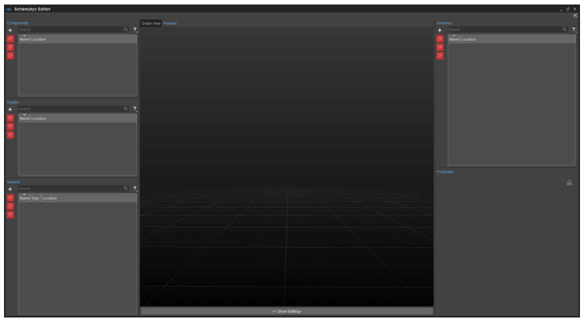
The Schematyc tool changes the way gameplay systems are built in CRYENGINE and gives designers the power to construct new and reusable objects from a set of building blocks provided by programmers. At first glance, the Schematyc Editor looks a little like Flow Graph, but the two systems have been built with very different purposes in mind. Where Flow Graph is very good for level scripting, Schematyc is designed to provide a finite control of the objects within those levels.

Schematyc is linked directly to C++ and doesn't require programmers to re-write everything. It also doesn't require any compiling. This means it's very efficient and gives users the option of building a game without much (or any) knowledge of C++.



The Schematyc tool in CRYENGINE comprises of the following panes:

Menu

The Menu Bar contains the following options:

File

Option	Description
New	Creates one of the following: • Schematyc Entity - what is this, technically? • Schematyc Library - what is this, technically?
Close	Closes the current project (but not the Schematyc Editor).
Open	Lets you open the Asset Browser to access the saved entity or library.
Save	Saves the current project.
Recent Files	Displays a list of the most recently opened Schematyc Entity or Library. Is this correct or can you only open recent Schematyc Entities here?

Edit

Only seems to have "Preferences" now, which is empty. I assume this was moved to the general Preferences of the Sandbox? Is this going to be replaced by the below (fairly standard) Edit options that already existed in the older Schematyc?

Option	Description
Undo	Undoes the last action.
Redo	Redoes a previously undone action.
Copy	Copies selected node(s).
Paste	Pastes the copied node(s)

Window

Option	Description
Add Pane	Lets you add the following panes to the Schematyc tool window:
Reset Layout	Resets the Editor layout to the default setting.

Using the Toolbar menu, users can quickly and easily access many of the features of the Schematyc Editor through the icons at the top of the window.

Button	Name	Description
? Unknown Attachment	**Save All Changes**	Lets you save any changes made.
	Clear log output	
	Show log settings in properties panel	
	Show preview settings in preview panel	

Scripts Browser

Lets you add the following script types:

Option	Description
Enumeration	Lets you add a new enumeration.
Signals	Lets you add a new signal.
Function	Lets you add a new graph function.
State Machine	Lets you add a new state machine.
Variable	Lets you add a new variable.
Timer	Lets you add a new timer.
Signal Receiver	Lets you add a new signal receiver.
Component	Lets you add a new component.

You can add any of the above options using the **Add** button in the Scripts Browser. You can use the **Sear ch** field to search the script types in the Scripts Browser window.

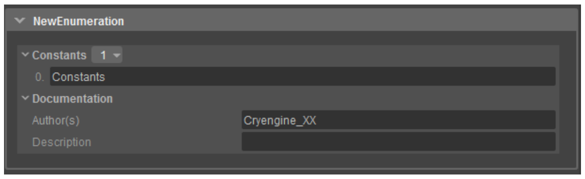
Properties

The Properties panels vary depending on the type of script selected in the Script Browser. You can edit the properties of the following script options:

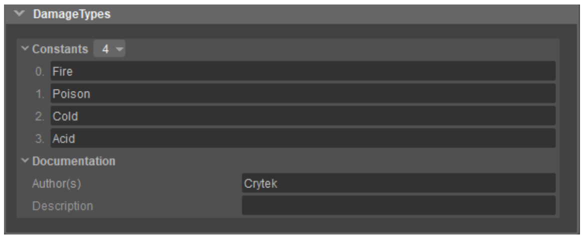
Enumeration

Enumeration lets you list a finite set of options with string identifiers.

