

# S32K344 Whiteboard

## Software User Guide

Rev. 1.0 — 3 April 2023

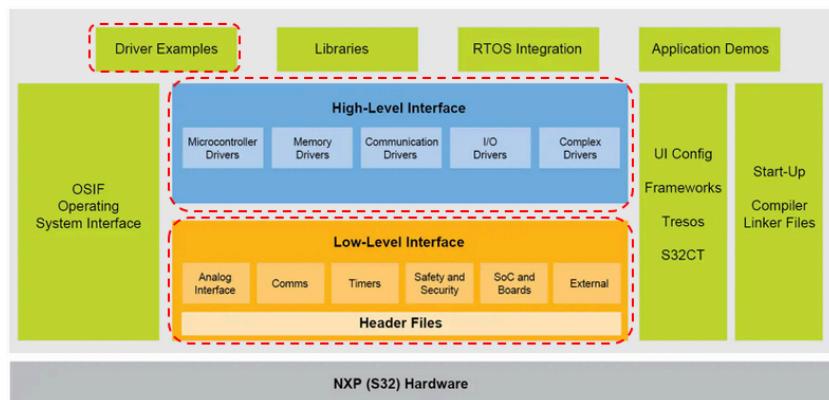
User guide  
COMPANY PUBLIC

## 1 Introduction

The [S32K344 Whiteboard](#) (S32K344-WB) is an evaluation board for providing quick prototype verification, such as Body Domain Control, Gateway, Passive Entry Passive Start (PEPS), Motor Control, and so on. It is Based on the 32-bit Arm® Cortex®-M7 S32K3 MCU in a 257 MPABGA package.

To help customers get familiar with the hardware quickly, a set of example projects are provided based on the [Real-Time Drivers](#)(RTD) provided by NXP. With these example projects, you can have an out-of-box experience with the S32K344-WB. You can also create your own projects based on these example projects easily.

The below block diagram shows the architecture of RTD. The “Driver examples” shows in the upper red box is a inbuilt package which released with the RTD package (For more information , please see the “[Note 1](#)” located in the end of this chapter). This software package for S32K344-WB extends the inbuilt driver examples. While these example projects are built on the RTD High-Level Interface<sup>1</sup> only, the examples based on Low-Level Interface are not part of this package.



This document is a software user guide of this example software package for the S32K344-WB.

- **This software user guide covers:**
  - Software<sup>2</sup> installation on Windows system
  - Operation of the “EB tresos Studio (EBT)”: Import/Generate, etc.
  - Operation of the “S32 Design Studio (S32DS)”:Import/Build/Download/Debug, etc.
  - Software package contents description
  - How to use the example projects
  - Update configuration without RTD installation
- **This software user guide doesn't covers:**
  - Software Installation on Linux systems

1 : The High-Level Interface follows the AUTOSAR MCAL specification.

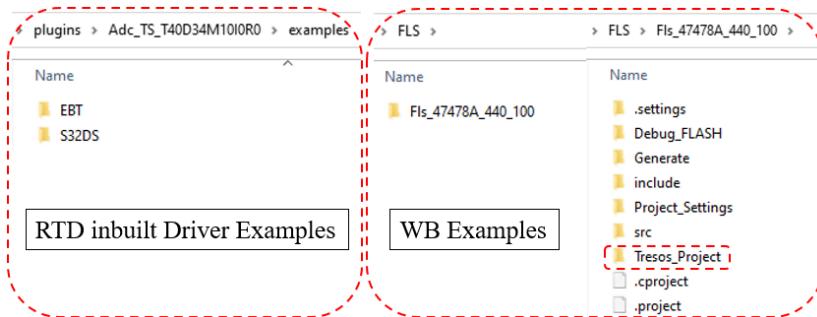
2 : Include: S32 Design Studio for S32 Platform (S32DS), RTD, EB tresos Studio (EBT).



- Work with S32 Configuration Tools (S32 CT) and LLD examples
- How to configure each peripheral module
- How to integrate RTD with IDE
- How to integrate RTD with RTOS (but we provided an example integrated with FreeRTOS)
- **Before you can start using the S32K344-WB kit, you need to prepare the following items:**
  - A 12V(DC) power supply and cable (DC005-2.1 connector or just two regular wires).
  - An external debugger, such as PEmicro Multilink Rev C(or newer) or Segger J-Link or Lauderbach, etc. S32K344-WB does **NOT** provide an on-board debugger.
  - The software development environment (reference to the list<sup>3</sup> of SWs).
  - In order to activate the software, your computer needs to have access to the internet.

**Note:**

1. In the “Driver Examples” inbuilt in the RTD (above figure), each module has two types project, one is for HLD (High-Level Interface Driver) and the other is for LLD (Low-Level Interface Driver). The HLD projects in EBT folder are configured in EB tresos Studio and built with scripts(makefile) which need a few modifications. If you want to debug it in S32DS, you need to create the debug target by yourself. The LLD projects in the S32DS folder are configured with S32CT (not EB tresos Studio) and are built with S32DS (See below figure on the left). But this example package for the S32K344-WB is different. It combine the EB tresos project and the S32DS project together. User configure the project with EB tresos Studio (“Tresos\_Project” in below figure) and build with S32DS.



2. All guide steps in this document are based on the Microsoft Windows OS. The steps may be slightly different on Linux systems.

<sup>3</sup> : Include: S32 Design Studio for S32 Platform (S32DS), RTD, EB tresos Studio (EBT).

## 2 Download & Install Software

Before starting with these example projects, the development environment should be installed first.

### 2.1 Required Software List

This software package is based on RTD V1.0.0. To setup the development environment, you need download the following packages.

- **S32 Design Studio for S32 Platform (S32DS):**

IDE for NXP S32 family, can be used for project creation, configuration, compilation, debugging, etc. In this package, the examples created base on version 3.4 of S32DS.

- **EB tresos Studio (EBT):**

RTD High-Level Interface configuration tool. In this package, the examples created base on version 27.1.0 of EBT.

- **S32K3 Real Time Drivers (RTD): (Optional)**

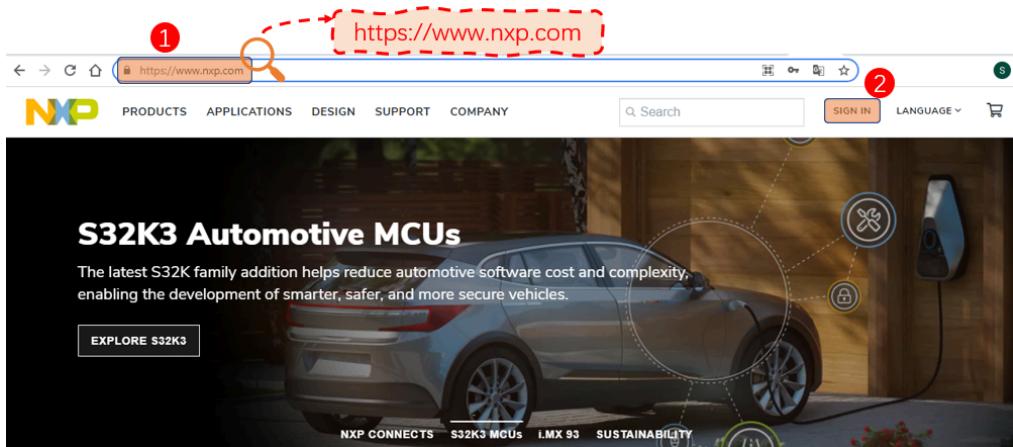
NXP S32K3 Real Time Drivers for the S32K3 family of processors. A copied version of the RTD contained in this package, thus you can easily and quickly verify any example project in this package. Therefore, this is an optional download. Of course, you can download and install it ("SW32K3\_RTD\_4.4\_1.0.0\_D2110") into the default path. And suggest you download the corresponding version if you plan to start your own real project.

The following chapters will guide you how to download and install these software.

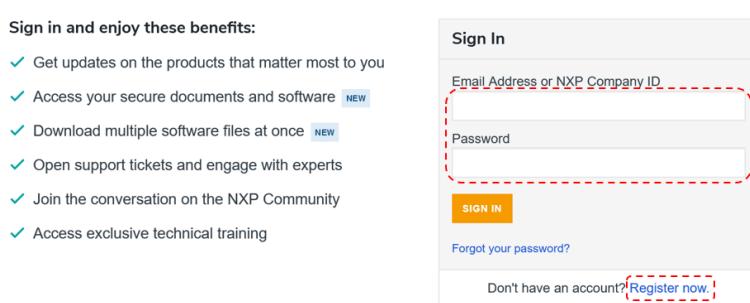
### 2.2 Download Preparation

You need to register/have an account at <https://www.nxp.com/> first to be able to download.

- Go to [NXP official website](https://www.nxp.com/), log in with your account at "sign in" in the top right corner of the page.



- Fill the account information in the pop-up window or click on "Register now" if you don't have it yet:



- After signing in, click on the link which mentioned in the following chapters, it will navigate you to the corresponding download page (If you have not logged in before, you will be directed to the “NXP Sign In” page). You will see a software package list which includes all the authorized software for your account.

**Tip: It is recommend that you keep this page open until you have downloaded all the software. And suggest you open the link in a new browser tab, which will be more convenient for you.**

## 2.3 Download S32 Design Studio

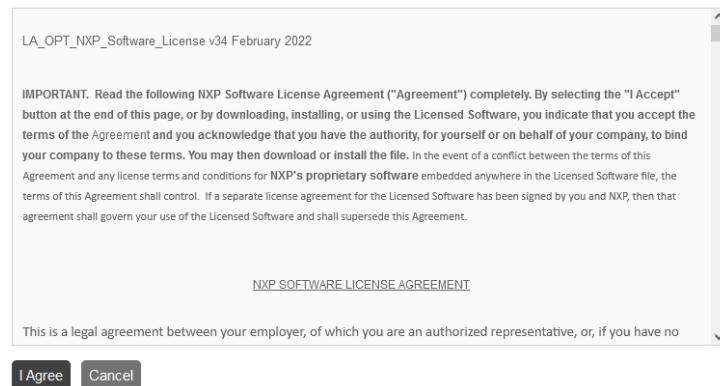
- Click the link to download: “[S32 Design Studio for S32 Platform](#)”. It will navigate you to the “Product Information - NXP Software” page. In this page, the first three links are grouped by product and the last one is the main package of “S32 Design Studio IDE”. We need download the main installation and the S32K3 development package(located in “*Automotive SW-S32K3-S32 Design Studio*”).
- First, click on the link in the red box to download the main installation package. (**It is recommended that you keep this page open until you have downloaded all the software, and suggest you open the link in a new browser tab, which will be more convenient for you.**)

- The version for this package is 3.4, please select the correct version to download. If you can't find it in the default page, try to find it in the “Previous” tab page. To complete the download of the software, confirm the license terms and click I Agree to accept in the window.

## Software Terms and Conditions

### S32 Design Studio for S32 Platform v.3.4

Please read the following agreement and click "I AGREE" at the bottom before downloading your software.



- On this page, you only need download an .exe file, as shows below.

