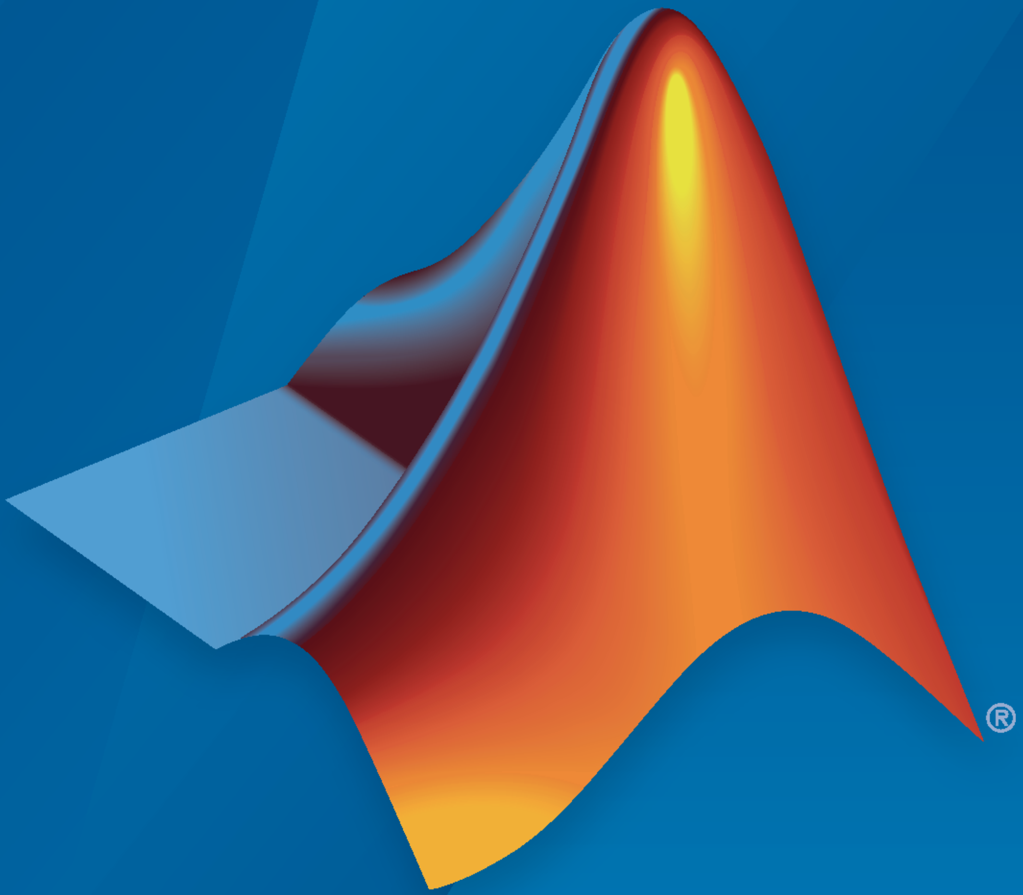
Stateflow®

API



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Stateflow® API

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1 Using the Stateflow API

Using the Stateflow API

Overview of the Stateflow API

In this section...

The Stateflow application programming interface (API) allows you to create or change Stateflow charts from the MATLAB Command Window. By placing Stateflow API commands in a MATLAB function or script, you can:

- Automate your chart modification operations by executing several editing steps in a single command.
- Eliminate repetitive chart creation steps by producing a "base" Stateflow chart that you can reuse as a template for your applications.
- Produce a specialized report of your model.

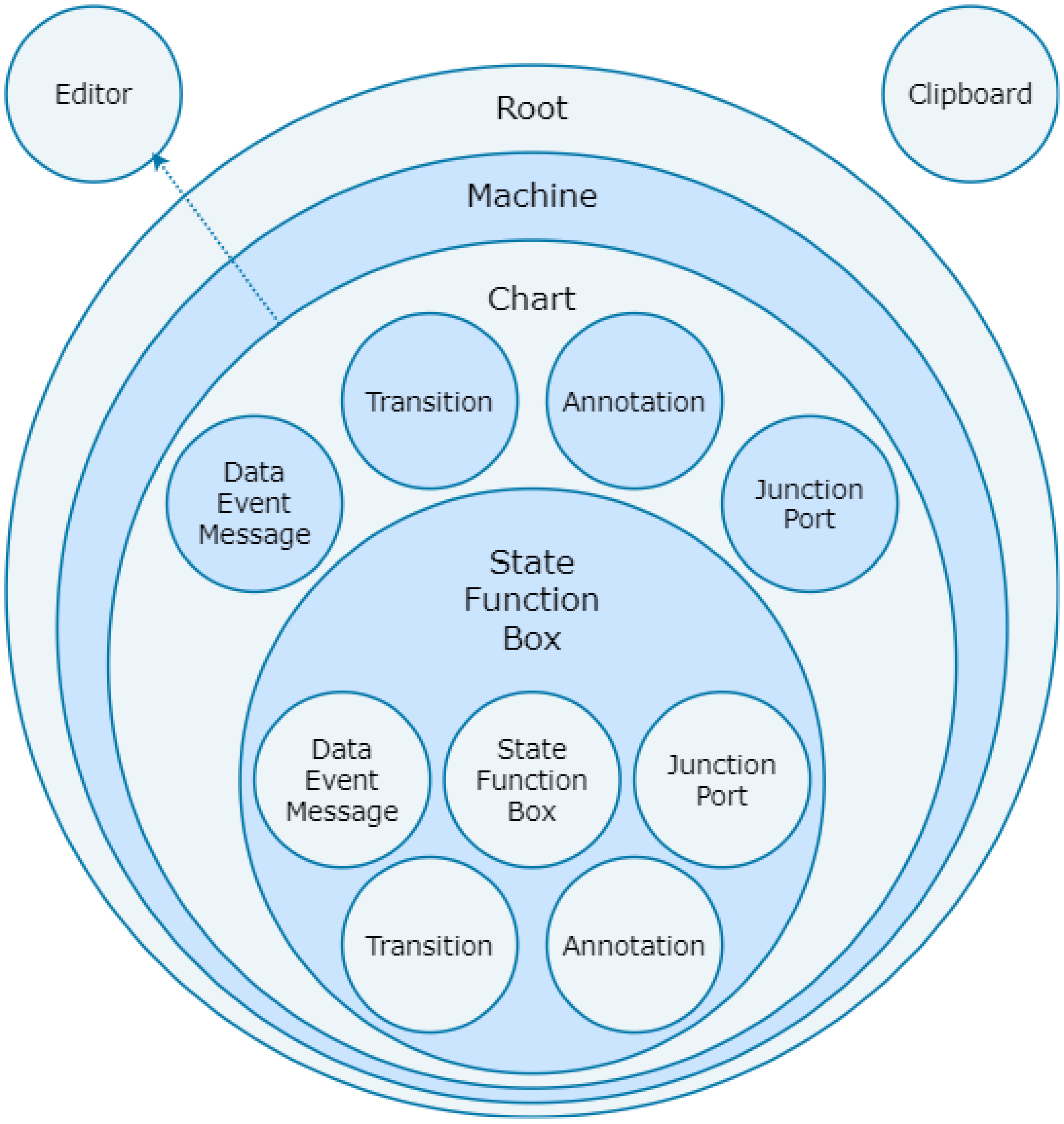
The Stateflow API consists of objects that represent the graphical and nongraphical objects of a Stateflow chart. For example, the API objects `Stateflow.State` and `Stateflow.Transition` represent states and transitions in a Stateflow chart. When you modify the properties of an API object or call one of its object functions, you affect the corresponding object in the Stateflow chart. When you use the Stateflow Editor to perform an operation on an object in the chart, you affect the corresponding API object.

Note You cannot undo any operation in the Stateflow Editor that you perform by using the Stateflow API. If you perform an editing operation through the API, the **Undo** and **Redo** buttons in the quick access toolbar are disabled.

Hierarchy of Stateflow API Objects

Stateflow API objects are organized in a containment hierarchy. For example, if state `A` contains state `B` in a Stateflow chart, then the API object for state `A` contains the API object for state `B`. The Stateflow API hierarchy follows the same rules of containment as the Stateflow object hierarchy. For example, charts can contain states, but states cannot contain charts. For more information, see "Overview of Stateflow Objects".

This diagram shows the hierarchy of objects in the Stateflow API.



The hierarchy consists of four levels of containment:

- **Root** — The `Simulink.Root` object is the parent of all Stateflow API objects. It is a placeholder at the top of the Stateflow API hierarchy that distinguishes Stateflow objects from other objects in a Simulink® model. You automatically create the `Simulink.Root` object when you add a Stateflow chart, a State Transition Table block, a Truth Table block, or a MATLAB Function block to a Simulink model, or when you load a model that contains one of these blocks.
- **Machine** — From a Stateflow perspective, `Stateflow.Machine` objects are equivalent to Simulink models. A `Stateflow.Machine` object contains objects that represent the Stateflow charts, State Transition Table blocks, Truth Table blocks, and MATLAB Function blocks in a model.
- **Chart** — `Stateflow.Chart`, `Stateflow.StateTransitionTableChart`, `Stateflow.TruthTableChart`, and `Stateflow.EMChart` objects represent Stateflow charts, State Transition Table blocks, Truth Table blocks, and MATLAB Function blocks, respectively. Objects in this level of the hierarchy can contain objects that represent states, functions, boxes, data, events, messages, transitions, junctions, entry and exit ports, and annotations.

- **States, Functions, and Boxes** — This level of the hierarchy includes `Stateflow.State`, `Stateflow.Function`, and `Stateflow.Box` objects that represent states, functions, and boxes, respectively. These objects can contain other objects that represent states, functions, boxes, data, events, messages, transitions, junctions, entry and exit ports, and annotations. Levels of nesting can continue indefinitely.

The hierarchy diagram shows two object types that exist outside of the containment hierarchy:

- **Editor** — `Stateflow.Editor` objects provide access to the graphical aspects of charts and state transition tables. For each `Stateflow.Chart` or `Stateflow.StateTransitionTableChart` object, there is a `Stateflow.Editor` object that you can use to control the position, size, and magnification level of the Stateflow Editor. For more information, see “Zoom in on Stateflow Chart” on page 2-59, “Zoom out on Stateflow Chart” on page 2-60, and “Set Zoom Factor” on page 2-60.
- **Clipboard** — The `Stateflow.Clipboard` object has two functions, `copy` and `pasteTo`, that use the clipboard as a staging area to implement copy-and-paste functionality in the Stateflow API. For more information, see “Copy and Paste by Grouping” on page 2-24 and “Copy and Paste Array of Objects” on page 2-25.

Access Stateflow API Objects

To use the Stateflow API, you begin by accessing the `Simulink.Root` object, which is the parent of all objects in the Stateflow API. You use the `Simulink.Root` object to access the other API objects in your model. For example:

1. Create a Simulink model with an empty Stateflow chart by calling the function `sfnew`.

   ```
   sfnew
   ```
2. Use the function `sfroot` to access the `Simulink.Root` object.

   ```
   rt = sfroot;
   ```
3. Call the `find` function to access the `Stateflow.Chart` object that corresponds to the chart in your model.

   ```
   ch = find(rt,'-isa','Stateflow.Chart');
   ```
4. Call the `Stateflow.State` function to add a state to the chart. This function returns an `Stateflow.State` object that corresponds to the new state.

   ```
   st = Stateflow.State(ch);
   ```
5. Display the new state in the Stateflow Editor.

   ```
   view(st)
   ```

For more information, see “Access Objects in Your Stateflow Chart” on page 1-6 and “Create Charts by Using the Stateflow API” on page 1-19.

Modify Properties of API Objects

API objects have properties that correspond to the values you set in the Stateflow Editor. For example, to use the editor to change the position of a state, you click and drag the state. With the Stateflow API, you change the position of a state by modifying the `Position` property of the corresponding `Stateflow.State` object:

```
st.Position = [10 20 100 80];
```

For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

Call API Object Functions

API objects have functions that correspond to actions in the Stateflow Editor. For example, to use the editor to open the Properties dialog box for a transition, you right-click the transition and select **Properties**. With the Stateflow API, you open this dialog box by calling the `dialog` function of the corresponding `Stateflow.Transition` object:

```
dialog(tr);
```

For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

See Also

Functions
`find` | `dialog` | `sfnew` | `sfroot` | `view`

Objects
`Stateflow.Box` | `Stateflow.Chart` | `Stateflow.Clipboard` | `Stateflow.Editor` | `Stateflow.EMChart` | `Stateflow.Function` | `Stateflow.Machine` | `Stateflow.State` | `Stateflow.StateTransitionTableChart` | `Stateflow.Transition` | `Stateflow.TruthTableChart`

More About

- “Create Charts by Using the Stateflow API” on page 1-19
- “Create Charts by Using a MATLAB Script” on page 1-24
- “Access Objects in Your Stateflow Chart” on page 1-6
- “Modify Properties and Call Functions of Stateflow Objects” on page 1-11

Access Objects in Your Stateflow Chart

The objects in the Stateflow API represent the graphical and nongraphical objects of a Stateflow chart. For example, the API objects `Stateflow.State` and `Stateflow.Transition` represent states and transitions in a Stateflow chart. For more information, see “Overview of the Stateflow API” on page 1-2.

Find Objects in a Chart

With the `find` function, you can locate an API object by specifying search criteria. You can combine criteria such as:

- The type of object
- The name of a property or function
- A property name and value

For example, this command searches the `Simulink.Root` object and returns every `Stateflow.State` object with the name `'On'`:

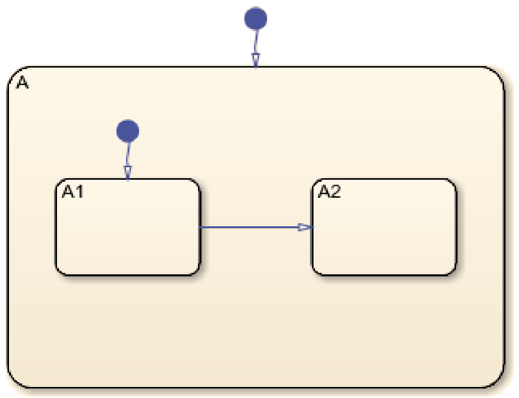
```
onState = find(sfroot,'-isa','Stateflow.State','Name','On')
```

If more than one object meets the search criteria, `find` returns an array of qualifying objects. For example, if more than one chart is open, this command returns an array of `Stateflow.Chart` objects:

```
chartArray = find(sfroot,'-isa','Stateflow.Chart')
```

Find Objects at Specific Levels of Containment

By default, the `find` function finds objects at all depths of containment within an object. For example, suppose that `ch` is a `Stateflow.Chart` object that corresponds to this chart. The chart contains a parent state `A` with two child states, `A1` and `A2`. For more information on this example, see “Create Charts by Using a MATLAB Script” on page 1-24.



Calling the `find` function to find all the states in this chart returns an array with three `Stateflow.State` objects:

```
states = find(ch,'-isa','Stateflow.State');
get(states,'Name')
```

```
ans =

  3×1 cell array

    {'A'}
    {'A1'}
    {'A2'}
```

To limit the maximum containment depth of a search, use the `'-depth'` argument as part of your search criteria. For example, to find the only `Stateflow.State` object at the first level of containment in `ch`, enter:

```
sA = find(ch,'-isa','Stateflow.State','-depth',1);
sA.Name
```

```
ans =

    'A'
```

Similarly, you can call the `find` function to search for states in the first level of containment in the `Stateflow.State` object `sA`. In this case, the search includes the zeroth level of containment, which is the searched object itself:

```
states = find(sA,'-isa','Stateflow.State','-depth',1);
get(states,'Name')
```

```
ans =

  3×1 cell array

    {'A'}
    {'A1'}
    {'A2'}
```

To exclude state `A` from the search results, call the MATLAB function `setdiff`:

```
childStates = setdiff(states,sA);
get(childStates,'Name')
```

```
ans =

  2×1 cell array

    {'A1'}
    {'A2'}
```

Navigate the Stateflow Hierarchy

After you access an API object, you can use the `getChildren` and `getParent` functions to navigate through the Stateflow hierarchy and identify the children that the object contains or the parent that contains the object.

Find Child Objects

To find the children of an API object, call the `getChildren` function. For instance, suppose that `ch` is the `Stateflow.Chart` object that corresponds to the chart in the previous example. Calling the `getChildren` function on `ch` returns an array that contains a `Stateflow.State` object and a `Stateflow.Transition` object.

```
children = getChildren(ch);
arrayfun(@class,children,UniformOutput=false)

ans =

  2×1 cell array

    {'Stateflow.State'     }
    {'Stateflow.Transition'}
```

The first element in the array is a `Stateflow.State` object that corresponds to state `A`.

```
state = children(1);
state.Name

ans =

    'A'
```

The second element in the array is a `Stateflow.Transition` object that corresponds to the default transition into state `A`.

```
children(2).Source

ans =

     []

children(2).Destination.Name

ans =

    'A'
```

Similarly, calling the `getChildren` function on the state returns an array that contains two `Stateflow.State` objects and two `Stateflow.Transition` objects.

```
grandchildren = getChildren(state);
arrayfun(@class,grandchildren,UniformOutput=false)

ans =

  4×1 cell array

    {'Stateflow.State'     }
    {'Stateflow.State'     }
    {'Stateflow.Transition'}
    {'Stateflow.Transition'}
```

The first and second elements in this array are `Stateflow.State` objects that correspond to the states `A1` and `A2`.

```
grandchildren(1).Name

ans =

    'A1'

grandchildren(2).Name
```

```
ans =

    'A2'
```

The third and fourth elements in `grandchildren` are `Stateflow.Transition` objects that correspond to the transitions into states `A1` and between state `A1` and `A2`, respectively.

```
grandchildren(3).Source
```

```
ans =

     []
```

```
grandchildren(3).Destination.Name
```

```
ans =

    'A1'
```

```
grandchildren(4).Source.Name
```

```
ans =

    'A1'
```

```
grandchildren(4).Destination.Name
```

```
ans =

    'A2'
```

Find Parent Object

To find the parent of an API object, call the `getParent` function. For instance, suppose that `sA1` is the `Stateflow.State` object that corresponds to state `A1` in the previous example. Calling the `getParent` function on `sA1` returns the `Stateflow.State` object that corresponds to state `A`:

```
parent = getParent(sA1);
parent.Name
```

```
ans =

    'A'
```

Similarly, calling the `getParent` function on `parent` returns the `Stateflow.Chart` object that corresponds to the chart:

```
grandparent = getParent(parent);
grandparent.Name
```

```
ans =

    'Chart'
```

Retrieve Recently Selected Objects

You can retrieve the most recently selected objects in a chart by calling the `sfgco` function. This function returns a single object or an array of objects, depending on your selection.

For instance, suppose that you select the transition from state `A1` to state `A2` in the previous example. Calling `sfgco` returns the corresponding `Stateflow.Transition` object:

```
tr = sfgco;
str = ['Transition from ' tr.Source.Name ' to ' tr.Destination.Name]
```

```
str =

    'Transition from A1 to A2'
```

Similarly, if you simultaneously select the three states in the chart, calling `sfgco` returns an array of `Stateflow.State` objects.

```
states = sfgco;
get(states,'Name')
```

```
ans =

  3×1 cell array

    {'A' }
    {'A1'}
    {'A2'}
```

Note When you use `sfgco` to access multiple objects, the order of the objects in the array depends on the order in which you select the objects.

See Also

Functions
`find` | `getChildren` | `getParent` | `setdiff` | `sfgco` | `arrayfun` | `class`

Objects
`Stateflow.Chart` | `Stateflow.State` | `Stateflow.Transition`

More About

- “Overview of the Stateflow API” on page 1-2
- “Modify Properties and Call Functions of Stateflow Objects” on page 1-11
- “Create and Delete Stateflow Objects” on page 1-13
- “Create Charts by Using the Stateflow API” on page 1-19

Modify Properties and Call Functions of Stateflow Objects

In this section...

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. For example, to use the editor to change the position of a state, you click and drag the state. With the Stateflow API, you change the position of a state by modifying the `Position` property of the corresponding `Stateflow.State` object:

```
st.Position = [10 20 100 80];
```

Additionally, object functions provide services that correspond to actions in the Stateflow Editor. For example, to use the editor to open the Properties dialog box for a transition, you right-click the transition and select **Properties**. With the Stateflow API, you open this dialog box by calling the `dialog` function of the corresponding `Stateflow.Transition` object:

```
dialog(tr);
```

Call Object Functions

To call a function of an API object, use standard function-call notation. For example, to open the Chart properties dialog box, call the `dialog` function of the corresponding `Stateflow.Chart` object `ch`:

```
dialog(ch)
```

Access Properties by Using Dot Notation

To access a property of an API object, use dot notation. For example, to see the value of the `StateMachineType` property for the `Stateflow.Chart` object `ch`, enter:

```
ch.StateMachineType
```

Similarly, to change the action language of the chart, modify its `ActionLanguage` property:

```
ch.ActionLanguage = 'MATLAB'
```

To access the subproperties of an API property, you can nest multiple property names in a single expression that uses dot notation. For example, you can set an entry breakpoint on a chart by changing the subproperty `Debug.Breakpoints.OnEntry` of the corresponding `Stateflow.Chart` object:

```
ch.Debug.Breakpoints.OnEntry = true;
```

When a property or function returns another API object, you can also access the properties and functions for the second object by using nested dot notation. For example, the `Machine` property of a `Stateflow.Chart` returns the `Stateflow.Machine` object that contains the corresponding chart. To access the `Name` property of this `Stateflow.Machine` object, enter the expression:

```
machineName = ch.Machine.Name;
```

Similarly, the `defaultTransitions` function returns an array of `Stateflow.Transition` objects that correspond to the default transitions in the chart. If the chart contains only one default transition, you can retrieve its label by entering:

```
label = defaultTransitions(ch).LabelString;
```

If the chart contains more than one default transition, you must first store the array and then use an array index to retrieve each label:

```
transitions = defaultTransitions(ch);
label1 = transitions(1).LabelString;
label2 = transitions(2).LabelString;
```

Get and Set the Values of Multiple Properties

You can access multiple properties of an API object in a single command by calling the `get` function. For example, to obtain the name and description for the `Stateflow.Chart` object `ch`, enter:

```
chartInfo = get(ch,{'Name','Description'});
```

You can also use the `get` to access properties of multiple API objects. For example, this command returns a cell array that contains the names and descriptions of the `Stateflow.Chart` objects in the array `chartArray`:

```
chartInfo = get(chartArray,{'Name','Description'});
```

Similarly, you can change the value of multiple properties by calling the `set` function. For example, to change the name and description of the `Stateflow.Chart` object `ch`, enter:

```
set(ch,{'Name','Description'},{'Rectifier','Half-wave rectifier.'})
```

To set the names and descriptions of the `Stateflow.Chart` objects in the array `chartArray`, enter:

```
set(chartArray,{'Name','Description'},chartInfo);
```

In this command, `chartInfo` must be an *N*-by-2 cell array, where *N* equals the number of charts in `chartArray`. The first column in `chartInfo` contains the new chart names, and the second column contains the new descriptions.

See Also

Functions
`defaultTransitions` | `dialog` | `fitToView`

Objects
`Stateflow.Chart` | `Stateflow.State` | `Stateflow.Transition`

More About

- "Overview of the Stateflow API" on page 1-2
- "List of Stateflow API Properties" on page 4-2

Create and Delete Stateflow Objects

The objects in the Stateflow API represent the graphical and nongraphical objects of a Stateflow chart. For example, the API objects `Stateflow.State` and `Stateflow.Transition` represent states and transitions in a Stateflow chart. For more information, see “Overview of the Stateflow API” on page 1-2.

Create Stateflow Objects

Stateflow API objects are organized in the containment hierarchy described in “Hierarchy of Stateflow API Objects” on page 1-2. To create a Stateflow object as the child of a parent object, you begin by accessing the parent object. Then use the parent object as the input argument to a function that creates th child object. For example, to add a new `Stateflow.State` object in a `Stateflow.Chart` object, follow these steps:

1. Access the parent object `ch` as described in “Access Objects in Your Stateflow Chart” on page 1-6.
2. Call the `Stateflow.State` function using the parent object `ch` as an argument.

   ```
   st = Stateflow.State(ch);
   ```
3. Display the new state in the Stateflow Editor by calling the `view` function. Use the `Stateflow.State` object as the argument to the function.

   ```
   view(st)
   ```
4. Make changes to the state by modifying the properties of the `Stateflow.State` object. For example, you can set the name and position of the state by modifying the `Name` and `Position` properties. To set the `Position` property, specify the new position as a four-element vector in which the first two values are the (*x*,*y*) coordinates of the upper-left corner of the state and the last two values are the width and height of the state.

   ```
   st.Name = 'A';
   st.Position = [30 30 90 60];
   ```

   You can also connect the new state to other states or junctions in your chart by creating a `Stateflow.Transition` object and setting its `Source` or `Destination` properties to `st`.

For an example of how to add states, transitions, and data objects to a chart, see “Create Charts by Using the Stateflow API” on page 1-19.

Graphical Object Containment

When you create a graphical object such as a state, function, box, junction, or annotation, it appears in the upper-left corner of its parent object. You can move the graphical object to a different location by modifying its `Position` property, as explained in the previous example.

When you create a transition, it appears in the upper-left corner of the chart or subchart where you can view the parent object. You can move the transition to a different location by setting its source and destination or by modifying its `SourceEndPoint`, `MidPoint`, and `DestinationEndPoint` properties.

A graphical object must be located inside the boundary of its parent. Repositioning a graphical object can change its parent or result in an undefined parent error. You can check for this condition by examining the value of the `BadIntersection` property of an object. This property is `true` if the edges of the graphical object overlap with another graphical object. Set the position and size of objects so that they are separate from other objects.

You cannot move an object in a subcharted state, box, or graphical function to a different level of the chart hierarchy by changing its position. Instead, copy and paste the object from one parent object to another. Then delete the original object. For more information, see "Copy and Paste by Grouping" on page 2-24 and "Copy and Paste Array of Objects" on page 2-25.

Nongraphical Object Containment

When you create nongraphical objects such as data, events, or messages, they appear in the Model Explorer and in the Symbols Pane at the hierarchical level of their parent object. You can also see the location of the parent object by inspecting the `Path` property of an object.

You cannot change the parent of a nongraphical object programmatically. Instead, use the Model Explorer. For more information, see "Use the Model Explorer with Stateflow Objects".

Delete Stateflow Objects

You can delete most objects in a Stateflow chart by calling the function `delete`. For example, to delete a `Stateflow.State` object `st`, enter:

```
delete(st);
```

After you delete the state, the variable `st` still exists in the MATLAB workspace, but it is no longer associated with the state.

Note You cannot use the `delete` function to delete objects of these types:

- `Simulink.Root`
- `Stateflow.Machine`
- `Stateflow.Chart`
- `Stateflow.EMChart`
- `Stateflow.StateTransitionTableChart`
- `Stateflow.TruthTableChart`
- `Stateflow.Clipboard`
- `Stateflow.Editor`

See Also

Functions
`delete` | `view`

Objects
`Stateflow.Chart` | `Stateflow.State` | `Stateflow.Transition`

More About

- “Overview of the Stateflow API” on page 1-2
- “Access Objects in Your Stateflow Chart” on page 1-6
- “Create Charts by Using the Stateflow API” on page 1-19

Specify Labels in States and Transitions Programmatically

When using the Stateflow API, specify the labels of states and transitions by assigning a character vector to the `LabelString` property.

To extract parts of the state or transition label, use the properties of the `Stateflow.State` and `Stateflow.Transition` objects listed in this table.

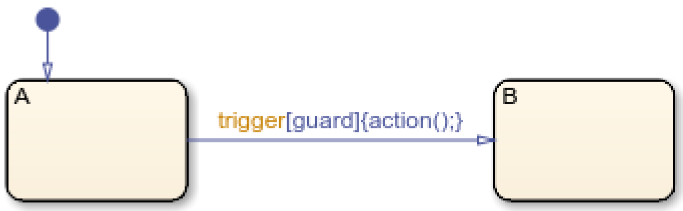
API Object	Property	Description
`Stateflow.State`	`DuringAction`	Text in the `during` action in this state. This property is not supported in Moore charts.
	`EntryAction`	Text in the `entry` action in this state. This property is not supported in Moore charts.
	`ExitAction`	Text in the `exit` action in this state. This property is not supported in Moore charts.
	`MooreAction`	Text in the action in this state. This property is supported only in Moore charts. For more information, see "Design Rules for Moore Charts".
	`Name`	Name of this state.
	`OnAction`	Text in the `on` actions in this state, parsed as a cell array of this form: `{'trigger1','action1',...,'triggerN','actionN'}` This property is not supported in Moore charts.
`Stateflow.Transition`	`Condition`	Text in the condition on this transition.
	`ConditionAction`	Text in the condition action on this transition.
	`TransitionAction`	Text in the transition action on this transition.
	`Trigger`	Text in the trigger on this transition.

With the exception of `Name`, all of these properties are read-only. For more information on the syntax for state and transition labels, see "State Labels" and "Transition Labels".

Enter Labels on Transitions

Suppose that `tr` is the `Stateflow.Transition` object that corresponds to a transition. You can assign a label that specifies a trigger, condition, and condition action on this transition by entering:

```
tr.LabelString = 'trigger[guard]{action();}';
```



To extract the trigger, condition, and condition action specified by the transition label, enter:

```
trigger = tr.Trigger

trigger =

    'trigger'

cond = tr.Condition

cond =

    'guard'

action = tr.ConditionAction

action =

    'action();'
```

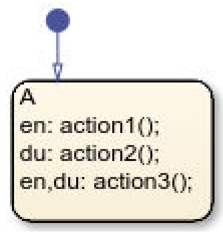
Enter Multiline Labels in States

There are two equivalent ways to enter multiline labels for states and transitions. For example, Suppose that `sA` is a `Stateflow.State` object that corresponds to a state. To enter a multiline label with `entry` and `during` actions, you can:

- Call the MATLAB function `sprintf` and use the escape sequence `\n` to insert newline characters:

  ```
  str = sprintf('A\nen: action1();\ndu: action2();\nen,du: action3();');
  sA.LabelString = str;
  ```
- Enter a concatenated text expression that uses the integer 10 as the ASCII equivalent of a newline character:

  ```
  str = ['A',10, ...
      'en: action1();',10, ...
      'du: action2();',10, ...
      'en,du: action3();'];
  sA.LabelString = str;
  ```



To extract the state name, `entry` action, and `during` action specified by the state label, enter:

```
name = sA.Name

name =

    'A'

entry = sA.EntryAction

entry =
```

```
    ' action1();
      action3();'
```

```
during = sA.DuringAction
```

```
during =

    ' action2();
      action3();'
```

See Also

Functions
`sprintf`

Objects
`Stateflow.State` | `Stateflow.Transition`

More About

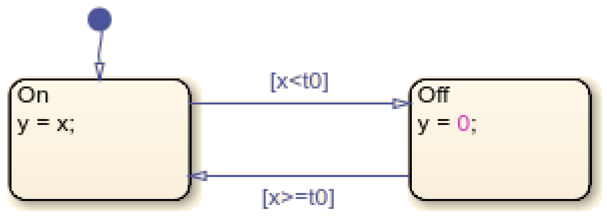
- “Overview of the Stateflow API” on page 1-2
- “Create Charts by Using the Stateflow API” on page 1-19
- “State Labels”
- “Transition Labels”

Create Charts by Using the Stateflow API

This example shows how to create a Stateflow® chart by using the Stateflow application programming interface (API). The Stateflow API is a tool to create or change Stateflow charts through MATLAB® commands. For more information, see "Overview of the Stateflow API" on page 1-2.

Create a Stateflow Chart

This Stateflow chart presents the logic underlying a half-wave rectifier. The chart contains two states labeled `On` and `Off`. In the `On` state, the chart output signal `y` is equal to the input `x`. In the `Off` state, the output signal is set to zero. When the input signal crosses some threshold `t0`, the chart transitions between these states. The actions in each state update the value of `y` at each time step of the simulation.



For more information on simulating this chart, see "Construct and Run a Stateflow Chart".

1. Close all models.

```
bdclose all
```

2. Create a Simulink® model called `rectify` that contains an empty Stateflow Chart block.

```
sfnew rectify
```

Access the `Chart` Object

To use the Stateflow API, you begin by accessing the `Simulink.Root` object, which is the parent of all objects in the Stateflow API. You use the `Simulink.Root` object to access the other API objects in your model.

1. Use the function `sfroot` to access the `Simulink.Root` object.

```
rt = sfroot;
```

2. Call the `find` function to access the `Stateflow.Chart` object that corresponds to the chart in your model.

```
ch = find(rt,'-isa','Stateflow.Chart');
```

3. To open the chart in the Stateflow Editor, call the `view` function.

```
view(ch);
```

4. To change the action language, modify the `ActionLanguage` property of the chart.

```
ch.ActionLanguage = 'C';
```

Add States

To create a Stateflow API object as the child of a parent object, use the parent object as the input argument to a function that creates the child object. For more information, see “Create and Delete Stateflow Objects” on page 1-13.

1. Call the `Stateflow.State` function to add a state to the chart.

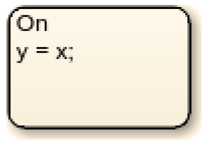
```
s1 = Stateflow.State(ch);
```

2. Adjust the position of the state by changing the `Position` property of the corresponding `State` object. Specify the new position as a four-element vector in which the first two values are the *(x,y)* coordinates of the upper-left corner of the state and the last two values are the width and height of the state.

```
s1.Position = [30 30 90 60];
```

3. Specify the name and label for the state by changing the `LabelString` property, as described in “Specify Labels in States and Transitions Programmatically” on page 1-16.

```
s1.LabelString = ['On',10,'y = x;'];
```



4. Create a second state. Adjust its position and specify its name and label.

```
s2 = Stateflow.State(ch);
s2.Position = [230 30 90 60];
s2.LabelString = ['Off',10,'y = 0;'];
```

Add Transitions

When you add a transition, you specify its source and destination by modifying its `Source` and `Destination` properties. For a default transition, you specify a destination but no source.

1. Call the `Stateflow.Transition` function to add a transition to the chart.

```
t1 = Stateflow.Transition(ch);
```

2. Set the transition source and destination.

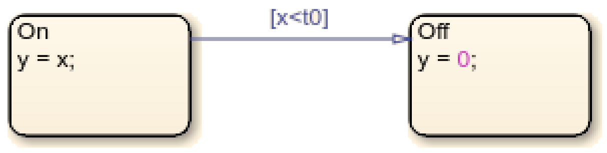
```
t1.Source = s1;
t1.Destination = s2;
```

3. Adjust the position of the transition by modifying its `SourceOClock` property.

```
t1.SourceOClock = 2.1;
```

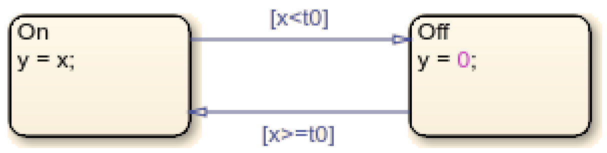
4. Specify the transition label and its position by changing the `LabelString` and `LabelPosition` properties.

```
t1.LabelString = '[x<t0]';
t1.LabelPosition= [159 23 31 16];
```



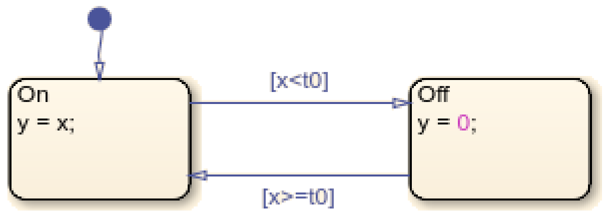
5. Create a second transition. Specify its source, destination, and label.

```
t2 = Stateflow.Transition(ch);
t2.Source = s2;
t2.Destination = s1;
t2.SourceOClock = 8.1;
t2.LabelString = '[x>=t0]';
t2.LabelPosition= [155 81 38 16];
```



6. Add a default transition to the state `On`. To make a vertical transition, modify the values of the `SourceEndpoint` and `Midpoint` properties. For more information, see “Add a Default Transition” on page 2-181.

```
t0 = Stateflow.Transition(ch);
t0.Destination = s1;
t0.DestinationOClock = 0;
t0.SourceEndpoint = t0.DestinationEndpoint-[0 30];
t0.Midpoint = t0.DestinationEndpoint-[0 15];
```



Add Data

Before you can simulate your chart, you must define each data symbol that you use in the chart and specify its scope and type.

1. Call the `Stateflow.Data` function to add a data object that represents the input to the chart.

```
x = Stateflow.Data(ch);
```

2. Specify the name of the data object as `'x'` and its scope as `'Input'`.

```
x.Name = 'x';
x.Scope = 'Input';
```

3. To specify that the input `x` has type `double`, set its `Props.Type.Method` property to `'Built-in'`. The default built-in data type is `'double'`.

```
x.Props.Type.Method = 'Built-in';
x.DataType

ans =
'double'
```

4. Add a data object that represents the output for the chart. Specify its name as `'y'` and its scope as `'Output'`.

```
y = Stateflow.Data(ch);
y.Name = 'y';
y.Scope = 'Output';
```

5. To specify that the output y has type `single`, set its `Props.Type.Method` property to `'Built-in'` and its `DataType` property to `'single'`.

```
y.Props.Type.Method = 'Built-in';
y.DataType = 'single';
y.DataType

ans =
'single'
```

6. Add a data object that represents the transition threshold in the chart. Specify its name as `'t0'` and its scope as `'Constant'`. Set its initial value to 0.

```
t0 = Stateflow.Data(ch);
t0.Name = 't0';
t0.Scope = 'Constant';
t0.Props.InitialValue = '0';
```

7. To specify that the threshold `t0` has a fixed-point data type, set its `Props.Type.Method` property to `'Fixed-point'`. Then specify the values of the `Props.Type` properties that apply to fixed-point data.

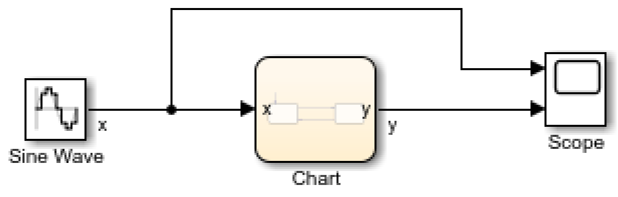
```
t0.Props.Type.Method = 'Fixed point';
t0.Props.Type.Signed = true;
t0.Props.Type.WordLength = '5';
t0.Props.Type.Fixpt.ScalingMode = 'Binary point';
t0.Props.Type.Fixpt.FractionLength = '2';
t0.DataType

ans =
'fixdt(1,5,2)'
```

Save and Simulate Your Chart

To save the model that contains your completed chart, call the `sfsave` function.

```
sfsave
```

To simulate the chart, connect it to other blocks in the Simulink model through input and output ports.



For more information, see “Simulate the Chart as a Simulink Block”.

See Also

Blocks
Chart

Functions
`bdclose` | `find` | `sfnew` | `sfroot` | `sfsave` | `view`

Objects
`Stateflow.State` | `Stateflow.Transition` | `Stateflow.Data`

More About

- “Overview of the Stateflow API” on page 1-2
- “Create and Delete Stateflow Objects” on page 1-13
- “Modify Properties and Call Functions of Stateflow Objects” on page 1-11
- “Specify Labels in States and Transitions Programmatically” on page 1-16

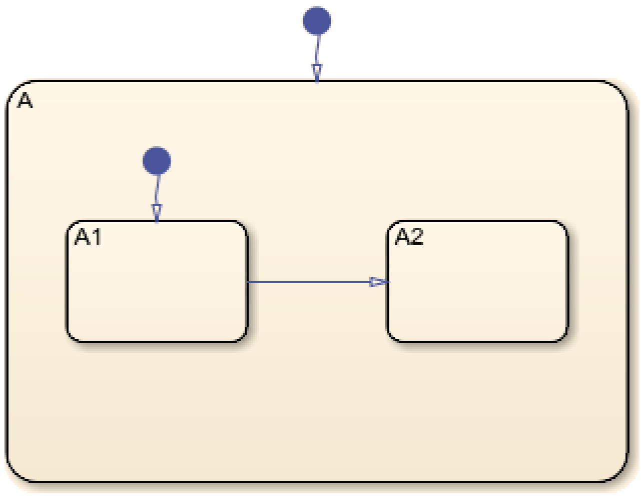
Create Charts by Using a MATLAB Script

This example shows how to include Stateflow® API commands in a MATLAB® function or script. Creating a script of API commands allows you to avoid repetitive chart creation steps and recreate the same model with a single command. For more information, see “Overview of the Stateflow API” on page 1-2.

Run the MATLAB Function

The function `makeMyModel`, which is defined at the bottom of this page on page 1-0 , produces a "base" Stateflow chart that you can reuse as a template for your applications.

```
ch = makeMyModel;
view(ch)
```



Create Base Chart Function

This function creates a Stateflow chart and returns the corresponding `Stateflow.Chart` object.

```
function ch = makeMyModel
```

Create model and access new `Stateflow.Chart` object.

```
    rt = sfroot;
    prev_machines = find(rt,'-isa','Stateflow.Machine');
    sfnew;
    curr_machines = find(rt,'-isa','Stateflow.Machine');
    m = setdiff(curr_machines,prev_machines);
    ch = find(m,'-isa','Stateflow.Chart');
```

Create state `A` in chart.

```
    sA = Stateflow.State(ch);
    sA.Name = 'A';
    sA.Position = [50 50 310 200];
```

Create state `A1` inside of state `A`.

```
    sA1 = Stateflow.State(ch);
    sA1.Name = 'A1';
    sA1.Position = [80 120 90 60];
```

Create state A2 inside of state A.

```
    sA2 = Stateflow.State(ch);
    sA2.Name = 'A2';
    sA2.Position = [240 120 90 60];
```

Create transition from A1 to A2.

```
    tA1A2 = Stateflow.Transition(ch);
    tA1A2.Source = sA1;
    tA1A2.Destination = sA2;
    tA1A2.SourceOClock = 3;
    tA1A2.DestinationOClock = 9;
```

Add default transition to state A.

```
    dtA = Stateflow.Transition(ch);
    dtA.Destination = sA;
    dtA.DestinationOClock = 0;
    dtA.SourceEndPoint = dtA.DestinationEndpoint-[0 30];
    dtA.MidPoint = dtA.DestinationEndpoint-[0 15];
```

Add default transition to state A1.

```
    dtA1 = Stateflow.Transition(ch);
    dtA1.Destination = sA1;
    dtA1.DestinationOClock = 0;
    dtA1.SourceEndPoint = dtA1.DestinationEndpoint-[0 30];
    dtA1.MidPoint = dtA1.DestinationEndpoint-[0 15];
end
```

See Also

Functions
view | sfroot | find | sfnew | setdiff

Objects
Stateflow.State | Stateflow.Transition

More About

- “Overview of the Stateflow API” on page 1-2
- “Create Charts by Using the Stateflow API” on page 1-19

API Object Reference

Stateflow.Annotation

Annotation in chart, state, box, or function

Description

Use `Stateflow.Annotation` objects to include descriptive comments in your chart. Annotations can contain any combination of:

- Text
- Images
- Equations using TeX commands
- Hyperlinks that open a website or perform MATLAB functions

For more information, see "Add Descriptive Comments in a Chart".

Creation

Syntax

`annotation = Stateflow.Annotation(parent)`

Description

`annotation = Stateflow.Annotation(parent)` creates a `Stateflow.Annotation` object in a parent chart, state, box, or graphical function.

Input Arguments

`parent` — Parent for new annotation
`Stateflow.Chart` object | `Stateflow.State` object | `Stateflow.Box` object | `Stateflow.Function` object

Parent for the new annotation, specified as a Stateflow API object of one of these types:

- `Stateflow.Box`
- `Stateflow.Chart`
- `Stateflow.Function`
- `Stateflow.State`

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see "Modify Properties and Call Functions of Stateflow Objects" on page 1-11.

Content

`Text` — Text for annotation
`'?'` (default) | character vector

Text for the annotation, specified as a character vector.

`Alignment` — Alignment of text
`'LEFT'` (default) | `'CENTER'` | `'RIGHT'`

Alignment of the annotation text, specified as `'LEFT'`, `'CENTER'`, or `'RIGHT'`.

`Interpretation` — Format of text
`'OFF'` (default) | `'RICH'` | `'TEX'`

Format of the annotation text, specified as `'OFF'`, `'RICH'`, or `'TEX'`.

`PlainText` — Text without formatting
character vector

This property is read-only.

Annotation text without formatting, specified as a character vector.

`IsImage` — Whether annotation contains image
`false` or 0 (default) | `true` or 1

This property is read-only.

Whether the annotation contains an image, specified as a numeric or logical 1 (`true`) or 0 (`false`).

Graphical Appearance

`Position` — Position and size of annotation box
`[0 0 8 16]` (default) | `[left top width height]`

Position and size of annotation box, specified as a four-element numeric vector of the form `[left top width height]`.

`InternalMargins` — Space between text and border of annotation box
`[0 0 0 0]` (default) | `[left top right bottom]`

Space between the text and the border of the annotation box, specified as a four-element numeric vector of the form `[left top right bottom]`.

`DropShadow` — Whether to display a drop shadow around annotation box
`false` or 0 (default) | `true` or 1

Whether to display a drop shadow around the annotation box, specified as a numeric or logical 1 (`true`) or 0 (`false`).

`FixedHeight` — Whether to fix height of annotation box
`false` or 0 (default) | `true` or 1

Whether to fix height of the annotation box, specified as a numeric or logical 1 (`true`) or 0 (`false`).

- `true` — Fixes the height of the annotation box and hides content that is longer than the box.
- `false` — Resizes the annotation box vertically as you add content.

`FixedWidth` — Whether to fix width of annotation box
`false` or 0 (default) | `true` or 1

Whether to fix height of the annotation box, specified as a numeric or logical 1 (`true`) or 0 (`false`).

- `true` — Fixes the width of the annotation box and wraps text that is longer than the box.
- `false` — Resizes the annotation box horizontally as you add content.

`BackgroundColor` — Background color
`[1 1 1]` (default) | `[red green blue]`

Background color for the annotation, specified as a three-element numeric vector of the form `[red green blue]` that specifies the red, green, and blue values. Each element must be in the range between 0 and 1. This property applies only when the `AutoBackgroundColor` property is `false`.

`ForegroundColor` — Foreground color
`[0 0 0]` (default) | `[red green blue]`

Foreground color for the annotation, specified as a three-element numeric vector of the form `[red green blue]` that specifies the red, green, and blue values. Each element must be in the range between 0 and 1. This property applies only when the `AutoForegroundColor` property is `false`.

`AutoBackgroundColor` — Whether to use default background color
`true` or 1 (default) | `false` or 0

Whether to use the default background color, specified as a numeric or logical 1 (`true`) or 0 (`false`).

- `true` — Use the default color specified by the `ChartColor` property of the chart that contains the annotation.
- `false` — Use the color specified by the `BackgroundColor` property of the annotation.

`AutoForegroundColor` — Whether to use default foreground color
`true` or 1 (default) | `false` or 0

Whether to use the default foreground color, specified as a numeric or logical 1 (`true`) or 0 (`false`).

- `true` — Use the default color specified by the `StateLabelColor` property of the chart that contains the annotation.
- `false` — Use the color specified by the `ForegroundColor` property of the annotation.

`Font` — Font for annotation text
`Stateflow.NoteFont` object

Font for the annotation text, specified as a `Stateflow.NoteFont` object with these properties:

- **`Name`** — Font name, specified as a character vector. This property is read-only. The `StateFont.Name` property of the chart that contains the annotation sets the value of this property.
- **`Angle`** — Font angle, specified as `'NORMAL'` or `'ITALIC'`.
- **`Weight`** — Font weight, specified as `'NORMAL'` or `'BOLD'`.

- **`Size`** — Font size, specified as a scalar.

Example: `annotation.Font.Angle = 'ITALIC';`

Example: `annotation.Font.Weight = 'BOLD';`

Example: `annotation.Font.Size = 8;`

Callbacks

`ClickFcn` — Callback on click
`''` (default) | character vector

Callback on click, specified as a character vector. This callback contains MATLAB code to execute when to execute when you click the annotation.

`LoadFcn` — Callback at model load
`''` (default) | character vector

Callback at model load, specified as a character vector. This callback contains MATLAB code to execute when you load the model that contains the annotation.

`DeleteFcn` — Callback at delete
`''` (default) | character vector

Callback at delete, specified as a character vector. This callback contains MATLAB code to execute before you delete the annotation.

`UseDisplayTextAsClickCallback` — Whether to use annotation text as callback
`false` or 0 (default) | `true` or 1

Whether to use the annotation text as a callback, specified as a numeric or logical 1 (`true`) or 0 (`false`). When this property is enabled, the contents of the `Text` property is used as the callback when you click the annotation.

Hierarchy

`Chart` — Chart that contains annotation
`Stateflow.Chart` object

This property is read-only.

Chart that contains the annotation, specified as a `Stateflow.Chart` object.

`Subviewer` — Subviewer for annotation
`Stateflow.Chart` object | `Stateflow.State` object | `Stateflow.Box` object | `Stateflow.Function` object

This property is read-only.

Subviewer for the annotation, specified as a `Stateflow.Chart`, `Stateflow.State`, `Stateflow.Box`, or `Stateflow.Function` object. The subviewer is the chart or subchart where you can graphically view the annotation.

`Machine` — Machine that contains annotation
`Stateflow.Machine` object

This property is read-only.

Machine that contains the annotation, specified as a `Stateflow.Machine` object.

`Path` — Location of parent in model hierarchy
character vector

This property is read-only.

Location of the parent of the annotation in the model hierarchy, specified as a character vector.

Identification

`Description` — Description
`''` (default) | character vector

Description for the annotation, specified as a character vector.

`Document` — Document link
`''` (default) | character vector

Document link for the annotation, specified as a character vector.

`Tag` — User-defined tag
`[]` (default) | any data type | ...

User-defined tag for the annotation, specified as data of any type.

`Id` — Unique identifier
scalar

This property is read-only.

Unique identifier, specified as an integer scalar. Use this property to distinguish the annotation from other objects in the model. The value of this property is reassigned every time you start a new MATLAB session and may be recycled after an object is deleted.