- **Constants:** String identifier


NewEnumeration
Constants 1
0. Constants
Documentation
Author(s) Cryengine_XX
Description

Below you can see an example of how such an enumeration could look. This example defines different types of damage.

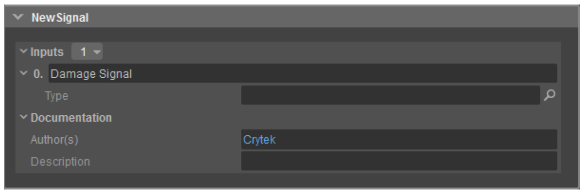

DamageTypes

Constants	4
0.	Fire
1.	Poison
2.	Cold
3.	Acid
Documentation	
Author(s)	Crytek
Description	

Signal

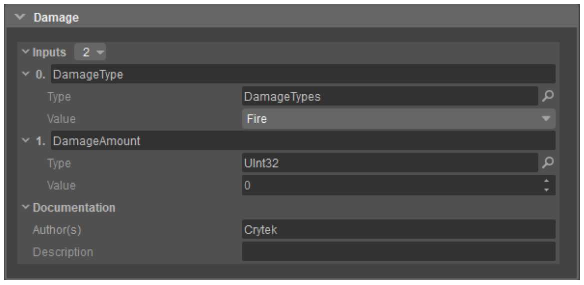
Signals are used to communicate between objects and object states, so for example, you could create a damage signal to send damage from one object to another. Signals can also be used to send data, so in the example of the damage signal you might add two variables; damage type and damage amount in order to specify the damage being delivered.

- Inputs: This defines how many inputs a signal has. Every input can have a string identifier and a type.
- **Types**: This defines the data type of the signal input.
    - **Standard**: Represents all default types defined by Schematyc itself. All user defined types will be shown below the standard types.
    - **Resource**: All supported resource types in Schematyc.
    - **Math**: All math related types defined by Schematyc.
    - **Bool**: Can be either true or false.
    - **String**: Array of characters.
    - **Int32**: Saves signed and unsigned integer.
    - **UInt32**: Saves only unsigned integer.
    - **ObjectID**: Unique internal Schematyc object identifier.
    - **EntityID**: Unique entity identifier.


NewSignal

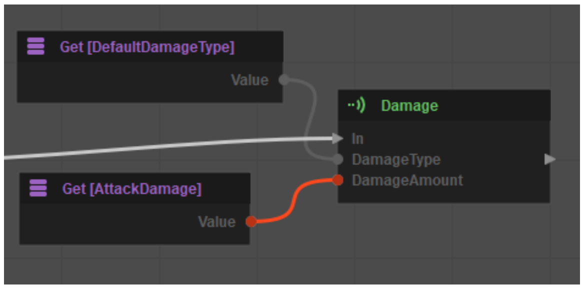
Inputs	1
0.	Damage Signal
Type	
Documentation	
Author(s)	Crytek
Description	

Below you can see an example of how a signal could look. This signal, as mentioned earlier, will inform other entities that they were damaged. We specify the type of damage and the amount of damage. If another entity receives this signal it knows what type of damage, how much damage and can react to that information.


Damage

Inputs	2
0.	DamageType
Type	DamageTypes
Value	Fire
1.	DamageAmount
Type	UInt32
Value	0
Documentation	
Author(s)	Crytek
Description	

Below, you can see how a send signal node would look like in the graph view. As you can see it has all inputs we defined in the properties.

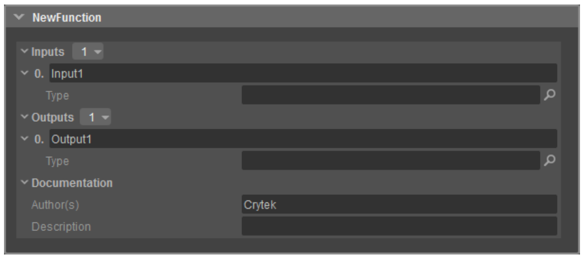


Function

Functions in Schematyc are just like functions in any other programming language. They pass input(s), the function performs some logic then an output is returned.