PRODUCTS APPLICATIONS DESIGN SUPPORT COMPANY

NXP > Design > S32 Design Studio IDE > S32 Design Studio for S32 Platform v.3.4 : Files

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**Product Download**

**S32 Design Studio for S32 Platform v.3.4**

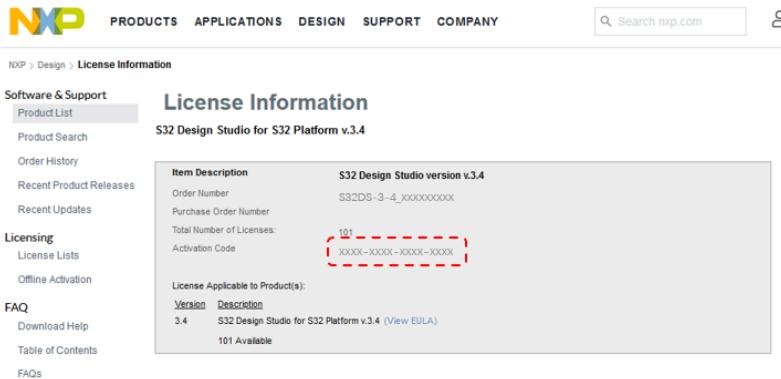
**Files** License Keys Notes

Show All Files

11 Files

File Description	File Size	File Name
S32 Design Studio v3.4 Windows installer	1.5 GB	S32DS.3.4_b201217_win32.x86_64.exe
S32 Design Studio v3.4 Linux Installer	1.1 GB	S32DS.3.4_b201217_linux.x86_64.bin
S32 Design Studio Installation Guide	1.2 MB	S32DS_Installation_Guide_3.4.0.pdf
S32 Design Studio 3.4 Release Notes	72.5 KB	S32DS_Release_Notes_3.4.0.pdf
S32 Design Studio 3.4 S32K1 Development Package Release Notes	47.5 KB	S32K1xx_Development_Package_Release_Notes_3.4.0.pdf
S32 Design Studio 3.4 S32G2 Development Package Release Notes	48 KB	S32G2xx_Development_Package_Release_Notes_3.4.0.pdf
S32 Design Studio 3.4 S32S2TV Development Package Release Notes	49.6 KB	S32S2xxTV_Development_Package_Release_Notes_3.4.0.pdf
S32 Design Studio 3.4 S32V2 Development Package Release Notes	46 KB	S32V2xx_Development_Package_Release_Notes_3.4.0.pdf
S32 Design Studio 3.4 S32K1xx Service Pack 1 for offline use	2.6 GB	SW32K1_S32DS_3.4.1_D2106.zip
S32 Design Studio 3.4 development packages for offline use, support for S32G2 family	1.3 GB	SW32G2_S32DS_3.4.0_D2012.zip
S32 Design Studio 3.4 development packages for offline use	3.7 GB	SW32_S32DS_3.4.0_D2012.zip

- Switch to "License Keys" tab and copy Activation Code and save it where you can easily find it. The Activation Code will be received by email when you start the download.



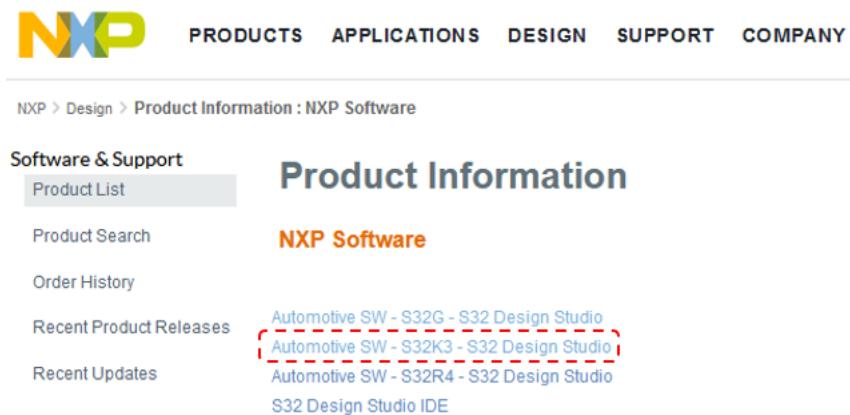
NXP > Design > License Information

**License Information**

S32 Design Studio for S32 Platform v.3.4

Item Description	S32 Design Studio version v.3.4
Order Number	S32DS-3-4_xxxxxxxxx
Purchase Order Number	
Total Number of Licenses:	101
Activation Code	XXXX-XXXX-XXXX-XXXX
License Applicable to Product(s):	
Version	Description
3.4	S32 Design Studio for S32 Platform v.3.4 (View EULA)
101 Available	

- After the download is complete, go back to the “[Product Information - NXP Software](#)” page and click on the link in the red box in the below figure. It will go to the download page of the S32K3xx development package.



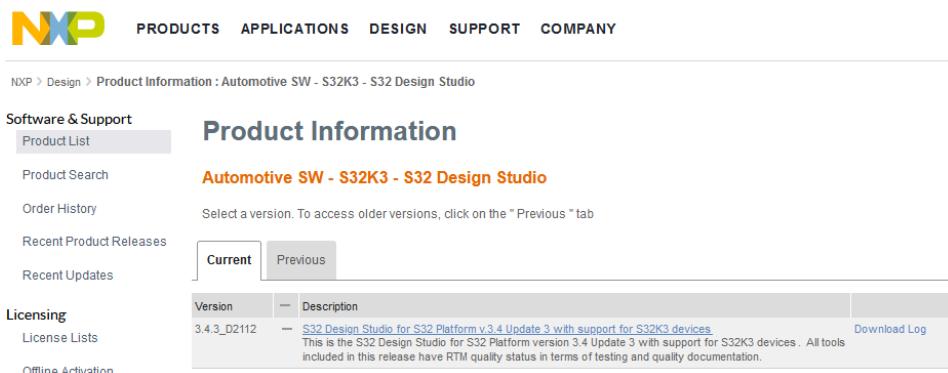
NXP > Design > Product Information : NXP Software

**Product Information**

**NXP Software**

- Automotive SW - S32G - S32 Design Studio
- Automotive SW - S32K3 - S32 Design Studio
- Automotive SW - S32R4 - S32 Design Studio
- S32 Design Studio IDE

- Download the package in the “Current” tab page, you may see multiple packages in your page. It is suggested download the latest version. But the version name must start with “3.4.x” which means the package is for S32DS 3.4.x. (You may see a newer version than below shows. Please ignore the picture in the next steps).



NXP > Design > Product Information : Automotive SW - S32K3 - S32 Design Studio

**Product Information**

**Automotive SW - S32K3 - S32 Design Studio**

Select a version. To access older versions, click on the “Previous” tab

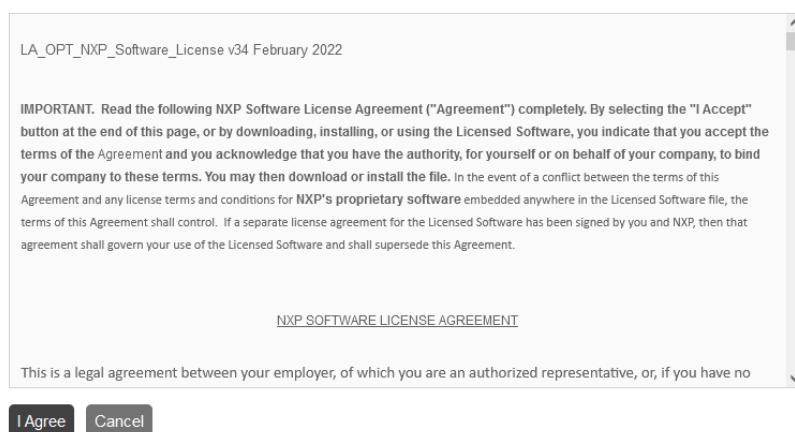
Current	Previous
Version	Description
3.4.3_D2112	<p>S32 Design Studio for S32 Platform v.3.4 Update 3 with support for S32K3 devices</p> <p>This is the S32 Design Studio for S32 Platform version 3.4 Update 3 with support for S32K3 devices. All tools included in this release have RTM quality status in terms of testing and quality documentation.</p>
Download Log	

- Confirm the license terms and by click I Agree to accept it in the window.

## Software Terms and Conditions

### S32 Design Studio for S32 Platform v.3.4 Update 3 with support for S32K3 devices

Please read the following agreement and click "I AGREE" at the bottom before downloading your software.



- Download all the contents of this page.

**Product Download**

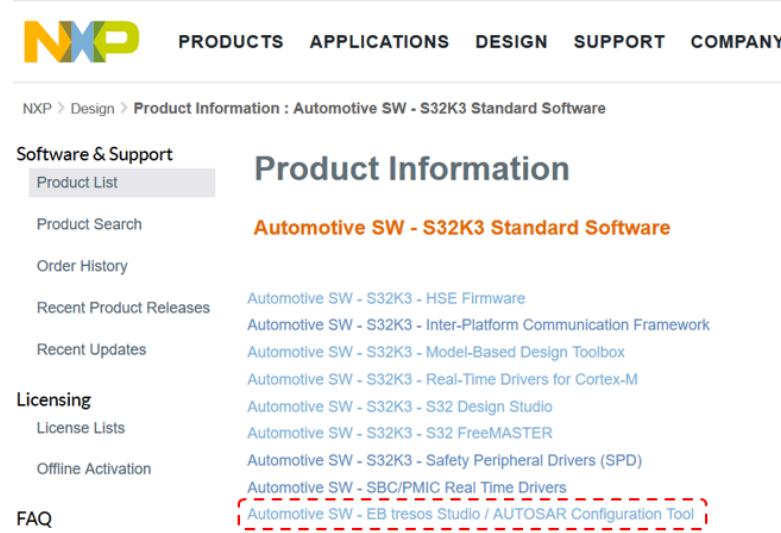
**S32 Design Studio for S32 Platform v.3.4 Update 3 with support for S32K3 devices**

File Description	File Size	File Name
Offline package includes Update 3 for S32 Design Studio v.3.4 and S32K3 development package. This update should be installed on top of S32 Design Studio v.3.4. Support for S32K342 device added.	3.4 GB	<a href="#">SW32K3_S32DS_3.4.3_D2112.zip</a>
S32 Design Studio S32K3 Development Package v 3.4.3 Release Notes	50.1 KB	<a href="#">S32K3xx_Development_Package_Release_Notes_3.4.3.pdf</a>
S32DS 3.4 Update 3 Release Notes	73.9 KB	<a href="#">S32DS_Release_Notes_3.4.3.pdf</a>

**Tip:** *Don't close your browser and keep your account login, we will continue to download the others software.*

## 2.4 Download EB tresos Studio

- Go to the "[Automotive SW - S32K3 Standard Software](#)" download page, click on "Automotive SW – EB tresos Studio / AUTOSAR Configuration Tool".



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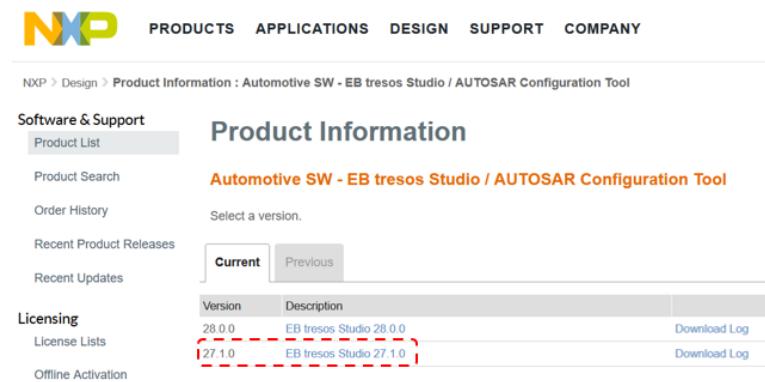
FAQ

**Product Information**

**Automotive SW - S32K3 Standard Software**

- Automotive SW - S32K3 - HSE Firmware
- Automotive SW - S32K3 - Inter-Platform Communication Framework
- Automotive SW - S32K3 - Model-Based Design Toolbox
- Automotive SW - S32K3 - Real-Time Drivers for Cortex-M
- Automotive SW - S32K3 - S32 Design Studio
- Automotive SW - S32K3 - S32 FreeMASTER
- Automotive SW - S32K3 - Safety Peripheral Drivers (SPD)
- Automotive SW - SBC/PMIC Real Time Drivers
- Automotive SW - EB tresos Studio / AUTOSAR Configuration Tool**

- It shows you the available software list of EB tresos Studio, **please download the correct version required by this package: 27.1.0** (If you can't find this version, please try to find it in the "Previous" tab).



