FlexCase

Simulink Guide

In this tutorial:

- Install processor toolbox for MATLAB
- Connect FlexCase blocks to Simulink Models
- Build microcontroller code for the FlexCase

Step 0 - Prerequisites

- **Complete quick-start guide**
- Check that you have the required Mathworks products: MATLAB, Simulink, MATLAB Coder, Simulink Coder, Embedded Coder
- Download Audesse model examples from our website

Step 1 - Power Up and Connect

Connect to the FlexCase using S32DS and VirtualHere in the same manner as the **quick-start guide**.

Step 2 - Install the MBDT to MATLAB (Static Installation)

1. Start MATLAB
2. Go to the MBDT page (**link**) and click "DOWNLOAD" (if prompted, use the same NXP account used to install S32DS)
3. Select the S32K1xx Automotive Microprocessors Family link and download NXP "Model-Based Design Toolbox for S32K1xx" from the "Files" Tab. **Leave the browser open** for generating a license later in this tutorial.

Product Download

Model-Based Design Toolbox for S32K1xx Automotive Microprocessors Family

| Files | License Keys | Notes | | @ Download Help |

The NXP Model-Based Design Toolbox is delivered as a MATLAB MLTBX file. If your browser download the file as a zip, simply change the file extension back to *.mltbx to be recognized by MATLAB Installer

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	File Description	File Size	File Name
+	NXP Model-Based Design Toolbox for S32K1xx version 4.2.0	408.8 MB	⬇ MBDToolbox_S32K1xx_4.2.0_20200720.mltbx
+	NXP Support Package for MBDT S32K1xx version 4.2.0	1 MB	⬇ NXP_Support_Package_S32K1xx_20200720.mltbx
+	Quick Start Guide for MBDT S32K1xx version 4.2.0	1.2 MB	⬇ Model_Based_Design_Toolbox_S32K1xx_Series_Quick_Start_Guide.pdf
+	Release Notes for MBDT S32K1xx version 4.2.0	2 MB	⬇ Model_Based_Design_Toolbox_S32K1xx_Series_Release_Notes.pdf
+	Software Content Register MBDT S32K1xx version 4.2.0	2.1 KB	⬇ Software_Content_Register_MBDT_S32K1xx.txt

4. Using MATLAB's file explorer, navigate to the directory where the toolbox was downloaded, right-click on the toolbox and "Install"

a. If the file extension was changed to ".zip" during the download, rename the file extension with the ".mltbx" extension before attempting to install.
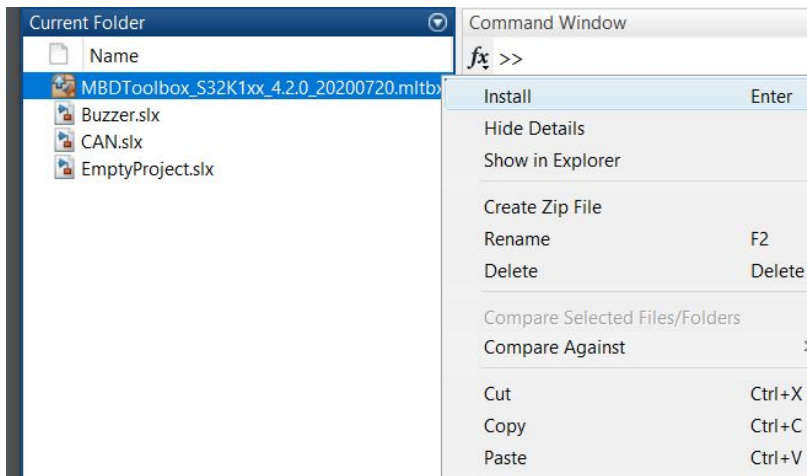
5. After the toolbox is installed, it will appear in the Add-ons manager. **Make a note of the toolbox file location**, which will be needed for adding the license:
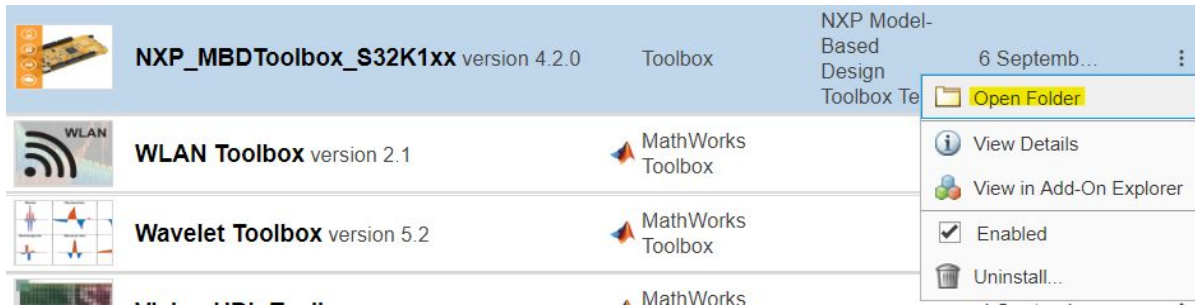

