

# Model-Based Design Toolbox S32K3xx Series

## Quick Start Guide

**Automatic Code Generation for the S32K3xx Family of Processors**  
**Version 1.1.0**

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



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# 1 Installation

Installing the Model-Based Design Toolbox is the first step in setting up and running automatic C code generation from MATLAB/Simulink for NXP's embedded target processors and development boards.

## 1.1 System Requirements

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

- *Windows® 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

## 1.2 Installation Steps

NXP's Model-Based Design Toolbox is delivered as MATLAB Toolbox Package that can be installed offline or online from MathWorks Add-ons. This document shows how to install the offline package, assuming you have already downloaded the file from NXP's [MBDT official download web page](#).

To have the toolbox installed and configured properly the following actions should be executed:

1. Run the MATLAB toolbox package file \*.mltbx downloaded from [NXP's Model-Based Design Toolbox web page](#) by pressing the **Download Eval** button.
2. Setup the MATLAB path for Model-Based Design Toolbox and generate the appropriate toolchain setting for the user MATLAB environment (it is recommended that the path does not contain spaces).

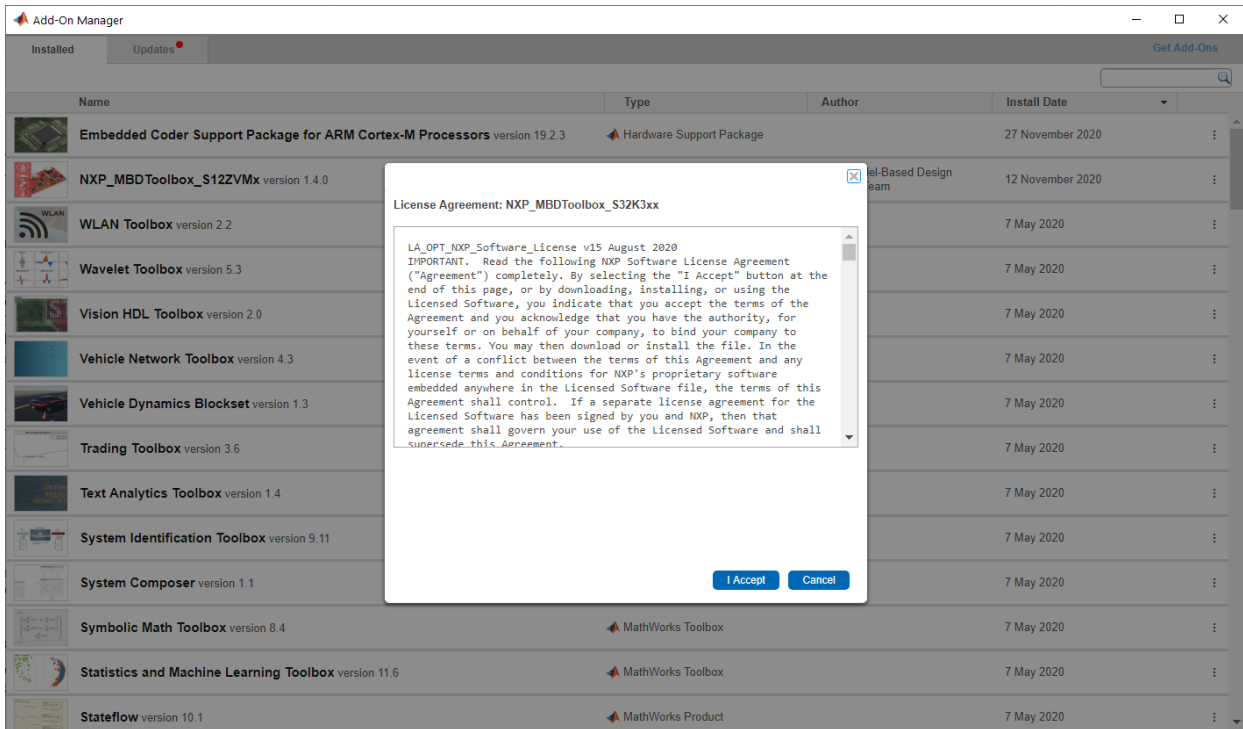
Each of these actions is explained in the following sub-chapters.

## 1.2.1 Run Add-on installer

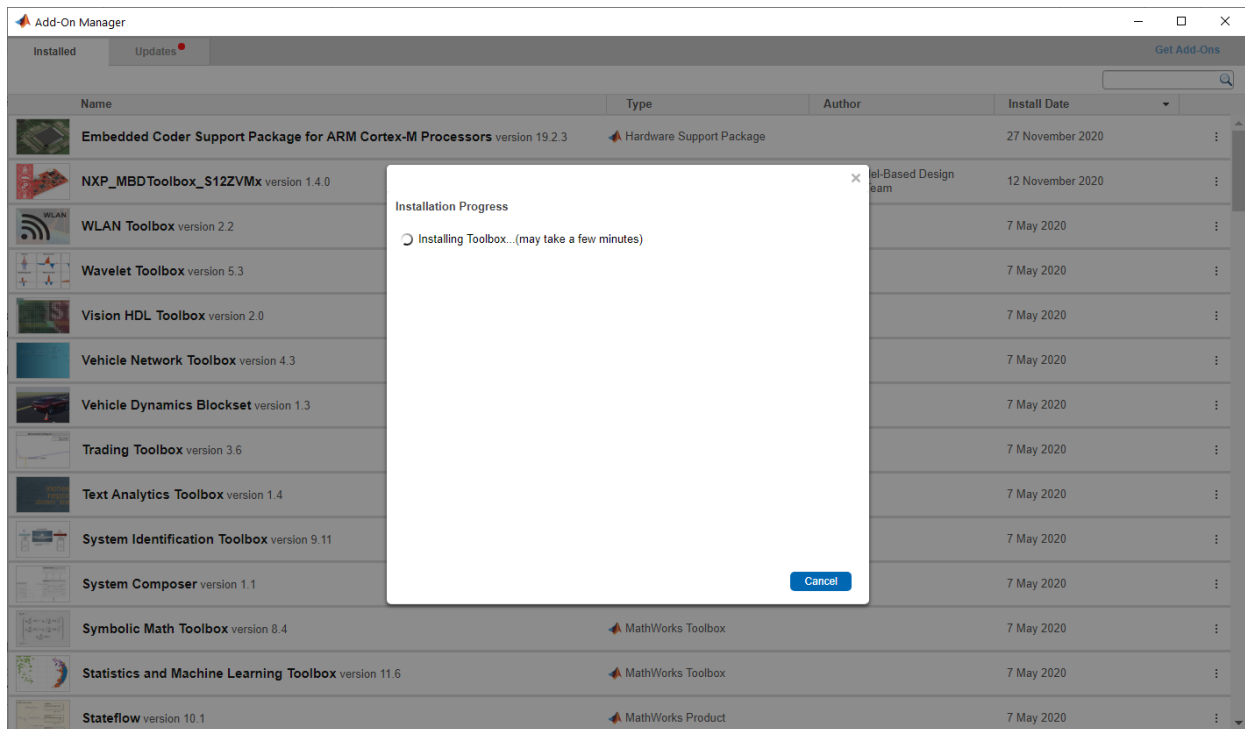
Install the NXP's Model-Based Design Toolbox by double-clicking the \*.mltbx file. This will activate the MATLAB Add-ons installer that will automatically start the installation process.

