BMS Software Installation Guide

Rev. 2.0 — 6 October 2023 User manual

Document information

Information	Content
Keywords	Battery Management System, BMS, High Voltage Battery Management System, HVBMS, Low Voltage Battery Management System, LVBMS, Software, Complex Device Driver, CDD, SDK, Software Development Kit
Abstract	This document aims to help installing and getting started with the Battery Management System (BMS) software packages.

1 Introduction

Software is a key part of the NXP Battery Management System solution. This document contains the steps needed to get started with NXP tools and software deliverables.

2 License activation

If you want to purchase the premium SW package please contact NXP sales or an NXP authorized distributor.

3 How to use the Package manager

Go on Package manager webpage.

Package manager from NXP downloads all the required software packages for the HVBMS use case besides S32 Design Studio IDE and tresos Studio.

How to use package manager for BMS:

1. In the *Devices* tab, select the MCU based on the BMU version:
   - S32K344 for V 2.0
   - S32K358 for V 3.0
2. Select the *HVBMS* use case in the *BUNDLES AND USE CASES*.
3. Click *GENERATE BUNDLE INSTALLER*.
4. Review the package selection (in the *Review Package* selection) and click *Next*.
5. In the *Export Control* tab, select for what type of industry/domain you use the NXP solution for and provide a short description of the intended use.
6. In the *License Agreement* tab, review the agreement and click *I accept the terms of the license agreement*.
7. A *NXP_Multi_Installer* is generated for the bundle and the download starts automatically.

See the downloaded *NXP_Multi_Installer_User_Manual.pdf* on how to use the *NXP Multi-Installer*.

In the *NXP Multi-Installer*, unselect the **Launch executables** files after download.

To continue with the installation, follow the procedures described in this document.

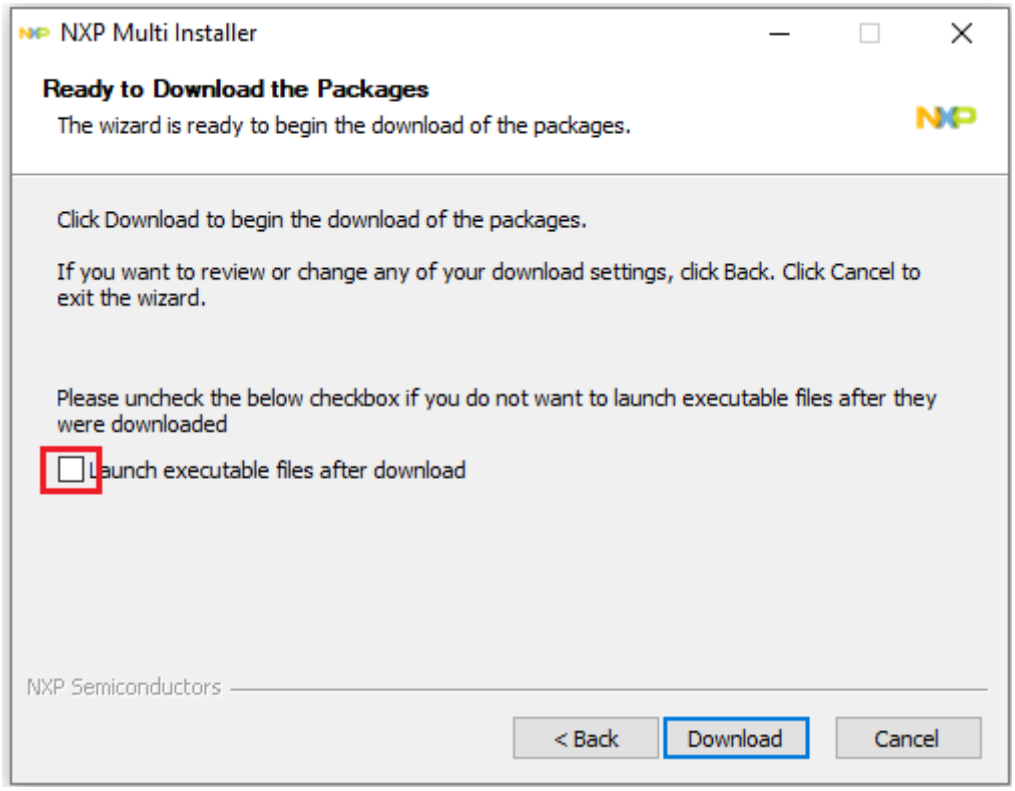


Figure 1. NXP Multi-Installer Launch executable

4 BMS Software installation procedure

This section details the installation steps, from license activation to the first run of an example project.

4.1 Development environments

NXP Battery Management software can be used plug and play in the following development environments:

- NXP S32 Design Studio and its integrated Configuration Tool (S32CT)
- AUTOSAR® Elektrobit (EB) Tresos

The next sections are detailing the installation procedure for both options.

4.1.1 S32 Design Studio

The S32 Design Studio for S32 Platform IDE is based on the Eclipse open development platform. It integrates the Eclipse IDE, GNU Compiler Collection (GCC), GNU Debugger (GDB), and other software to offer designers a straightforward development tool with no code-size limitations.

To install S32 Design Studio follow the instructions from section Section 4.1.1.1.

In addition to S32 Design Studio, the following update sites must be installed in the order presented below:

1. S32 Design Studio 3.5 Update 3 package: *SW32_S32DS_3.5.3_D2306.zip*
2. S32K3 Development Packages: *SW32K3xx_S32DS_3.5.0_D2303.zip*
   For more information, refer to chapter *Installation* from the Release Notes
3. Real-Time Drivers: *SW32K3_RTD_4.4_R21-11_3.0.0_D2303_DS_updatesite.zip*

4. BMS Software Development Kit: *SW32K3_BMS_SDK_4.4_R21-11_1.0.1_updatesite_D2308.zip.*
5. BMS Safety Libraries Software Development Kit:
   - *SW32K3_BMS_SL_SDK_4.4_R21-11_1.0.1_DEMO_updatesite_D2308.zip* if the *demo* variant was acquired
   - *SW32K3_BMS_SL_SDK_4.4_R21-11_1.0.1_updatesite_D2308.zip* if the premium *variant* was purchased

   To switch between *demo* and *premium* version see section: Section 4.1.1.3
6. HVBMS Reference Application SW package: *SW32K3_BMS_APP_4.4_CD02_0.8.0_updatesite_2310.zip*.
7. FS26 SBC driver: *SW32K3_FS26_R21-11_2.0.0_DS_updatesite_D2308.zip.*
8. FreeRTOS: *SW32K3_FreeRTOS_10_5_1_UOS_3_1_0_DS_updatesite_D2304.zip.*
9. FreeMASTER communication driver: *com.nxp.s32ds.s32k3.sdk.freemaster.v_3.0.repository_1.0.0.202308041202.zip.*

Note: To install the above mentioned packages, follow the generic installation procedure.

4.1.1.1 S32 Design Studio installation

The first step to complete in this installation is to set up the S32 Design Studio for S32 Platform IDE. To do so, perform the following steps:

1. Run *S32DS.3.5_b220726_win32.x86_64.exe* to start the installation procedure.
   For more details, please refer to *S32 Design Studio for S32 Platform 3.5 Installation Guide*
2. Open S32 Design Studio.
3. Open *S32DS Extensions and Updates*.