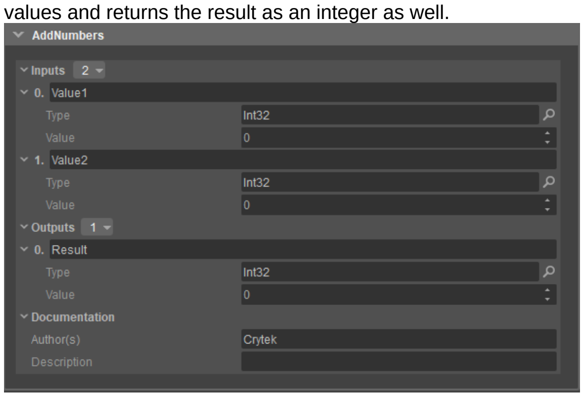
Input(s): Required input(s) by the function. Those data types can then be used inside the function.

Output(s): Data types the function returns after calling it.



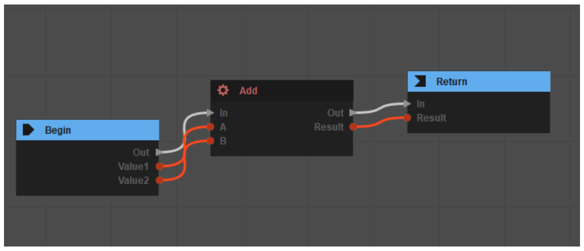
NewFunction
- Inputs 1
  - 0. Input1
    - Type
- Outputs 1
  - 0. Output1
    - Type
- Documentation
  - Author(s): Crytek
  - Description

Below, you can see a simple example function definition. This function does nothing more than adding an integer and returning the result. As you can see the function takes two inputs, which are both integer values and returns the result as an integer as well.



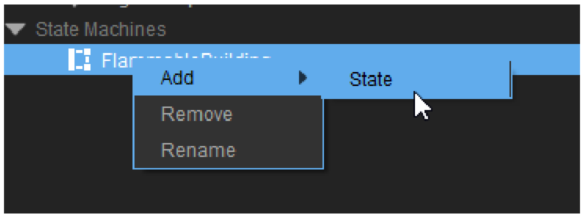
AddNumbers
- Inputs 2
  - 0. Value1
    - Type: Int32
    - Value: 0
  - 1. Value2
    - Type: Int32
    - Value: 0
- Outputs 1
  - 0. Result
    - Type: Int32
    - Value: 0
- Documentation
  - Author(s): Crytek
  - Description

The Begin node defines the beginning of your function. This node contains all of your previously defined input data types, however the data of those data types will be set by the caller of your function. After you have performed your logic in the function, you can return/finish your function. Now you can return the result of your function or return nothing and just end the function.

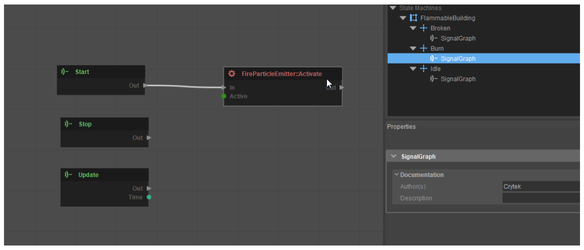


State Machine

A state machine, as the name suggests, is a construct to manage and pass states. A state machine can be used to handle complex orders of logic, for example a Non Player Character (NPC) behavior could be achieved in a state machine. Therefore, a state machine contains different states which can be added by right clicking on the state machine.

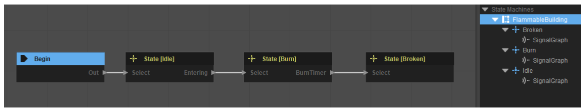


Every State has its own signal graph and gets the same default signal (start, update, end). When this State gets triggered, then the Start signal will be sent and as long as this state is active then the update signal will be called on every frame. Of course when the state ends, then the End signal will be sent.