After the MATLAB opens, you will be prompted with the following options:

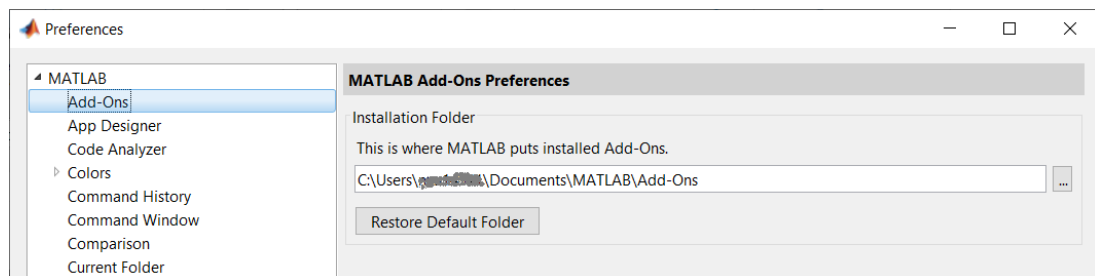
1. Indicate acceptance of the NXP Software License Agreement by selecting “I Accept” to proceed.



- The rest of the process is silent and under MATLAB control. All the files will be automatically copied into default Add-Ons folder within the MATLAB

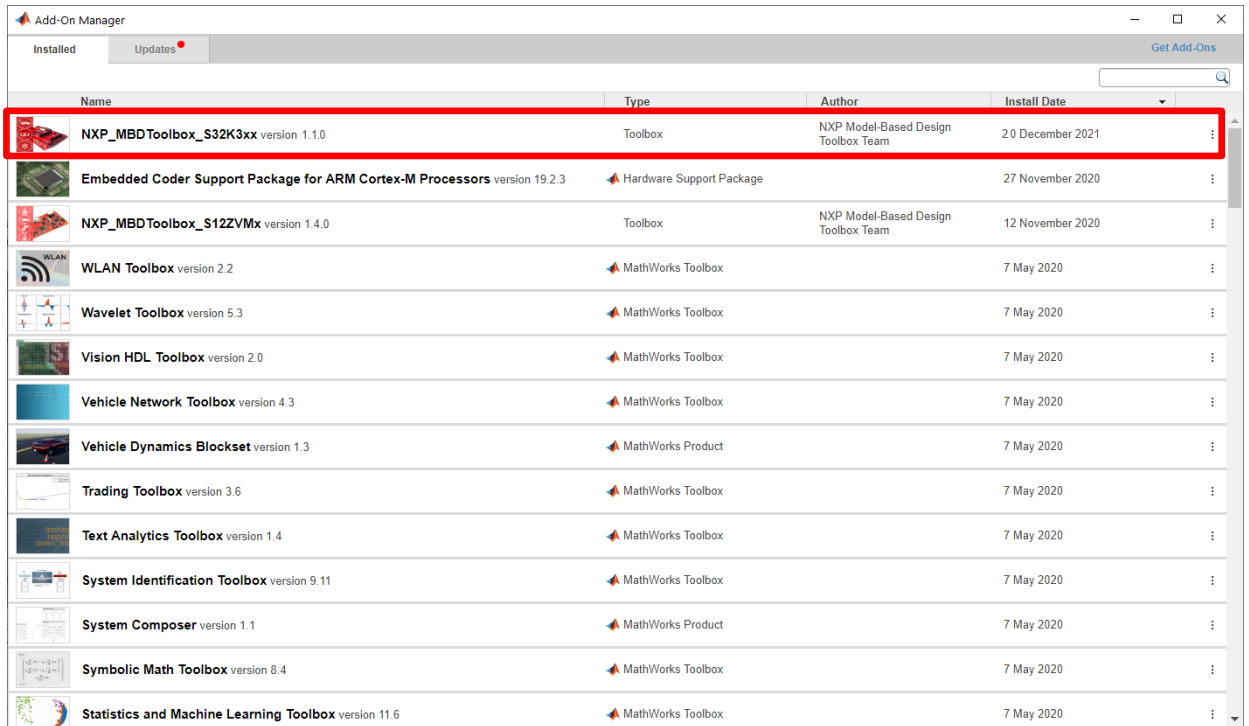


The default location can be changed before installation by changing the Add-Ons path from MATLAB Preferences