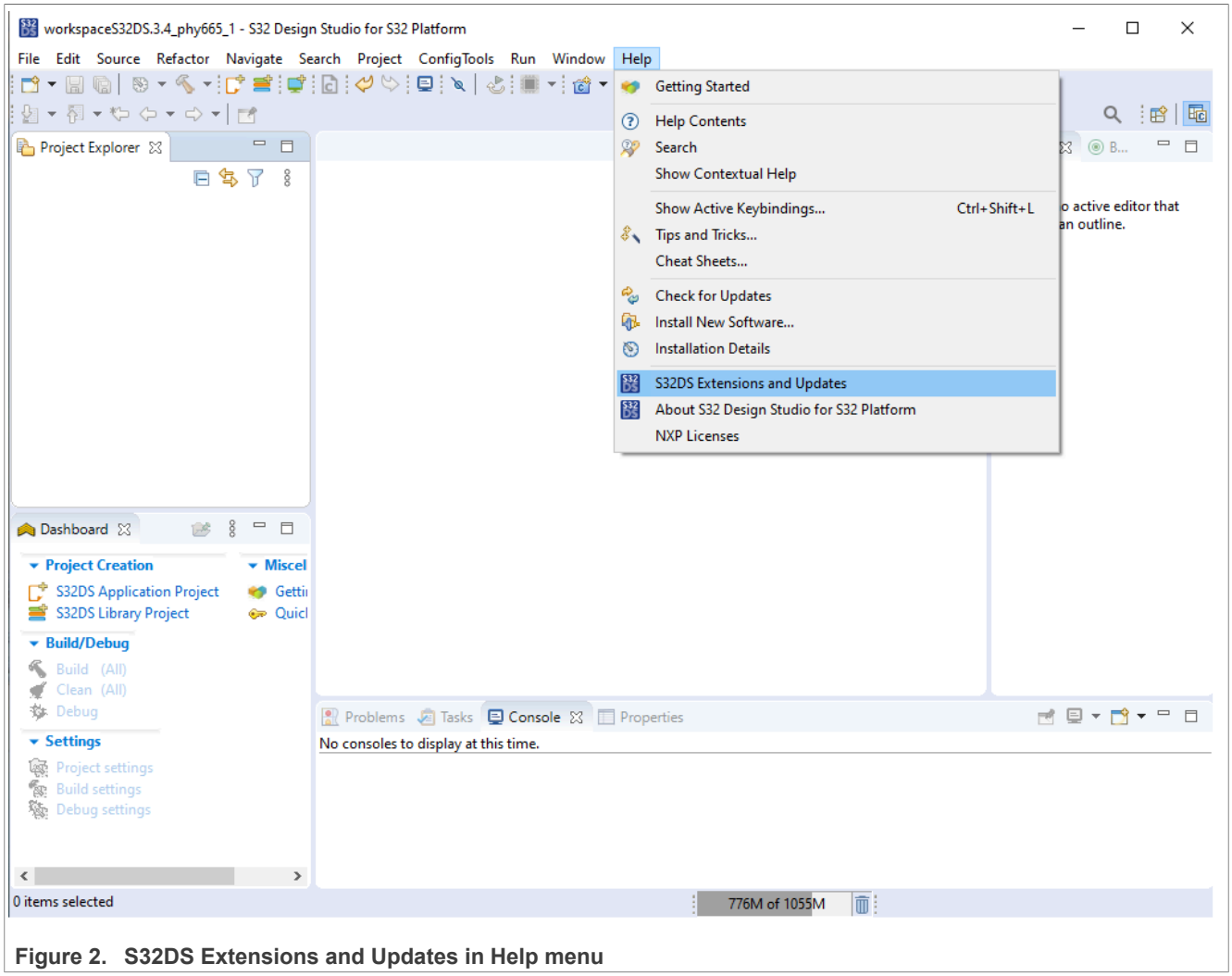


Figure 2. S32DS Extensions and Updates in Help menu

4. Click on *Manage Sites*.

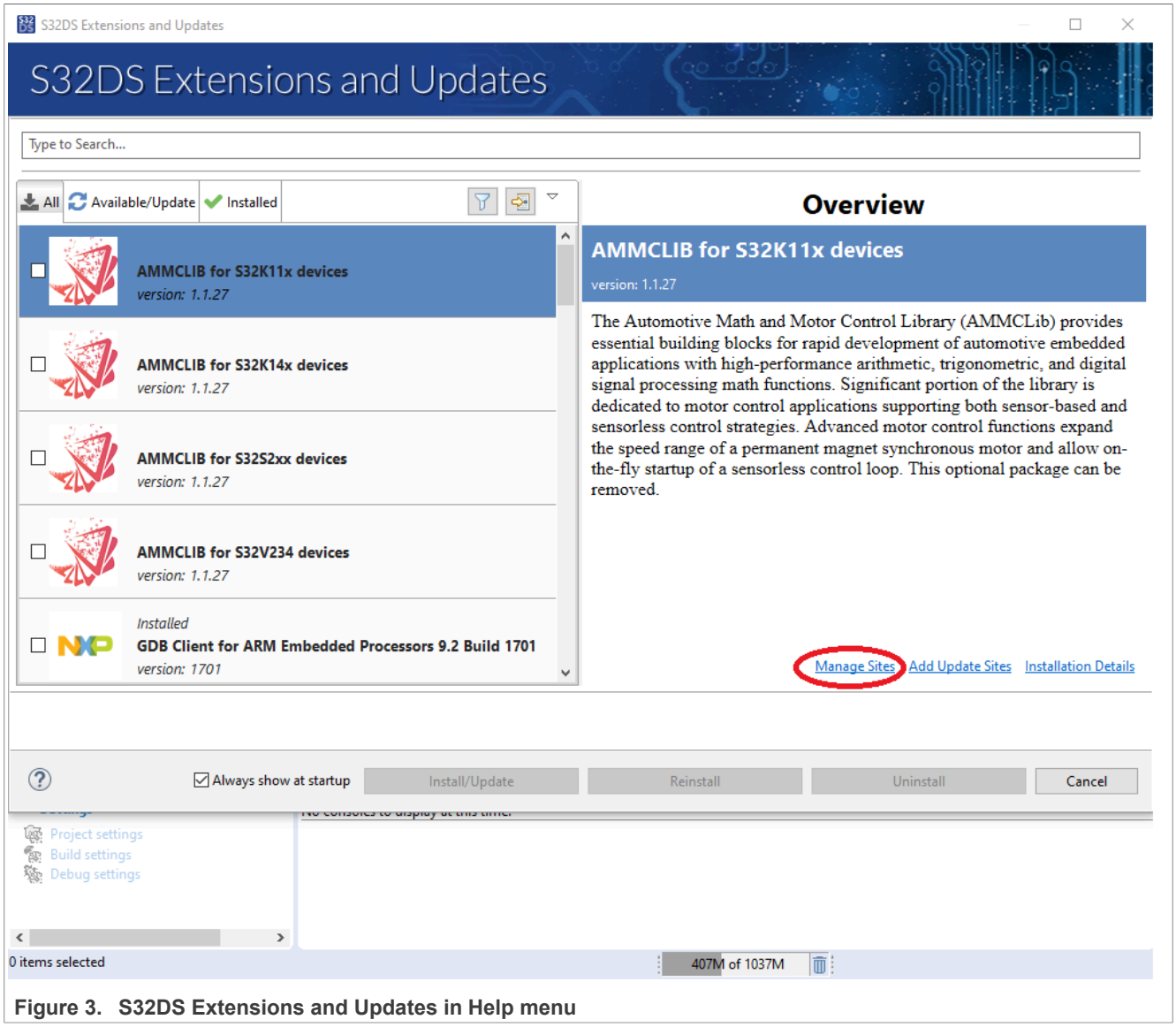


Figure 3. S32DS Extensions and Updates in Help menu

5. Remove all elements from *Available S32DS Software Sites*

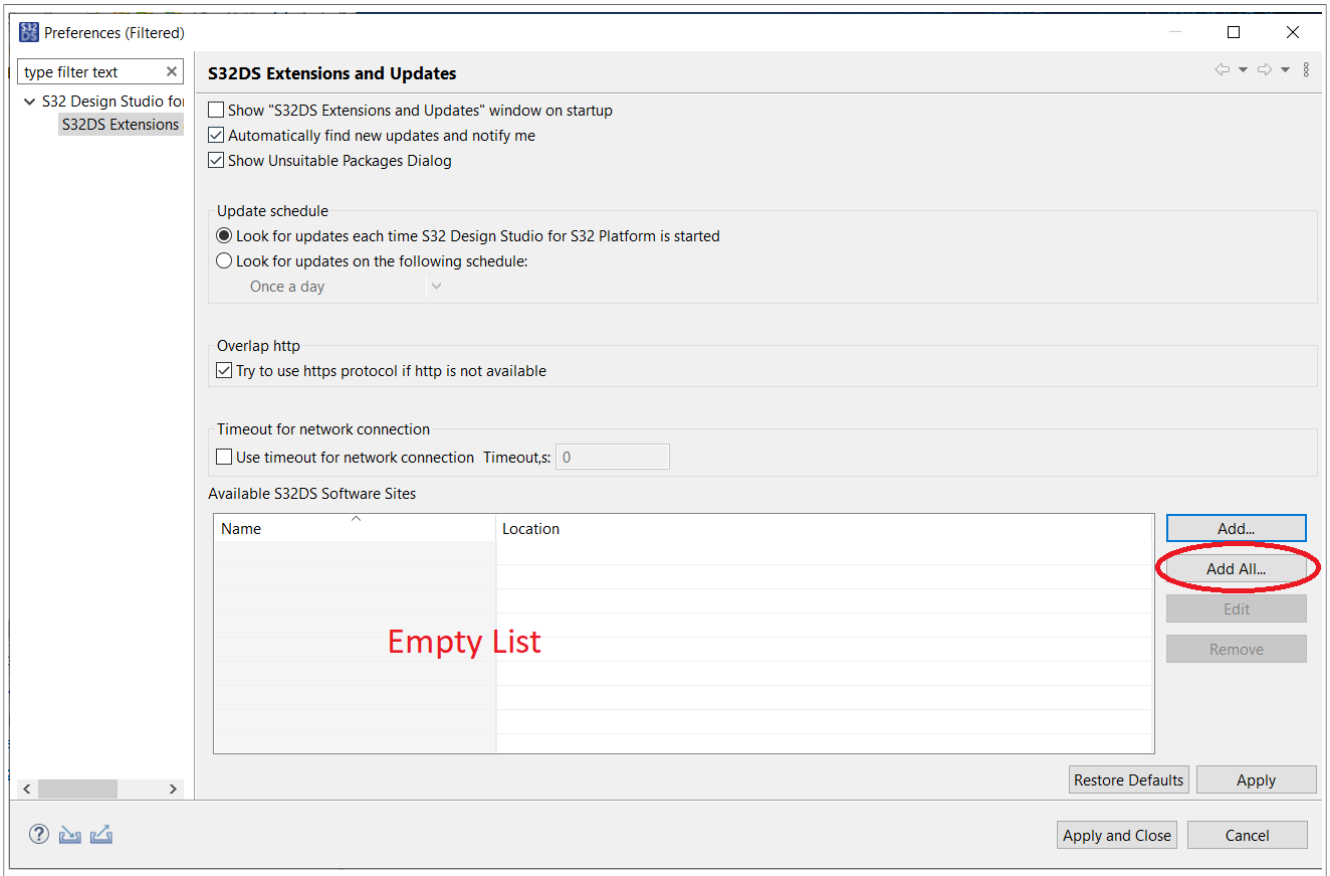


Figure 4. Add packages

6. Add the following required update sites:
   - *SW32_S32DS_3.5.3_D2306.zip*
   - *SW32K3xx_S32DS_3.5.0_D2303.zip*
   - *SW32K3_RTD_4.4_R21-11_3.0.0_D2303_DS_updatesite.zip*
   - *SW32K3_BMS_SDK_4.4_R21-11_1.0.1_updatesite_D2308.zip*
   - *SW32K3_BMS_SL_SDK_4.4_R21-11_1.0.1_DEMO_updatesite_D2308.zip*
   - *SW32K3_BMS_APP_4.4_CD02_0.8.0_updatesite_2310.zip*
   - *SW32K3_FS26_R21-11_2.0.0_DS_updatesite_D2308.zip*
   - *SW32K3_FreeRTOS_10_5_1_UOS_3_1_0_DS_updatesite_D2304.zip*
   - *com.nxp.s32ds.s32k3.sdk.freemaster.v_3.0.repository_1.0.0.202308041202.zip*
7. Click on *Apply and Close*.

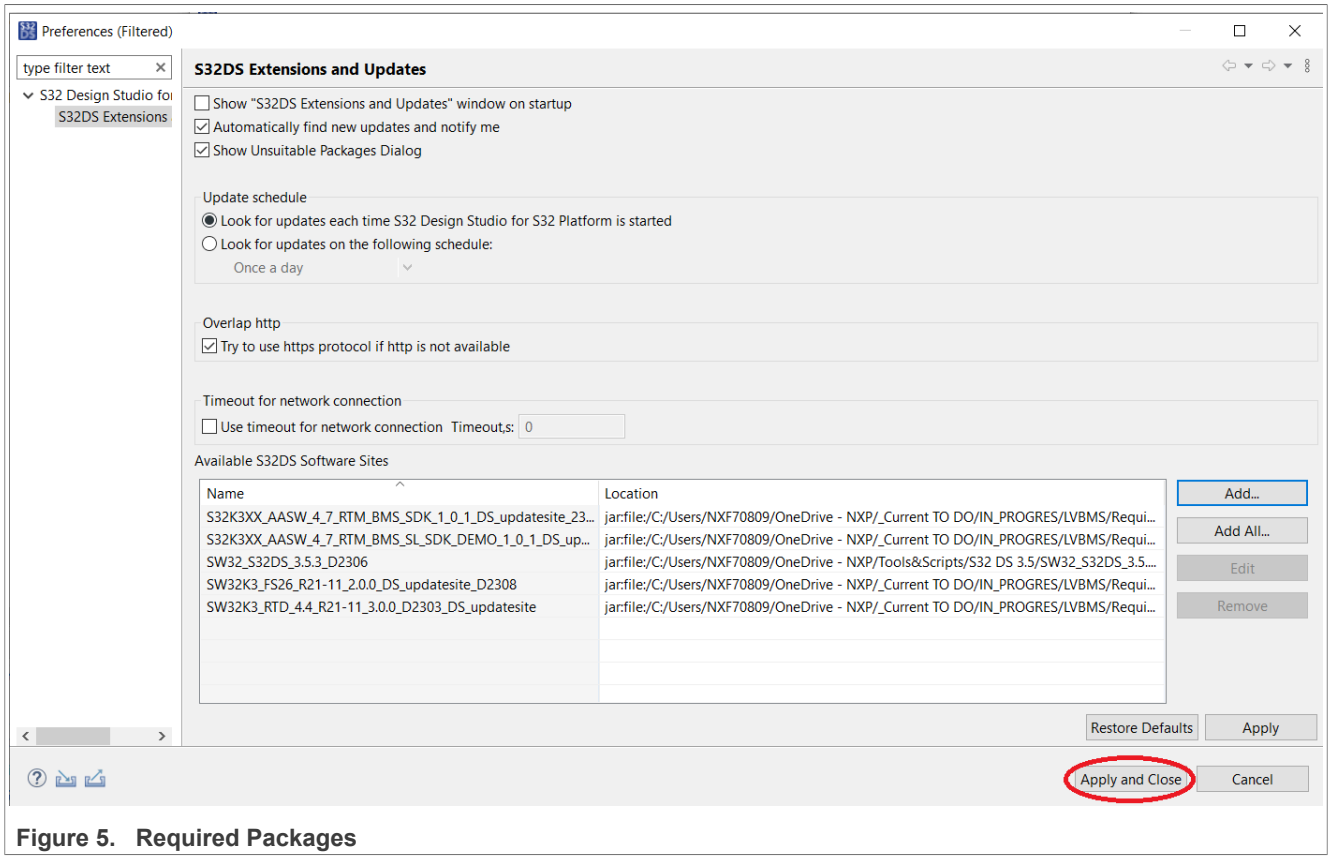


Figure 5. Required Packages

8. Install *S32K3XX RTD AUTOSAR R21-11 Version 3.0.0* package. The other required RTD packages will be installed automatically as dependencies.

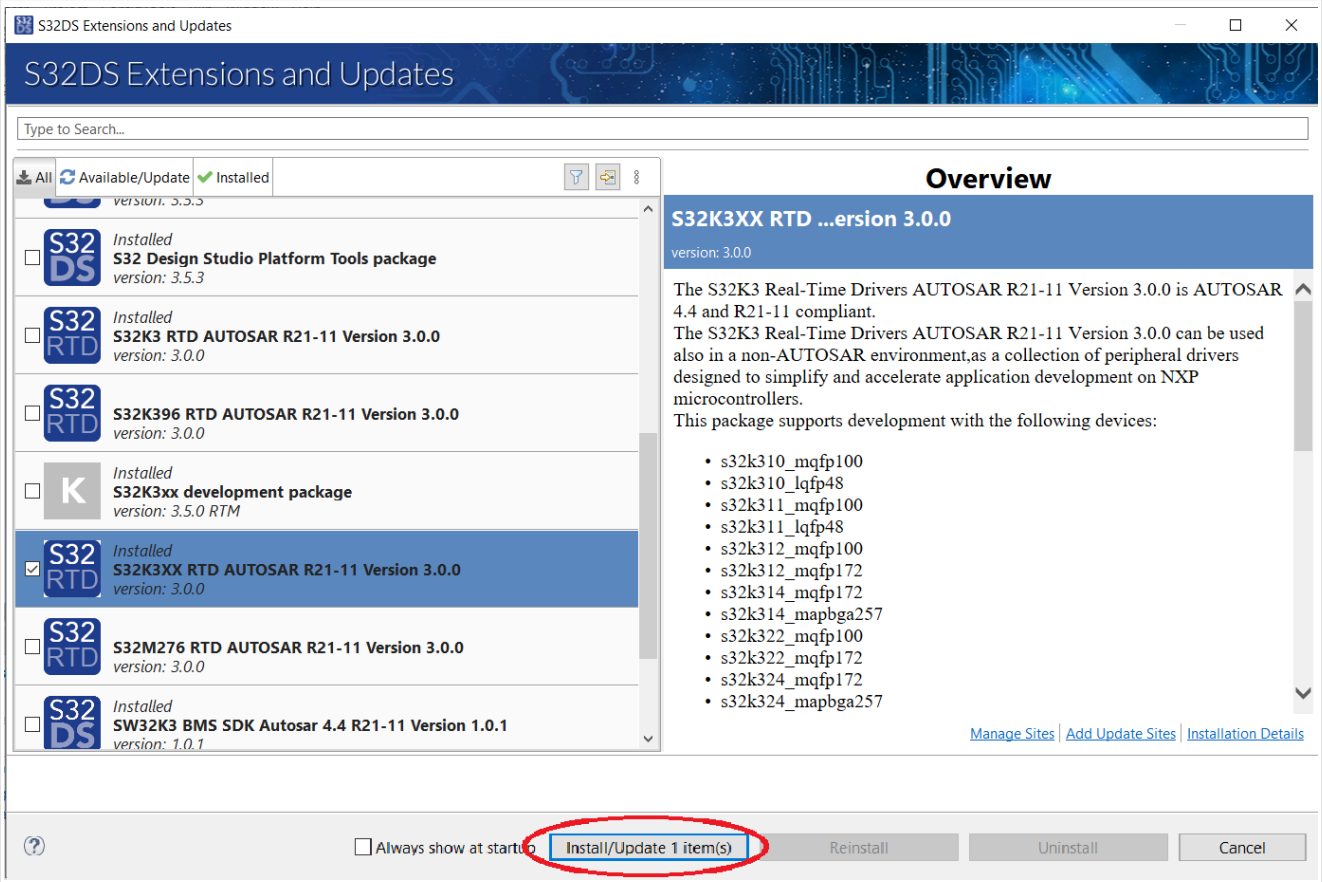


Figure 6. Install S32K3 Real-Time Drivers AUTOSAR R21-11 Version 3.0.0

9. Install the remaining packages in the order described above
10. Follow the troubleshooting section for required changes in S32DS, see S3DS Troubleshooting.

Note: Release version in the figures might not correspond to the latest version.

4.1.1.2 FreeMASTER standalone interface

The FreeMASTER standalone interface is required to run the GUI provided with the HVBMS Reference Design Example Application source code. It can also be used as a debug monitor.

To download the FreeMASTER standalone interface, visit nxp.com/FreeMASTER, and navigate to the Downloads section. Select the FreeMASTER tool 3.2 (includes Lite 1.2) – Windows installer and click *download*.

Note: It is required to sign in to proceed to download.

Note: Recommended version is 3.2.2.2.