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**Automotive SW - EB tresos Studio / AUTOSAR Configuration Tool**

Select a version.

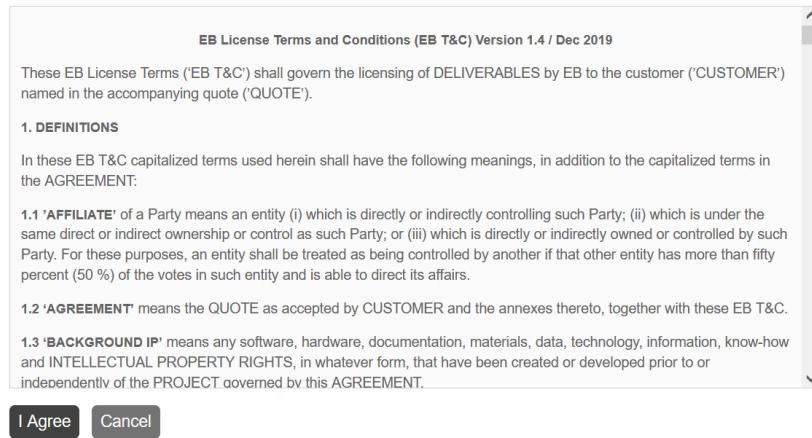
**Current** Previous

Version	Description	Download Log
28.0.0	EB tresos Studio 28.0.0	Download Log
<b>27.1.0</b>	<b>EB tresos Studio 27.1.0</b>	Download Log

- Click on the link of corresponding version in the above figure. To complete the download of the software, confirm the license terms and click I Agree to continue.

**EB tresos Studio 27.1.0**

Please read the following agreement and click "I AGREE" at the bottom before downloading your software.



- It is recommended to download all the contents from EB tresos download page, especially the .exe and .uip files.

PRODUCTS APPLICATIONS DESIGN SUPPORT COMPANY

NXP > Design > Automotive SW - EB tresos Studio / AUTOSAR Configuration Tool > EB tresos Studio 27.1.0 : Files

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EB tresos Studio 27.1.0

Files License Keys Notes

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Please use the following activation code within EB Client License Administrator to start EB tresos Studio XXXX-XXXX-XXXX (valid until 09/30/2022). 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 or Chromium based web browser (MS Edge) 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.

File Description	File Size	File Name
1.1_EB_tresos_installation_guide.pdf	2 MB	1.1_EB_tresos_installation_guide.pdf
2.2_Studio_release_notes.pdf	1.3 MB	2.2_Studio_release_notes.pdf
2.3_Studio_new_and_noteworthy.pdf	1 MB	2.3_Studio_new_and_noteworthy.pdf
Documentation_Doc.uip	10.7 MB	Documentation_Doc.uip
Documentation_EBtresosStudio.uip	36.5 MB	Documentation_EBtresosStudio.uip
EBtresosStudio_EBtresosStudio.uip	365.2 MB	EBtresosStudio_EBtresosStudio.uip
EBtresosStudio_WibroKeyRuntime.uip	21.9 MB	EBtresosStudio_WibroKeyRuntime.uip
EB_Client_License_Administrator_1_4_1_Setup.exe	29.2 MB	EB_Client_License_Administrator_1_4_1_Setup.exe
ImportantNotes-B337087.txt	41.3 KB	ImportantNotes-B337087.txt
setup.exe	2.6 MB	setup.exe

10 Files

The Activation Code is shown in the above figure. Copy and save it where you can easily find it. **Please pay attention to the "NOTE" information.**

**Note:**

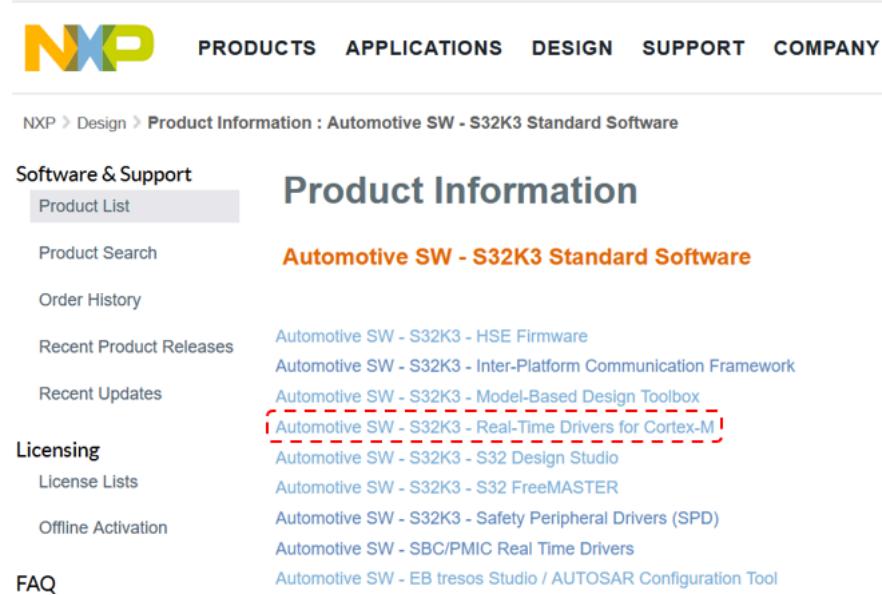
*This is a TRIAL license that will expire after a period of time. You can purchase a formal license from EB company.*

**Tip: Don't close your browser and keep your account login, we will continue to download the other software.**

## 2.5 Download Real-Time Drivers (Optional)

In this package, the RTD driver had included. If you only need to verify some examples quickly, and will not modify any configuration, you can ignore this chapter. Otherwise, you have two ways: The first way is that download and install the RTD into the default path following this chapter. The second way is that create a link file for EBT to link to the RTD folder ("SW32K3\_RTD\_4.4\_1.0.0") located in the root folder of this package (Please refer to the chapter [8 Update EBT Link \(Optional\)](#)).

- Go to the "[Automotive SW - S32K3 Standard Software](#)" download page, click on "Automotive SW - S32K3 - Real-Time Drivers for Cortex-M".



The screenshot shows the NXP Software & Support website. The top navigation bar includes the NXP logo and links for PRODUCTS, APPLICATIONS, DESIGN, SUPPORT, and COMPANY. Below the navigation, a breadcrumb trail shows 'NXP > Design > Product Information : Automotive SW - S32K3 Standard Software'. The main content area is titled 'Product Information' and lists several software components under 'Automotive SW - S32K3 Standard Software'. A red dashed box highlights the entry 'Automotive SW - S32K3 - Real-Time Drivers for Cortex-M'.

Software & Support	Product Information
Product List	<b>Automotive SW - S32K3 Standard Software</b>
Product Search	Automotive SW - S32K3 - HSE Firmware
Order History	Automotive SW - S32K3 - Inter-Platform Communication Framework
Recent Product Releases	Automotive SW - S32K3 - Model-Based Design Toolbox
Recent Updates	Automotive SW - S32K3 - Real-Time Drivers for Cortex-M
Licensing	Automotive SW - S32K3 - S32 Design Studio
License Lists	Automotive SW - S32K3 - S32 FreeMASTER
Offline Activation	Automotive SW - S32K3 - Safety Peripheral Drivers (SPD)
FAQ	Automotive SW - SBC/PMIC Real Time Drivers
	Automotive SW - EB tresos Studio / AUTOSAR Configuration Tool

- As mentioned before, this example package are based on RTD version RTM\_1.0.0, so if you see multiple versions in the download list, please download the appropriate RTD version. If you can't find this version in the "Current" tab, it is probably located in the "Previous" tab page. If you plan to start a real project, suggest you download the newest version.

**Product Information**

**Automotive SW - S32K3 - Real-Time Drivers for Cortex-M**

Version	Description	Download Log
1.0.0	<p><b>S32K3 Real Time Drivers Version 1.0.0</b>            This is the NXP S32K3 Real Time Drivers Version 1.0.0 Patch 01 release for the S32K3 family of processors. It can be used standalone, or the update site can be installed on top of S32 Design Studio IDE v3.4 Service Pack 2. All software included in this release has RTM quality status in terms of testing and quality documentation with some driver's exceptions which are qualified as EAR (DC driver). RTM qualified drivers can be used in production.</p>	<a href="#">Download Log</a>
1.0.0	<p><b>S32K3 Real Time Drivers Version 1.0.0 Patch 02</b>            This is the NXP S32K3 Real Time Drivers Version 1.0.0 Patch 02 release for the S32K3 family of processors. It can be used standalone, or the update site can be installed on top of S32 Design Studio IDE v3.4 Service Pack 2. All software included in this release has RTM quality status in terms of testing and quality documentation with some driver's exceptions which are qualified as EAR (DC driver). RTM qualified drivers can be used in production.</p>	<a href="#">Download Log</a>
1.0.0	<p><b>S32K3 Real Time Drivers Version 1.0.0 Patch 03</b>            This is the NXP S32K3 Real Time Drivers Version 1.0.0 Patch 03 release for the S32K3 family of processors. It can be used standalone, or the update site can be installed on top of S32 Design Studio IDE v3.4 Service Pack 2. All software included in this release has RTM quality status in terms of testing and quality documentation with some driver's exceptions which are qualified as EAR (DC driver). RTM qualified drivers can be used in production.</p>	<a href="#">Download Log</a>
1.0.0	<p><b>S32K3 Real Time Drivers Version 1.0.0 Patch 04</b>            This is the NXP S32K3 Real Time Drivers Version 1.0.0 Patch 04 release for the S32K3 family of processors. It can be used standalone, or the update site can be installed on top of S32 Design Studio IDE v3.4 Service Pack 2. All software included in this release has RTM quality status in terms of testing and quality documentation with some driver's exceptions which are qualified as EAR (DC driver). RTM qualified drivers can be used in production.</p>	<a href="#">Download Log</a>

- Click on the link in the red box in the above figure. To complete the download of the software, confirm the license terms and click I Agree to accept in the window.

## Software Terms and Conditions

### S32K3 Real Time Drivers Version 1.0.0

Please read the following agreement and click "I AGREE" at the bottom before downloading your software.

ATTACHMENT A – NXP S32 PLATFORM SOFTWARE LICENSE AGREEMENT v1.5

IMPORTANT. Read the following NXP S32 Platform Software License Agreement ("Agreement") completely. By selecting the "I Accept" button at the end of this page, or by downloading, installing, or using the Software, you indicate that you accept the terms of the Agreement and you acknowledge that you have the authority, for yourself or on behalf of your company, to bind your company to these terms. You may then download or install the file(s). In the event of a conflict between the terms of this Agreement and any license terms and conditions for NXP's proprietary software embedded anywhere in the Software file(s), the terms of this Agreement shall control. If a separate license agreement for the Software has been signed by you or your company and NXP, then that agreement shall govern your use of the Software and shall supersede this Agreement.

NXP S32 PLATFORM SOFTWARE LICENSE AGREEMENT

- It is recommended to download all the contents, especially the .exe file is necessary.