Object Functions

getParent	Identify parent of object
dialog	Open properties dialog box
view	Display object in editing environment
fitToView	Zoom in on graphical object
setImage	Insert image into annotation

Examples

Add Text Annotation to Chart

Add an annotation in the chart `ch`. Set its content to `'This is an annotation.'`

```
annotation = Stateflow.Annotation(ch);
annotation.Text = 'This is an annotation';
```

Add Image Annotation to Chart

Add an annotation in the chart `ch`. Use the file `myImageFile.png`, which is located in the folder `myfolder/annotation_images`, as the image for the annotation.

```
annotation = Stateflow.Annotation(ch);
setImage(annotation, ...
    fullfile('myfolder','annotation_images','myImageFile.png'));
```

See Also

`Stateflow.Box` | `Stateflow.Chart` | `Stateflow.Function` | `Stateflow.State`

Topics
"Overview of the Stateflow API" on page 1-2
"Add Descriptive Comments in a Chart"
"List of Stateflow API Properties" on page 4-2

Introduced in R2017b

Stateflow.AtomicBox

Atomic box in chart, state, box, or function

Description

Use `Stateflow.AtomicBox` objects to encapsulate graphical, truth table, MATLAB, and Simulink functions in a separate namespace. Atomic boxes allow for:

- Faster simulation after making small changes to a function in a chart with many states or levels of hierarchy
- Reuse of the same functions across multiple charts and models
- Ease of team development for people working on different parts of the same chart
- Manual inspection of generated code for a specific function in a chart

For more information, see “Reuse Functions by Using Atomic Boxes”.

Creation

Syntax

```
atomicBox = Stateflow.AtomicBox(parent)
```

Description

`atomicBox = Stateflow.AtomicBox(parent)` creates a `Stateflow.AtomicBox` object in a parent chart, state, box, or graphical function.

Input Arguments

`parent` — Parent for new atomic box
`Stateflow.Chart` object | `Stateflow.State` object | `Stateflow.Box` object | `Stateflow.Function` object

Parent for the new atomic box, specified as a Stateflow API object of one of these types:

- `Stateflow.Box`
- `Stateflow.Chart`
- `Stateflow.Function`
- `Stateflow.State`

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

Content

`Name` — Name of atomic box
`''` (default) | character vector

Name of the atomic box, specified as a character vector.

`LabelString` — Label for atomic box
`'?'` (default) | character vector

Label for the atomic box, specified as a character vector.

`IsLink` — Whether atomic box is a library link
`true` or 1 | `false` or 0

This property is read-only.

Whether the atomic box is a library link, specified as a numeric or logical 1 (`true`) or 0 (`false`).

`IsExplicitlyCommented` — Whether to comment out atomic box
`false` or 0 (default) | `true` or 1

Whether to comment out the atomic box, specified as a numeric or logical 1 (`true`) or 0 (`false`). Setting this property to `true` is equivalent to right-clicking the atomic box and selecting **Comment Out**. For more information, see “Commenting Stateflow Objects in a Chart”.

`IsImplicitlyCommented` — Whether atomic box is implicitly commented out
`true` or 1 | `false` or 0

This property is read-only.

Whether the atomic box is implicitly commented out, specified as a numeric or logical 1 (`true`) or 0 (`false`). The atomic box is implicitly commented out when you comment out a state, box, or function that contains it.

`CommentText` — Comment text
`''` (default) | character vector

Comment text for the atomic box, specified as a character vector. This property applies only when the `IsExplicitlyCommented` property is `true`. In the Stateflow Editor, when you point to the comment badge on the atomic box, the text appears as a tooltip. When you set the `IsExplicitlyCommented` property to `false`, the value of `CommentText` reverts to `''`.

Graphical Appearance

`Position` — Position and size of atomic box
`[0 0 90 60]` (default) | `[left top width height]`

Position and size of the atomic box, specified as a four-element numeric vector of the form `[left top width height]`.

`BadIntersection` — Whether atomic box intersects a box, state, or function
`true` or 1 | `false` or 0

This property is read-only.

Whether the atomic box graphically intersects a box, state, or function, specified as a numeric or logical 1 (`true`) or 0 (`false`).

`ContentPreviewEnabled` — Whether to display preview of atomic box contents
`false` or 0 (default) | `true` or 1

Whether to display a preview of the atomic box contents, specified as a numeric or logical 1 (`true`) or 0 (`false`).

`FontSize` — Font size for atomic box label
scalar

Font size for the atomic box label, specified as a scalar. The `StateFont.Size` property of the chart that contains the atomic box sets the initial value of this property.

Hierarchy

`Chart` — Chart that contains atomic box
`Stateflow.Chart` object

This property is read-only.

Chart that contains the atomic box, specified as a `Stateflow.Chart` object.

`Subchart` — Contents of atomic box
`Stateflow.Chart` object

This property is read-only.

Contents of the atomic box, specified as a `Stateflow.Chart` object. Use this object to add children, such as states and transitions, to the atomic box.

`Subviewer` — Subviewer for atomic box
`Stateflow.Chart` object | `Stateflow.State` object | `Stateflow.Box` object | `Stateflow.Function` object

This property is read-only.

Subviewer for the atomic box, specified as a `Stateflow.Chart`, `Stateflow.State`, `Stateflow.Box`, or `Stateflow.Function` object. The subviewer is the chart or subchart where you can graphically view the atomic box.

`Machine` — Machine that contains atomic box
`Stateflow.Machine` object

This property is read-only.

Machine that contains the atomic box, specified as a `Stateflow.Machine` object.

`Path` — Location of parent in model hierarchy
character vector

This property is read-only.

Location of the parent of the atomic box in the model hierarchy, specified as a character vector.

Identification

`Description` — Description
`''` (default) | character vector

Description for the atomic box, specified as a character vector.

`Document` — Document link
`''` (default) | character vector

Document link for the atomic box, specified as a character vector.

`Tag` — User-defined tag
`[ ]` (default) | any data type

User-defined tag for the atomic box, specified as data of any type.

`SSIdNumber` — Session-independent identifier
scalar

This property is read-only.

Session-independent identifier, specified as an integer scalar. Use this property to distinguish the atomic box from other objects in the model.

`Id` — Unique identifier
scalar

This property is read-only.

Unique identifier, specified as an integer scalar. Unlike `SSIdNumber`, the value of this property is reassigned every time you start a new MATLAB session and may be recycled after an object is deleted.

Object Functions

getParent	Identify parent of object
dialog	Open properties dialog box
isCommented	Determine if graphical object is commented out
view	Display object in editing environment
highlight	Highlight graphical object
fitToView	Zoom in on graphical object

Examples

Add Atomic Box to Chart

Add an atomic box in the chart `ch`. Set its name to `'A'`.

```
atomicBox = Stateflow.AtomicBox(ch);
atomicBox.Name = 'A';
```

See Also

`Stateflow.Box` | `Stateflow.Chart` | `Stateflow.Function` | `Stateflow.State`

Topics

"Overview of the Stateflow API" on page 1-2
"Reuse Functions by Using Atomic Boxes"
"List of Stateflow API Properties" on page 4-2

Introduced in R2012b

Stateflow.AtomicSubchart

Atomic subchart in chart, state, or box

Description

Use `Stateflow.AtomicSubchart` objects to create independent subcomponents in a Stateflow chart. Atomic subcharts allow for:

- Reuse of the same state or subchart across multiple charts and models
- Faster simulation after making small changes to a chart with many states or levels of hierarchy
- Ease of team development when multiple people are working on different parts of the same chart
- Manual inspection of generated code for a specific state or subchart in a chart

For more information, see “Create Reusable Subcomponents by Using Atomic Subcharts”.

Creation

Syntax

```
atomicSubchart = Stateflow.AtomicSubchart(parent)
```

Description

`atomicSubchart = Stateflow.AtomicSubchart(parent)` creates a `Stateflow.AtomicSubchart` object in a parent chart, state, or box.

Input Arguments

`parent` — Parent for new atomic subchart
`Stateflow.Chart` object | `Stateflow.State` object | `Stateflow.Box` object

Parent for the new atomic subchart, specified as a Stateflow API object of one of these types:

- `Stateflow.Box`
- `Stateflow.Chart`
- `Stateflow.State`

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

Content

`Name` — Name of atomic subchart
`''` (default) | character vector

Name of the atomic subchart, specified as a character vector.

`LabelString` — Label for atomic subchart
`'?'` (default) | character vector

Label for the atomic subchart, specified as a character vector.

`IsLink` — Whether atomic subchart is a library link
`true` or 1 | `false` or 0

This property is read-only.

Whether the atomic subchart is a library link, specified as a numeric or logical 1 (`true`) or 0 (`false`).

`IsExplicitlyCommented` — Whether to comment out atomic subchart
`false` or 0 (default) | `true` or 1

Whether to comment out the atomic subchart, specified as a numeric or logical 1 (`true`) or 0 (`false`). Setting this property to `true` is equivalent to right-clicking the atomic subchart and selecting **Comment Out**. For more information, see “Commenting Stateflow Objects in a Chart”.

`IsImplicitlyCommented` — Whether atomic subchart is implicitly commented out
`true` or 1 | `false` or 0

This property is read-only.

Whether the atomic subchart is implicitly commented out, specified as a numeric or logical 1 (`true`) or 0 (`false`). The atomic subchart is implicitly commented out when you comment out a state or box that contains it.

`CommentText` — Comment text
`''` (default) | character vector

Comment text for the atomic subchart, specified as a character vector. This property applies only when the `IsExplicitlyCommented` property is `true`. In the Stateflow Editor, when you point to the comment badge % on the atomic subchart, the text appears as a tooltip. When you set the `IsExplicitlyCommented` property to `false`, the value of `CommentText` reverts to `''`.

Graphical Appearance

`Position` — Position and size of atomic subchart
`[0 0 90 60]` (default) | `[left top width height]`

Position and size of the atomic subchart, specified as a four-element numeric vector of the form `[left top width height]`.

`BadIntersection` — Whether atomic subchart intersects a box, state, or function
`true` or 1 | `false` or 0

This property is read-only.

Whether the atomic subchart graphically intersects a box, state, or function, specified as a numeric or logical 1 (`true`) or 0 (`false`).

`ContentPreviewEnabled` — Whether to display preview of atomic subchart contents
`false` or 0 (default) | `true` or 1

Whether to display a preview of the atomic subchart contents, specified as a numeric or logical 1 (`true`) or 0 (`false`).

`ArrowSize` — Size of incoming transition arrows
8 (default) | scalar

Size of incoming transition arrows, specified as a scalar.

`FontSize` — Font size for atomic subchart label
scalar

Font size for the atomic subchart label, specified as a scalar. The `StateFont.Size` property of the chart that contains the atomic subchart sets the initial value of this property.

State Decomposition

Type — Decomposition of sibling states
`'AND'` | `'OR'`

This property is read-only.

Decomposition of sibling states, specified as `'OR'` or `'AND'`. The atomic subchart inherits this property from the `Decomposition` property of its parent state or chart.

`ExecutionOrder` — Execution order in parallel (AND) decomposition
scalar

Execution order for the atomic subchart in parallel (AND) decomposition, specified as an integer scalar. This property applies only when both of these conditions are satisfied:

- The `Type` property of the atomic subchart is `'AND'`.
- The `UserSpecifiedStateTransitionExecutionOrder` property of the chart that contains the atomic subchart is `true`.

Active State Output

`HasOutputData` — Whether to create active state data output
`false` or 0 (default) | `true` or 1

Whether to create an active state data output port for the atomic subchart, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “Monitor State Activity Through Active State Data”.

`OutputData` — Active state data object
`Stateflow.Data` object

This property is read-only.

Active state data object for the atomic subchart, specified as a `Stateflow.Data` object. This property applies only when the `HasOutputData` property for the atomic subchart is `true`.

`OutputPortName` — Name of active state data object
character vector

Name of the active state data object for the atomic subchart, specified as a character vector. This property applies only when the `HasOutputData` property for the atomic subchart is `true`.

`OutputMonitoringMode` — Monitoring mode for active state output
`'SelfActivity'`

Monitoring mode for the active state output data, specified as a character vector. For atomic subcharts, the only option is `'SelfActivity'`.

Signal Logging

`LoggingInfo` — Signal logging properties
`Stateflow.SigLoggingInfo` object

Signal logging properties for the atomic subchart, specified as a `Stateflow.SigLoggingInfo` object with these properties:

- **`DataLogging`** — Whether to enable signal logging, specified as a numeric or logical 1 (`true`) or 0 (`false`).
- **`DecimateData`** — Whether to limit the amount of logged data, specified as a numeric or logical 1 (`true`) or 0 (`false`).
- **`Decimation`** — Decimation interval, specified as an integer scalar. This property applies only when the `DecimateData` property is `true`.
- **`LimitDataPoints`** — Whether to limit the number of data points to log, specified as a numeric or logical 1 (`true`) or 0 (`false`).
- **`MaxPoints`** — Maximum number of data points to log, specified as an integer scalar. This property applies only when the `LimitDataPoints` property is `true`.
- **`NameMode`** — Source of the signal name, specified as `'SignalName'` or `'Custom'`.
- **`LoggingName`** — Custom signal name, specified as a character vector. This property applies only when the `NameMode` property is `'Custom'`.

For more information, see “Log Simulation Output for States and Data”.

Example: `state.LoggingInfo.DataLogging = true;`

Debugging

`Debug` — Debugger properties
`Stateflow.StateDebug` object

Debugger properties for the state, atomic subchart, or Simulink based state, specified as a `Stateflow.StateDebug` object with these properties:

- **`OnEntry`** — Whether to set the `On State Entry` breakpoint, specified as a numeric or logical 1 (`true`) or 0 (`false`).
- **`OnDuring`** — Whether to set the `During State` breakpoint, specified as a numeric or logical 1 (`true`) or 0 (`false`).
- **`OnExit`** — Whether to set the `On State Exit` breakpoint, specified as a numeric or logical 1 (`true`) or 0 (`false`).

For more information, see “Set Breakpoints to Debug Charts”.

Example: `atomicSubchart.Debug.Breakpoints.OnEntry = true;`

Example: `atomicSubchart.Debug.Breakpoints.OnDuring = true;`

Example: `atomicSubchart.Debug.Breakpoints.OnExit = true;`

`TestPoint` — Whether to set atomic subchart as test point
`false` or 0 (default) | `true` or 1

Whether to set the atomic subchart as a test point, specified as a numeric or logical 1 (`true`) or 0 (`false`).

Hierarchy

`Chart` — Chart that contains atomic subchart
`Stateflow.Chart` object

This property is read-only.

Chart that contains the atomic subchart, specified as a `Stateflow.Chart` object.

`Subchart` — Contents of atomic subchart
`Stateflow.Chart` object

This property is read-only.

Contents of the atomic subchart, specified as a `Stateflow.Chart` object. Use this object to add children, such as states and transitions, to the atomic subchart. For more information, see “Add Exit Port and Junction to Atomic Subchart” on page 2-18.

`Subviewer` — Subviewer for atomic subchart
`Stateflow.Chart` object | `Stateflow.State` object | `Stateflow.Box` object

This property is read-only.

Subviewer for the atomic subchart, specified as a `Stateflow.Chart`, `Stateflow.State`, or `Stateflow.Box` object. The subviewer is the chart or subchart where you can graphically view the atomic subchart.

`Machine` — Machine that contains atomic subchart
`Stateflow.Machine` object

This property is read-only.

Machine that contains the atomic subchart, specified as a `Stateflow.Machine` object.

`Path` — Location of parent in model hierarchy
character vector

This property is read-only.

Location of the parent of the atomic subchart in the model hierarchy, specified as a character vector.

Identification

`Description` — Description
`''` (default) | character vector

Description for the atomic subchart, specified as a character vector.

`Document` — Document link
`''` (default) | character vector

Document link for the atomic subchart, specified as a character vector.

`Tag` — User-defined tag
`[]` (default) | any data type

User-defined tag for the atomic subchart, specified as data of any type.

`SSIdNumber` — Session-independent identifier
scalar

This property is read-only.

Session-independent identifier, specified as an integer scalar. Use this property to distinguish the atomic subchart from other objects in the model.

`Id` — Unique identifier
scalar

This property is read-only.

Unique identifier, specified as an integer scalar. Unlike `SSIdNumber`, the value of this property is reassigned every time you start a new MATLAB session and may be recycled after an object is deleted.

Object Functions

getParent	Identify parent of object
dialog	Open properties dialog box
isCommented	Determine if graphical object is commented out
view	Display object in editing environment
highlight	Highlight graphical object
fitToView	Zoom in on graphical object

Examples

Add Atomic Subchart to Chart

Add an atomic subchart in the chart `ch`. Set its name to `'A'`.

```
atomicSubchart = Stateflow.AtomicSubchart(ch);
atomicSubchart.Name = 'A';
```

Add Exit Port and Junction to Atomic Subchart

Find the `Stateflow.AtomicSubchart` object that corresponds to the atomic subchart `A` in the chart `ch`.

```
atomicSubchart = find(ch,'-isa','Stateflow.AtomicSubchart','Name','A');
```

Add an exit junction to the atomic subchart. Use the `Subchart` property of the atomic subchart as the parent of the exit junction. Display the value of the `PortType` property of the exit junction.

```
exitJunction = Stateflow.Port(atomicSubchart.Subchart,'ExitJunction');
exitJunction.PortType
```

```
ans =

    'ExitJunction'
```

Set the label of the exit junction to `'exit'`.

```
exitJunction.labelString = 'exit';
```

Find the `Stateflow.Port` object for the matching exit port. Display the value of the `PortType` property of the exit port.

```
exitPort = Stateflow.findMatchingPort(exitJunction);
exitPort.PortType
```

```
ans =

    'ExitPort'
```

Display the label of the exit port.

```
exitPort.labelString
```

```
ans =

    'exit'
```

See Also

Functions
`find` | `Stateflow.findMatchingPort`

Objects
`Stateflow.Box` | `Stateflow.Chart` | `Stateflow.Port` | `Stateflow.State`

Topics
"Overview of the Stateflow API" on page 1-2
"Create Reusable Subcomponents by Using Atomic Subcharts"
"List of Stateflow API Properties" on page 4-2

Introduced in R2010b

Stateflow.Box

Box in chart, state, box, or function

Description

Use `Stateflow.Box` objects to organize objects such as functions and states in your chart. You can also use a box to encapsulate states and functions in a separate namespace. For more information, see “Group Chart Objects by Using Boxes”.

Creation

Syntax

`box = Stateflow.Box(parent)`

Description

`box = Stateflow.Box(parent)` creates a `Stateflow.Box` object in a parent chart, state, box, or graphical function.

Input Arguments

`parent` — Parent for new box
`Stateflow.Chart` object | `Stateflow.State` object | `Stateflow.Box` object | `Stateflow.Function` object

Parent for the new box, specified as a Stateflow API object of one of these types:

- `Stateflow.Box`
- `Stateflow.Chart`
- `Stateflow.Function`
- `Stateflow.State`

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

Content

`Name` — Name of box
`''` (default) | character vector

Name of the box, specified as a character vector.

`LabelString` — Label for box
`'?'` (default) | character vector

Label for the box, specified as a character vector.

`IsExplicitlyCommented` — Whether to comment out box
`false` or 0 (default) | `true` or 1

Whether to comment out the box, specified as a numeric or logical 1 (`true`) or 0 (`false`). Setting this property to `true` is equivalent to right-clicking the box and selecting **Comment Out**. For more information, see “Commenting Stateflow Objects in a Chart”.

`IsImplicitlyCommented` — Whether box is implicitly commented out
`true` or 1 | `false` or 0

This property is read-only.

Whether the box is implicitly commented out, specified as a numeric or logical 1 (`true`) or 0 (`false`). The box is implicitly commented out when you comment out a state, box, or function that contains it.

`CommentText` — Comment text
`''` (default) | character vector

Comment text for the box, specified as a character vector. This property applies only when the `IsExplicitlyCommented` property is `true`. In the Stateflow Editor, when you point to the comment badge % on the box, the text appears as a tooltip. When you set the `IsExplicitlyCommented` property to `false`, the value of `CommentText` reverts to `''`.

Graphical Appearance

`Position` — Position and size of box
`[0 0 90 60]` (default) | `[left top width height]`

Position and size of the box, specified as a four-element numeric vector of the form `[left top width height]`.

`BadIntersection` — Whether box intersects a box, state, or function
`true` or 1 | `false` or 0

This property is read-only.

Whether the box graphically intersects a box, state, or function, specified as a numeric or logical 1 (`true`) or 0 (`false`).

`IsGrouped` — Whether box is a grouped box
`false` or 0 (default) | `true` or 1

Whether the box is a grouped box, specified as a numeric or logical 1 (`true`) or 0 (`false`). When you copy and paste a grouped box, you copy not only the box but all of its contents. For more information, see “Copy and Paste by Grouping” on page 2-24.

`IsSubchart` — Whether box is a subchart
`false` or 0 (default) | `true` or 1

Whether the box is a subchart, specified as a numeric or logical 1 (`true`) or 0 (`false`).

`ContentPreviewEnabled` — Whether to display preview of box contents
`false` or 0 (default) | `true` or 1

Whether to display a preview of the box contents, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property applies only when the `IsSubchart` property is `true`.

`FontSize` — Font size for box label
scalar

Font size for the box label, specified as a scalar. The `StateFont.Size` property of the chart that contains the box sets the initial value of this property.

Hierarchy

`Chart` — Chart that contains box
`Stateflow.Chart` object

This property is read-only.

Chart that contains the box, specified as a `Stateflow.Chart` object.

`Subviewer` — Subviewer for box
`Stateflow.Chart` object | `Stateflow.State` object | `Stateflow.Box` object | `Stateflow.Function` object

This property is read-only.

Subviewer for the box, specified as a `Stateflow.Chart`, `Stateflow.State`, `Stateflow.Box`, or `Stateflow.Function` object. The subviewer is the chart or subchart where you can graphically view the box.

`Machine` — Machine that contains box
`Stateflow.Machine` object

This property is read-only.

Machine that contains the box, specified as a `Stateflow.Machine` object.

`Path` — Location of parent in model hierarchy
character vector

This property is read-only.

Location of the parent of the box in the model hierarchy, specified as a character vector.

Identification

`Description` — Description
`''` (default) | character vector

Description for the box, specified as a character vector.

`Document` — Document link
`''` (default) | character vector

Document link for the box, specified as a character vector.

Tag — User-defined tag
[ ] (default) | any data type

User-defined tag for the box, specified as data of any type.

Id — Unique identifier
scalar

This property is read-only.

Unique identifier, specified as an integer scalar. Use this property to distinguish the box from other objects in the model. The value of this property is reassigned every time you start a new MATLAB session and may be recycled after an object is deleted.

Object Functions

find	Identify specified objects in hierarchy
getChildren	Identify children of object
getParent	Identify parent of object
dialog	Open properties dialog box
isCommented	Determine if graphical object is commented out
view	Display object in editing environment
highlight	Highlight graphical object
fitToView	Zoom in on graphical object

Examples

Add Box to Chart

Add a box in the chart `ch`. Set its name to `'A'`.

```
box = Stateflow.Box(ch);
box.Name = 'A';
```

See Also

`Stateflow.Chart` | `Stateflow.Function` | `Stateflow.State`

Topics
“Overview of the Stateflow API” on page 1-2
“Group Chart Objects by Using Boxes”
“List of Stateflow API Properties” on page 4-2

Introduced before R2006a

Stateflow.Clipboard

Clipboard to copy and paste Stateflow objects

Description

Use the `Stateflow.Clipboard` object to copy and paste graphical and nongraphical objects within the same chart, between charts in the same Simulink model, or between charts in different models.

Creation

There is only one `Stateflow.Clipboard` object, which is created automatically when you start Stateflow. To access this object, call the `sfclipboard` function:

```
clipboard = sfclipboard;
```

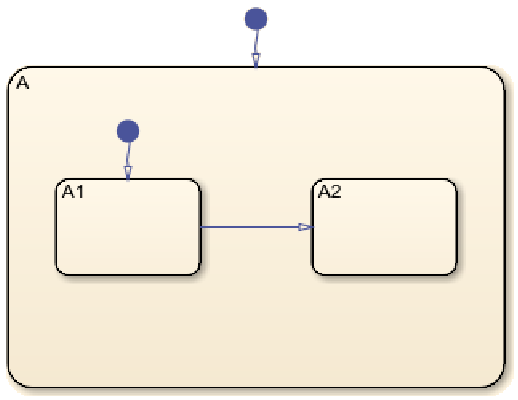
Object Functions

copy	Copy array of objects to clipboard
pasteTo	Paste objects in clipboard to specified container object

Examples

Copy and Paste by Grouping

Group state `A` and copy its contents to chart `ch`. When you group a state, box, or graphical function, you can copy and paste all the objects contained in the grouped object, as well as all the relationships among these objects. This method is the simplest way of copying and pasting objects programmatically. If a state is not grouped, copying the state does not copy any of its contents.



1 Find the `Stateflow.State` object named `A` in chart `ch`.

```
sA = find(ch,'-isa','Stateflow.State','Name','A');
```

2 Group state A and its contents by setting the IsGrouped property for sA to true. Save the previous setting of this property so you can revert to it later.

```
prevGrouping = sA.IsGrouped;
sA.IsGrouped = true;
```

3 Change the name of the state to 'Copy_of_A'. Save the previous name so you can revert to it later.

```
prevName = sA.Name;
newName = ['Copy_of_' prevName];
sA.Name = newName;
```

4 Access the clipboard object.

```
cb = sfclipboard;
```

5 Copy the grouped state to the clipboard.

```
copy(cb,sA);
```

6 Restore the state properties to their original settings.

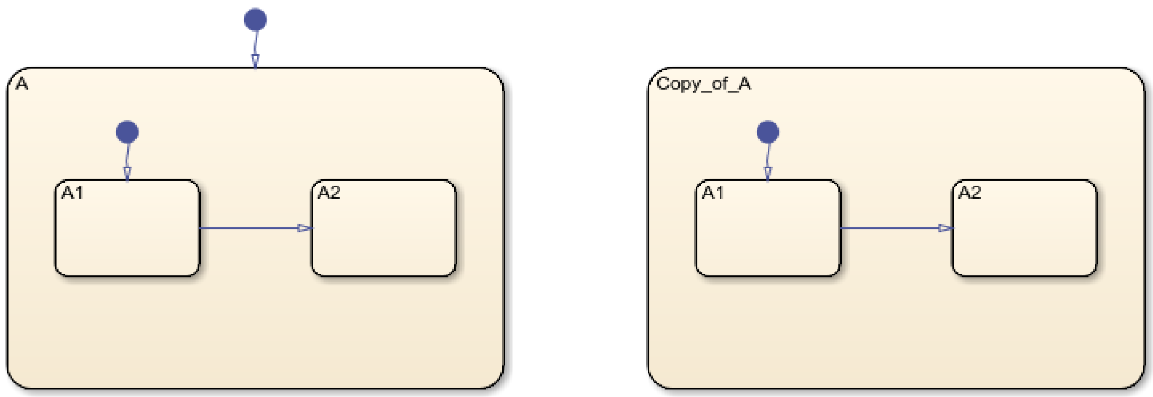
```
sA.IsGrouped = prevGrouping;
sA.Name = prevName;
```

7 Paste a copy of the objects from the clipboard to the chart.

```
pasteTo(cb,ch);
```

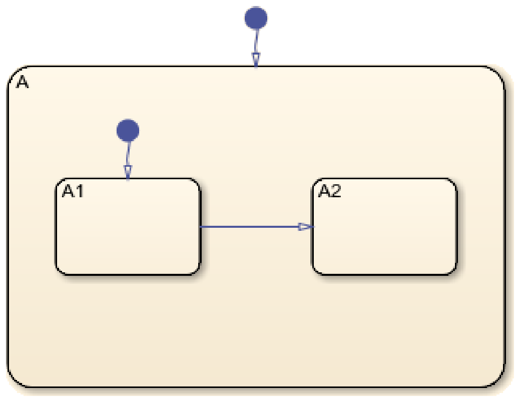
8 Adjust the state properties of the new state.

```
sNew = find(ch,'-isa','Stateflow.State','Name',newName);
sNew.Position = sA.Position + [400 0 0 0];
sNew.IsGrouped = prevGrouping;
```



Copy and Paste Array of Objects

Copy states A1 and A2, along with the transition between them, to a new state in chart ch. To preserve transition connections and containment relationships between objects, copy all the connected objects at once.



1 Find the `Stateflow.State` object named `A` in chart `ch`.

```
sA = find(ch,'-isa','Stateflow.State','Name','A');
```

2 Add a new state called `B`. To enable pasting of other objects inside `B`, convert the new state to a subchart.

```
sB = Stateflow.State(ch);
sB.Name = 'B';
sB.Position = sA.Position + [400 0 0 0];
sB.IsSubchart = true;
```

3 Create an array called `objArray` that contains the states and transitions in state `A`. Use the function `setdiff` to remove state `A` from the array of objects to copy.

```
objArrayS = find(sA,'-isa','Stateflow.State');
objArrayS = setdiff(objArrayS,sA);
objArrayT = find(sA,'-isa','Stateflow.Transition');
objArray = [objArrayS objArrayT];
```

4 Access the clipboard object.

```
cb = sfclipboard;
```

5 Copy the objects in `objArray` and paste them in subchart `B`.

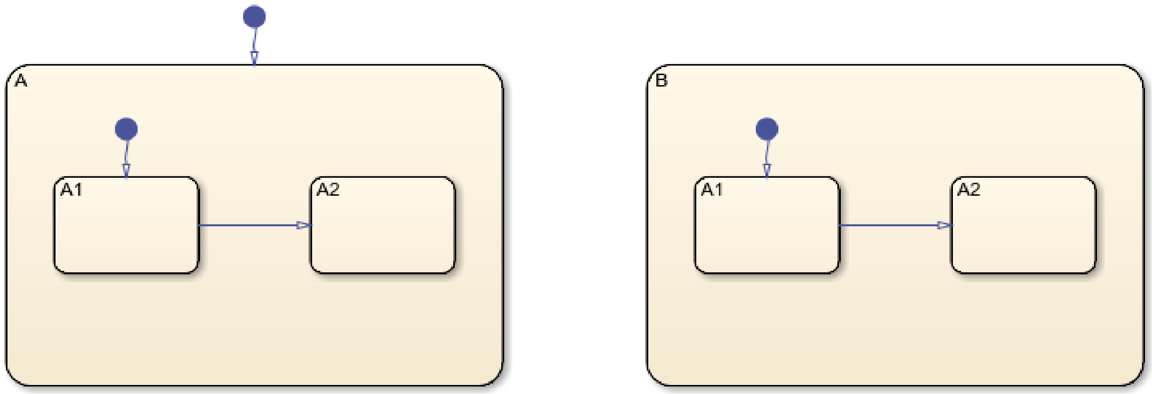
```
copy(cb,objArray);
pasteTo(cb,sB);
```

6 Revert `B` to a state.

```
sB.IsSubchart = false;
sB.IsGrouped = false;
```

7 Reposition the states and transitions in `B`.

```
newStates = find(sB,'-isa','Stateflow.State');
newStates = setdiff(newStates,sB);
newTransitions = find(sB,'-isa','Stateflow.Transition');
newOClocks = get(newTransitions,{'SourceOClock','DestinationOClock'});
for i = 1:numel(newStates)
newStates(i).Position = newStates(i).Position + [25 35 0 0];
end
set(newTransitions,{'SourceOClock','DestinationOClock'},newOClocks);
```



See Also

Functions
`find` | `setdiff` | `sfclipboard`

Objects
`Stateflow.State`

Topics
"Overview of the Stateflow API" on page 1-2
"List of Stateflow API Properties" on page 4-2

Introduced before R2006a

Stateflow.Chart

Graphical representation of a finite state machine

Description

Use a `Stateflow.Chart` object to create a graphical representation of a finite state machine by combining states, transitions, and data. For more information, see “Finite State Machine Concepts” and “Create Charts by Using the Stateflow API” on page 1-19.

Creation

To create a `Stateflow.Chart` object, call the function `sfnew`. For example, to create an empty chart in a new Simulink model called `myModel`, enter:

```
sfnew myModel
```

Alternatively, you can add a new chart to an existing model by using the function `add_block`:

```
add_block('sflib/Chart','myModel/Chart')
```

Then, to access the `Stateflow.Chart` object, call the `find` function for the `Simulink.Root` object:

```
rt = sfroot;
chart = find(rt,'-isa','Stateflow.Chart', ...
    'Path','myModel/Chart');
```

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

Content

Name — Name of chart

`'Chart'` (default) | character vector

Name of the chart, specified as a character vector.

`ActionLanguage` — Action language

`'MATLAB'` (default) | `'C'`

Action language used to program the chart, specified as `'MATLAB'` or `'C'`. For more information, see “Differences Between MATLAB and C as Action Language Syntax”.

`StateMachineType` — State machine semantics

`'Classic'` (default) | `'Mealy'` | `'Moore'`

State machine semantics implemented by the chart, specified as `'Classic'`, `'Mealy'`, or `'Moore'`. For more information, see “Overview of Mealy and Moore Machines”.

`SupportVariableSizing` — Whether chart supports variable-size data
`true` or 1 (default) | `false` or 0

Whether the chart supports variable-size data, specified as a numeric or logical 1 (`true`) or 0 (`false`). Only variable-size data can change dimension during simulation. For more information, see “Declare Variable-Size Data in Stateflow Charts”.

State Decomposition

`Decomposition` — Decomposition of substates
`'EXCLUSIVE_OR'` (default) | `'PARALLEL_AND'`

Decomposition of substates at the top level of containment in the chart, specified as `'EXCLUSIVE_OR'` or `'PARALLEL_AND'`. For more information, see “Specify Substate Decomposition”.

Chart Initialization

`ExecuteAtInitialization` — Whether to initialize state configuration
`false` or 0 (default) | `true` or 1

Whether to initialize the state configuration of the chart at time zero instead of at the first input event, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “Execution of a Chart at Initialization”.

`StatesWhenEnabling` — Behavior of states when event reenables chart
`''` (default) | `'held'` | `'reset'`

Behavior of the states when a function-call input event reenables the chart, specified as one of these values:

- `''` — The chart does not contain function-call input events.
- `'held'` — The chart maintains the most recent values of the states.
- `'reset'` — The chart reverts to the initial conditions of the states.

For more information, see “Control States in Charts Enabled by Function-Call Input Events”.

`InitializeOutput` — Whether to initialize output data
`false` or 0 (default) | `true` or 1

Whether to initialize the output data every time the chart wakes up, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “Initialize outputs every time chart wakes up”.

Active State Output

`HasOutputData` — Whether to create active state data output
`false` or 0 (default) | `true` or 1

Whether to create an active state data output port for the chart, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “Monitor State Activity Through Active State Data”.

`OutputData` — Active state data object
`Stateflow.Data` object

This property is read-only.

Active state data object for the chart, specified as a `Stateflow.Data` object. This property applies only when the `HasOutputData` property for the chart is `true`.

`OutputPortName` — Name of active state data object
character vector

Name of the active state data object for the chart, specified as a character vector. This property applies only when the `HasOutputData` property for the chart is `true`.

`OutputMonitoringMode` — Monitoring mode for active state output
`'ChildActivity'` (default) | `'LeafStateActivity'`

Monitoring mode for the active state output data, specified as `'ChildActivity'` or `'LeafStateActivity'`.

`EnumTypeName` — Name of enumerated data type for active state data object
character vector

Name of the enumerated data type for the active state data object for the chart, specified as a character vector. For more information, see “Enum Name”.

`DoNotAutogenerateEnum` — Whether to define enumerated data type manually
`false` or 0 (default) | `true` or 1

Whether to define the enumerated data type for the active state data output manually, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “Define State Activity Enumeration Type”.

Discrete and Continuous-Time Semantics

`ChartUpdate` — Activation method for chart
`'INHERITED'` (default) | `'CONTINUOUS'` | `'DISCRETE'`

Activation method for the chart, specified as `'CONTINUOUS'`, `'DISCRETE'`, or `'INHERITED'`. For more information, see “Update Method”.

`SampleTime` — Sample time for activating chart
`'-1'` (default) | character vector

Sample time for activating the chart, specified as a character vector. This property applies only when the `ChartUpdate` property for the chart is `'DISCRETE'`.

`EnableZeroCrossings` — Whether to enable zero-crossing detection
`true` or 1 (default) | `false` or 0

Whether to enable zero-crossing detection on state transitions in the chart, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property applies only when the `ChartUpdate` property for the chart is set to `'CONTINUOUS'`. For more information, see “Disable Zero-Crossing Detection”.

Super Step Semantics

`EnableNonTerminalStates` — Whether to enable super step semantics

`false` or 0 (default) | `true` or 1

Whether to enable super step semantics for the chart, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “Super Step Semantics”.

`NonTerminalMaxCounts` — Maximum number of transitions in one super step

`1000` (default) | scalar

Maximum number of transitions the chart can take in one super step, specified as an integer scalar. This property applies only when the `EnableNonTerminalStates` property for the chart is `true`.

`NonTerminalUnstableBehavior` — Behavior if super step exceeds maximum number of transitions

`'Proceed'` (default) | `'Throw Error'`

Behavior if a super step for the chart exceeds the maximum number of transitions specified in the `NonTerminalMaxCounts` property before reaching a stable state, specified as one of these values:

- `'Proceed'` — The chart goes to sleep with the last active state configuration.
- `'Throw Error'` — The chart generates an error.

This property applies only when the `EnableNonTerminalStates` property for the chart is `true`.

Exported Functions

`ExportChartFunctions` — Whether to export chart-level functions

`false` or 0 (default) | `true` or 1

Whether to export chart-level functions to other blocks in the Simulink model, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “Export Stateflow Functions for Reuse”.

`AllowGlobalAccessToExportedFunctions` — Whether exported functions are globally visible

`false` or 0 (default) | `true` or 1

Whether exported functions from the chart are globally visible in the Simulink model, specified as a numeric or logical 1 (`true`) or 0 (`false`). When this property is enabled, blocks throughout the model can call functions exported from the chart without using qualified notation. This property applies only when the `ExportChartFunctions` property for the chart is `true`.

Integer and Fixed-Point Data

`SaturateOnIntegerOverflow` — Whether data saturates on integer overflow

`true` or 1 (default) | `false` or 0

Whether the data in the chart saturates on integer overflow, specified as a numeric or logical 1 (`true`) or 0 (`false`). When this property is disabled, the data in the chart wraps on integer overflow. For more information, see “Handle Integer Overflow for Chart Data”.

`TreatAsFi` — Inherited Simulink signals to treat as `fi` objects

`'Fixed-point'` (default) | `'Fixed-point & Integer'`

Inherited Simulink signals to treat as Fixed-Point Designer™ `fi` objects, specified as one of these values:

- `'Fixed-point'` — The chart treats all fixed-point inputs as `fi` objects.
- `'Fixed-point & Integer'` — The chart treats all fixed-point and integer inputs as `fi` objects.

This property applies only to charts that use MATLAB as the action language.

`EmlDefaultFimath` — Default `fimath` properties
`'Same as MATLAB Default'` (default) | `'Other:UserSpecified'`

Default `fimath` properties for the chart, specified as one of these values:

- `'Same as MATLAB Default'` — Use the same `fimath` properties as the current default `fimath` object.
- `'Other:UserSpecified'` — Use the `InputFimath` property to specify the default `fimath` object.

This property applies only when the `ActionLanguage` property of the chart is `'MATLAB'`.

`InputFimath` — Default `fimath` object
character vector

Default `fimath` object, specified as a character vector. When the `EmlDefaultFimath` property for the chart is `'Other:UserSpecified'`, you can use this property to:

- Enter an expression that constructs a `fimath` object.
- Enter the variable name for a `fimath` object in the MATLAB or model workspace.

This property applies only to charts that use MATLAB as the action language.

Code Generation

`GeneratePreprocessorConditionals` — Whether generated code includes a preprocessor conditional
`false` or 0 (default) | `true` or 1

Whether the generated code includes a preprocessor conditional statement for the variant conditions in the chart, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property applies only when generating code with Embedded Coder®. For more information, see “Code Generation Using Variant Transitions”.

C Action Language

`StrongDataTypingWithSimulink` — Whether to use strong data typing
`true` or 1 (default) | `false` or 0

Whether to use strong data typing when the chart interfaces with Simulink input and output signals, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property applies only to charts that use C as the action language. For more information, see “Use strong data typing with Simulink I/O”.

`EnableBitOps` — Whether to use bit operations
`false` or 0 (default) | `true` or 1

Whether to use bit operations in state and transition actions in the chart, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property applies only to charts that use C as the action language. For more information, see “Enable C-bit operations”.

`UserSpecifiedStateTransitionExecutionOrder` — Whether to use explicit ordering of parallel states and transitions
`true` or 1 (default) | `false` or 0

Whether to use explicit ordering of parallel states and transitions, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property applies only to charts that use C as the action language. For more information, see “User-specified state/transition execution order”.

Debugging

`Debug` — Debugger properties
`Stateflow.ChartDebug` object

Debugger properties for the chart, specified as a `Stateflow.ChartDebug` object with this property:

- **`Breakpoints.OnEntry`** — Whether to set the `On Chart Entry` breakpoint, specified as a numeric or logical 1 (`true`) or 0 (`false`).

For more information, see “Set Breakpoints to Debug Charts”.

Example: `chart.Debug.Breakpoints.OnEntry = true;`

Graphical Appearance

`Editor` — Editor
`Stateflow.Editor` object

This property is read-only.

Editor for the chart, specified as a `Stateflow.Editor` object. You can use this object to control the position, size, and magnification level of the Stateflow Editor window.

`Visible` — Whether editor is displaying chart
`true` or 1 | `false` or 0

Whether the Stateflow Editor window is displaying the chart, specified as a numeric or logical 1 (`true`) or 0 (`false`).

`ChartColor` — Background color
`[1 0.9608 0.8824]` (default) | `[red green blue]`

Background color for the chart, specified as a three-element numeric vector of the form `[red green blue]` that specifies the red, green, and blue values. Each element must be in the range between 0 and 1.

`StateColor` — Color for states
`[0 0 0]` (default) | `[red green blue]`

Color for the boxes, functions, and states in the chart, specified as a three-element numeric vector of the form `[red green blue]` that specifies the red, green, and blue values. Each element must be in the range between 0 and 1.

`TransitionColor` — Color for transitions
`[0.2902 0.3294 0.6039]` (default) | `[red green blue]`

Color for transitions in the chart, specified as a three-element numeric vector of the form `[red green blue]` that specifies the red, green, and blue values. Each element must be in the range between 0 and 1.

`JunctionColor` — Color for junctions
`[0.6824 0.3294 0]` (default) | `[red green blue]`

Color for junctions in the chart, specified as a three-element numeric vector of the form `[red green blue]` that specifies the red, green, and blue values. Each element must be in the range between 0 and 1.

`StateFont` — Font for state labels
`Stateflow.StateFont` object

Font for the box, function, and state labels in the chart, specified as a `Stateflow.StateFont` object with these properties:

- **`Name`** — Font name, specified as a character vector. This property also determines the font for annotations in the chart.
- **`Angle`** — Font angle, specified as `'NORMAL'` or `'ITALIC'`.
- **`Weight`** — Font weight, specified as `'NORMAL'` or `'BOLD'`.
- **`Size`** — Default font size for new boxes, functions, and states, specified as a scalar. This property also determines the default font size for new annotations in the chart.

Example: `chart.StateFont.Name = 'Arial';`

Example: `chart.StateFont.Angle = 'ITALIC';`

Example: `chart.StateFont.Weight = 'BOLD;`

Example: `chart.StateFont.Size = 8;`

`StateLabelColor` — Color for state labels
`[0 0 0]` (default) | `[red green blue]`

Color for the box, function, and state labels in the chart, specified as a three-element numeric vector of the form `[red green blue]` that specifies the red, green, and blue values. Each element must be in the range between 0 and 1.

`TransitionFont` — Font for transition labels
`Stateflow.TransFont` object

Font for the transition labels in the chart, specified as a `Stateflow.TransFont` object with these properties:

- **`Name`** — Font name, specified as a character vector.
- **`Angle`** — Font angle, specified as `'NORMAL'` or `'ITALIC'`.
- **`Weight`** — Font weight, specified as `'NORMAL'` or `'BOLD'`.
- **`Size`** — Default font size for new transitions, specified as a scalar.

Example: `chart.TransitionFont.Name = 'Arial';`

Example: `chart.TransitionFont.Angle = 'ITALIC';`

Example: `chart.TransitionFont.Weight = 'BOLD';`

Example: `chart.TransitionFont.Size = 8;`

`TransitionLabelColor` — Color for transition labels
`[0.2902 0.3294 0.6039]` (default) | `[red green blue]`

Color for the transition labels in the chart, specified as a three-element numeric vector of the form `[red green blue]` that specifies the red, green, and blue values. Each element must be in the range between 0 and 1.

Hierarchy

`Machine` — Machine that contains chart
`Stateflow.Machine` object

This property is read-only.

Machine that contains the chart, specified as a `Stateflow.Machine` object.

`Path` — Location of chart in model hierarchy
character vector

This property is read-only.

Location of the chart in the model hierarchy, specified as a character vector.

`Dirty` — Whether chart has changed
`true` or 1 | `false` or 0

Whether the chart has changed after being opened or saved, specified as a numeric or logical 1 (`true`) or 0 (`false`).

`Locked` — Whether chart is locked
`false` or 0 (default) | `true` or 1

Whether the chart is locked, specified as a numeric or logical 1 (`true`) or 0 (`false`). Enable this property to prevent changes in the chart.

`Iced` — Whether chart is locked
`false` or 0 (default) | `true` or 1

This property is read-only.

Whether the chart is locked, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property is equivalent to the property `Locked`, but is used internally to prevent changes in the chart during simulation.

Identification

`Description` — Description
`''` (default) | character vector

Description for the chart, specified as a character vector.

`Document` — Document link
`''` (default) | character vector

Document link for the chart, specified as a character vector.

`Tag` — User-defined tag
[ ] (default) | any data type

User-defined tag for the chart, specified as data of any type.

`Id` — Unique identifier
scalar

This property is read-only.

Unique identifier, specified as an integer scalar. Use this property to distinguish the chart from other objects in the model. The value of this property is reassigned every time you start a new MATLAB session and may be recycled after an object is deleted.

Object Functions

find	Identify specified objects in hierarchy
getChildren	Identify children of object
defaultTransitions	Identify default transitions in specified object
dialog	Open properties dialog box
view	Display object in editing environment
fitToView	Zoom in on graphical object

Examples

Create Empty Stateflow Chart

Call the function `sfnew` to open a new Simulink model that contains an empty Stateflow chart.

```
sfnew
```

Access the `Simulink.Root` object by calling the `sfroot` function.

```
rt = sfroot;
```

Access the `Stateflow.Chart` object by calling the `find` function for the `Simulink.Root` object.

```
chart = find(rt,'-isa','Stateflow.Chart');
```

See Also

Blocks
Chart

Functions
`sfnew` | `sfroot` | `add_block`

Topics
"Overview of the Stateflow API" on page 1-2

"Finite State Machine Concepts"
"Specify Properties for Stateflow Charts"
"Create Charts by Using the Stateflow API" on page 1-19
"List of Stateflow API Properties" on page 4-2

Introduced before R2006a

Stateflow.Data

Data in chart, state, box, or function

Description

Use `Stateflow.Data` objects to store values that are visible at a specific level of the Stateflow hierarchy. For more information, see “Add Stateflow Data” and “Set Data Properties”.

Creation

Syntax

`data = Stateflow.Data(parent)`

Description

`data = Stateflow.Data(parent)` creates a `Stateflow.Data` object in a parent chart, state, box, or function.

Input Arguments

`parent` — Parent for new data object
`Stateflow.Chart` object | `Stateflow.State` object | `Stateflow.Box` object | `Stateflow.Function` object | ...

Parent for the new data object, specified as a Stateflow API object of one of these types:

- `Stateflow.Box`
- `Stateflow.Chart`
- `Stateflow.EMFunction`
- `Stateflow.Function`
- `Stateflow.SLFunction`
- `Stateflow.State`
- `Stateflow.TruthTable`

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

Interface

`Name` — Name of data object
`'data'` (default) | character vector

Name of the data object, specified as a character vector.

`Scope` — Scope of data object
`'Local'` (default) | `'Input'` | `'Output'` | `'Constant'` | `'Parameter'` | `'Data Store Memory'` | `'Temporary'` | `'Imported'` | `'Exported'`

Scope of the data object, specified as one of these values:

- `'Local'`
- `'Input'`
- `'Output'`
- `'Constant'`
- `'Parameter'`
- `'Data Store Memory'`
- `'Temporary'`
- `'Imported'`
- `'Exported'`

For more information, see "Scope".

`Port` — Port index for data object
scalar

Port index for the data object, specified as an integer scalar. This property applies only to input and output data. For more information, see "Port".

`UpdateMethod` — Method for updating data object
`'Discrete'` (default) | `'Continuous'`

Method for updating data object, specified as `'Discrete'` or `'Continuous'`. This property applies only when the `ChartUpdate` property of the chart that contains the data is `'CONTINUOUS'`. For more information, see "Continuous-Time Modeling in Stateflow".

`InitializeMethod` — Method for initializing data object
`'Expression'` (default) | `'Parameter'` | `'Not Needed'`

Method for initializing the value of the data object, specified as a character vector that depends on the scope of the data:

- For local and output data, use `'Expression'` or `'Parameter'`.
- For constant data, use `'Expression'`.
- For input data, parameters, and data store memory, use `'Not Needed'`.

To specify the initial value of the data object, use the `Props.InitialValue` property.

This property is equivalent to the **Initial Value** drop-down list in the Model Explorer and the Data properties dialog box. For more information, see "Initial Value".

`SaveToWorkspace` — Whether to save data object to workspace variable
`false` or 0 (default) | `true` or 1

Whether to save the value of the data object to a variable of the same name in the MATLAB base workspace at the end of the simulation, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property applies only to data in charts that use C as the action language. For more information, see “Save Final Value to Base Workspace”.

`Tunable` — Whether data object is tunable parameter
`true` or 1 (default) | `false` or 0

Whether the data object is a tunable parameter, specified as a numeric or logical 1 (`true`) or 0 (`false`). Only tunable parameters can be modified during simulation. This property applies only to parameter data.

Data Specification

`DataType` — Type of data object
`'Inherit: From definition in chart'` (default) | `'double'` | `'single'` | `'int32'` | `'uint32'` | `'boolean'` | ...

Type of the data object, specified as a character vector that depends on the `Props.Type.Method` property of the data object:

- If the `Props.Type.Method` property of the data object is `'Inherit'`, the value of this property is `'Inherit: From definition in chart'` for local data and `'Inherit: Same as Simulink'` for input, output, and parameter data.
- If the `Props.Type.Method` property of the data object is `'Built-in'`, you can specify this property with one of these options:
  - `'double'`
  - `'single'`
  - `'int8'`
  - `'int16'`
  - `'int32'`
  - `'int64'`
  - `'uint8'`
  - `'uint16'`
  - `'uint32'`
  - `'uint64'`
  - `'boolean'`
  - `'string'`
  - `'ml'` (Supported only in charts that use C as the action language)
- Otherwise, the `Props.Type` properties of the data object determine the value of this property.