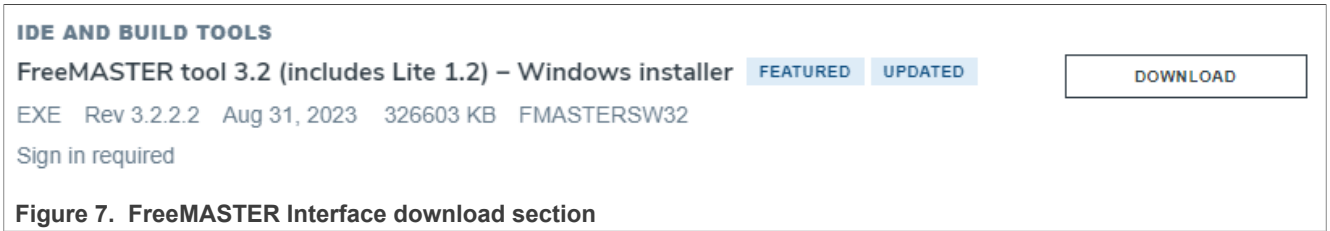


Figure 7. FreeMASTER Interface download section

After the license agreement is confirmed, the *FMASTERSW32.exe* setup executable will download. Once the download is completed, double-click on it to launch the installer.

Note: For the HVBMS Reference Design Example Application, the only component required is the FreeMASTER desktop application.

Note: Release version in the figures might not correspond to the latest version.

4.1.1.3 Switch to the Premium variant

To switch from *demo* version to *premium* version of the BMS SL SDK, the following steps are required:

1. Contact NXP sales or an NXP authorized distributor to purchase a BMS SL SDK premium variant license
2. Uninstall *S32K3 BMS SL SDK Autosar 4.4_R21-11 Version 1.0.1 DEMO* as described in Section 4.1.1.4.2

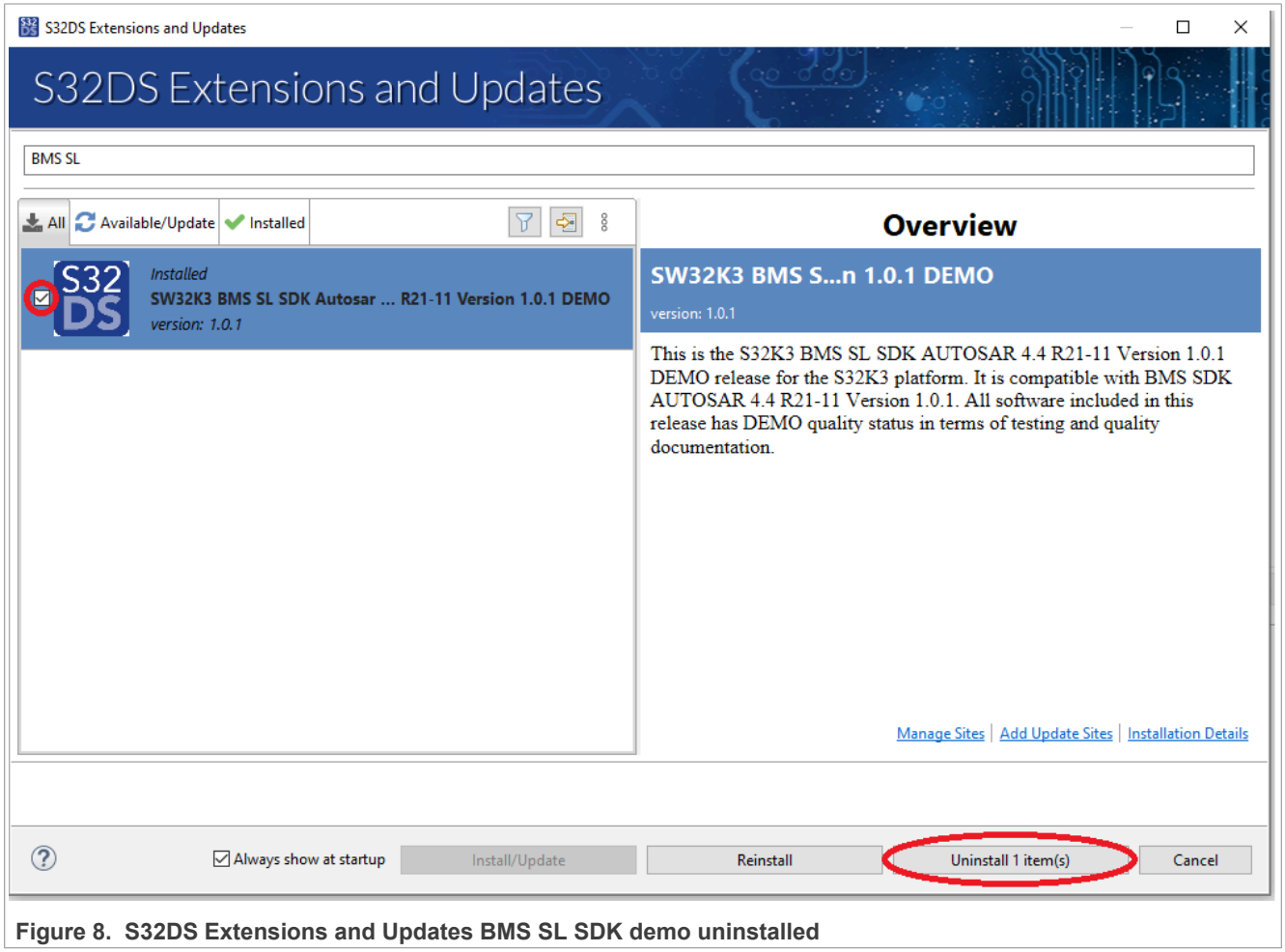


Figure 8. S32DS Extensions and Updates BMS SL SDK demo uninstalled

3. Install the *full* version of the BMS SL SDK (*SW32K3_BMS_SL_SDK_4.4_R21-11_1.0.1_updatesite_D2308.zip*) as described in Section 4.1.1.4.1
4. After following the above steps in the S32DS Extensions and Updates tab, the BMS SL SDK package will be marked *Installed*

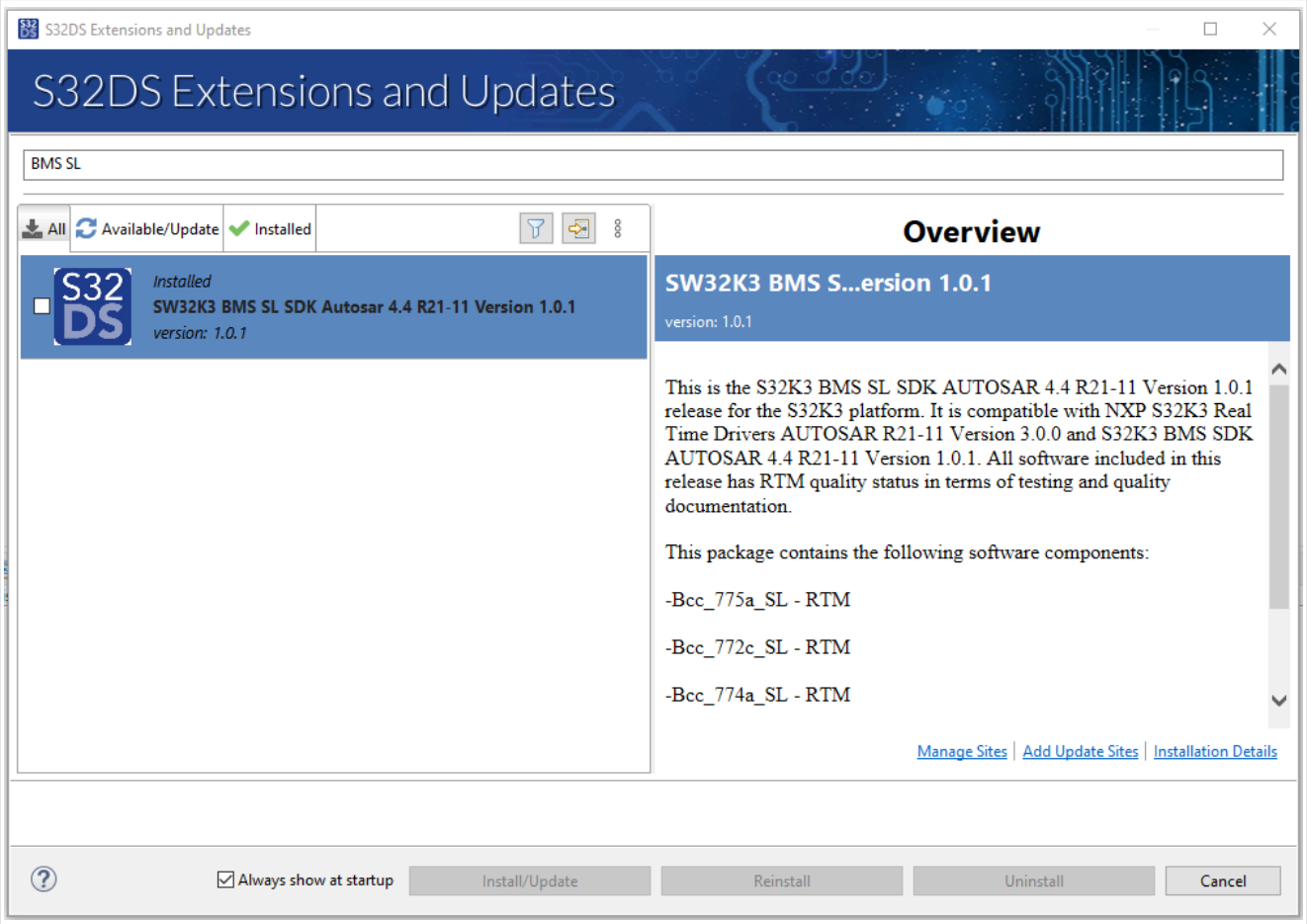


Figure 9. S32DS Extensions and Updates BMS SL SDK and BMS SDK view

Note: Release version in the figures might not correspond to the latest version.

4.1.1.4 How to install a S32DS update site

4.1.1.4.1 Install an update site (general procedure)

This section contains the NXP standard update site installation procedure, this procedure is a reference for all update sites.