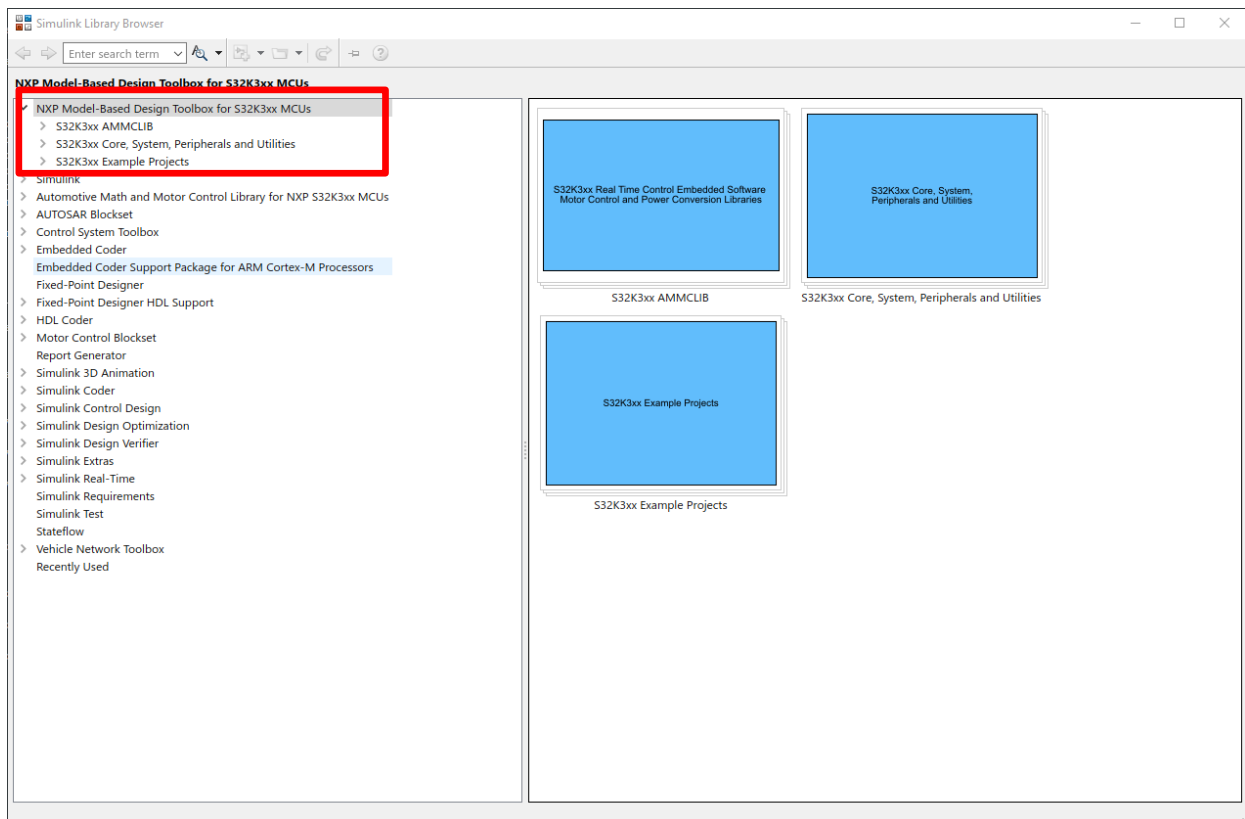


**Note:** It is recommended to install the MATLAB and NXP Toolbox into a location that does not contain special characters, empty spaces, or mapped drives.

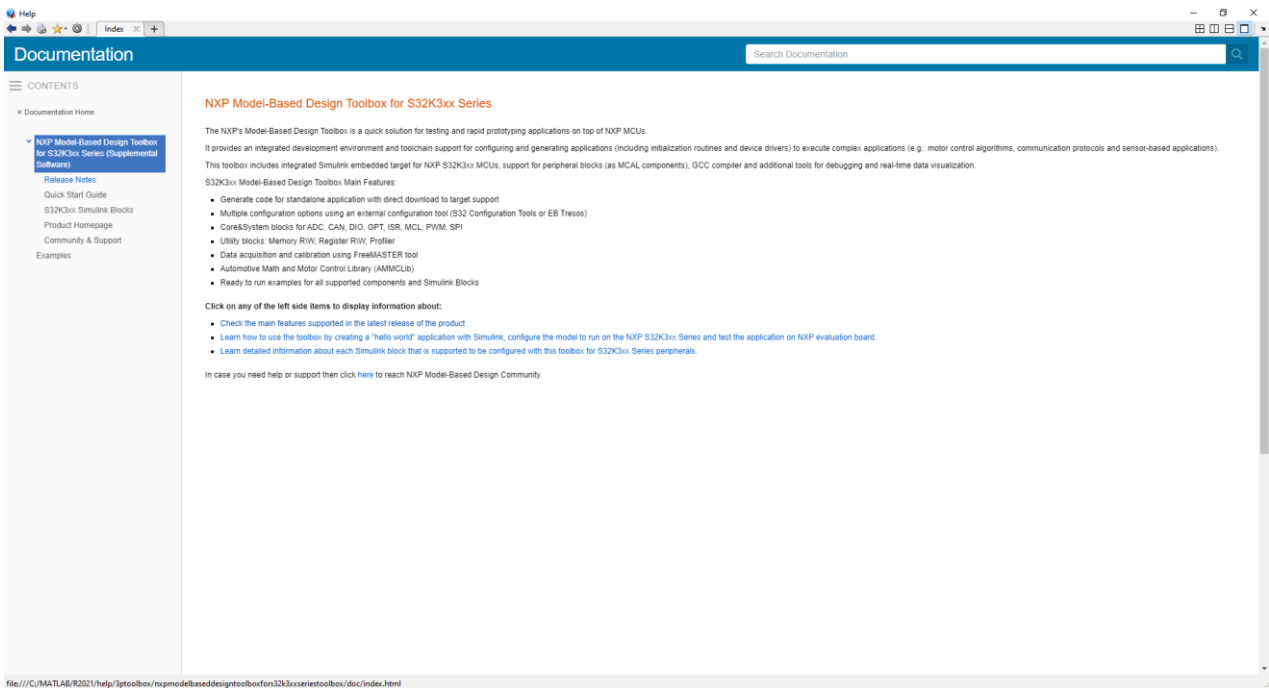
- After a few minutes (~4-5min), the NXP's Model-Based Design Toolbox should be visible as new Add-ons.