For more information, see the section Add Data on page 1-0 in “Create Charts by Using the Stateflow API” on page 1-19.

`Props` — Data specification properties
`Stateflow.DataProps` object

Data specification properties, specified as a `Stateflow.DataProps` object with these properties:

- **`Type.Method`** — Method for setting the type of the data object, specified as a character vector.

  - For local, input, output, or parameter data, use `'Inherited'`, `'Built-in'`, `'Bus Object'`, `'Enumerated'`, `'Expression'`, or `'Fixed point'`.
  - For constant data, use `'Built-in'`, `'Expression'`, or `'Fixed point'`.
  - For data store memory data, use `'Inherited'`.

  This property is equivalent to the **Mode** field of the Data Type Assistant in the Model Explorer and the Data properties dialog box. For more information, see “Specify Type of Stateflow Data”.
- **`Type.BusObject`** — Name of the `Simulink.Bus` object that defines the data object, specified as a character vector. This property applies only when the `Type.Method` property of the data object is `'Bus Object'`. For more information, see “Access Bus Signals Through Stateflow Structures”.
- **`Type.EnumType`** — Name of the enumerated type that defines the data object, specified as a character vector. This property applies only when the `Type.Method` property of the data object is `'Enumerated'`. For more information, see “Reference Values by Name by Using Enumerated Data”.
- **`Type.Expression`** — Expression that evaluates to the data type of the data object, specified as a character vector. This property applies only when the `Type.Method` property of the data object is `'Expression'`. For more information, see “Specify Data Properties by Using MATLAB Expressions”.
- **`Type.Signed`** — Signedness, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property applies only when the `Type.Method` property of the data object is `'Fixed point'`. For more information, see “Fixed-Point Data in Stateflow Charts”.
- **`Type.WordLength`** — Word length, in bits, specified as a character vector. This property applies only when the `Type.Method` property of the data object is `'Fixed point'`. For more information, see “Fixed-Point Data in Stateflow Charts”.
- **`Type.Fixpt.ScalingMode`** — Method for scaling the fixed-point data object, specified as `'Binary point'`, `'Slope and bias'`, or `'None'`. This property applies only when the `Type.Method` property of the data object is `'Fixed point'`. For more information, see “Fixed-Point Data in Stateflow Charts”.
- **`Type.Fixpt.FractionLength`** — Fraction length, in bits, specified as a character vector. This property applies only when the `Type.Method` property is `'Fixed point'` and the `Type.Fixpt.ScalingMode` property is `'Binary point'`.
- **`Type.Fixpt.Slope`** — Slope, specified as a character vector. This property applies only when the `Type.Method` property is `'Fixed point'` and the `Type.Fixpt.ScalingMode` property is `'Slope and bias'`.
- **`Type.Fixpt.Bias`** — Bias, specified as a character vector. This property applies only when the `Type.Method` property is `'Fixed point'` and the `Type.Fixpt.ScalingMode` property is `'Slope and bias'`.
- **`Type.Fixpt.Lock`** — Whether to prevent replacement of the fixed-point type with an autoscaled type chosen by the Fixed-Point Tool (Fixed-Point Designer), specified as a numeric or logical 1 (`true`) or 0 (`false`). This property applies only when the `Type.Method` property of the data object is `'Fixed point'`.
- **`Array.Size`** — Size of the data object, specified as a character vector. For more information, see “Specify Size of Stateflow Data”.
- **`Array.IsDynamic`** — Whether the data object has variable size, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property applies only to input, output, and local data and is equivalent to the **Variable Size** check box in the Property Inspector, the Model Explorer, or the Data properties dialog box. Use the `Size` property to specify the maximum size for the data. For more information, see “Declare Variable-Size Data in Stateflow Charts”.

- **`Array.FirstIndex`** — Index for the first element of the array data object, specified as a character vector. This property applies only to array data in charts that use C as the action language. For more information, see “Save Final Value to Base Workspace”.
- **`Complexity`** — Whether the data object accepts complex values, specified as `'On'` or `'Off'`. For more information, see “Complex Data in Stateflow Charts”.
- **`InitialValue`** — Initial value, specified as a character vector. For more information, see “Initial Value”.
- **`Range.Minimum`** — Minimum value, specified as a character vector. For more information, see “Limit Range”.
- **`Range.Maximum`** — Maximum value, specified as a character vector. For more information, see “Limit Range”.
- **`ResolveToSignalObject`** — Whether the data object resolves to a `Simulink.Signal` object that you define in the model or base workspace, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “Resolve Data Properties from Simulink Signal Objects”.
- **`Unit.Name`** — Unit of measurement, specified as a character vector. This property applies only to input and output data. For more information, see “Specify Units for Stateflow Data”.

`CompiledSize` — Data size as determined by compiler
`''` (default) | character vector

This property is read-only.

Data size as determined by the compiler, specified as a character vector.

`CompiledType` — Data type as determined by compiler
`'unknown'` (default) | character vector

This property is read-only.

Data type as determined by the compiler, specified as a character vector.

Active State Output

`OutputState` — State or chart monitored by data object
`[]` (default) | `Stateflow.AtomicSubchart` object | `Stateflow.Chart` | `Stateflow.SimulinkBasedState` object | `Stateflow.State` object | `Stateflow.StateTransitionTableChart` object

This property is read-only.

State or chart monitored by the data object, specified as an empty array or a `Stateflow.AtomicSubchart`, `Stateflow.Chart`, `Stateflow.SimulinkBasedState`, `Stateflow.State`, or `Stateflow.StateTransitionTableChart` object. For more information, see “Monitor State Activity Through Active State Data”.

Signal Logging

`LoggingInfo` — Signal logging properties
`Stateflow.SigLoggingInfo` object

Signal logging properties for the data object, specified as a `Stateflow.SigLoggingInfo` object with these properties:

- **`DataLogging`** — Whether to enable signal logging, specified as a numeric or logical 1 (`true`) or 0 (`false`).
- **`DecimateData`** — Whether to limit the amount of logged data, specified as a numeric or logical 1 (`true`) or 0 (`false`).
- **`Decimation`** — Decimation interval, specified as an integer scalar. This property applies only when the `DecimateData` property is `true`.
- **`LimitDataPoints`** — Whether to limit the number of data points to log, specified as a numeric or logical 1 (`true`) or 0 (`false`).
- **`MaxPoints`** — Maximum number of data points to log, specified as an integer scalar. This property applies only when the `LimitDataPoints` property is `true`.
- **`NameMode`** — Source of the signal name, specified as `'SignalName'` or `'Custom'`.
- **`LoggingName`** — Custom signal name, specified as a character vector. This property applies only when the `NameMode` property is `'Custom'`.

For more information, see “Log Simulation Output for States and Data”.

Example: `data.LoggingInfo.DataLogging = true;`

Debugging

`Debug` — Debugger properties
`Stateflow.DataDebug` object

Debugger properties for the data object, specified as a `Stateflow.DataDebug` object with this property:

- **`Watch`** — Whether to track the value of the data object in the Breakpoints and Watch window, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “View Data in the Breakpoints and Watch Window”.

Example: `data.Debug.Watch = true;`

`TestPoint` — Whether to set data object as test point
`false` or 0 (default) | `true` or 1

Whether to set the data object as a test point, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “Monitor Test Points in Stateflow Charts”.

Hierarchy

`Machine` — Machine that contains data object
`Stateflow.Machine` object

This property is read-only.

Machine that contains the data object, specified as a `Stateflow.Machine` object.

`Path` — Location of parent in model hierarchy
character vector

This property is read-only.

Location of the parent of the data object in the model hierarchy, specified as a character vector.

Identification

`Description` — Description
`''` (default) | character vector

Description for the data object, specified as a character vector.

`Document` — Document link
`''` (default) | character vector

Document link for the data object, specified as a character vector.

`Tag` — User-defined tag
`[]` (default) | any data type

User-defined tag for the data object, specified as data of any type.

`SSIdNumber` — Session-independent identifier
scalar

This property is read-only.

Session-independent identifier, specified as an integer scalar. Use this property to distinguish the data object from other objects in the model.

`Id` — Unique identifier
scalar

This property is read-only.

Unique identifier, specified as an integer scalar. Unlike `SSIdNumber`, the value of this property is reassigned every time you start a new MATLAB session and may be recycled after an object is deleted.

Object Functions

getParent	Identify parent of object
dialog	Open properties dialog box
view	Display object in editing environment

Examples

Add Data to Chart

Add a data object to the chart `ch`. Specify its name, scope, and data type.

```
data = Stateflow.Data(ch);
data.Name = 'x';
data.Scope = 'Input';
data.Props.Type.Method = 'Built-in';
data.DataType = 'single';
```

Compatibility Considerations

Stateflow no longer supports creating machine-parented data

Errors starting in R2021b

Starting in R2021b, the `Stateflow.Data` function does not support arguments of type `Stateflow.Machine`. The presence of machine-parented data in a model prevents the reuse of generated code and other code optimizations. This type of data is also incompatible with many Simulink and Stateflow features. To make Stateflow data accessible to other charts and blocks in a model, use data store memory. For more information, see “Best Practices for Using Data in Charts” and “Access Data Store Memory from a Chart”.

See Also

`Stateflow.Box` | `Stateflow.Chart` | `Stateflow.EMFunction` | `Stateflow.Function` | `Stateflow.SimulinkBasedState` | `Stateflow.SLFunction` | `Stateflow.State` | `Stateflow.TruthTable`

Topics

“Overview of the Stateflow API” on page 1-2
“Add Stateflow Data”
“Set Data Properties”
“List of Stateflow API Properties” on page 4-2

Introduced before R2006a

Stateflow.DataArray

Array properties for data and messages

Description

Use a `Stateflow.DataArray` object to specify the array properties for a data object or message.

Creation

Each data object and message has its own `Stateflow.DataArray` object. To access the `Stateflow.DataArray` object, use the `Props.Array` property for the `Stateflow.Data` or `Stateflow.Message` object.

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

`Size` — Size
`'-1'` (default) | character vector

Size of the data object or message data, specified as a character vector. For more information, see “Specify Size of Stateflow Data”.

`IsDynamic` — Whether data object has variable size
`false` or 0 (default) | `true` or 1

Whether the data object has variable size, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property applies only to input, output, and local data and is equivalent to the **Variable Size** check box in the Property Inspector, the Model Explorer, or the Data properties dialog box. Use the `Size` property to specify the maximum size for the data. For more information, see “Declare Variable-Size Data in Stateflow Charts”.

`FirstIndex` — Index for first element of array
character vector

Index for the first element of the array data object, specified as a character vector. This property applies only to array data in charts that use C as the action language. For more information, see “Save Final Value to Base Workspace”.

Examples

Specify Size of Data

Access the `Stateflow.Props` and `Stateflow.DataArray` objects for the `Stateflow.Data` object `x`.

```
properties = x.Props;
array = properties.Array;
```

Specify the size of the data object.

```
array.size = "[2 3]";
```

See Also

`Stateflow.Data` | `Stateflow.Message`

Topics

"Overview of the Stateflow API" on page 1-2
"List of Stateflow API Properties" on page 4-2
"Specify Size of Stateflow Data"
"Declare Variable-Size Data in Stateflow Charts"
"Save Final Value to Base Workspace"

Introduced before R2006a

Stateflow.DataDebug

Debugger properties for data

Description

Use a `Stateflow.DataDebug` object to specify the debugger properties for a data object.

Creation

Each data object has its own `Stateflow.DataDebug` object. To access the `Stateflow.DataDebug` object, use the `Debug` property for the `Stateflow.Data` object.

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

`Watch` — Whether to track data object
`false` or 0 (default) | `true` or 1

Whether to track the value of the data object in the Breakpoints and Watch window, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “View Data in the Breakpoints and Watch Window”.

Examples

Add Data to Breakpoints and Watch Window

Access the `Stateflow.DataDebug` object for the `Stateflow.Data` object `x`.

```
debug = x.Debug;
```

Add the data object to the Breakpoints and Watch window.

```
debug.Watch = true;
```

See Also

`Stateflow.Data`

Topics

“Overview of the Stateflow API” on page 1-2
“List of Stateflow API Properties” on page 4-2
“View Data in the Breakpoints and Watch Window”

Introduced before R2006a

Stateflow.DataProps

Data specification properties for data and messages

Description

Use a `Stateflow.DataProps` object to specify the data properties for a data object or message.

Creation

Each data object and message has its own `Stateflow.DataProps` object. To access the `Stateflow.DataProps` object, use the `Props` property for the `Stateflow.Data` or `Stateflow.Message` object.

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see "Modify Properties and Call Functions of Stateflow Objects" on page 1-11.

Type — Data type properties
`Stateflow.DataType` object

Data type properties, specified as a `Stateflow.DataType` object with these properties:

- **`Method`** — Method for setting the type of the data object or message, specified as a character vector.

    - For local, input, output, or parameter data, use `'Inherited'`, `'Built-in'`, `'Bus Object'`, `'Enumerated'`, `'Expression'`, or `'Fixed point'`.
    - For constant data, use `'Built-in'`, `'Expression'`, or `'Fixed point'`.
    - For data store memory data, use `'Inherited'`.
    - For messages, use `'Inherited'`, `'Built-in'`, `'Bus Object'`, `'Enumerated'`, `'Expression'`, or `'Fixed point'`.

  This property is equivalent to the **Mode** field of the Data Type Assistant in the Model Explorer and the Data properties dialog box. For more information, see "Specify Type of Stateflow Data".
- **`BusObject`** — Name of the `Simulink.Bus` object that defines the data object or message data, specified as a character vector. This property applies only when the `Method` property of the data object is `'Bus Object'`. For more information, see "Access Bus Signals Through Stateflow Structures".
- **`EnumType`** — Name of the enumerated type that defines the data object or message data, specified as a character vector. This property applies only when the `Method` property of the data object is `'Enumerated'`. For more information, see "Reference Values by Name by Using Enumerated Data".

- **Expression** — Expression that evaluates to the data type of the data object or message data, specified as a character vector. This property applies only when the `Method` property of the data object is `'Expression'`. For more information, see “Specify Data Properties by Using MATLAB Expressions”.
- **Signed** — Signedness, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property applies only when the `Method` property of the data object is `'Fixed point'`. For more information, see “Fixed-Point Data in Stateflow Charts”.
- **WordLength** — Word length, in bits, specified as a character vector. This property applies only when the `Method` property of the data object is `'Fixed point'`. For more information, see “Fixed-Point Data in Stateflow Charts”.
- **Fixpt.ScalingMode** — Method for scaling the fixed-point data object or message data, specified as `'Binary point'`, `'Slope and bias'`, or `'None'`. This property applies only when the `Method` property of the data object is `'Fixed point'`. For more information, see “Fixed-Point Data in Stateflow Charts”.
- **Fixpt.FractionLength** — Fraction length, in bits, specified as a character vector. This property applies only when the `Method` property is `'Fixed point'` and the `Fixpt.ScalingMode` property is `'Binary point'`.
- **Fixpt.Slope** — Slope, specified as a character vector. This property applies only when the `Method` property is `'Fixed point'` and the `Fixpt.ScalingMode` property is `'Slope and bias'`.
- **Fixpt.Bias** — Bias, specified as a character vector. This property applies only when the `Method` property is `'Fixed point'` and the `Fixpt.ScalingMode` property is `'Slope and bias'`.
- **Fixpt.Lock** — Whether to prevent replacement of the fixed-point type with an autoscaled type chosen by the Fixed-Point Tool (Fixed-Point Designer), specified as a numeric or logical 1 (`true`) or 0 (`false`). This property applies only when the `Method` property of the data object is `'Fixed point'`.

Array — Array properties
`Stateflow.DataArray` object

Array properties, specified as a `Stateflow.DataArray` object with these properties:

- **Size** — Size of the data object or message data, specified as a character vector. For more information, see “Specify Size of Stateflow Data”.
- **IsDynamic** — Whether the data object has variable size, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property applies only to input, output, and local data and is equivalent to the **Variable Size** check box in the Property Inspector, the Model Explorer, or the Data properties dialog box. Use the `Size` property to specify the maximum size for the data. For more information, see “Declare Variable-Size Data in Stateflow Charts”.
- **FirstIndex** — Index for the first element of the array data object, specified as a character vector. This property applies only to array data in charts that use C as the action language. For more information, see “Save Final Value to Base Workspace”.

Complexity — Whether data object or message accepts complex values
`'Off'` (default) | `'On'`

Whether the data object or message accepts complex values, specified as `'On'` or `'Off'`. For more information, see “Complex Data in Stateflow Charts”.

InitialValue — Initial value
`''` (default) | character vector

Initial value, specified as a character vector.

Range — Range of acceptable values
`Stateflow.DataRange` object

Range of acceptable values for the data object, specified as a `Stateflow.DataRange` object with these properties:

- **`Minimum`** — Minimum value, specified as a character vector.
- **`Maximum`** — Maximum value, specified as a character vector.

This property does not apply to message data. For more information, see “Limit Range”.

`ResolveToSignalObject` — Whether data object resolves to `Simulink.Signal` object
`false` or 0 (default) | `true` or 1

Whether the data object resolves to a `Simulink.Signal` object that you define in the model or base workspace, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property does not apply to message data. For more information, see “Resolve Data Properties from Simulink Signal Objects”.

Unit — Unit of measurement for input and output data
`Stateflow.Unit` object

Unit of measurement for input and output data objects, specified as a `Stateflow.Unit` object with this property:

- **Name** — Name of the unit of measurement, specified as a character vector.

This property applies only to input and output data. For more information, see “Specify Units for Stateflow Data”.

Examples

Specify Fixed-Point Data Type

Access the `Stateflow.Props`, `Stateflow.DataType`, and `Stateflow.FixptType` objects for the `Stateflow.Data` object `x`.

```
properties = x.Props;
type = properties.Type;
fixpt = type.Fixpt;
```

Specify the fixed-point properties.

```
type.Method = 'Fixed point';
type.Signed = true;
type.WordLength = '5';
fixpt.ScalingMode = 'Binary point';
fixpt.FractionLength = '2';
```

Verify the data type.

```
x.DataType
```

```
ans =
    'fixdt(1,5,2)'
```

Specify Size of Data

Access the `Stateflow.Props` and `Stateflow.DataArray` objects for the `Stateflow.Data` object `x`.

```
properties = x.Props;
array = properties.Array;
```

Specify the size of the data object.

```
array.size = "[2 3]";
```

Specify Range of Values for Data

Access the `Stateflow.Props` and `Stateflow.DataRanges` objects for the `Stateflow.Data` object `x`.

```
properties = x.Props;
range = properties.Range;
```

Specify the minimum and maximum acceptable values.

```
range.Minimum = "0";
range.Maximum = "1024";
```

Specify Units for Data

Access the `Stateflow.Props` and `Stateflow.Unit` objects for the `Stateflow.Data` object `x`.

```
properties = x.Props;
unit = properties.Unit;
```

Specify the units as meters.

```
unit.Name = "m";
```

See Also

`Stateflow.Data` | `Stateflow.Message`

Topics

"Overview of the Stateflow API" on page 1-2
"List of Stateflow API Properties" on page 4-2

Introduced before R2006a

Stateflow.DataRange

Range of acceptable values for data

Description

Use a `Stateflow.DataRange` object to specify the range of acceptable values for a data object. For more information, see “Limit Range”.

Creation

Each data object and message has its own `Stateflow.DataRange` object. However, the object only applies for `Stateflow.Data` objects. To access the `Stateflow.DataRange` object, use the `Props.Range` property for the `Stateflow.Data` object.

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

`Minimum` — Minimum value
`''` (default) | character vector

Minimum value, specified as a character vector.

`Maximum` — Maximum value
`''` (default) | character vector

Maximum value, specified as a character vector.

Examples

Specify Range of Values for Data

Access the `Stateflow.Props` and `Stateflow.DataRanges` objects for the `Stateflow.Data` object `x`.

```
properties = x.Props;
range = properties.Range;
```

Specify the minimum and maximum acceptable values.

```
range.Minimum = "0";
range.Maximum = "1024";
```

See Also

`Stateflow.Data`

Topics

"Overview of the Stateflow API" on page 1-2
"List of Stateflow API Properties" on page 4-2

Introduced before R2006a

Stateflow.DataType

Data type properties for data and messages

Description

Use a `Stateflow.DataType` object to specify the data type properties for a data object or message.

Creation

Each data object and message has its own `Stateflow.DataType` object. To access the `Stateflow.DataType` object, use the `Props.Type` property for the `Stateflow.Data` or `Stateflow.Message` object.

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

`Method` — Method for setting data type
`'Inherited'` (default) | `'Built-in'` | `'Bus Object'` | `'Enumerated'` | `'Expression'` | `'Fixed point'`

Method for setting the type of the data object or message, specified as a character vector.

- For local, input, output, or parameter data, use `'Inherited'`, `'Built-in'`, `'Bus Object'`, `'Enumerated'`, `'Expression'`, or `'Fixed point'`.
- For constant data, use `'Built-in'`, `'Expression'`, or `'Fixed point'`.
- For data store memory data, use `'Inherited'`.
- For messages, use `'Inherited'`, `'Built-in'`, `'Bus Object'`, `'Enumerated'`, `'Expression'`, or `'Fixed point'`.

This property is equivalent to the **Mode** field of the Data Type Assistant in the Model Explorer and the Data properties dialog box. For more information, see “Specify Type of Stateflow Data”.

`BusObject` — Name of `Simulink.Bus` object
`''` (default) | character vector

Name of the `Simulink.Bus` object that defines the data object or message data, specified as a character vector. This property applies only when the `Method` property of the data object is `'Bus Object'`. For more information, see “Access Bus Signals Through Stateflow Structures”.

`EnumType` — Name of enumerated type
`''` (default) | character vector

Name of the enumerated type that defines the data object or message data, specified as a character vector. This property applies only when the `Method` property of the data object is `'Enumerated'`. For more information, see “Reference Values by Name by Using Enumerated Data”.

`Expression` — Expression that evaluates to data type
`''` (default) | character vector

Expression that evaluates to the data type of the data object or message data, specified as a character vector. This property applies only when the `Method` property of the data object is `'Expression'`. For more information, see “Specify Data Properties by Using MATLAB Expressions”.

`Signed` — Signedness
`true` or 1 (default) | `false` or 0

Signedness, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property applies only when the `Method` property of the data object is `'Fixed point'`. For more information, see “Fixed-Point Data in Stateflow Charts”.

`WordLength` — Word length
`'16'` (default) | character vector

Word length, in bits, specified as a character vector. This property applies only when the `Method` property of the data object is `'Fixed point'`. For more information, see “Fixed-Point Data in Stateflow Charts”.

`Fixpt` — Fixed-point properties
`Stateflow.FixptType` object

Fixed-point properties, specified as a `Stateflow.FixptType` object with these properties:

- **`ScalingMode`** — Method for scaling the fixed-point data object or message data, specified as `'Binary point'`, `'Slope and bias'`, or `'None'`.
- **`FractionLength`** — Fraction length, in bits, specified as a character vector. This property applies only when the `ScalingMode` property is `'Binary point'`.
- **`Slope`** — Slope, specified as a character vector. This property applies only when the `ScalingMode` property is `'Slope and bias'`.
- **`Bias`** — Bias, specified as a character vector. This property applies only when the `ScalingMode` property is `'Slope and bias'`.
- **`Lock`** — Whether to prevent replacement of the fixed-point type with an autoscaled type chosen by the Fixed-Point Tool (Fixed-Point Designer), specified as a numeric or logical 1 (`true`) or 0 (`false`).

This property applies only when the `Method` property of the data object is `'Fixed point'`. For more information, see “Fixed-Point Data in Stateflow Charts”.

Examples

Specify Fixed-Point Data Type

Access the `Stateflow.Props`, `Stateflow.DataType`, and `Stateflow.FixptType` objects for the `Stateflow.Data` object `x`.

```
properties = x.Props;
type = properties.Type;
fixpt = type.Fixpt;
```

Specify the fixed-point properties.

```
type.Method = 'Fixed point';
type.Signed = true;
type.WordLength = '5';
fixpt.ScalingMode = 'Binary point';
fixpt.FractionLength = '2';
```

Verify the data type.

```
x.DataType
```

```
ans =
    'fixdt(1,5,2)'
```

See Also

`Stateflow.Data` | `Stateflow.Message`

Topics

"Overview of the Stateflow API" on page 1-2
"List of Stateflow API Properties" on page 4-2

Introduced before R2006a

Stateflow.Editor

Graphical aspects of a chart or state transition table

Description

Use the `Stateflow.Editor` object to access the graphical aspects of a Stateflow chart or state transition table. You can use the `Stateflow.Editor` object to control the position, size, and magnification level of the Stateflow Editor window.

Creation

Each chart has its own `Stateflow.Editor` object. When you create a chart, an `Stateflow.Editor` object is automatically created for it. To access the `Stateflow.Editor` object, use the `Editor` property for the chart. For example, if `ch` is a `Stateflow.Chart` or `Stateflow.StateTransitionTableChart` object, enter:

```
editor = ch.Editor;
```

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see "Modify Properties and Call Functions of Stateflow Objects" on page 1-11.

`WindowPosition` — Position and size of window
`[left top width height]`

Position and size of the Stateflow editor window, specified as a four-element numeric vector of the form `[left top width height]`.

`ZoomFactor` — Magnification level
scalar

Magnification level of the chart or state transition table in the editor, specified as a scalar value between `0.5` and `10`. A value of `1` corresponds to a magnification of 100%.

Object Functions

zoomIn	Zoom in on Stateflow chart
zoomOut	Zoom out on Stateflow chart

Examples

Zoom in on Stateflow Chart

Increase the magnification level of a nonempty chart `ch`.

```
editor = ch.Editor;
zoomIn(editor)
```

If the magnification level for the chart was initially 100%, this command increases it to 130%.

Zoom out on Stateflow Chart

Decrease the magnification level of a nonempty chart `ch`.

```
editor = ch.Editor;
zoomOut(editor)
```

If the magnification level for the chart was initially 100%, this command decreases it to 76.9%.

Set Zoom Factor

Set the `ZoomFactor` property for a nonempty chart `ch` to an absolute magnification level of 150%.

```
editor = ch.Editor;
editor.ZoomFactor = 1.5;
```

See Also

`Stateflow.Chart` | `Stateflow.StateTransitionTableChart`

Topics

"Overview of the Stateflow API" on page 1-2
"List of Stateflow API Properties" on page 4-2

Introduced before R2006a

Stateflow.EMChart

Stateflow interface to MATLAB Function block

Description

Use `Stateflow.EMChart` objects to configure MATLAB Function blocks through the Stateflow programmatic interface.

MATLAB Function blocks define custom functionality in Simulink models. Use these blocks when:

- You have an existing MATLAB function that models custom functionality, or it would be easy for you to create such a function.
- Your model requires custom functionality that is not or cannot be captured in the Simulink graphical language.
- You find it easier to model custom functionality by using a MATLAB function than by using a Simulink block diagram.
- The custom functionality that you want to model does not include continuous or discrete dynamic states. To model dynamic states, use S-functions.

For more information, see “Implementing MATLAB Functions Using Blocks” (Simulink) and “Create Custom Functionality Using MATLAB Function Blocks” (Simulink).

Tip You can also configure the properties of a MATLAB Function block programmatically by using a `MATLABFunctionConfiguration` object. This object provides a direct interface to the properties of a MATLAB Function block. For more information, see “Configure MATLAB Function Blocks Programmatically” (Simulink).

Creation

Each MATLAB Function block has its own `Stateflow.EMChart` object. When you add a MATLAB Function block to a Simulink model, a `Stateflow.EMChart` object is automatically created for it. For example, you can use the function `add_block`:

```
add_block('simulink/User-Defined Functions/MATLAB Function', ...
   'myModel/MATLAB Function')
```

Then, to access the `Stateflow.EMChart` object, call the `find` function for the `Simulink.Root` object:

```
rt = sfroot;
block = find(rt,'-isa','Stateflow.EMChart', ...
    'Path','myModel/MATLAB Function')
```

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

Content

`Name` — Name of MATLAB Function block

`'MATLAB Function'` (default) | character vector

Name of the MATLAB Function block, specified as a character vector.

`Script` — Code for MATLAB Function block

character vector

Code for the MATLAB Function block, specified as a character vector. To enter multiple lines of code, you can:

- Call the MATLAB function `sprintf` and use `\n` to insert newline characters:

  ```
  str = sprintf('function y=f(x)\ny=x+1;\nend');
  block.Script = str;
  ```
- Enter a concatenated text expression that uses the integer 10 as the ASCII equivalent of a newline character:

  ```
  str = ['function y=f(x)',10, ...
      'y=x+1;',10, ...
      'end'];
  block.Script = str;
  ```

`SupportVariableSizing` — Whether MATLAB Function block supports variable-size data

`true` or `1` (default) | `false` or `0`

Whether the MATLAB Function block supports variable-size data, specified as a numeric or logical `1` (`true`) or `0` (`false`). Only variable-size data can change dimension during simulation. For more information, see “Declare Variable-Size Inputs and Outputs” (Simulink).

`AllowDirectFeedthrough` — Whether MATLAB Function block supports direct feedthrough semantics

`true` or `1` (default) | `false` or `0`

Whether the MATLAB Function block supports direct feedthrough semantics, specified as a numeric or logical `1` (`true`) or `0` (`false`). For more information, see “Allow direct feedthrough” (Simulink).

`VectorOutputs1D` — Whether MATLAB Function block outputs column vectors as one-dimensional data

`false` or `0` (default) | `true` or `1`

Whether the MATLAB Function block outputs column vectors as one-dimensional data, specified as a numeric or logical `0` (`false`) or `1` (`true`). For more information, see “Interpret output column vectors as one-dimensional data” (Simulink).

Interface

`Inputs` — Input arguments

array of `Stateflow.Data` objects

This property is read-only.

Input arguments of the MATLAB Function block, specified as an array of `Stateflow.Data` objects. The value of this property depends on the inputs defined in the `Script` property for the block.

`Outputs` — Output arguments
array of `Stateflow.Data` objects

This property is read-only.

Output arguments of the MATLAB Function block, specified as an array of `Stateflow.Data` objects. The value of this property depends on the outputs defined in the `Script` property for the block.

Discrete and Continuous-Time Semantics

`ChartUpdate` — Activation method for MATLAB Function block
`'INHERITED'` (default) | `'CONTINUOUS'` | `'DISCRETE'`

Activation method for the MATLAB Function block, specified as `'CONTINUOUS'`, `'DISCRETE'`, or `'INHERITED'`. For more information, see “Update method” (Simulink).

`SampleTime` — Sample time for activating MATLAB Function block
`'-1'` (default) | character vector

Sample time for activating the MATLAB Function block, specified as a character vector. This property applies only when the `ChartUpdate` property for the MATLAB function is `'DISCRETE'`.

Integer and Fixed-Point Data

`SaturateOnIntegerOverflow` — Whether data saturates on integer overflow
`true` or `1` (default) | `false` or `0`

Whether the data in the MATLAB Function block saturates on integer overflow, specified as a numeric or logical `1` (`true`) or `0` (`false`). When this property is disabled, the data in the function wraps on integer overflow. For more information, see “Saturate on integer overflow” (Simulink).

`TreatAsFi` — Inherited Simulink signals to treat as `fi` objects
`'Fixed-point'` (default) | `'Fixed-point & Integer'`

Inherited Simulink signals to treat as Fixed-Point Designer `fi` objects, specified as one of these values:

- `'Fixed-point'` — The MATLAB Function block treats all fixed-point inputs as `fi` objects.
- `'Fixed-point & Integer'` — The MATLAB Function block treats all fixed-point and integer inputs as `fi` objects.

`EmlDefaultFimath` — Default `fimath` properties
`'Same as MATLAB Default'` (default) | `'Other:UserSpecified'`

Default `fimath` properties for the MATLAB Function block, specified as one of these values:

- `'Same as MATLAB Default'` — Use the same `fimath` properties as the current default `fimath` object.
- `'Other:UserSpecified'` — Use the `InputFimath` property to specify the default `fimath` object.

`InputFimath` — Default `fimath` object
character vector

Default `fimath` object, specified as a character vector. When the `EmlDefaultFimath` property for the MATLAB Function block is `'Other:UserSpecified'`, you can use this property to:

- Enter an expression that constructs a `fimath` object.
- Enter the variable name for a `fimath` object in the MATLAB or model workspace.

Hierarchy

`Machine` — Machine that contains MATLAB Function block
`Stateflow.Machine` object

This property is read-only.

Machine that contains the MATLAB Function block, specified as a `Stateflow.Machine` object.

`Path` — Location of MATLAB Function block in model hierarchy
character vector

This property is read-only.

Location of the MATLAB Function block in the model hierarchy, specified as a character vector.

`Dirty` — Whether MATLAB Function block has changed
`true` or `1` | `false` or `0`

Whether the MATLAB Function block has changed after being opened or saved, specified as a numeric or logical `1` (`true`) or `0` (`false`).

`Locked` — Whether MATLAB Function block is locked
`false` or `0` (default) | `true` or `1`

Whether the MATLAB Function block is locked, specified as a numeric or logical `1` (`true`) or `0` (`false`). Enable this property to prevent changes in the MATLAB Function block.

`Iced` — Whether MATLAB Function block is locked
`false` or `0` (default) | `true` or `1`

This property is read-only.

Whether the MATLAB Function block is locked, specified as a numeric or logical `1` (`true`) or `0` (`false`). This property is equivalent to the property `Locked`, but is used internally to prevent changes in the MATLAB Function block during simulation.

Identification

`Description` — Description
`''` (default) | character vector

Description for the MATLAB Function block, specified as a character vector.

`Document` — Document link
`''` (default) | character vector

Document link for the MATLAB Function block, specified as a character vector.

Tag — User-defined tag
[ ] (default) | any data type

User-defined tag for the MATLAB Function block, specified as data of any type.

Id — Unique identifier
scalar

This property is read-only.

Unique identifier, specified as an integer scalar. Use this property to distinguish the MATLAB Function block from other objects in the model. The value of this property is reassigned every time you start a new MATLAB session and may be recycled after an object is deleted.

Object Functions

find	Identify specified objects in hierarchy
getChildren	Identify children of object
dialog	Open properties dialog box
view	Display object in editing environment

Examples

Program MATLAB Function Block

Access the `Stateflow.EMChart` object for a MATLAB Function block.

```
block = find(sfroot,'-isa','Stateflow.EMChart');
```

Store the MATLAB code to calculate the mean and standard deviation for a vector of values as a character vector.

```
str = ['function [mean,stdev] = stats(vals)',10, ...
'% Calculates a statistical mean and a standard',10, ...
'% deviation for the values in vals.',10,10, ...
'len = length(vals);',10, ...
'mean = avg(vals,len);',10, ...
'stdev = sqrt(sum(((vals-avg(vals,len)).^2))/len);',10, ...
'plot(vals,''-+'');',10,10,...
'function mean = avg(array,size)',10, ...
'mean = sum(array)/size;'];
```

Populate the block with code by modifying the `Script` property of the corresponding `Stateflow.EMChart` object.

```
block.Script = str;
```

Open the function in the MATLAB Function Block Editor.

```
view(block)
```

The editor shows this code.

```
function [mean,stdev] = stats(vals)
% Calculates a statistical mean and a standard
% deviation for the values in vals.

len = length(vals);
mean = avg(vals,len);
stdev = sqrt(sum(((vals-avg(vals,len)).^2))/len);
plot(vals,'-+');

function mean = avg(array,size)
mean = sum(array)/size;
```

Import Code from MATLAB Function

Open a Simulink model called `myModel`.

```
open_system('myModel')
```

Add a MATLAB Function block to `myModel`.

```
blockPath = 'myModel/My Function';
add_block('simulink/User-Defined Functions/MATLAB Function',blockPath)
```

Populate the block with code from the MATLAB function `myFunction.m`.

```
block = find(sfroot,'-isa','Stateflow.EMChart', ...
    'Path',newBlockPath);
block.Script = fileread('myFunction.m');
```

Find Number of MATLAB Function Blocks in Model

Open a Simulink model called `myModel`.

```
open_system('myModel')
```

Access the `Simulink.Root` object at the top level of the Stateflow hierarchy.

```
rt = sfroot;
```

Find the MATLAB Function blocks in the model.

```
blocks = find(rt,'-isa','Stateflow.EMChart');
```

Count the number of blocks.

```
numel(blocks);
```

See Also

Blocks
MATLAB Function

Functions
`sfroot` | `add_block` | `fileread` | `numel`

Objects
`MATLABFunctionConfiguration`

Topics
“Overview of the Stateflow API” on page 1-2
“Implementing MATLAB Functions Using Blocks” (Simulink)
“Create Custom Functionality Using MATLAB Function Blocks” (Simulink)
“Specify MATLAB Function Block Properties” (Simulink)
“List of Stateflow API Properties” on page 4-2

Introduced in R2011a

Stateflow.EMFunction

MATLAB function in chart, state, box, or function

Description

Use `Stateflow.EMFunction` objects to create MATLAB functions for coding algorithms that are more easily expressed by using MATLAB code instead of the graphical Stateflow constructs. Typical applications include:

- Matrix-oriented calculations
- Data analysis and visualization

You can call a MATLAB function in the actions of states and transitions. For more information, see “Reuse MATLAB Code by Defining MATLAB Functions”.

Creation

Syntax

```
function = Stateflow.EMFunction(parent)
```

Description

`function = Stateflow.EMFunction(parent)` creates a `Stateflow.EMFunction` object in a parent chart, state, box, or function.

Input Arguments

`parent` — Parent for new MATLAB function
`Stateflow.Chart` object | `Stateflow.State` object | `Stateflow.Box` object | `Stateflow.Function` object

Parent for the new MATLAB function, specified as a Stateflow API object of one of these types:

- `Stateflow.Box`
- `Stateflow.Chart`
- `Stateflow.Function`
- `Stateflow.State`

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

Content

Name — Name of MATLAB function

`''` (default) | character vector

Name of the MATLAB function, specified as a character vector.

`LabelString` — Label for MATLAB function

`'?'` (default) | character vector

Label for the MATLAB function, specified as a character vector.

`Script` — Code for MATLAB function

character vector

Code for the MATLAB function, specified as a character vector. To enter multiple lines of code, you can:

- Call the MATLAB function `sprintf` and use the escape sequence `\n` to insert newline characters:

  ```
  str = sprintf('function y=f(x)\ny=x+1;\nend');
  function.Script = str;
  ```

- Enter a concatenated text expression that uses the integer 10 as the ASCII equivalent of a newline character:

  ```
  str = ['function y=f(x)',10, ...
      'y=x+1;',10, ...
      'end'];
  function.Script = str;
  ```

`IsExplicitlyCommented` — Whether to comment out MATLAB function

`false` or 0 (default) | `true` or 1

Whether to comment out the MATLAB function, specified as a numeric or logical 1 (`true`) or 0 (`false`). Setting this property to `true` is equivalent to right-clicking the MATLAB function and selecting **Comment Out**. For more information, see “Commenting Stateflow Objects in a Chart”.

`IsImplicitlyCommented` — Whether MATLAB function is implicitly commented out

`true` or 1 | `false` or 0

This property is read-only.

Whether the MATLAB function is implicitly commented out, specified as a numeric or logical 1 (`true`) or 0 (`false`). The MATLAB function is implicitly commented out when you comment out a state, box, or function that contains it.

`CommentText` — Comment text

`''` (default) | character vector

Comment text for the MATLAB function, specified as a character vector. This property applies only when the `IsExplicitlyCommented` property is `true`. In the Stateflow Editor, when you point to the comment badge % on the MATLAB function, the text appears as a tooltip. When you set the `IsExplicitlyCommented` property to `false`, the value of `CommentText` reverts to `''`.

Graphical Appearance

`Position` — Position and size of MATLAB function
`[0 0 90 60]` (default) | `[left top width height]`

Position and size of the MATLAB function, specified as a four-element numeric vector of the form `[left top width height]`.

`BadIntersection` — Whether function intersects a box, state, or function
`true` or 1 | `false` or 0

This property is read-only.

Whether the MATLAB function graphically intersects a box, state, or function, specified as a numeric or logical 1 (`true`) or 0 (`false`).

`FontSize` — Font size for MATLAB function label
scalar

Font size for the MATLAB function label, specified as a scalar. The `StateFont.Size` property of the chart that contains the graphical function sets the initial value of this property.

Integer and Fixed-Point Data

`SaturateOnIntegerOverflow` — Whether data saturates on integer overflow
`true` or 1 (default) | `false` or 0

Whether the data in the MATLAB function saturates on integer overflow, specified as a numeric or logical 1 (`true`) or 0 (`false`). When this property is disabled, the data in the function wraps on integer overflow. For more information, see “Handle Integer Overflow for Chart Data”.

This property applies only when the `ActionLanguage` of the chart that contains the function is `'C'`. Otherwise, the behavior of data depends on the value of the `SaturateOnIntegerOverflow` property for the chart.

`EmlDefaultFimath` — Default `fimath` properties
`'Same as MATLAB Default'` (default) | `'Other:UserSpecified'`

Default `fimath` properties for the MATLAB function, specified as one of these values:

- `'Same as MATLAB Default'` — Use the same `fimath` properties as the current default `fimath` object.
- `'Other:UserSpecified'` — Use the `InputFimath` property to specify the default `fimath` object.

This property applies only when the `ActionLanguage` of the chart that contains the function is `'C'`. Otherwise, the behavior of data depends on the value of the `EmlDefaultFimath` property for the chart.

`InputFimath` — Default `fimath` object
character vector

Default `fimath` object, specified as a character vector. When the `EmlDefaultFimath` property for the MATLAB function is `'Other:UserSpecified'`, you can use this property to:

- Enter an expression that constructs a `fimath` object.
- Enter the variable name for a `fimath` object in the MATLAB or model workspace.

This property applies only when the `ActionLanguage` of the chart that contains the function is `'C'`. Otherwise, the behavior of data depends on the value of the `InputFimath` property for the chart.

Code Generation

`InlineOption` — Appearance in generated code
`'Auto'` (default) | `'Function'` | `'Inline'`

Appearance of the MATLAB function in generated code, specified as one of these values:

- `'Auto'` — An internal calculation determines the appearance of the function in generated code.
- `'Function'` — The function is implemented as a separate C function.
- `'Inline'` — Calls to the function are replaced by code.

For more information, see “Inline State Functions in Generated Code” (Simulink Coder).

Hierarchy

`Chart` — Chart that contains MATLAB function
`Stateflow.Chart` object

This property is read-only.

Chart that contains the MATLAB function, specified as a `Stateflow.Chart` object.

`Subviewer` — Subviewer for MATLAB function
`Stateflow.Chart` object | `Stateflow.State` object | `Stateflow.Box` object | `Stateflow.Function` object

This property is read-only.

Subviewer for the MATLAB function, specified as a `Stateflow.Chart`, `Stateflow.State`, `Stateflow.Box`, or `Stateflow.Function` object. The subviewer is the chart or subchart where you can graphically view the MATLAB function.

`Machine` — Machine that contains MATLAB function
`Stateflow.Machine` object

This property is read-only.

Machine that contains the MATLAB function, specified as a `Stateflow.Machine` object.

`Path` — Location of parent in model hierarchy
character vector

This property is read-only.

Location of the parent of the MATLAB function in the model hierarchy, specified as a character vector.

Identification

`Description` — Description
`''` (default) | character vector

Description for the MATLAB function, specified as a character vector.

`Document` — Document link
`''` (default) | character vector

Document link for the MATLAB function, specified as a character vector.

`Tag` — User-defined tag
`[]` (default) | any data type

User-defined tag for the MATLAB function, specified as data of any type.

`SSIdNumber` — Session-independent identifier
scalar

This property is read-only.

Session-independent identifier, specified as an integer scalar. Use this property to distinguish the MATLAB function from other objects in the model.

`Id` — Unique identifier
scalar

This property is read-only.

Unique identifier, specified as an integer scalar. Unlike `SSIdNumber`, the value of this property is reassigned every time you start a new MATLAB session and may be recycled after an object is deleted.

Object Functions

find	Identify specified objects in hierarchy
getChildren	Identify children of object
getParent	Identify parent of object
dialog	Open properties dialog box
isCommented	Determine if graphical object is commented out
view	Display object in editing environment
highlight	Highlight graphical object
fitToView	Zoom in on graphical object

Examples

Add MATLAB Function to Chart

Add a MATLAB function in the chart `ch`. Set its label to `'[y1,y2] = f(x1,x2,x3)'`.

```
function = Stateflow.EMFunction(ch);
function.LabelString = '[y1,y2] = f(x1,x2,x3)';
```

See Also

`Stateflow.Box` | `Stateflow.Chart` | `Stateflow.Function` | `Stateflow.State`

Topics

“Overview of the Stateflow API” on page 1-2
“Reuse MATLAB Code by Defining MATLAB Functions”
“List of Stateflow API Properties” on page 4-2

Introduced before R2006a

Stateflow.ChartBreakpoints

Breakpoint properties for chart or state transition table

Description

Use a `Stateflow.ChartBreakpoints` object to specify the breakpoint properties for a chart or state transition table. For more information, see “Set Breakpoints to Debug Charts”.

Creation

Each chart and state transition table has its own `Stateflow.ChartBreakpoints` object. To access the `Stateflow.ChartBreakpoints` object, use the `Debug.Breakpoints` property of the `Stateflow.Chart` or `Stateflow.StateTransitionTableChart` object.

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

`OnEntry` — Whether to set `On Chart Entry` breakpoint
`false` or 0 (default) | `true` or 1

Whether to set the `On Chart Entry` breakpoint, specified as a numeric or logical 1 (`true`) or 0 (`false`).

Examples

Set Breakpoint for Chart

Access the `Stateflow.ChartDebug` and `Stateflow.ChartBreakpoints` objects for the `Stateflow.Chart` object `ch`.

```
debug = ch.Debug;
breakpoints = debug.Breakpoints;
```

Set the `On Chart Entry` breakpoint.

```
breakpoints.OnEntry = true;
```

See Also

`Stateflow.Chart` | `Stateflow.StateTransitionTableChart`

Topics
“Overview of the Stateflow API” on page 1-2

“List of Stateflow API Properties” on page 4-2
“Set Breakpoints to Debug Charts”

Introduced before R2006a

Stateflow.ChartDebug

Debugger properties for chart or state transition table

Description

Use a `Stateflow.ChartDebug` object to specify the debugger properties for a chart or state transition table.

Creation

Each chart and state transition table has its own `Stateflow.ChartDebug` object. To access the `Stateflow.ChartDebug` object, use the `Debug` property for the `Stateflow.Chart` or `Stateflow.StateTransitionTableChart` object.

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

`Breakpoints` — Breakpoint properties
`Stateflow.ChartBreakpoints` object

Breakpoint properties for the chart or state transition table, specified as a `Stateflow.ChartBreakpoints` object with this property:

- **`OnEntry`** — Whether to set the `On Chart Entry` breakpoint, specified as a numeric or logical 1 (`true`) or 0 (`false`).

For more information, see “Set Breakpoints to Debug Charts”.

Examples

Set Breakpoint for Chart

Access the `Stateflow.ChartDebug` and `Stateflow.ChartBreakpoints` objects for the `Stateflow.Chart` object `ch`.

```
debug = ch.Debug;
breakpoints = debug.Breakpoints;
```

Set the `On Chart Entry` breakpoint.

```
breakpoints.OnEntry = true;
```

See Also

`Stateflow.Chart` | `Stateflow.StateTransitionTableChart`

Topics

"Overview of the Stateflow API" on page 1-2
"List of Stateflow API Properties" on page 4-2
"Set Breakpoints to Debug Charts"

Introduced before R2006a

Stateflow.Event

Event in chart, state, or box

Description

Use `Stateflow.Event` objects to trigger actions in one of these objects:

- A parallel state in a Stateflow chart
- Another Stateflow chart
- A Simulink triggered or function-call subsystem

For more information, see “Synchronize Model Components by Broadcasting Events”.

Creation

Syntax

`event = Stateflow.Event(parent)`

Description

`event = Stateflow.Event(parent)` creates a `Stateflow.Event` object in a parent chart, state, or box.

Input Arguments

`parent` — Parent for new event
`Stateflow.Chart` object | `Stateflow.State` object | `Stateflow.Box` object

Parent for the new event, specified as a Stateflow API object of one of these types:

- `Stateflow.Box`
- `Stateflow.Chart`
- `Stateflow.State`

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

Interface

`Name` — Name of event
`'event'` (default) | character vector

Name of the event, specified as a character vector.

`Scope` — Scope of event
`'Local'` (default) | `'Input'` | `'Output'`

Scope of the event, specified as `'Local'`, `'Input'`, or `'Output'`. For more information, see “Scope”.

`Trigger` — Type of trigger
`'Function call'` (default) | `'Rising'` | `'Falling'` | `'Either'`

Type of trigger associated with the event, specified as a character vector that depends on the scope of the data:

- For input events, use `'Function call'`, `'Rising'`, `'Falling'`, or `'Either'`.
- For output events, use `'Function call'` or `'Either'`.

This property does not apply to local events. For more information, see “Trigger”.

`Port` — Port index for event
scalar

Port index for the event, specified as an integer scalar. This property applies only to input and output events. For more information, see “Port”.

Debugging

`Debug` — Debugger properties
`Stateflow.EventDebug` object

Debugger properties for the event, specified as a `Stateflow.EventDebug` object with these properties:

- **`Breakpoints.StartBroadcast`** — Whether to set the `Start of Broadcast` breakpoint, specified as a numeric or logical 1 (`true`) or 0 (`false`).
- **`Breakpoints.EndBroadcast`** — Whether to set the `End of Broadcast` breakpoint, specified as a numeric or logical 1 (`true`) or 0 (`false`).

For more information, see “Set Breakpoints to Debug Charts”.

Example: `event.Debug.Breakpoints.StartBroadcast = true;`

Example: `event.Debug.Breakpoints.EndBroadcast = true;`

Hierarchy

`Machine` — Machine that contains event
`Stateflow.Machine` object

This property is read-only.

Machine that contains the event, specified as a `Stateflow.Machine` object.

`Path` — Location of parent in model hierarchy
character vector

This property is read-only.

Location of the parent of the event in the model hierarchy, specified as a character vector.

Identification

`Description` — Description
`''` (default) | character vector

Description for the event, specified as a character vector.

`Document` — Document link
`''` (default) | character vector

Document link for the event, specified as a character vector.

`Tag` — User-defined tag
`[]` (default) | any data type

User-defined tag for the event, specified as data of any type.