1. Open S32 Design Studio.
2. Go to *Help* and then *S32DS Extensions and Updates*.

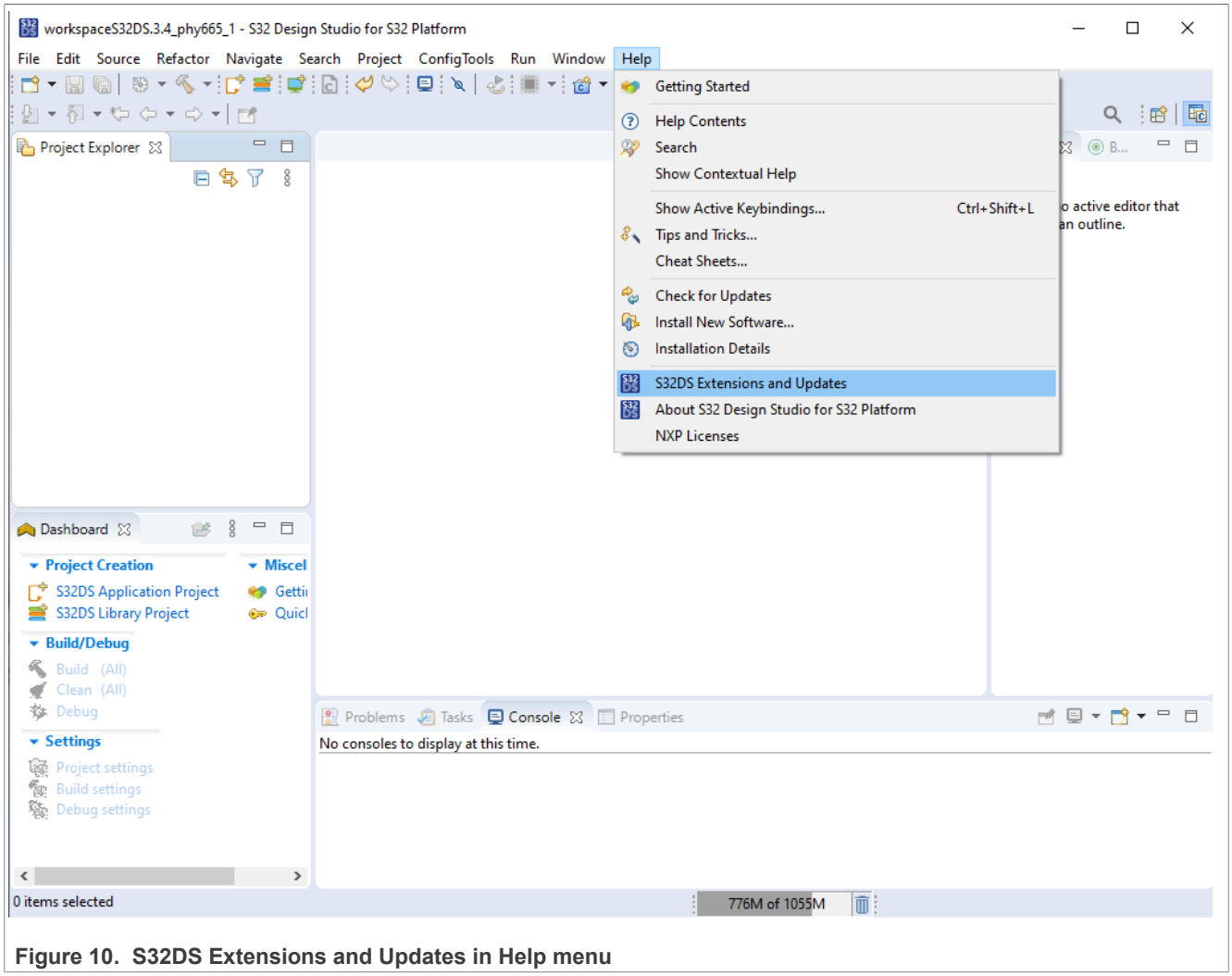


Figure 10. S32DS Extensions and Updates in Help menu

3. Click *Add Update Sites*.

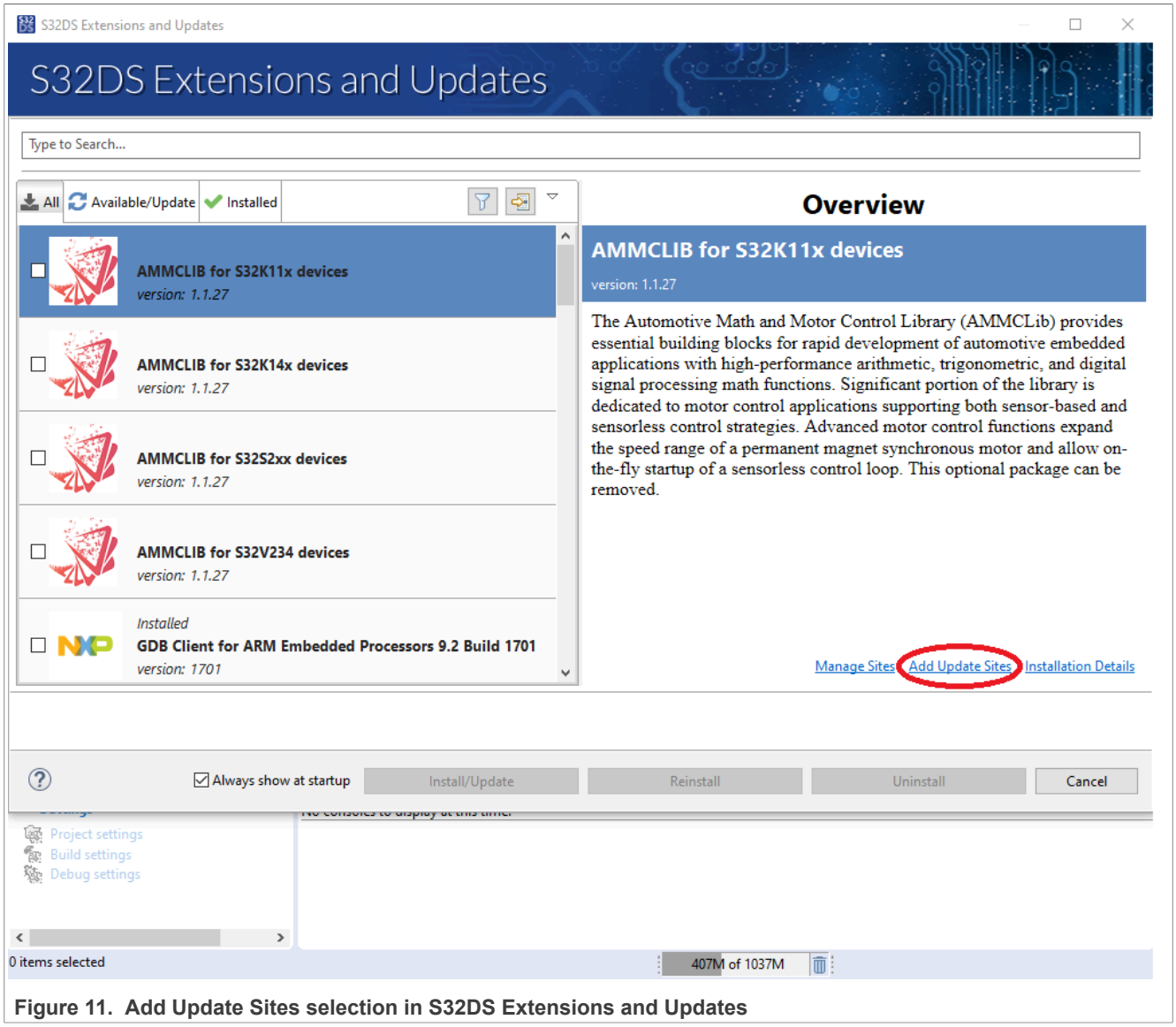


Figure 11. Add Update Sites selection in S32DS Extensions and Updates

4. Browse and select the previously downloaded ZIP file to install.
5. Click *Open*, the update site will be loaded into the *S32DS Extensions and Updates* interface.
6. Select the update site in the *S32DS Extensions and Updates* interface and click *Install/Update item*.

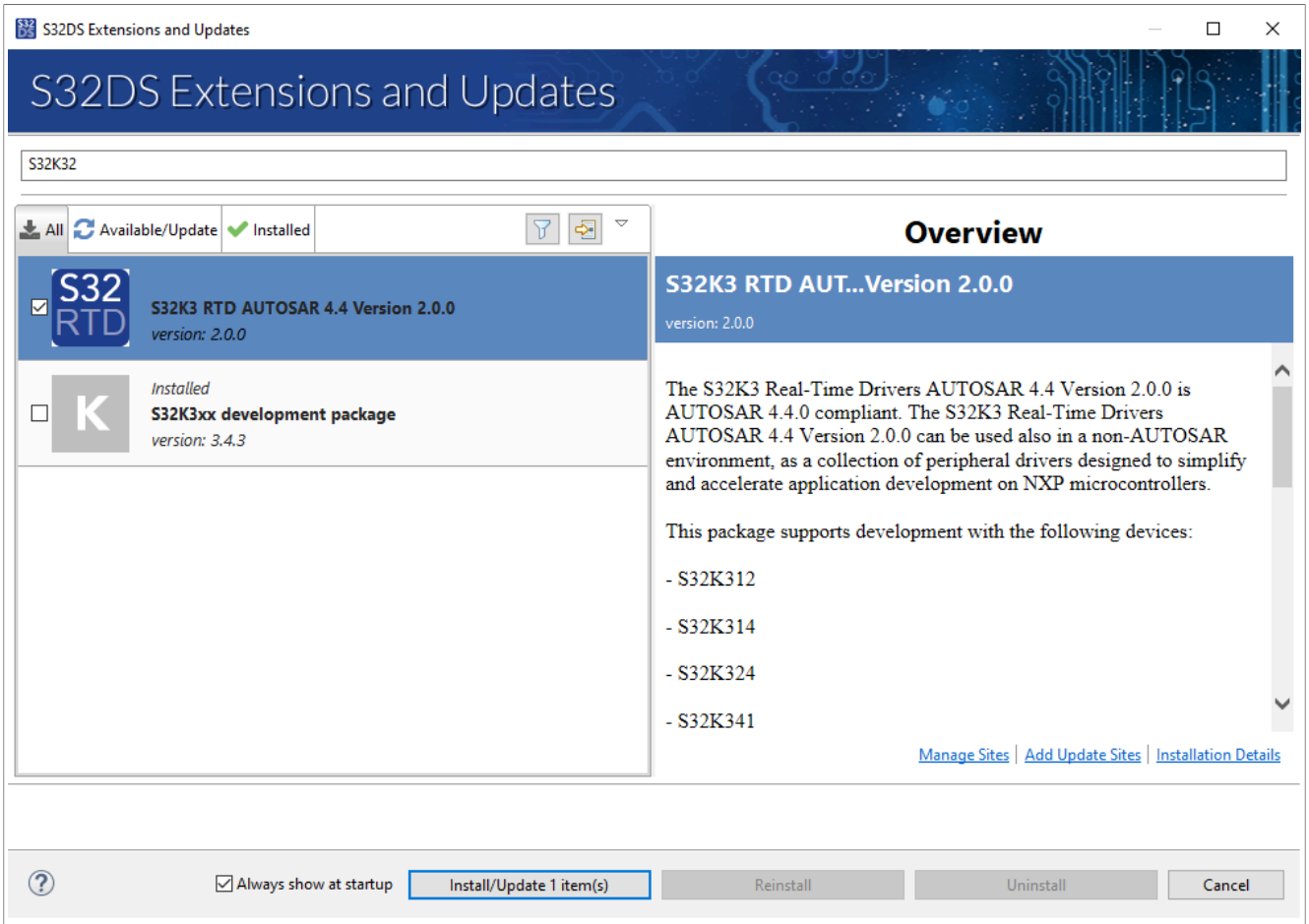


Figure 12. Update site installation in S32DS Extensions and Updates

7. Click *Next*.
8. Select *I accept the terms of the license agreement* then click *Finish*.
9. Select the NXP certificates on the pop-up window, and click *Accept* selected.
10. Restart S32 Design Studio by clicking *Yes*.

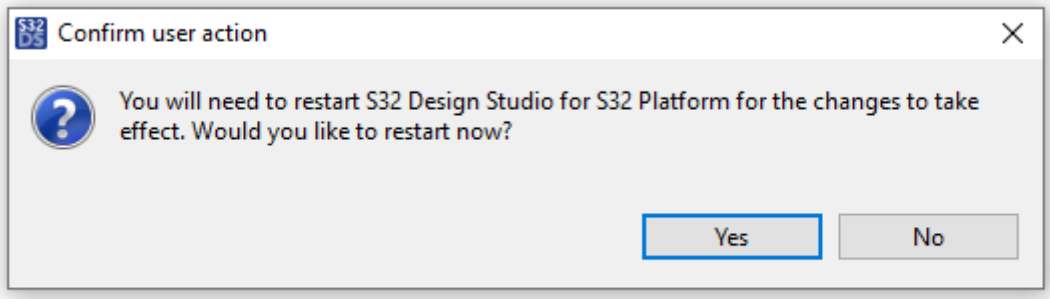


Figure 13. Restart S32DS pop-up

11. In order to check if the installation is done correctly, check if the *Reinstall* and *Uninstall* options are available for the selected update site.

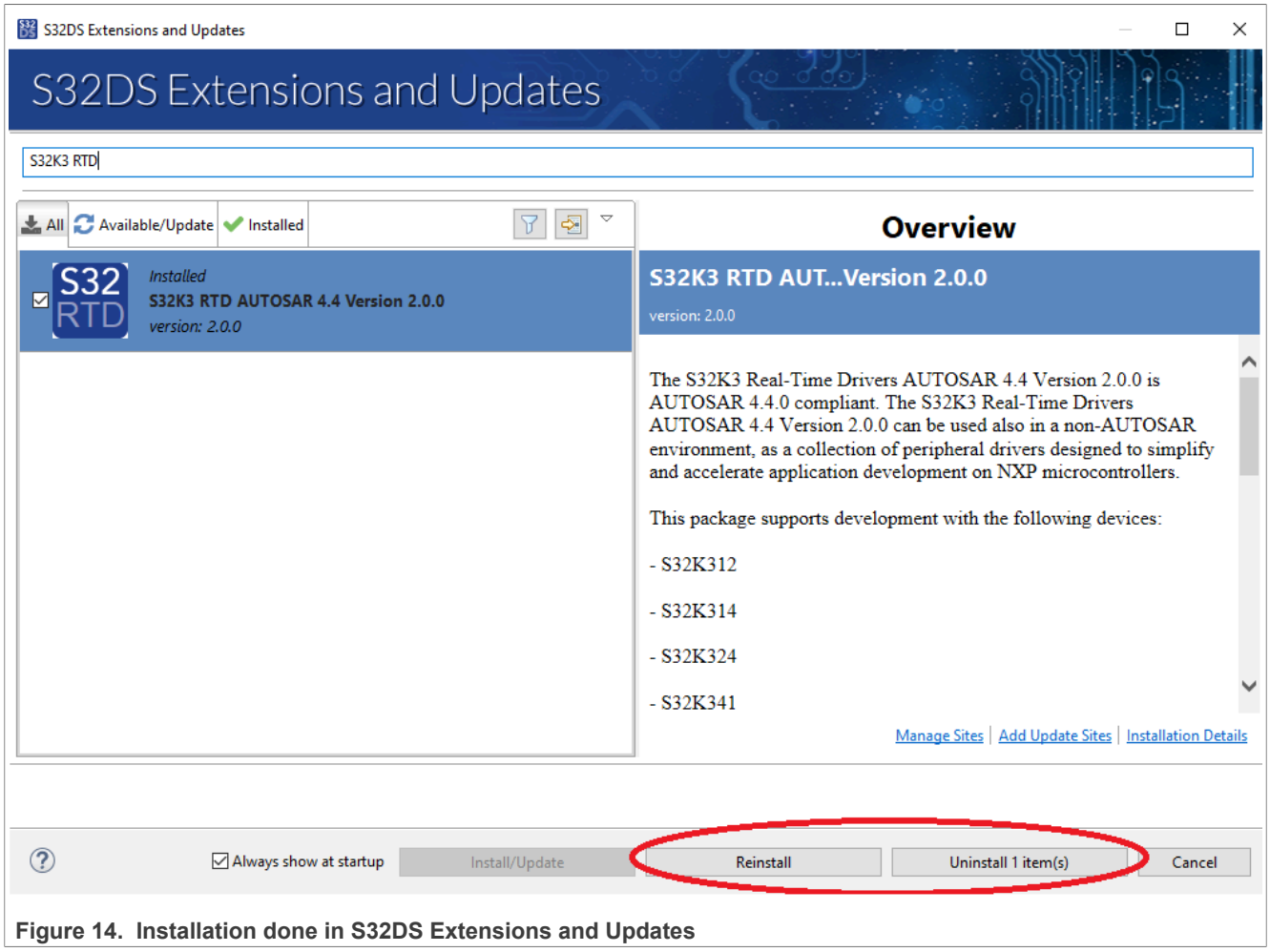


Figure 14. Installation done in S32DS Extensions and Updates

4.1.1.4.2 Uninstall an update site (general procedure)

This section contains the NXP standard update site uninstallation procedure. This procedure is a reference for all update sites.