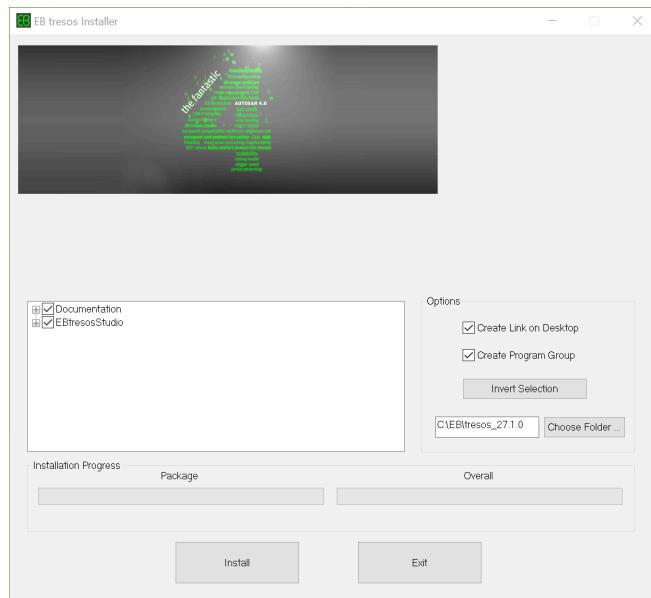
The screenshot shows the NXP Software & Support Product Download page for the S32K3 Real Time Drivers Version 1.0.0. The page has a navigation bar with links for PRODUCTS, APPLICATIONS, DESIGN, SUPPORT, and COMPANY. Below the navigation bar, the URL is NXP > Design > Automotive SW - S32K3 - Real-Time Drivers for Cortex-M > S32K3 Real Time Drivers Version 1.0.0 : Files. The main content area is titled "Product Download" and "S32K3 Real Time Drivers Version 1.0.0". It features a "Files" tab selected, showing a list of 6 files. The files are:

File Description	File Size	File Name
SW32K3_RTD_4.4_1.0.0_D2110.exe	48.7 MB	SW32K3_RTD_4.4_1.0.0_D2110.exe
SW32K3_RTD_4.4_1.0.0_D2110_QualityPackage.zip	43.3 MB	SW32K3_RTD_4.4_1.0.0_D2110_QualityPackage.zip
SW32K3_RTD_4.4_1.0.0_D2110_ReleaseNotes.pdf	2.1 MB	SW32K3_RTD_4.4_1.0.0_D2110_ReleaseNotes.pdf
SW32K3_RTD_4.4_1.0.0_D2110_SCR.txt	2.1 KB	SW32K3_RTD_4.4_1.0.0_D2110_SCR.txt
SW32K3_RTD_4.4_1.0.0_DS_updatesite_D2110.zip	69.4 MB	SW32K3_RTD_4.4_1.0.0_DS_updatesite_D2110.zip
SW32K3_RTD_4.4_D2110_SafetyPackage.zip	1.1 MB	SW32K3_RTD_4.4_D2110_SafetyPackage.zip

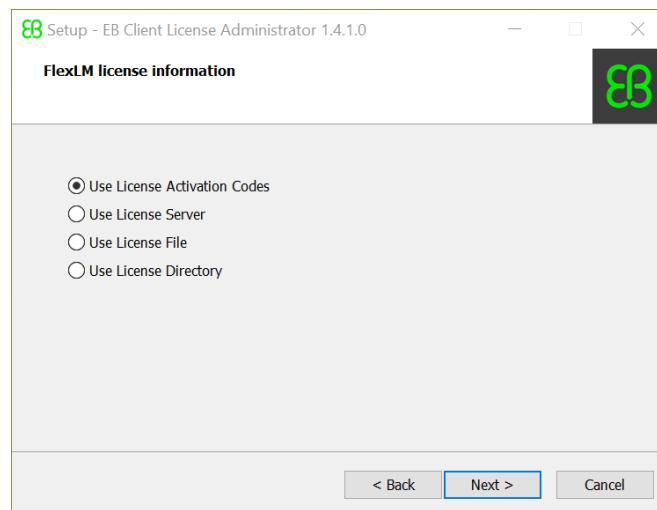
This next chapters will guide you how to install the above downloaded software.

## 2.6 Install EB tresos Studio

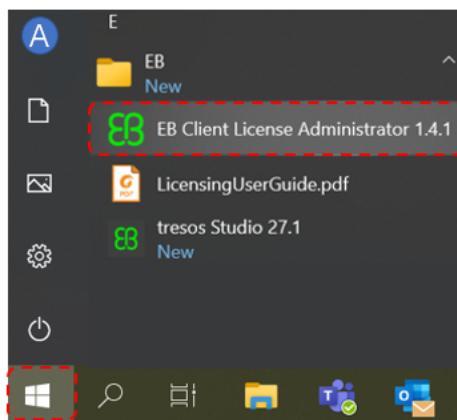
- Run the installation file: `setup.exe` and install it with default configuration. However, if you will/are installing multiple versions of EB, you need to pay attention to the installation path, each version should has its own separate installation folder/path. E.g. you can add a version number to the default folder name (For example: "C:\EB\tresos\_27.1.0").



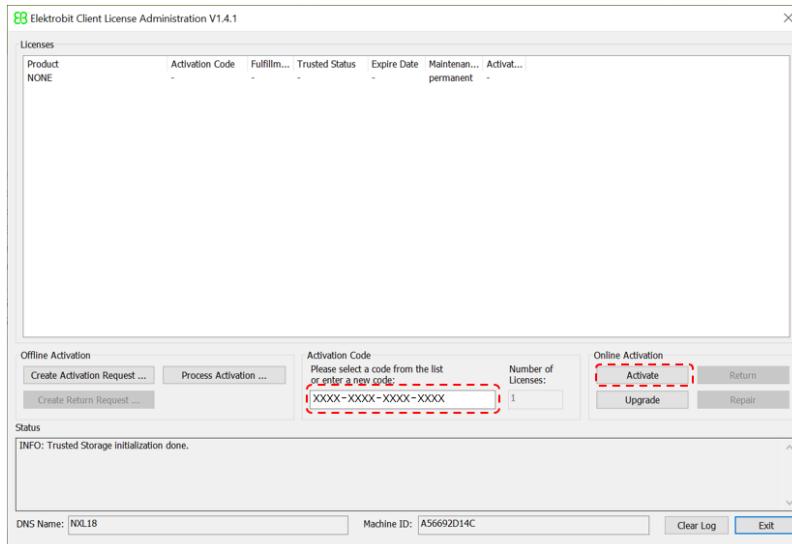
- Optional:** Only perform this step if you have not installed any "`EB_Client_License_Administrator`" before. Run the execute file: `EB_Client_License_Administrator_1_4_1_Setup.exe` and during installation select:  `Use License Activation Codes`, in order to activate the software.



- Launch “EB Client License Administrator” application from the Windows menu for activation of the EB tresos Studio.



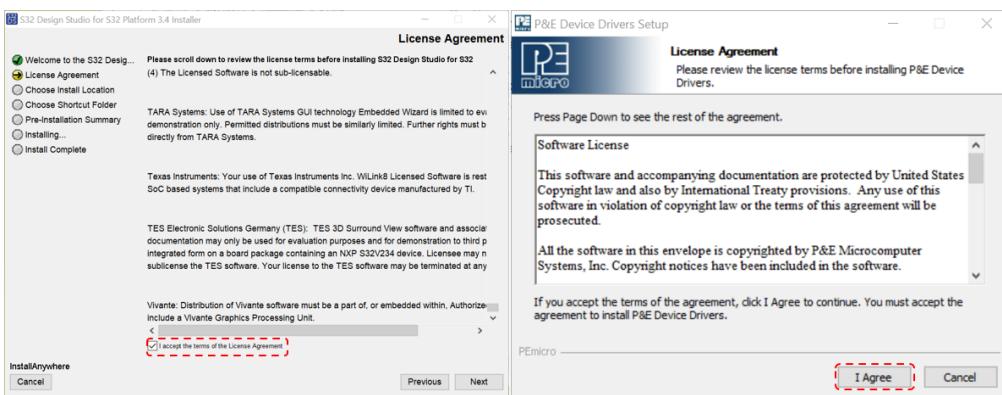
- Using the activation code previously stored, paste it in the "Activation Code" box, and click the Activate button to activate.



**Note:** There might be errors reported in the activation process. You can try to close the firewall or re-try at another time.

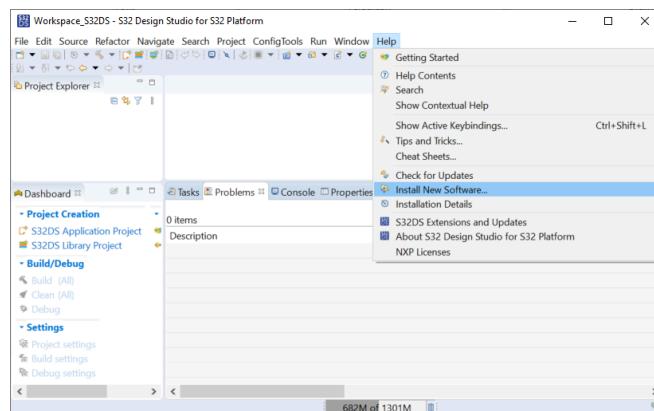
## 2.7 Install S32 Design Studio

Run the installation file: S32DS.3.4\_b201217\_win32.x86\_64.exe and keep the default settings. If you are installing for the first time, please activate it online using a previously stored activation code or the activation code in the email. To complete the installation, during this process, confirm the license terms and accept them by checking the item:  I accept the terms of the License Agreement and by click on the button: I Agree .

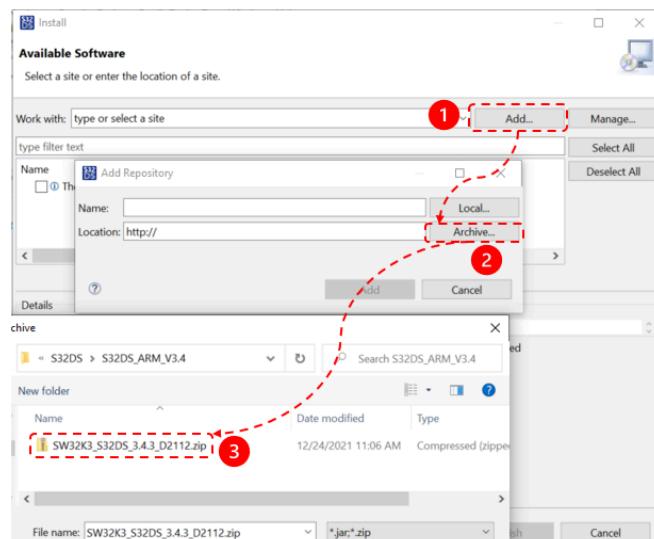


After this, you need install the S32K3 development package, which contains several updates.

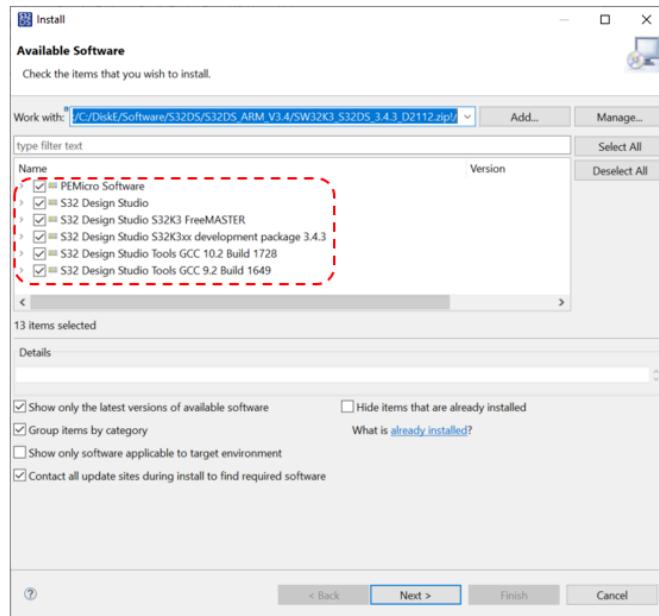
- Open S32DS, Help → “Install New Software...”:



- In the pop up window, browse the S32K3 development package: *SW32K3\_S32DS\_3.4.3\_D2112.zip*.