6. In the MATLAB command window, type *mbd_s32k_hostid* to get the disk ID for the toolbox installation.

7. On the NXP MBDT webpage (where you downloaded the software), click on the "License Keys" tab and generate a license for the toolbox
   a. The generator will ask for the disk ID that you got from the MATLAB command window
   b. Naming the file is optional, since the license will generate text that you can copy out later

8. Once generated, you can click "Save All" to download the license as "license.dat" and copy to the toolbox file location you noted earlier (copy to <toolbox_path>/lic/)

If there are difficulties during installation, more details can be found in a tutorial by NXP (**link**)

Step 3 - Open the Sample Model

1. Change the MATLAB directory to the folder with the provided example file buzzer.slx
2. Open the buzzer.slx model in simulink, which should look like the image below:
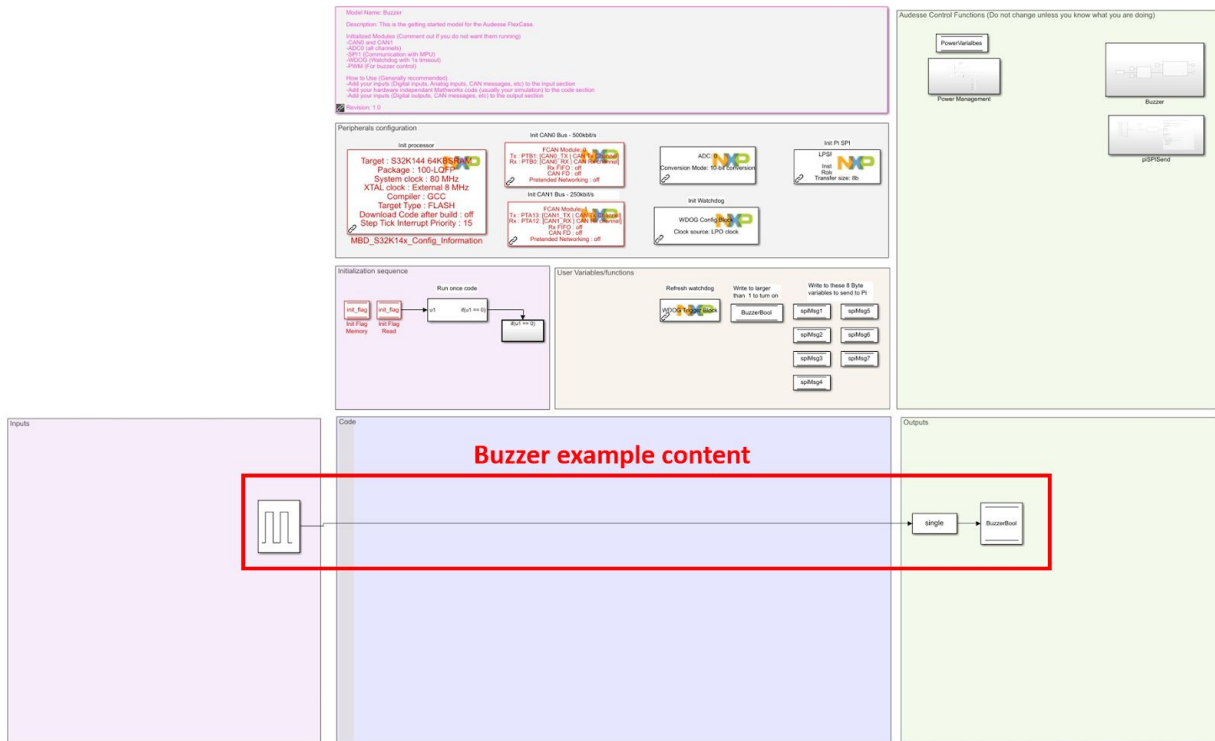
The sample models are built from the EmptyProject template, which is provided as a base function set for working with the FlexCase. The template has many features preconfigured to work out of the box so that you can start developing right away.

Apart from the base functions included in the template, the only additional content required to get the buzzer beeping periodically is highlighted in red.

For increased stability, the use of doubles as data types should be limited as much as possible, which is why the data is converted into a single in this example.

Step 4 - Build the model

Press "Ctrl + B" to begin building the model. After approximately 30 seconds the project should be built to the same MATLAB directory as a folder labeled "Buzzer_mbd_rtw". Within this folder is the file "Buzzer.elf" which is the binary used to program the FlexCase.

The ELF file is exactly the same as the one used in the Quick-Start guide to flash the FlexCase.

Step 5 - Flash a precompiled example file

Flashing the model is done similarly to the Quick-Start guide. Using S32DS, select the recently compiled "Buzzer.elf" as the C/C++ Application.

You can review the Quick-Start guide to see the step by step process if required.

Step 6 - Success!

You have successfully flashed the program.

You can try modifying the program to see how easy it is to work with. For example, change the Period of the pulse generator in the inputs section to modify the timing of the beeps. Recompile and reflash to observe the result.

You will always hear a short beep to confirm the board has been flashed, reset, and is running the chosen program

Next Steps

You are now prepared to begin building your own projects. Use the provided template simulink models and start adding your own code.

Any questions? Email labs@audesseinc.com