1. Open S32 Design Studio.
2. Go to *Help* and then *S32DS Extensions and Updates.*

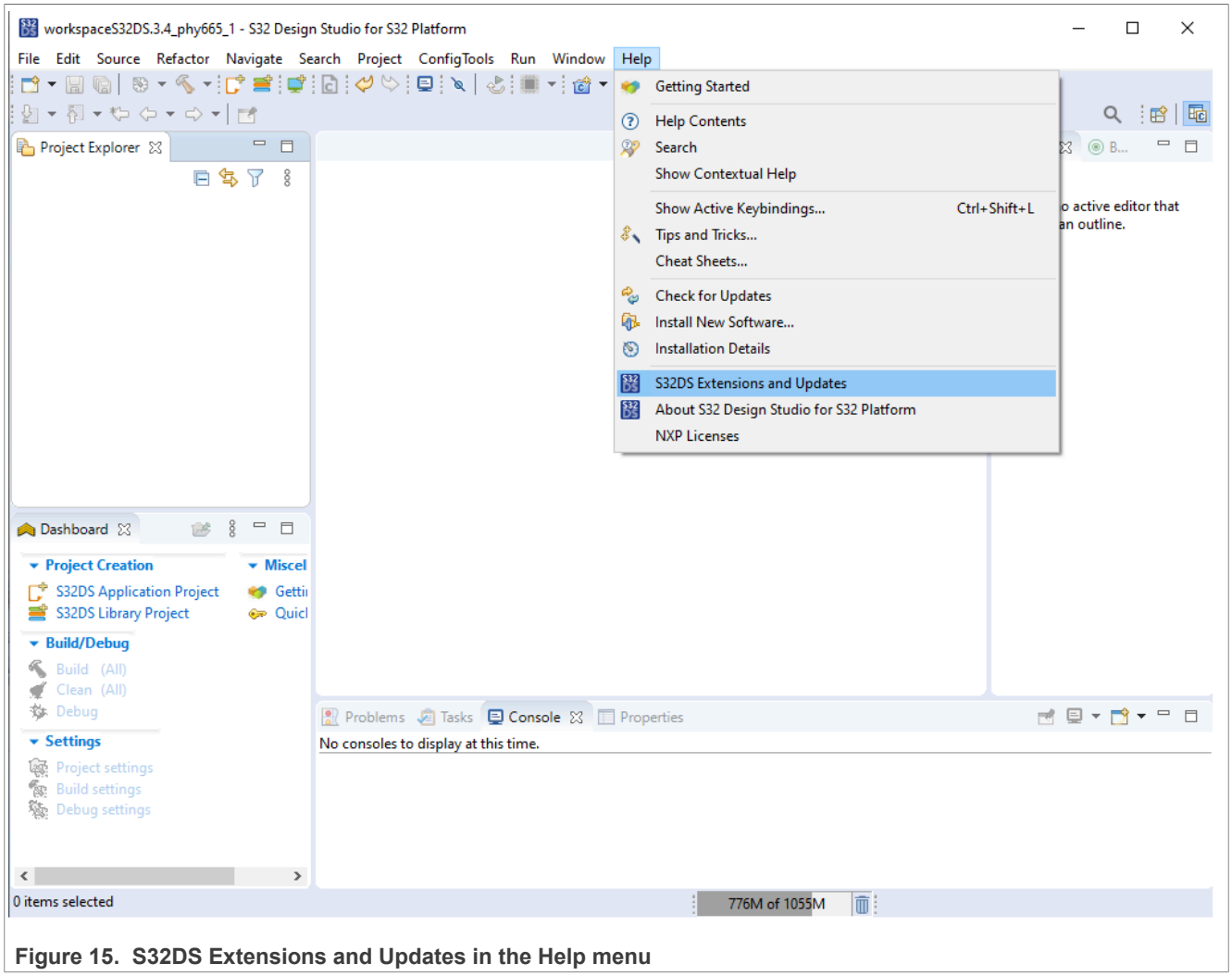


Figure 15. S32DS Extensions and Updates in the Help menu

3. Select the update site to be uninstalled and click *Uninstall*.

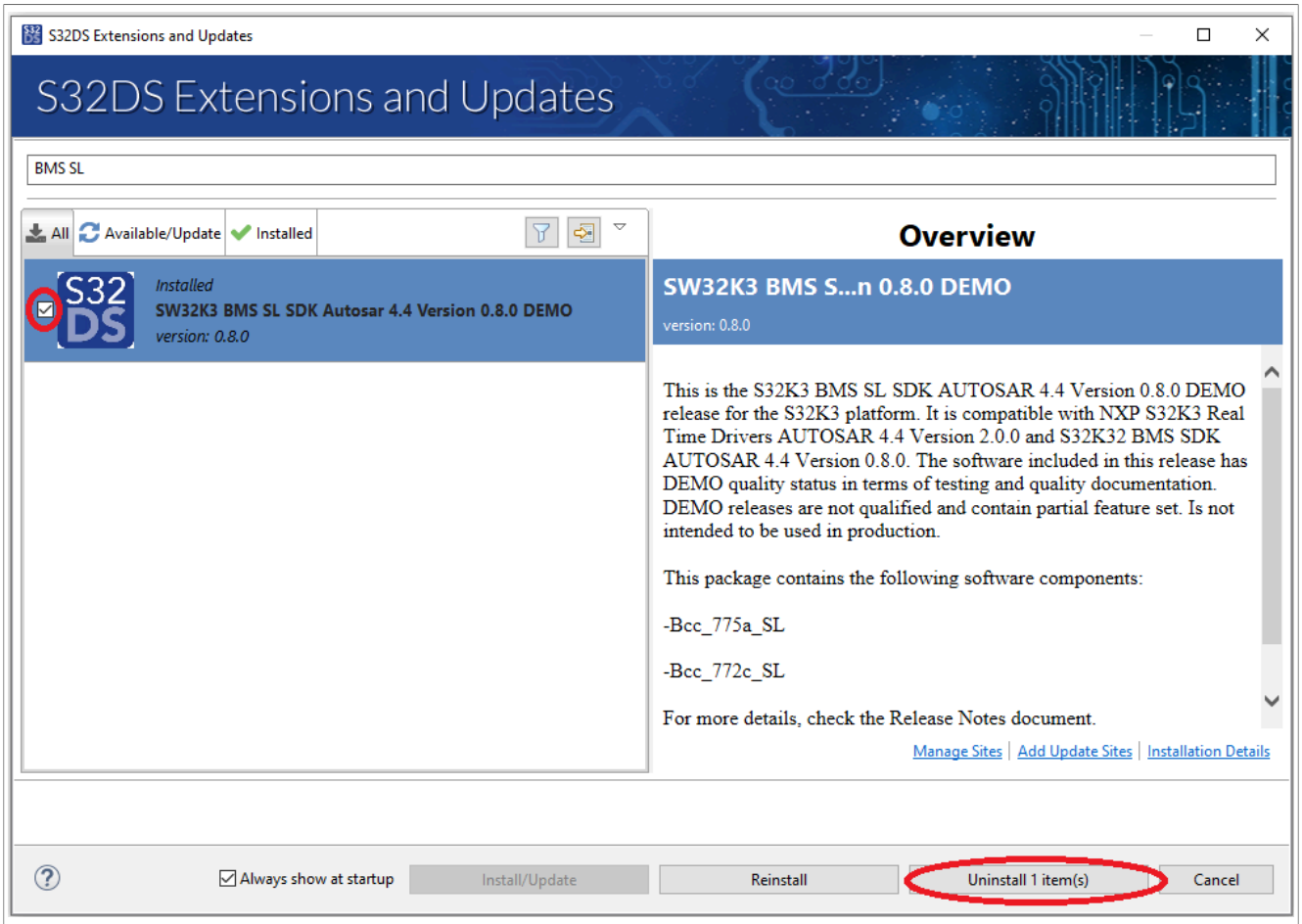


Figure 16. Uninstall selection in S32DS Extensions and Updates

4. The following pop-up window appears, click *OK*.

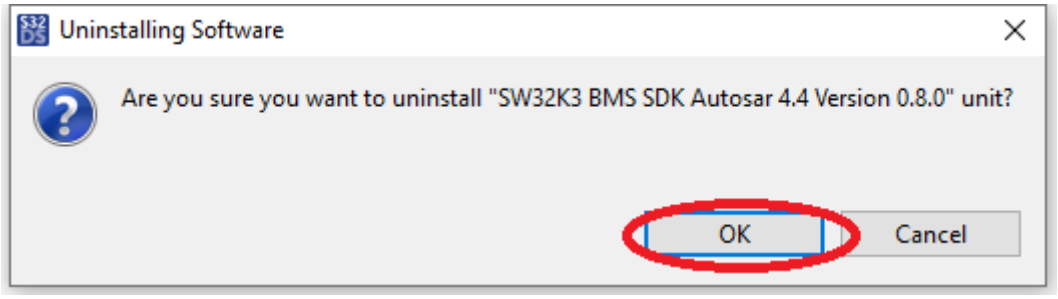


Figure 17. Uninstalling software pop-up

5. Restart S32 Design Studio by clicking *Yes*.
6. To check if the uninstallation is done correctly, check if the Install/Update option is available for the selected update site.

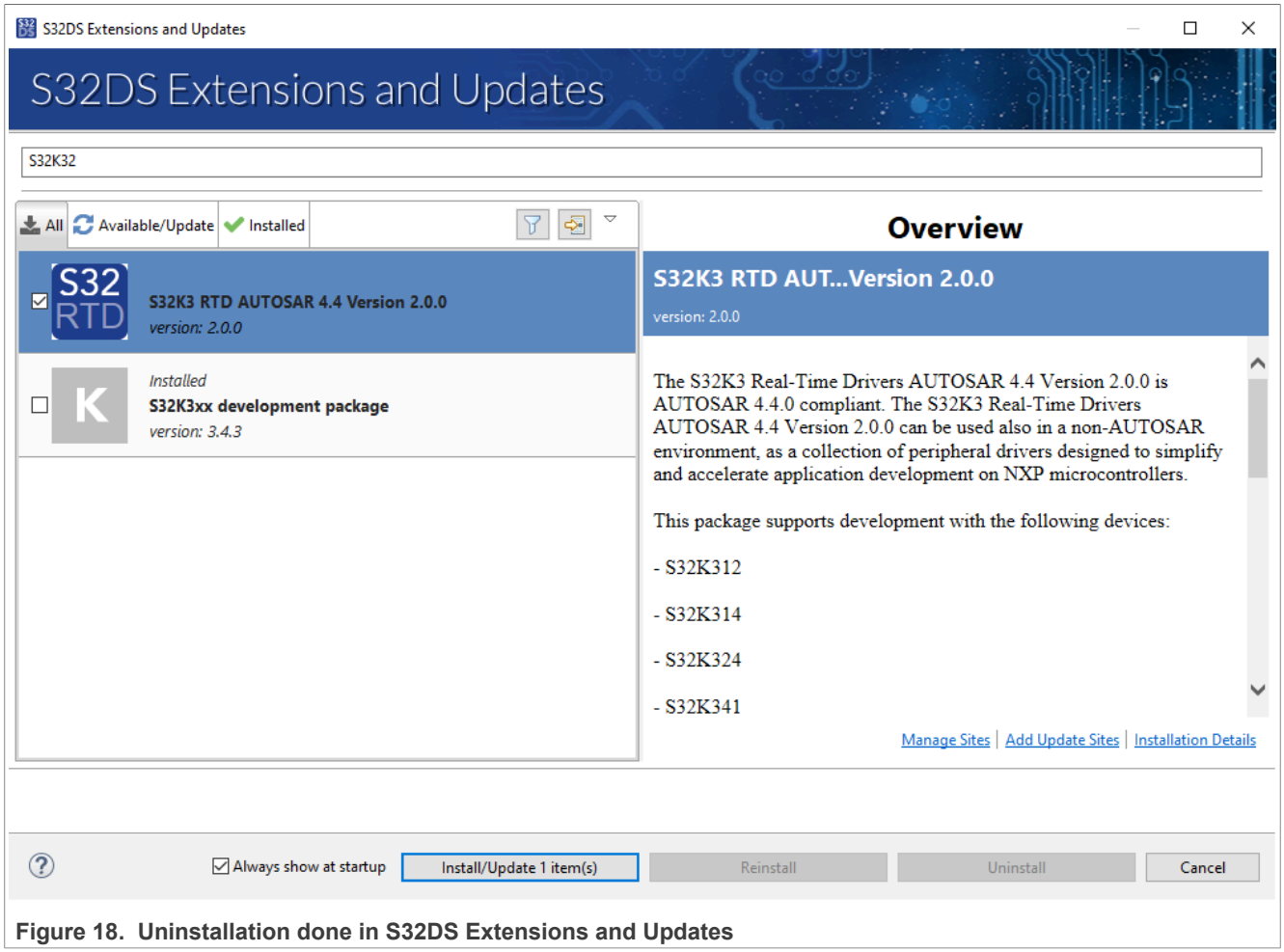


Figure 18. Uninstallation done in S32DS Extensions and Updates

4.1.1.4.3 Troubleshooting

This section lists workarounds for known bugs. These bugs are taken into account to be fixed in future releases.

4.1.1.4.3.1 Workspace nomenclature

The workspace path **should not contain any white spaces**:

For example, a correct workspace path: C:\NXP_correct_workspace\myWorkspace\

For example, an incorrect workspace path: C:\NXP incorrect workspace\myWorkspace\

4.1.2 AUTOSAR® environment with EB Tresos

In order to evaluate the NXP Battery Management software into *Elektrobit tresos Studio* environment, go through the following steps:

1. Install *tresos Studio* with *ACP-8.8.8* and RTD *3.0.0*.
   - Extract the contents of the *ACP-8.8.8_S32K34X_36054-B666457.zip* archive
   - In the path where you extracted the contents of the archive, you will find another archive named *ACP-8.8.8_S32K34X_36054-B666457.zip*. Extract the content of the second archive as well
   - Run *setup.exe* and install all packages except for *WibuKey* (not required as we don't use a hardware dongle license)

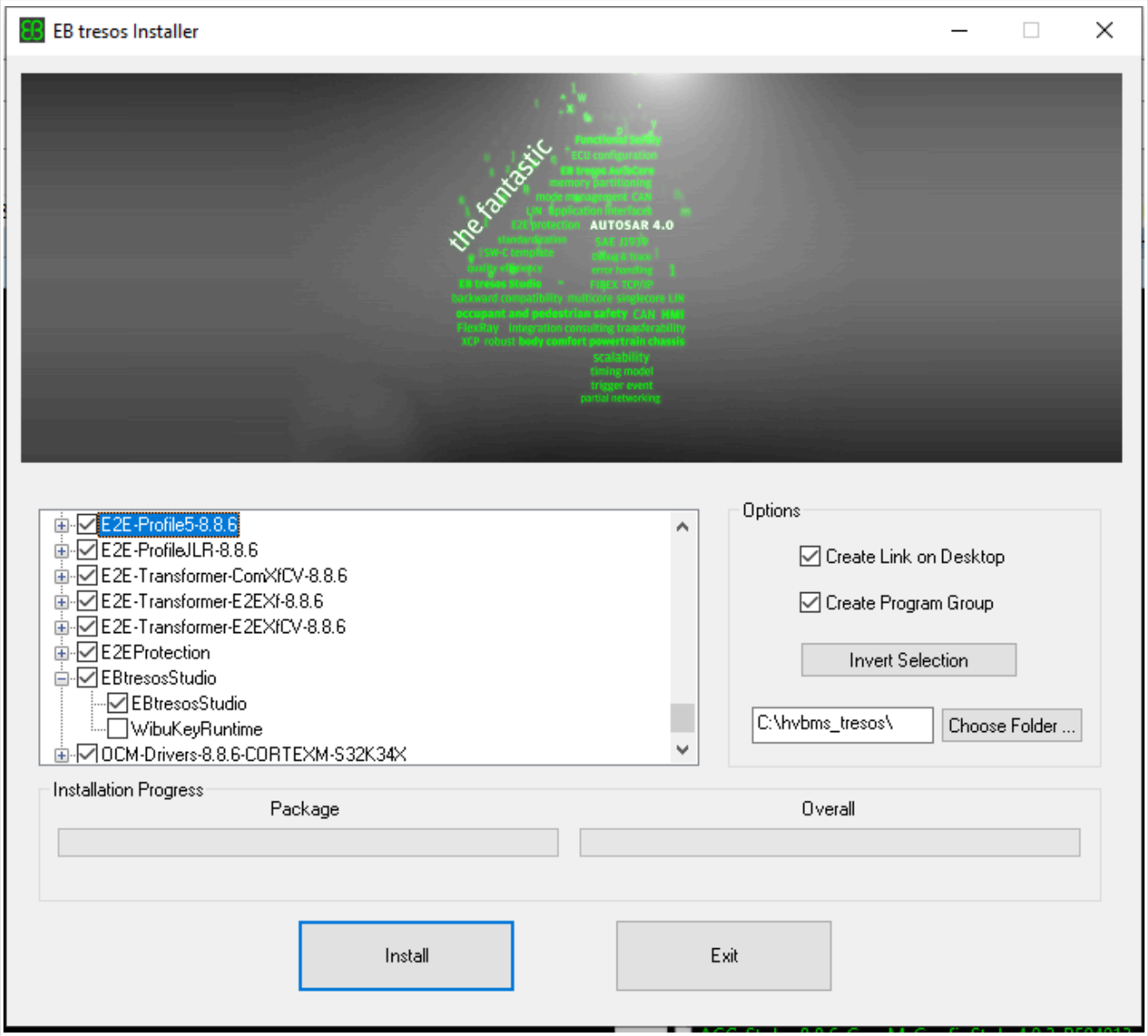


Figure 19. tresos Studio installation

Note: Release version in the figures might not correspond to the latest version.
Note: Further in this User Manual the installation location of this package will be refered as *TRESOS_STUDIO_INSTALLATION_PATH*.