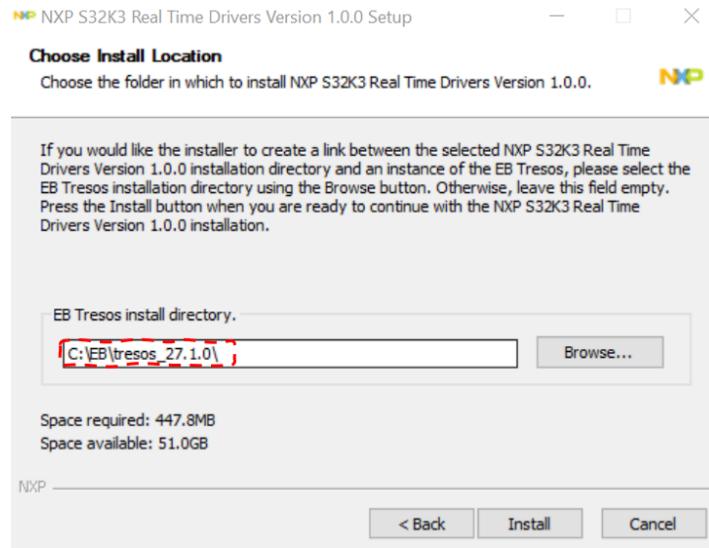


- It is recommended that install all components by default and confirm the license terms during the process.



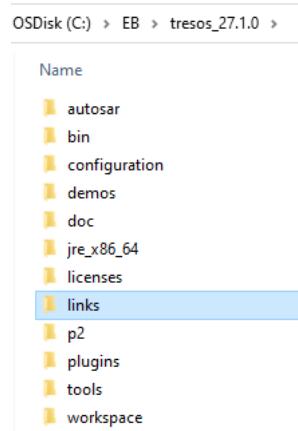
## 2.8 Install Real-Time Drivers (Optional)

Run the installation file: **SW32K3\_RTD\_4.4\_1.0.0\_D2110.exe**, and install it with default configuration. There is a step that requires to specify the EB tresos Studio installation path, shown in the below figure. Browse the correct installation path of EB tresos Studio, if you installed EB tresos Studio into a non-default directory.



### Note:

*In some documents, you may be told to install RTD/MCAL into EBT's plugins folder. But if you have multiple versions of RTD installed (including HotFix/Patch packages), there might be compatibility issues. It is recommended that you keep the default installation path, it will create a link file in the <EBT\_Installation\_Path>/links folder to bind the package.*

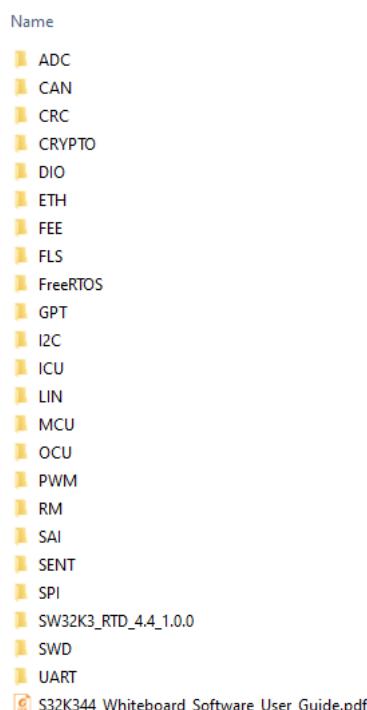


## 3 Package Contents

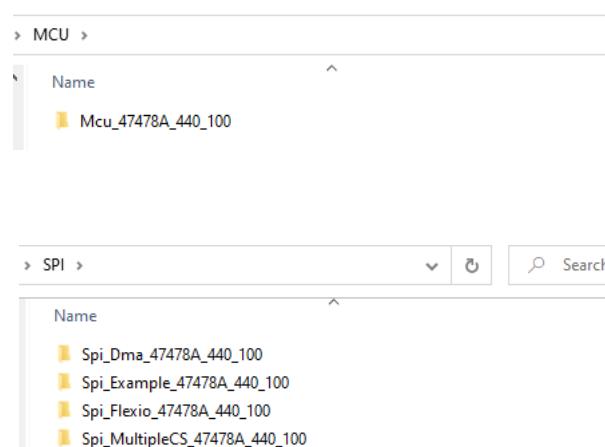
### 3.1 Overview

In this example package, each module contains at least one example project to address different usage scenarios. In addition to the on-chip peripherals, it provides example projects for external devices of the S32K344-WB.

After installation, the package will look like this:



Each module has its own folder. The name of each module's folder is an abbreviation for the module.



The name of each example project looks like this: **Xxx\_(Yyy)\*\_47478A\_440\_100**.

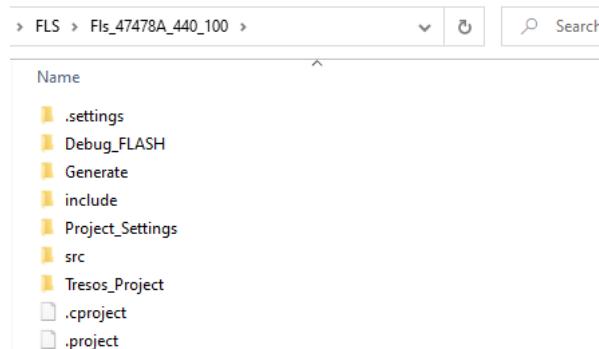
**Table 1. Explanation of project name rules**

Items	Description
<b>Xxx</b>	Module name abbreviation. For example: Spi, Mcu, Dio.
<b>(Yyy)*</b>	This is an optional part, it can be used to indicate the function or submodule name, it may exist multiple parts.
<b>47478A</b>	Indicates the hardware number, commonly you can find it on the board. In this package, it is fixed to "47478 A", it means white board.
<b>440</b>	Indicates the AUTOSAR version which developed based. In this package it is fixed to "440", which means development based on AUTOSAR version 4.4.0.
<b>100</b>	Indicates the SW release number, this is defined by NXP. In this package it is fixed to "100", which means RTM 1.0.0.

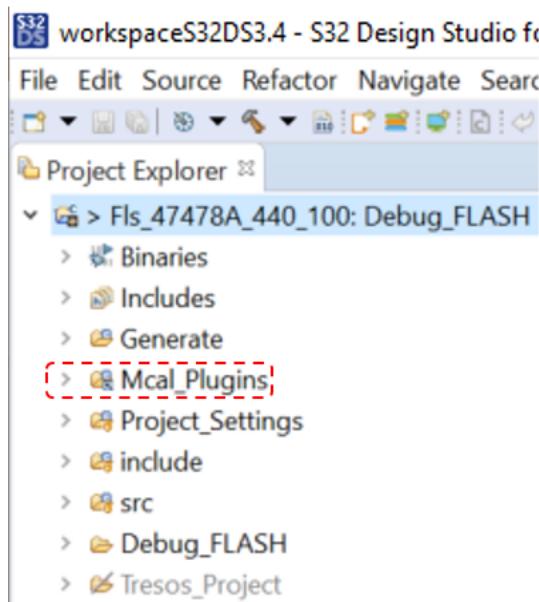
Each part separated by underscore (\_).

## 3.2 Example Project Structure

The contents of most example projects look like this, only few example projects may different.



After importing the project into S32DS, it looks like this:



It will shows another folder named “*Mcal\_Plugins*” which is a linked folder to the RTD plugin which located in the package root folder (“*SW32K3\_RTD\_4.4\_1.0.0*”). All the example projects share the same piece of code.

The specific information is shown in the table below:

Table 2. Explanation of project folder structure

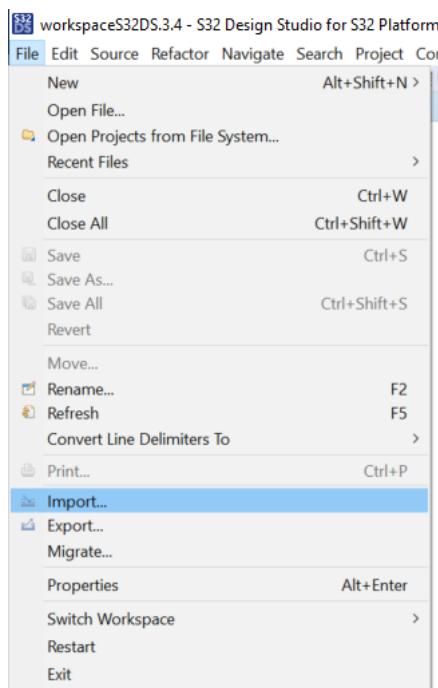
Items	Description
<b>.settings</b>	Generated by S32DS, don't need care it.
<b>Debug_FLASH</b>	Compiler output folder, the “.elf” file is located in it, it will not be seen this folder in default, after compile it will appear.
<b>Generate</b>	Configuration output folder which generated by EB tresos Studio.
<b>include</b>	Reserve it for use. You can put your “.h” file in this folder, or delete it if you don't use it.
<b>Project_Settings</b>	Generated by S32DS, the debugger file located in this folder.
<b>src</b>	The source files located in this folder.
<b>Tresos_Project</b>	EB tresos Studio project which used to configure the modules.
<b>.cproject/.project</b>	Both these two files are S32DS project file.

## 4 Import Project

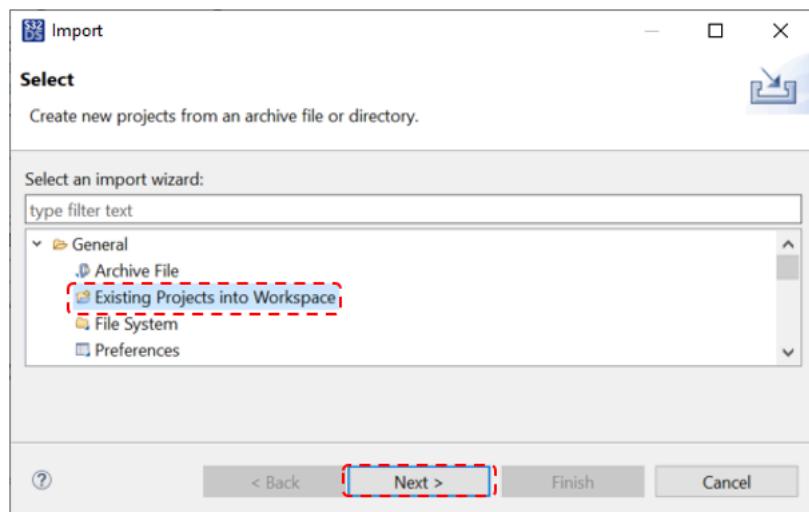
After completing the environment setup, you can run the example project on the target board. Please follow the steps in the next chapters.