`Id` — Unique identifier
scalar

This property is read-only.

Unique identifier, specified as an integer scalar. Use this property to distinguish the event from other objects in the model. The value of this property is reassigned every time you start a new MATLAB session and may be recycled after an object is deleted.

Object Functions

getParent	Identify parent of object
dialog	Open properties dialog box
view	Display object in editing environment

Examples

Add Event to Chart

Add a event to the chart `ch`. Specify its name and scope.

```
event = Stateflow.Event(ch);
event.Name = 'E';
event.Scope = 'Input';
```

See Also

`Stateflow.Box` | `Stateflow.Chart` | `Stateflow.State`

Topics

"Overview of the Stateflow API" on page 1-2
"Synchronize Model Components by Broadcasting Events"
"Set Properties for an Event"

“List of Stateflow API Properties” on page 4-2

Introduced before R2006a

Stateflow.EventBreakpoints

Breakpoint properties for event

Description

Use a `Stateflow.EventBreakpoints` object to specify the breakpoint properties for an event. For more information, see “Set Breakpoints to Debug Charts”.

Creation

Each event has its own `Stateflow.EventBreakpoints` object. To access the `Stateflow.EventBreakpoints` object, use the `Debug.Breakpoints` property of the `Stateflow.Event` object.

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

`StartBroadcast` — Whether to set `Start of Broadcast` breakpoint
`false` or 0 (default) | `true` or 1

Whether to set the `Start of Broadcast` breakpoint, specified as a numeric or logical 1 (`true`) or 0 (`false`).

`EndBroadcast` — Whether to set `End of Broadcast` breakpoint
`false` or 0 (default) | `true` or 1

Whether to set the `End of Broadcast` breakpoint, specified as a numeric or logical 1 (`true`) or 0 (`false`).

Examples

Set Breakpoints for Event

Access the `Stateflow.EventDebug` and `Stateflow.EventBreakpoints` objects for the `Stateflow.Event` object `event`.

```
debug = event.Debug;
breakpoints = debug.Breakpoints;
```

Set the `Start of Broadcast` and `End of Broadcast` breakpoints.

```
breakpoints.StartBroadcast = true;
breakpoints.EndBroadcast = true;
```

See Also

`Stateflow.Event`

Topics

“Overview of the Stateflow API” on page 1-2
“List of Stateflow API Properties” on page 4-2
“Set Breakpoints to Debug Charts”

Introduced before R2006a

Stateflow.EventDebug

Debugger properties for event

Description

Use a `Stateflow.EventDebug` object to specify the debugger properties for an event.

Creation

Each event has its own `Stateflow.EventDebug` object. To access the `Stateflow.EventDebug` object, use the `Debug` property for the `Stateflow.Event` object.

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

`Breakpoints` — Breakpoint properties
`Stateflow.EventBreakpoints` object

Breakpoint properties for the event, specified as a `Stateflow.EventBreakpoints` object with these properties:

- **`StartBroadcast`** — Whether to set the `Start of Broadcast` breakpoint, specified as a numeric or logical 1 (`true`) or 0 (`false`).
- **`EndBroadcast`** — Whether to set the `End of Broadcast` breakpoint, specified as a numeric or logical 1 (`true`) or 0 (`false`).

For more information, see “Set Breakpoints to Debug Charts”.

Examples

Set Breakpoints for Event

Access the `Stateflow.EventDebug` and `Stateflow.EventBreakpoints` objects for the `Stateflow.Event` object `event`.

```
debug = event.Debug;
breakpoints = debug.Breakpoints;
```

Set the `Start of Broadcast` and `End of Broadcast` breakpoints.

```
breakpoints.StartBroadcast = true;
breakpoints.EndBroadcast = true;
```

See Also

`Stateflow.Event`

Topics

“Overview of the Stateflow API” on page 1-2
“List of Stateflow API Properties” on page 4-2
“Set Breakpoints to Debug Charts”

Introduced before R2006a

Stateflow.FixptType

Fixed-point properties for data and messages

Description

Use a `Stateflow.FixptType` object to specify the fixed-point properties for a data object or message. For more information, see “Fixed-Point Data in Stateflow Charts”.

Creation

Each data object and message has its own `Stateflow.FixptType` object. To access the `Stateflow.FixptType` object, use the `Props.Type.Fixpt` property for the `Stateflow.Data` or `Stateflow.Message` object.

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

`ScalingMode` — Method for scaling fixed-point data
`'None'` (default) | `'Binary point'` | `'Slope and bias'`

Method for scaling the fixed-point data object or message data, specified as `'Binary point'`, `'Slope and bias'`, or `'None'`.

`FractionLength` — Fraction length
`''` (default) | character vector

Fraction length, in bits, specified as a character vector. This property applies only to fixed-point data when the `ScalingMode` property is `'Binary point'`.

`Slope` — Slope
`''` (default) | character vector

Slope, specified as a character vector. This property applies only to fixed-point data when the `ScalingMode` property is `'Slope and bias'`.

`Bias` — Bias
`''` (default) | character vector

Bias, specified as a character vector. This property applies only to fixed-point data when the `ScalingMode` property is `'Slope and bias'`.

`Lock` — Whether to prevent replacement of fixed-point type
`false` or 0 (default) | `true` or 1

Whether to prevent replacement of the fixed-point type with an autoscaled type chosen by the Fixed-Point Tool (Fixed-Point Designer), specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “Iterative Fixed-Point Conversion Using the Fixed-Point Tool” (Fixed-Point Designer).

Examples

Specify Fixed-Point Data Type

Access the `Stateflow.Props`, `Stateflow.DataType`, and `Stateflow.FixptType` objects for the `Stateflow.Data` object `x`.

```
properties = x.Props;
type = properties.Type;
fixpt = type.Fixpt;
```

Specify the fixed-point properties.

```
type.Method = 'Fixed point';
type.Signed = true;
type.WordLength = '5';
fixpt.ScalingMode = 'Binary point';
fixpt.FractionLength = '2';
```

Verify the data type.

```
x.DataType
```

```
ans =
    'fixdt(1,5,2)'
```

See Also

`Stateflow.Data` | `Stateflow.Message`

Topics

“Overview of the Stateflow API” on page 1-2

“List of Stateflow API Properties” on page 4-2

Introduced before R2006a

Stateflow.Function

Graphical function in chart, state, box, or function

Description

Use `Stateflow.Function` objects to create graphical functions that contain control-flow logic and iterative loops. You create graphical functions with flow charts that use connective junctions and transitions. You can call a graphical function in the actions of states and transitions. For more information, see “Reuse Logic Patterns by Defining Graphical Functions”.

Creation

Syntax

`function = Stateflow.Function(parent)`

Description

`function = Stateflow.Function(parent)` creates a `Stateflow.Function` object in a parent chart, state, box, or function.

Input Arguments

`parent` — Parent for new graphical function
`Stateflow.Chart` object | `Stateflow.State` object | `Stateflow.Box` object | `Stateflow.Function` object

Parent for the new graphical function, specified as a Stateflow API object of one of these types:

- `Stateflow.Box`
- `Stateflow.Chart`
- `Stateflow.Function`
- `Stateflow.State`

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

Content

`Name` — Name of graphical function
`''` (default) | character vector

Name of the graphical function, specified as a character vector.

`LabelString` — Label for graphical function
`'?'` (default) | character vector

Label for the graphical function, specified as a character vector.

`IsExplicitlyCommented` — Whether to comment out graphical function
`false` or 0 (default) | `true` or 1

Whether to comment out the graphical function, specified as a numeric or logical 1 (`true`) or 0 (`false`). Setting this property to `true` is equivalent to right-clicking the graphical function and selecting **Comment Out**. For more information, see "Commenting Stateflow Objects in a Chart".

`IsImplicitlyCommented` — Whether graphical function is implicitly commented out
`true` or 1 | `false` or 0

This property is read-only.

Whether the graphical function is implicitly commented out, specified as a numeric or logical 1 (`true`) or 0 (`false`). The graphical function is implicitly commented out when you comment out a state, box, or function that contains it.

`CommentText` — Comment text
`''` (default) | character vector

Comment text for the graphical function, specified as a character vector. This property applies only when the `IsExplicitlyCommented` property is `true`. In the Stateflow Editor, when you point to the comment badge % on the graphical function, the text appears as a tooltip. When you set the `IsExplicitlyCommented` property to `false`, the value of `CommentText` reverts to `''`.

Graphical Appearance

`Position` — Position and size of graphical function
`[0 0 90 60]` (default) | `[left top width height]`

Position and size of the graphical function, specified as a four-element numeric vector of the form `[left top width height]`.

`BadIntersection` — Whether function intersects a box, state, or function
`true` or 1 | `false` or 0

This property is read-only.

Whether the graphical function graphically intersects a box, state, or function, specified as a numeric or logical 1 (`true`) or 0 (`false`).

`IsGrouped` — Whether function is a grouped function
`false` or 0 (default) | `true` or 1

Whether the function is a grouped function, specified as a numeric or logical 1 (`true`) or 0 (`false`). When you copy and paste a grouped function, you copy not only the function but all of its contents. For more information, see "Copy and Paste by Grouping" on page 2-24.

`IsSubchart` — Whether function is a subchart
`false` or 0 (default) | `true` or 1

Whether the function is a subchart, specified as a numeric or logical 1 (`true`) or 0 (`false`).

`ContentPreviewEnabled` — Whether to display preview of function contents
`false` or 0 (default) | `true` or 1

Whether to display a preview of the graphical function contents, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property applies only when the `IsSubchart` property is `true`.

`FontSize` — Font size for graphical function label
scalar

Font size for the graphical function label, specified as a scalar. The `StateFont.Size` property of the chart that contains the graphical function sets the initial value of this property.

Debugging

`Debug` — Debugger properties
`Stateflow.FunctionDebug` object

Debugger properties for the graphical function, specified as a `Stateflow.FunctionDebug` object with this property:

- **`Breakpoints.OnDuring`** — Whether to set the `During Function Call` breakpoint, specified as a numeric or logical 1 (`true`) or 0 (`false`).

For more information, see “Set Breakpoints to Debug Charts”.

Example: `function.Debug.Breakpoints.OnDuring = true;`

Code Generation

`InlineOption` — Appearance in generated code
`'Auto'` (default) | `'Function'` | `'Inline'`

Appearance of the graphical function in generated code, specified as one of these values:

- `'Auto'` — An internal calculation determines the appearance of the function in generated code.
- `'Function'` — The function is implemented as a separate C function.
- `'Inline'` — Calls to the function are replaced by code.

For more information, see “Inline State Functions in Generated Code” (Simulink Coder).

Hierarchy

`Chart` — Chart that contains graphical function
`Stateflow.Chart` object

This property is read-only.

Chart that contains the graphical function, specified as a `Stateflow.Chart` object.

`Subviewer` — Subviewer for graphical function
`Stateflow.Chart` object | `Stateflow.State` object | `Stateflow.Box` object | `Stateflow.Function` object

This property is read-only.

Subviewer for the graphical function, specified as a `Stateflow.Chart`, `Stateflow.State`, `Stateflow.Box`, or `Stateflow.Function` object. The subviewer is the chart or subchart where you can graphically view the graphical function.

`Machine` — Machine that contains graphical function
`Stateflow.Machine` object

This property is read-only.

Machine that contains the graphical function, specified as a `Stateflow.Machine` object.

`Path` — Location of parent in model hierarchy
character vector

This property is read-only.

Location of the parent of the graphical function in the model hierarchy, specified as a character vector.

Identification

`Description` — Description
`''` (default) | character vector

Description for the graphical function, specified as a character vector.

`Document` — Document link
`''` (default) | character vector

Document link for the graphical function, specified as a character vector.

`Tag` — User-defined tag
`[]` (default) | any data type

User-defined tag for the graphical function, specified as data of any type.

`SSIdNumber` — Session-independent identifier
scalar

This property is read-only.

Session-independent identifier, specified as an integer scalar. Use this property to distinguish the graphical function from other objects in the model.

`Id` — Unique identifier
scalar

This property is read-only.

Unique identifier, specified as an integer scalar. Unlike `SSIdNumber`, the value of this property is reassigned every time you start a new MATLAB session and may be recycled after an object is deleted.

Object Functions

find	Identify specified objects in hierarchy
getChildren	Identify children of object
getParent	Identify parent of object
defaultTransitions	Identify default transitions in specified object
dialog	Open properties dialog box
isCommented	Determine if graphical object is commented out
view	Display object in editing environment
highlight	Highlight graphical object
fitToView	Zoom in on graphical object

Examples

Add Graphical Function to Chart

Add a graphical function in the chart `ch`. Set its label to `'[y1,y2] = f(x1,x2,x3)'`.

```
function = Stateflow.Function(ch);
function.LabelString = '[y1,y2] = f(x1,x2,x3)';
```

See Also

`Stateflow.Box` | `Stateflow.Chart` | `Stateflow.State`

Topics

"Overview of the Stateflow API" on page 1-2
"Reuse Logic Patterns by Defining Graphical Functions"
"List of Stateflow API Properties" on page 4-2

Introduced before R2006a

Stateflow.FunctionBreakpoint

Breakpoint properties for graphical or truth table function

Description

Use a `Stateflow.FunctionBreakpoint` object to specify the breakpoint properties for a graphical or truth table function. For more information, see “Set Breakpoints to Debug Charts”.

Creation

Each graphical and truth table function has its own `Stateflow.FunctionBreakpoint` object. To access the `Stateflow.FunctionBreakpoint` object, use the `Debug.Breakpoints` property of the `Stateflow.Function` or `Stateflow.TruthTable` object.

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

`OnDuring` — Whether to set `During Function Call` breakpoint
`false` or 0 (default) | `true` or 1

Whether to set the `During Function Call` breakpoint, specified as a numeric or logical 1 (`true`) or 0 (`false`).

Examples

Set Breakpoint for Graphical Function

Access the `Stateflow.FunctionDebug` and `Stateflow.FunctionBreakpoints` objects for the `Stateflow.Function` object `f`.

```
debug = f.Debug;
breakpoints = debug.Breakpoints;
```

Set the `During Function Call` breakpoint.

```
breakpoints.OnDuring = true;
```

See Also

`Stateflow.Function` | `Stateflow.TruthTable`

Topics
“Overview of the Stateflow API” on page 1-2

“List of Stateflow API Properties” on page 4-2
“Set Breakpoints to Debug Charts”

Introduced before R2006a

Stateflow.FunctionDebug

Debugger properties for graphical or truth table function

Description

Use a `Stateflow.FunctionDebug` object to specify the debugger properties for a graphical or truth table function.

Creation

Each graphical or truth table function has its own `Stateflow.FunctionDebug` object. To access the `Stateflow.FunctionDebug` object, use the `Debug` property for the `Stateflow.Function` or `Stateflow.TruthTable` object.

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see "Modify Properties and Call Functions of Stateflow Objects" on page 1-11.

`Breakpoints` — Breakpoint properties
`Stateflow.FunctionBreakpoint` object

Breakpoint properties for the graphical or truth table function, specified as a `Stateflow.FunctionBreakpoint` object with this property:

- **`OnDuring`** — Whether to set the `During Function Call` breakpoint, specified as a numeric or logical 1 (`true`) or 0 (`false`).

For more information, see "Set Breakpoints to Debug Charts".

Examples

Set Breakpoint for Graphical Function

Access the `Stateflow.FunctionDebug` and `Stateflow.FunctionBreakpoints` objects for the `Stateflow.Function` object `f`.

```
debug = f.Debug;
breakpoints = debug.Breakpoints;
```

Set the `During Function Call` breakpoint.

```
breakpoints.OnDuring = true;
```

See Also

`Stateflow.Function` | `Stateflow.TruthTable`

Topics

"Overview of the Stateflow API" on page 1-2
"List of Stateflow API Properties" on page 4-2
"Set Breakpoints to Debug Charts"

Introduced before R2006a

Stateflow.Junction

Connective or history junction in chart, state, box, or function

Description

Use `Stateflow.Junction` objects to create junctions that:

- Represent decision points in a transition path
- Record the activity of substates inside a superstate

For more information, see “Combine Transitions and Junctions to Create Branching Paths” and “Record State Activity by Using History Junctions”.

Creation

Syntax

```
junction = Stateflow.Junction(parent)
```

Description

`junction = Stateflow.Junction(parent)` creates a `Stateflow.Junction` object in a parent chart, state, box, or graphical function.

Input Arguments

`parent` — Parent for new junction
`Stateflow.Chart` object | `Stateflow.State` object | `Stateflow.Box` object | `Stateflow.Function` object

Parent for the new junction, specified as a Stateflow API object of one of these types:

- `Stateflow.Box`
- `Stateflow.Chart`
- `Stateflow.Function`
- `Stateflow.State`

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

Content

Type — Type of junction
'CONNECTIVE' (default) | 'HISTORY'

Type of junction, specified as one of these values:

- 'CONNECTIVE' — Connective junction that represents a decision point in a transition path
- 'HISTORY' — History junction that records the activity of substates inside a superstate

IsExplicitlyCommented — Whether to comment out junction
false or 0 (default) | true or 1

Whether to comment out the junction, specified as a numeric or logical 1 (true) or 0 (false). Setting this property to true is equivalent to right-clicking the junction and selecting **Comment Out**. For more information, see “Commenting Stateflow Objects in a Chart”.

IsImplicitlyCommented — Whether junction is implicitly commented out
true or 1 | false or 0

This property is read-only.

Whether the junction is implicitly commented out, specified as a numeric or logical 1 (true) or 0 (false). The junction is implicitly commented out when you comment out a state, box, or function that contains it.

CommentText — Comment text
'' (default) | character vector

Comment text added to the junction, specified as a character vector. This property applies only when the IsExplicitlyCommented property is true. In the Stateflow Editor, when you point to the comment badge on the junction, the text appears as a tooltip. When you set the IsExplicitlyCommented property to false, the value of CommentText reverts to ''.

Graphical Appearance

Position — Position and size of junction
Stateflow.JunctionPosition object

Position and size of the junction, specified as a Stateflow.JunctionPosition object with these properties:

- **Center** — Position of the center of the junction, specified as a two-element numeric vector [x y] of coordinates relative to the upper left corner of the chart.
- **Radius** — Radius of the junction, specified as a scalar.

Example: `junction.Position.Center = [31.41 27.18];`

Example: `junction.Position.Radius = 16.18;`

ArrowSize — Size of incoming transition arrows
8 (default) | scalar

Size of incoming transition arrows, specified as a scalar.

Hierarchy

`Chart` — Chart that contains junction
`Stateflow.Chart` object

This property is read-only.

Chart that contains the junction, specified as a `Stateflow.Chart` object.

`Subviewer` — Subviewer for junction
`Stateflow.Chart` object | `Stateflow.State` object | `Stateflow.Box` object | `Stateflow.Function` object

This property is read-only.

Subviewer for the junction, specified as a `Stateflow.Chart`, `Stateflow.State`, `Stateflow.Box`, or `Stateflow.Function` object. The subviewer is the chart or subchart where you can graphically view the junction.

`Machine` — Machine that contains junction
`Stateflow.Machine` object

This property is read-only.

Machine that contains the junction, specified as a `Stateflow.Machine` object.

`Path` — Location of parent in model hierarchy
character vector

This property is read-only.

Location of the parent of the junction in the model hierarchy, specified as a character vector.

Identification

`Description` — Description
`''` (default) | character vector

Description for the junction, specified as a character vector.

`Document` — Document link
`''` (default) | character vector

Document link for the junction, specified as a character vector.

`Tag` — User-defined tag
`[]` (default) | any data type

User-defined tag for the junction, specified as data of any type.

`SSIdNumber` — Session-independent identifier
scalar

This property is read-only.

Session-independent identifier, specified as an integer scalar. Use this property to distinguish the junction from other objects in the model.

Id — Unique identifier
scalar

This property is read-only.

Unique identifier, specified as an integer scalar. Unlike `SSIdNumber`, the value of this property is reassigned every time you start a new MATLAB session and may be recycled after an object is deleted.

Object Functions

getParent	Identify parent of object
sinkedTransitions	Identify transitions with specified destination
sourcedTransitions	Identify transitions with specified source
dialog	Open properties dialog box
isCommented	Determine if graphical object is commented out
view	Display object in editing environment
highlight	Highlight graphical object
fitToView	Zoom in on graphical object

Examples

Add Connective Junction to Chart

Add a connective junction in the chart `ch`. Change its size and position.

```
junction = Stateflow.Junction(ch);
junction.Position.Radius = 16.18;
junction.Position.Center = [31.41 27.18];
```

Add History Junction to Chart

Add a history junction in the chart `ch`.

```
junction = Stateflow.Junction(ch);
junction.Type = 'HISTORY';
```

See Also

`Stateflow.AtomicBox` | `Stateflow.AtomicSubchart` | `Stateflow.Box` | `Stateflow.Chart` | `Stateflow.Function` | `Stateflow.SimulinkBasedState` | `Stateflow.State`

Topics
“Overview of the Stateflow API” on page 1-2
“Combine Transitions and Junctions to Create Branching Paths”
“Record State Activity by Using History Junctions”
“List of Stateflow API Properties” on page 4-2

Introduced before R2006a

Stateflow.JunctionPosition

Position and size of junctions

Description

Use a `Stateflow.JunctionPosition` object to control the position and size of a connective or history junction.

Creation

Each junction has its own `Stateflow.JunctionPosition` object. To access the `Stateflow.JunctionPosition` object, use the `Position` property for the `Stateflow.Junction` object.

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

`Center` — Position of center of junction
`[7 7]` (default) | `[x y]`

Position of the center of the junction, specified as a two-element numeric vector `[x y]` of coordinates relative to the upper left corner of the chart.

`Radius` — Radius of junction
7 (default) | scalar

Radius of the junction, specified as a scalar.

Examples

Change Size of Entry Junction

Set the radius of the connective junction `junction` to `10`.

```
junction.Position.Radius = 10;
```

See Also

`Stateflow.Junction`

Topics
“Overview of the Stateflow API” on page 1-2
“List of Stateflow API Properties” on page 4-2

Introduced before R2006a

Stateflow.Machine

Container for Stateflow blocks in a Simulink model

Description

From a Stateflow perspective, `Stateflow.Machine` objects are equivalent to Simulink models. A `Stateflow.Machine` object contains `Stateflow.Chart`, `Stateflow.StateTransitionTableChart`, `Stateflow.TruthTableChart`, and `Stateflow.EMChart` objects that represent the Stateflow charts, State Transition Table blocks, Truth Table blocks, and MATLAB Function blocks in a Simulink model. For more information, see "Overview of the Stateflow API" on page 1-2.

Creation

You automatically create a `Stateflow.Machine` object when you load a model that contains a Stateflow block or call the function `sfnew`. To access the `Stateflow.Machine` object, call the `find` function for the `Simulink.Root` object. For example, if your Simulink model is named `myModel`, enter:

```
rt = sfroot;
machine = find(rt,'-isa','Stateflow.Machine','Name','myModel');
```

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see "Modify Properties and Call Functions of Stateflow Objects" on page 1-11.

Content

Name — Name of Simulink model
character vector

This property is read-only.

Name of the Simulink model for the machine, specified as a character vector.

`FullFileName` — Full file path of Simulink model
character vector

This property is read-only.

Full file path of the Simulink model for the machine, specified as a character vector.

`IsLibrary` — Whether model builds library
`false` or 0 (default) | `true` or 1

This property is read-only.

Whether the Simulink model for the machine builds a library and not an application, specified as a numeric or logical 1 (`true`) or 0 (`false`).

Debugging

`Debug` — Debugger properties
`Stateflow.MachineDebug` object

Debugger properties for charts in the machine, specified as a `Stateflow.MachineDebug` object with these properties:

- **`Animation.Enabled`** — Whether to animate the charts in the machine during simulation, specified as a numeric or logical 1 (`true`) or 0 (`false`). Disabling this property is equivalent to selecting `None` in the **Animation Speed** drop-down list in the **Debug** tab.
- **`Animation.Delay`** — Delay that the chart animation uses for highlighting each transition segment in the machine, specified as a scalar. These values correspond to the settings of the **Animation Speed** drop-down list in the **Debug** tab:

Delay Value	Animation Speed
0.5	`Slow`
0.2	`Medium`
0	`Fast`
-1	`Lightning Fast`

- **`Animation.MaintainHighlighting`** — Whether to maintain the highlighting of active states in the machine after the simulation ends, specified as a numeric or logical 1 (`true`) or 0 (`false`).

Example: `machine.Debug.Animation.Enabled = true;`

Example: `machine.Debug.Animation.Delay = -1;`

Hierarchy

`Path` — Location of machine in model hierarchy
character vector

This property is read-only.

Location of the machine in the model hierarchy, specified as a character vector.

`Dirty` — Whether model has changed
`true` or 1 | `false` or 0

Whether the Simulink model for the machine has changed after being opened or saved, specified as a numeric or logical 1 (`true`) or 0 (`false`).

`Locked` — Whether machine is locked
`false` or 0 (default) | `true` or 1

Whether the machine is locked, specified as a numeric or logical 1 (`true`) or 0 (`false`). Enable this property to prevent changes in the Stateflow charts, state transition tables, and truth table blocks in this machine.

`Iced` — Whether machine is locked
`false` or 0 (default) | `true` or 1

This property is read-only.

Whether the machine is locked, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property is equivalent to the property `Locked`, but is used internally to prevent changes in the machine during simulation.

Identification

`Created` — Date of creation
character vector

This property is read-only.

Date of the creation of the machine, specified as a character vector.

`Creator` — Creator
`'Unknown'` (default) | character vector

Creator of the machine, specified as a character vector.

`Modified` — Record of modifications
`''` (default) | character vector

Record of modifications to the machine, specified as a character vector.

`Version` — Version
`'none'` (default) | character vector

Version of the machine, specified as a character vector.

`Description` — Description
`''` (default) | character vector

Description for the machine, specified as a character vector.

`Document` — Document link
`''` (default) | character vector

Document link for the machine, specified as a character vector.

`Tag` — User-defined tag
`[]` (default) | any data type

User-defined tag for the machine, specified as data of any type.

`Id` — Unique identifier
scalar

This property is read-only.

Unique identifier, specified as an integer scalar. Use this property to distinguish the machine from other objects in the model. The value of this property is reassigned every time you start a new MATLAB session and may be recycled after an object is deleted.

Object Functions

find	Identify specified objects in hierarchy
dialog	Open properties dialog box

Examples

Update Machine Version

Update the `Modified` and `Version` properties of machine `machine`.

```
machine.Modified = string(datetime);
oldVersion = str2num(machine.Version);
if isempty(oldVersion)
    machine.Version = '1';
else
    machine.Version = num2str(oldVersion+1);
end
```

See Also

Functions
`sfroot`

Objects
`Stateflow.Chart` | `Stateflow.StateTransitionTableChart` | `Stateflow.TruthTableChart` | `Stateflow.EMChart`

Topics
"Overview of the Stateflow API" on page 1-2
"Machine Properties"
"List of Stateflow API Properties" on page 4-2

Introduced before R2006a

Stateflow.MachineAnimation

Animation properties for charts in Stateflow machine

Description

Use a `Stateflow.MachineAnimation` object to specify the animation properties for the charts in a Stateflow machine.

Creation

Each Stateflow machine has its own `Stateflow.MachineAnimation` object. To access the `Stateflow.MachineAnimation` object, use the `Debug.Animation` property for the `Stateflow.Machine` object.

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

`Enabled` — Whether to animate charts during simulation
`true` or 1 (default) | `false` or 0

Whether to animate the charts in the machine during simulation, specified as a numeric or logical 1 (`true`) or 0 (`false`). Disabling this property is equivalent to selecting `None` in the **Animation Speed** drop-down list in the **Debug** tab.

`Delay` — Delay for highlighting transitions
0 (default) | scalar

Delay that the chart animation uses for highlighting each transition segment in the machine, specified as a scalar. These values correspond to the settings of the **Animation Speed** drop-down list in the **Debug** tab:

Delay Value	Animation Speed
0.5	`Slow`
0.2	`Medium`
0	`Fast`
-1	`Lightning Fast`

This property applies only when the `Enable` property of the machine is `true`.

`MaintainHighlighting` — Whether to maintain highlighting of active states
`false` or 0 (default) | `true` or 1

Whether to maintain the highlighting of active states in the machine after the simulation ends, specified as a numeric or logical 1 (`true`) or 0 (`false`).

Examples

Set Animation Speed to Lightning Fast

Access the `Stateflow.MachineDebug` and `Stateflow.MachineAnimation` objects for the `Stateflow.Machine` object `machine`.

```
debug = machine.Debug;
animation = debug.Animation;
```

Enable animation and set delay to `-1`.

```
animation.Enabled = true;
animation.Delay = -1;
```

See Also
`Stateflow.Machine`

Topics
"Overview of the Stateflow API" on page 1-2
"List of Stateflow API Properties" on page 4-2

Introduced before R2006a

Stateflow.MachineDebug

Debugger properties for charts in Stateflow machine

Description

Use a `Stateflow.MachineDebug` object to specify the debugger properties for the charts in a Stateflow machine.

Creation

Each Stateflow machine has its own `Stateflow.MachineDebug` object. To access the `Stateflow.MachineDebug` object, use the `Debug` property for the `Stateflow.Machine` object.

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

`Animation` — Animation properties
`Stateflow.MachineAnimation` object

Animation properties for charts in the machine, specified as a `Stateflow.MachineAnimation` object with these properties:

- **`Enabled`** — Whether to animate the charts in the machine during simulation, specified as a numeric or logical 1 (`true`) or 0 (`false`). Disabling this property is equivalent to selecting `None` in the **Animation Speed** drop-down list in the **Debug** tab.
- **`Delay`** — Delay that the chart animation uses for highlighting each transition segment in the machine, specified as a scalar. These values correspond to the settings of the **Animation Speed** drop-down list in the **Debug** tab:

Delay Value	Animation Speed
0.5	`Slow`
0.2	`Medium`
0	`Fast`
-1	`Lightning Fast`

- **`MaintainHighlighting`** — Whether to maintain the highlighting of active states in the machine after the simulation ends, specified as a numeric or logical 1 (`true`) or 0 (`false`).

Examples

Set Animation Speed to Lightning Fast

Access the `Stateflow.MachineDebug` and `Stateflow.MachineAnimation` objects for the `Stateflow.Machine` object `machine`.

```
debug = machine.Debug;
animation = debug.Animation;
```

Enable animation and set delay to `-1`.

```
animation.Enabled = true;
animation.Delay = -1;
```

See Also

`Stateflow.Machine`

Topics

"Overview of the Stateflow API" on page 1-2
"List of Stateflow API Properties" on page 4-2

Introduced before R2006a

Stateflow.Message

Message in chart, state, or box

Description

Use `Stateflow.Message` objects to communicate data locally or between Stateflow charts in Simulink models. For more information, see “Communicate with Stateflow Charts by Sending Messages”.

Creation

Syntax

`message = Stateflow.Message(parent)`

Description

`message = Stateflow.Message(parent)` creates a `Stateflow.Message` object in a parent chart, state, or box.

Input Arguments

`parent` — Parent for new message
`Stateflow.Chart` object | `Stateflow.State` object | `Stateflow.Box` object

Parent for the new message, specified as a Stateflow API object of one of these types:

- `Stateflow.Box`
- `Stateflow.Chart`
- `Stateflow.State`

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

Interface

`Name` — Name of message
`'message'` (default) | character vector

Name of the message, specified as a character vector.

`Scope` — Scope of message
`'Output'` (default) | `'Input'` | `'Local'`

Scope of the message, specified as specified as `'Local'`, `'Input'`, or `'Output'`. For more information, see “Scope”.

`Port` — Port index for message
scalar

Port index for the message, specified as an integer scalar. This property applies only to input and output messages. For more information, see “Port”.

`InitializeMethod` — Method for initializing message data
`'Expression'` (default) | `'Parameter'` | `'Not Needed'`

Method for initializing the value of the message data, specified as a character vector that depends on the scope of the message:

- For local and output messages, use `'Expression'` or `'Parameter'`.
- For input messages, use `'Not Needed'`.

To specify the initial value of the message data, use the `Props.InitialValue` property.

For more information, see “Initial Value”.

`Priority` — Priority
`'300'` (default) | character vector

Priority for the message, specified as a character vector. If two distinct messages occur at the same time, this property determines which message is processed first. A smaller numeric value indicates a higher priority. This property applies only to local and output messages in discrete-event charts. For more information, see “Create Custom Queuing Systems Using Discrete-Event Stateflow Charts” (SimEvents).

Queue

`UseInternalQueue` — Whether chart maintains internal queue for message
`true` or 1 (default) | `false` or 0

Whether the Stateflow chart maintains an internal receiving queue for the input message, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property applies only to input messages. For more information, see “Use Internal Queue”.

`QueueType` — Order in which messages are removed from queue
`'FIFO'` (default) | `'LIFO'` | `'Priority'`

Order in which messages are removed from the receiving queue, specified as one of these values:

- `'FIFO'` — First in, first out.
- `'LIFO'` — Last in, first out.
- `'Priority'` — Remove messages according to the value in the data field. To specify the order, use the `MessagePriorityOrder` property for the message.

This property applies only to local messages and to input messages that have `UseInternalQueue` set to `true`. For more information, see “Queue Type”.

`MessagePriorityOrder` — Type of priority queue
`'Ascending'` (default) | `'Descending'`

Type of priority queue for the message, specified as one of these values:

- `'Ascending'` — Messages are received in ascending order of the message data value.
- `'Descending'` — Messages are received in descending order of the message data value.

This property applies only when the `QueueType` property of the message is `'Priority'`. For more information, see “Queue Type”.

`QueueCapacity` — Length of internal queue

`10` (default) | scalar

Length of the internal queue for the message, specified as an integer scalar. This property applies only to local messages and to input messages that have `UseInternalQueue` set to `true`. For more information, see “Queue Capacity”.

`QueueOverflowDiagnostic` — Level of diagnostic when number of messages exceeds queue capacity

`'Error'` (default) | `'Warning'` | `'None'`

Level of diagnostic action when the number of incoming messages exceeds the queue capacity for the message, specified as `'Error'`, `'Warning'`, or `'None'`. This property applies only to local messages and to input messages that have `UseInternalQueue` set to `true`. For more information, see “Queue Overflow Diagnostic”.

Data Specification

`DataType` — Data type of message

`'Inherit: Same as Simulink'` (default) | `'double'` | `'single'` | `'int32'` | `'uint32'` | `'boolean'` | ...

Data type of the message, specified as a character vector that depends on the `Props.Type.Method` property of the message:

- If the `Props.Type.Method` property of the message is `'Inherit'`, the value of this property is `'Inherit: Same as Simulink'`.
- If the `Props.Type.Method` property of the message is `'Built-in'`, you can specify this property with one of these options:
  - `'double'`
  - `'single'`
  - `'int8'`
  - `'int16'`
  - `'int32'`
  - `'int64'`
  - `'uint8'`
  - `'uint16'`
  - `'uint32'`
  - `'uint64'`
  - `'boolean'`
  - `'string'`

  - `'ml'` (Supported only in charts that use C as the action language)
- Otherwise, the `Props.Type` properties of the message determine the value of this property.

For more information, see the section Add Data on page 1-0 in “Create Charts by Using the Stateflow API” on page 1-19.

Props — Data specification properties
`Stateflow.DataProps` object

Data specification properties, specified as a `Stateflow.DataProps` object with these properties:

- **`Type.Method`** — Method for setting the data type of the message, specified as `'Inherited'`, `'Built-in'`, `'Bus Object'`, `'Enumerated'`, `'Expression'`, or `'Fixed point'`. This property is equivalent to the **Mode** field of the Data Type Assistant in the Model Explorer and the Data properties dialog box. For more information, see “Specify Type of Stateflow Data”.
- **`Type.BusObject`** — Name of the `Simulink.Bus` object that defines the message data, specified as a character vector. This property applies only when the `Type.Method` property of the data object is `'Bus Object'`. For more information, see “Access Bus Signals Through Stateflow Structures”.
- **`Type.EnumType`** — Name of the enumerated type that defines the message data, specified as a character vector. This property applies only when the `Type.Method` property of the data object is `'Enumerated'`. For more information, see “Reference Values by Name by Using Enumerated Data”.
- **`Type.Expression`** — Expression that evaluates to the data type of the message data, specified as a character vector. This property applies only when the `Type.Method` property of the data object is `'Expression'`. For more information, see “Specify Data Properties by Using MATLAB Expressions”.
- **`Type.Signed`** — Signedness, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property applies only when the `Type.Method` property of the data object is `'Fixed point'`. For more information, see “Fixed-Point Data in Stateflow Charts”.
- **`Type.WordLength`** — Word length, in bits, specified as a character vector. This property applies only when the `Type.Method` property of the data object is `'Fixed point'`. For more information, see “Fixed-Point Data in Stateflow Charts”.
- **`Type.Fixpt.ScalingMode`** — Method for scaling the fixed-point message data, specified as `'Binary point'`, `'Slope and bias'`, or `'None'`. This property applies only when the `Type.Method` property of the data object is `'Fixed point'`. For more information, see “Fixed-Point Data in Stateflow Charts”.
- **`Type.Fixpt.FractionLength`** — Fraction length, in bits, specified as a character vector. This property applies only when the `Type.Method` property is `'Fixed point'` and the `Type.Fixpt.ScalingMode` property is `'Binary point'`.
- **`Type.Fixpt.Slope`** — Slope, specified as a character vector. This property applies only when the `Type.Method` property is `'Fixed point'` and the `Type.Fixpt.ScalingMode` property is `'Slope and bias'`.
- **`Type.Fixpt.Bias`** — Bias, specified as a character vector. This property applies only to when the `Type.Method` property is `'Fixed point'` and the `Type.Fixpt.ScalingMode` property is `'Slope and bias'`.
- **`Type.Fixpt.Lock`** — Whether to prevent replacement of the fixed-point type with an autoscaled type chosen by the Fixed-Point Tool (Fixed-Point Designer), specified as a numeric or logical 1 (`true`) or 0 (`false`). This property applies only when the `Type.Method` property of the data object is `'Fixed point'`.

- **`Array.Size`** — Size of the message data, specified as a character vector. For more information, see “Specify Size of Stateflow Data”.
- **`Complexity`** — Whether the message accepts complex values, specified as `'On'` or `'Off'`. For more information, see “Complex Data in Stateflow Charts”.
- **`InitialValue`** — Initial value, specified as a character vector.

`CompiledSize` — Message data size as determined by compiler
`''` (default) | character vector

This property is read-only.

Message data size as determined by the compiler, specified as a character vector.

`CompiledType` — Data type as determined by compiler
`'unknown'` (default) | character vector

This property is read-only.

Data type as determined by the compiler, specified as a character vector.

Hierarchy

`Machine` — Machine that contains message
`Stateflow.Machine` object

This property is read-only.

Machine that contains the message, specified as a `Stateflow.Machine` object.

`Path` — Location of parent in model hierarchy
character vector

This property is read-only.

Location of the parent of the message in the model hierarchy, specified as a character vector.

Identification

`Description` — Description
`''` (default) | character vector

Description for the message, specified as a character vector.

`Document` — Document link
`''` (default) | character vector

Document link for the message, specified as a character vector.

`Tag` — User-defined tag
`[]` (default) | any data type

User-defined tag for the message, specified as data of any type.

`SSIdNumber` — Session-independent identifier
scalar

This property is read-only.

Session-independent identifier, specified as an integer scalar. Use this property to distinguish the message from other objects in the model.

Id — Unique identifier
scalar

This property is read-only.

Unique identifier, specified as an integer scalar. Unlike `SSIdNumber`, the value of this property is reassigned every time you start a new MATLAB session and may be recycled after an object is deleted.

Object Functions

getParent	Identify parent of object
dialog	Open properties dialog box
view	Display object in editing environment

Examples

Add Message to Chart

Add a message to the chart `ch`. Specify its name, scope, and data type.

```
message = Stateflow.Message(ch);
message.Name = 'M';
message.Scope = 'Input';
message.Props.Type.Method = 'Built-in';
message.DataType = 'int32';
```

See Also

`Stateflow.Box` | `Stateflow.Chart` | `Stateflow.State`

Topics
“Overview of the Stateflow API” on page 1-2
“Communicate with Stateflow Charts by Sending Messages”
“Set Properties for a Message”
“List of Stateflow API Properties” on page 4-2

Introduced in R2015b

Stateflow.NoteFont

Font properties for annotations

Description

Use a `Stateflow.NoteFont` object to specify the font properties for an annotation.

Creation

Each annotation has its own `Stateflow.NoteFont` object. To access the `Stateflow.NoteFont` object, use the `Font` property for the `Stateflow.Annotation` object.

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

`Name` — Font name
`'Helvetica'` (default) | character vector

This property is read-only.

Font name, specified as a character vector. The `StateFont.Name` property of the chart that contains the annotation sets the value of this property.

`Angle` — Font angle
`'NORMAL'` (default) | `'ITALIC'`

Font angle, specified as `'NORMAL'` or `'ITALIC'`.

`Weight` — Font weight
`'NORMAL'` (default) | `'BOLD'`

Font weight, specified as `'NORMAL'` or `'BOLD'`.

`Size` — Font size
scalar

Font size, specified as a scalar. The `StateFont.Size` property of the chart that contains the annotation sets the default value of this property.

Examples

Change Font Properties for Annotation

Access the `Stateflow.NoteFont` object for the `Stateflow.Annotation` object `annotation`.

```
font = annotation.Font;
```

Set the font angle to italics, the font weight to bold, and the font size to 8.

```
font.Angle = 'ITALIC';
font.Weight = 'BOLD';
font.Size = 8;
```

See Also
`Stateflow.Annotation`

Topics
"Overview of the Stateflow API" on page 1-2
"List of Stateflow API Properties" on page 4-2

Introduced before R2006a

Stateflow.Port

Entry or exit port in state or atomic subchart

Description

Use `Stateflow.Port` objects to create ports and junctions that provide entry and exit connections across boundaries in the Stateflow hierarchy. Entry and exit ports improve componentization by isolating the transition logic for entering and exiting states. Unlike supertransitions, they can be used in atomic subcharts. For more information, see “Create Entry and Exit Connections Across State Boundaries”.

Entry and exit ports are located on the boundary of a state or atomic subchart. Each port has a matching junction that marks the entry or exit point inside the state or atomic subchart. The port and junction are represented by separate `Stateflow.Port` objects.

Creation

Syntax

```
port = Stateflow.Port(parent,portType)
```

Description

`port = Stateflow.Port(parent,portType)` creates a `Stateflow.Port` object of the specified port type in the parent. The function creates a second `Stateflow.Port` object for the matching entry or exit port on the boundary of the parent. To identify the matching `Stateflow.Port` object, use the function `Stateflow.findMatchingPort`.

Input Arguments

`parent` — Parent for new entry or exit junction
`Stateflow.State` object | `Stateflow.Chart` object

Parent for the new entry or exit junction, specified as a `Stateflow.State` object or as a `Stateflow.Chart` object that is the subchart of a `Stateflow.AtomicSubchart` object.

`portType` — Type of junction
`'EntryJunction'` | `'ExitJunction'`

Type of junction, specified as `'EntryJunction'` or `'ExitJunction'`.

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

Content

`LabelString` — Label for port or junction
`''` (default) | character vector

Label for the port or junction, specified as a character vector. Changing this property automatically sets the `LabelString` property for the matching `Stateflow.Port` object to the same value.

`PortType` — Type of port or junction
`'EntryJunction'` | `'EntryPort'` | `'ExitJunction'` | `'ExitPort'`

This property is read-only.

Type of port or junction, specified as one of these values:

- `'EntryJunction'` — Entry junction inside a state or atomic subchart
- `'EntryPort'` — Entry port on the boundary of a state or atomic subchart
- `'ExitJunction'` — Exit junction inside a state or atomic subchart
- `'ExitPort'` — Exit port on the boundary of a state or atomic subchart

`IsExplicitlyCommented` — Whether to comment out junction and port pair
`false` or 0 (default) | `true` or 1

Whether to comment out the junction and port pair, specified as a numeric or logical 1 (`true`) or 0 (`false`). Setting this property to `true` is equivalent to right-clicking the entry or exit junction and selecting **Comment Out**. This property applies only to entry and exit junctions. Attempting to set this property on an entry or exit port results in an error. For more information, see "Commenting Stateflow Objects in a Chart".

`IsImplicitlyCommented` — Whether port or junction is implicitly commented out
`true` or 1 | `false` or 0

This property is read-only.

Whether the port or junction is implicitly commented out, specified as a numeric or logical 1 (`true`) or 0 (`false`). The port or junction is implicitly commented out when you comment out a state, box, or function that contains it. Additionally, entry and exit ports are implicitly commented out when you comment out their matching entry or exit junction.

`CommentText` — Comment text
`''` (default) | character vector

Comment text added to the entry or exit junction, specified as a character vector. This property applies only to entry and exit junctions when the `IsExplicitlyCommented` property is `true`. In the Stateflow Editor, when you point to the comment badge % on the junction, the text appears as a tooltip. When you set the `IsExplicitlyCommented` property to `false`, the value of `CommentText` reverts to `''`.

Graphical Appearance

`Position` — Position and size of port or junction
`Stateflow.PortPosition` object

Position and size of the port or junction, specified as a `Stateflow.PortPosition` object with these properties:

- **`Center`** — Position of the center of the port or junction, specified as a two-element numeric vector `[x y]` of coordinates relative to the upper left corner of the chart.
- **`Radius`** — Radius of the port or junction, specified as a scalar.

Example: `port.Position.Center = [31.41 27.18];`

Example: `port.Position.Radius = 16.18;`

`LabelPosition` — Position and size of port or junction label
`[-10 -15 2 16]` (default) | `[left top width height]`

Position and size of the port or junction label, specified as a four-element numeric vector of the form `[left top width height]`.

`ArrowSize` — Size of incoming transition arrows
8 (default) | scalar

Size of incoming transition arrows, specified as a scalar.

Hierarchy

`Chart` — Chart that contains port or junction
`Stateflow.Chart` object

This property is read-only.

Chart that contains the port or junction, specified as a `Stateflow.Chart` object.

`Subviewer` — Subviewer for port or junction
`Stateflow.Chart` object | `Stateflow.State` object | `Stateflow.Box` object

This property is read-only.

Subviewer for the port or junction, specified as a `Stateflow.Chart`, `Stateflow.State`, or `Stateflow.Box` object. The subviewer is the chart or subchart where you can graphically view the port.

`Home` — Home state or subchart
`Stateflow.State` object | `Stateflow.AtomicSubchart` object

This property is read-only.

Home state or subchart, specified as a `Stateflow.State` or `Stateflow.AtomicSubchart` object. The home of an entry or exit port is the state or subchart whose boundary contains the port. This property applies only to entry and exit ports.

`Machine` — Machine that contains port or junction
`Stateflow.Machine` object

This property is read-only.

Machine that contains the port or junction, specified as a `Stateflow.Machine` object.

`Path` — Location of parent in model hierarchy
character vector

This property is read-only.

Location of the parent of the port or junction in the model hierarchy, specified as a character vector.

`Linked` — Whether port or junction has matching junction or port
`true` or 1 (default) | `false` or 0

This property is read-only.

Whether the port or junction has a matching junction or port, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property is used to detect internal inconsistencies in the chart.

Identification

`Description` — Description
`''` (default) | character vector

Description for the port or junction, specified as a character vector.

`Document` — Document link
`''` (default) | character vector

Document link for the port or junction, specified as a character vector.

`Tag` — User-defined tag
`[]` (default) | any data type

User-defined tag for the port or junction, specified as data of any type.

`SSIdNumber` — Session-independent identifier
scalar

This property is read-only.

Session-independent identifier, specified as an integer scalar. Use this property to distinguish the port or junction from other objects in the model.

`Id` — Unique identifier
scalar

This property is read-only.

Unique identifier, specified as an integer scalar. Unlike `SSIdNumber`, the value of this property is reassigned every time you start a new MATLAB session and may be recycled after an object is deleted.

Object Functions

getParent	Identify parent of object
sinkedTransitions	Identify transitions with specified destination
sourcedTransitions	Identify transitions with specified source
dialog	Open properties dialog box

isCommented	Determine if graphical object is commented out
view	Display object in editing environment
highlight	Highlight graphical object
fitToView	Zoom in on graphical object

Examples

Add Exit Port and Junction to Atomic Subchart

Find the `Stateflow.AtomicSubchart` object that corresponds to the atomic subchart `A` in the chart `ch`.

```
atomicSubchart = find(ch,'-isa','Stateflow.AtomicSubchart','Name','A');
```

Add an exit junction to the atomic subchart. Use the `Subchart` property of the atomic subchart as the parent of the exit junction. Display the value of the `PortType` property of the exit junction.

```
exitJunction = Stateflow.Port(atomicSubchart.Subchart,'ExitJunction');
exitJunction.PortType

ans =

    'ExitJunction'
```

Set the label of the exit junction to `'exit'`.

```
exitJunction.labelString = 'exit';
```

Find the `Stateflow.Port` object for the matching exit port. Display the value of the `PortType` property of the exit port.

```
exitPort = Stateflow.findMatchingPort(exitJunction);
exitPort.PortType

ans =

    'ExitPort'
```

Display the label of the exit port.

```
exitPort.labelString

ans =

    'exit'
```

Tips

- If you move an entry or exit junction to a different parent, Stateflow deletes the `Stateflow.Port` object for the matching port and creates a `Stateflow.Port` object on the new parent. To identify the new matching port, use the `Stateflow.findMatchingPort` function.

See Also

Functions
`find` | `Stateflow.findMatchingPort`

Objects
`Stateflow.AtomicSubchart` | `Stateflow.Chart` | `Stateflow.State`

Topics
“Overview of the Stateflow API” on page 1-2
“List of Stateflow API Properties” on page 4-2
“Create Entry and Exit Connections Across State Boundaries”

Introduced in R2021b

Stateflow.PortPosition

Position and size of entry or exit ports

Description

Use a `Stateflow.PortPosition` object to control the position and size of an entry or exit port.

Creation

Each entry or exit port has its own `Stateflow.PortPosition` object. To access the `Stateflow.PortPosition` object, use the `Position` property for the `Stateflow.Port` object.

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

`Center` — Position of center of port or junction
`[x y]`

Position of the center of the port or junction, specified as a two-element numeric vector `[x y]` of coordinates relative to the upper left corner of the chart.

`Radius` — Radius of port or junction
scalar

Radius of the port or junction, specified as a scalar.