2. Install the BMS SDK: *SW32K3_BMS_SDK_4.4_R21-11_1.0.1_D2308.exe*.
3. Install the BMS SL SDK: *SW32K3_BMS_SL_SDK_4.4_R21-11_1.0.1_D2308.exe*.
4. Install HVBMS Reference Application SW package: *SW32K3_BMS_APP_4.4_CD02_0.8.0_D2310.exe*.
5. Install FS26 SBC driver: *SW32K3_FS26_R21-11_2.0.0_D2308.exe*.
6. Install Can Transceiver driver: *SW32K3_CANTRCV_TJA1145A_R21-11_0.8.0_CD02_D2305.exe*.
7. Optional Install *Vector CANoe*.
   Note: In the *tresos Studio* integration project, a GUI is provided that can be used to visualize measurements like cell temperatures, pack voltage levels, cell temperatures, currents and other measurements. The usage of tool is optional as it requires *Vector CANoe* software and hardware, which is not provided by NXP.

Note: In order to use the application, you must install *GHS* compiler and *Trace32*.

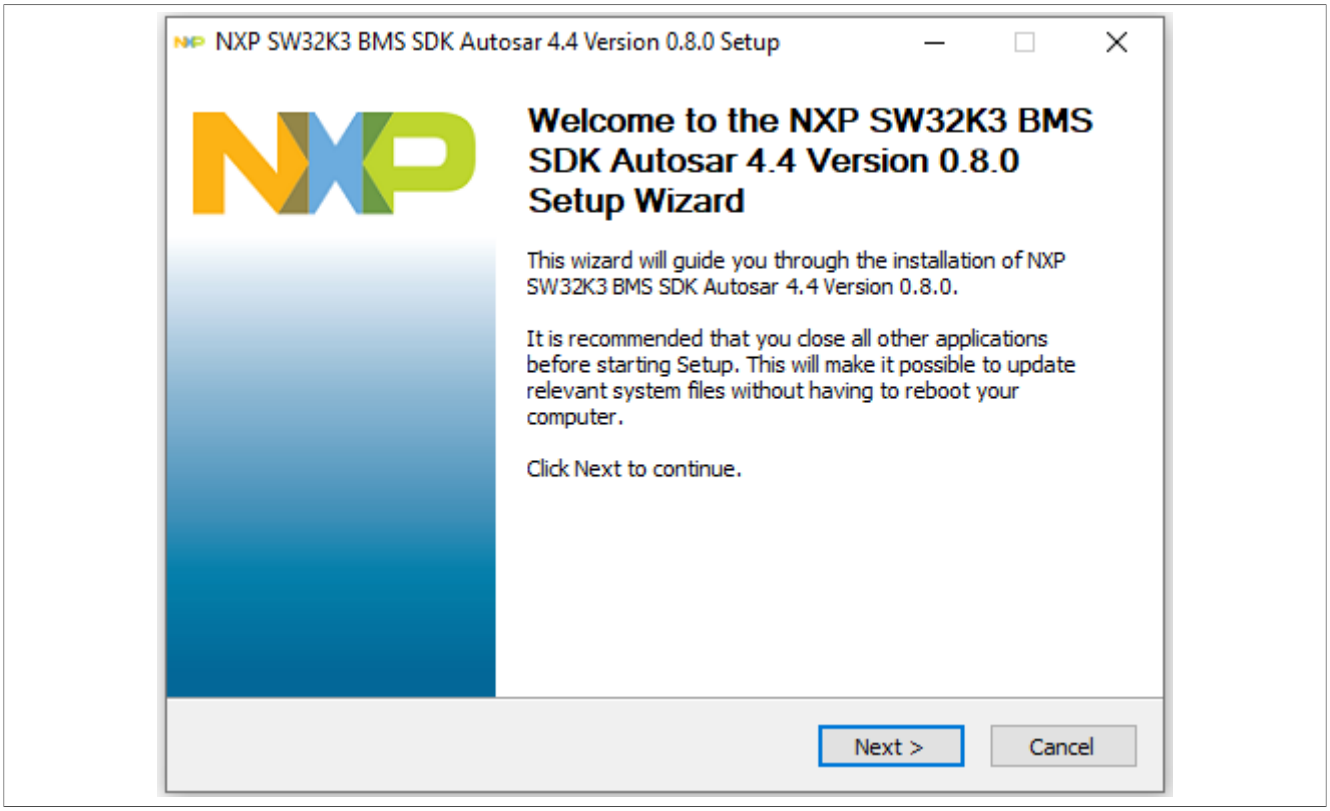
Note: For packages 3 to 9 please follow the generic installation procedure

4.1.2.1 How to install an EB tresos package

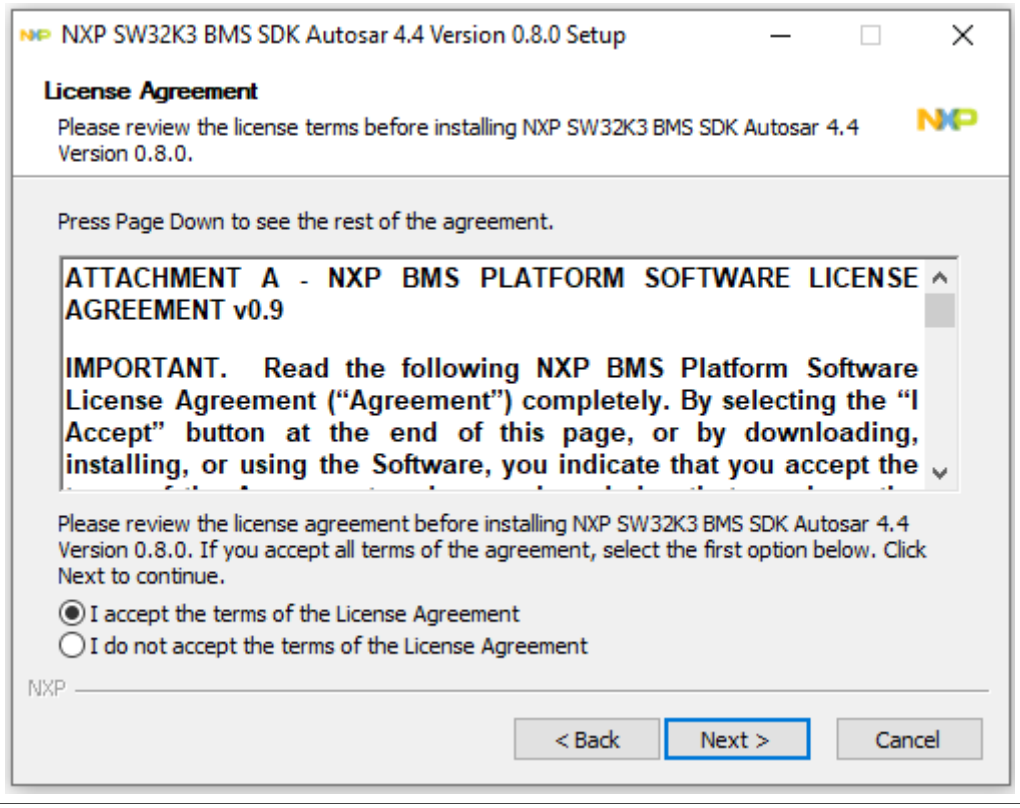
4.1.2.1.1 Install NXP EB Tresos package

To install NXP EB Tresos packages, the following steps are required:

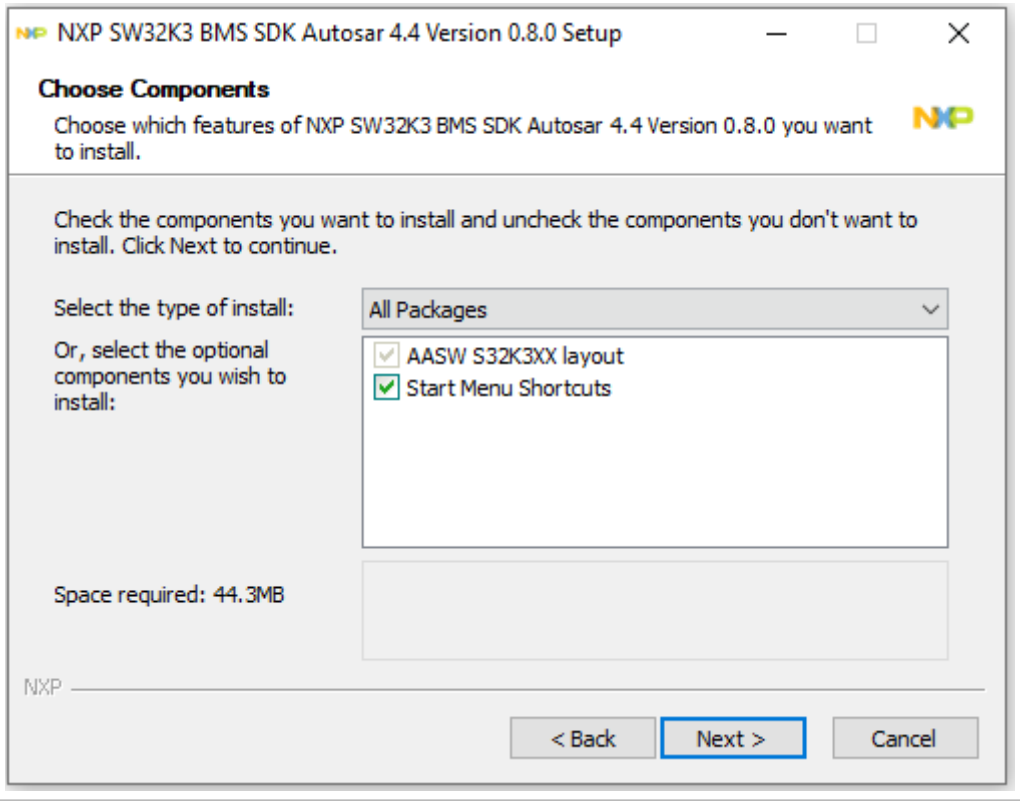
1. Open the .exe installer (for example, *SW32K3_BMS_SDK_4.4_0.8.0_D2205.exe*).
2. Click *Next*.



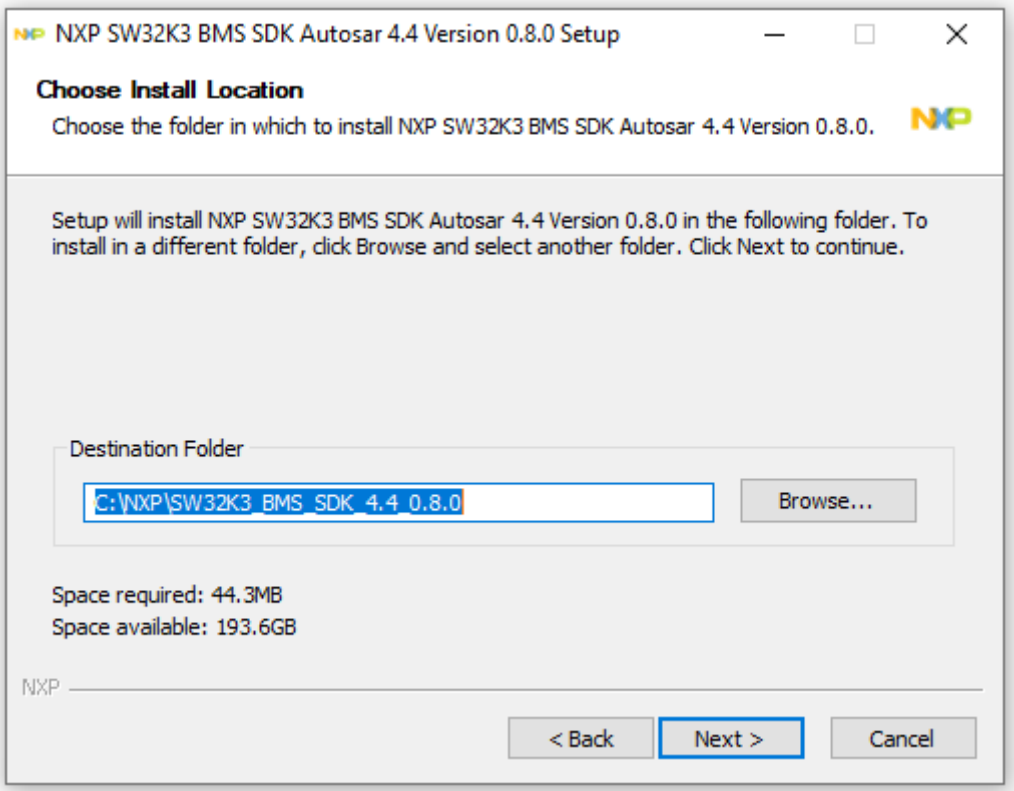
3. Select *I accept the terms of the License Agreement* and click on *Next*



