

# Model-Based Design Toolbox for HCP

## Release Notes

**Automatic Code Generation for the HCP Family**  
**Version 1.2.0**

**Target Based Automatic Code Generation Tools**  
For MATLAB™/Simulink™/Stateflow™ Models working with Simulink Coder™ and Embedded Coder®

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## Summary

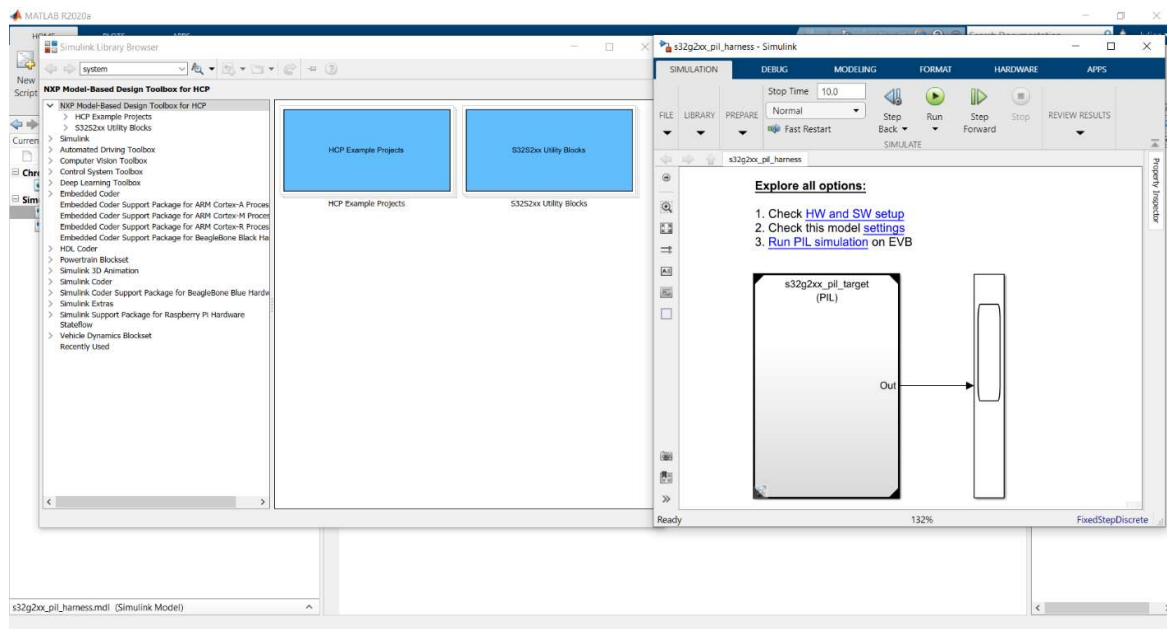
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# 1 Main Features

The NXP's Model-Based Design Toolbox for HCP version 1.2.0 is designed to support S32S2xx, S32R4x and S32G2xx MCUs into MATLAB/Simulink environment, allowing users to:

- **Design** applications using Model-Based Design methodologies;
- **Simulate** and **Test** Simulink models for S32S, S32R and S32G MCUs before deploying the models to the hardware targets;
- **Generate** the application code automatically without any needs for hand coding C/ASM
- **Deployment** of the application directly from MATLAB/Simulink to the NXP evaluation boards



The main features and functionalities supported in v1.2.0 RFP release are:

- Support for S32S247TV MCU and the GreenBox II Development Platform
- Support for S32G274A MCU and the GoldBox Development Platform (S32G-VNP-RDB2 Reference Design Board)
- Support for S32R41 MCU with Development Board (X-S32R41-EVB)
- Compatible with MATLAB releases R2020a – R2022b
- Fully integrated with Simulink Toolchain
- Includes an Example library that covers:
  - o Software-in-Loop, Processor-in-Loop
  - o For more details about each of the topics highlighted above please refer to the following chapters.