### 4.1 Import S32DS Project

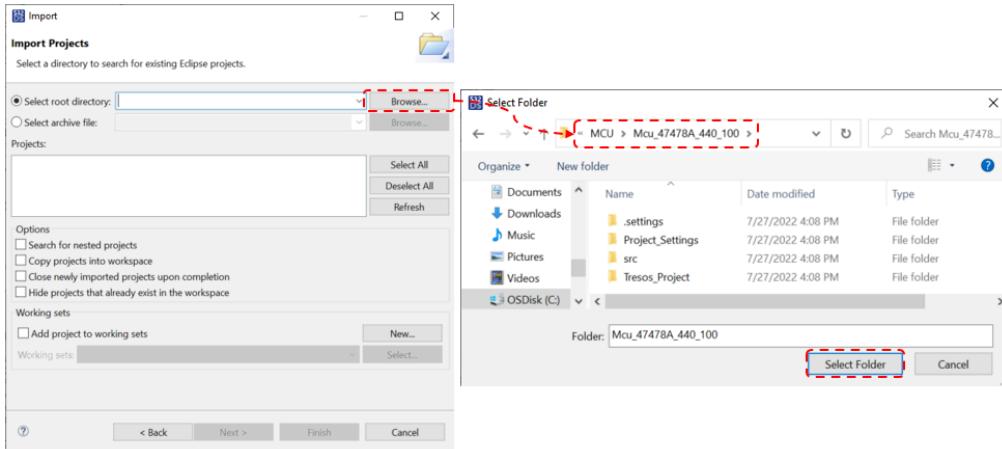
- Open S32 Design Studio: File → “Import...”.



- General → “Existing Projects into Workspace”.



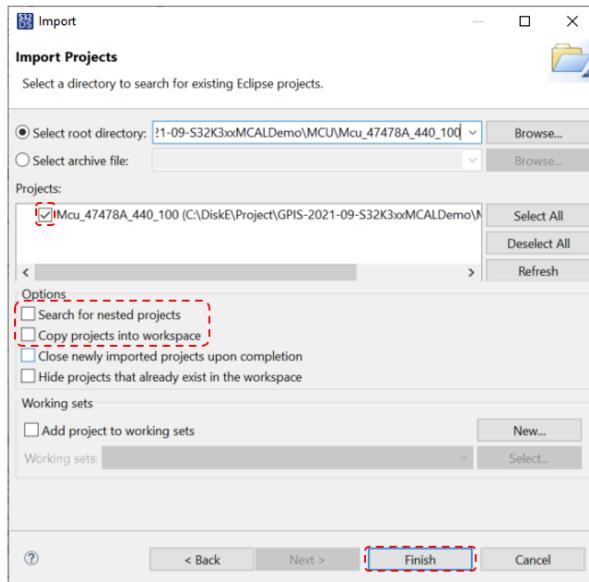
- Browse the project.



#### Note:

In the above figure, don't browse the "Tresos\_Project" folder, under this folder, there is another folder also named "Mcu\_47478A\_440\_100", but that folder is for EB tresos Studio.

- Setting options, then click on Finish to complete.



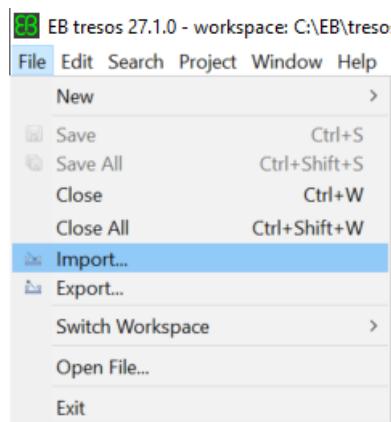
#### Note:

In the above figure, **DON'T** check the option:  Search for nested projects and  Copy projects into workspace.

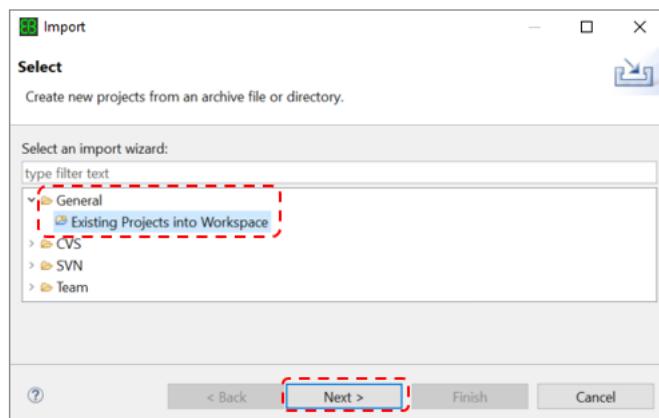
In general, the configuration files must be generated by EB tresos Studio prior compiling the S32DS project. In this example package, it has provided in default thus you can compile directly. If you will not need change any configuration, then you can ignore the following two chapters.

## 4.2 Import EB tresos Project (Optional)

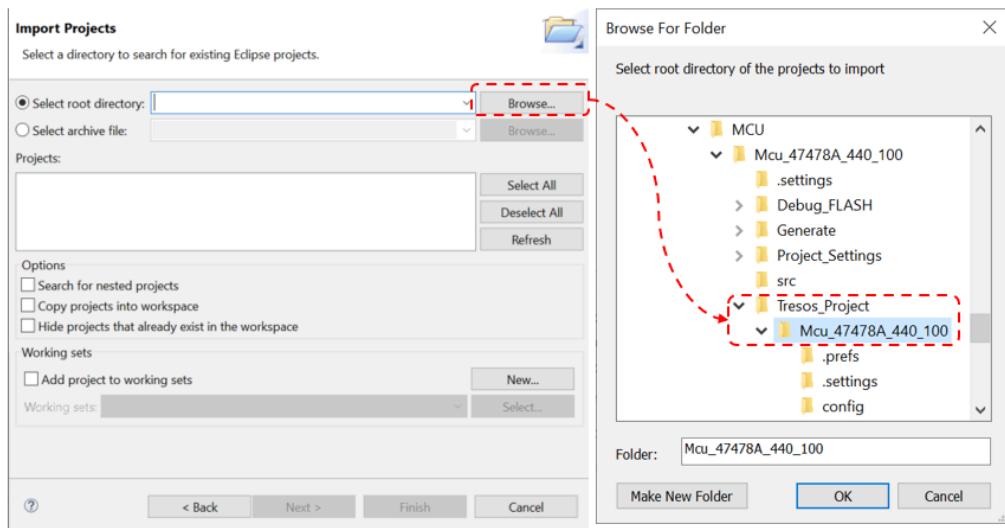
- Open EB tresos Studio: File → “Import...”.



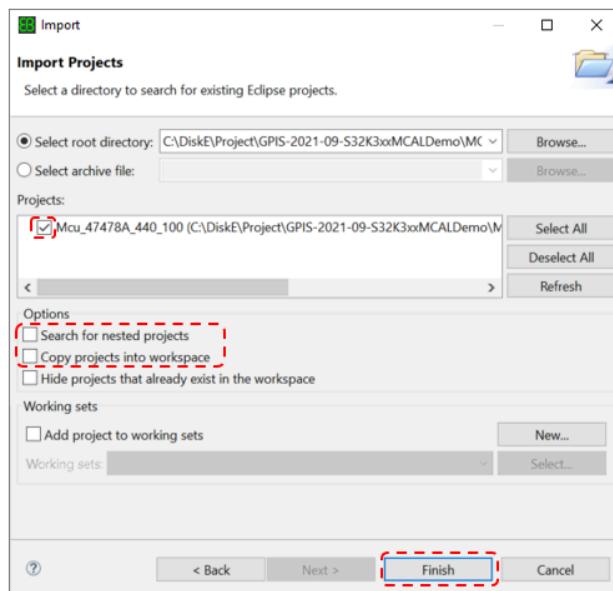
- General → “Existing Projects into Workspace”.



- Browse the project located in the “Tresos\_Project” folder.



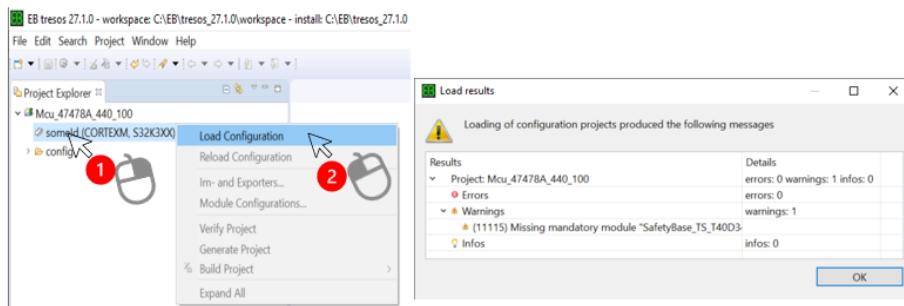
- Setting options. Uncheck the option:  *Search for nested projects* and  *Copy projects into workspace*, then click-on **Finish** to complete.



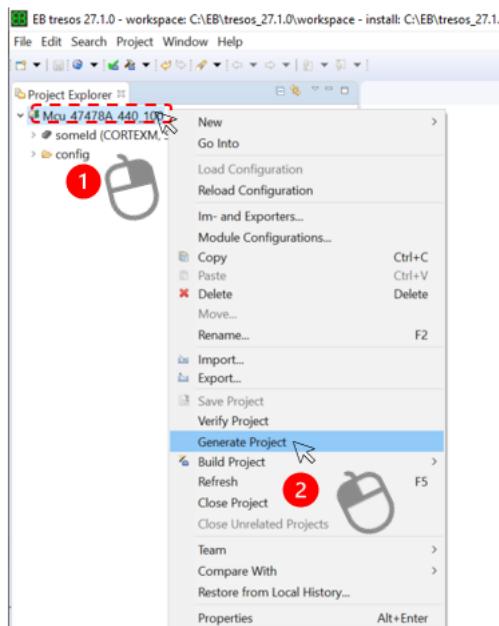
## 5 Generate Code (Optional)

All the examples include the generate code in default, you can compile directly if you didn't change any configuration.

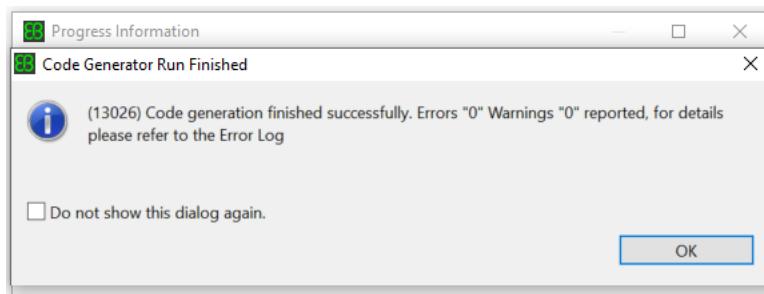
- Right-click on the project/instance → Click on “Load Configuration” to load project. Otherwise, the generate function will be deactivated. During this process, it may pop up a results window to show you if there are errors or warnings.



- Right-click on the project root folder → Click on “Generate Project” to generate the configuration codes.



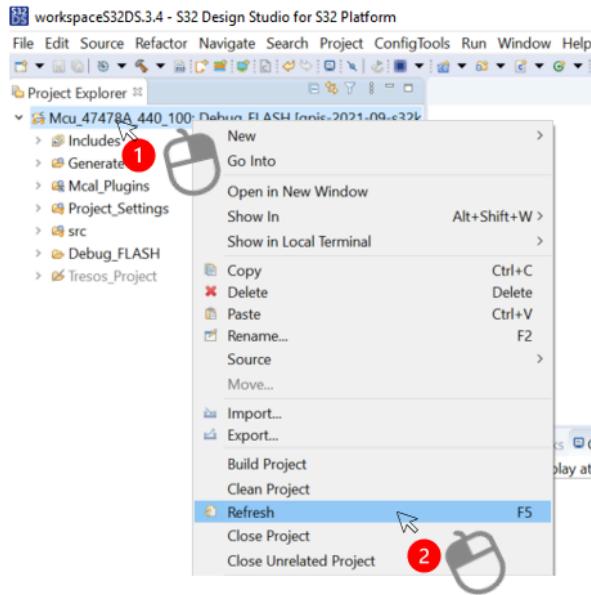
- It will pop up a window showing if there are errors and warnings.



