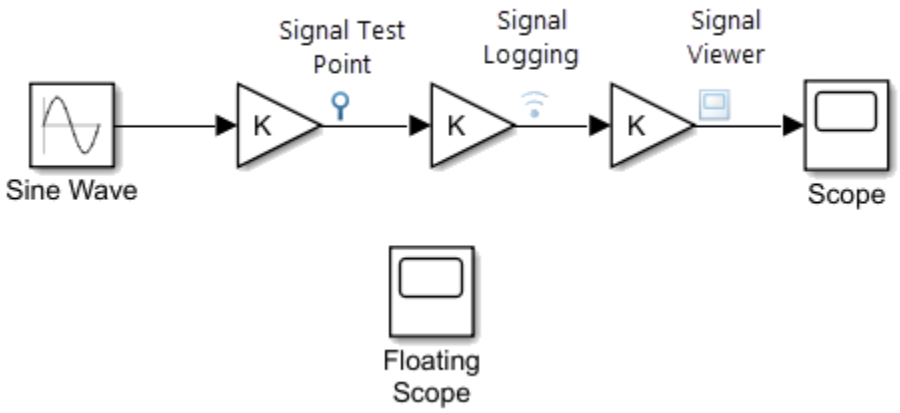
Scope Blocks and Scope Viewer Overview

Overview of Methods

Simulink® scopes provide several methods for displaying simulation data and capturing the data for later analysis. Symbols on your block diagram represent the various data display and data capture methods.



For more information about these methods:

- Scope and Floating Scope blocks — Scope, Floating Scope, Common Scope Block Tasks, Floating Scope and Scope Viewer Tasks.
- Scope Viewer — Viewers and Generators Manager, Floating Scope and Scope Viewer Tasks.
- Signal Logging — Save Simulation Data from Floating Scope.
- Signal Test Point — Configure Signals as Test Points.

Simulink Scope Versus Floating Scope

Scope blocks and Floating Scope blocks both display simulation results, but they differ in how you attach signals and save data. Simulation behavior for a Floating Scope and a Scope Viewer is identical, but you manage them differently in your model.

Capability	Simulink Scope	Simulink Floating Scope	Simulink Scope Viewer
Attaching signals	Connect signal lines to a Scope block using input ports.	Attach signals interactively from the model before and during a simulation. See Add Signals to an Existing Floating Scope or Scope Viewer and Quickly Switch Visualization of Different Signals on a Floating Scope.	Attach signals from the Viewers and Generators Manager, interactively from the toolstrip, or using the signal line context menu.

Capability	Simulink Scope	Simulink Floating Scope	Simulink Scope Viewer
Access to signals	Because signals lines are connected to a Scope block, access signals at different levels of a model hierarchy using GoTo blocks.	Because signals are attached without signal lines, you do not have to route lines to a Floating Scope block. You can access most signals inside the model hierarchy, including referenced models and Stateflow® charts. You cannot access optimized signals.	Scope viewers are attached to signal lines. You can access most signals inside the model hierarchy, including referenced models and Stateflow charts. You cannot access optimized signals.
Data logging	Save data to a MATLAB® variable as an array, structure, or object.	Save data to a MATLAB variable as an object.	Save data to a MATLAB variable as an object.
Simulation control	Run, forward, and back toolbar buttons.	Run, forward, and back toolbar buttons.	Run, forward, and back toolbar buttons.
Scale axes after simulation	Toolbar buttons to scale X-axis and Y-axis limits **Axes scaling** set to `Auto` for the X-axis and Y-axis.	Toolbar buttons to scale X-axis and Y-axis limits. **Axes scaling** set to `Auto` for only the Y-axis.	Toolbar buttons to scale X-axis and Y-axis limits. **Axes scaling** set to `Auto` for the X-axis and Y-axis.
Add to model	Add block from Simulink sinks library.	Add block from Simulink sinks library.	Add using Viewers and Generators Manager.
Visual indication in model	Scope block connected to signals.	Floating Scope block not attached to any signal lines.	Viewer icons located above signal lines for all attached signals.
Manage scopes centrally	No.	No.	Use the Viewers and Generators Manager to add or delete viewers, and attach or remove signals.
Manage scopes locally	Attach signal lines to Scope block in ports.	Attach signals from the Floating Scope window.	Add viewers and attach additional signals within a model hierarchy using the context menus or from the Scope viewer window.
Simulink Report Generator™ support	Yes.	Yes.	No.
Connecting Constant block with Sample time set to `inf` (constant sample time)	Plots the data value at the first time step and anytime you tune a parameter.	Plots all data values.	Plots the data value at the first time step and anytime you tune a parameter.

Simulink Scope Versus DSP System Toolbox Time Scope

If you have a Simulink and a DSP System Toolbox™ license, you can use either the Simulink Scope or DSP System Toolbox Time Scope. Choose the scope based on your application requirements, how the blocks work, and the default values of each block.

If you have a DSP System Toolbox license and you have been using Time Scopes, continue to do so in your applications. Using the Time Scope block requires a DSP System Toolbox license.

Feature	Scope	Time Scope
Location in block library	Simulink Sinks library	DSP System Toolbox Sinks library
Trigger and measurement panels	With Simulink only: • Trigger • Cursor Measurement With DSP System Toolbox or Simscape™ license: • Signal Statistics • Bilevel Measurements • Peak Finder	• Trigger • Cursor Measurements • Signal Statistics • Bilevel Measurements • Peak Finder
Simulation mode support for block-based sample times For block-based sample times, all the inputs of the block run at the same rate. For rapid-accelerator mode, see Behavior of Scopes and Viewers with Rapid Accelerator Mode.	• Normal • Accelerator • Rapid-Accelerator • External	• Rapid-Accelerator • External
Simulation mode support for port-based sample times For port-based sample times, the input ports can run at different rates.	No.	• Normal • Accelerator
Frame processing of signals	Included in Scope block with DSP System Toolbox license.	Included in Time Scope block.
Sample time propagation	If the different ports have different sample rates, the scope uses the greatest common divisor of the rates.	When using port-based sample times, the different ports of the Scope block inherit the different rates and plots the signals according to those rates.
Save model to previous Simulink release	If saving to a release before R2015a, the Scope block is converted to a scope with the features available in that release.	No change in features.

This table lists the differences in Configuration Property default values between the Scope and Time Scope blocks.

Property	Scope Default	Time Scope Default
Open at start of simulation	Cleared	Selected
Input processing	Elements as channels (sample based)	Columns as channels (frame based)
Maximize Axes	Off	Auto
Time Units	None	Metric (based on Time Span)
Time-axis labels	Bottom displays only	All
Show time-axis label	Cleared	Selected
Plot Type	Auto	Line

Property	Scope Default	Time Scope Default
Title	%<Signal Label>	No title
Y label	No label	Amplitude

See Also

Floating Scope | Scope | Scope Viewer | Time Scope (DSP System Toolbox)

Related Topics

- Common Scope Block Tasks
- Display Time-Domain Data (DSP System Toolbox)
- Configure Time Scope Block (DSP System Toolbox)
- Floating Scope and Scope Viewer Tasks