## 2 HCP MCU Support

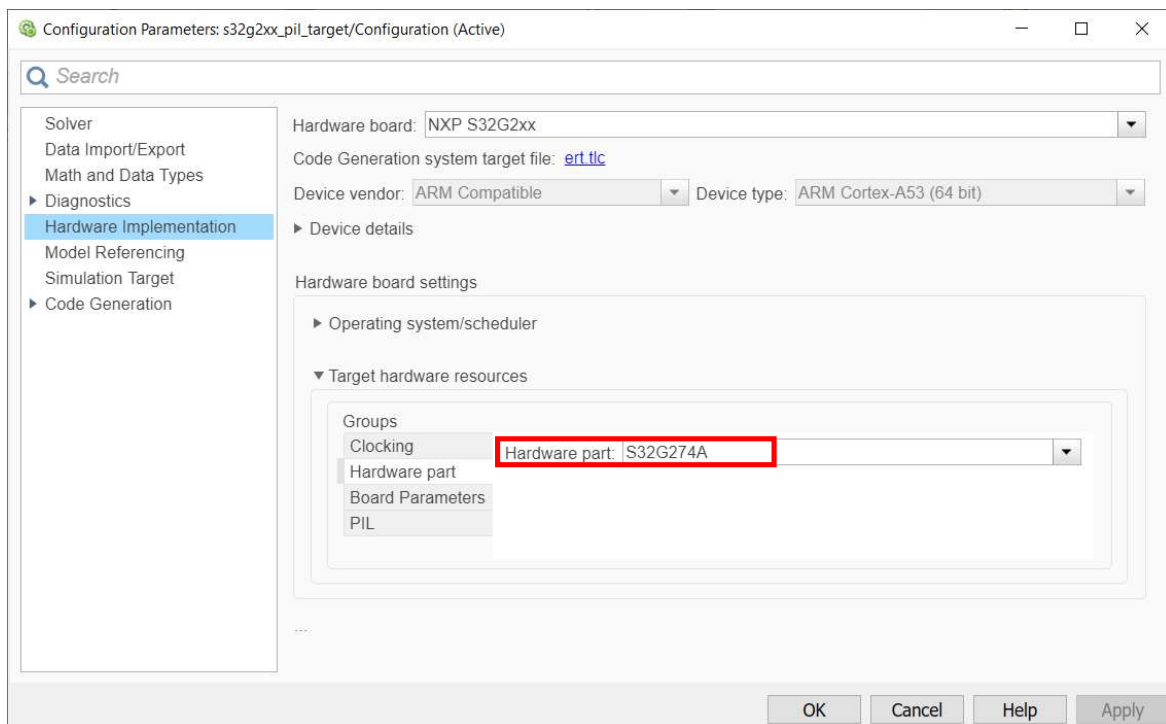
### 2.1 Packages & Derivatives

The Model-Based Design Toolbox for HCP version 1.2.0 supports:



- S32S2xx MCU Packages:
  - o S32S247TV
- S32G2xx MCU Packages:
  - o S32G274A
- S32R4x MCU Packages:
  - o S32R41

The configurations can be easily changed for each Simulink model from the **Configuration Parameters** menu:

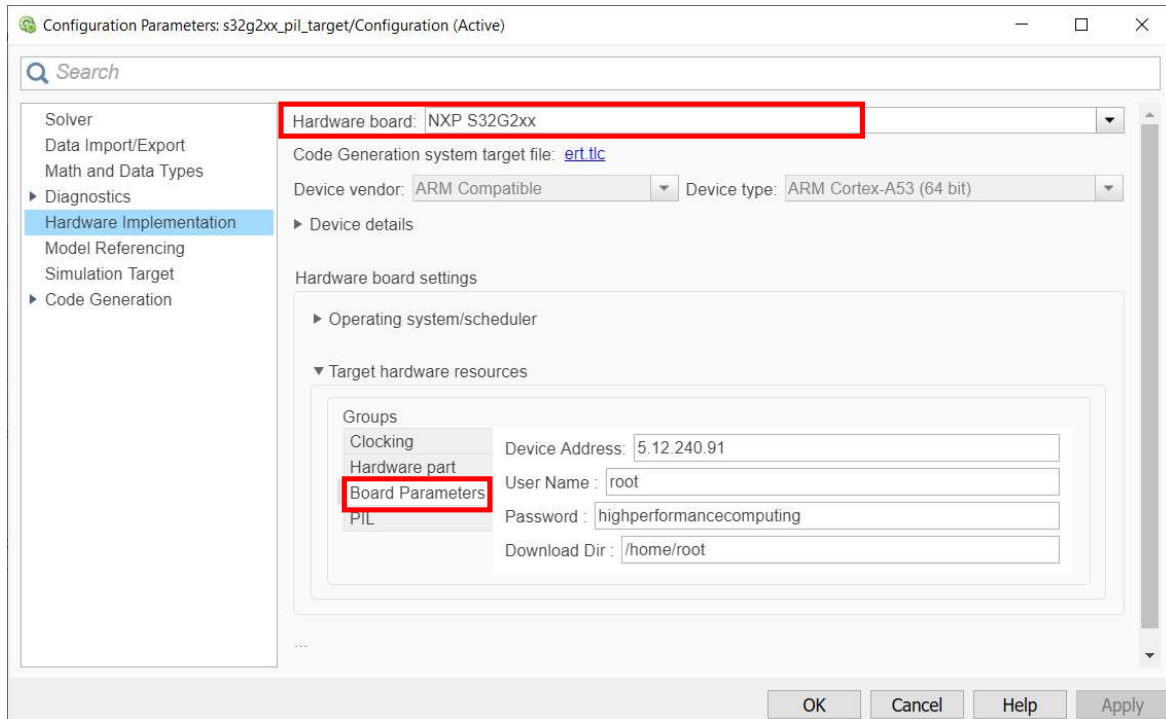


## 2.2 Functions

The Model-Based Design Toolbox for HCP version 1.2.0 supports the following functions:

- Memory read/write
- Register read/write
- Profiler

The default configuration supported by the toolbox is available inside the **Target Hardware Resources** panels:



From this panel, the user can update the model **Board Parameters** like device address, user name, password, and download folder.

The Model-Based Design Toolbox for HCP version 1.2.0 has been tested using the official NXP GreenBox II Development Platform for S32S2xx, NXP GoldBox Development Platform for S32G2xx and X-S32R41-EVB Development Board for S32R41.