Author(s) Crytek
Description

To setup the general order or behavior of the states you can click directly on the state machine. In this graph, you can add your states and logic to trigger the different states. In the example shown below you can see how a simple state machine could look. The Begin node will call the Idle state when the game starts. If the entity gets the "Entering" signal then it will go to the next state "Burn" and if/once the "BurnTimer" is over, it will go into the "Broken" state and will stay there for the rest of the game.



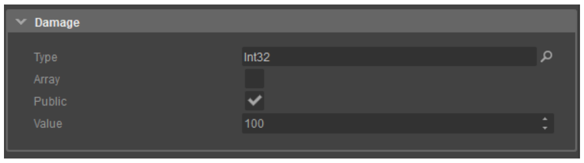
Variable

Variables are a way to store specific information. The variable consists of three options that you can choose after adding it to your entity.

Option	Description
Type	Lets you define the type of variable. Depending on the type you choose you can enter the value below the Public option.
Array	Lets you define if this variable should be an array or not.
Public	Lets you define if you can change this variable in the component inspector in your level.

The variable can now be used in the signal graph to describe a certain attribute of your entity. For example you could have a variable called "Damage" which would contain the information of how much damage this entity inflicts.

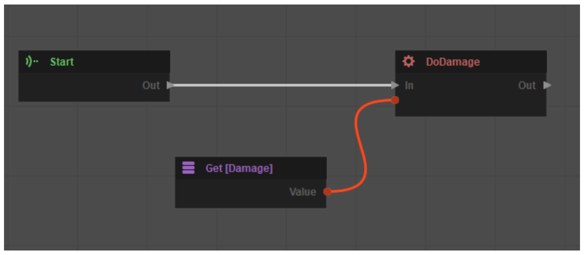
Example of a variable definition.



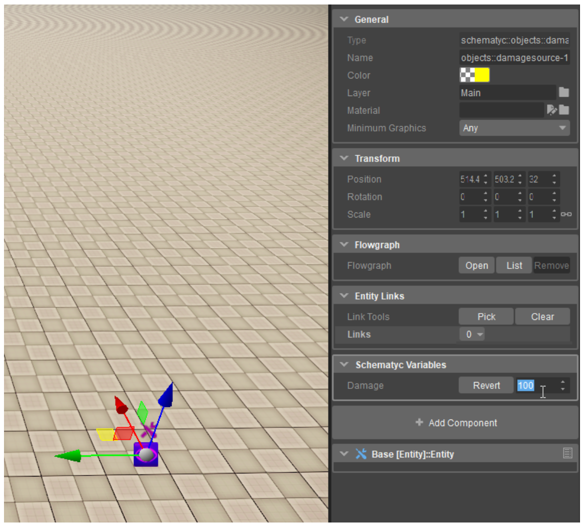
Damage

Type	Int32
Array	
Public	✓
Value	100

An example of how a variable can be used in the graph. The "DoDamage" function takes an int32 value and we get the variable we already have declared.



If the public option is active, then you can edit the variables under the "Schematyc Variables" property.


General
Type schematyc::objects::dama
Name objects::damagesource-1
Color
Layer Main
Material
Minimum Graphics Any

Transform
Position 514.4 503.2 32
Rotation 0 0 0
Scale 1 1 1

Flowgraph
Flowgraph Open List Remove

Entity Links
Link Tools Pick Clear
Links 0

Schematyc Variables
Damage Revert 100

Timer

A timer has a limited number of units and will count those units down. Once the 'number of units' has passed, then it will trigger a signal.