- NXP's Model-Based Design Toolbox layout and Simulink Library are shown below



5. NXP's Model-Based Design Toolbox documentation, help, and examples are fully integrated with the MATLAB development environment. Get more details by accessing the standard Help and **Supplemental Software** section:



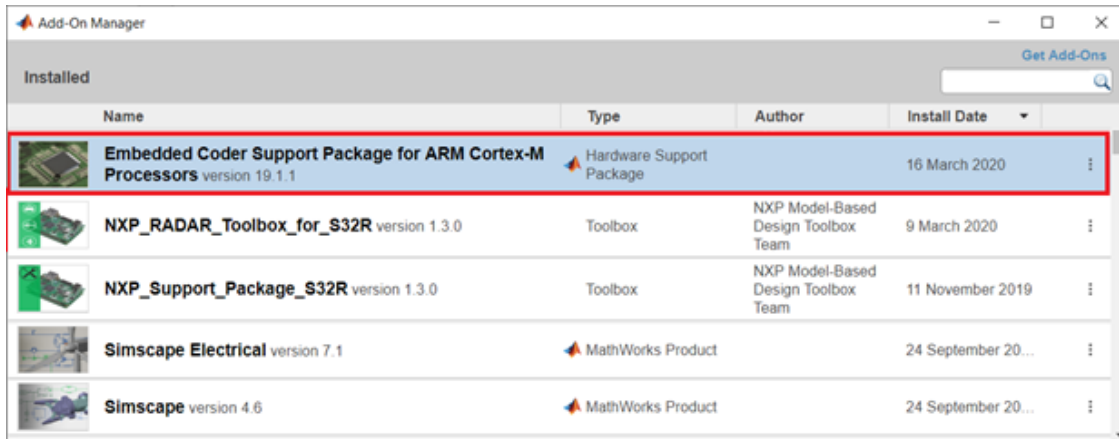
## 1.2.2 Setting the Path for Model-Based Design Toolbox and Toolchain Generation

The Model-Based Design Toolbox uses the Toolchain mechanism exposed by the Simulink to enable automatic code generation with Embedded Coder toolbox. By default, the toolchain is configured for the MATLAB R2020a / R2020b / R2021a release. 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_S32K3xx\`) and running the “`mbd_s32k3_path.m`” and “`mbd_s32k3.target.create_codertarget`” scripts.

```
>> mbd_s32k3_path
Treating 'C:[...]\S32K3\src' as MBD Toolbox installation root.
MBD Toolbox path prepended.
Registering the toolchain ...
C:\Windows\System32\where.exe
Successful.
Creating folders for the target 'NXP S32K3xx' in the folder
'C:\[...]\S32K3\src\mbdtbx_s32k3\codertarget\2021a'...
Creating the framework for the target 'NXP S32K3xx'...
Registering the target 'NXP S32K3xx'...
Done.
```

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



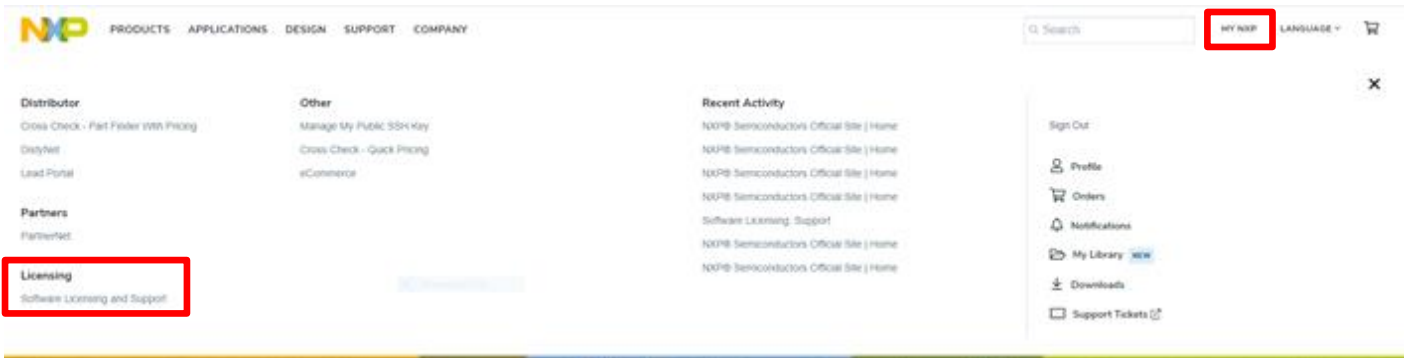
The “`mbd_s32k3_path.m`” script verifies the user setup dependencies and will issue instructions for a successful installation and configuration of the toolbox.



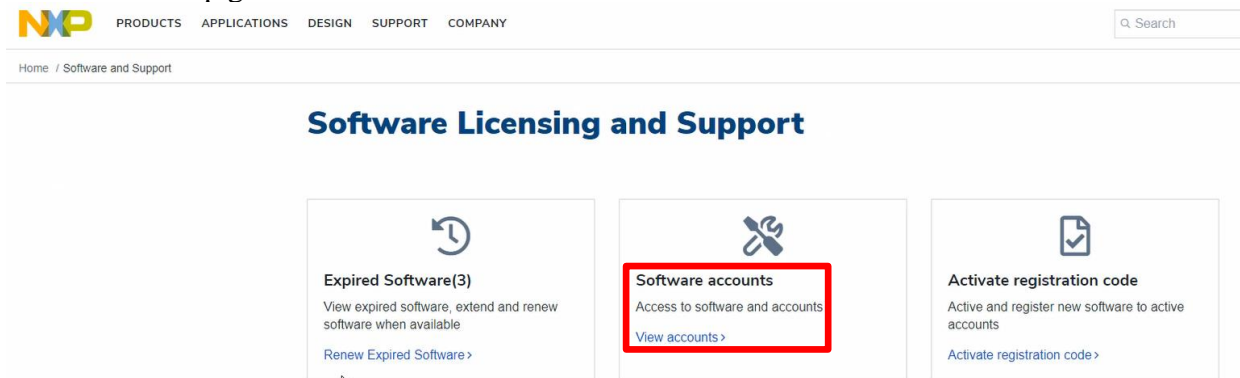
### 1.2.3 Installing EB Tresos (optional step)