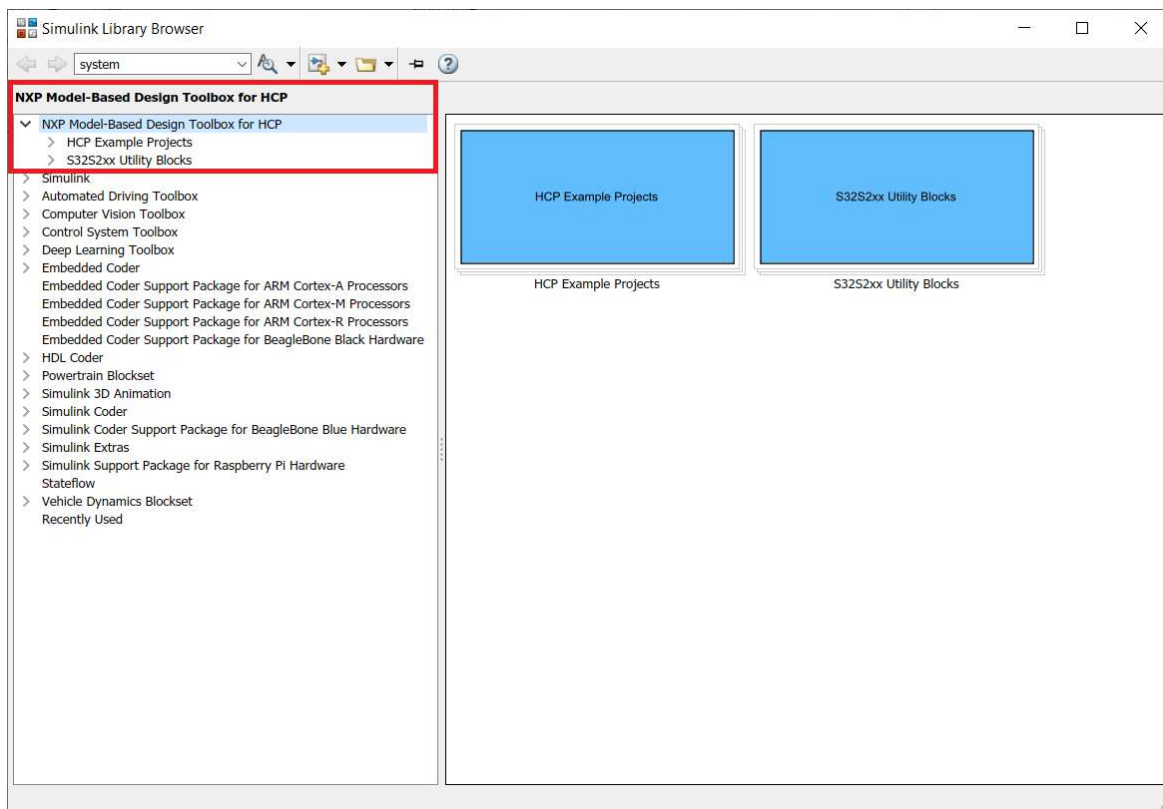


### 3 Model-Based Design Toolbox Features

The Model-Based Design Toolbox for HCP version 1.2.0 is delivered with complete HCP MCUs Simulink Block Library as shown below.

There are two main categories:

- HCP Example Projects
- S32S2xx Utility Blocks



### 3.1 HCP Simulation modes

The toolbox provides support for the following Simulation modes:

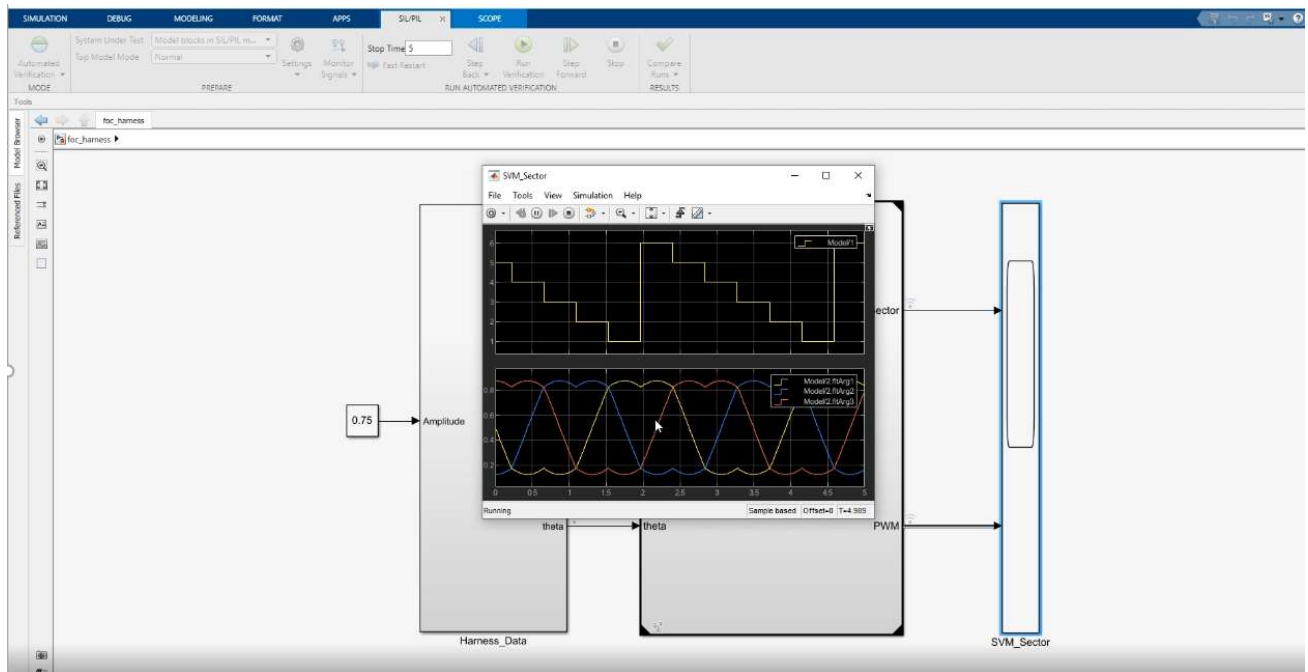
- Software-in-Loop (SIL)
- Processor-in-Loop (PIL)