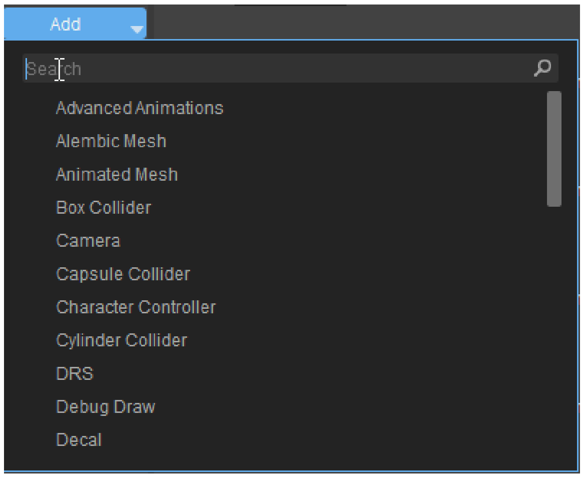
Option	Description
Units	Lets you decide which type of units the timer should count down.
Duration	Lets you set a number of units that will be set for the count down.
Auto Start	Lets you decide if the timer should start directly and doesn't have to be triggered.
Repeat	Lets you decide if the timer should repeat.

Signal Receiver

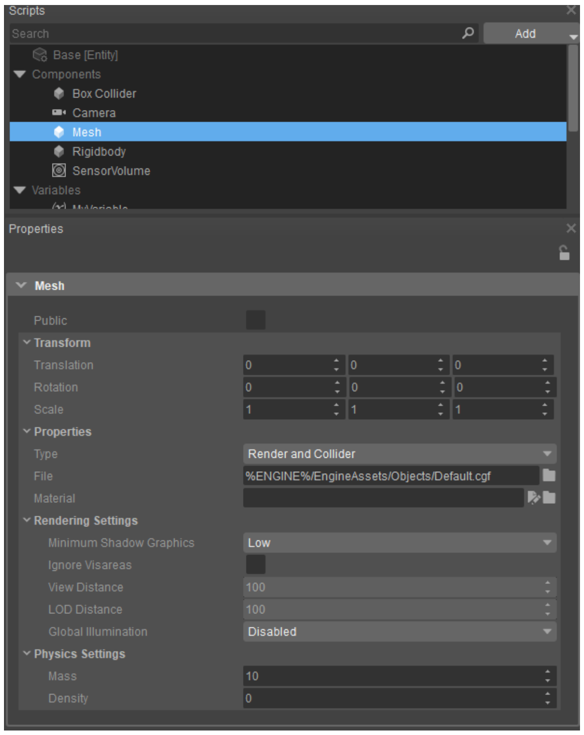
The Signal Receiver is just a new signal graph and this graph can do the same things as the default signal graph of your entity. This can be used to organize and structure your logic, for example if you have a rather complex logic (after a certain signal is triggered) and you don't want to put everything into the default signal graph. So to keep the setup clean and structured you can create a new Signal Receiver for just this specific logic.

Component

Components are containers for a specific logic or functionality. The components that you can add here are the same as in the Sandbox Editor with the "AddComponent" button. There are already some predefined components from CryEngine by default, for example, you can find the components for input, lighting, physics, geometry and more. You can also search for a component in the search line. If you have created your own components in C# or C++, they should be on the list and you can add them to your Schematyc entity and use the logic you exposed to Schematyc. For more information about components and what they can do, go **here**.

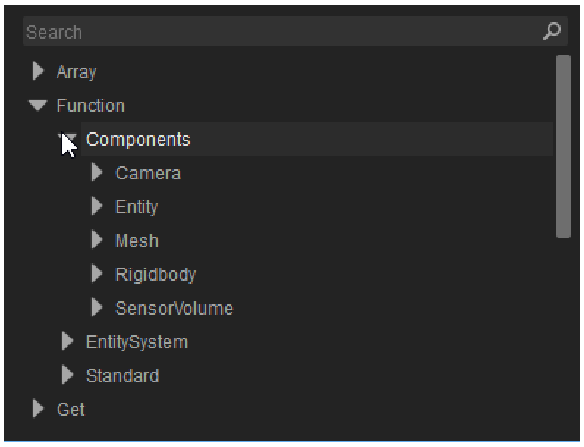


Once you have added a component you can see the component in the components list for your entity. All entity components will be on that list and can be removed or renamed here. A lot of those components have their own properties which can be edited in the properties panel after clicking on them.