Model-based Design Toolbox for S32K3xx provides support for 2 external configuration tools – NXP S32Configuration Tools (which is made available directly through the mlbtx installer and requires no additional installation) and EB Tresos. To install this product, you will need to follow these instructions:

Go to the [nxp.com](http://nxp.com) website, log into your account (or make one for free). Then go to My NXP -> Licensing -> Software Licensing and Support:



For the next step go to Software accounts -> View accounts



You will find a Product list on the next page from which you should select **Automotive SW – S32K3 Standard Software**. From the Product Information page, you should find the item names **Automotive SW – EB tresos Studio / AUTOSAR Configuration Tool**.



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### Automotive SW - S32K3 Standard Software

Your choice contains a suite of products. Please select one of the product lines below:  
To register a New Product please click on the button below

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- [Automotive SW - S32K3 - HSE Firmware](#)
- [Automotive SW - S32K3 - Inter-Platform Communication Framework](#)
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- [Automotive SW - S32K3 - Platform Software Integration](#)
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- [Automotive SW - S32K3 - S32 Design Studio](#)
- [Automotive SW - S32K3 - S32 FreeMASTER](#)
- [Automotive SW - S32K3 - Safety Software Framework](#)
- [Automotive SW - S32K3 - Stacks](#)
- [Automotive SW - EB tresos Studio / AUTOSAR Configuration Tool](#)

From the next page, select **EB tresos Studio 27.1.0**. Read the Software Terms and Conditions on the following page and click on **I Agree**.

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## Product Download

### EB tresos Studio 27.1.0

Files License Keys Notes

[Download Help](#)

Please use the following activation code within EB Client License Administrator to start EB tresos Studio: 5F1C-54B0-F7F8-DEF9 (valid until 09/30/2021)  
 A new activation code will appear here 30 days before expiration of the current one, provided that your license to the target software (e.g. MCAL) is not expired by then.

**NOTE:** If you are using Chrome web browser for file download, be aware that it changes the original .uip file extension to .gz. You have to manually change the .gz back to .uip after finishing download otherwise the installation will fail.

Show All Files

10 Files

+	File Description	File Size	File Name
+	1.1_EB_tresos_installation_guide.pdf	2 MB	<a href="#">1.1_EB_tresos_installation_guide.pdf</a>
+	2.2_Studio_release_notes.pdf	1.3 MB	<a href="#">2.2_Studio_release_notes.pdf</a>
+	2.3_Studio_new_and_noleworthy.pdf	1 MB	<a href="#">2.3_Studio_new_and_noleworthy.pdf</a>
+	Documentation_Doc.uip	10.7 MB	<a href="#">Documentation_Doc.uip</a>
+	Documentation_EBtresosStudio.uip	36.5 MB	<a href="#">Documentation_EBtresosStudio.uip</a>
+	EBtresosStudio_EBtresosStudio.uip	368.2 MB	<a href="#">EBtresosStudio_EBtresosStudio.uip</a>
+	EBtresosStudio_WibuKeyRuntime.uip	21.9 MB	<a href="#">EBtresosStudio_WibuKeyRuntime.uip</a>
+	EB_Client_License_Administrator_1_4_1_Setup.exe	29.2 MB	<a href="#">EB_Client_License_Administrator_1_4_1_Setup.exe</a>
+	ImportantNotes-B337087.txt	41.3 KB	<a href="#">ImportantNotes-B337087.txt</a>
+	setup.exe	2.6 MB	<a href="#">setup.exe</a>

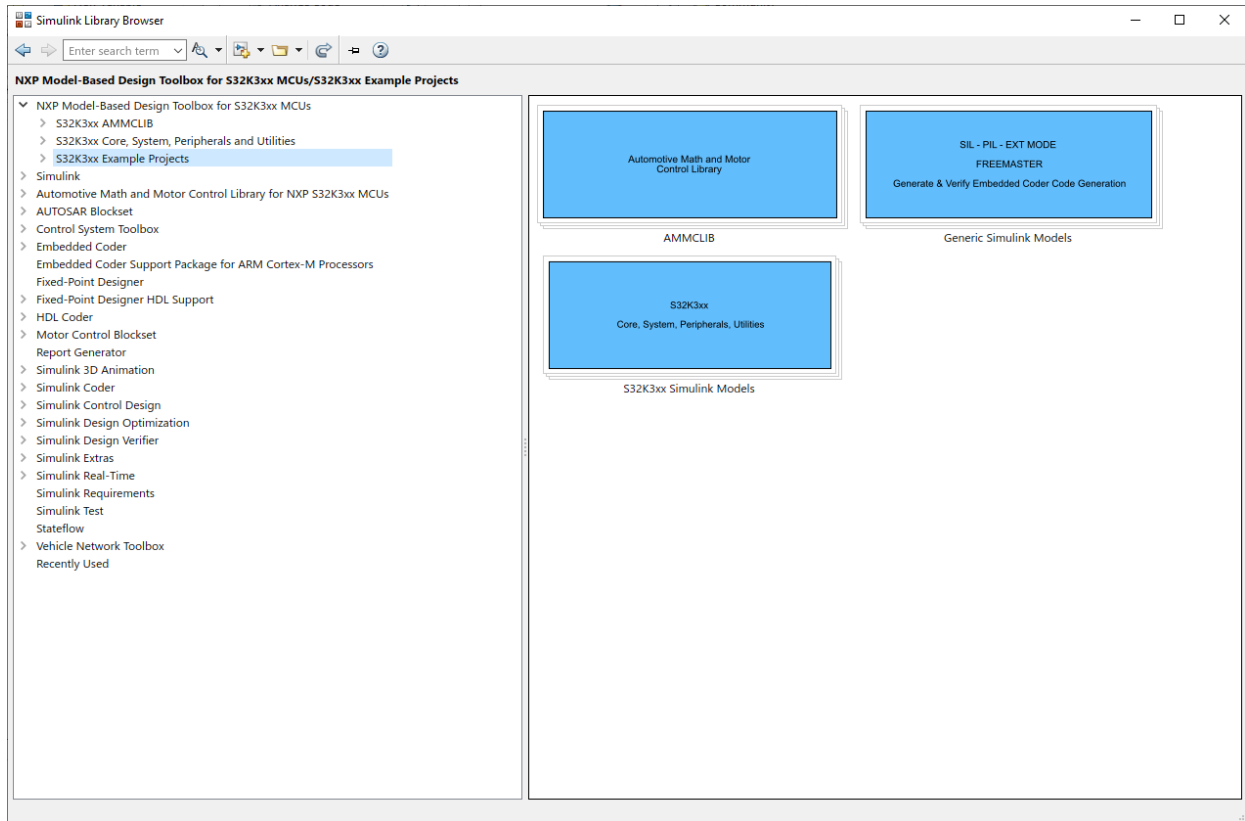
From this page, download (minimum) the files shown in the picture above. Note that when the download is complete, the .uip files might have been renamed to .gz or .zip. You will have to manually change the extensions of those files back to .uip, then simply run the **setup.exe** file. From that step, the EB Tresos wizard will guide you through the installation. Additionally, you can download from the same location (shown in the picture above) the EB Tresos installation guide (available in .pdf format). Note that you will require a license for this configuration tool, but it is made available on that same page (highlighted in yellow), for free.