Examples

Change Size of Entry Junction

Set the radius of the entry junction `entryJunction` to `10`.

```
entryJunction.Position.Radius = 10;
```

See Also

`Stateflow.Port`

Topics
“Overview of the Stateflow API” on page 1-2
“List of Stateflow API Properties” on page 4-2

Introduced in R2021b

Stateflow.SigLoggingInfo

Signal logging properties for states and data

Description

Use a `Stateflow.SigLoggingInfo` object to specify the signal logging properties for a state or data object. For more information, see “Log Simulation Output for States and Data”.

Creation

Each state, atomic subchart, Simulink based state, and data object has its own `Stateflow.SigLoggingInfo` object. To access the `Stateflow.SigLoggingInfo` object, use the `LoggingInfo` property for the `Stateflow.State`, `Stateflow.AtomicSubchart`, `Stateflow.SimulinkBasedState`, or `Stateflow.Data` object.

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

`DataLogging` — Whether to enable signal logging
`false` or 0 (default) | `true` or 1

Whether to enable signal logging for the state or data object, specified as a numeric or logical 1 (`true`) or 0 (`false`).

`DecimateData` — Whether to limit logged data
`false` or 0 (default) | `true` or 1

Whether to limit the amount of logged data, specified as a numeric or logical 1 (`true`) or 0 (`false`). When this property is `true`, signal logging skips samples by using the interval size specified by the `Decimation` property. For more information, see “Decimation”.

`Decimation` — Decimation interval
2 (default) | scalar

Decimation interval, specified as an integer scalar. This property applies only when the `DecimateData` property is `true`. The default value of `2` means that the chart logs every other sample.

`LimitDataPoints` — Whether to limit number of data points to log
`false` or 0 (default) | `true` or 1

Whether to limit the number of data points to log, specified as a numeric or logical 1 (`true`) or 0 (`false`). When this property is `true`, signal logging limits the number of data points by using the value specified by the `MaxPoints` property. For more information, see “Limit Data Points to Last”.

MaxPoints — Maximum number of data points to log
5000 (default) | scalar

Maximum number of data points to log, specified as an integer scalar. This property applies only when the LimitDataPoints property is true. The default value of 5000 means the chart logs the last 5000 data points generated by the simulation.

NameMode — Source of signal name
'SignalName' (default) | 'Custom'

Source of the signal name used to log the state or data object, specified as one of these values:

- 'SignalName' — Use the name of the state or data object.
- 'Custom' — Use the custom signal name specified by the LoggingName property.

For more information, see "Logging Name".

LoggingName — Custom signal name
character vector

Custom signal name for the state or data object, specified as a character vector. This property applies only when the NameMode property is 'Custom'.

Examples

Enable Signal Logging for Data

Access the SigLoggingInfo object for the Stateflow.Data object x.

```
log = x.LoggingInfo;
```

Enable logging for the data object and specify a custom signal name.

```
log.DataLogging = true;
log.NameMode = 'Custom';
log.LoggingName = 'My Data';
```

See Also
Stateflow.Data | Stateflow.State | Stateflow.AtomicSubchart | Stateflow.SimulinkBasedState

Topics
"Overview of the Stateflow API" on page 1-2
"List of Stateflow API Properties" on page 4-2
"Log Simulation Output for States and Data"

Introduced before R2006a

Stateflow.SimulinkBasedState

Simulink based state in chart, state, or box

Description

Use `Stateflow.SimulinkBasedState` objects to create Simulink subsystems within a Stateflow state. With Simulink based states, you can model hybrid dynamic systems or systems that switch between periodic and continuous time dynamics. For more information, see “Simulink Subsystems as States”.

Creation

Syntax

`simulinkBasedState = Stateflow.SimulinkBasedState(parent)`

Description

`simulinkBasedState = Stateflow.SimulinkBasedState(parent)` creates a `Stateflow.SimulinkBasedState` object in a parent chart, state, or box.

Input Arguments

`parent` — Parent for new Simulink based state
`Stateflow.Chart` object | `Stateflow.State` object | `Stateflow.Box` object

Parent for the new Simulink based state, specified as a Stateflow API object of one of these types:

- `Stateflow.Box`
- `Stateflow.Chart`
- `Stateflow.State`

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

Content

`Name` — Name of Simulink based state
`''` (default) | character vector

Name of the Simulink based state, specified as a character vector.

`IsExplicitlyCommented` — Whether to comment out Simulink based state
`false` or 0 (default) | `true` or 1

Whether to comment out the Simulink based state, specified as a numeric or logical 1 (`true`) or 0 (`false`). Setting this property to `true` is equivalent to right-clicking the Simulink based state and selecting **Comment Out**. For more information, see “Commenting Stateflow Objects in a Chart”.

`IsImplicitlyCommented` — Whether Simulink based state is implicitly commented out
`true` or 1 | `false` or 0

This property is read-only.

Whether the Simulink based state is implicitly commented out, specified as a numeric or logical 1 (`true`) or 0 (`false`). The Simulink based state is implicitly commented out when you comment out a state or box that contains it.

`CommentText` — Comment text
`''` (default) | character vector

Comment text added to the Simulink based state, specified as a character vector. This property applies only when the `IsExplicitlyCommented` property is `true`. In the Stateflow Editor, when you point to the comment badge on the Simulink based state, the text appears as a tooltip. When you set the `IsExplicitlyCommented` property to `false`, the value of `CommentText` reverts to `''`.

Graphical Appearance

`Position` — Position and size of Simulink based state
`[0 0 90 60]` (default) | `[left top width height]`

Position and size of the Simulink based state, specified as a four-element numeric vector of the form `[left top width height]`.

`BadIntersection` — Whether Simulink based state intersects a box, state, or function
`true` or 1 | `false` or 0

This property is read-only.

Whether the Simulink based state graphically intersects a box, state, or function, specified as a numeric or logical 1 (`true`) or 0 (`false`).

`ContentPreviewEnabled` — Whether to display preview of Simulink based state contents
`true` or 1 (default) | `false` or 0

Whether to display a preview of the Simulink based state contents, specified as a numeric or logical 1 (`true`) or 0 (`false`).

`ArrowSize` — Size of incoming transition arrows
8 (default) | scalar

Size of incoming transition arrows, specified as a scalar.

`FontSize` — Font size for Simulink based state label
scalar

Font size for the Simulink based state label, specified as a scalar. The `StateFont.Size` property of the chart that contains the Simulink based state sets the initial value of this property.

State Decomposition

Type — Decomposition of sibling states
'AND' | 'OR'

This property is read-only.

Decomposition of sibling states, specified as `'OR'` or `'AND'`. The Simulink based state inherits this property from the `Decomposition` property of its parent state or chart.

`ExecutionOrder` — Execution order in parallel (AND) decomposition
scalar

Execution order for the Simulink based state in parallel (AND) decomposition, specified as an integer scalar. This property applies only when both of these conditions are satisfied:

- The `Type` property of the Simulink based state is `'AND'`.
- The `UserSpecifiedStateTransitionExecutionOrder` property of the chart that contains the Simulink based state is `true`.

Active State Output

`HasOutputData` — Whether to create active state data output
`false` or 0 (default) | `true` or 1

Whether to create an active state data output port for the Simulink based state, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “Monitor State Activity Through Active State Data”.

`OutputData` — Active state data object
`Stateflow.Data` object

This property is read-only.

Active state data object for the Simulink based state, specified as a `Stateflow.Data` object. This property applies only when the `HasOutputData` property for the Simulink based state is `true`.

`OutputPortName` — Name of active state data object
character vector

Name of the active state data object for the Simulink based state, specified as a character vector. This property applies only when the `HasOutputData` property for the Simulink based state is `true`.

`OutputMonitoringMode` — Monitoring mode for active state output
`'SelfActivity'`

Monitoring mode for the active state output data, specified as a character vector. For Simulink based states, the only option is `'SelfActivity'`.

Signal Logging

`LoggingInfo` — Signal logging properties
`Stateflow.SigLoggingInfo` object

Signal logging properties for the Simulink based state, specified as a `Stateflow.SigLoggingInfo` object with these properties:

- **`DataLogging`** — Whether to enable signal logging, specified as a numeric or logical 1 (`true`) or 0 (`false`).
- **`DecimateData`** — Whether to limit the amount of logged data, specified as a numeric or logical 1 (`true`) or 0 (`false`).
- **`Decimation`** — Decimation interval, specified as an integer scalar. This property applies only when the `DecimateData` property is `true`.
- **`LimitDataPoints`** — Whether to limit the number of data points to log, specified as a numeric or logical 1 (`true`) or 0 (`false`).
- **`MaxPoints`** — Maximum number of data points to log, specified as an integer scalar. This property applies only when the `LimitDataPoints` property is `true`.
- **`NameMode`** — Source of the signal name, specified as `'SignalName'` or `'Custom'`.
- **`LoggingName`** — Custom signal name, specified as a character vector. This property applies only when the `NameMode` property is `'Custom'`.

For more information, see "Log Simulation Output for States and Data".

Example: `state.LoggingInfo.DataLogging = true;`

Debugging

Debug — Debugger properties
`Stateflow.StateDebug` object

Debugger properties for the Simulink based state, specified as a `Stateflow.StateDebug` object with these properties:

- **`OnEntry`** — Whether to set the `On State Entry` breakpoint, specified as a numeric or logical 1 (`true`) or 0 (`false`).
- **`OnDuring`** — Whether to set the `During State` breakpoint, specified as a numeric or logical 1 (`true`) or 0 (`false`).
- **`OnExit`** — Whether to set the `On State Exit` breakpoint, specified as a numeric or logical 1 (`true`) or 0 (`false`).

For more information, see "Set Breakpoints to Debug Charts".

Example: `simulinkBasedState.Debug.Breakpoints.OnEntry = true;`

Example: `simulinkBasedState.Debug.Breakpoints.OnDuring = true;`

Example: `simulinkBasedState.Debug.Breakpoints.OnExit = true;`

TestPoint — Whether to set Simulink based state as test point
`false` or 0 (default) | `true` or 1

Whether to set the Simulink based state as a test point, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see "Monitor Test Points in Stateflow Charts".

Hierarchy

Chart — Chart that contains Simulink based state
`Stateflow.Chart` object

This property is read-only.

Chart that contains the Simulink based state, specified as a `Stateflow.Chart` object.

`Subviewer` — Subviewer for Simulink based state
`Stateflow.Chart` object | `Stateflow.State` object | `Stateflow.Box` object

This property is read-only.

Subviewer for the Simulink based state, specified as a `Stateflow.Chart`, `Stateflow.State`, or `Stateflow.Box` object. The subviewer is the chart or subchart where you can graphically view the Simulink based state.

`Machine` — Machine that contains Simulink based state
`Stateflow.Machine` object

This property is read-only.

Machine that contains the Simulink based state, specified as a `Stateflow.Machine` object.

`Path` — Location of parent in model hierarchy
character vector

This property is read-only.

Location of the parent of the Simulink based state in the model hierarchy, specified as a character vector.

Identification

`Description` — Description
`''` (default) | character vector

Description for the Simulink based state, specified as a character vector.

`Document` — Document link
`''` (default) | character vector

Document link for the Simulink based state, specified as a character vector.

`Tag` — User-defined tag
`[]` (default) | any data type

User-defined tag for the Simulink based state, specified as data of any type.

`SSIdNumber` — Session-independent identifier
scalar

This property is read-only.

Session-independent identifier, specified as an integer scalar. Use this property to distinguish the Simulink based state from other objects in the model.

`Id` — Unique identifier
scalar

This property is read-only.

Unique identifier, specified as an integer scalar. Unlike `SSIdNumber`, the value of this property is reassigned every time you start a new MATLAB session and may be recycled after an object is deleted.

Object Functions

getParent	Identify parent of object
dialog	Open properties dialog box
isCommented	Determine if graphical object is commented out
view	Display object in editing environment
highlight	Highlight graphical object
fitToView	Zoom in on graphical object

Examples

Add Simulink Based State to Chart

Add a Simulink based state in the chart `ch`. Set its name to `'A'`.

```
simulinkBasedState = Stateflow.SimulinkBasedState(ch);
simulinkBasedState.Name = 'A';
```

See Also

`Stateflow.Box` | `Stateflow.Chart` | `Stateflow.State`

Topics

“Overview of the Stateflow API” on page 1-2
“Simulink Subsystems as States”
“List of Stateflow API Properties” on page 4-2

Introduced in R2017b

Stateflow.SLFunction

Simulink function in chart, state, box, or function

Description

Use `Stateflow.SLFunction` objects to create Simulink functions that enable you to call Simulink subsystems in the actions of states and transitions. Typical applications include:

- Defining a function that requires Simulink blocks
- Scheduling execution of multiple controllers

For more information, see “Reuse Simulink Functions in Stateflow Charts”.

Creation

Syntax

```
function = Stateflow.SLFunction(parent)
```

Description

`function = Stateflow.SLFunction(parent)` creates a `Stateflow.SLFunction` object in a parent chart, state, box, or function.

Input Arguments

`parent` — Parent for new Simulink function
`Stateflow.Chart` object | `Stateflow.State` object | `Stateflow.Box` object | `Stateflow.Function` object

Parent for the new Simulink function, specified as a Stateflow API object of one of these types:

- `Stateflow.Box`
- `Stateflow.Chart`
- `Stateflow.Function`
- `Stateflow.State`

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

Content

`Name` — Name of Simulink function
`''` (default) | character vector

Name of the Simulink function, specified as a character vector.

`LabelString` — Label for Simulink function
`'?'` (default) | character vector

Label for the Simulink function, specified as a character vector.

`IsExplicitlyCommented` — Whether to comment out Simulink function
`false` or 0 (default) | `true` or 1

Whether to comment out the Simulink function, specified as a numeric or logical 1 (`true`) or 0 (`false`). Setting this property to `true` is equivalent to right-clicking the Simulink function and selecting **Comment Out**. For more information, see “Commenting Stateflow Objects in a Chart”.

`IsImplicitlyCommented` — Whether Simulink function is implicitly commented out
`true` or 1 | `false` or 0

This property is read-only.

Whether the Simulink function is implicitly commented out, specified as a numeric or logical 1 (`true`) or 0 (`false`). The Simulink function is implicitly commented out when you comment out a state, box, or function that contains it.

`CommentText` — Comment text
`''` (default) | character vector

Comment text added to the Simulink function, specified as a character vector. This property applies only when the `IsExplicitlyCommented` property is `true`. In the Stateflow Editor, when you point to the comment badge % on the Simulink function, the text appears as a tooltip. When you set the `IsExplicitlyCommented` property to `false`, the value of `CommentText` reverts to `''`.

Graphical Appearance

`Position` — Position and size of Simulink function
`[0 0 90 60]` (default) | `[left top width height]`

Position and size of the Simulink function, specified as a four-element numeric vector of the form `[left top width height]`.

`BadIntersection` — Whether function intersects a box, state, or function
`true` or 1 | `false` or 0

This property is read-only.

Whether the Simulink function graphically intersects a box, state, or function, specified as a numeric or logical 1 (`true`) or 0 (`false`).

`ContentPreviewEnabled` — Whether to display preview of Simulink function contents
`true` or 1 (default) | `false` or 0

Whether to display a preview of the Simulink function contents, specified as a numeric or logical 1 (`true`) or 0 (`false`).

`FontSize` — Font size for Simulink function label
scalar

Font size for the Simulink function label, specified as a scalar. The `StateFont.Size` property of the chart that contains the graphical function sets the initial value of this property.

Hierarchy

`Chart` — Chart that contains Simulink function
`Stateflow.Chart` object

This property is read-only.

Chart that contains the Simulink function, specified as a `Stateflow.Chart` object.

`Subviewer` — Subviewer for Simulink function
`Stateflow.Chart` object | `Stateflow.State` object | `Stateflow.Box` object | `Stateflow.Function` object

This property is read-only.

Subviewer for the Simulink function, specified as a `Stateflow.Chart`, `Stateflow.State`, `Stateflow.Box`, or `Stateflow.Function` object. The subviewer is the chart or subchart where you can graphically view the Simulink function.

`Machine` — Machine that contains Simulink function
`Stateflow.Machine` object

This property is read-only.

Machine that contains the Simulink function, specified as a `Stateflow.Machine` object.

`Path` — Location of parent in model hierarchy
character vector

This property is read-only.

Location of the parent of the Simulink function in the model hierarchy, specified as a character vector.

Identification

`Description` — Description
`''` (default) | character vector

Description for the Simulink function, specified as a character vector.

`Document` — Document link
`''` (default) | character vector

Document link for the Simulink function, specified as a character vector.

`Tag` — User-defined tag
`[]` (default) | any data type

User-defined tag for the Simulink function, specified as data of any type.

`SSIdNumber` — Session-independent identifier
scalar

This property is read-only.

Session-independent identifier, specified as an integer scalar. Use this property to distinguish the MATLAB function from other objects in the model.

`Id` — Unique identifier
scalar

This property is read-only.

Unique identifier, specified as an integer scalar. Unlike `SSIdNumber`, the value of this property is reassigned every time you start a new MATLAB session and may be recycled after an object is deleted.

Object Functions

find	Identify specified objects in hierarchy
getChildren	Identify children of object
getParent	Identify parent of object
dialog	Open properties dialog box
isCommented	Determine if graphical object is commented out
view	Display object in editing environment
highlight	Highlight graphical object
fitToView	Zoom in on graphical object

Examples

Add Simulink Function to Chart

Add a Simulink function in the chart `ch`. Set its label to `'[y1,y2] = f(x1,x2,x3)'`.

```
function = Stateflow.SLFunction(ch);
function.LabelString = '[y1,y2] = f(x1,x2,x3)';
```

See Also

`Stateflow.Box` | `Stateflow.Chart` | `Stateflow.Function` | `Stateflow.State`

Topics
“Overview of the Stateflow API” on page 1-2
“Reuse Simulink Functions in Stateflow Charts”
“List of Stateflow API Properties” on page 4-2

Introduced in R2008b

Stateflow.State

State in chart, state, or box

Description

Use `Stateflow.State` objects to describe an operating mode of a reactive system. For more information, see “Represent Operating Modes by Using States”.

Creation

Syntax

`state = Stateflow.State(parent)`

Description

`state = Stateflow.State(parent)` creates a `Stateflow.State` object in a parent chart, state, or box.

Input Arguments

`parent` — Parent for new state
`Stateflow.Chart` object | `Stateflow.State` object | `Stateflow.Box` object

Parent for the new state, specified as a Stateflow API object of one of these types:

- `Stateflow.Box`
- `Stateflow.Chart`
- `Stateflow.State`

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

Content

`Name` — Name of state
`''` (default) | character vector

Name of the state, specified as a character vector.

`LabelString` — Label for state
`'?'` (default) | character vector

Label for the state, specified as a character vector. For more information, see “Specify Labels in States and Transitions Programmatically” on page 1-16.

`DuringAction` — State `during` action
character vector

This property is read-only.

State `during` action, specified as a character vector. The value of this property depends on the `LabelString` property for the state. For more information, see “Specify Labels in States and Transitions Programmatically” on page 1-16. This property is not supported in Moore charts.

`EntryAction` — State `entry` action
character vector

This property is read-only.

State `entry` action, specified as a character vector. The value of this property depends on the `LabelString` property for the state. For more information, see “Specify Labels in States and Transitions Programmatically” on page 1-16. This property is not supported in Moore charts.

`ExitAction` — State `exit` action
character vector

This property is read-only.

State `exit` action, specified as a character vector. The value of this property depends on the `LabelString` property for the state. For more information, see “Specify Labels in States and Transitions Programmatically” on page 1-16. This property is not supported in Moore charts.

`MooreAction` — State action in Moore chart
character vector

This property is read-only.

State action in a Moore chart, specified as a character vector. The value of this property depends on the `LabelString` property for the state. For more information, see “Specify Labels in States and Transitions Programmatically” on page 1-16. This property is supported only in Moore charts. For more information, see “Design Rules for Moore Charts”.

`OnAction` — State `on` actions
cell array of character vectors

This property is read-only.

State `on` actions, specified as a cell array of character vectors in the form

```
{'trigger1','action1',...,'triggerN','actionN'}
```

The value of this property depends on the `LabelString` property for the state. For more information, see “Specify Labels in States and Transitions Programmatically” on page 1-16. This property is not supported in Moore charts.

`IsExplicitlyCommented` — Whether to comment out state
`false` or 0 (default) | `true` or 1

Whether to comment out the state, specified as a numeric or logical 1 (`true`) or 0 (`false`). Setting this property to `true` is equivalent to right-clicking the state and selecting **Comment Out**. For more information, see “Commenting Stateflow Objects in a Chart”.

`IsImplicitlyCommented` — Whether state is implicitly commented out
`true` or 1 | `false` or 0

This property is read-only.

Whether the state is implicitly commented out, specified as a numeric or logical 1 (`true`) or 0 (`false`). The state is implicitly commented out when you comment out a state or box that contains it.

`CommentText` — Comment text
`''` (default) | character vector

Comment text added to the state, specified as a character vector. This property applies only when the `IsExplicitlyCommented` property is `true`. In the Stateflow Editor, when you point to the comment badge on the state, the text appears as a tooltip. When you set the `IsExplicitlyCommented` property to `false`, the value of `CommentText` reverts to `''`.

Graphical Appearance

`Position` — Position and size of state
`[0 0 90 60]` (default) | `[left top width height]`

Position and size of the state, specified as a four-element numeric vector of the form `[left top width height]`.

`BadIntersection` — Whether state intersects a box, state, or function
`true` or 1 | `false` or 0

This property is read-only.

Whether the state graphically intersects a box, state, or function, specified as a numeric or logical 1 (`true`) or 0 (`false`).

`IsGrouped` — Whether state is a grouped state
`false` or 0 (default) | `true` or 1

Whether the state is a grouped state, specified as a numeric or logical 1 (`true`) or 0 (`false`). When you copy and paste a grouped state, you copy not only the state but all of its contents. For more information, see “Copy and Paste by Grouping” on page 2-24.

`IsSubchart` — Whether state is a subchart
`false` or 0 (default) | `true` or 1

Whether the state is a subchart, specified as a numeric or logical 1 (`true`) or 0 (`false`).

`ContentPreviewEnabled` — Whether to display preview of state contents
`false` or 0 (default) | `true` or 1

Whether to display a preview of the state contents, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property applies only when the `IsSubchart` property is `true`.

`ArrowSize` — Size of incoming transition arrows
8 (default) | scalar

Size of incoming transition arrows, specified as a scalar.

`FontSize` — Font size for state label
scalar

Font size for the state label, specified as a scalar. The `StateFont.Size` property of the chart that contains the state sets the initial value of this property.

State Decomposition

`Decomposition` — Decomposition of substates
`'EXCLUSIVE_OR'` (default) | `'PARALLEL_AND'`

Decomposition of substates at the top level of containment in the state, specified as `'EXCLUSIVE_OR'` or `'PARALLEL_AND'`. For more information, see “Specify Substate Decomposition”.

`Type` — Decomposition of sibling states
`'AND'` | `'OR'`

This property is read-only.

Decomposition of sibling states, specified as `'OR'` or `'AND'`. The state inherits this property from the `Decomposition` property of its parent state or chart.

`ExecutionOrder` — Execution order in parallel (AND) decomposition
scalar

Execution order for the state in parallel (AND) decomposition, specified as an integer scalar. This property applies only when both of these conditions are satisfied:

- The `Type` property of the state is `'AND'`.
- The `UserSpecifiedStateTransitionExecutionOrder` property of the chart that contains the state is `true`.

Active State Output

`HasOutputData` — Whether to create active state data output
`false` or 0 (default) | `true` or 1

Whether to create an active state data output port for the state, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “Monitor State Activity Through Active State Data”.

`OutputData` — Active state data object
`Stateflow.Data` object

This property is read-only.

Active state data object for the state, specified as a `Stateflow.Data` object. This property applies only when the `HasOutputData` property for the state is `true`.

`OutputPortName` — Name of active state data object
character vector

Name of the active state data object for the state, specified as a character vector. This property applies only when the `HasOutputData` property for the state is `true`.

`OutputMonitoringMode` — Monitoring mode for active state output
`'SelfActivity'` (default) | `'ChildActivity'` | `'LeafStateActivity'`

Monitoring mode for the active state output data, specified as `'SelfActivity'`, `'ChildActivity'`, or `'LeafStateActivity'`.

`EnumTypeName` — Name of enumerated data type for active state data object
character vector

Name of the enumerated data type for the active state data object for the state, specified as a character vector. This property applies only when the `OutputMonitoringMode` property for the state is `'ChildActivity'` or `'LeafStateActivity'`. For more information, see “Enum Name”.

`DoNotAutogenerateEnum` — Whether to define enumerated data type manually
`false` or 0 (default) | `true` or 1

Whether to define the enumerated data type for the active state data output manually, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property applies only when the `OutputMonitoringMode` property for the state is `'ChildActivity'` or `'LeafStateActivity'`. For more information, see “Define State Activity Enumeration Type”.

Signal Logging

`LoggingInfo` — Signal logging properties
`Stateflow.SigLoggingInfo` object

Signal logging properties for the state, specified as a `Stateflow.SigLoggingInfo` object with these properties:

- **`DataLogging`** — Whether to enable signal logging, specified as a numeric or logical 1 (`true`) or 0 (`false`).
- **`DecimateData`** — Whether to limit the amount of logged data, specified as a numeric or logical 1 (`true`) or 0 (`false`).
- **`Decimation`** — Decimation interval, specified as an integer scalar. This property applies only when the `DecimateData` property is `true`.
- **`LimitDataPoints`** — Whether to limit the number of data points to log, specified as a numeric or logical 1 (`true`) or 0 (`false`).
- **`MaxPoints`** — Maximum number of data points to log, specified as an integer scalar. This property applies only when the `LimitDataPoints` property is `true`.
- **`NameMode`** — Source of the signal name, specified as `'SignalName'` or `'Custom'`.
- **`LoggingName`** — Custom signal name, specified as a character vector. This property applies only when the `NameMode` property is `'Custom'`.

For more information, see “Log Simulation Output for States and Data”.

Example: `state.LoggingInfo.DataLogging = true;`

Debugging

`Debug` — Debugger properties
`Stateflow.StateDebug` object

Debugger properties for the state, specified as a `Stateflow.StateDebug` object with these properties:

- **`OnEntry`** — Whether to set the `On State Entry` breakpoint, specified as a numeric or logical 1 (`true`) or 0 (`false`).
- **`OnDuring`** — Whether to set the `During State` breakpoint, specified as a numeric or logical 1 (`true`) or 0 (`false`).
- **`OnExit`** — Whether to set the `On State Exit` breakpoint, specified as a numeric or logical 1 (`true`) or 0 (`false`).

For more information, see “Set Breakpoints to Debug Charts”.

Example: `state.Debug.Breakpoints.OnEntry = true;`

Example: `state.Debug.Breakpoints.OnDuring = true;`

Example: `state.Debug.Breakpoints.OnExit = true;`

`TestPoint` — Whether to set state as test point
`false` or 0 (default) | `true` or 1

Whether to set the state as a test point, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “Monitor Test Points in Stateflow Charts”.

Code Generation

`InlineOption` — Appearance in generated code
`'Auto'` (default) | `'Function'` | `'Inline'`

Appearance of the state functions in generated code, specified as one of these values:

- `'Auto'` — An internal calculation determines the appearance of state functions in generated code.
- `'Function'` — State functions are implemented as separate C functions.
- `'Inline'` — Calls to state functions are replaced by code.

For more information, see “Inline State Functions in Generated Code” (Simulink Coder).

Hierarchy

`Chart` — Chart that contains state
`Stateflow.Chart` object

This property is read-only.

Chart that contains the state, specified as a `Stateflow.Chart` object.

`Subviewer` — Subviewer for state
`Stateflow.Chart` object | `Stateflow.State` object | `Stateflow.Box` object | `Stateflow.Function` object

This property is read-only.

Subviewer for the state, specified as a `Stateflow.Chart`, `Stateflow.State`, or `Stateflow.Box` object. The subviewer is the chart or subchart where you can graphically view the state.

`Machine` — Machine that contains state
`Stateflow.Machine` object

This property is read-only.

Machine that contains the state, specified as a `Stateflow.Machine` object.

`Path` — Location of parent in model hierarchy
character vector

This property is read-only.

Location of the parent of the state in the model hierarchy, specified as a character vector.

Identification

`Description` — Description
`''` (default) | character vector

Description for the state, specified as a character vector.

`Document` — Document link
`''` (default) | character vector

Document link for the state, specified as a character vector.

`Tag` — User-defined tag
`[]` (default) | any data type

User-defined tag for the state, specified as data of any type.

`SSIdNumber` — Session-independent identifier
scalar

This property is read-only.

Session-independent identifier, specified as an integer scalar. Use this property to distinguish the state from other objects in the model.

`Id` — Unique identifier
scalar

This property is read-only.

Unique identifier, specified as an integer scalar. Unlike `SSIdNumber`, the value of this property is reassigned every time you start a new MATLAB session and may be recycled after an object is deleted.

Object Functions

find	Identify specified objects in hierarchy
getChildren	Identify children of object
getParent	Identify parent of object
defaultTransitions	Identify default transitions in specified object
innerTransitions	Identify inner transitions with specified source
outerTransitions	Identify outer transitions with specified source
sinkedTransitions	Identify transitions with specified destination
sourcedTransitions	Identify transitions with specified source
dialog	Open properties dialog box
isCommented	Determine if graphical object is commented out
view	Display object in editing environment
highlight	Highlight graphical object
fitToView	Zoom in on graphical object

Examples

Add State to Chart

Add a state in the chart `ch`. Set its name to `'A'`.

```
state = Stateflow.State(ch);
state.Name = 'A';
```

Enter Multiline Label in State

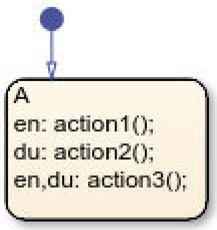
To enter a multiline label in the state `state`, you can:

- Call the MATLAB function `sprintf` and use the escape sequence `\n` to insert newline characters:

  ```
  str = sprintf('A\nen: action1();\ndu: action2();\nen,du: action3();');
  state.LabelString = str;
  ```

- Enter a concatenated text expression that uses the integer 10 as the ASCII equivalent of a newline character:

  ```
  str = ['A',10, ...
      'en: action1();',10, ...
      'du: action2();',10, ...
      'en,du: action3();'];
  state.LabelString = str;
  ```



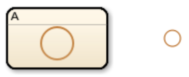
To extract the state name, `entry` action, and `during` action specified by the state label, enter:

```
name = state.Name

name =

    'A'

entry = state.EntryAction

entry =

    ' action1();
      action3();'

during = state.DuringAction

during =

    ' action2();
      action3();'
```

For more information, see "Specify Labels in States and Transitions Programmatically" on page 1-16.

Add Supertransition from Subchart

Create a supertransition that connects junction `j1`, which is inside a subchart, to junction `j2`, which is outside the subchart.



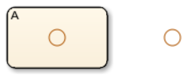
Save the original position of subchart `st` to a temporary workspace variable `subchartPosition`.

```
subchartPosition = st.Position;
```

Convert the subchart to a normal state by setting its `IsSubchart` and `IsGrouped` properties to `false`.

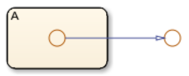
```
st.IsSubchart = false;
st.IsGrouped = false;
```

When you convert a subchart to a normal state, it may change size to display its contents.



Add a transition that connects junction `j1` to junction `j2` in the chart `ch`.

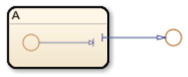
```
tr = Stateflow.Transition(ch);
tr.Source = j1;
tr.Destination = j2;
```



Revert the state to a subchart by setting its `IsSubchart` property to `true`. Restore the subchart to its original position.

```
st.IsSubchart = true;
st.Position = subchartPosition;
```

The state `A` is now a subchart and the transition between the junctions is now a supertransition.



For more information, see “Move Between Levels of Hierarchy by Using Supertransitions”.

See Also

`Stateflow.Box` | `Stateflow.Chart` | `Stateflow.Transition`

Topics

“Overview of the Stateflow API” on page 1-2
“Represent Operating Modes by Using States”
“Specify Labels in States and Transitions Programmatically” on page 1-16
“List of Stateflow API Properties” on page 4-2

Introduced before R2006a

Stateflow.StateBreakpoints

Breakpoint properties for state

Description

Use a `Stateflow.StateBreakpoints` object to specify the breakpoint properties for a state, atomic subchart, or Simulink based state. For more information, see “Set Breakpoints to Debug Charts”.

Creation

Each state, atomic subchart, and Simulink based state has its own `Stateflow.StateBreakpoints` object. To access the `Stateflow.StateBreakpoints` object, use the `Debug.Breakpoints` property of the `Stateflow.State`, `Stateflow.AtomicSubchart`, or `Stateflow.SimulinkBasedState` object.

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

`OnEntry` — Whether to set `On State Entry` breakpoint
`false` or 0 (default) | `true` or 1

Whether to set the `On State Entry` breakpoint, specified as a numeric or logical 1 (`true`) or 0 (`false`).

`OnDuring` — Whether to set `During State` breakpoint
`false` or 0 (default) | `true` or 1

Whether to set the `During State` breakpoint, specified as a numeric or logical 1 (`true`) or 0 (`false`).

`OnExit` — Whether to set `On State Exit` breakpoint
`false` or 0 (default) | `true` or 1

Whether to set the `On State Exit` breakpoint, specified as a numeric or logical 1 (`true`) or 0 (`false`).

Examples

Set Breakpoints for State

Access the `Stateflow.StateDebug` and `Stateflow.StateBreakpoints` objects for the `Stateflow.State` object `state`.

```
debug = state.Debug;
breakpoints = debug.Breakpoints;
```

Set the `On State Entry`, `During State`, and `On State Exit` breakpoints.

```
breakpoints.OnEntry = true;
breakpoints.OnDuring = true;
breakpoints.OnExit = true;
```

See Also

`Stateflow.State` | `Stateflow.SimulinkBasedState` | `Stateflow.AtomicSubchart`

Topics

"Overview of the Stateflow API" on page 1-2
"List of Stateflow API Properties" on page 4-2
"Set Breakpoints to Debug Charts"

Introduced before R2006a

Stateflow.StateDebug

Debugger properties for state

Description

Use a `Stateflow.StateDebug` object to specify the debugger properties for a state, atomic subchart, or Simulink based state.

Creation

Each state, atomic subchart, and Simulink based state has its own `Stateflow.StateDebug` object. To access the `Stateflow.StateDebug` object, use the `Debug` property for the `Stateflow.State`, `Stateflow.AtomicSubchart`, or `Stateflow.SimulinkBasedState` object.

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

`Breakpoints` — Breakpoint properties
`Stateflow.StateBreakpoints` object

Breakpoint properties for the state, atomic subchart, or Simulink based state, specified as a `Stateflow.StateBreakpoints` object with these properties:

- **`OnEntry`** — Whether to set the `On State Entry` breakpoint, specified as a numeric or logical 1 (`true`) or 0 (`false`).
- **`OnDuring`** — Whether to set the `During State` breakpoint, specified as a numeric or logical 1 (`true`) or 0 (`false`).
- **`OnExit`** — Whether to set the `On State Exit` breakpoint, specified as a numeric or logical 1 (`true`) or 0 (`false`).

For more information, see “Set Breakpoints to Debug Charts”.

Examples

Set Breakpoints for State

Access the `Stateflow.StateDebug` and `Stateflow.StateBreakpoints` objects for the `Stateflow.State` object `state`.

```
debug = state.Debug;
breakpoints = debug.Breakpoints;
```

Set the `On State Entry`, `During State`, and `On State Exit` breakpoints.

```
breakpoints.OnEntry = true;
breakpoints.OnDuring = true;
breakpoints.OnExit = true;
```

See Also

`Stateflow.State` | `Stateflow.SimulinkBasedState` | `Stateflow.AtomicSubchart`

Topics

“Overview of the Stateflow API” on page 1-2
“List of Stateflow API Properties” on page 4-2
“Set Breakpoints to Debug Charts”

Introduced before R2006a

Stateflow.StateFont

Font for box, function, and state labels

Description

Use a `Stateflow.StateFont` object to specify the font properties for box, function, and state labels in a chart.

Creation

Each chart has its own `Stateflow.StateFont` object. To access the `Stateflow.StateFont` object, use the `StateFont` property for the `Stateflow.Chart` object.

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

`Name` — Font name
`'Helvetica'` (default) | character vector

Font name, specified as a character vector. This property also determines the font for annotations in the chart.

`Angle` — Font angle
`'NORMAL'` (default) | `'ITALIC'`

Font angle, specified as `'NORMAL'` or `'ITALIC'`.

`Weight` — Font weight
`'NORMAL'` (default) | `'BOLD'`

Font weight, specified as `'NORMAL'` or `'BOLD'`.

`Size` — Default font size
`12` (default) | scalar

Default font size for new boxes, functions, and states in the chart, specified as a scalar. This property also determines the default font size for new annotations in the chart.

Examples

Change Font Properties for State Labels

Access the `Stateflow.StateFont` object for the `Stateflow.Chart` object `ch`.

```
font = ch.StateFont;
```

Set the font for box, function, and state labels to Arial. Set the font angle to italics and the font weight to bold. Set the default font size to 8.

```
font.Name = 'Arial';
font.Angle = 'ITALIC';
font.Weight = 'BOLD';
font.Size = 8;
```

See Also

`Stateflow.Chart`

Topics

"Overview of the Stateflow API" on page 1-2
"List of Stateflow API Properties" on page 4-2

Introduced before R2006a

Stateflow.StateTransitionTableChart

Tabular representation of state machine for modal logic

Description

Use a `Stateflow.StateTransitionTableChart` object to create a tabular representation of a finite state machine for modal logic. The benefits of using state transition tables include:

- The ease of modeling train-like state machines, where the modal logic involves transitions from one state to its neighbor
- A concise, compact format for a state machine
- Reduced maintenance of graphical objects

For more information, see "State Transition Tables in Stateflow".

Creation

To create a `Stateflow.StateTransitionTableChart` object, call the function `sfnew` with the `-STT` argument. For example, to create a State Transition Table block in a new Simulink model called `myModel`, enter:

```
sfnew -STT myModel
```

Alternatively, you can add a new State Transition Table block to an existing model by using the function `add_block`:

```
add_block('sflib/State Transition Table','myModel/State Transition Table')
```

Then, to access the `Stateflow.StateTransitionTableChart` object, call the `find` function for the `Simulink.Root` object:

```
rt = sfroot;
table = find(rt,'-isa','Stateflow.StateTransitionTableChart', ...
    'Path','myModel/State Transition Table');
```

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see "Modify Properties and Call Functions of Stateflow Objects" on page 1-11.

Content

Name — Name of state transition table
`'State Transition Table'` (default) | character vector

Name of the state transition table, specified as a character vector.

`ActionLanguage` — Action language
`'MATLAB'` (default) | `'C'`

Action language used to program the state transition table, specified as `'MATLAB'` or `'C'`. For more information, see “Differences Between MATLAB and C as Action Language Syntax”.

`StateMachineType` — State machine semantics
`'Classic'` (default) | `'Mealy'` | `'Moore'`

State machine semantics implemented by the state transition table, specified as `'Classic'`, `'Mealy'`, or `'Moore'`. For more information, see “Overview of Mealy and Moore Machines”.

`SupportVariableSizing` — Whether state transition table supports variable-size data
`true` or 1 (default) | `false` or 0

Whether the state transition table supports variable-size data, specified as a numeric or logical 1 (`true`) or 0 (`false`). Only variable-size data can change dimension during simulation. For more information, see “Declare Variable-Size Data in Stateflow Charts”.

Chart Initialization

`ExecuteAtInitialization` — Whether to initialize state configuration
`false` or 0 (default) | `true` or 1

Whether to initialize the state configuration of the state transition table at time zero instead of at the first input event, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “Execution of a Chart at Initialization”.

`StatesWhenEnabling` — Behavior of states when event reenables state transition table
`''` (default) | `'held'` | `'reset'`

Behavior of the states when a function-call input event reenables the state transition table, specified as one of these values:

- `''` — The state transition table does not contain function-call input events.
- `'held'` — The state transition table maintains the most recent values of the states.
- `'reset'` — The state transition table reverts to the initial conditions of the states.

For more information, see “Control States in Charts Enabled by Function-Call Input Events”.

`InitializeOutput` — Whether to initialize output data
`false` or 0 (default) | `true` or 1

Whether to initialize the output data every time the state transition table wakes up, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “Initialize outputs every time chart wakes up”.

Active State Output

`HasOutputData` — Whether to create active state data output
`false` or 0 (default) | `true` or 1

Whether to create an active state data output port for the state transition table, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “Monitor State Activity Through Active State Data”.

`OutputData` — Active state data object
`Stateflow.Data` object

This property is read-only.

Active state data object for the state transition table, specified as a `Stateflow.Data` object. This property applies only when the `HasOutputData` property for the state transition table is `true`.

`OutputPortName` — Name of active state data object
character vector

Name of the active state data object for the state transition table, specified as a character vector. This property applies only when the `HasOutputData` property for the state transition table is `true`.

`OutputMonitoringMode` — Monitoring mode for active state output
`'ChildActivity'` (default) | `'LeafStateActivity'`

Monitoring mode for the active state output data, specified as `'ChildActivity'` or `'LeafStateActivity'`.

`EnumTypeName` — Name of enumerated data type for active state data object
character vector

Name of the enumerated data type for the active state data object for the state transition table, specified as a character vector. For more information, see “Enum Name”.

`DoNotAutogenerateEnum` — Whether to define enumerated data type manually
`false` or 0 (default) | `true` or 1

Whether to define the enumerated data type for the active state data output manually, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “Define State Activity Enumeration Type”.

Discrete and Continuous-Time Semantics

`ChartUpdate` — Activation method for state transition table
`'INHERITED'` (default) | `'CONTINUOUS'` | `'DISCRETE'`

Activation method for the state transition table, specified as `'CONTINUOUS'`, `'DISCRETE'`, or `'INHERITED'`. For more information, see “Update Method”.

`SampleTime` — Sample time for activating state transition table
`'-1'` (default) | character vector

Sample time for activating the state transition table, specified as a character vector. This property applies only when the `ChartUpdate` property for the state transition table is `'DISCRETE'`.

`EnableZeroCrossings` — Whether to enable zero-crossing detection
`true` or 1 (default) | `false` or 0

Whether to enable zero-crossing detection on state transitions in the state transition table, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property applies only when the `ChartUpdate` property for the state transition table is set to `'CONTINUOUS'`. For more information, see “Disable Zero-Crossing Detection”.

Super Step Semantics

`EnableNonTerminalStates` — Whether to enable super step semantics
`false` or 0 (default) | `true` or 1

Whether to enable super step semantics for the state transition table, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “Super Step Semantics”.

`NonTerminalMaxCounts` — Maximum number of transitions in one super step
`1000` (default) | scalar

Maximum number of transitions the state transition table can take in one super step, specified as an integer scalar. This property applies only when the `EnableNonTerminalStates` property for the state transition table is `true`.

`NonTerminalUnstableBehavior` — Behavior if super step exceeds maximum number of transitions
`'Proceed'` (default) | `'Throw Error'`

Behavior if a super step for the state transition table exceeds the maximum number of transitions specified in the `NonTerminalMaxCounts` property before reaching a stable state, specified as one of these values:

- `'Proceed'` — The state transition table goes to sleep with the last active state configuration.
- `'Throw Error'` — The state transition table generates an error.

This property applies only when the `EnableNonTerminalStates` property for the state transition table is `true`.

Integer and Fixed-Point Data

`SaturateOnIntegerOverflow` — Whether data saturates on integer overflow
`true` or 1 (default) | `false` or 0

Whether the data in the state transition table saturates on integer overflow, specified as a numeric or logical 1 (`true`) or 0 (`false`). When this property is disabled, the data in the state transition table wraps on integer overflow. For more information, see “Handle Integer Overflow for Chart Data”.

`TreatAsFi` — Inherited Simulink signals to treat as `fi` objects
`'Fixed-point'` (default) | `'Fixed-point & Integer'`

Inherited Simulink signals to treat as Fixed-Point Designer `fi` objects, specified as one of these values:

- `'Fixed-point'` — The state transition table treats all fixed-point inputs as `fi` objects.
- `'Fixed-point & Integer'` — The state transition table treats all fixed-point and integer inputs as `fi` objects.

This property applies only when the `ActionLanguage` property of the state transition table is `'MATLAB'`.

`EmlDefaultFimath` — Default `fimath` properties
`'Same as MATLAB Default'` (default) | `'Other:UserSpecified'`

Default `fimath` properties for the state transition table, specified as one of these values:

- `'Same as MATLAB Default'` — Use the same `fimath` properties as the current default `fimath` object.
- `'Other:UserSpecified'` — Use the `InputFimath` property to specify the default `fimath` object.

This property applies only when the `ActionLanguage` property of the state transition table is `'MATLAB'`.

`InputFimath` — Default `fimath` object
character vector

Default `fimath` object, specified as a character vector. When the `EmlDefaultFimath` property for the state transition table is `'Other:UserSpecified'`, you can use this property to:

- Enter an expression that constructs a `fimath` object.
- Enter the variable name for a `fimath` object in the MATLAB or model workspace.

This property applies only when the `ActionLanguage` property of the state transition table is `'MATLAB'`.

C Action Language

`StrongDataTypingWithSimulink` — Whether to use strong data typing
`true` or 1 (default) | `false` or 0

Whether to use strong data typing when the state transition table interfaces with Simulink input and output signals, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property applies only to state transition tables that use C as the action language. For more information, see "Use strong data typing with Simulink I/O".

`EnableBitOps` — Whether to use bit operations
`false` or 0 (default) | `true` or 1

Whether to use bit operations in state and transition actions in the state transition table, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property applies only to state transition tables that use C as the action language. For more information, see "Enable C-bit operations".

Debugging

`Debug` — Debugger properties
`Stateflow.ChartDebug` object

Debugger properties for the state transition table, specified as a `Stateflow.ChartDebug` object with this property:

- **`Breakpoints.OnEntry`** — Whether to set the `On Chart Entry` breakpoint, specified as a numeric or logical 1 (`true`) or 0 (`false`).

For more information, see "Set Breakpoints to Debug Charts".

Example: `table.Debug.Breakpoints.OnEntry = true;`

Graphical Appearance

`Editor` — Editor
`Stateflow.Editor` object

This property is read-only.

Editor for the state transition table, specified as a `Stateflow.Editor` object. You can use this object to control the position, size, and magnification level of the Stateflow Editor window.

`Visible` — Whether editor is displaying state transition table
`true` or 1 | `false` or 0

Whether the Stateflow Editor window is displaying the state transition table, specified as a numeric or logical 1 (`true`) or 0 (`false`).

`ChartColor` — Background color
`[1 0.9608 0.8824]` (default) | `[red green blue]`

Background color for the chart that is automatically generated for the state transition table, specified as a three-element numeric vector of the form `[red green blue]` that specifies the red, green, and blue values. Each element must be in the range between 0 and 1.

`StateColor` — Color for states
`[0 0 0]` (default) | `[red green blue]`

Color for the states in the chart that is automatically generated for the state transition table, specified as a three-element numeric vector of the form `[red green blue]` that specifies the red, green, and blue values. Each element must be in the range between 0 and 1.

`TransitionColor` — Color for transitions
`[0.2902 0.3294 0.6039]` (default) | `[red green blue]`

Color for transitions in the chart that is automatically generated for the state transition table, specified as a three-element numeric vector of the form `[red green blue]` that specifies the red, green, and blue values. Each element must be in the range between 0 and 1.

`JunctionColor` — Color for junctions
`[0.6824 0.3294 0]` (default) | `[red green blue]`

Color for junctions in the chart that is automatically generated for the state transition table, specified as a three-element numeric vector of the form `[red green blue]` that specifies the red, green, and blue values. Each element must be in the range between 0 and 1.

`StateFont` — Font for state labels
`Stateflow.STTStateFont` object

Font for the state labels in the chart that is automatically generated for the state transition table, specified as a `Stateflow.STTStateFont` object with these properties:

- **`Name`** — Font name, specified as a character vector.
- **`Angle`** — Font angle, specified as `'NORMAL'` or `'ITALIC'`.
- **`Weight`** — Font weight, specified as `'NORMAL'` or `'BOLD'`.
- **`Size`** — Default font size for new states, specified as a scalar.

Example: `table.StateFont.Name = 'Arial';`

Example: `table.StateFont.Angle = 'ITALIC';`

Example: `table.StateFont.Weight = 'BOLD;`

Example: `table.StateFont.Size = 8;`

`StateLabelColor` — Color for state labels
`[0 0 0]` (default) | `[red green blue]`

Color for the state labels in the chart that is automatically generated for the state transition table, specified as a three-element numeric vector of the form `[red green blue]` that specifies the red, green, and blue values. Each element must be in the range between 0 and 1.

`TransitionFont` — Font for transition labels
`Stateflow.STTTransFont` object

Font for the transition labels in the chart that is automatically generated for the state transition table, specified as a `Stateflow.STTTransFont` object with these properties:

- **`Name`** — Font name, specified as a character vector.
- **`Angle`** — Font angle, specified as `'NORMAL'` or `'ITALIC'`.
- **`Weight`** — Font weight, specified as `'NORMAL'` or `'BOLD'`.
- **`Size`** — Default font size for new transitions, specified as a scalar.

Example: `table.TransitionFont.Name = 'Arial';`

Example: `table.TransitionFont.Angle = 'ITALIC';`

Example: `table.TransitionFont.Weight = 'BOLD';`

Example: `table.TransitionFont.Size = 8;`

`TransitionLabelColor` — Color for transition labels
`[0.2902 0.3294 0.6039]` (default) | `[red green blue]`

Color for the transition labels in the chart that is automatically generated for the state transition table, specified as a three-element numeric vector of the form `[red green blue]` that specifies the red, green, and blue values. Each element must be in the range between 0 and 1.

Hierarchy

`Machine` — Machine that contains state transition table
`Stateflow.Machine` object

This property is read-only.

Machine that contains the state transition table, specified as a `Stateflow.Machine` object.

`Path` — Location of state transition table in model hierarchy
character vector

This property is read-only.

Location of the state transition table in the model hierarchy, specified as a character vector.

`Dirty` — Whether state transition table has changed
`true` or 1 | `false` or 0

Whether the state transition table has changed after being opened or saved, specified as a numeric or logical 1 (`true`) or 0 (`false`).

`Locked` — Whether state transition table is locked
`false` or 0 (default) | `true` or 1

Whether the state transition table is locked, specified as a numeric or logical 1 (`true`) or 0 (`false`). Enable this property to prevent changes in the state transition table.

`Iced` — Whether state transition table is locked
`false` or 0 (default) | `true` or 1

This property is read-only.

Whether the state transition table is locked, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property is equivalent to the property `Locked`, but is used internally to prevent changes in the state transition table during simulation.