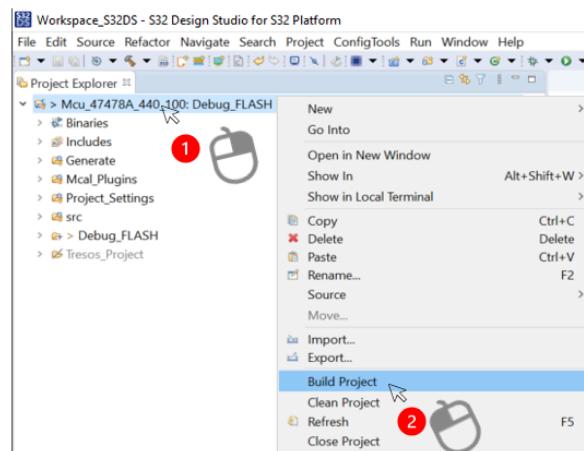
## 6 Build Project

Once generate the code without error (optional steps for this package), you can build the project now. All these example projects are built with S32DS + GCC.

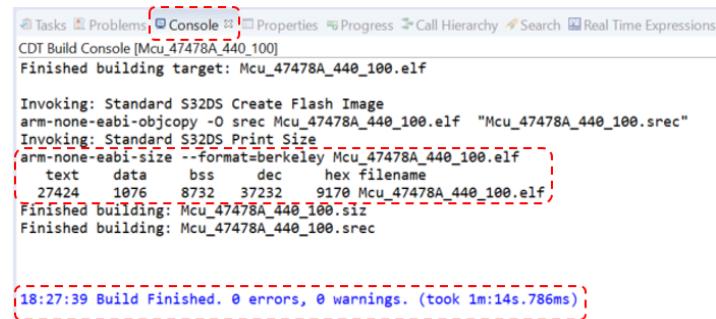
- Right-click on the project root folder → select “Refresh”.



- Right-click on the project root folder → select “Build Project”.



- There will be the following figure shown in the S32DS Console window when build completed.



```
CDT Build Console [Mcu_47478A_440_100]
Finished building target: Mcu_47478A_440_100.elf

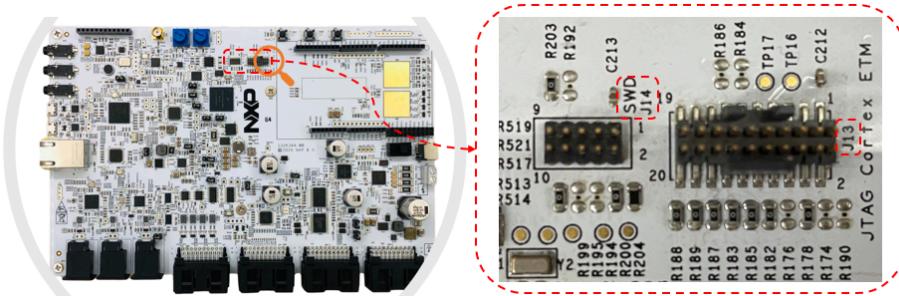
Invoking: Standard S32DS Create Flash Image
arm-none-eabi-objcopy -O srec Mcu_47478A_440_100.elf "Mcu_47478A_440_100.srec"
Invoking: Standard S32DS Print Size
arm-none-eabi-size --format=berkeley Mcu_47478A_440_100.elf
text      data      bss      dec      hex      filename
27424    1076    8732    37232    9170  Mcu_47478A_440_100.elf
Finished building: Mcu_47478A_440_100.siz
Finished building: Mcu_47478A_440_100.srec

18:27:39 Build Finished. 0 errors, 0 warnings. (took 1m:14s.786ms)
```

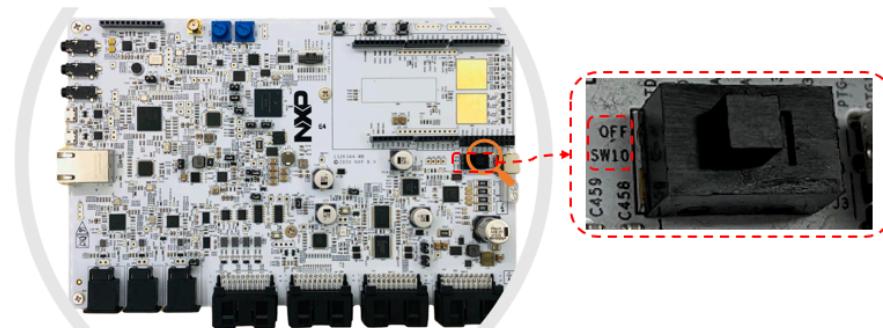
## 7 Download And Debug

Once build the example project without errors, download the binary file into your target board and debug it. However, the S32K344-WB don't have on-board debugger. Here we introduce how to use the debugger: "PEmicro Multilink" to download and debug.

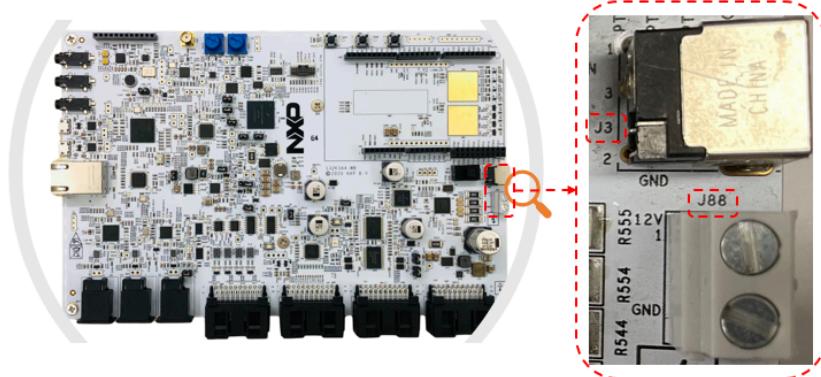
- First, connect the debugger via a 20-pin/10-pin cable to J13/J14.



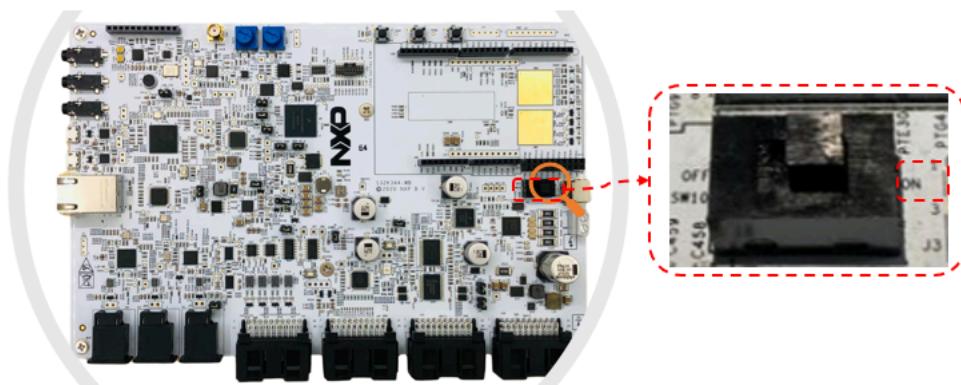
- Make sure the switch/SW10 is off.



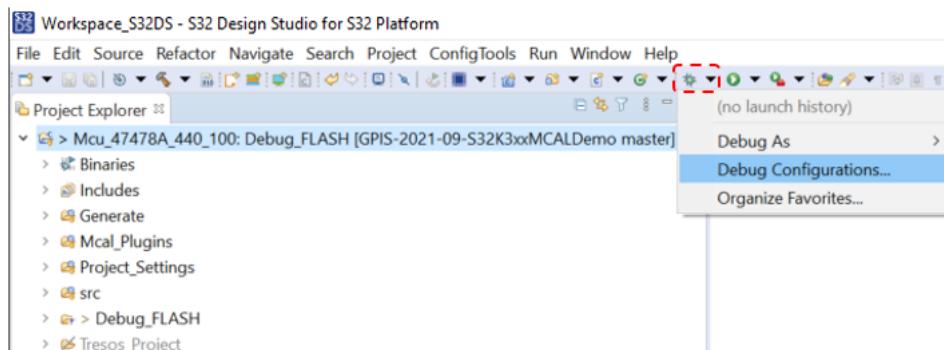
- Connect the power supply to the board on either J3 or J88 (Please make sure connecting the VBAT and GND to the correct terminals).

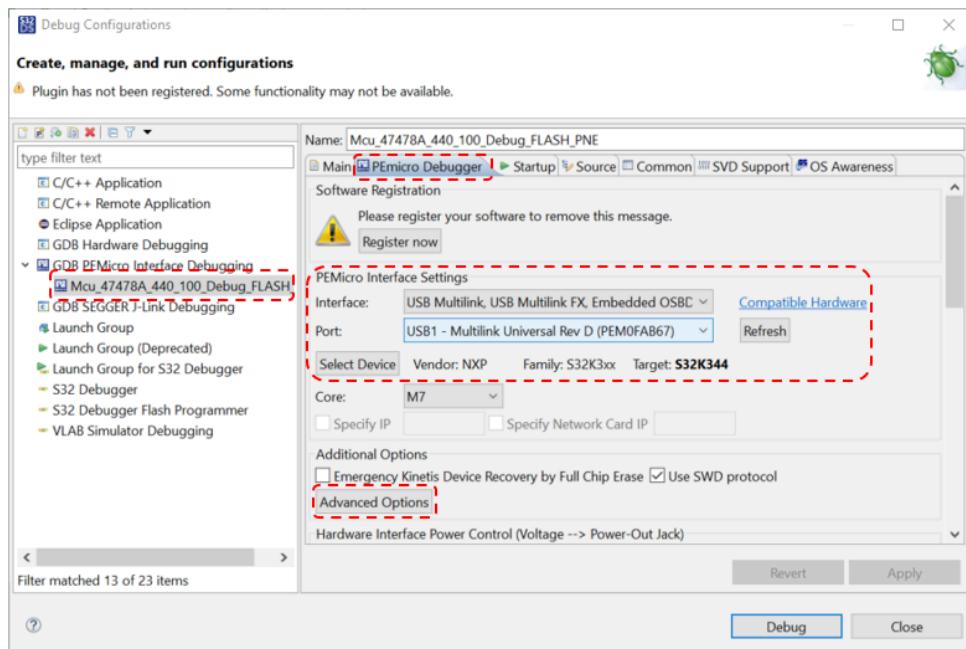


- Turn on the power supply of DC 12V.
- Turn on the switch/SW10.

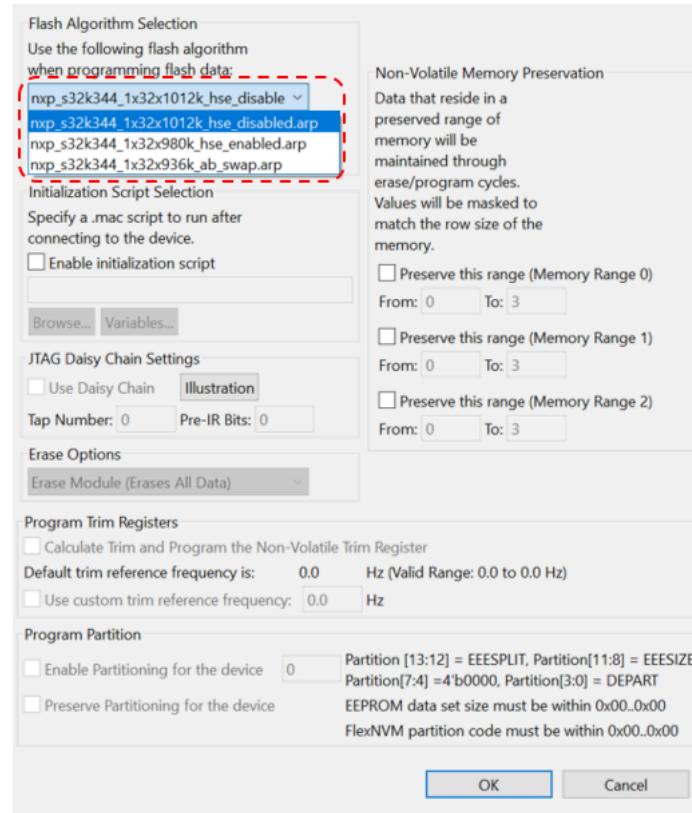


- Then follow the below figures to setup the debug target.