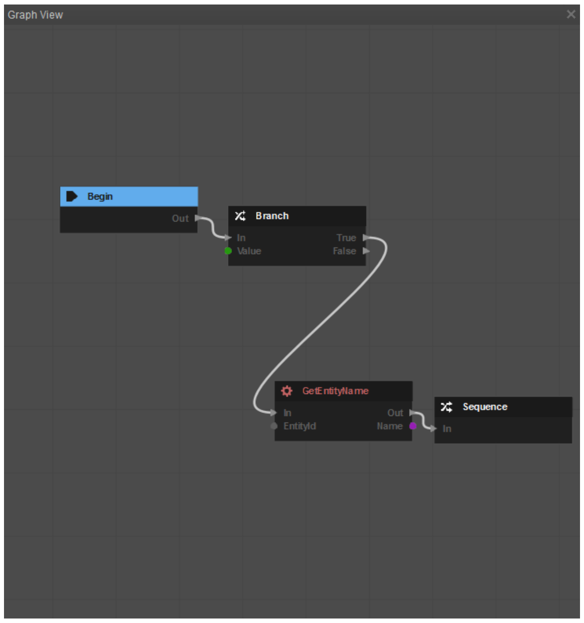
Public			
Transform			
Translation	0	0	0
Rotation	0	0	0
Scale	1	1	1
Properties			
Type	Render and Collider		
File	%ENGINE%/EngineAssets/Objects/Default.cgf		
Material			
Rendering Settings			
Minimum Shadow Graphics	Low		
Ignore Visareas			
View Distance	100		
LOD Distance	100		
Global Illumination	Disabled		
Physics Settings			
Mass	10		
Density	0		

After adding your components you should also be able to use the functions they expose. Those functions should be in your function list and can be used in the signal graph. The component can also expose signals and other functionality in Schematyc.



Graph View

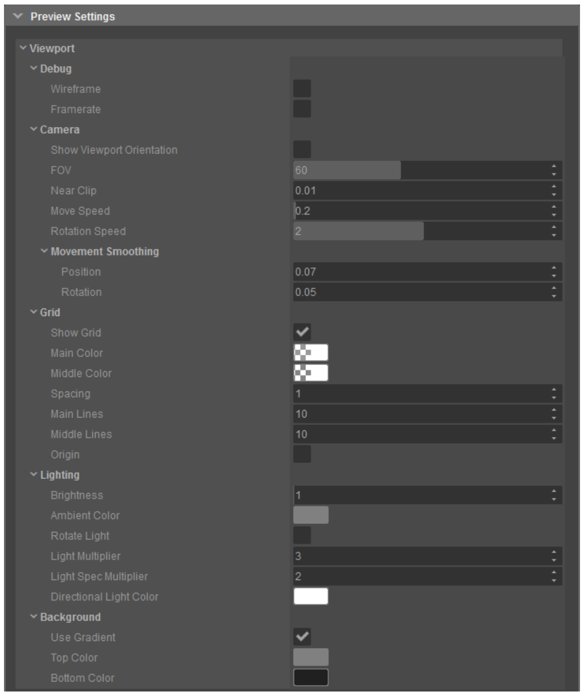
Shows a graphical representation of the entities and lets you add nodes to a function. Schematyc introduces the concept of a transition graph. This is where we control how and when you switch from one state to another. Note: It is impossible to trigger transitions from anywhere else and while this may not seem quite as convenient as simply being able to link up a 'switch state' node, it does make it much easier to view the overall picture and track down issues when designs become more complex.



Preview

Provides a preview for the newly created Schematyc entity.