#### Software-in-Loop

A SIL simulation compiles and runs the generated code on the user's development computer. One can use such a simulation to detect early defects and fix them.

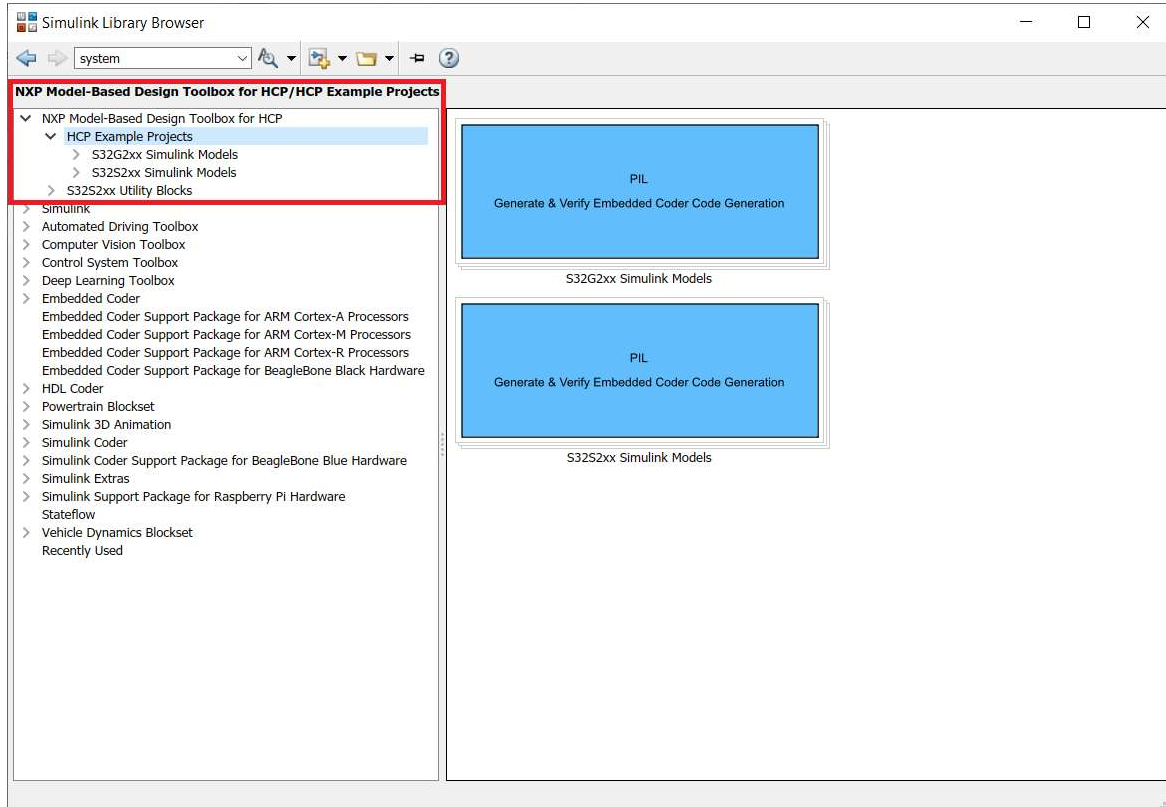
#### Processor-in-loop

In a PIL simulation, the generated code runs on the target hardware. The results of the PIL simulation are transferred to Simulink to verify the numerical equivalence of the simulation and the code generation results. The PIL verification process is a crucial part of the design cycle to ensure that the behavior of the deployment code matches the design.



## 3.2 HCP Example Library

The Examples Library represents a collection of Simulink models that let you test different MCU on-chip modules and run complex PIL applications.



The Simulink models shown as examples are enhanced with a comprehensive description to help users better understand the functionality that is exercised, hardware setup instructions whenever are necessary, and a result validation section.

The examples are also available from the MATLAB help page.



## 4 Prerequisites

### 4.1 MATLAB Releases and OSes Supported

This toolbox is developed and tested to supports the following MATLAB releases:

- R2020a;
- R2020b;
- R2021a;
- R2021b;
- R2022a;
- R2022b

For a flowless development experience the minimum recommended PC platform is:

- *Windows® OS* or *Ubuntu OS*: any x64 processor
- At least 4 GB of RAM
- At least 6 GB of free disk space.
- Internet connectivity for web downloads.

#### Operating System Supported

|              | SP Level | 64-bit |
|--------------|----------|--------|
| Windows 7    | SP1      | X      |
| Windows 10   |          | X      |
| Ubuntu 21.10 |          | X      |

### 4.2 Build Toolchain Support

The following compilers are supported:

| MCU Family | Compiler Supported              | Release Version |
|------------|---------------------------------|-----------------|
| S32S2xx    | GCC for ARM Embedded Processors | V9.2            |
| S32G2xx    | GCC for ARM Embedded Processors | V10.2           |
| S32R4x     | GCC for ARM Embedded Processors | V9.2            |

The target compiler for the Model-Based Design Toolbox needs to be configured.

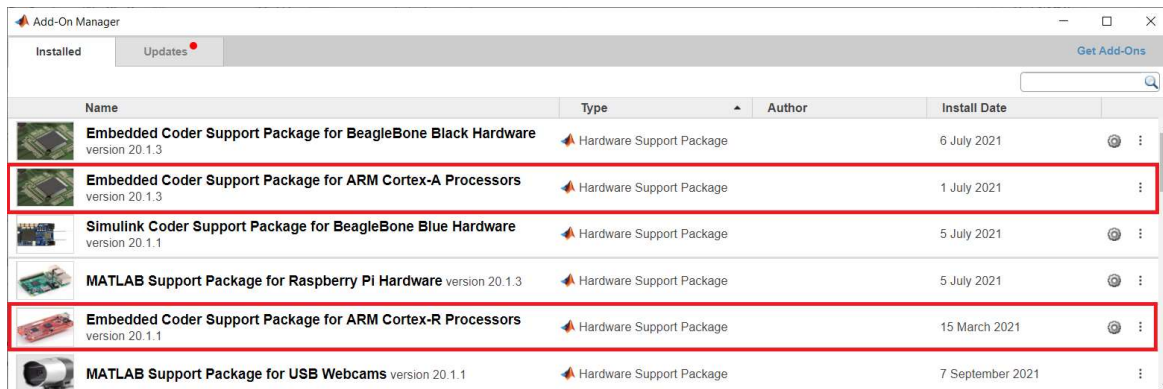
The Model-Based Design Toolbox uses the Toolchain mechanism exposed by the Simulink to enable automatic code generation with Embedded and Simulink Coder toolbox. By default, the toolchain is configured for the MATLAB R2020a - R2022b releases. For any other MATLAB release, the user needs to execute a toolbox m-script to generate the appropriate settings for his/her installation environment.

