# **Generating C Code for Simulink models.**

## **Subsystem configuration.**

When preparing a model for code generation, configure each subsystem within your model by right-clicking on the subsystem and selecting Block Parameters near the bottom of the drop-down menu. Here, under the menu tab, make sure that Treat as atomic unit is selected for each subsystem. This will treat the subsystem as a unit when determining the execution order of block methods.

**Programmatic Use**

|  |
| --- |
| **Parameter**: TreatAsAtomicUnit |
| **Type**: character vector |
| **Value**: 'off' | 'on' |
| **Default**: 'off' |

Graphical user interface, application

Description automatically generated

## **Ensuring generated code produces a parameterized function**

When the model is finished and executes as desired, wrap it in a parent subsystem with only those inputs and outputs desired in your function parameters. Right-click on this main model subsystem and select Block Parameters near the bottom of the drop-down menu. Under the main tab, ensure Treat as Atomic Unit is selected, then under the Code Generation tab set Function packaging to Reusable Function. Set Function name: and File name: to the desired naming method.

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**Function packaging:**

#### Dependencies

* This parameter requires Simulink Coder for code generation.
* To enable this parameter, select **Treat as atomic unit**.

#### Programmatic Use

|  |
| --- |
| **Parameter**: RTWSystemCode |
| **Type**: character vector |
| **Value**: 'Auto' | 'Inline' | 'Nonreusable function' | 'Reusable function' |
| **Default**: 'Auto' |

**Function name options:**

**Dependencies**

* This parameter requires a Simulink Coder license.
* To enable this parameter, set **Function packaging** to Nonreusable function or Reusable function.

**Programmatic Use**

|  |
| --- |
| **Parameter**: RTWFcnNameOpts |
| **Type**: character vector |
| **Value**: 'Auto' | 'Use subsystem name' | 'User specified' |
| **Default**: 'Auto' |

**Function name:**

#### Programmatic Use

|  |
| --- |
| **Parameter**: RTWFcnName |
| **Type**: character vector |
| **Value**: '' | '<function name>' |
| **Default**: '' |

**File name options:**

#### Programmatic Use

|  |
| --- |
| **Parameter**: RTWFileNameOpts |
| **Type**: character vector |
| **Value**: 'Auto' | 'Use subsystem name' | 'Use function name' | 'User specified' |
| **Default**: 'Auto' |

**File name:**

#### Programmatic Use

|  |
| --- |
| **Parameter**: RTWFileName |
| **Type**: character vector |
| **Value**: '' | '<file name>' |
| **Default**: '' |

## **Model Configuration Settings**

In Simulink, under the MODELING tab, Model Settings (Ctrl-E)

### **Solver**

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Set Solver Selection to Type: Fixed -step

#### Command-Line Information

|  |
| --- |
| **Parameter:**SolverType |
| **Value:**'Variable-step' | 'Fixed-step' |
| **Default:** 'Variable-step' |

### **Code Generation**

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Set System Target File to ert.tlc Embedded Coder

The ert (embedded real-time target) uses the smaller memory model as well as optimizes for better speed and memory when generating code. It is also required for generating Reusable functions.

#### Command-Line Information

|  |
| --- |
| **Parameter:** SystemTargetFile |
| **Type:** character vector |
| **Value:** valid system target file |
| **Default:** 'grt.tlc' |
| **Use: ‘ert.tlc’** |

Set Generate Code Only to ** On**

#### Command-Line Information

|  |
| --- |
| **Parameter:** GenCodeOnly |
| **Type:** character vector |
| **Value:** 'on' | 'off' |
| **Default:** 'off' |

Set Code generation objectives to Execution efficiency

#### Command-Line Information

|  |
| --- |
| **Parameter:** 'ObjectivePriorities' |
| **Type:** cell array of character vectors or string array |
| **Value:** {''} | {'Debugging'} | {'Execution efficiency'} |
| **Default:** {''} |

### **Interface**

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Set Code interface packaging to Reusable Function

#### Command-Line Information

|  |
| --- |
| **Parameter:** CodeInterfacePackaging |
| **Type:** character vector |
| **Value:** 'C++ class' | 'Nonreusable function' | 'Reusable function' |
| **Default:** 'Nonreusable function' if TargetLang is set to 'C'; 'C++ class' if TargetLang is set to 'C++' |

Set “Multi-instance code error diagnostic:” to None

#### Command-Line Information

|  |
| --- |
| **Parameter:** MultiInstanceErrorCode |
| **Type:** character vector |
| **Value:** 'None' | 'Warning' | 'Error' |
| **Default:** 'Error' |

Select “Remove error status field in real-time model data structure” ** On**

#### Command-Line Information

|  |
| --- |
| **Parameter:** SuppressErrorStatus |
| **Type:** character vector |
| **Value:** 'on' | 'off' |
| **Default:** 'off' |

## **Generate C Code**

When your model configuration parameters have been set, and you are ready to build, on the C Code tab click the Build button, or press (Ctrl - B) Graphical user interface

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