Identification

`Description` — Description
`''` (default) | character vector

Description for the state transition table, specified as a character vector.

`Document` — Document link
`''` (default) | character vector

Document link for the state transition table, specified as a character vector.

`Tag` — User-defined tag
`[]` (default) | any data type

User-defined tag for the state transition table, specified as data of any type.

`Id` — Unique identifier
scalar

This property is read-only.

Unique identifier, specified as an integer scalar. Use this property to distinguish the state transition table from other objects in the model. The value of this property is reassigned every time you start a new MATLAB session and may be recycled after an object is deleted.

Object Functions

find	Identify specified objects in hierarchy
getChildren	Identify children of object
dialog	Open properties dialog box
view	Display object in editing environment

Examples

Create Empty State Transition Table

Call the function `sfnew` with the `-STT` argument to open a new Simulink model that contains an empty State Transition Table block.

```
sfnew -STT
```

Access the `Simulink.Root` object by calling the `sfroot` function.

```
rt = sfroot;
```

Access the `Stateflow.StateTransitionTableChart` object by calling the `find` function for the `Simulink.Root` object.

```
table = find(rt,'-isa','Stateflow.StateTransitionTableChart');
```

See Also

Blocks
State Transition Table

Functions
`sfnew` | `sfroot` | `add_block`

Topics
“Overview of the Stateflow API” on page 1-2
“Finite State Machine Concepts”
“State Transition Tables in Stateflow”
“List of Stateflow API Properties” on page 4-2

Introduced in R2012b

Stateflow.STTStateFont

Font for state labels in state transition tables

Description

Use a `Stateflow.STTStateFont` object to specify the font properties for state labels in the chart that is automatically generated for a state transition table.

Creation

Each state transition table has its own `Stateflow.STTStateFont` object. To access the `Stateflow.STTStateFont` object, use the `StateFont` property for the `Stateflow.StateTransitionTableChart` object.

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

`Name` — Font name
`'Helvetica'` (default) | character vector

Font name, specified as a character vector.

`Angle` — Font angle
`'NORMAL'` (default) | `'ITALIC'`

Font angle, specified as `'NORMAL'` or `'ITALIC'`.

`Weight` — Font weight
`'NORMAL'` (default) | `'BOLD'`

Font weight, specified as `'NORMAL'` or `'BOLD'`.

`Size` — Default font size
12 (default) | scalar

Default font size for new states in the state transition table, specified as a scalar.

Examples

Change Font Properties for State Labels

Access the `Stateflow.STTStateFont` object for the `Stateflow.StateTransitionTableChart` object `stt`.

```
font = stt.StateFont;
```

Set the font for state labels to Arial. Set the font angle to italics and the font weight to bold. Set the default font size to 8.

```
font.Name = 'Arial';
font.Angle = 'ITALIC';
font.Weight = 'BOLD';
font.Size = 8;
```

See Also

`Stateflow.StateTransitionTableChart`

Topics

"Overview of the Stateflow API" on page 1-2
"List of Stateflow API Properties" on page 4-2

Introduced before R2006a

Stateflow.STTTransFont

Font properties for transition labels in state transition tables

Description

Use a `Stateflow.STTTransFont` object to specify the font properties for transition labels in the chart that is automatically generated for a state transition table.

Creation

Each state transition table has its own `Stateflow.STTTransFont` object. To access the `Stateflow.STTTransFont` object, use the `TransitionFont` property for the `Stateflow.StateTransitionTableChart` object.

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

`Name` — Font name
`'Helvetica'` (default) | character vector

Font name, specified as a character vector.

`Angle` — Font angle
`'NORMAL'` (default) | `'ITALIC'`

Font angle, specified as `'NORMAL'` or `'ITALIC'`.

`Weight` — Font weight
`'NORMAL'` (default) | `'BOLD'`

Font weight, specified as `'NORMAL'` or `'BOLD'`.

`Size` — Default font size
12 (default) | scalar

Default font size for new transitions in the state transition table, specified as a scalar.

Examples

Change Font Properties for Transition Labels

Access the `Stateflow.STTTransFont` object for the `Stateflow.StateTransitionTableChart` object `stt`.

```
font = stt.TransitionFont;
```

Set the font for transition labels to Arial. Set the font angle to italics and the font weight to bold. Set the default font size to 8.

```
font.Name = 'Arial';
font.Angle = 'ITALIC';
font.Weight = 'BOLD';
font.Size = 8;
```

See Also

`Stateflow.StateTransitionTableChart`

Topics

"Overview of the Stateflow API" on page 1-2
"List of Stateflow API Properties" on page 4-2

Introduced before R2006a

Stateflow.TransBreakpoints

Breakpoint properties for transition

Description

Use a `Stateflow.TransBreakpoints` object to specify the breakpoint properties for a transition. For more information, see “Set Breakpoints to Debug Charts”.

Creation

Each transition has its own `Stateflow.TransBreakpoints` object. To access the `Stateflow.TransBreakpoints` object, use the `Debug.Breakpoints` property of the `Stateflow.Transition` object.

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

`WhenTested` — Whether to set `When Transition is Tested` breakpoint
`false` or 0 (default) | `true` or 1

Whether to set the `When Transition is Tested` breakpoint, specified as a numeric or logical 1 (`true`) or 0 (`false`).

`WhenValid` — Whether to set `When Transition is Valid` breakpoint
`false` or 0 (default) | `true` or 1

Whether to set the `When Transition is Valid` breakpoint, specified as a numeric or logical 1 (`true`) or 0 (`false`).

Examples

Set Breakpoints for Transition

Access the `Stateflow.TransDebug` and `Stateflow.TransBreakpoints` objects for the `Stateflow.Transition` object `transition`.

```
debug = transition.Debug;
breakpoints = debug.Breakpoints;
```

Set the `When Transition is Tested` and `When Transition is Valid` breakpoints.

```
breakpoints.WhenTested = true;
breakpoints.WhenValid = true;
```

See Also

`Stateflow.Transition`

Topics

"Overview of the Stateflow API" on page 1-2
"List of Stateflow API Properties" on page 4-2
"Set Breakpoints to Debug Charts"

Introduced before R2006a

Stateflow.TransDebug

Debugger properties for transition

Description

Use a Stateflow.TransDebug object to specify the debugger properties for a transition.

Creation

Each transition has its own Stateflow.TransDebug object. To access the Stateflow.TransDebug object, use the Debug property for the Stateflow.Transition object.

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the get and set functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

Breakpoints — Breakpoint properties
Stateflow.TransBreakpoints object

Breakpoint properties for the transition, specified as a Stateflow.TransBreakpoints object with these properties:

- **WhenTested** — Whether to set the When Transition is Tested breakpoint, specified as a numeric or logical 1 (true) or 0 (false).
- **WhenValid** — Whether to set the When Transition is Valid breakpoint, specified as a numeric or logical 1 (true) or 0 (false).

For more information, see “Set Breakpoints to Debug Charts”.

Examples

Set Breakpoints for Transition

Access the Stateflow.TransDebug and Stateflow.TransBreakpoints objects for the Stateflow.Transition object transition.

```
debug = transition.Debug;
breakpoints = debug.Breakpoints;
```

Set the When Transition is Tested and When Transition is Valid breakpoints.

```
breakpoints.WhenTested = true;
breakpoints.WhenValid = true;
```

See Also

`Stateflow.Transition`

Topics

“Overview of the Stateflow API” on page 1-2
“List of Stateflow API Properties” on page 4-2
“Set Breakpoints to Debug Charts”

Introduced before R2006a

Stateflow.TransFont

Font properties for transition labels

Description

Use a `Stateflow.TransFont` object to specify the font properties for transition labels in a chart.

Creation

Each chart has its own `Stateflow.TransFont` object. To access the `Stateflow.TransFont` object, use the `TransitionFont` property for the `Stateflow.Chart` object.

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

`Name` — Font name
`'Helvetica'` (default) | character vector

Font name, specified as a character vector.

`Angle` — Font angle
`'NORMAL'` (default) | `'ITALIC'`

Font angle, specified as `'NORMAL'` or `'ITALIC'`.

`Weight` — Font weight
`'NORMAL'` (default) | `'BOLD'`

Font weight, specified as `'NORMAL'` or `'BOLD'`.

`Size` — Default font size
`12` (default) | scalar

Default font size for new transitions in the chart, specified as a scalar.

Examples

Change Font Properties for Transition Labels

Access the `Stateflow.TransFont` object for the `Stateflow.Chart` object `ch`.

```
font = ch.TransitionFont;
```

Set the font for transition labels to Arial. Set the font angle to italics and the font weight to bold. Set the default font size to 8.

```
font.Name = 'Arial';
font.Angle = 'ITALIC';
font.Weight = 'BOLD';
font.Size = 8;
```

See Also

`Stateflow.Chart`

Topics

"Overview of the Stateflow API" on page 1-2
"List of Stateflow API Properties" on page 4-2

Introduced before R2006a

Stateflow.Transition

Transition in chart, state, box, or function

Description

Use `Stateflow.Transition` objects to create transitions from one operating mode to another. For more information, see “Transition Between Operating Modes”.

Creation

Syntax

`transition = Stateflow.Transition(parent)`

Description

`transition = Stateflow.Transition(parent)` creates a `Stateflow.Transition` object in a parent chart, state, box, or graphical function.

Input Arguments

`parent` — Parent for new transition
`Stateflow.Chart` object | `Stateflow.State` object | `Stateflow.Box` object | `Stateflow.Function` object

Parent for the new transition, specified as a Stateflow API object of one of these types:

- `Stateflow.Box`
- `Stateflow.Chart`
- `Stateflow.Function`
- `Stateflow.State`

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

Content

`LabelString` — Label for transition
`''` (default) | character vector

Label for the transition, specified as a character vector. For more information, see “Specify Labels in States and Transitions Programmatically” on page 1-16.

`Condition` — Transition condition
character vector

This property is read-only.

Transition condition, specified as a character vector. The value of this property depends on the `LabelString` property for the transition. For more information, see “Specify Labels in States and Transitions Programmatically” on page 1-16.

`ConditionAction` — Transition condition action
character vector

This property is read-only.

Transition condition action, specified as a character vector. The value of this property depends on the `LabelString` property for the transition. For more information, see “Specify Labels in States and Transitions Programmatically” on page 1-16.

`TransitionAction` — Transition action
character vector

This property is read-only.

Transition action, specified as a character vector. The value of this property depends on the `LabelString` property for the transition. For more information, see “Specify Labels in States and Transitions Programmatically” on page 1-16.

`Trigger` — Transition trigger
character vector

This property is read-only.

Transition trigger, specified as a character vector. The value of this property depends on the `LabelString` property for the transition. For more information, see “Specify Labels in States and Transitions Programmatically” on page 1-16.

`ExecutionOrder` — Execution order for transition
scalar

Execution order for the transition when its source is active, specified as an integer scalar. This property applies only when the `UserSpecifiedStateTransitionExecutionOrder` property of the chart that contains the transition is `true`. For more information, see “Transition Evaluation Order”.

`IsExplicitlyCommented` — Whether to comment out transition
`false` or 0 (default) | `true` or 1

Whether to comment out the transition, specified as a numeric or logical 1 (`true`) or 0 (`false`). Setting this property to `true` is equivalent to right-clicking the transition and selecting **Comment Out**. For more information, see “Commenting Stateflow Objects in a Chart”.

`IsImplicitlyCommented` — Whether transition is implicitly commented out
`true` or 1 | `false` or 0

This property is read-only.

Whether the transition is implicitly commented out, specified as a numeric or logical 1 (`true`) or 0 (`false`). The transition is implicitly commented out when you comment out its source, its destination, or a state, box, or function that contains it.

`CommentText` — Comment text
`''` (default) | character vector

Comment text added to the transition, specified as a character vector. This property applies only when the `IsExplicitlyCommented` property is `true`. In the Stateflow Editor, when you point to the comment badge % on the transition, the text appears as a tooltip. When you set the `IsExplicitlyCommented` property to `false`, the value of `CommentText` reverts to `''`.

Graphical Appearance

`Source` — Source of transition
`[]` (default) | `Stateflow.AtomicSubchart` object | object | `Stateflow.Junction` object | `Stateflow.SimulinkBasedState` object | `Stateflow.State`

Source of the transition, specified as an empty array or a Stateflow API object of one of these types:

- `Stateflow.AtomicSubchart`
- `Stateflow.Junction`
- `Stateflow.SimulinkBasedState`
- `Stateflow.State`

`SourceEndPoint` — Position of transition endpoint at source
`[2 2]` (default) | `[x y]`

Position of the transition endpoint at its source, specified as a two-element numeric vector `[x y]` of coordinates relative to the upper left corner of the chart.

`SourceOClock` — Location of transition endpoint at source
`0` (default) | scalar between 0 and 12

Location of the transition endpoint at its source, specified as a scalar between 0 and 12 that describes a clock position.

`Destination` — Destination of transition
`[]` (default) | `Stateflow.AtomicSubchart` object | object | `Stateflow.Junction` object | `Stateflow.SimulinkBasedState` object | `Stateflow.State`

Destination of the transition, specified as an empty array or a Stateflow API object of one of these types:

- `Stateflow.AtomicSubchart`
- `Stateflow.Junction`
- `Stateflow.SimulinkBasedState`
- `Stateflow.State`

`DestinationEndPoint` — Position of transition endpoint at destination
`[40 40]` (default) | `[x y]`

Position of the transition endpoint at its destination, specified as a two-element numeric vector `[x y]` of coordinates relative to the upper left corner of the chart.

`DestinationOClock` — Location of transition endpoint at destination
`0` (default) | scalar between 0 and 12

Location of the transition endpoint at its destination, specified as a scalar between 0 and 12 that describes a clock position.

`MidPoint` — Position of midpoint of transition
`[21 21]` (default) | `[x y]`

Position of the midpoint of the transition, specified as a two-element numeric vector `[x y]` of coordinates relative to the upper left corner of the chart.

`LabelPosition` — Position and size of transition label
`[0 0 8 14]` (default) | `[left top width height]`

Position and size of the transition label, specified as a four-element numeric vector of the form `[left top width height]`.

`ArrowSize` — Size of transition arrow
scalar

Size of the transition arrow at the destination, specified as a scalar. When you change the destination of the transition, this property resets to the value of the `ArrowSize` property of the new destination.

`FontSize` — Font size for transition label
scalar

Font size for the transition label, specified as a scalar. The `TransitionFont.Size` property of the chart that contains the transition sets the initial value of this property.

Debugging

`Debug` — Debugger properties
`Stateflow.TransDebug` object

Debugger properties for the transition, specified as a `Stateflow.TransDebug` object with these properties:

- **`Breakpoints.WhenTested`** — Whether to set the `When Transition is Tested` breakpoint, specified as a numeric or logical 1 (`true`) or 0 (`false`).
- **`Breakpoints.WhenValid`** — Whether to set the `When Transition is Valid` breakpoint, specified as a numeric or logical 1 (`true`) or 0 (`false`).

For more information, see “Set Breakpoints to Debug Charts”.

Example: `transition.Debug.Breakpoints.WhenTested = true;`

Example: `transition.Debug.Breakpoints.WhenValid = true;`

Code Generation

`IsVariant` — Whether transition is a variant transition
`false` or 0 (default) | `true` or 1

Whether the transition is a variant transition, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “Code Generation Using Variant Transitions”.

Hierarchy

`Chart` — Chart that contains transition
`Stateflow.Chart` object

This property is read-only.

Chart that contains the transition, specified as a `Stateflow.Chart` object.

`Subviewer` — Subviewer for transition
`Stateflow.Chart` object | `Stateflow.State` object | `Stateflow.Box` object | `Stateflow.Function` object

This property is read-only.

Subviewer for the transition, specified as a `Stateflow.Chart`, `Stateflow.State`, `Stateflow.Box`, or `Stateflow.Function` object. The subviewer is the chart or subchart where you can graphically view the transition.

`Machine` — Machine that contains transition
`Stateflow.Machine` object

This property is read-only.

Machine that contains the transition, specified as a `Stateflow.Machine` object.

`Path` — Location of parent in model hierarchy
character vector

This property is read-only.

Location of the parent of the transition in the model hierarchy, specified as a character vector.

Identification

`Description` — Description
`''` (default) | character vector

Description for the transition, specified as a character vector.

`Document` — Document link
`''` (default) | character vector

Document link for the transition, specified as a character vector.

`Tag` — User-defined tag
`[]` (default) | any data type

User-defined tag for the transition, specified as data of any type.

`SSIdNumber` — Session-independent identifier
scalar

This property is read-only.

Session-independent identifier, specified as an integer scalar. Use this property to distinguish the transition from other objects in the model.

Id — Unique identifier
scalar

This property is read-only.

Unique identifier, specified as an integer scalar. Unlike `SSIdNumber`, the value of this property is reassigned every time you start a new MATLAB session and may be recycled after an object is deleted.

Object Functions

getParent	Identify parent of object
dialog	Open properties dialog box
isCommented	Determine if graphical object is commented out
view	Display object in editing environment
highlight	Highlight graphical object
fitToView	Zoom in on graphical object

Examples

Add Transition to Chart

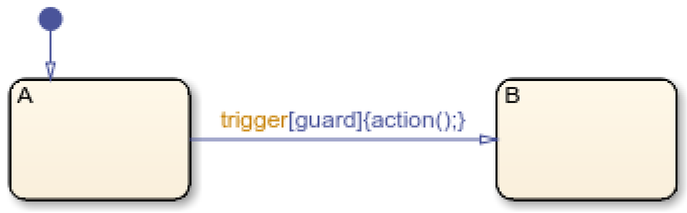
Add a transition that connects state `s1` to state `s2` in the chart `ch`.

```
transition = Stateflow.Transition(ch);
transition.Source = s1;
transition.Destination = s2;
```

Label Transitions

Add a label that specifies a trigger, condition, and condition action on the transition `transition`.

```
transition.LabelString = 'trigger[guard]{action();}';
```



To extract the trigger, condition, and condition action specified by the transition label, enter:

```
trigger = transition.Trigger
trigger =

    'trigger'

condition = transition.Condition

condition =

    'guard'

action = transition.ConditionAction

action =

    'action();'
```

Add a Default Transition

Create a `Stateflow.Transition` object in the `Stateflow.Chart` object `ch`.

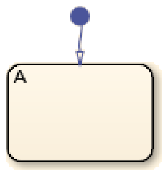
```
dt = Stateflow.Transition(ch);
```

Set the destination of the transition to the `Stateflow.State` object `st`.

```
dt.Destination = st;
dt.DestinationOClock = 0;
```

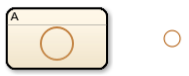
Place the source endpoint for the transition 30 pixels above the destination endpoint. Place the midpoint for the transition 15 pixels above the destination endpoint.

```
dt.SourceEndPoint = dt.DestinationEndPoint-[0 30];
dt.MidPoint = dt.DestinationEndPoint-[0 15];
```



Add Supertransition from Subchart

Create a supertransition that connects junction `j1`, which is inside a subchart, to junction `j2`, which is outside the subchart.



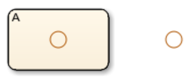
Save the original position of subchart `st` to a temporary workspace variable `subchartPosition`.

```
subchartPosition = st.Position;
```

Convert the subchart to a normal state by setting its `IsSubchart` and `IsGrouped` properties to `false`.

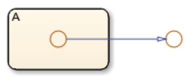
```
st.IsSubchart = false;
st.IsGrouped = false;
```

When you convert a subchart to a normal state, it may change size to display its contents.



Add a transition that connects junction `j1` to junction `j2` in the chart `ch`.

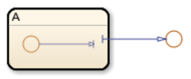
```
tr = Stateflow.Transition(ch);
tr.Source = j1;
tr.Destination = j2;
```



Revert the state to a subchart by setting its `IsSubchart` property to `true`. Restore the subchart to its original position.

```
st.IsSubchart = true;
st.Position = subchartPosition;
```

The state A is now a subchart and the transition between the junctions is now a supertransition.



For more information, see "Move Between Levels of Hierarchy by Using Supertransitions".

See Also

`Stateflow.AtomicSubchart` | `Stateflow.Chart` | `Stateflow.Function` | `Stateflow.Junction` | `Stateflow.SimulinkBasedState` | `Stateflow.State`

Topics

"Overview of the Stateflow API" on page 1-2
"Transition Between Operating Modes"
"List of Stateflow API Properties" on page 4-2

Introduced before R2006a

Stateflow.TruthTable

Truth table function in chart, state, box, or function

Description

Use `Stateflow.TruthTable` objects to create truth table functions that implement combinatorial logic design in a concise, tabular format. Typical applications include decision making for:

- Fault detection and management
- Mode switching

You can call a truth table function in the actions of states and transitions. For more information, see "Use Truth Tables to Model Combinatorial Logic".

Creation

Syntax

```
function = Stateflow.TruthTable(parent)
```

Description

`function = Stateflow.TruthTable(parent)` creates a `Stateflow.TruthTable` object in a parent chart, state, box, or function.

Input Arguments

`parent` — Parent for new truth table
`Stateflow.Chart` object | `Stateflow.State` object | `Stateflow.Box` object | `Stateflow.Function` object

Parent for the new truth table, specified as a Stateflow API object of one of these types:

- `Stateflow.Box`
- `Stateflow.Chart`
- `Stateflow.Function`
- `Stateflow.State`

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see "Modify Properties and Call Functions of Stateflow Objects" on page 1-11.

Content

`Name` — Name of truth table
`''` (default) | character vector

Name of the truth table, specified as a character vector.

`LabelString` — Label for truth table
`'?'` (default) | character vector

Label for the truth table, specified as a character vector.

`ActionTable` — Action table
cell array of character vectors

Action table for the truth table, specified as a cell array of character vectors.

`ConditionTable` — Condition table
cell array of character vectors

Condition table for the truth table, specified as a cell array of character vectors.

`Language` — Action language
`'MATLAB'` (default) | `'C'`

Action language used to program the truth table, specified as `'MATLAB'` or `'C'`. The option `'C'` is supported only in truth tables in charts that use C as the action language. For more information, see "Differences Between MATLAB and C as Action Language Syntax".

`IsExplicitlyCommented` — Whether to comment out truth table
`false` or 0 (default) | `true` or 1

Whether to comment out the truth table, specified as a numeric or logical 1 (`true`) or 0 (`false`). Setting this property to `true` is equivalent to right-clicking the truth table and selecting **Comment Out**. For more information, see "Commenting Stateflow Objects in a Chart".

`IsImplicitlyCommented` — Whether truth table is implicitly commented out
`true` or 1 | `false` or 0

This property is read-only.

Whether the truth table is implicitly commented out, specified as a numeric or logical 1 (`true`) or 0 (`false`). The truth table is implicitly commented out when you comment out a state, box, or function that contains it.

`CommentText` — Comment text
`''` (default) | character vector

Comment text added to the truth table, specified as a character vector. This property applies only when the `IsExplicitlyCommented` property is `true`. In the Stateflow Editor, when you point to the comment badge % on the truth table, the text appears as a tooltip. When you set the `IsExplicitlyCommented` property to `false`, the value of `CommentText` reverts to `''`.

Graphical Appearance

`Position` — Position and size of truth table
`[0 0 90 60]` (default) | `[left top width height]`

Position and size of the truth table, specified as a four-element numeric vector of the form `[left top width height]`.

`BadIntersection` — Whether function intersects a box, state, or function
`true` or 1 | `false` or 0

This property is read-only.

Whether the truth table graphically intersects a box, state, or function, specified as a numeric or logical 1 (`true`) or 0 (`false`).

`FontSize` — Font size for truth table label
scalar

Font size for the truth table label, specified as a scalar. The `StateFont.Size` property of the chart that contains the truth table sets the initial value of this property.

Debugging

`OverSpecDiagnostic` — Level of diagnostic when truth table is overspecified
`'Error'` (default) | `'Warning'` | `'None'`

Level of diagnostic action when the truth table is overspecified, specified as `'Error'`, `'Warning'`, or `'None'`. For more information, see “Correct Overspecified and Underspecified Truth Tables”.

`UnderSpecDiagnostic` — Level of diagnostic when truth table is underspecified
`'Error'` (default) | `'Warning'` | `'None'`

Level of diagnostic action when the truth table is underspecified, specified as `'Error'`, `'Warning'`, or `'None'`. For more information, see “Correct Overspecified and Underspecified Truth Tables”.

`Debug` — Debugger properties
`Stateflow.FunctionDebug` object

Debugger properties for the truth table, specified as a `Stateflow.FunctionDebug` object with this property:

- **`Breakpoints.OnDuring`** — Whether to set the `During Function Call` breakpoint, specified as a numeric or logical 1 (`true`) or 0 (`false`).

This property applies only when both the `Language` property of the truth table and the `ActionLanguage` of the chart that contains the truth table are `'C'`. For more information, see “Set Breakpoints to Debug Charts”.

Example: `function.Debug.Breakpoints.OnDuring = true;`

Integer and Fixed-Point Data

`SaturateOnIntegerOverflow` — Whether data saturates on integer overflow
`true` or 1 (default) | `false` or 0

Whether the data in the truth table saturates on integer overflow, specified as a numeric or logical 1 (`true`) or 0 (`false`). When this property is disabled, the data in the truth table wraps on integer overflow. This property applies only when the `Language` property of the truth table is `'MATLAB'` and the `ActionLanguage` of the chart that contains the truth table is `'C'`. For more information, see “Handle Integer Overflow for Chart Data”.

`EmlDefaultFimath` — Default `fimath` properties
`'Same as MATLAB Default'` (default) | `'Other:UserSpecified'`

Default `fimath` properties for the truth table, specified as one of these values:

- `'Same as MATLAB Default'` — Use the same `fimath` properties as the current default `fimath` object.
- `'Other:UserSpecified'` — Use the `InputFimath` property to specify the default `fimath` object.

This property applies only when the `Language` property of the truth table is `'MATLAB'` and the `ActionLanguage` of the chart that contains the truth table is `'C'`.

`InputFimath` — Default `fimath` object
character vector

Default `fimath` object, specified as a character vector. When the `EmlDefaultFimath` property for the MATLAB function is `'Other:UserSpecified'`, you can use this property to:

- Enter an expression that constructs a `fimath` object.
- Enter the variable name for a `fimath` object in the MATLAB or model workspace.

This property applies only when the `Language` property of the truth table is `'MATLAB'` and the `ActionLanguage` of the chart that contains the truth table is `'C'`.

Code Generation

`InlineOption` — Appearance in generated code
`'Auto'` (default) | `'Function'` | `'Inline'`

Appearance of the truth table in generated code, specified as one of these values:

- `'Auto'` — An internal calculation determines the appearance of the function in generated code.
- `'Function'` — The function is implemented as a separate C function.
- `'Inline'` — Calls to the function are replaced by code.

For more information, see “Inline State Functions in Generated Code” (Simulink Coder).

Hierarchy

`Chart` — Chart that contains truth table
`Stateflow.Chart` object

This property is read-only.

Chart that contains the truth table, specified as a `Stateflow.Chart` object.

`Subviewer` — Subviewer for truth table
`Stateflow.Chart` object | `Stateflow.State` object | `Stateflow.Box` object | `Stateflow.Function` object

This property is read-only.

Subviewer for the truth table, specified as a `Stateflow.Chart`, `Stateflow.State`, `Stateflow.Box`, or `Stateflow.Function` object. The subviewer is the chart or subchart where you can graphically view the truth table.

`Machine` — Machine that contains truth table
`Stateflow.Machine` object

This property is read-only.

Machine that contains the truth table, specified as a `Stateflow.Machine` object.

`Path` — Location of parent in model hierarchy
character vector

This property is read-only.

Location of the parent of the truth table in the model hierarchy, specified as a character vector.

Identification

`Description` — Description
`''` (default) | character vector

Description for the truth table, specified as a character vector.

`Document` — Document link
`''` (default) | character vector

Document link for the truth table, specified as a character vector.

`Tag` — User-defined tag
`[]` (default) | any data type

User-defined tag for the truth table, specified as data of any type.

`SSIdNumber` — Session-independent identifier
scalar

This property is read-only.

Session-independent identifier, specified as an integer scalar. Use this property to distinguish the truth table from other objects in the model.

`Id` — Unique identifier
scalar

This property is read-only.

Unique identifier, specified as an integer scalar. Unlike `SSIdNumber`, the value of this property is reassigned every time you start a new MATLAB session and may be recycled after an object is deleted.

Object Functions

find	Identify specified objects in hierarchy
getChildren	Identify children of object
getParent	Identify parent of object
dialog	Open properties dialog box
isCommented	Determine if graphical object is commented out
view	Display object in editing environment
highlight	Highlight graphical object
fitToView	Zoom in on graphical object

Examples

Add Truth Table Function to Chart

Add a truth table function in the chart `ch`. Set its label to `'[y1,y2] = f(x1,x2,x3)'`.

```
function = Stateflow.TruthTable(ch);
function.LabelString = '[y1,y2] = f(x1,x2,x3)';
```

See Also

`Stateflow.Box` | `Stateflow.Chart` | `Stateflow.Function` | `Stateflow.State`

Topics

"Overview of the Stateflow API" on page 1-2
"Use Truth Tables to Model Combinatorial Logic"
"List of Stateflow API Properties" on page 4-2

Introduced before R2006a

Stateflow.TruthTableChart

Tabular representation of state machine for decision logic

Description

Use `Stateflow.TruthTableChart` objects to create truth table blocks that implement combinatorial logic design in a concise, tabular format. Typical applications include decision making for:

- Fault detection and management
- Mode switching

Truth table blocks execute as Simulink blocks and provide a more direct implementation of decision logic than using truth table functions in Stateflow charts. For more information, see “Use Truth Tables to Model Combinatorial Logic”.

Creation

To create a `Stateflow.TruthTableChart` object, call the function `sfnew` with the `-TT` argument. For example, to create a Truth Table block in a new Simulink model called `myModel`, enter:

```
sfnew -TT myModel
```

Alternatively, you can add a new Truth Table block to an existing model by using the function `add_block`:

```
add_block('sflib/Truth Table','myModel/Truth Table')
```

Then, to access the `Stateflow.TruthTableChart` object, call the `find` function for the `Simulink.Root` object:

```
rt = sfroot;
table = find(rt,'-isa','Stateflow.TruthTableChart', ...
    'Path','myModel/Truth Table');
```

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

Content

Name — Name of truth table
`'Truth Table'` (default) | character vector

Name of the truth table, specified as a character vector.

`ActionTable` — Action table
cell array of character vectors

Action table for the truth table, specified as a cell array of character vectors.

`ConditionTable` — Condition table
cell array of character vectors

Condition table for the truth table, specified as a cell array of character vectors.

`SupportVariableSizing` — Whether truth table supports variable-size data
`true` or 1 (default) | `false` or 0

Whether the truth table supports variable-size data, specified as a numeric or logical 1 (`true`) or 0 (`false`). Only variable-size data can change dimension during simulation. For more information, see “Declare Variable-Size Data in Stateflow Charts”.

Discrete and Continuous-Time Semantics

`ChartUpdate` — Activation method for truth table
`'INHERITED'` (default) | `'CONTINUOUS'` | `'DISCRETE'`

Activation method for the truth table, specified as `'CONTINUOUS'`, `'DISCRETE'`, or `'INHERITED'`. For more information, see “Update Method”.

`SampleTime` — Sample time for activating truth table
`'-1'` (default) | character vector

Sample time for activating the truth table, specified as a character vector. This property applies only when the `ChartUpdate` property for the truth table is `'DISCRETE'`.

Integer and Fixed-Point Data

`SaturateOnIntegerOverflow` — Whether data saturates on integer overflow
`true` or 1 (default) | `false` or 0

Whether the data in the truth table saturates on integer overflow, specified as a numeric or logical 1 (`true`) or 0 (`false`). When this property is disabled, the data in the truth table wraps on integer overflow. For more information, see “Handle Integer Overflow for Chart Data”.

`TreatAsFi` — Inherited Simulink signals to treat as `fi` objects
`'Fixed-point'` (default) | `'Fixed-point & Integer'`

Inherited Simulink signals to treat as Fixed-Point Designer `fi` objects, specified as one of these values:

- `'Fixed-point'` — The truth table treats all fixed-point inputs as `fi` objects.
- `'Fixed-point & Integer'` — The truth table treats all fixed-point and integer inputs as `fi` objects.

`EmlDefaultFimath` — Default `fimath` properties
`'Same as MATLAB Default'` (default) | `'Other:UserSpecified'`

Default `fimath` properties for the truth table, specified as one of these values:

- `'Same as MATLAB Default'` — Use the same `fimath` properties as the current default `fimath` object.
- `'Other:UserSpecified'` — Use the `InputFimath` property to specify the default `fimath` object.

`InputFimath` — Default `fimath` object
character vector

Default `fimath` object, specified as a character vector. When the `EmlDefaultFimath` property for the truth table is `'Other:UserSpecified'`, you can use this property to:

- Enter an expression that constructs a `fimath` object.
- Enter the variable name for a `fimath` object in the MATLAB or model workspace.

Debugging

`OverSpecDiagnostic` — Level of diagnostic when truth table is overspecified
`'Error'` (default) | `'Warning'` | `'None'`

Level of diagnostic action when the truth table is overspecified, specified as `'Error'`, `'Warning'`, or `'None'`. For more information, see “Correct Overspecified and Underspecified Truth Tables”.

`UnderSpecDiagnostic` — Level of diagnostic when truth table is underspecified
`'Error'` (default) | `'Warning'` | `'None'`

Level of diagnostic action when the truth table is underspecified, specified as `'Error'`, `'Warning'`, or `'None'`. For more information, see “Correct Overspecified and Underspecified Truth Tables”.

Hierarchy

`Machine` — Machine that contains truth table
`Stateflow.Machine` object

This property is read-only.

Machine that contains the truth table, specified as a `Stateflow.Machine` object.

`Path` — Location of truth table in model hierarchy
character vector

This property is read-only.

Location of the truth table in the model hierarchy, specified as a character vector.

`Dirty` — Whether truth table has changed
`true` or 1 | `false` or 0

Whether the truth table has changed after being opened or saved, specified as a numeric or logical 1 (`true`) or 0 (`false`).

`Locked` — Whether truth table is locked
`false` or 0 (default) | `true` or 1

Whether the truth table is locked, specified as a numeric or logical 1 (`true`) or 0 (`false`). Enable this property to prevent changes in the truth table.

`Iced` — Whether truth table is locked
`false` or 0 (default) | `true` or 1

This property is read-only.

Whether the truth table is locked, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property is equivalent to the property `Locked`, but is used internally to prevent changes in the truth table during simulation.

Identification

`Description` — Description
`''` (default) | character vector

Description for the truth table, specified as a character vector.

`Document` — Document link
`''` (default) | character vector

Document link for the truth table, specified as a character vector.

`Tag` — User-defined tag
`[]` (default) | any data type

User-defined tag for the truth table, specified as data of any type.

`Id` — Unique identifier
scalar

This property is read-only.

Unique identifier, specified as an integer scalar. Use this property to distinguish the truth table from other objects in the model. The value of this property is reassigned every time you start a new MATLAB session and may be recycled after an object is deleted.

Object Functions

find	Identify specified objects in hierarchy
getChildren	Identify children of object
dialog	Open properties dialog box
view	Display object in editing environment

Examples

Create Empty Truth Table

Call the function `sfnew` with the `-TT` argument to open a new Simulink model that contains an empty Truth Table block.

```
sfnew -TT
```

Access the `Simulink.Root` object by calling the `sfroot` function.

```
rt = sfroot;
```

Access the `Stateflow.TruthTableChart` object by calling the `find` function for the `Simulink.Root` object.

```
table = find(rt,'-isa','Stateflow.TruthTableChart');
```

See Also

Blocks
Truth Table

Functions
`sfnew` | `sfroot` | `add_block`

Topics
“Overview of the Stateflow API” on page 1-2
“Finite State Machine Concepts”
“Use Truth Tables to Model Combinatorial Logic”
“List of Stateflow API Properties” on page 4-2

Introduced before R2006a

Stateflow.Unit

Unit of measurement for input and output data

Description

Use a `Stateflow.Unit` object to specify the unit of measurement for an input or output data object. For more information, see “Specify Units for Stateflow Data”.

Creation

Each data object and message has its own `Stateflow.Unit` object. However, the object only applies for `Stateflow.Data` objects when the `Scope` property is set to `'Input'` or `'Output'`. To access the `Stateflow.Unit` object, use the `Props.Unit` property for the `Stateflow.Data` object.

Properties

Stateflow API objects have properties that correspond to the values you set in the Stateflow Editor. To access or modify a property, use dot notation. To access or modify multiple properties for multiple API objects, use the `get` and `set` functions, respectively. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.

`Name` — Name of unit of measurement
`'inherit'` (default) | character vector

Name of unit of measurement, specified as a character vector. This property applies only to input and output data.

Examples

Specify Units for Data

Access the `Stateflow.Props` and `Stateflow.Unit` objects for the `Stateflow.Data` object `x`.

```
properties = x.Props;
unit = properties.Unit;
```

Specify the units as meters.

```
unit.Name = "m";
```

See Also

`Stateflow.Data`

Topics
“Overview of the Stateflow API” on page 1-2
“List of Stateflow API Properties” on page 4-2

“Specify Units for Stateflow Data”

Introduced before R2006a

API Object Function Reference

copy

Package: `Stateflow`

Copy array of objects to clipboard

Syntax

```
copy(clipboard,objArray)
```

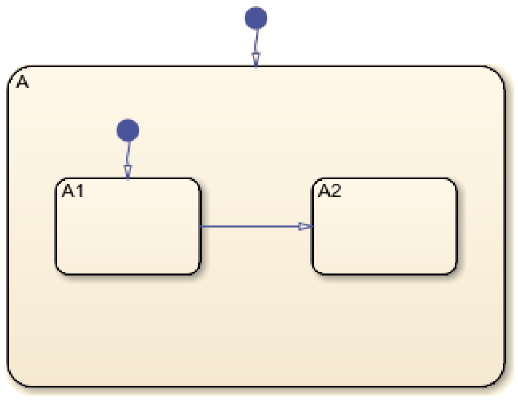
Description

`copy(clipboard,objArray)` copies the objects in the array `objArray` to the clipboard. To paste the copied objects, use the `pasteTo` function.

Examples

Copy and Paste by Grouping

Group state `A` and copy its contents to chart `ch`. When you group a state, box, or graphical function, you can copy and paste all the objects contained in the grouped object, as well as all the relationships among these objects. This method is the simplest way of copying and pasting objects programmatically. If a state is not grouped, copying the state does not copy any of its contents.



1. Find the `Stateflow.State` object named `A` in chart `ch`.

   ```
   sA = find(ch,'-isa','Stateflow.State','Name','A');
   ```
2. Group state `A` and its contents by setting the `IsGrouped` property for `sA` to `true`. Save the previous setting of this property so you can revert to it later.

   ```
   prevGrouping = sA.IsGrouped;
   sA.IsGrouped = true;
   ```
3. Change the name of the state to `'Copy_of_A'`. Save the previous name so you can revert to it later.

```
prevName = sA.Name;
newName = ['Copy_of_' prevName];
sA.Name = newName;
```

4. Access the clipboard object.

```
cb = sfclipboard;
```

5. Copy the grouped state to the clipboard.

```
copy(cb,sA);
```

6. Restore the state properties to their original settings.

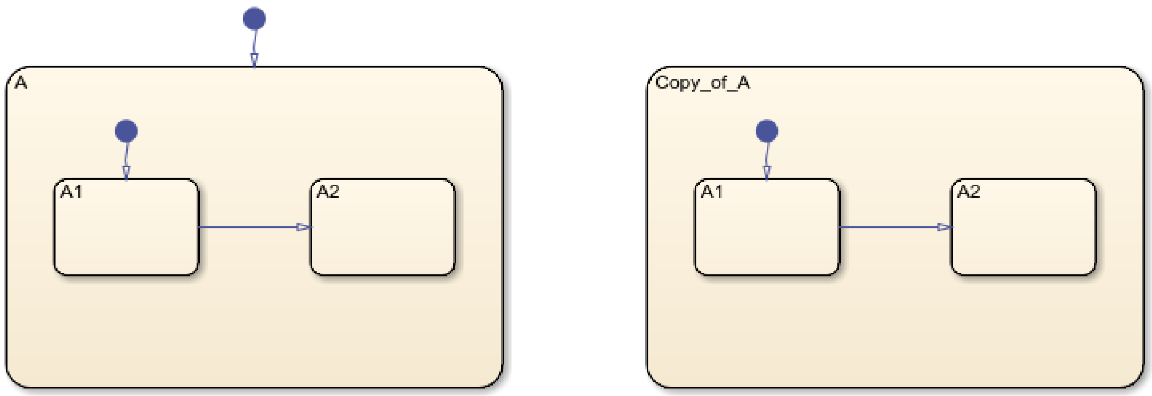
```
sA.IsGrouped = prevGrouping;
sA.Name = prevName;
```

7. Paste a copy of the objects from the clipboard to the chart.

```
pasteTo(cb,ch);
```

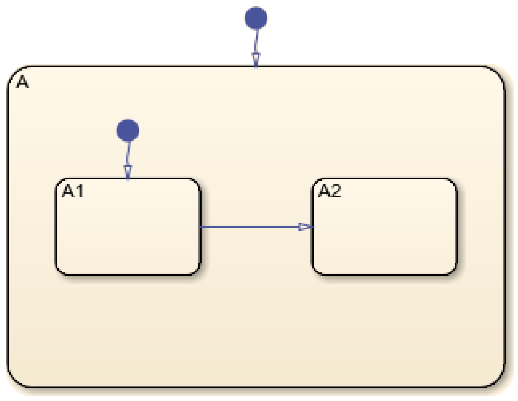
8. Adjust the state properties of the new state.

```
sNew = find(ch,'-isa','Stateflow.State','Name',newName);
sNew.Position = sA.Position + [400 0 0 0];
sNew.IsGrouped = prevGrouping;
```



Copy and Paste Array of Objects

Copy states A1 and A2, along with the transition between them, to a new state in chart ch. To preserve transition connections and containment relationships between objects, copy all the connected objects at once.



1. Find the `Stateflow.State` object named `A` in chart `ch`.

   ```
   sA = find(ch,'-isa','Stateflow.State','Name','A');
   ```
2. Add a new state called `B`. To enable pasting of other objects inside `B`, convert the new state to a subchart.

   ```
   sB = Stateflow.State(ch);
   sB.Name = 'B';
   sB.Position = sA.Position + [400 0 0 0];
   sB.IsSubchart = true;
   ```
3. Create an array called `objArray` that contains the states and transitions in state `A`. Use the function `setdiff` to remove state `A` from the array of objects to copy.

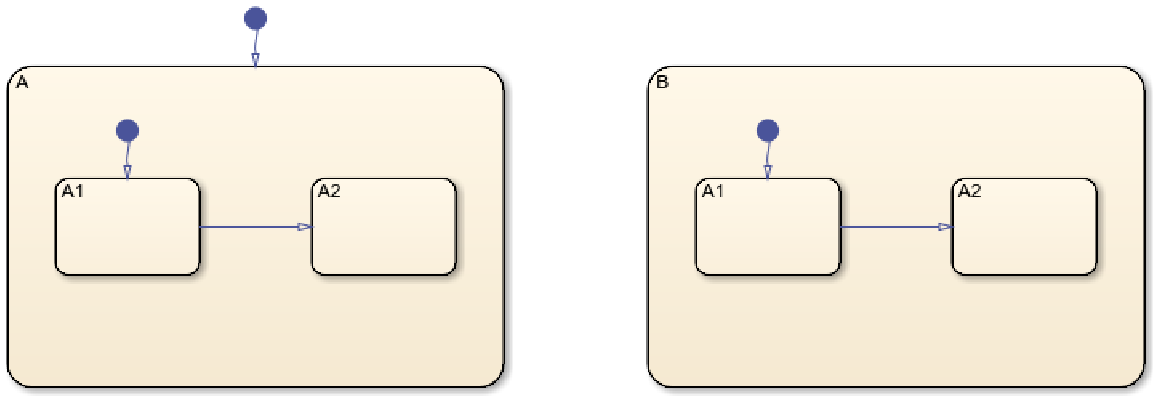
   ```
   objArrayS = find(sA,'-isa','Stateflow.State');
   objArrayS = setdiff(objArrayS,sA);
   objArrayT = find(sA,'-isa','Stateflow.Transition');
   objArray = [objArrayS objArrayT];
   ```
4. Access the clipboard object.

   ```
   cb = sfclipboard;
   ```
5. Copy the objects in `objArray` and paste them in subchart `B`.

   ```
   copy(cb,objArray);
   pasteTo(cb,sB);
   ```
6. Revert `B` to a state.

   ```
   sB.IsSubchart = false;
   sB.IsGrouped = false;
   ```
7. Reposition the states and transitions in `B`.

   ```
   newStates = find(sB,'-isa','Stateflow.State');
   newStates = setdiff(newStates,sB);
   newTransitions = find(sB,'-isa','Stateflow.Transition');
   newOClocks = get(newTransitions,{'SourceOClock','DestinationOClock'});
   for i = 1:numel(newStates)
   newStates(i).Position = newStates(i).Position + [25 35 0 0];
   end
   set(newTransitions,{'SourceOClock','DestinationOClock'},newOClocks);
   ```



Input Arguments

`clipboard` — Clipboard
`Stateflow.Clipboard` object

Clipboard, specified as a `Stateflow.Clipboard` object.

`objArray` — Objects to copy
array of Stateflow objects

Objects to copy, specified as an array of Stateflow API objects. The array must contain only graphical objects or only nongraphical objects.

Graphical objects include:

- `Stateflow.Annotation`
- `Stateflow.AtomicBox`
- `Stateflow.AtomicSubchart`
- `Stateflow.Box`
- `Stateflow.EMFunction`
- `Stateflow.Function`
- `Stateflow.Junction`
- `Stateflow.SimulinkBasedState`
- `Stateflow.SLFunction`
- `Stateflow.State`
- `Stateflow.Transition`
- `Stateflow.TruthTable`

Nongraphical objects include:

- `Stateflow.Data`
- `Stateflow.Event`
- `Stateflow.Message`

Copying graphical objects also copies the `Stateflow.Data`, `Stateflow.Event`, and `Stateflow.Message` objects that the graphical objects contain. When you copy multiple graphical objects, the value of their `Subviewer` property must be the same.

Tips

To maintain the transition connections and containment relationships between copied objects, you must:

- Copy a grouped object to the clipboard. When you group a state, box, or graphical function, you can copy and paste all the objects contained in the grouped object, as well as all the relationships among these objects. For more information, see “Copy and Paste by Grouping” on page 3-2.
- Copy all the related objects. For example, to copy two states connected by a transition to another container, create an array that contains both the states and the transition. Then you can copy the array to the clipboard. For more information, see “Copy and Paste Array of Objects” on page 3-3.

See Also

Functions
`find` | `pasteTo` | `setdiff` | `sfclipboard`

Objects
`Stateflow.State` | `Stateflow.Clipboard`

Topics
“Overview of the Stateflow API” on page 1-2

Introduced before R2006a

defaultTransitions

Package: `Stateflow`

Identify default transitions in specified object

Syntax

```
transitions = defaultTransitions(parent)
```

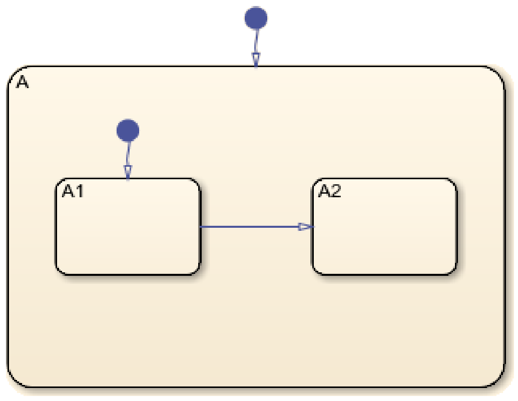
Description

`transitions = defaultTransitions(parent)` returns an array of `Stateflow.Transition` objects that correspond to the default transitions at the top level of the specified parent object. For more information, see “Default Transitions”.

Examples

Identify Default Transitions

Suppose that `ch` is the `Stateflow.Chart` object that corresponds to this chart.



Identify the default transition at the top level of the chart. Display the name of the destination.

```
tr1 = defaultTransitions(ch);
tr1.Destination.Name
```

```
ans =

    'A'
```

Save the `Stateflow.State` object that corresponds to state `A`.

```
state = tr1.Destination;
```

Identify the default transition at the top level of the state `A`. Display the name of the destination.

```
tr2 = defaultTransitions(state);
tr2.Destination.Name

ans =

    'A1'
```

Input Arguments

parent — Parent object
Stateflow.Chart object | Stateflow.Function object | Stateflow.State object

Parent object, specified as a Stateflow API object of one of these types:

- `Stateflow.Chart`
- `Stateflow.Function`
- `Stateflow.State`

Tips

- To identify default transitions inside a `Stateflow.Box`, call the `defaultTransitions` function on the `Stateflow.Chart`, `Stateflow.Function`, or `Stateflow.State` object that contains the box.

See Also

Functions
`find` | `getChildren` | `innerTransitions` | `outerTransitions` | `sinkedTransitions` | `sourcedTransitions`

Objects
`Stateflow.Box` | `Stateflow.Chart` | `Stateflow.Function` | `Stateflow.State` | `Stateflow.Transition`

Topics
“Overview of the Stateflow API” on page 1-2
“Access Objects in Your Stateflow Chart” on page 1-6
“Default Transitions”
“Group and Execute Transitions”

Introduced before R2006a

dialog

Package: `Stateflow`

Open properties dialog box

Syntax

```
dialog(object)
```

Description

`dialog(object)` opens the properties dialog box of an object.

Examples

Open Chart Properties Dialog Box

Open a Simulink model called `myModel`. Suppose that the model contains a Stateflow chart named `My Chart`.

```
open_system('myModel')
```

Access the `Simulink.Root` object at the top level of the Stateflow hierarchy.

```
rt = sfroot;
```

Find the chart named `My Chart`.

```
ch = find(rt,'-isa','Stateflow.Chart','Name','My Chart');
```

Open the properties dialog box for the chart.

```
dialog(ch);
```

Input Arguments

`object` — Object to inspect
`Stateflow.Chart` object | `Stateflow.State` object | `Stateflow.Box` object | `Stateflow.Function` object | ...