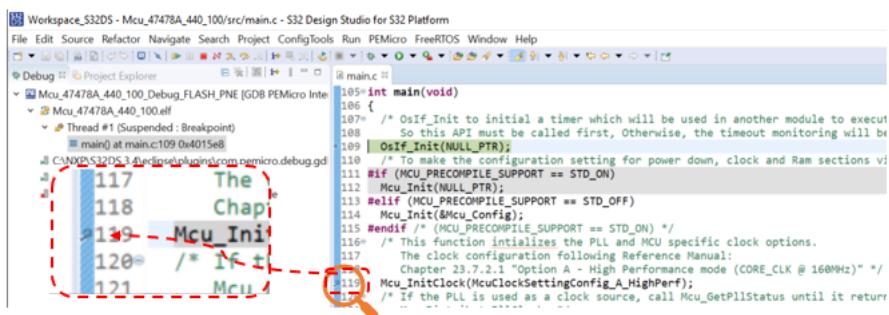




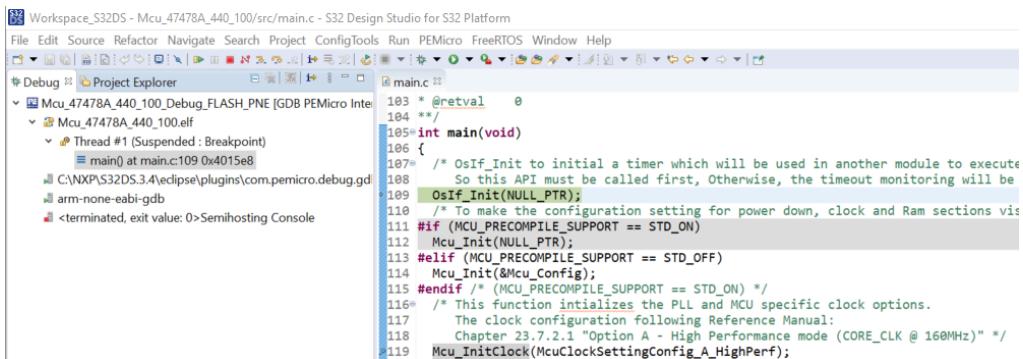
- If the MCU was installed with the HSE firmware, you need change the flash algorithm, click on the Advanced Options button shows in the above figure. There are three options:
  - The first one is the default option for MCU without HSE firmware.
  - The second one is for MCU with HSE firmware installed.
  - The last one is for MCU with HSE firmware installed and AB swap feature enabled.



- You can set a breakpoint by double-clicking in front of a line of code.



- Click to run the program. Click to pause. Click to terminate. Click this icon to reset/restart MCU. You can debug step by step through these icons:

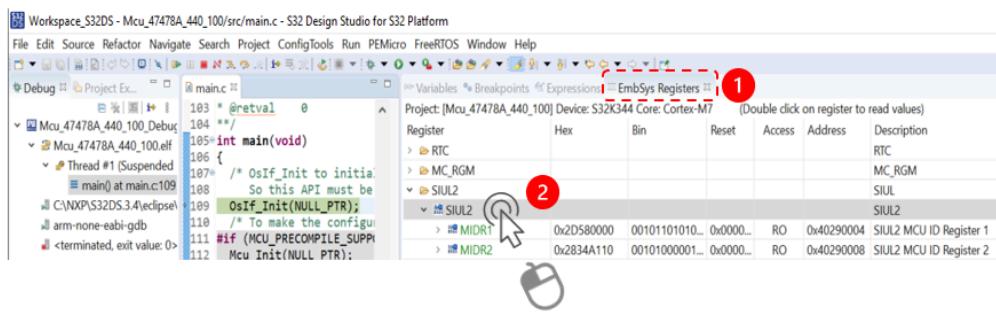


```

103 * @retval 0
104 */
105 int main(void)
106 {
107     /* OsIf_Init to initial a timer which will be used in another module to execute
108     So this API must be called first, Otherwise, the timeout monitoring will be
109     OsIf_Init(NULL_PTR);
110     /* To make the configuration setting for power down, clock and Ram sections vis
111     #if (MCU_PRECOMPILE_SUPPORT == STD_ON)
112     Mcu_Init(NULL_PTR);
113     #elif (MCU_PRECOMPILE_SUPPORT == STD_OFF)
114     Mcu_Init(&mcu_Config);
115     #endif /* (MCU_PRECOMPILE_SUPPORT == STD_ON) */
116     /* This function intializes the PLL and MCU specific clock options.
117     The clock configuration following Reference Manual:
118     Chapter 23.7.2.1 "Option A - High Performance mode (CORE_CLK @ 160MHz)" */
119     Mcu_Initclock(McuClockSettingConfig_A_HighPerf);

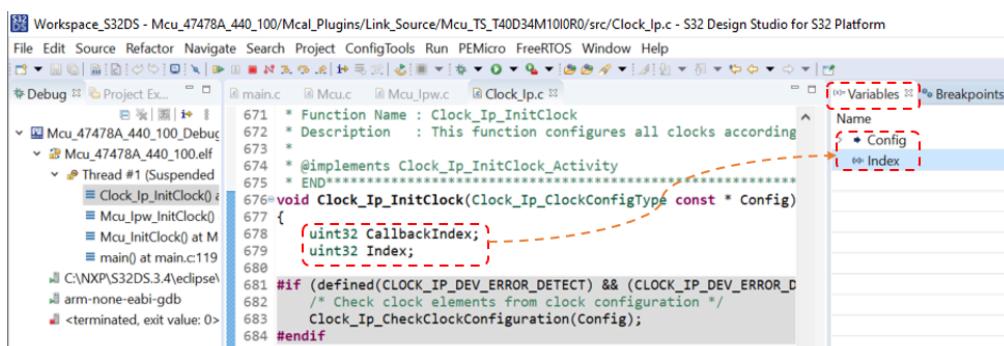
```

- You can view the register values in the “EmbSys Registers” window (Double-click the register name).



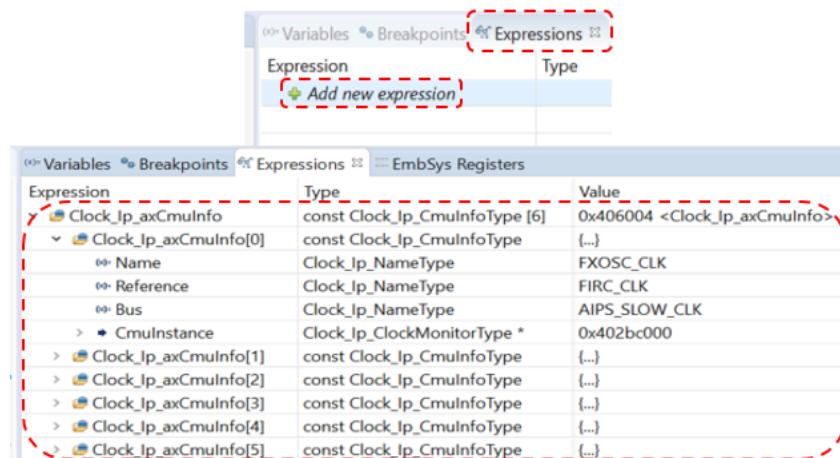
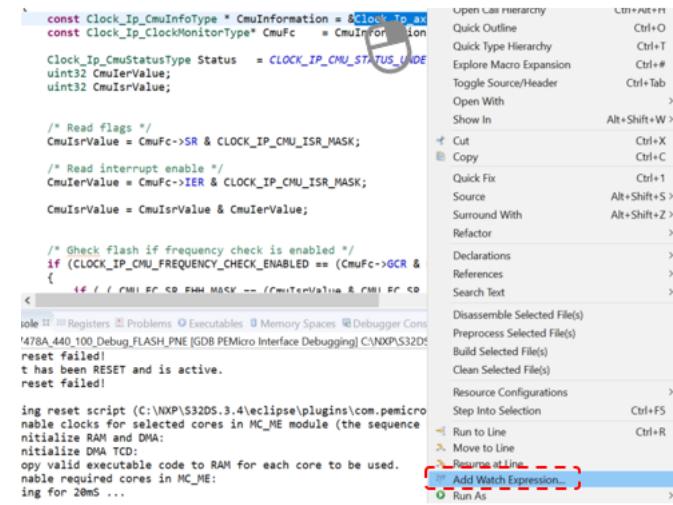
Register	Hex	Bin	Reset	Access	Address	Description
RTC						RTC
MC_RGM						MC_RGM
SIUL2						SIUL2
SIUL2						SIUL2
MIRD1	0x2D580000	00101101010...	0x0000...	RO	0x40290004	SIUL2 MCU ID Register 1
MIRD2	0x2834A110	00101000001...	0x0000...	RO	0x40290008	SIUL2 MCU ID Register 2

- You can see the local variables in the “Variables” window.



Name
Config

- You have two ways to observe a global variable value. Select the global variable which you want to observe, then right-click, select: “Add Watch Expression...”. Or you can copy the variable name and add it in the “Expressions” window directly through the feature: “Add new expression”.



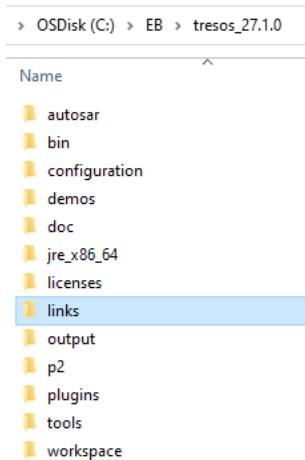
## 8 Update EBT Link (Optional)

If you will not modify any configuration for these example projects, please ignore this chapter. If you have the following two use cases, please continue:

- If you want to modify the configuration and you didn't install the RTD package.
- If you want to modify the configuration, and you had installed the RTD with a **non-default path**.

For the first case, a copied RTD codes had included in this package, but before use it, we need bond it with the EBT by a link file which located in: <EBT Installation folder>/links.

- Go to the path which you had installed the EBT and find the folder named "links". If there not exist, please create it.



- Create a link file in the "links" folder named: "SW32K1\_RTD\_4.4\_1.0.1\_HF01.link". Then input the following content into the file: *path=thePackagePathWhichYouLocated*.  
For example, suppose this package had installed with default path: C:\NXP\S32K344\_Whiteboard\_Example\_RTM\_1.0.0. The content of the link file should be:

```
path=C:/NXP/S32K344_Whiteboard_Example_RTM_1.0.0/S32K344_Whiteboard_Example_RTM_1.0.0/  
SW32K3_RTD_4.4_1.0.0
```

**CAUTION:** Please pay attention to the slash.

For the second case, the method is similar with above, the difference is that you don't need create the link file, but change the path directly based on the existed link file.

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## Tables

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Please be aware that important notices concerning this document and the product(s) described herein, have been included in section 'Legal information'.

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