## 2 Run Models

### 2.1 Examples Library & Help

NXP’s Model-Based Design Toolbox comes with an Examples Library collection that lets you test different MCU on-chip modules and run complex applications.

The Examples Library `mbd_s32k3_examples.slx` can be opened from “{Model Based Design Install Directory}\S32K3\_Examples” folder or directly from the Simulink Library Browser main window



Each category contains multiple examples that showcase different Model-Based Design Toolbox capabilities that are categorized into different groups.

The examples are also available from standard MATLAB Help for NXP’s Model-Based Design Toolbox Example.

## 2.2 Hardware Setup

All examples provided with the Model-Based Design Toolbox were developed on XS32K3X4EVB-Q257 as the primary hardware target.

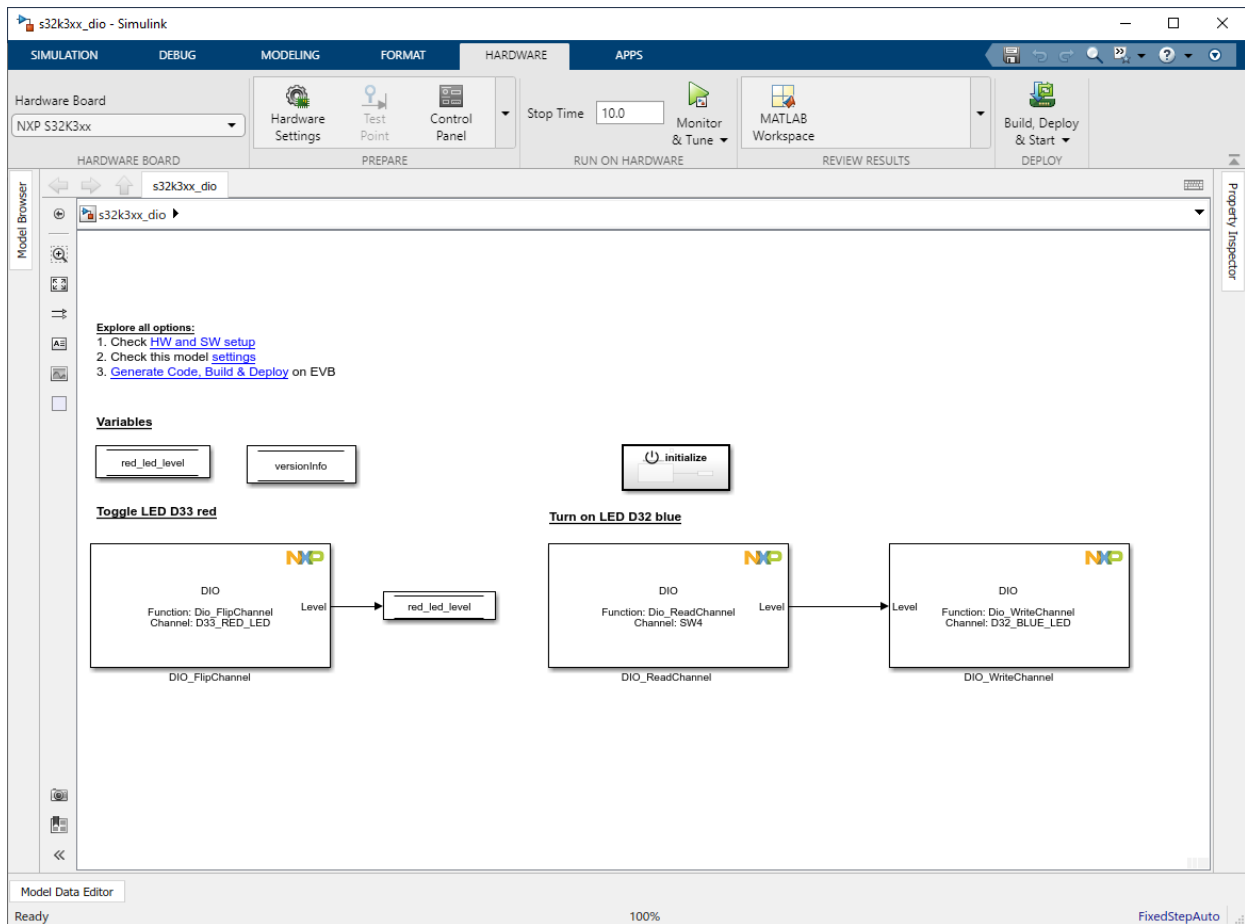


## 2.3 A “Hello World” Example

If the hardware setup is completed successfully, then all ingredients are present for running successfully the Model-Based Design Toolbox for S32K3xx specific examples.