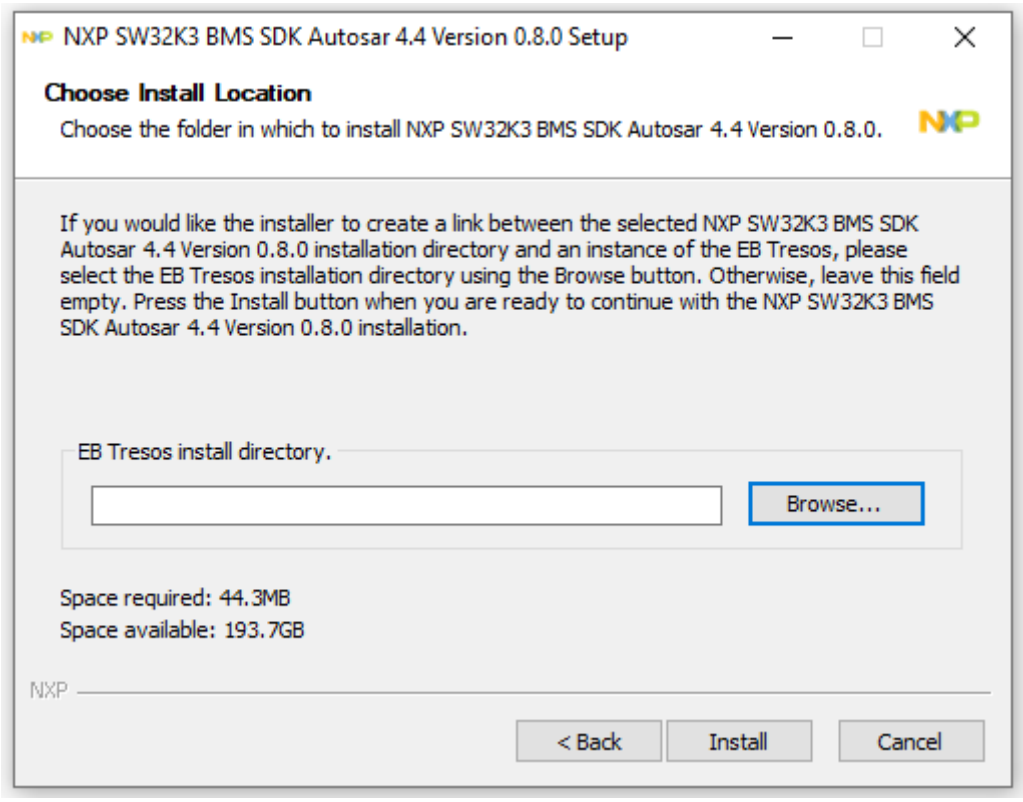
4. Click on *Next*.



5. Choose an installation folder and then click on *Next*.



6. *Leave the EB Tresos install directory* field empty.
   Instead of providing the tresos Studio path during the installation process, the plugins can manually be copied from the installation path - See Step 8.
   Click *Install*.



7. If the installation is successful, the following window appears. Click *Finish*.

8. After the installation is finished, go to installation folder (e.g *c:\NXP\SW32K3_BMS_SDK_4.4_1.0.0\eclipse \plugins*) and copy all the installed plugins to *TRESOS_STUDIO_INSTALLATION_PATH\plugins*

5 Getting started with the HVBMS Software

This section contains details on how to use the HVBMS Software code provided with the software packages.

5.1 HVBMS Reference Application - S32 Design Studio

The HVBMS Reference Integration project showcases a possible implementation of the HVBMS-RD Initialization and DTTI (Diagnostic Test Time Intervals) sequence. Using FreeRTOS and a base cycle of 5 ms for Initialization, and 20 ms for the DTTI the following parameters are available:

- Cell Monitoring Unit (CMU):
  - Cell voltage measurement, and pack voltage measurement
  - Temperature measurement
- Battery Junction Box (BJB):
  - Pack current measurement
  - Temperature measurement
  - High-voltage measurements
- Other Battery Management Unit (BMU) functionalities:
  - UART communication with the PC to showcase the measured values in the FreeMASTER application

Follow the next section steps to get started with this example application.

5.1.1 Import the project

To import the project, go through the following steps.

1. Open S32DS.
2. Open menu *File*, *Import*, *General* and then *Existing Projects into workspace*.
3. Click on *Select archive file*, browse for the .zip file.
4. Select the project according to your hardware setup.
5. Click *Finish*.

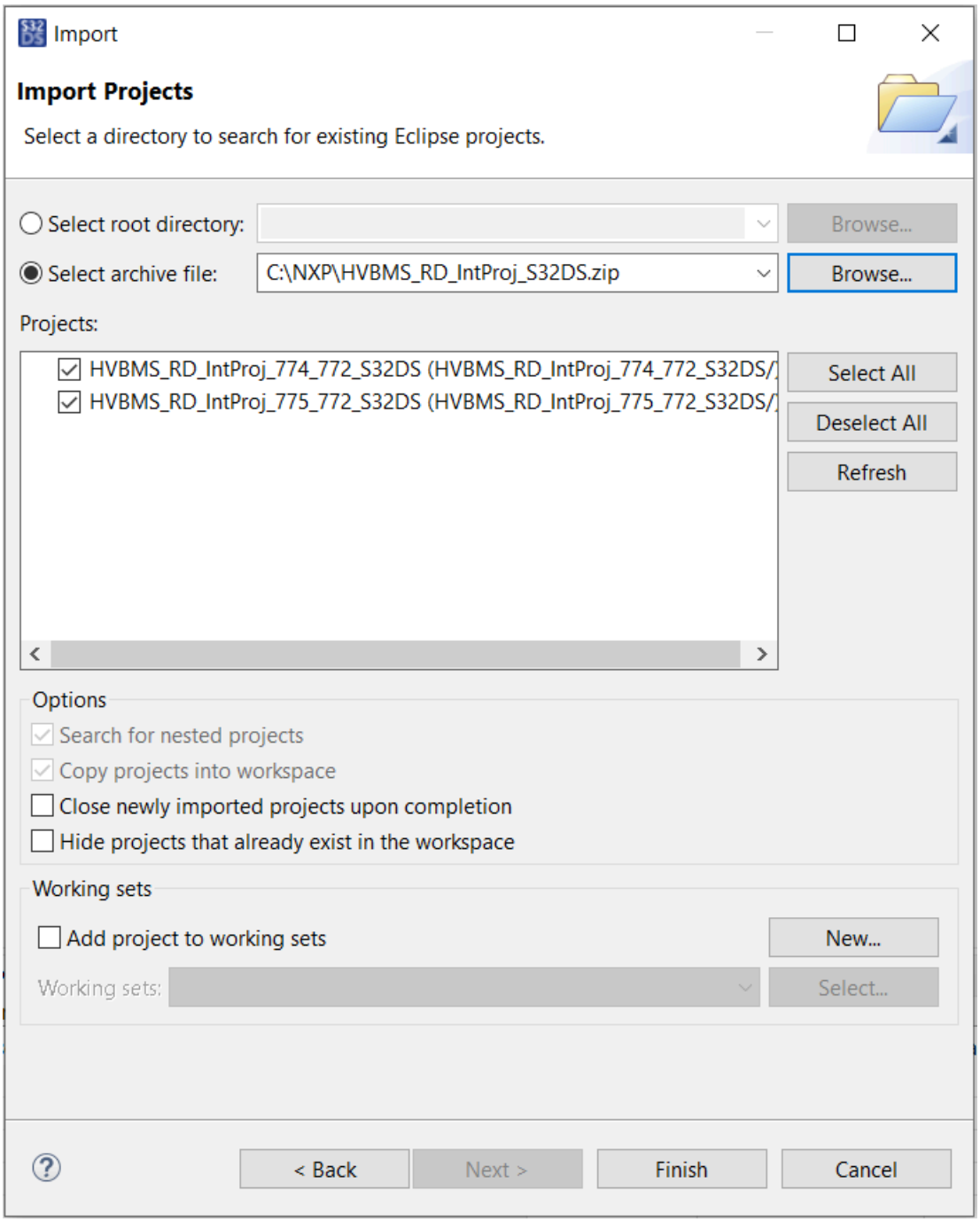


Figure 20. HVBMS Import Application

5.1.2 Building and running the project

In order to build and run the project, go through the following steps:

1. Double-click the **.mex* file to open *S32 Configuration Tool*
2. Open the *Peripherals* perspective and click on *Update Code* to generate the code.

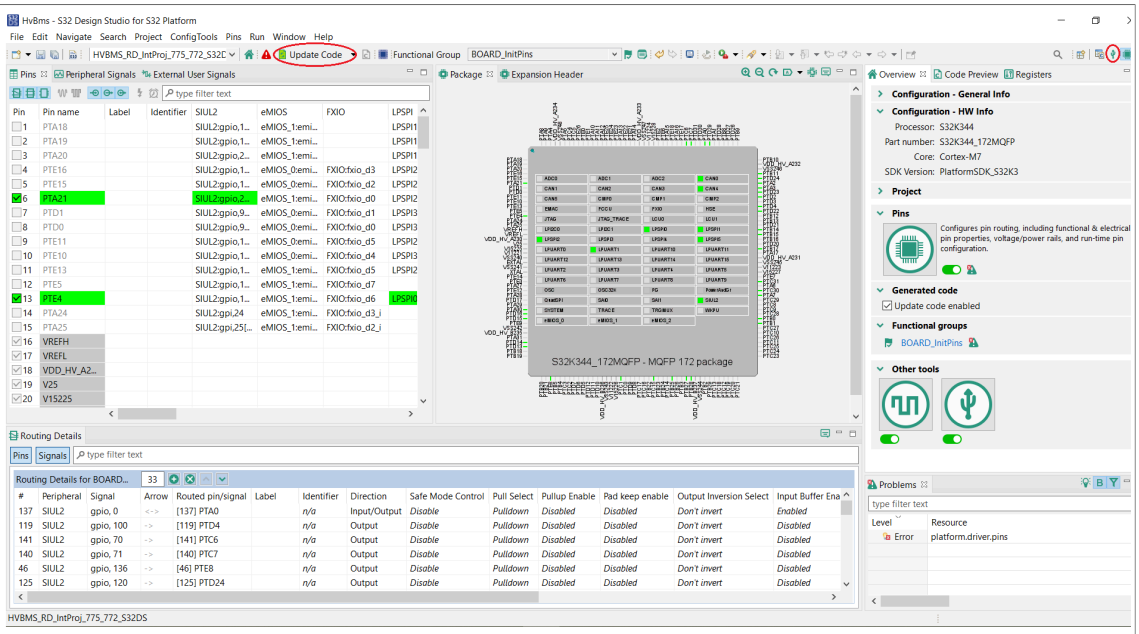


Figure 21. Select Peripheral perspective

3. After the code generation is finshed switch to *C/C++* perspective.

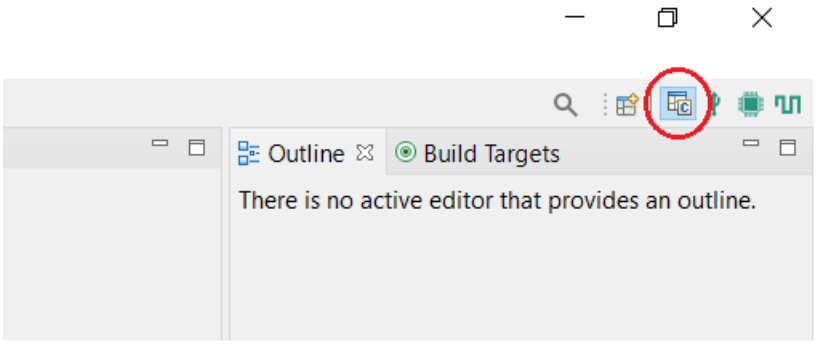


Figure 22. Select project configuration and update code

4. Click the drop-down list near the *Build* icon and select *Debug_Flash* to build the project.

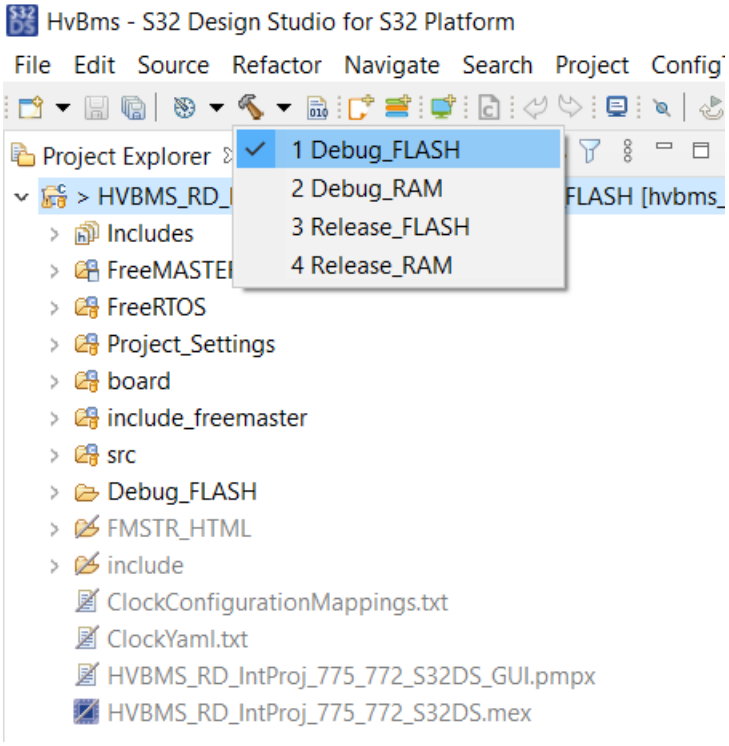


Figure 23. HVBMS-RD Application build

5. Start the board with FS26 SBC in *Debug mode* (this is required for flashing the code via debugging interface):
   - BMU V 2.0: press the **SW1** button on the BMU board
6. Click the drop-down list near the *Debug* button and select *Debug Configurations* .
7. Select *IntProj_Debug_FLASH_PNE* (e.g. *HVBMS_RD_IntProj_775_772_S32DS_Debug_FLASH_PNE* | *HVBMS_RD_IntProj_774_772_S32DS_Debug_FLASH_PNE*) and click *Debug*. If the C/C++ Application field is empy, select the appropriate .elf file browsing the project location.