Preview Settings



Preview Settings

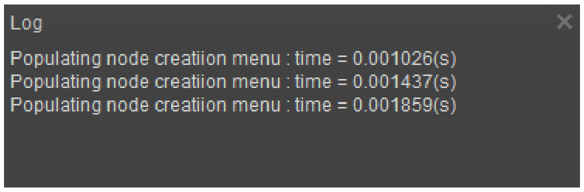
Viewport	
Debug	
Wireframe	☐
Framerate	☐
Camera	
Show Viewport Orientation	☐
FOV	60
Near Clip	0.01
Move Speed	0.2
Rotation Speed	2
Movement Smoothing	
Position	0.07
Rotation	0.05
Grid	
Show Grid	✓
Main Color	⬜
Middle Color	⬜
Spacing	1
Main Lines	10
Middle Lines	10
Origin	☐
Lighting	
Brightness	1
Ambient Color	▨
Rotate Light	☐
Light Multiplier	3
Light Spec Multiplier	2
Directional Light Color	⬜
Background	
Use Gradient	✓
Top Color	▨
Bottom Color	⬛

Options	Description
Debug	
Wireframe	Lets you draw the object in wireframe mode.
Frame Rate	Lets you display the frame rate of the preview window.
Camera	
Show Viewport orientation	Lets you display an orientation helper in the left-hand corner.
FOV	Lets you change the Field of View.
Near Clip	Lets you set the distance in which geometry gets the clip in front of the camera.
Move Speed	Lets you adjust the movement speed of the camera throughout the scene.
Rotation Speed	Lets you alter the rotation speed of the camera.
Movement Smoothing	• Position: Determines how much camera movement will be smooth • Rotation: Determines how much camera rotation will be smooth
Grid	
Show Grid	Lets you disable or enable the grid.
Main Color	Lets you change the color of the main grid lines.
Middle Color	Lets you change the color of the smaller grid lines.
Spacing	Lets you change the size of the space between the lines.
Main Lines	Lets you change the radius in which the main lines will be drawn.
Middle Lines	Lets you change the radius in which the middle lines will be drawn.
Origin	Lets you display a helper in the origin of the grid.
Lighting	
Brightness	Lets you change the brightness of the light.
Ambient Color	Lets you change the color of the ambient light.

Rotate Light	Lets you rotate the light slowly around the object.
Light Multiplier	Lets you modify the multiplier of the light color.
Light Spec Multiplier	Lets you modify the multiplier of the light specular color.
Directional Light Color	Lets you change the color of the directional light.
Background	
Use Gradient	Lets you enable or disable the gradient.
Top Color	Lets you change the color of the top part of the gradient. If the gradient is deactivated this will be the color of the whole background.
Bottom Color	Lets you change the color of the bottom part of the gradient. This will only work if the gradient is active.

Log

Lets you view the logs within the Schematyc tool.

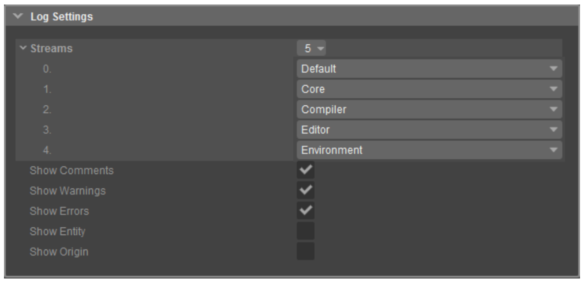


Log

```
Populating node creatiion menu : time = 0.001026(s)
Populating node creatiion menu : time = 0.001437(s)
Populating node creatiion menu : time = 0.001859(s)
```

Log Settings

You can sort the log information based on the values assigned in the Log Settings.



Log Settings

Streams	5
0.	Default
1.	Core
2.	Compiler
3.	Editor
4.	Environment
Show Comments	✓
Show Warnings	✓
Show Errors	✓
Show Entity	
Show Origin	

Options	Description
Streams	Lets you sort the log details based on the options below: • Compiler • Core • Default • Editor • Environment
Show Comments	Enables or disables comments in the log. Comments can be logged with the "Comment" node.
Show Warnings	Enables or disables warnings in the log. Warnings can be logged with the "Warning" node.
Show Errors	Enables or disables errors in the log. Errors can be logged with the "Errors" node.
Show Entity	If enabled, shows the name of the entity from which the message originates.
Show Origin	If enabled, shows the name of the function from which the message originates.