Object to inspect, specified as a Stateflow API object of one of these types:

- `Stateflow.Annotation`
- `Stateflow.AtomicBox`
- `Stateflow.AtomicSubchart`
- `Stateflow.Box`
- `Stateflow.Chart`

- `Stateflow.Data`
- `Stateflow.EMChart`
- `Stateflow.EMFunction`
- `Stateflow.Event`
- `Stateflow.Function`
- `Stateflow.Junction`
- `Stateflow.Machine`
- `Stateflow.Message`
- `Stateflow.Port`
- `Stateflow.SimulinkBasedState`
- `Stateflow.SLFunction`
- `Stateflow.State`
- `Stateflow.StateTransitionTableChart`
- `Stateflow.Transition`
- `Stateflow.TruthTable`
- `Stateflow.TruthTableChart`

See Also
`view` | `highlight` | `fitToView`

Topics
“Overview of the Stateflow API” on page 1-2

Introduced before R2006a

find

Package: `Stateflow`

Identify specified objects in hierarchy

Syntax

```
objArray = find(location,Name,Value)
objArray = find(location,'-not',Name,Value)
objArray = find(location,'-regexp',Name,Value)
objArray = find(location,___,logicalOp,___)
```

Description

`objArray = find(location,Name,Value)` returns an array of objects in the hierarchy of `location` that match the criteria specified by one or more `Name,Value` pair arguments.

`objArray = find(location,'-not',Name,Value)` returns objects that do not match the criteria specified by the subsequent `Name,Value` pair argument.

`objArray = find(location,'-regexp',Name,Value)` indicates that the subsequent `Name,Value` pair argument contains a regular expression. For more information, see “Regular Expressions”.

`objArray = find(location,___,logicalOp,___)` combines search criteria by using one of these logical operations:

- `'-and'` — Results must match both search criteria.
- `'-or'` — Results must match at least one criterion.
- `'-xor'` — Results must match exactly one criterion.

When using various logical operators, `-and` has the highest precedence, while `-or` and `-xor` are right-associative. If no logical operator is specified, then `-and` is assumed.

Examples

Find States in a Chart

Find all states in the chart `ch`.

```
states = find(ch,'-isa','Stateflow.State')
```

Find States Named A

Find all states in the chart `ch` whose `Name` property is `'A'`.

```
statesNamedA = find(ch,'-isa','Stateflow.State','-and','Name','A')
```

Find Objects with Name Starting with A

Find all objects in the chart `ch` whose `Name` property starts with the letter `A`.

```
startsWithA = find(ch,'-regexp','Name','^A')
```

Find Nongraphical Objects

Find all objects in the chart `ch` that do not have an object function called `fitToView`.

```
nongraphical = find(ch,'-not','-method','fitToView')
```

Use Function to Specify Search Criteria

Find all charts in a Simulink model called `myModel`.

```
f = @(h) (strcmp(h.Machine.Name,'myModel'));                % define function handle
ch = find(rt,'-isa','Stateflow.Chart','-and','-function',f);   % find charts for which f returns
```

Input Arguments

`location` — Location to search
`Simulink.Root` object | `Stateflow.Chart` object | `Stateflow.State` object | ...

Location to search, specified as a Stateflow API object of one of these types:

- `Simulink.Root`
- `Stateflow.Box`
- `Stateflow.Chart`
- `Stateflow.EMChart`
- `Stateflow.EMFunction`
- `Stateflow.Function`
- `Stateflow.Machine`
- `Stateflow.State`
- `Stateflow.SLFunction`
- `Stateflow.StateTransitionTableChart`
- `Stateflow.TruthTable`
- `Stateflow.TruthTableChart`

Name-Value Pair Arguments

Specify optional comma-separated pairs of `Name,Value` arguments. `Name` is the argument name and `Value` is the corresponding value. `Name` must appear inside quotes. You can specify several name and value pair arguments in any order as `Name1,Value1,...,NameN,ValueN`. In addition to the

`Name,Value` arguments listed here, you can use the name of a Stateflow API property and its corresponding value. For more information, see “List of Stateflow API Properties” on page 4-2.

Example: `find(ch,'Name','A')` finds all objects in the chart `ch` whose `Name` property is `'A'`.

`-isa` — Type of object
character vector

Type of object for which to search, specified as the comma-separated pair consisting of `'-isa'` and a character vector or a class handle for an object.

Example: `find(ch,'-isa','Stateflow.State')` finds all states in the chart `ch`.

Example: `find(ch,'-isa',class(object))` finds all objects of the same type as `object`.

`-depth` — Depth of search
`inf` (default) | scalar nonnegative integer

Depth of search in the object hierarchy, specified as the comma-separated pair consisting of `'-depth'` and a scalar nonnegative integer or `inf`.

Example: `find(ch,'-depth',2)` finds all objects in the top two levels of the hierarchy of the chart `ch`.

`-function` — Filtering function
function handle

Filtering function, specified as the comma-separated pair consisting of `'-function'` and a function handle. The function evaluates each object visited in the search and returns a logical scalar value that indicates whether the object is a match.

Example: `find(ch,'-function',f)` finds all objects for which `f` is `true`.

`-method` — Object function
character vector

Object function that belongs to the objects for which to search, specified as the comma-separated pair consisting of `'-method'` and a character vector.

Example: `find(ch,'-method','dialog')` finds all objects in the chart `ch` that have an object function called `dialog`.

`-property` — Property
character vector

Property that belongs to the objects for which to search, specified as the comma-separated pair consisting of `'-property'` and a character vector.

Example: `find(ch,'-property','HasOutputData')` finds all objects in the chart `ch` that have a property called `HasOutputData`.

Output Arguments

`objArray` — Search results
array

Search results, returned as an array of Stateflow API objects.

Tips

- Using the `find` function on `Simulink.Root` or `Stateflow.Machine` objects can return Simulink objects that match the search criteria you specify. For example, this command can return a Simulink subsystem or block named `ABC`:

  ```
  find(rt,'Name','ABC')
  ```
- Opening a main model that refers to a linked Stateflow chart does not guarantee that the Stateflow API can find the linked chart. To access the objects in a linked library chart, first load the library model into the Simulink workspace by performing one of these tasks:

  - Open the library model.
  - View a linked subsystem or block in the main model.
  - Compile or simulate the model.

See Also
`getChildren` | `getParent` | `strcmp`

Topics
"Access Objects in Your Stateflow Chart" on page 1-6
"List of Stateflow API Properties" on page 4-2
"Regular Expressions"

Introduced before R2006a

fitToView

Package: `Stateflow`

Zoom in on graphical object

Syntax

```
fitToView(graphicalObject)
```

Description

`fitToView(graphicalObject)` zooms in on a graphical object in the Stateflow Editor.

Examples

Zoom in on State in Chart

Open a Simulink model called `myModel`. Suppose that the model contains a Stateflow chart with a state named `A`.

```
open_system('myModel')
```

Access the `Simulink.Root` object at the top level of the Stateflow hierarchy.

```
rt = sfroot;
```

Find the state named `A`.

```
st = find(rt,'-isa','Stateflow.State','Name','A');
```

Zoom in on the state in the Stateflow Editor.

```
fitToView(st);
```

Input Arguments

`graphicalObject` — Graphical object
`Stateflow.State` object | `Stateflow.Box` object | `Stateflow.Function` object | ...

Graphical object, specified as a Stateflow API object of one of these types:

- `Stateflow.Annotation`
- `Stateflow.AtomicBox`
- `Stateflow.AtomicSubchart`
- `Stateflow.Box`
- `Stateflow.Chart`
- `Stateflow.EMFunction`

- `Stateflow.Function`
- `Stateflow.Junction`
- `Stateflow.Port`
- `Stateflow.SimulinkBasedState`
- `Stateflow.SLFunction`
- `Stateflow.State`
- `Stateflow.Transition`
- `Stateflow.TruthTable`

See Also
`view` | `highlight` | `zoomIn` | `zoomOut`

Topics
"Overview of the Stateflow API" on page 1-2

Introduced in R2008a

getChildren

Package: `Stateflow`

Identify children of object

Syntax

```
objArray = getChildren(parent)
```

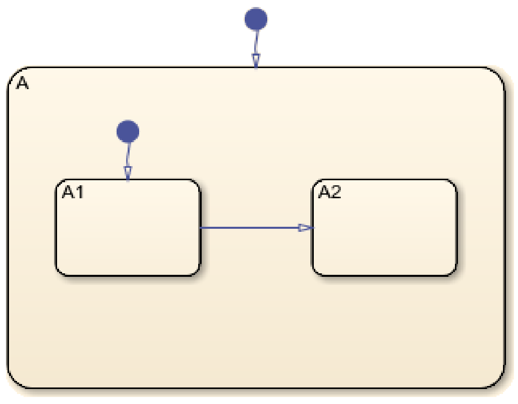
Description

`objArray = getChildren(parent)` returns an array of objects that have the specified parent.

Examples

Identify Children of Chart

Suppose that `ch` is the `Stateflow.Chart` object that corresponds to this chart. This chart has two children, state `A` and a default transition. State `A` has four children, state `A1`, state `A2`, and two transitions.



Identify the children of the chart `ch`. Display the object types of the children.

```
children = getChildren(ch);
arrayfun(@class,children,UniformOutput=false)
```

```
ans =

  2×1 cell array

    {'Stateflow.State'     }
    {'Stateflow.Transition'}
```

The first element in `children` is a state. Display the name of the state.

```
state = children(1);
state.Name

ans =

    'A'
```

Identify the children of state `A`. Display the object types of the children.

```
grandchildren = getChildren(state);
arrayfun(@class,grandchildren,UniformOutput=false)

ans =

  4×1 cell array

    {'Stateflow.State'     }
    {'Stateflow.State'     }
    {'Stateflow.Transition'}
    {'Stateflow.Transition'}
```

The first two elements in `grandchildren` are states. Display the names of the states.

```
grandchildren(1).Name

ans =

    'A1'

grandchildren(2).Name

ans =

    'A2'
```

Input Arguments

`parent` — Parent object
`Stateflow.Chart` object | `Stateflow.State` object | `Stateflow.Box` object | `Stateflow.Function` object | ...

Parent object, specified as a Stateflow API object of one of these types:

- `Stateflow.Box`
- `Stateflow.Chart`
- `Stateflow.EMChart`
- `Stateflow.EMFunction`
- `Stateflow.Function`
- `Stateflow.SimulinkBasedState`
- `Stateflow.State`
- `Stateflow.SLFunction`
- `Stateflow.StateTransitionTableChart`
- `Stateflow.TruthTable`

- `Stateflow.TruthTableChart`

See Also

Functions
`find` | `getParent` | `arrayfun` | `class`

Objects
`Stateflow.State` | `Stateflow.Box` | `Stateflow.Function`

Topics
"Overview of the Stateflow API" on page 1-2
"Access Objects in Your Stateflow Chart" on page 1-6

Introduced before R2006a

getParent

Package: `Stateflow`

Identify parent of object

Syntax

```
parent = getParent(object)
```

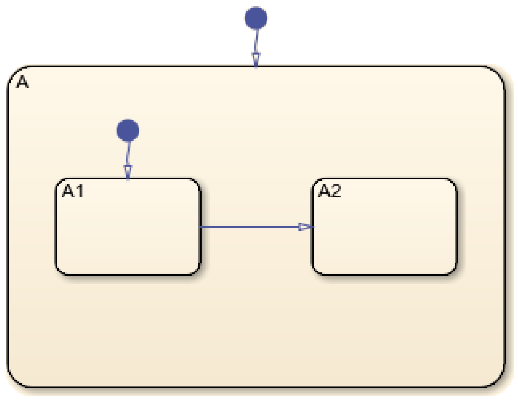
Description

`parent = getParent(object)` returns the parent of an object in a Stateflow chart, State Transition Table, Truth Table, or MATLAB Function block.

Examples

Identify Parent of State

Suppose that `ch` is the `Stateflow.Chart` object that corresponds to this chart. In this chart, the parent of state `A1` is state `A`. The parent of state `A` is the chart.



Find the `Stateflow.State` object named `A1`.

```
sA1 = find(ch,'-isa','Stateflow.State','Name','A1');
```

Identify the parent of state `A1`. Display the name of the parent.

```
parent = getParent(sA1);
parent.Name
```

```
ans =

    'A'
```

Identify the parent of state `A`. Display the name of the parent.

```
grandparent = getParent(parent);
grandparent.Name

ans =

    'Chart'
```

Input Arguments

`object` — Object
`Stateflow.State` object | `Stateflow.Box` object | `Stateflow.Function` object | ...

Object in a Stateflow chart, State Transition Table, Truth Table, or MATLAB Function block, specified as a Stateflow API object of one of these types:

- `Stateflow.Annotation`
- `Stateflow.AtomicBox`
- `Stateflow.AtomicSubchart`
- `Stateflow.Box`
- `Stateflow.Data`
- `Stateflow.EMFunction`
- `Stateflow.Event`
- `Stateflow.Function`
- `Stateflow.Junction`
- `Stateflow.Message`
- `Stateflow.Port`
- `Stateflow.SimulinkBasedState`
- `Stateflow.SLFunction`
- `Stateflow.State`
- `Stateflow.Transition`
- `Stateflow.TruthTable`

See Also

Functions
`find` | `getChildren`

Objects
`Stateflow.State` | `Stateflow.Box` | `Stateflow.Function`

Topics
"Overview of the Stateflow API" on page 1-2
"Access Objects in Your Stateflow Chart" on page 1-6

Introduced before R2006a

highlight

Package: `Stateflow`

Highlight graphical object

Syntax

```
highlight(graphicalObject)
```

Description

`highlight(graphicalObject)` highlights a graphical object in the Stateflow Editor.

Examples

Highlight State in Chart

Open a Simulink model called `myModel`. Suppose that the model contains a Stateflow chart with a state named `A`.

```
open_system('myModel')
```

Access the `Simulink.Root` object at the top level of the Stateflow hierarchy.

```
rt = sfroot;
```

Find the state named `A`.

```
st = find(rt,'-isa','Stateflow.State','Name','A');
```

Highlight the state in the Stateflow Editor.

```
highlight(st);
```

Input Arguments

`graphicalObject` — Graphical object
`Stateflow.State` object | `Stateflow.Box` object | `Stateflow.Function` object | ...

Graphical object, specified as a Stateflow API object of one of these types:

- `Stateflow.AtomicBox`
- `Stateflow.AtomicSubchart`
- `Stateflow.Box`
- `Stateflow.EMFunction`
- `Stateflow.Function`
- `Stateflow.Junction`

- `Stateflow.Port`
- `Stateflow.SimulinkBasedState`
- `Stateflow.SLFunction`
- `Stateflow.State`
- `Stateflow.Transition`
- `Stateflow.TruthTable`

Tips

To clear the highlighting, use the `hilite_system` function. For example, to clear the highlighting in chart `ch`, enter:

```
hilite_system(ch.Path,'none')
```

Alternatively, you can use the Stateflow Editor. In the **Debug** tab, under **Animation**, click the Remove animation highlighting button .

See Also

`view` | `fitToView` | `hilite_system` | `zoomIn` | `zoomOut`

Topics

"Overview of the Stateflow API" on page 1-2

Introduced in R2012a

innerTransitions

Package: `Stateflow`

Identify inner transitions with specified source

Syntax

```
transitions = innerTransitions(source)
```

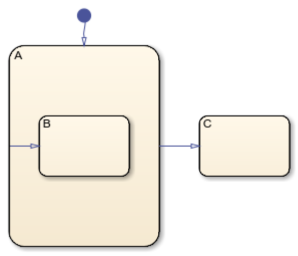
Description

`transitions = innerTransitions(source)` returns an array of `Stateflow.Transition` objects that correspond to the inner transitions of the specified source state. An inner transition is a transition that does not exit the source state. For more information, see “Inner Transitions”.

Examples

Identify Inner Transitions

Suppose that `ch` is the `Stateflow.Chart` object that corresponds to this chart.



Find the `Stateflow.State` object named `A`.

```
sA = find(ch,'-isa','Stateflow.State','Name','A');
```

Identify the transition whose source is state `A` and whose destination is inside state `A`. Display the name of the destination.

```
tr = innerTransitions(sA);
tr.Destination.Name
```

```
ans =

    'B'
```

Input Arguments

`source` — Source state
`Stateflow.State` object

Source state, specified as a `Stateflow.State` object.

See Also

Functions
`find` | `defaultTransitions` | `outerTransitions` | `sinkedTransitions` | `sourcedTransitions`

Objects
`Stateflow.State` | `Stateflow.Transition`

Topics
"Overview of the Stateflow API" on page 1-2
"Access Objects in Your Stateflow Chart" on page 1-6
"Inner Transitions"
"Group and Execute Transitions"

Introduced before R2006a

isCommented

Package: `Stateflow`

Determine if graphical object is commented out

Syntax

```
tf = isCommented(graphicalObject)
```

Description

`tf = isCommented(graphicalObject)` returns a logical value that indicates if a graphical object is commented out. The function returns logical `1` (`true`) if:

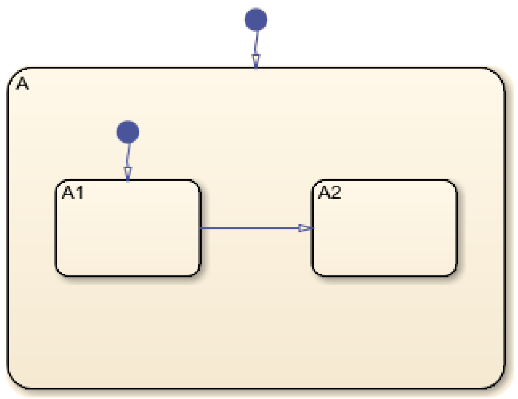
- The graphical object is explicitly commented out. To explicitly comment out an object, set its `IsExplicitlyCommented` property to `true`. Alternatively, you can right-click the graphical object and select **Comment Out**.
- The graphical object is implicitly commented out. In this case, its `IsImplicitlyCommented` property has a value of `true`. An object is implicitly commented out when you explicitly comment out a state, box, or function that contains the object. Additionally,
  - Transitions are implicitly commented out when you comment out their source or destination.
  - Entry and exit ports are implicitly commented out when you comment out their matching entry or exit junction.

Otherwise, the function returns logical `0` (`false`).

Examples

Comment Out State

When you explicitly comment out a state, box, or function, you implicitly comment out all the graphical objects that it contains. For example, when you comment out state `A` in this chart, you also comment out its substates, `A1` and `A2`.



Find the `Stateflow.State` objects named `A`, `A1`, and `A2`.

```
sA = find(ch,'-isa','Stateflow.State','Name','A');
sA1 = find(ch,'-isa','Stateflow.State','Name','A1');
sA2 = find(ch,'-isa','Stateflow.State','Name','A2');
```

Check that state `A` and its substates are not commented out.

```
[isCommented(sA),isCommented(sA1),isCommented(sA2)]
```

```
ans =

  1×3 logical array

   0   0   0
```

Explicitly comment out state `A`.

```
sA.IsExplicitlyCommented = true;
```

Check that state `A` and its substates are commented out.

```
[isCommented(sA),isCommented(sA1),isCommented(sA2)]
```

```
ans =

  1×3 logical array

   1   1   1
```

Input Arguments

`graphicalObject` — Graphical object

`Stateflow.State` object | `Stateflow.Box` object | `Stateflow.Function` object | ...

Graphical object, specified as a Stateflow API object of one of these types:

- `Stateflow.AtomicBox`
- `Stateflow.AtomicSubchart`
- `Stateflow.Box`
- `Stateflow.EMFunction`
- `Stateflow.Function`
- `Stateflow.Junction`
- `Stateflow.Port`
- `Stateflow.SimulinkBasedState`
- `Stateflow.SLFunction`
- `Stateflow.State`
- `Stateflow.Transition`
- `Stateflow.TruthTable`

See Also

Functions
`find`

Objects
`Stateflow.State` | `Stateflow.Box` | `Stateflow.Function`

Topics
"Overview of the Stateflow API" on page 1-2
"Commenting Stateflow Objects in a Chart"
"List of Stateflow API Properties" on page 4-2

Introduced in R2016a

outerTransitions

Package: `Stateflow`

Identify outer transitions with specified source

Syntax

```
transitions = outerTransitions(source)
```

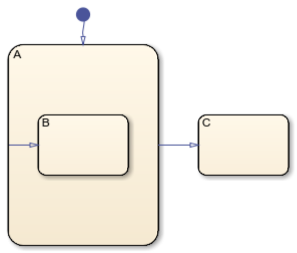
Description

`transitions = outerTransitions(source)` returns an array of `Stateflow.Transition` objects that correspond to the outer transitions of the specified source state. An inner transition is a transition that does not exit the source state.

Examples

Identify Outer Transitions

Suppose that `ch` is the `Stateflow.Chart` object that corresponds to this chart.



Find the `Stateflow.State` object named `A`.

```
sA = find(ch,'-isa','Stateflow.State','Name','A');
```

Identify the transition whose source is state `A` and whose destination is outside of state `A`. Display the name of the destination.

```
tr = outerTransitions(sA);
tr.Destination.Name
```

```
ans =

    'C'
```

Input Arguments

`source` — Source state
`Stateflow.State` object

Source state, specified as a `Stateflow.State` object.

See Also

Functions
`find` | `defaultTransitions` | `innerTransitions` | `sinkedTransitions` | `sourcedTransitions`

Objects
`Stateflow.State` | `Stateflow.Transition`

Topics
"Overview of the Stateflow API" on page 1-2
"Access Objects in Your Stateflow Chart" on page 1-6
"Group and Execute Transitions"

Introduced before R2006a

pasteTo

Package: `Stateflow`

Paste objects in clipboard to specified container object

Syntax

```
pasteTo(clipboard,parent)
```

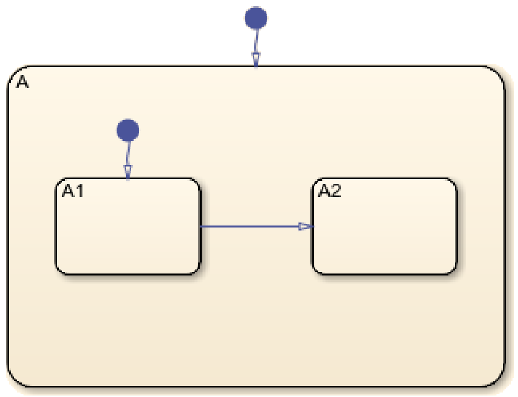
Description

`pasteTo(clipboard,parent)` pastes the contents of the clipboard to the specified parent. To copy objects to the clipboard, use the `copy` function.

Examples

Copy and Paste by Grouping

Group state `A` and copy its contents to chart `ch`. When you group a state, box, or graphical function, you can copy and paste all the objects contained in the grouped object, as well as all the relationships among these objects. This method is the simplest way of copying and pasting objects programmatically. If a state is not grouped, copying the state does not copy any of its contents.



1. Find the `Stateflow.State` object named `A` in chart `ch`.

   ```
   sA = find(ch,'-isa','Stateflow.State','Name','A');
   ```
2. Group state `A` and its contents by setting the `IsGrouped` property for `sA` to `true`. Save the previous setting of this property so you can revert to it later.

   ```
   prevGrouping = sA.IsGrouped;
   sA.IsGrouped = true;
   ```
3. Change the name of the state to `'Copy_of_A'`. Save the previous name so you can revert to it later.

```
prevName = sA.Name;
newName = ['Copy_of_' prevName];
sA.Name = newName;
```

4. Access the clipboard object.

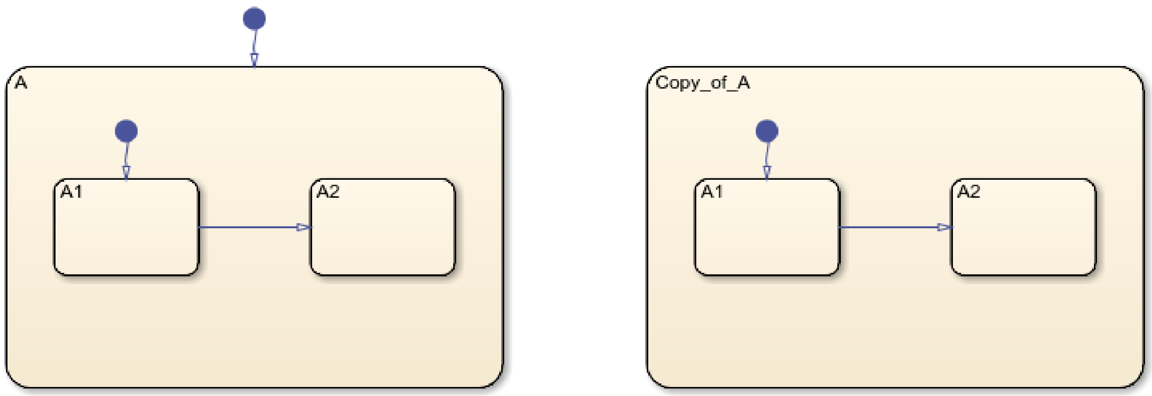
   ```
   cb = sfclipboard;
   ```
5. Copy the grouped state to the clipboard.

   ```
   copy(cb,sA);
   ```
6. Restore the state properties to their original settings.

   ```
   sA.IsGrouped = prevGrouping;
   sA.Name = prevName;
   ```
7. Paste a copy of the objects from the clipboard to the chart.

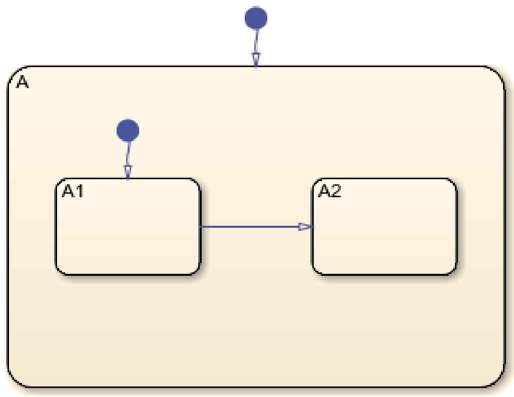
   ```
   pasteTo(cb,ch);
   ```
8. Adjust the state properties of the new state.

   ```
   sNew = find(ch,'-isa','Stateflow.State','Name',newName);
   sNew.Position = sA.Position + [400 0 0 0];
   sNew.IsGrouped = prevGrouping;
   ```



Copy and Paste Array of Objects

Copy states `A1` and `A2`, along with the transition between them, to a new state in chart `ch`. To preserve transition connections and containment relationships between objects, copy all the connected objects at once.



1 Find the `Stateflow.State` object named `A` in chart `ch`.

```
sA = find(ch,'-isa','Stateflow.State','Name','A');
```

2 Add a new state called `B`. To enable pasting of other objects inside `B`, convert the new state to a subchart.

```
sB = Stateflow.State(ch);
sB.Name = 'B';
sB.Position = sA.Position + [400 0 0 0];
sB.IsSubchart = true;
```

3 Create an array called `objArray` that contains the states and transitions in state `A`. Use the function `setdiff` to remove state `A` from the array of objects to copy.

```
objArrayS = find(sA,'-isa','Stateflow.State');
objArrayS = setdiff(objArrayS,sA);
objArrayT = find(sA,'-isa','Stateflow.Transition');
objArray = [objArrayS objArrayT];
```

4 Access the clipboard object.

```
cb = sfclipboard;
```

5 Copy the objects in `objArray` and paste them in subchart `B`.

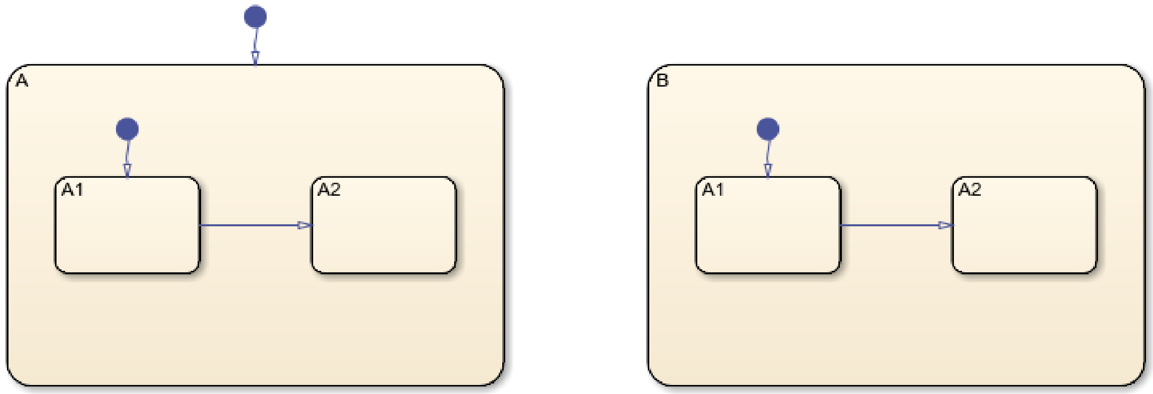
```
copy(cb,objArray);
pasteTo(cb,sB);
```

6 Revert `B` to a state.

```
sB.IsSubchart = false;
sB.IsGrouped = false;
```

7 Reposition the states and transitions in `B`.

```
newStates = find(sB,'-isa','Stateflow.State');
newStates = setdiff(newStates,sB);
newTransitions = find(sB,'-isa','Stateflow.Transition');
newOClocks = get(newTransitions,{'SourceOClock','DestinationOClock'});
for i = 1:numel(newStates)
newStates(i).Position = newStates(i).Position + [25 35 0 0];
end
set(newTransitions,{'SourceOClock','DestinationOClock'},newOClocks);
```



Input Arguments

`clipboard` — Clipboard
`Stateflow.Clipboard` object

Clipboard, specified as a `Stateflow.Clipboard` object.

`parent` — Parent for copied objects
`Stateflow.Chart` object | `Stateflow.State` object | `Stateflow.Box` object | `Stateflow.Function` object | ...

Parent for the copied objects, specified as a Stateflow API object of one of these types:

- `Stateflow.Box`
- `Stateflow.Chart`
- `Stateflow.EMFunction`
- `Stateflow.Function`
- `Stateflow.SimulinkBasedState`
- `Stateflow.SLFunction`
- `Stateflow.State`
- `Stateflow.TruthTable`

If the objects in the clipboard are all graphical (states, boxes, functions, annotations, transitions, or junctions), this object must be a chart or subchart.

Tips

When you paste graphical objects, the new parent must be a chart or a subchart. To convert a state, box, or graphical function to a subchart, set its `IsSubchart` property to `true`. After pasting, you can revert the parent by setting its `IsSubchart` and `IsGrouped` properties to `false`.

See Also

Functions
`copy` | `find` | `setdiff` | `sfclipboard`

Objects
`Stateflow.State` | `Stateflow.Clipboard`

Topics
"Overview of the Stateflow API" on page 1-2

Introduced before R2006a

setImage

Package: `Stateflow`

Insert image into annotation

Syntax

`setImage(annotation,source)`

Description

`setImage(annotation,source)` inserts an image from the clipboard or an image file into an annotation.

Examples

Add Image Annotation to Chart

Add an annotation in the chart `ch`. Use the file `myImageFile.png`, which is located in the folder `myfolder/annotation_images`, as the image for the annotation.

```
annotation = Stateflow.Annotation(ch);
setImage(annotation, ...
    fullfile('myfolder','annotation_images','myImageFile.png'));
```

Input Arguments

`annotation` — Annotation
`Stateflow.Annotation` object

Annotation, specified as a `Stateflow.Annotation` object.

`source` — Source of image
character array | `'clipboard'` | `''`

Source of the image, specified as a character array that contains the full path and name of an image file. Alternatively, to insert an image from the clipboard, specify `'clipboard'`.

To convert an image annotation to a text annotation, specify `''`.

See Also

Functions
`fullfile`

Objects
`Stateflow.Annotation`

Topics
"Overview of the Stateflow API" on page 1-2

Introduced in R2014a

sinkedTransitions

Package: `Stateflow`

Identify transitions with specified destination

Syntax

```
transitions = sinkedTransitions(destination)
```

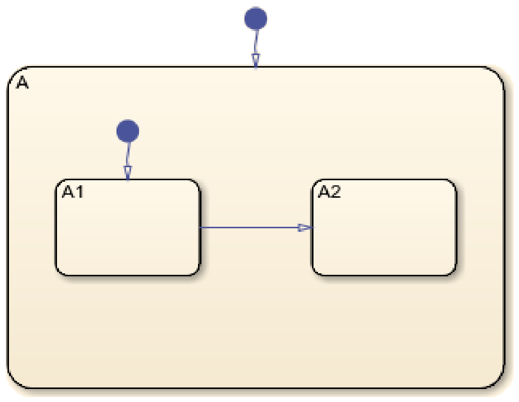
Description

`transitions = sinkedTransitions(destination)` returns an array of `Stateflow.Transition` objects with the specified destination.

Examples

Identify Transitions With Specified Destination

Suppose that `ch` is the `Stateflow.Chart` object that corresponds to this chart.



Find the `Stateflow.State` object named `A2`.

```
sA2 = find(ch,'-isa','Stateflow.State','Name','A2');
```

Identify the transition whose destination is state `A2`. Display the name of the source.

```
tr = sinkedTransitions(sA2);
tr.Source.Name
```

```
ans =

    'A1'
```

Input Arguments

`destination` — Destination object
`Stateflow.Junction` object | `Stateflow.Port` object | `Stateflow.State` object

Destination object, specified as a Stateflow API object of one of these types:

- `Stateflow.Junction`
- `Stateflow.Port`
- `Stateflow.State`

See Also

Functions
`find` | `defaultTransitions` | `innerTransitions` | `outerTransitions` | `sourcedTransitions`

Objects
`Stateflow.Junction` | `Stateflow.Port` | `Stateflow.State` | `Stateflow.Transition`

Topics
"Overview of the Stateflow API" on page 1-2
"Access Objects in Your Stateflow Chart" on page 1-6

Introduced in R2012a

sourcedTransitions

Package: `Stateflow`

Identify transitions with specified source

Syntax

```
transitions = sourcedTransitions(source)
```

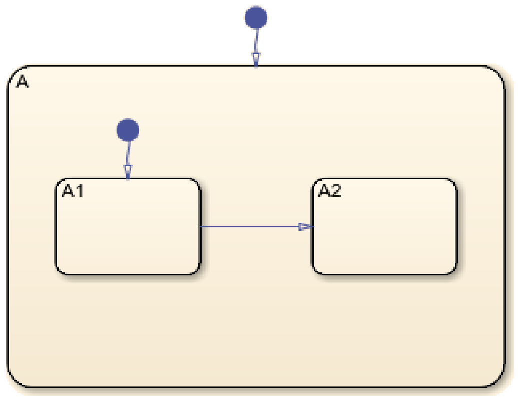
Description

`transitions = sourcedTransitions(source)` returns an array of `Stateflow.Transition` objects with the specified source.

Examples

Identify Transitions With Specified Source

Suppose that `ch` is the `Stateflow.Chart` object that corresponds to this chart.



Find the `Stateflow.State` object named `A1`.

```
sA1 = find(ch,'-isa','Stateflow.State','Name','A1');
```

Identify the transition whose source is state `A1`. Display the name of the destination.

```
tr = sinkedTransitions(sA1);
tr.Destination.Name
```

```
ans =

    'A2'
```

Input Arguments

`source` — Source object
`Stateflow.Junction` object | `Stateflow.Port` object | `Stateflow.State` object

Source object, specified as a Stateflow API object of one of these types:

- `Stateflow.Junction`
- `Stateflow.Port`
- `Stateflow.State`

See Also

Functions
`find` | `defaultTransitions` | `innerTransitions` | `outerTransitions` | `sinkedTransitions`

Objects
`Stateflow.Junction` | `Stateflow.Port` | `Stateflow.State` | `Stateflow.Transition`

Topics
"Overview of the Stateflow API" on page 1-2
"Access Objects in Your Stateflow Chart" on page 1-6

Introduced before R2006a

up

Package: `Stateflow`

(Not recommended) Identify parent of object

Note Using `up` is not recommended. Use `getParent` instead.

Syntax

```
parent = up(object)
```

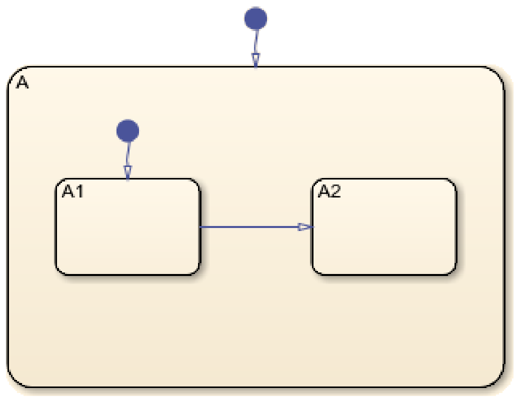
Description

`parent = up(object)` returns the parent of an object in a Stateflow chart, State Transition Table, Truth Table, or MATLAB Function block.

Examples

Identify Parent of State

Suppose that `ch` is the `Stateflow.Chart` object that corresponds to this chart. In this chart, the parent of state `A1` is state `A`. The parent of state `A` is the chart.



Find the `Stateflow.State` object named `A1`.

```
sA1 = find(ch,'-isa','Stateflow.State','Name','A1');
```

Identify the parent of state `A1`. Display the name of the parent.

```
parent = up(sA1);
parent.Name
```

```
ans =

    'A'
```

Identify the parent of state `A`. Display the name of the parent.

```
grandparent = up(parent);
grandparent.Name
```

```
ans =

    'Chart'
```

Input Arguments

`object` — Object
`Stateflow.State` object | `Stateflow.Box` object | `Stateflow.Function` object | ...

Object in a Stateflow chart, State Transition Table, Truth Table, or MATLAB Function block, specified as a Stateflow API object of one of these types:

- `Stateflow.Annotation`
- `Stateflow.AtomicBox`
- `Stateflow.AtomicSubchart`
- `Stateflow.Box`
- `Stateflow.Data`
- `Stateflow.EMFunction`
- `Stateflow.Event`
- `Stateflow.Function`
- `Stateflow.Junction`
- `Stateflow.Message`
- `Stateflow.SimulinkBasedState`
- `Stateflow.SLFunction`
- `Stateflow.State`
- `Stateflow.Transition`
- `Stateflow.TruthTable`

See Also

Functions
`find` | `getChildren` | `getParent`

Objects
`Stateflow.State` | `Stateflow.Box` | `Stateflow.Function`

Topics
“Overview of the Stateflow API” on page 1-2
“Access Objects in Your Stateflow Chart” on page 1-6

Introduced before R2006a

view

Package: `Stateflow`

Display object in editing environment

Syntax

```
view(object)
```

Description

`view(object)` displays an object in its editing environment, such as the Stateflow, MATLAB, and Simulink Editors.

- The Stateflow Editor displays the contents of these objects:
  - `Stateflow.AtomicBox`
  - `Stateflow.AtomicSubchart`
  - `Stateflow.Box` with `IsSubchart` set to `true`
  - `Stateflow.Chart`
  - `Stateflow.Function` with `IsSubchart` set to `true`
  - `Stateflow.State` with `IsSubchart` set to `true`
- The Stateflow Editor shows these objects in their subviewer:
  - `Stateflow.Annotation`
  - `Stateflow.Box` with `IsSubchart` set to `false`
  - `Stateflow.Function` with `IsSubchart` set to `false`
  - `Stateflow.Junction`
  - `Stateflow.Port`
  - `Stateflow.State` with `IsSubchart` set to `false`
  - `Stateflow.Transition`
- The MATLAB Function Editor displays the code for `Stateflow.EMChart` and `Stateflow.EMFunction` objects.
- The Simulink Editor displays the block diagram for `Stateflow.SimulinkBasedState` and `Stateflow.SLFunction` objects.
- The Truth Table Editor displays the content of `Stateflow.TruthTable` and `Stateflow.TruthTableChart` objects.
- The State Transition Table Editor displays the content of `Stateflow.StateTransitionTableChart` objects.
- The Model Explorer displays the properties of these objects:
  - `Stateflow.Data`
  - `Stateflow.Event`

- `Stateflow.Message`

Examples

Display State in Chart

Open a Simulink model called `myModel`. Suppose that the model contains a Stateflow chart with a state named `A`.

```
open_system('myModel')
```

Access the `Simulink.Root` object at the top level of the Stateflow hierarchy.

```
rt = sfroot;
```

Find the state named `A`.

```
st = find(rt,'-isa','Stateflow.State','Name','A');
```

Display the state in the Stateflow Editor.

```
view(st);
```

Input Arguments

`object` — Object to view
`Stateflow.Chart` object | `Stateflow.State` object | `Stateflow.Box` object | `Stateflow.Function` object | ...

Object to view, specified as a Stateflow API object of one of these types:

- `Stateflow.Annotation`
- `Stateflow.AtomicBox`
- `Stateflow.AtomicSubchart`
- `Stateflow.Box`
- `Stateflow.Chart`
- `Stateflow.Data`
- `Stateflow.EMChart`
- `Stateflow.EMFunction`
- `Stateflow.Event`
- `Stateflow.Function`
- `Stateflow.Junction`
- `Stateflow.Message`
- `Stateflow.Port`
- `Stateflow.SimulinkBasedState`
- `Stateflow.SLFunction`
- `Stateflow.State`

- `Stateflow.StateTransitionTableChart`
- `Stateflow.Transition`
- `Stateflow.TruthTable`
- `Stateflow.TruthTableChart`

See Also

`highlight` | `fitToView` | `zoomIn` | `zoomOut`

Topics

"Overview of the Stateflow API" on page 1-2

Introduced before R2006a

zoomIn

Package: `Stateflow`

Zoom in on Stateflow chart

Syntax

`zoomIn(editor)`

Description

`zoomIn(editor)` increases the magnification level of the `Stateflow.Editor` object `editor` for a chart.

Examples

Zoom in on Stateflow Chart

Increase the magnification level of a nonempty chart `ch`.

```
ed = ch.Editor;
zoomIn(ed)
```

If the magnification level for the chart was initially 100%, this command increases it to 130%.

Input Arguments

`editor` — Editor for chart
`Stateflow.Editor` object

Editor for a chart, specified as a `Stateflow.Editor` object. The `Stateflow.Editor` object provides access to the graphical aspects of a chart. For example, to access the `Stateflow.Editor` object for a `Stateflow.Chart` object `ch`, enter:

```
ed = ch.Editor;
```

Algorithms

The `zoomIn` function modifies the `ZoomFactor` property of the `Stateflow.Editor` object. The property is limited to a minimum of `0.5` and a maximum of `10`. `zoomIn` multiplies `ZoomFactor` by a factor of `1.3` as long as the resulting value is in this range. Otherwise, `zoomIn` sets `ZoomFactor` to the maximum value of `10`.

See Also

`view` | `highlight` | `fitToView` | `zoomOut`

Topics
“Overview of the Stateflow API” on page 1-2

Introduced before R2006a

zoomOut

Package: `Stateflow`

Zoom out on Stateflow chart

Syntax

`zoomOut(editor)`

Description

`zoomOut(editor)` reduces the magnification level of the `Stateflow.Editor` object `editor` for a chart.

Examples

Zoom out on Stateflow Chart

Decrease the magnification level of a nonempty chart `ch`.

```
ed = ch.Editor;
zoomOut(ed)
```

If the magnification level for the chart was initially 100%, this command decreases it to 76.9%.

Input Arguments

`editor` — Editor for chart
`Stateflow.Editor` object

Editor for a chart, specified as a `Stateflow.Editor` object. The `Stateflow.Editor` object provides access to the graphical aspects of a chart. For example, to access the `Stateflow.Editor` object for a `Stateflow.Chart` object `ch`, enter:

```
ed = ch.Editor;
```

Algorithms

The `zoomOut` function modifies the `ZoomFactor` property of the `Stateflow.Editor` object. The property is limited to a minimum of `0.5` and a maximum of `10`. `zoomOut` divides `ZoomFactor` by a factor of `1.3` as long as the resulting value is in this range. Otherwise, `zoomOut` sets `ZoomFactor` to the minimum value of `0.5`.

See Also
`view` | `highlight` | `fitToView` | `zoomIn`

Topics
“Overview of the Stateflow API” on page 1-2

Introduced before R2006a

API Property Reference

List of Stateflow API Properties

The following reference tables for Stateflow API properties have these columns:

- **Property** — The name of the property. To access or set a property value, use its name in dot notation along with a Stateflow object. Properties with multiple levels of hierarchy (such as the `LoggingInfo` and `Props` properties of data objects) must be set individually. For more information, see “Modify Properties and Call Functions of Stateflow Objects” on page 1-11.
- **Access** — An access type for the property.
  - RW (read/write): You can access or set the value of these properties by using the Stateflow API.
  - RO (read-only): These properties are set by the Stateflow software.
- **Description** — A description of the property.
- **Objects** — The types of objects that have this property. The object types are listed as: Annotation (A on page 2-2), Atomic Box (AB on page 2-8), Atomic Subchart (AS on page 2-13), Box (B on page 2-20), Chart (C on page 2-28), Clipboard (CB on page 2-24), Data (D on page 2-38), Event (E on page 2-78), Editor (ED on page 2-59), Graphical Function (GF on page 2-88), Junction (J on page 2-97), Machine (M on page 2-104), MATLAB Function (MF on page 2-68), MATLAB Function Block (MFB on page 2-61), Message (MS on page 2-112), Entry or Exit Port (P on page 2-120), State (S on page 2-140), Simulink Based State (SBS on page 2-130), Simulink Function (SF on page 2-136), State Transition Table (STT on page 2-156), Transition (T on page 2-175), Truth Table Block (TTB on page 2-189), and Truth Table Function (TTF on page 2-183).