Navigate to “\S32K3\_Examples\dio” folder and open the s32k3xx\_dio.mdl Simulink model.

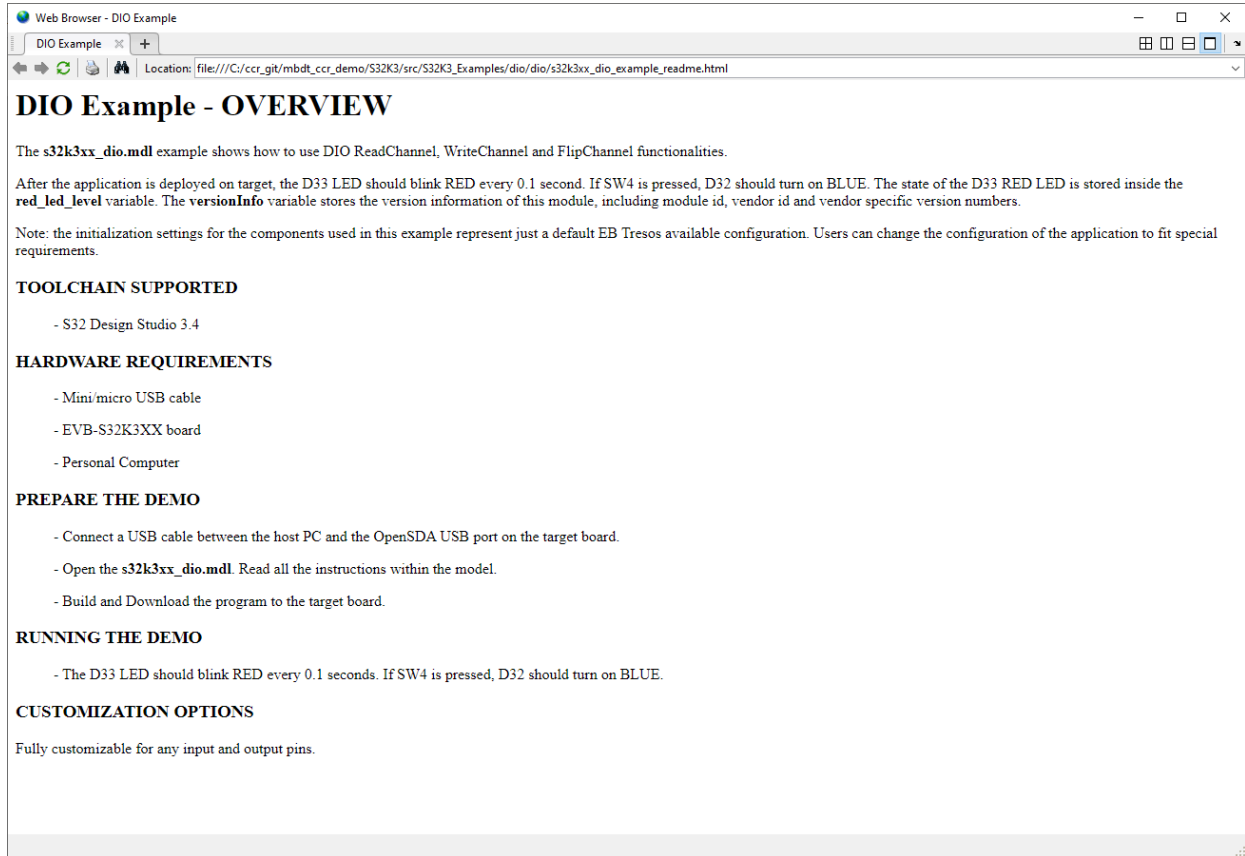
This model programs the S32K3X4 EVB to toggle the D33 red LED every 0.1 seconds. Additionally, if SW4 is pressed, the D32 blue LED should turn on.