This is done by changing the MATLAB Current Directory to the toolbox installation directory (e.g.: `..\MATLAB\Add-Ons\Toolboxes\NXP_MBDToolbox_HCP\`) and running the “`mbd_hcp_path.m`” script.

```
>> mbd_hcp_path
Treating 'C[...]\NXP_MBDToolbox_HCP' as MBD Toolbox installation root.
MBD Toolbox path prepended.
Registering the toolchain ...
Successful.
```

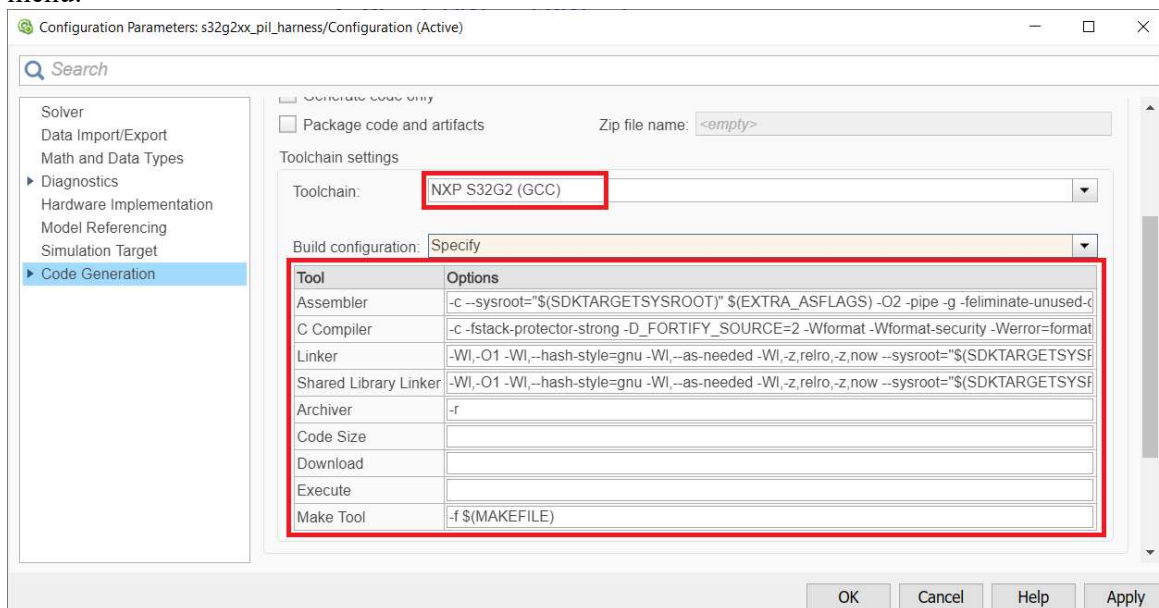


This mechanism requires users to install the [Embedded Coder Support Package for ARM Cortex-A Processor](#) and [Embedded Coder Support Package for ARM Cortex-R Processor](#) as a prerequisite.



The “mbd\_hcp\_path.m” script verifies the user setup dependencies and will issue instructions for a successful installation and configuration of the toolbox.

The toolchain can be further enhanced using the Simulink **Model Configuration Parameters** menu:



## 5 Known Limitations

The list of known limitations can be found in the readme.txt file that is delivered with the toolbox and can be consulted in the MATLAB Add-on installation folder of the Model-Based Design Toolbox for HCP.

## 6 Support Information

For technical support please sign on to the following NXP's Model-Based Design Toolbox Community: <https://community.nxp.com/t5/NXP-Model-Based-Design-Tools/bd-p/mbdt>



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