Active State Output

Property	Access	Description	Objects
`DoNotAutogenerateEnum`	RW	Whether to define the enumerated data type for the active state data output manually, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property applies only when the `OutputMonitoringMode` property is `'ChildActivity'` or `'LeafStateActivity'`. For more information, see “Define State Activity Enumeration Type”.	C on page 2-28 S on page 2-140 STT on page 2-156
`EnumTypeName`	RW	Name of the enumerated data type for the active state data object, specified as a character vector. This property applies only when the `OutputMonitoringMode` property is `'ChildActivity'` or `'LeafStateActivity'`. For more information, see “Enum Name”.	C on page 2-28 S on page 2-140 STT on page 2-156
`HasOutputData`	RW	Whether to create an active state data output port for the object, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “Monitor State Activity Through Active State Data”.	AS on page 2-13 C on page 2-28 SBS on page 2-130 S on page 2-140 STT on page 2-156

Property	Access	Description	Objects
`OutputData`	RO	Active state data object, specified as a `Stateflow.Data` object. This property applies only when the `HasOutputData` property is `true`.	AS on page 2-13 C on page 2-28 SBS on page 2-130 S on page 2-140 STT on page 2-156
`OutputMonitoringMode`	RW	Monitoring mode for the active state output data, specified as `'SelfActivity'`, `'ChildActivity'`, or `'LeafStateActivity'`. For charts, the options are `'ChildActivity'` or `'LeafStateActivity'`. For atomic subcharts and Simulink based states, the only option is `'SelfActivity'`.	AS on page 2-13 C on page 2-28 SBS on page 2-130 S on page 2-140 STT on page 2-156
`OutputPortName`	RW	Name of the active state data object, specified as a character vector. This property applies only when the `HasOutputData` property is `true`.	AS on page 2-13 C on page 2-28 SBS on page 2-130 S on page 2-140 STT on page 2-156
`OutputState`	RO	State or chart monitored by the data object, specified as an empty array or a `Stateflow.AtomicSubchart`, `Stateflow.Chart`, `Stateflow.SimulinkBasedState`, `Stateflow.State`, or `Stateflow.StateTransitionTableChart` object. For more information, see "Monitor State Activity Through Active State Data".	D on page 2-38

C Action Language

Property	Access	Description	Objects
`EnableBitOps`	RW	Whether to use bit operations in state and transition actions, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property applies only to charts and state transition tables that use C as the action language. For more information, see "Enable C-bit operations".	C on page 2-28 STT on page 2-156

Property	Access	Description	Objects
`StrongDataTypingWithSimulink`	RW	Whether to use strong data typing when the chart or state transition table interfaces with Simulink input and output signals, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property applies only to charts and state transition tables that use C as the action language. For more information, see “Use strong data typing with Simulink I/O”.	C on page 2-28 STT on page 2-156
`UserSpecifiedStateTransitionExecutionOrder`	RW	Whether to use explicit ordering of parallel states and transitions, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property applies only to charts that use C as the action language. For more information, see “User-specified state/transition execution order”.	C on page 2-28

Callbacks

Property	Access	Description	Objects
`ClickFcn`	RW	Callback on click, specified as a character vector. This callback contains MATLAB code to execute when to execute when you click the annotation.	A on page 2-2
`DeleteFcn`	RW	Callback at delete, specified as a character vector. This callback contains MATLAB code to execute before you delete the annotation.	A on page 2-2
`LoadFcn`	RW	Callback at model load, specified as a character vector. This callback contains MATLAB code to execute when you load the model that contains the annotation.	A on page 2-2
`UseDisplayTextAsClickCallback`	RW	Whether to use the annotation text as a callback, specified as a numeric or logical 1 (`true`) or 0 (`false`). When this property is enabled, the contents of the `Text` property is used as the callback when you click the annotation.	A on page 2-2

Chart Initialization

Property	Access	Description	Objects
`ExecuteAtInitialization`	RW	Whether to initialize the state configuration of the chart or state transition table at time zero instead of at the first input event, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “Execution of a Chart at Initialization”.	C on page 2-28 STT on page 2-156
`InitializeOutput`	RW	Whether to initialize the output data every time the chart or state transition table wakes up, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “Initialize outputs every time chart wakes up”.	C on page 2-28 STT on page 2-156

Property	Access	Description	Objects
`StatesWhenEnabling`	RW	Behavior of the states when a function-call input event reenables the chart or state transition table, specified as one of these values: • `''` — The chart or state transition table does not contain function-call input events. • `'held'` — The chart or state transition table maintains the most recent values of the states. • `'reset'` — The chart or state transition table reverts to the initial conditions of the states. For more information, see “Control States in Charts Enabled by Function-Call Input Events”.	C on page 2-28 STT on page 2-156

Code Generation

Property	Access	Description	Objects
`GeneratePreprocessorConditionals`	RW	Whether the generated code includes a preprocessor conditional statement for the variant conditions in the chart, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property applies only when generating code with Embedded Coder. For more information, see “Code Generation Using Variant Transitions”.	C on page 2-28
`InlineOption`	RW	Appearance of the state functions, graphical function, MATLAB function, or truth table function in generated code, specified as one of these values: • `'Auto'` — An internal calculation determines the appearance of the functions in generated code. • `'Function'` — The functions are implemented as a separate C functions. • `'Inline'` — Calls to the functions are replaced by code. For more information, see “Inline State Functions in Generated Code” (Simulink Coder).	GF on page 2-88 MF on page 2-68 S on page 2-140 TTF on page 2-183
`IsVariant`	RW	Whether the transition is a variant transition, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “Code Generation Using Variant Transitions”.	T on page 2-175

Content

Property	Access	Description	Objects
`ActionLanguage`	RW	Action language used to program the chart or state transition table, specified as `'MATLAB'` or `'C'`. For more information, see “Differences Between MATLAB and C as Action Language Syntax”.	C on page 2-28 STT on page 2-156
`ActionTable`	RW	Action table for the truth table, specified as a cell array of character vectors.	TTB on page 2-189 TTF on page 2-183
`Alignment`	RW	Alignment of the annotation text, specified as `'LEFT'`, `'CENTER'`, or `'RIGHT'`.	A on page 2-2
`AllowDirectFeedthrough`	RW	Whether the MATLAB Function block supports direct feedthrough semantics, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “Allow direct feedthrough” (Simulink).	MFB on page 2-61
`CommentText`	RW	Comment text added to the graphical object, specified as a character vector. This property applies only when the `IsExplicitlyCommented` property is `true`. In the Stateflow Editor, when you point to the comment badge on the graphical object, the text appears as a tooltip. When you set the `IsExplicitlyCommented` property to `false`, the value of `CommentText` reverts to `''`.	AB on page 2-8 AS on page 2-13 B on page 2-20 GF on page 2-88 J on page 2-97 MF on page 2-68 P on page 2-120 SBS on page 2-130 SF on page 2-136 S on page 2-140 T on page 2-175 TTF on page 2-183
`Condition`	RO	Transition condition, specified as a character vector. The value of this property depends on the `LabelString` property for the transition. For more information, see “Specify Labels in States and Transitions Programmatically” on page 1-16.	T on page 2-175
`ConditionAction`	RO	Transition condition action, specified as a character vector. The value of this property depends on the `LabelString` property for the transition. For more information, see “Specify Labels in States and Transitions Programmatically” on page 1-16.	T on page 2-175
`ConditionTable`	RW	Condition table for the truth table, specified as a cell array of character vectors.	TTB on page 2-189 TTF on page 2-183

Property	Access	Description	Objects
`DuringAction`	RO	State `during` action, specified as a character vector. The value of this property depends on the `LabelString` property for the state. For more information, see "Specify Labels in States and Transitions Programmatically" on page 1-16. This property is not supported in Moore charts.	S on page 2-140
`EntryAction`	RO	State `entry` action, specified as a character vector. The value of this property depends on the `LabelString` property for the state. For more information, see "Specify Labels in States and Transitions Programmatically" on page 1-16. This property is not supported in Moore charts.	S on page 2-140
`ExecutionOrder`	RW	Execution order for the transition when its source is active, specified as an integer scalar. This property applies only when the `UserSpecifiedStateTransitionExecutionOrder` property of the chart that contains the transition is `true`. For more information, see "Transition Evaluation Order".	T on page 2-175
`ExitAction`	RO	State `exit` action, specified as a character vector. The value of this property depends on the `LabelString` property for the state. For more information, see "Specify Labels in States and Transitions Programmatically" on page 1-16. This property is not supported in Moore charts.	S on page 2-140
`FullFileName`	RO	Full file path of the Simulink model for the machine, specified as a character vector.	M on page 2-104
`Interpretation`	RW	Format of the annotation text, specified as `'OFF'`, `'RICH'`, or `'TEX'`.	A on page 2-2
`IsExplicitlyCommented`	RW	Whether to comment out the graphical object, specified as a numeric or logical 1 (`true`) or 0 (`false`). Setting this property to `true` is equivalent to right-clicking the graphical object and selecting **Comment Out**. For more information, see "Commenting Stateflow Objects in a Chart".	AB on page 2-8 AS on page 2-13 B on page 2-20 GF on page 2-88 J on page 2-97 MF on page 2-68 P on page 2-120 SBS on page 2-130 SF on page 2-136 S on page 2-140 T on page 2-175 TTF on page 2-183

Property	Access	Description	Objects
`IsImage`	RO	Whether the annotation contains an image, specified as a numeric or logical 1 (`true`) or 0 (`false`).	A on page 2-2
`IsImplicitlyCommented`	RO	Whether the graphical object is implicitly commented out, specified as a numeric or logical 1 (`true`) or 0 (`false`). The graphical object is implicitly commented out when you comment out a state, box, or function that contains it. Additionally, transitions are implicitly commented out when you comment out their source or destination.	AB on page 2-8 AS on page 2-13 B on page 2-20 GF on page 2-88 J on page 2-97 MF on page 2-68 P on page 2-120 SBS on page 2-130 SF on page 2-136 S on page 2-140 T on page 2-175 TTF on page 2-183
`IsLibrary`	RO	Whether the Simulink model for the machine builds a library and not an application, specified as a numeric or logical 1 (`true`) or 0 (`false`).	M on page 2-104
`IsLink`	RO	Whether the atomic box or subchart is a library link, specified as a numeric or logical 1 (`true`) or 0 (`false`).	AB on page 2-8 AS on page 2-13
`LabelString`	RW	Label for the graphical object, specified as a character vector. For more information, see “Specify Labels in States and Transitions Programmatically” on page 1-16.	AB on page 2-8 AS on page 2-13 B on page 2-20 GF on page 2-88 MF on page 2-68 P on page 2-120 SF on page 2-136 S on page 2-140 T on page 2-175 TTF on page 2-183
`Language`	RW	Action language used to program the truth table, specified as `'MATLAB'` or `'C'`. The option `'C'` is supported only in truth tables in charts that use C as the action language. For more information, see “Differences Between MATLAB and C as Action Language Syntax”.	TTF on page 2-183

Property	Access	Description	Objects
`MooreAction`	RO	State action in a Moore chart, specified as a character vector. The value of this property depends on the `LabelString` property for the state. For more information, see "Specify Labels in States and Transitions Programmatically" on page 1-16. This property is supported only in Moore charts. For more information, see "Design Rules for Moore Charts".	S on page 2-140
`Name`	RO for all `Stateflow.Machine` objects. RW for all other objects.	Name of the object, specified as a character vector.	AB on page 2-8 AS on page 2-13 B on page 2-20 C on page 2-28 GF on page 2-88 M on page 2-104 MF on page 2-68 SBS on page 2-130 SF on page 2-136 S on page 2-140 STT on page 2-156 TTB on page 2-189 TTF on page 2-183 MFB on page 2-61
`OnAction`	RO	State `on` actions, specified as a cell array of character vectors in the form `{'trigger1','action1',...,'triggerN','actionN'}` The value of this property depends on the `LabelString` property for the state. For more information, see "Specify Labels in States and Transitions Programmatically" on page 1-16. This property is not supported in Moore charts.	S on page 2-140
`PlainText`	RO	Annotation text without formatting, specified as a character vector.	A on page 2-2
`PortType`	RO	Type of junction, specified as `'EntryJunction'`, `'EntryPort'`, `'ExitJunction'`or `'ExitPort'`.	P on page 2-120

Property	Access	Description	Objects

`Script`	RW	Code for the MATLAB function or MATLAB Function block, specified as a character vector. To enter multiple lines of code, you can:
		• Call the MATLAB function `sprintf` and use the escape sequence `\n` to insert newline characters:
		`str = sprintf('function y=f(x)\ny=x+1;\nend');`
		`mfb.Script = str;`
		• Enter a concatenated text expression that uses the integer 10 as the ASCII equivalent of a newline character:
		`str = ['function y=f(x)',10, ...`
		`    'y=x+1;',10, ...`
		`    'end'];`
		`mfb.Script = str;`
			MF on page 2-68 MFB on page 2-61

`StateMachineType`	RW	State machine semantics implemented by the chart or state transition table, specified as `'Classic'`, `'Mealy'`, or `'Moore'`. For more information, see “Overview of Mealy and Moore Machines”.	C on page 2-28 STT on page 2-156
`SupportVariableSizing`	RW	Whether the chart, state transition table, truth table, or MATLAB Function block supports variable-size data, specified as a numeric or logical 1 (`true`) or 0 (`false`). Only variable-size data can change dimension during simulation. For more information, see “Declare Variable-Size Inputs and Outputs” (Simulink).	C on page 2-28 STT on page 2-156 TTB on page 2-189 MFB on page 2-61
`Text`	RW	Text for the annotation, specified as a character vector.	A on page 2-2
`TransitionAction`	RO	Transition action, specified as a character vector. The value of this property depends on the `LabelString` property for the transition. For more information, see “Specify Labels in States and Transitions Programmatically” on page 1-16.	T on page 2-175
`Trigger`	RO	Transition trigger, specified as a character vector. The value of this property depends on the `LabelString` property for the transition. For more information, see “Specify Labels in States and Transitions Programmatically” on page 1-16.	T on page 2-175
`Type`	RW	Type of junction, specified as one of these values: • `'CONNECTIVE'` — Connective junction that represents a decision point in a transition path • `'HISTORY'` — History junction that records the activity of substates inside a superstate	J on page 2-97

Data Specification

Property	Access	Description	Objects
`CompiledSize`	RO	Data size as determined by the compiler, specified as a character vector.	D on page 2-38 MS on page 2-112
`CompiledType`	RO	Data type as determined by the compiler, specified as a character vector.	D on page 2-38 MS on page 2-112
`DataType`	RW	Type of the data object or message data, specified as a character vector that depends on the `Props.Type.Method` property: • If the `Props.Type.Method` property is `'Inherit'`, the value of this property is `'Inherit: From definition in chart'` for local data and `'Inherit: Same as Simulink'` for input data, output data, parameter data, and messages. • If the `Props.Type.Method` property is `'Built-in'`, you can specify this property with one of these options: • `'double'` • `'single'` • `'int8'` • `'int16'` • `'int32'` • `'int64'` • `'uint8'` • `'uint16'` • `'uint32'` • `'uint64'` • `'boolean'` • `'ml'` (Supported only in charts that use C as the action language) • `'string'` (Supported only in charts that use C as the action language) • Otherwise, the `Props.Type` properties determine the value of this property. For more information, see the section Add Data on page 1-0 in “Create Charts by Using the Stateflow API” on page 1-19.	D on page 2-38 MS on page 2-112

Property	Access	Description	Objects
`Props.Array.FirstIndex`	RW	Index for the first element of the array data object, specified as a character vector. This property applies only to array data in charts that use C as the action language. For more information, see “Save Final Value to Base Workspace”.	D on page 2-38
`Props.Array.IsDynamic`	RW	Whether the data object has variable size, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property applies only to input, output, and local data and is equivalent to the **Variable Size** check box in the Data properties dialog box. Use the `Size` property to specify the maximum size for the data. For more information, see “Declare Variable-Size Data in Stateflow Charts”.	D on page 2-38
`Props.Array.Size`	RW	Size of the data object or message data, specified as a character vector. For more information, see “Specify Size of Stateflow Data”.	D on page 2-38 MS on page 2-112
`Props.Complexity`	RW	Whether the data object or message accepts complex values, specified as `'On'` or `'Off'`. For more information, see “Complex Data in Stateflow Charts”.	D on page 2-38 MS on page 2-112
`Props.InitialValue`	RW	Initial value, specified as a character vector.	D on page 2-38 MS on page 2-112
`Props.Range.Maximum`	RW	Maximum value for the data object, specified as a character vector. For more information, see “Limit Range”.	D on page 2-38
`Props.Range.Minimum`	RW	Minimum value for the data object, specified as a character vector. For more information, see “Limit Range”.	D on page 2-38
`Props.ResolveToSignalObject`	RW	Whether the data object resolves to a `Simulink.Signal` object that you define in the model or base workspace, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “Resolve Data Properties from Simulink Signal Objects”.	D on page 2-38
`Props.Type.BusObject`	RW	Name of the `Simulink.Bus` object that defines the data object or message data, specified as a character vector. This property applies only when the `Props.Type.Method` property is `'Bus Object'`. For more information, see “Access Bus Signals Through Stateflow Structures”.	D on page 2-38 MS on page 2-112
`Props.Type.EnumType`	RW	Name of the enumerated type that defines the data object or message data, specified as a character vector. This property applies only when the `Props.Type.Method` property is `'Enumerated'`. For more information, see “Reference Values by Name by Using Enumerated Data”.	D on page 2-38 MS on page 2-112

Property	Access	Description	Objects
`Props.Type.Expression`	RW	Expression that evaluates to the data type of the data object or message data, specified as a character vector. This property applies only when the `Props.Type.Method` property is `'Expression'`. For more information, see “Specify Data Properties by Using MATLAB Expressions”.	D on page 2-38 MS on page 2-112
`Props.Type.Fixpt.Bias`	RW	Bias, specified as a character vector. This property applies only when the `Props.Type.Method` property is `'Fixed point'` and the `Props.Type.Fixpt.ScalingMode` property is `'Slope and bias'`. For more information, see “Fixed-Point Data in Stateflow Charts”.	D on page 2-38 MS on page 2-112
`Props.Type.Fixpt.FractionLength`	RW	Fraction length, in bits, specified as a character vector. This property applies only when the `Props.Type.Method` property is `'Fixed point'` and the `Props.Type.Fixpt.ScalingMode` property is `'Binary point'`. For more information, see “Fixed-Point Data in Stateflow Charts”.	D on page 2-38 MS on page 2-112
`Props.Type.Fixpt.Lock`	RW	Whether to prevent replacement of the fixed-point type with an autoscaled type chosen by the Fixed-Point Tool (Fixed-Point Designer), specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “Iterative Fixed-Point Conversion Using the Fixed-Point Tool” (Fixed-Point Designer).	D on page 2-38 MS on page 2-112
`Props.Type.Fixpt.ScalingMode`	RW	Method for scaling the fixed-point data object or message data, specified as `'Binary point'`, `'Slope and bias'`, or `'None'`. This property applies only when the `Props.Type.Method` property is `'Fixed point'`. For more information, see “Fixed-Point Data in Stateflow Charts”.	D on page 2-38 MS on page 2-112
`Props.Type.Fixpt.Slope`	RW	Slope, specified as a character vector. This property applies only when the `Props.Type.Method` property is `'Fixed point'` and the `Props.Type.Fixpt.ScalingMode` property is `'Slope and bias'`. For more information, see “Fixed-Point Data in Stateflow Charts”.	D on page 2-38 MS on page 2-112

Property	Access	Description	Objects
`Props.Type.Method`	RW	Method for setting the type of the data object or message data, specified as a character vector. • For local, input, output, or parameter data, use `'Inherited'`, `'Built-in'`, `'Bus Object'`, `'Enumerated'`, `'Expression'`, or `'Fixed point'`. • For constant data, use `'Built-in'`, `'Expression'`, or `'Fixed point'`. • For data store memory data, use `'Inherited'`. • For messages, use `'Inherited'`, `'Built-in'`, `'Bus Object'`, `'Enumerated'`, `'Expression'`, or `'Fixed point'`. This property is equivalent to the **Mode** field of the Data Type Assistant in the Model Explorer, the Data properties dialog box, or the Message properties dialog box. For more information, see “Specify Type of Stateflow Data”.	D on page 2-38 MS on page 2-112
`Props.Type.Signed`	RW	Signedness, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property applies only when the `Props.Type.Method` property is `'Fixed point'`. For more information, see “Fixed-Point Data in Stateflow Charts”.	D on page 2-38 MS on page 2-112
`Props.Type.WordLength`	RW	Word length, in bits, specified as a character vector. This property applies only when the `Props.Type.Method` property is `'Fixed point'`. For more information, see “Fixed-Point Data in Stateflow Charts”.	D on page 2-38 MS on page 2-112
`Props.Unit.Name`	RW	Name of unit of measurement for the data object, specified as a character vector. This property applies only to input and ouput data. For more information, see “Specify Units for Stateflow Data”.	D on page 2-38

Debugging

Property	Access	Description	Objects
`Debug.Animation.Delay`	RW	Delay that the chart animation uses for highlighting each transition segment in the machine, specified as a scalar. These values correspond to the settings of the **Animation Speed** drop-down list in the **Debug** tab: **Delay Value** / **Animation Speed**: 0.5 — `Slow` 0.2 — `Medium` 0 — `Fast` -1 — `Lightning Fast` This property applies only when the `Debug.Animation.Enable` property of the machine is `true`.	M on page 2-104
`Debug.Animation.Enabled`	RW	Whether to animate the charts in the machine during simulation, specified as a numeric or logical 1 (`true`) or 0 (`false`). Disabling this property is equivalent to selecting `None` in the **Animation Speed** drop-down list in the **Debug** tab.	M on page 2-104
`Debug.Animation.MaintainHighlighting`	RW	Whether to maintain the highlighting of active states in the machine after the simulation ends, specified as a numeric or logical 1 (`true`) or 0 (`false`).	M on page 2-104
`Debug.Breakpoints.EndBroadcast`	RW	Whether to set the `End of Broadcast` breakpoint for the event, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “Set Breakpoints to Debug Charts”.	E on page 2-78
`Debug.Breakpoints.OnDuring`	RW	Whether to set the `During State` or `During Function Call` breakpoint, specified as a numeric or logical 1 (`true`) or 0 (`false`). For truth tables, this property applies only when both the `Language` property of the truth table and the `ActionLanguage` of the chart that contains the truth table are `'C'` . For more information, see “Set Breakpoints to Debug Charts”.	AS on page 2-13 GF on page 2-88 SBS on page 2-130 S on page 2-140 TTF on page 2-183
`Debug.Breakpoints.OnEntry`	RW	Whether to set the `On Chart Entry` or `On State Entry` breakpoint, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “Set Breakpoints to Debug Charts”.	AS on page 2-13 C on page 2-28 SBS on page 2-130 S on page 2-140 STT on page 2-156

Property	Access	Description	Objects
`Debug.Breakpoints.OnExit`	RW	Whether to set the `On State Exit` or `On State Exit`breakpoint, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “Set Breakpoints to Debug Charts”.	AS on page 2-13 SBS on page 2-130 S on page 2-140
`Debug.Breakpoints.StartBroadcast`	RW	Whether to set the `Start of Broadcast` breakpoint for the event, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “Set Breakpoints to Debug Charts”.	E on page 2-78
`Debug.Breakpoints.WhenTested`	RW	Whether to set the `When Transition is Tested` breakpoint for the transition, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “Set Breakpoints to Debug Charts”.	T on page 2-175
`Debug.Breakpoints.WhenValid`	RW	Whether to set the `When Transition is Valid` breakpoint for the transition, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “Set Breakpoints to Debug Charts”.	T on page 2-175
`Debug.Watch`	RW	Whether to track the value of the data object in the Breakpoints and Watch window, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “View Data in the Breakpoints and Watch Window”.	D on page 2-38
`OverSpecDiagnostic`	RW	Level of diagnostic action when the truth table is overspecified, specified as `'Error'`, `'Warning'`, or `'None'`. For more information, see “Correct Overspecified and Underspecified Truth Tables”.	TTB on page 2-189 TTF on page 2-183
`TestPoint`	RW	Whether to set the atomic subchart, state, Simulink based state, or data object as a test point, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “Monitor Test Points in Stateflow Charts”.	AS on page 2-13 D on page 2-38 SBS on page 2-130 S on page 2-140
`UnderSpecDiagnostic`	RW	Level of diagnostic action when the truth table is underspecified, specified as `'Error'`, `'Warning'`, or `'None'`. For more information, see “Correct Overspecified and Underspecified Truth Tables”.	TTB on page 2-189 TTF on page 2-183

Discrete and Continuous-Time Semantics

Property	Access	Description	Objects
`ChartUpdate`	RW	Activation method for the chart, state transition table, truth table, or MATLAB Function block, specified as `'CONTINUOUS'`, `'DISCRETE'`, or `'INHERITED'`. For more information, see “Update Method”.	C on page 2-28 STT on page 2-156 TTB on page 2-189 MFB on page 2-61

Property	Access	Description	Objects
`EnableZeroCrossings`	RW	Whether to enable zero-crossing detection on state transitions in the chart or state transition table, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property applies only when the `ChartUpdate` property for the chart is set to `'CONTINUOUS'`. For more information, see “Disable Zero-Crossing Detection”.	C on page 2-28 STT on page 2-156
`SampleTime`	RW	Sample time for activating the chart, state transition table, truth table, or MATLAB Function block, specified as a character vector. This property applies only when the `ChartUpdate` property for the chart is `'DISCRETE'`.	C on page 2-28 STT on page 2-156 TTB on page 2-189 MFB on page 2-61

Exported Functions

Property	Access	Description	Objects
`AllowGlobalAccessToExportedFunctions`	RW	Whether exported functions from the chart are globally visible in the Simulink model, specified as a numeric or logical 1 (`true`) or 0 (`false`). When this property is enabled, blocks throughout the model can call functions exported from the chart without using qualified notation. This property applies only when the `ExportChartFunctions` property for the chart is `true`.	C on page 2-28
`ExportChartFunctions`	RW	Whether to export chart-level functions to other blocks in the Simulink model, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “Export Stateflow Functions for Reuse”.	C on page 2-28

Graphical Appearance

Property	Access	Description	Objects
`ArrowSize`	RW	For states, subcharts, ports, and junctions, size of incoming transition arrows, specified as a scalar. For transitions, size of the transition arrow at the destination. When you change the destination of the transition, this property resets to the value of the `ArrowSize` property of the new destination.	AS on page 2-13 J on page 2-97 P on page 2-120 SBS on page 2-130 S on page 2-140 T on page 2-175

Property	Access	Description	Objects
`AutoBackgroundColor`	RW	Whether to use the default background color, specified as a numeric or logical 1 (`true`) or 0 (`false`). • `true` — Use the default color specified by the `ChartColor` property of the chart that contains the annotation. • `false` — Use the color specified by the `BackgroundColor` property of the annotation.	A on page 2-2
`AutoForegroundColor`	RW	Whether to use the default foreground color, specified as a numeric or logical 1 (`true`) or 0 (`false`). • `true` — Use the default color specified by the `StateLabelColor` property of the chart that contains the annotation. • `false` — Use the color specified by the `ForegroundColor` property of the annotation.	A on page 2-2
`BackgroundColor`	RW	Background color for the annotation, specified as a three-element numeric vector of the form `[red green blue]` that specifies the red, green, and blue values. Each element must be in the range between 0 and 1. This property applies only when the `AutoBackgroundColor` property is `false`.	A on page 2-2
`BadIntersection`	RO	Whether a box, state, or function graphically intersects another box, state, or function, specified as a numeric or logical 1 (`true`) or 0 (`false`).	AB on page 2-8 AS on page 2-13 B on page 2-20 GF on page 2-88 MF on page 2-68 SBS on page 2-130 SF on page 2-136 S on page 2-140 TTF on page 2-183
`ChartColor`	RW	Background color for the chart, specified as a three-element numeric vector of the form `[red green blue]` that specifies the red, green, and blue values. Each element must be in the range between 0 and 1. For state transition tables, this property controls the appearance of the chart that is automatically generated for the state transition table.	C on page 2-28 STT on page 2-156

Property	Access	Description	Objects
ContentPreviewEnabled	RW	Whether to display a preview of the contents of the object, specified as a numeric or logical 1 (`true`) or 0 (`false`). For boxes, states, or graphical functions, this property applies only when the `IsSubchart` property is `true`.	AB on page 2-8 AS on page 2-13 B on page 2-20 GF on page 2-88 SBS on page 2-130 SF on page 2-136 S on page 2-140
Destination	RW	Destination of the transition, specified as an empty array or a Stateflow API object of one of these types: • `Stateflow.AtomicBox` • `Stateflow.AtomicSubchart` • `Stateflow.Box` • `Stateflow.Junction` • `Stateflow.SimulinkBasedState` • `Stateflow.State`	T on page 2-175
DestinationEndPoint	RW	Position of the transition endpoint at its destination, specified as a two-element numeric vector `[x y]` of coordinates relative to the upper left corner of the chart.	T on page 2-175
DestinationOClock	RW	Location of the transition endpoint at its destination, specified as a scalar between 0 and 12 that describes a clock position.	T on page 2-175
DropShadow	RW	Whether to display a drop shadow around the annotation box, specified as a numeric or logical 1 (`true`) or 0 (`false`).	A on page 2-2
Editor	RO	Editor for the chart or state transition table, specified as a `Stateflow.Editor` object. You can use this object to control the position, size, and magnification level of the Stateflow Editor window.	C on page 2-28 STT on page 2-156
FixedHeight	RW	Whether to fix height of the annotation box, specified as a numeric or logical 1 (`true`) or 0 (`false`). • `true` — Fixes the height of the annotation box and hides content that is longer than the box. • `false` — Resizes the annotation box vertically as you add content.	A on page 2-2

Property	Access	Description	Objects
`FixedWidth`	RW	Whether to fix height of the annotation box, specified as a numeric or logical 1 (`true`) or 0 (`false`). • `true` — Fixes the width of the annotation box and wraps text that is longer than the box. • `false` — Resizes the annotation box horizontally as you add content.	A on page 2-2
`Font.Angle`	RW	Font angle for the annotation text, specified as `'NORMAL'` or `'ITALIC'`.	A on page 2-2
`Font.Name`	RO	Font name for the annotation text, specified as a character vector. The `StateFont.Name` property of the chart that contains the annotation sets the value of this property.	A on page 2-2
`Font.Size`	RW	Font size for the annotation text, specified as a scalar. The `StateFont.Size` property of the chart that contains the annotation sets the initial value of this property.	A on page 2-2
`Font.Weight`	RW	Font weight for the annotation text, specified as `'NORMAL'` or `'BOLD'`.	A on page 2-2
`FontSize`	RW	Font size for the label of a box, state, function, or transition, specified as a scalar. The `StateFont.Size` property of the chart that contains the graphical function sets the initial value of this property.	AB on page 2-8 AS on page 2-13 B on page 2-20 GF on page 2-88 MF on page 2-68 SBS on page 2-130 SF on page 2-136 S on page 2-140 T on page 2-175 TTF on page 2-183
`ForegroundColor`	RW	Foreground color for the annotation, specified as a three-element numeric vector of the form `[red green blue]` that specifies the red, green, and blue values. Each element must be in the range between 0 and 1. This property applies only when the `AutoForegroundColor` property is `false`.	A on page 2-2
`InternalMargins`	RW	Space between the text and the border of the annotation box, specified as a four-element numeric vector of the form `[left top right bottom]`.	A on page 2-2

Property	Access	Description	Objects
`IsGrouped`	RW	Whether the box, function, or state is grouped, specified as a numeric or logical 1 (`true`) or 0 (`false`). When you copy and paste a grouped object, you copy not only the object but all of its contents. For more information, see “Copy and Paste by Grouping” on page 2-24.	B on page 2-20 GF on page 2-88 S on page 2-140
`IsSubchart`	RW	Whether the box, function, or state is a subchart, specified as a numeric or logical 1 (`true`) or 0 (`false`).	B on page 2-20 GF on page 2-88 S on page 2-140
`JunctionColor`	RW	Color for junctions in the chart, specified as a three-element numeric vector of the form `[red green blue]` that specifies the red, green, and blue values. Each element must be in the range between 0 and 1. For state transition tables, this property controls the appearance of the chart that is automatically generated for the state transition table.	C on page 2-28 STT on page 2-156
`LabelPosition`	RW	Position and size of the transition, port, or junction label, specified as a four-element numeric vector of the form `[left top width height]`.	T on page 2-175 P on page 2-120
`MidPoint`	RW	Position of the midpoint of the transition, specified as a two-element numeric vector `[x y]` of coordinates relative to the upper left corner of the chart.	T on page 2-175
`Position`	RW	Position and size of the graphical object, specified as a four-element numeric vector of the form `[left top width height]`.	A on page 2-2 AB on page 2-8 AS on page 2-13 B on page 2-20 GF on page 2-88 MF on page 2-68 SBS on page 2-130 SF on page 2-136 S on page 2-140 TTF on page 2-183
`Position.Center`	RW	Position of the center of the port or junction, specified as a two-element numeric vector `[x y]` of coordinates relative to the upper left corner of the chart.	J on page 2-97 P on page 2-120
`Position.Radius`	RW	Radius of the port or junction, specified as a scalar.	J on page 2-97 P on page 2-120

Property	Access	Description	Objects
`Source`	RW	Source of the transition, specified as an empty array or a Stateflow API object of one of these types: • `Stateflow.AtomicBox` • `Stateflow.AtomicSubchart` • `Stateflow.Box` • `Stateflow.Junction` • `Stateflow.SimulinkBasedState` • `Stateflow.State`	T on page 2-175
`SourceEndPoint`	RW	Position of the transition endpoint at its source, specified as a two-element numeric vector `[x y]` of coordinates relative to the upper left corner of the chart.	T on page 2-175
`SourceOClock`	RW	Location of the transition endpoint at its source, specified as a scalar between 0 and 12 that describes a clock position.	T on page 2-175
`StateColor`	RW	Color for the boxes, functions, and states in the chart, specified as a three-element numeric vector of the form `[red green blue]` that specifies the red, green, and blue values. Each element must be in the range between 0 and 1. For state transition tables, this property controls the appearance of the chart that is automatically generated for the state transition table.	C on page 2-28 STT on page 2-156
`StateFont.Angle`	RW	Font angle for the box, function, and state labels in the chart, specified as `'NORMAL'` or `'ITALIC'`. For state transition tables, this property controls the appearance of the chart that is automatically generated for the state transition table.	C on page 2-28 STT on page 2-156
`StateFont.Name`	RW	Font name for the annotation, box, function, and state labels in the chart, specified as a character vector. For state transition tables, this property controls the appearance of the chart that is automatically generated for the state transition table.	C on page 2-28 STT on page 2-156
`StateFont.Size`	RW	Initial font size for the annotation, box, function, and state labels in the chart, specified as a scalar. For state transition tables, this property controls the appearance of the chart that is automatically generated for the state transition table.	C on page 2-28 STT on page 2-156

Property	Access	Description	Objects
`StateFont.Weight`	RW	Font weight for the box, function, and state labels in the chart, specified as `'NORMAL'` or `'BOLD'`. For state transition tables, this property controls the appearance of the chart that is automatically generated for the state transition table.	C on page 2-28 STT on page 2-156
`StateLabelColor`	RW	Color for the box, function, and state labels in the chart, specified as a three-element numeric vector of the form `[red green blue]` that specifies the red, green, and blue values. Each element must be in the range between 0 and 1. For state transition tables, this property controls the appearance of the chart that is automatically generated for the state transition table.	C on page 2-28 STT on page 2-156
`TransitionColor`	RW	Color for transitions in the chart, specified as a three-element numeric vector of the form `[red green blue]` that specifies the red, green, and blue values. Each element must be in the range between 0 and 1. For state transition tables, this property controls the appearance of the chart that is automatically generated for the state transition table.	C on page 2-28 STT on page 2-156
`TransitionFont.Angle`	RW	Font angle for the transition labels in the chart, specified as `'NORMAL'` or `'ITALIC'`. For state transition tables, this property controls the appearance of the chart that is automatically generated for the state transition table.	C on page 2-28 STT on page 2-156
`TransitionFont.Name`	RW	Font name for the transition labels in the chart, specified as a character vector. For state transition tables, this property controls the appearance of the chart that is automatically generated for the state transition table.	C on page 2-28 STT on page 2-156
`TransitionFont.Size`	RW	Initial font size for the transition labels in the chart, specified as a scalar. For state transition tables, this property controls the appearance of the chart that is automatically generated for the state transition table.	C on page 2-28 STT on page 2-156
`TransitionFont.Weigh t`	RW	Font weight for the transition labels in the chart, specified as `'NORMAL'` or `'BOLD'`. For state transition tables, this property controls the appearance of the chart that is automatically generated for the state transition table.	C on page 2-28 STT on page 2-156

Property	Access	Description	Objects
`TransitionLabelColor`	RW	Color for the transition labels in the chart, specified as a three-element numeric vector of the form `[red green blue]` that specifies the red, green, and blue values. Each element must be in the range between 0 and 1. For state transition tables, this property controls the appearance of the chart that is automatically generated for the state transition table.	C on page 2-28 STT on page 2-156
`Visible`	RW	Whether the Stateflow Editor window is displaying the chart or state transition table, specified as a numeric or logical 1 (`true`) or 0 (`false`).	C on page 2-28 STT on page 2-156

Hierarchy

Property	Access	Description	Objects
`Chart`	RO	Chart that contains the object, specified as a `Stateflow.Chart` object.	A on page 2-2 AB on page 2-8 AS on page 2-13 B on page 2-20 GF on page 2-88 J on page 2-97 MF on page 2-68 P on page 2-120 SBS on page 2-130 SF on page 2-136 S on page 2-140 T on page 2-175 TTF on page 2-183
`Dirty`	RW	Whether the chart, state transition table, truth table, MATLAB Function block, or the Simulink model for the Stateflow machine has changed after being opened or saved, specified as a numeric or logical 1 (`true`) or 0 (`false`).	C on page 2-28 M on page 2-104 STT on page 2-156 TTB on page 2-189 MFB on page 2-61
`Home`	RO	Home state or subchart, specified as a `Stateflow.State` or `Stateflow.AtomicSubchart` object. The home of an entry or exit port is the state or subchart whose boundary contains the port. This property applies only to entry and exit ports.	P on page 2-120

Property	Access	Description	Objects
`Iced`	RO	Whether the chart, state transition table, truth table, MATLAB Function block, or the Simulink model for the Stateflow machine is locked, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property is equivalent to the property `Locked`, but is used internally to prevent changes in the chart, block, or model during simulation.	C on page 2-28 M on page 2-104 STT on page 2-156 TTB on page 2-189 MFB on page 2-61
`Linked`	RO	Whether the port or junction has a matching junction or port, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property is used to detect internal inconsistencies in the chart.	P on page 2-120
`Locked`	RW	Whether the chart, state transition table, truth table, MATLAB Function block, or the Simulink model for the Stateflow machine is locked, specified as a numeric or logical 1 (`true`) or 0 (`false`). Enable this property to prevent changes in the chart, block, or model.	C on page 2-28 M on page 2-104 STT on page 2-156 TTB on page 2-189 MFB on page 2-61
`Machine`	RO	Machine that contains the object, specified as a `Stateflow.Machine` object.	A on page 2-2 AB on page 2-8 AS on page 2-13 B on page 2-20 C on page 2-28 D on page 2-38 E on page 2-78 GF on page 2-88 J on page 2-97 MF on page 2-68 MS on page 2-112 P on page 2-120 SBS on page 2-130 SF on page 2-136 S on page 2-140 STT on page 2-156 T on page 2-175 TTB on page 2-189 TTF on page 2-183 MFB on page 2-61

Property	Access	Description	Objects
`Path`	RO	Location of the object in the model hierarchy, specified as a character vector.	A on page 2-2 AB on page 2-8 AS on page 2-13 B on page 2-20 C on page 2-28 D on page 2-38 E on page 2-78 GF on page 2-88 J on page 2-97 M on page 2-104 MF on page 2-68 MS on page 2-112 P on page 2-120 SBS on page 2-130 SF on page 2-136 S on page 2-140 STT on page 2-156 T on page 2-175 TTB on page 2-189 TTF on page 2-183 MFB on page 2-61
`Subchart`	RO	Contents of the atomic box or subchart, specified as a `Stateflow.Chart` object. Use this object to add children, such as states and transitions, to an atomic subchart.	AB on page 2-8 AS on page 2-13

Property	Access	Description	Objects
`Subviewer`	RO	Subviewer for the graphical object, specified as a `Stateflow.Chart`, `Stateflow.State`, `Stateflow.Box`, or `Stateflow.Function` object. The subviewer is the chart or subchart where you can graphically view the object.	A on page 2-2 AB on page 2-8 AS on page 2-13 B on page 2-20 GF on page 2-88 J on page 2-97 MF on page 2-68 P on page 2-120 SBS on page 2-130 SF on page 2-136 S on page 2-140 T on page 2-175 TTF on page 2-183

Identification

Property	Access	Description	Objects
`Created`	RO	Date of the creation of the machine, specified as a character vector.	M on page 2-104
`Creator`	RW	Creator of the machine, specified as a character vector.	M on page 2-104

Property	Access	Description	Objects
`Description`	RW	Description for the object, specified as a character vector.	A on page 2-2 AB on page 2-8 AS on page 2-13 B on page 2-20 C on page 2-28 D on page 2-38 E on page 2-78 GF on page 2-88 J on page 2-97 M on page 2-104 MF on page 2-68 MS on page 2-112 P on page 2-120 SBS on page 2-130 SF on page 2-136 S on page 2-140 STT on page 2-156 T on page 2-175 TTB on page 2-189 TTF on page 2-183 MFB on page 2-61

Property	Access	Description	Objects
`Document`	RW	Document link for the object, specified as a character vector.	A on page 2-2 AB on page 2-8 AS on page 2-13 B on page 2-20 C on page 2-28 D on page 2-38 E on page 2-78 GF on page 2-88 J on page 2-97 M on page 2-104 MF on page 2-68 MS on page 2-112 P on page 2-120 SBS on page 2-130 SF on page 2-136 S on page 2-140 STT on page 2-156 T on page 2-175 TTB on page 2-189 TTF on page 2-183 MFB on page 2-61

Property	Access	Description	Objects
`Id`	RO	Unique identifier, specified as an integer scalar. Use this property to distinguish the object from other objects in the model. The value of this property is reassigned every time you start a new MATLAB session and may be recycled after an object is deleted.	A on page 2-2 AB on page 2-8 AS on page 2-13 B on page 2-20 C on page 2-28 D on page 2-38 E on page 2-78 GF on page 2-88 J on page 2-97 M on page 2-104 MF on page 2-68 MS on page 2-112 P on page 2-120 SBS on page 2-130 SF on page 2-136 S on page 2-140 STT on page 2-156 T on page 2-175 TTB on page 2-189 TTF on page 2-183 MFB on page 2-61
`Modified`	RW	Record of modifications to the machine, specified as a character vector.	M on page 2-104

Property	Access	Description	Objects
`SSIdNumber`	RO	Session-independent identifier, specified as an integer scalar. Use this property to distinguish the object from other objects in the model.	AB on page 2-8 AS on page 2-13 D on page 2-38 GF on page 2-88 J on page 2-97 MF on page 2-68 MS on page 2-112 P on page 2-120 SBS on page 2-130 SF on page 2-136 S on page 2-140 T on page 2-175 TTF on page 2-183
`Tag`	RW	User-defined tag for the object, specified as data of any type.	A on page 2-2 AB on page 2-8 AS on page 2-13 B on page 2-20 C on page 2-28 D on page 2-38 E on page 2-78 GF on page 2-88 J on page 2-97 M on page 2-104 MF on page 2-68 MS on page 2-112 P on page 2-120 SBS on page 2-130 SF on page 2-136 S on page 2-140 STT on page 2-156 T on page 2-175 TTB on page 2-189 TTF on page 2-183 MFB on page 2-61

Property	Access	Description	Objects
`Version`	RW	Version of the machine, specified as a character vector.	M on page 2-104

Integer and Fixed-Point Data

Property	Access	Description	Objects
`EmlDefaultFimath`	RW	Default `fimath` properties for the chart, state transition table, truth table, or MATLAB function, specified as one of these values: • `'Same as MATLAB Default'` — Use the same `fimath` properties as the current default `fimath` object. • `'Other:UserSpecified'` — Use the `InputFimath` property to specify the default `fimath` object. For charts and state transition tables, this property applies only when the `ActionLanguage` property is `'MATLAB'`. For MATLAB functions, this property applies only when the `ActionLanguage` of the chart that contains the function is `'C'`. For truth table functions, this property applies only when the `Language` property of the truth table is `'MATLAB'` and the `ActionLanguage` of the chart that contains the truth table is `'C'`.	C on page 2-28 MF on page 2-68 STT on page 2-156 TTB on page 2-189 TTF on page 2-183 MFB on page 2-61

Property	Access	Description	Objects
`InputFimath`	RW	Default `fimath` object, specified as a character vector. When the `EmlDefaultFimath` property of the chart, state transition table, truth table, or MATLAB function is `'Other:UserSpecified'`, you can use this property to: • Enter an expression that constructs a `fimath` object. • Enter the variable name for a `fimath` object in the MATLAB or model workspace. For charts and state transition tables, this property applies only when the `ActionLanguage` property is `'MATLAB'`. For MATLAB functions, this property applies only when the `ActionLanguage` of the chart that contains the function is `'C'`. For truth table functions, this property applies only when the `Language` property of the truth table is `'MATLAB'` and the `ActionLanguage` of the chart that contains the truth table is `'C'`.	C on page 2-28 MF on page 2-68 STT on page 2-156 TTB on page 2-189 TTF on page 2-183 MFB on page 2-61
`SaturateOnIntegerOverflow`	RW	Whether the data in the chart, state transition table, truth table, or MATLAB function saturates on integer overflow, specified as a numeric or logical 1 (`true`) or 0 (`false`). When this property is disabled, the data wraps on integer overflow. For more information, see “Saturate on integer overflow” (Simulink). For MATLAB functions, this property applies only when the `ActionLanguage` of the chart that contains the function is `'C'`. For truth table functions, this property applies only when the `Language` property of the truth table is `'MATLAB'` and the `ActionLanguage` of the chart that contains the truth table is `'C'`.	C on page 2-28 MF on page 2-68 STT on page 2-156 TTB on page 2-189 TTF on page 2-183 MFB on page 2-61

Property	Access	Description	Objects
`TreatAsFi`	RW	Inherited Simulink signals to treat as Fixed-Point Designer `fi` objects, specified as one of these values: • `'Fixed-point'` — The chart, state transition table, truth table, or MATLAB Function block treats all fixed-point inputs as `fi` objects. • `'Fixed-point & Integer'` — The chart, state transition table, truth table, or MATLAB Function block treats all fixed-point and integer inputs as `fi` objects. For charts and state transition tables, this property applies only when the `ActionLanguage` property is `'MATLAB'`.	C on page 2-28 STT on page 2-156 TTB on page 2-189 MFB on page 2-61

Interface

Property	Access	Description	Objects
`InitializeMethod`	RW	Method for initializing the value of the data object or message data, specified as a character vector that depends on the scope of the data or message: • For local and output data and messages, use `'Expression'` or `'Parameter'`. • For constant data, use `'Expression'`. • For input data and messages, parameters, and data store memory, use `'Not Needed'`. To specify the initial value, use the `Props.InitialValue` property.	D on page 2-38 MS on page 2-112
`Inputs`	RO	Input arguments of the MATLAB Function block, specified as an array of `Stateflow.Data` objects.	MFB on page 2-61
`Name`	RW	Name of the data object, event, or message, specified as a character vector.	D on page 2-38 E on page 2-78 MS on page 2-112
`Outputs`	RO	Output arguments of the MATLAB Function block, specified as an array of `Stateflow.Data` objects.	MFB on page 2-61
`Port`	RW	Port index for the data object, event, or message specified as an integer scalar. This property applies only to input and output data, events, and messages.	D on page 2-38 E on page 2-78 MS on page 2-112

Property	Access	Description	Objects
`Priority`	RW	Priority for the message, specified as a character vector. If two distinct messages occur at the same time, this property determines which message is processed first. A smaller numeric value indicates a higher priority. This property applies only to local and output messages in discrete-event charts. For more information, see “Create Custom Queuing Systems Using Discrete-Event Stateflow Charts” (SimEvents).	MS on page 2-112
`SaveToWorkspace`	RW	Whether to save the value of the data object to a variable of the same name in the MATLAB base workspace at the end of the simulation, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property applies only to data in charts that use C as the action language. For more information, see “Save Final Value to Base Workspace”.	D on page 2-38
`Scope`	RW	Scope of the data object, event, or message, specified as one of these values: • `'Local'` • `'Input'` • `'Output'` • `'Constant'` • `'Parameter'` • `'Data Store Memory'` • `'Temporary'` • `'Imported'` • `'Exported'`	D on page 2-38 E on page 2-78 MS on page 2-112
`Trigger`	RW	Type of trigger associated with the event, specified as a character vector that depends on the scope of the data: • For input events, use `'Function call'`, `'Rising'`, `'Falling'`, or `'Either'`. • For output events, use `'Function call'` or `'Either'`. This property does not apply to local events. For more information, see “Trigger”.	E on page 2-78
`Tunable`	RW	Whether the data object is a tunable parameter, specified as a numeric or logical 1 (`true`) or 0 (`false`). Only tunable parameters can be modified during simulation. This property applies only to parameter data.	D on page 2-38

Property	Access	Description	Objects
`UpdateMethod`	RW	Method for updating data object, specified as `'Discrete'` or `'Continuous'`. This property applies only when the `ChartUpdate` property of the chart that contains the data is `'CONTINUOUS'`. For more information, see “Continuous-Time Modeling in Stateflow”.	D on page 2-38

Queue

Property	Access	Description	Objects
`MessagePriorityOrder`	RW	Type of priority queue for the message, specified as one of these values: • `'Ascending'` — Messages are received in ascending order of the message data value. • `'Descending'` — Messages are received in descending order of the message data value. This property applies only when the `QueueType` property of the message is `'Priority'`. For more information, see “Queue Type”.	MS on page 2-112
`QueueCapacity`	RW	Length of the internal queue for the message, specified as an integer scalar. This property applies only to local messages and to input messages that have `UseInternalQueue` set to `true`. For more information, see “Queue Capacity”.	MS on page 2-112
`QueueOverflowDiagnostic`	RW	Level of diagnostic action when the number of incoming messages exceeds the queue capacity for the message, specified as `'Error'`, `'Warning'`, or `'None'`. This property applies only to local messages and to input messages that have `UseInternalQueue` set to `true`. For more information, see “Queue Overflow Diagnostic”.	MS on page 2-112
`QueueType`	RW	Order in which messages are removed from the receiving queue, specified as one of these values: • `'FIFO'` — First in, first out. • `'LIFO'` — Last in, first out. • `'Priority'` — Remove messages according to the value in the data field. To specify the order, use the `MessagePriorityOrder` property for the message. This property applies only to local messages and to input messages that have `UseInternalQueue` set to `true`. For more information, see “Queue Type”.	MS on page 2-112

Property	Access	Description	Objects
`UseInternalQueue`	RW	Whether the Stateflow chart maintains an internal receiving queue for the input message, specified as a numeric or logical 1 (`true`) or 0 (`false`). This property applies only to input messages. For more information, see “Use Internal Queue”.	MS on page 2-112

Signal Logging

Property	Access	Description	Objects
`LoggingInfo.DataLogging`	RW	Whether to enable signal logging for the atomic subchart, state, Simulink based state, or data object, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “Log Simulation Output for States and Data”.	AS on page 2-13 D on page 2-38 SBS on page 2-130 S on page 2-140
`LoggingInfo.DecimateData`	RW	Whether to limit the amount of logged data, specified as a numeric or logical 1 (`true`) or 0 (`false`). When this property is `true`, signal logging skips samples by using the interval size specified by the `LoggingInfo.Decimation` property.	AS on page 2-13 D on page 2-38 SBS on page 2-130 S on page 2-140
`LoggingInfo.Decimation`	RW	Decimation interval, specified as an integer scalar. This property applies only when the `LoggingInfo.DecimateData` property is `true`. The default value of `2` means that the chart logs every other sample.	AS on page 2-13 D on page 2-38 SBS on page 2-130 S on page 2-140
`LoggingInfo.LimitDataPoints`	RW	Whether to limit the number of data points to log, specified as a numeric or logical 1 (`true`) or 0 (`false`). When this property is `true`, signal logging limits the number of data points by using the value specified by the `LoggingInfo.MaxPoints` property.	AS on page 2-13 D on page 2-38 SBS on page 2-130 S on page 2-140
`LoggingInfo.LoggingName`	RW	Custom signal name for the atomic subchart, state, Simulink based state, or data object, specified as a character vector. This property applies only when the `LoggingInfo.NameMode` property is `'Custom'`.	AS on page 2-13 D on page 2-38 SBS on page 2-130 S on page 2-140
`LoggingInfo.MaxPoints`	RW	Maximum number of data points to log, specified as an integer scalar. This property applies only when the `LoggingInfo.LimitDataPoints` property is `true`. The default value of `5000` means the chart logs the last 5000 data points generated by the simulation.	AS on page 2-13 D on page 2-38 SBS on page 2-130 S on page 2-140

Property	Access	Description	Objects
`LoggingInfo.NameMode`	RW	Source of the signal name used to log the atomic subchart, state, Simulink based state, or data object, specified as one of these values: • `'SignalName'` — Use the name of the atomic subchart, state, Simulink based state, or data object. • `'Custom'` — Use the custom signal name specified by the `LoggingInfo.LoggingName` property.	AS on page 2-13 D on page 2-38 SBS on page 2-130 S on page 2-140

State Decomposition

Property	Access	Description	Objects
`Decomposition`	RW	Decomposition of substates at the top level of containment in the chart or state, specified as `'EXCLUSIVE_OR'` or `'PARALLEL_AND'`. For more information, see “Specify Substate Decomposition”.	C on page 2-28 S on page 2-140
`ExecutionOrder`	RW	Execution order for the atomic subchart, state, or Simulink based state in parallel (AND) decomposition, specified as an integer scalar. This property applies only when both of these conditions are satisfied: • The `Type` property is `'AND'`. • The `UserSpecifiedStateTransitionExecutionOrder` property of the chart that contains the atomic subchart, state, or Simulink based state is `true`.	AS on page 2-13 SBS on page 2-130 S on page 2-140
`Type`	RO	Decomposition of sibling states, specified as `'OR'` or `'AND'`. The atomic subchart, state, or Simulink based state inherits this property from the `Decomposition` property of its parent state or chart.	AS on page 2-13 SBS on page 2-130 S on page 2-140

Super Step Semantics

Property	Access	Description	Objects
`EnableNonTerminalStates`	RW	Whether to enable super step semantics for the chart or state transition table, specified as a numeric or logical 1 (`true`) or 0 (`false`). For more information, see “Super Step Semantics”.	C on page 2-28 STT on page 2-156
`NonTerminalMaxCounts`	RW	Maximum number of transitions the chart or state transition table can take in one super step, specified as an integer scalar. This property applies only when the `EnableNonTerminalStates` property is `true`.	C on page 2-28 STT on page 2-156

Property	Access	Description	Objects
NonTerminalUnstableBehavior	RW	Behavior if a super step for the chart or state transition table exceeds the maximum number of transitions specified in the NonTerminalMaxCounts property before reaching a stable state, specified as one of these values: • 'Proceed' — The chart or state transition table goes to sleep with the last active state configuration. • 'Throw Error' — The chart or state transition table generates an error. This property applies only when the EnableNonTerminalStates property is true.	C on page 2-28 STT on page 2-156

See Also

sfclipboard | sfnew | sfroot

More About

- “Create Charts by Using the Stateflow API” on page 1-19
- “Create and Delete Stateflow Objects” on page 1-13
- “Modify Properties and Call Functions of Stateflow Objects” on page 1-11