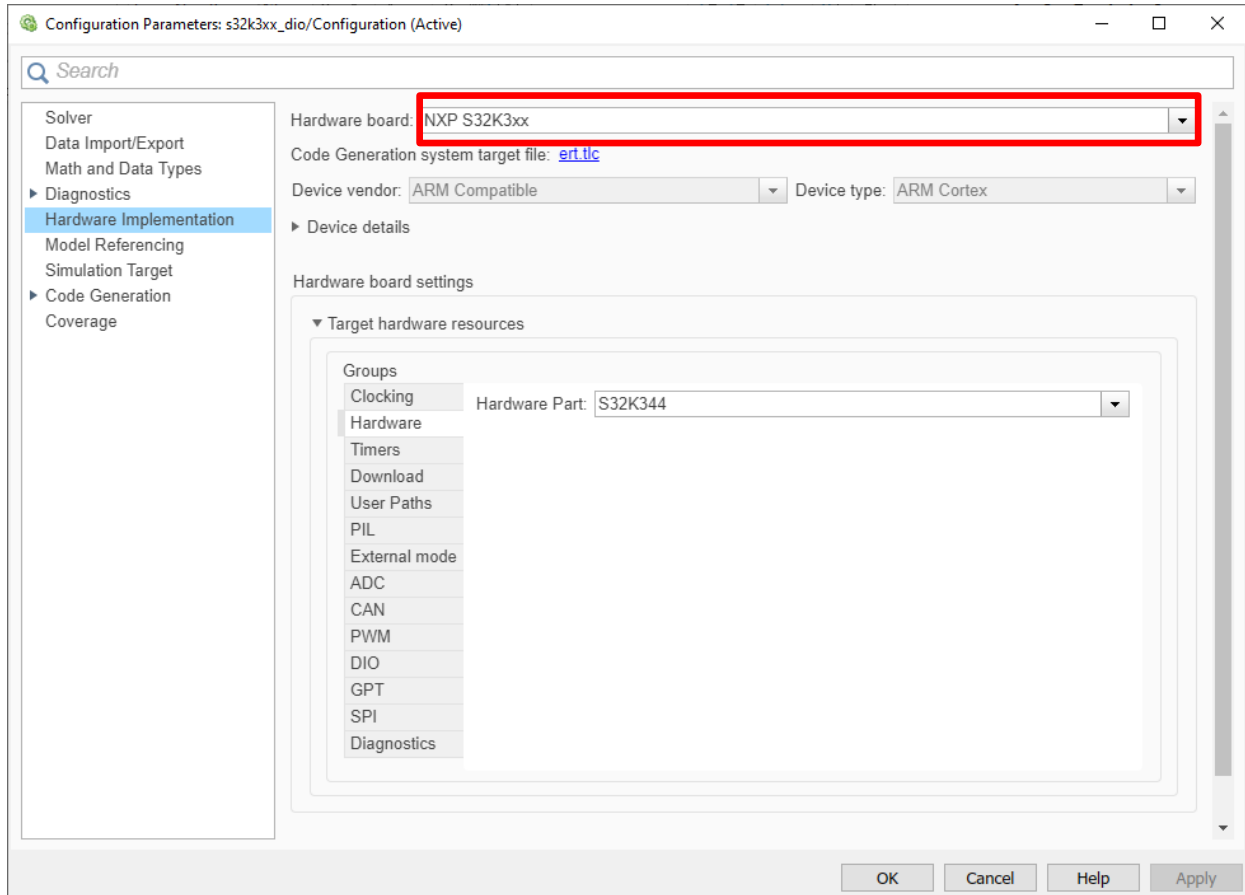


Follow the next steps to run the example:

1. Open and README.html file to understand the hardware and software requirements for running the application

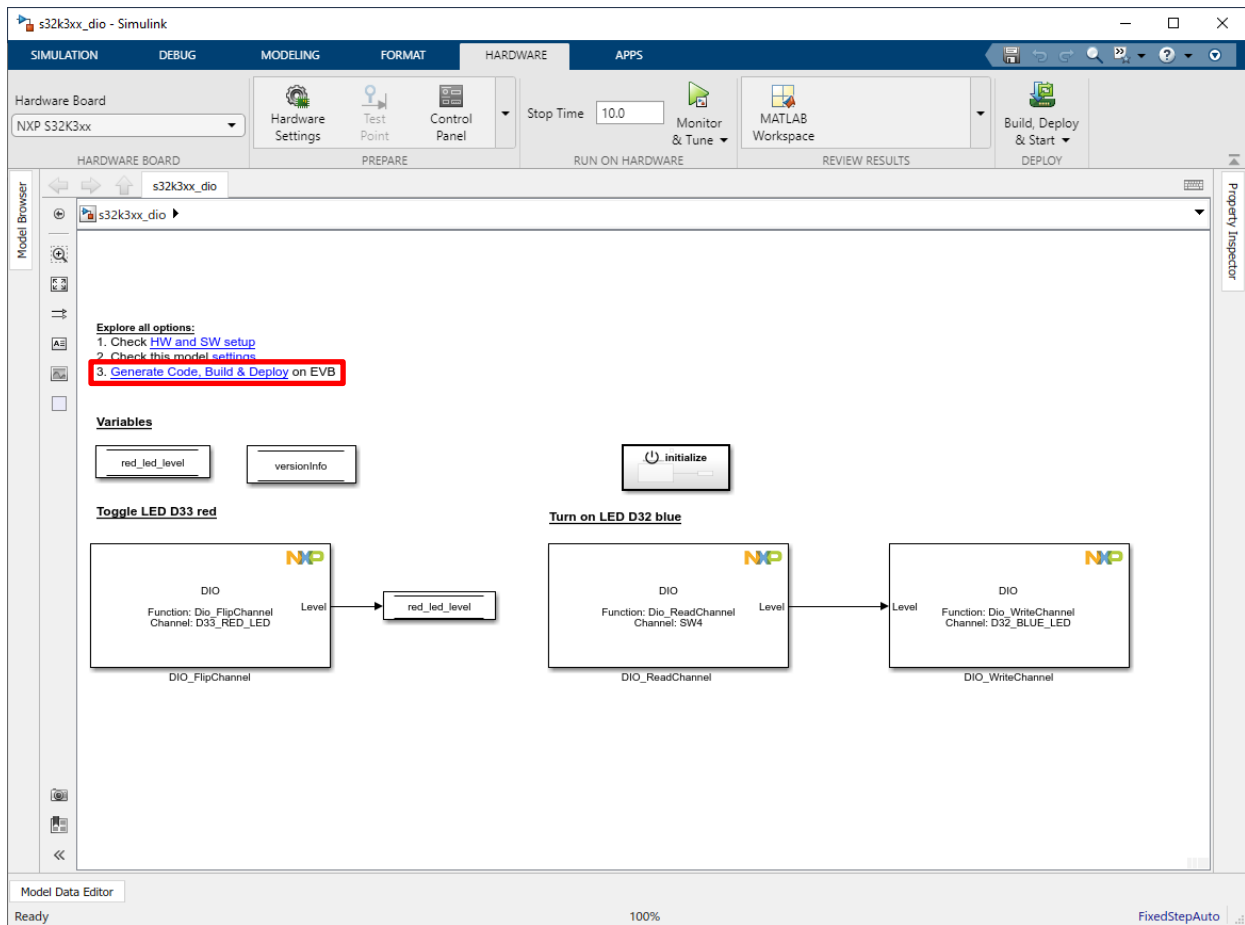


2. Open the Simulink Model Configuration Parameters and select the appropriate MCU (S32K344 in this case).





- Press the Build Model button and wait until the code is generated, compiled, and downloaded to the evaluation board. Alternatively, you can press on the text highlighted in the model to start the process automatically.



If you see the LEDs toggling, congratulations! You succeeded in running your first example created with

### Model-Based Design Toolbox for S32K3xx

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**Web Support:**

[www.nxp.com/support](http://www.nxp.com/support)

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