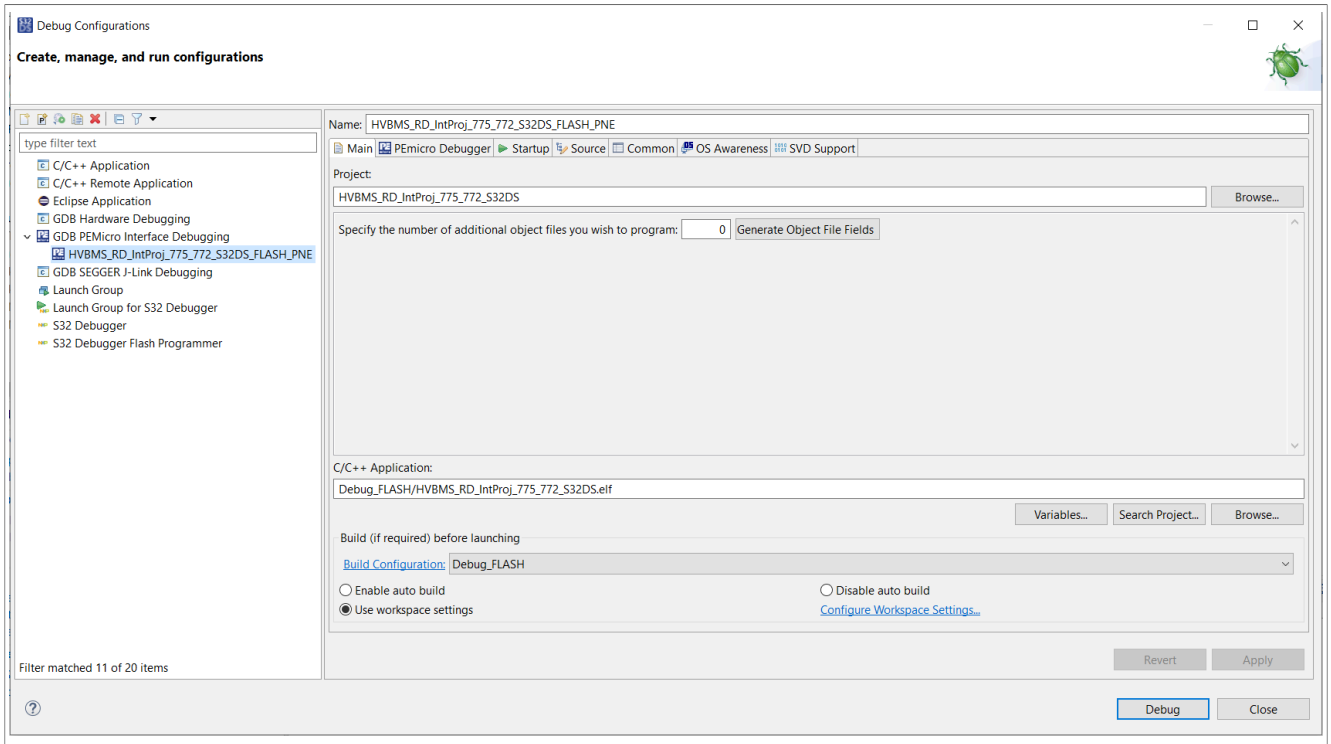


Figure 24. HVBMS-RD Application debug

8. In the newly opened *Debug* perspectiv, click the *Run* icon to start the software.

5.1.3 FreeMASTER GUI connect

While the application is executing on the BMU board, the Green LED must be on. In order to see the measurements performed by the HVBMS Reference Design application follow the next steps:

1. In S32DS, switch view from *Debug* view to *Project* view.
2. Double-click the **.pmpx* file to open the FreeMASTER interface.

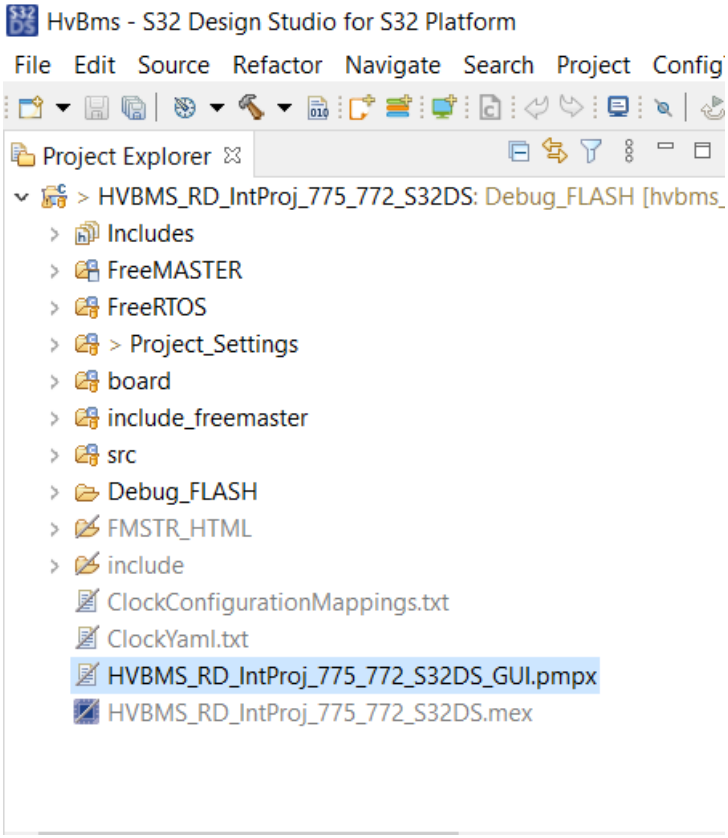


Figure 25. HVBMS_RD_IntProj_S32DS_GUI.pmpx

3. In FreeMASTER, click *Tools*, and then *Connection Wizard*, a new window opens.
4. Click *Next*, then select *Use direct connection to on-board USB port* and click *Next*.
5. Select the correct COM port and make sure that the selected Baud-rate is 115200, click *Next*.

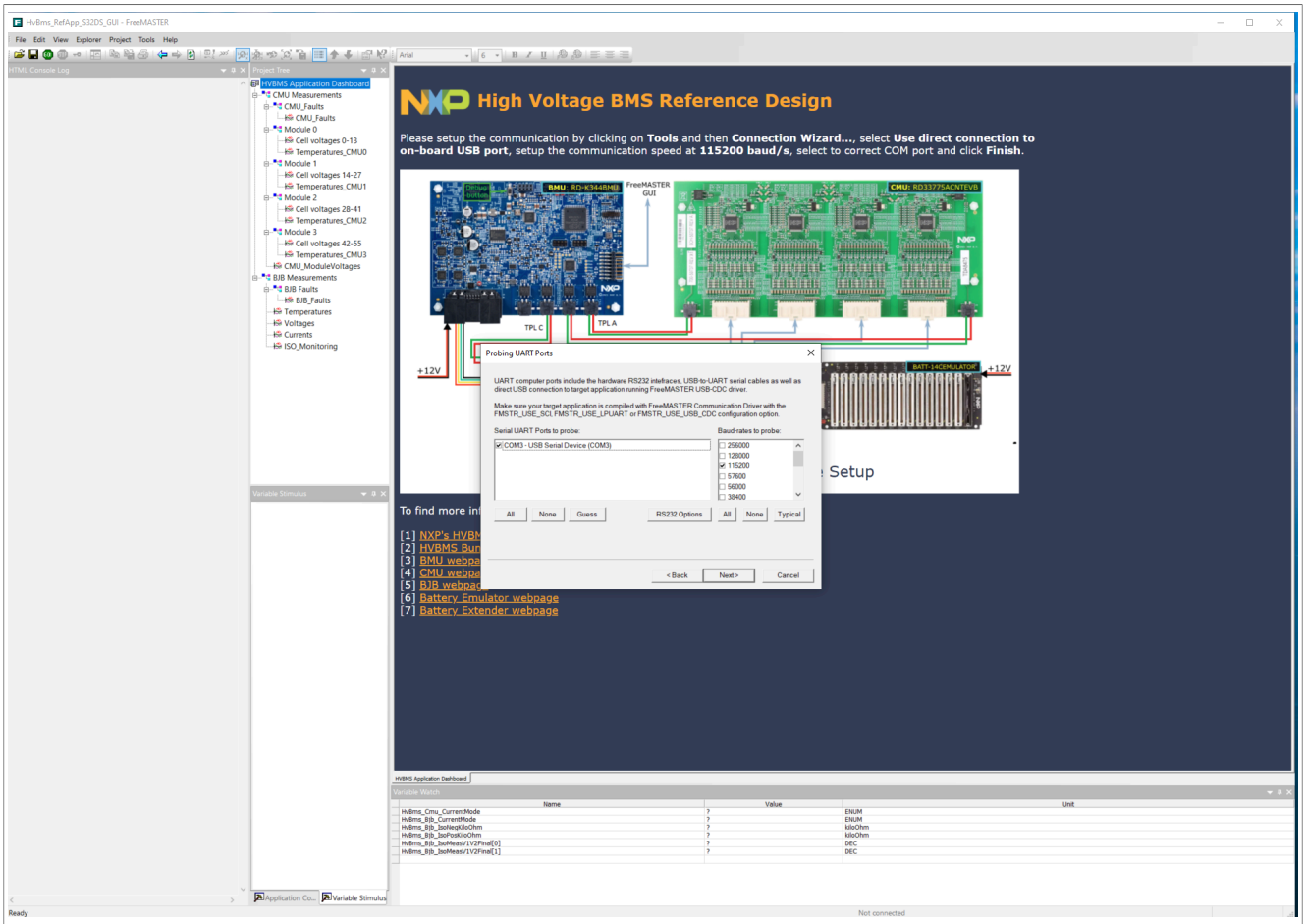


Figure 26. Connection UART

6. A board should be detected. Select *Yes, use detected port settings and start using FreeMASTER tool* and click *Finish*.
7. The GUI is connected to the HVBMS application running on the hardware.

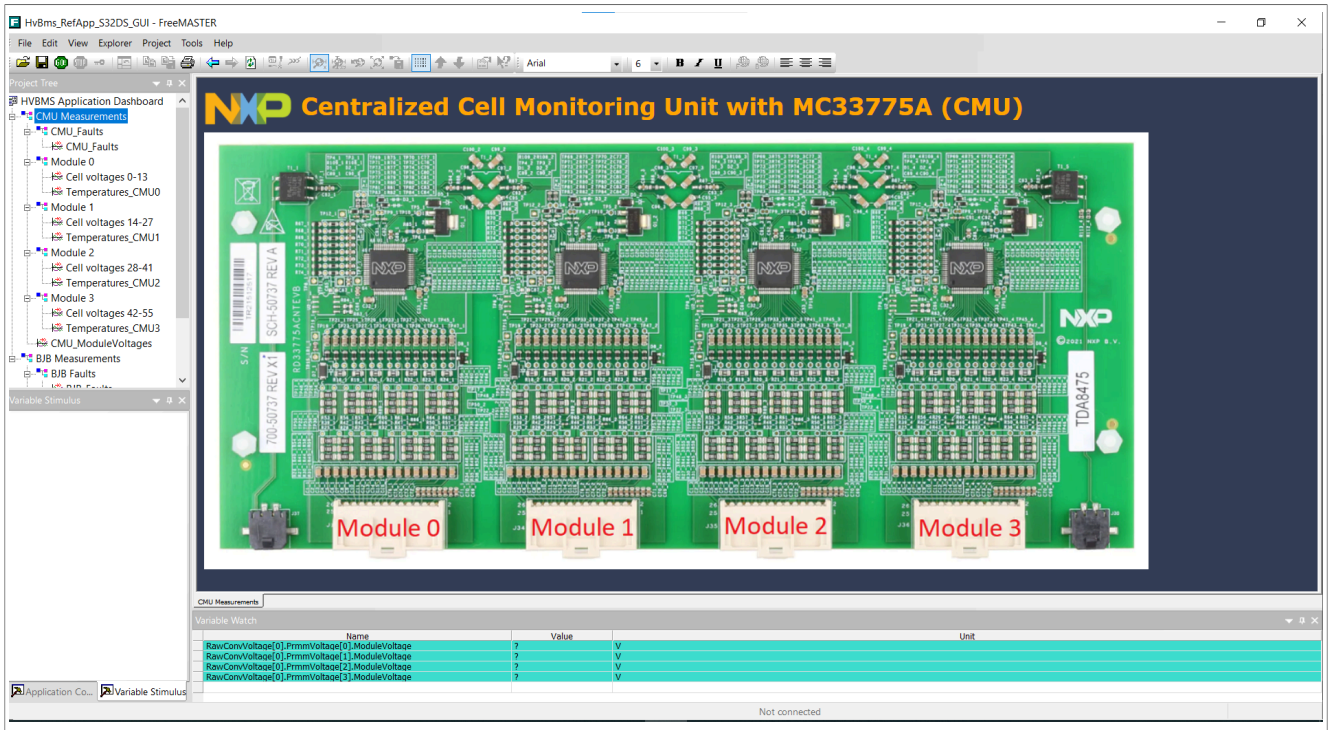


Figure 27. HVBMS GUI

5.2 HVBMS Reference Application - AUTOSAR® enviroment

The HVBMS Reference Integration project showcases a possible implementation of the HVBMS-RD Init and DTTI (Diagnostic Test Time Intervals) sequence. Using AUTOSAR® operating system and a base cycle of 5ms for Init, and 20ms for the DTTI the following parameters are available:

- Cell Monitoring Unit (CMU):
  - Cell voltage measurement, and pack voltage measurement
  - Temperature measurement
- Battery Junction Box (BJB):
  - Pack current measurement
  - Temperature measurement
  - High-voltage measurements
- Other Battery Management Unit (BMU) functionalities:
  - CAN communication with the PC to showcase the measured values in CANoe application

Follow the next section steps in order to get started with this example application.

5.2.1 Import the project

In order to import the project, go through the following steps.

1. Open EB Tresos: *TRESOS_STUDIO_INSTALLATION_PATH\bin\tresos_gui.exe*
2. Click *File*, *Import*, *General* and then *Existing Projects into Workspace*.
3. Click on *Select archive file*, browse for the .zip file.
4. Select the project according to your hardware setup.
5. Click *Finish*.

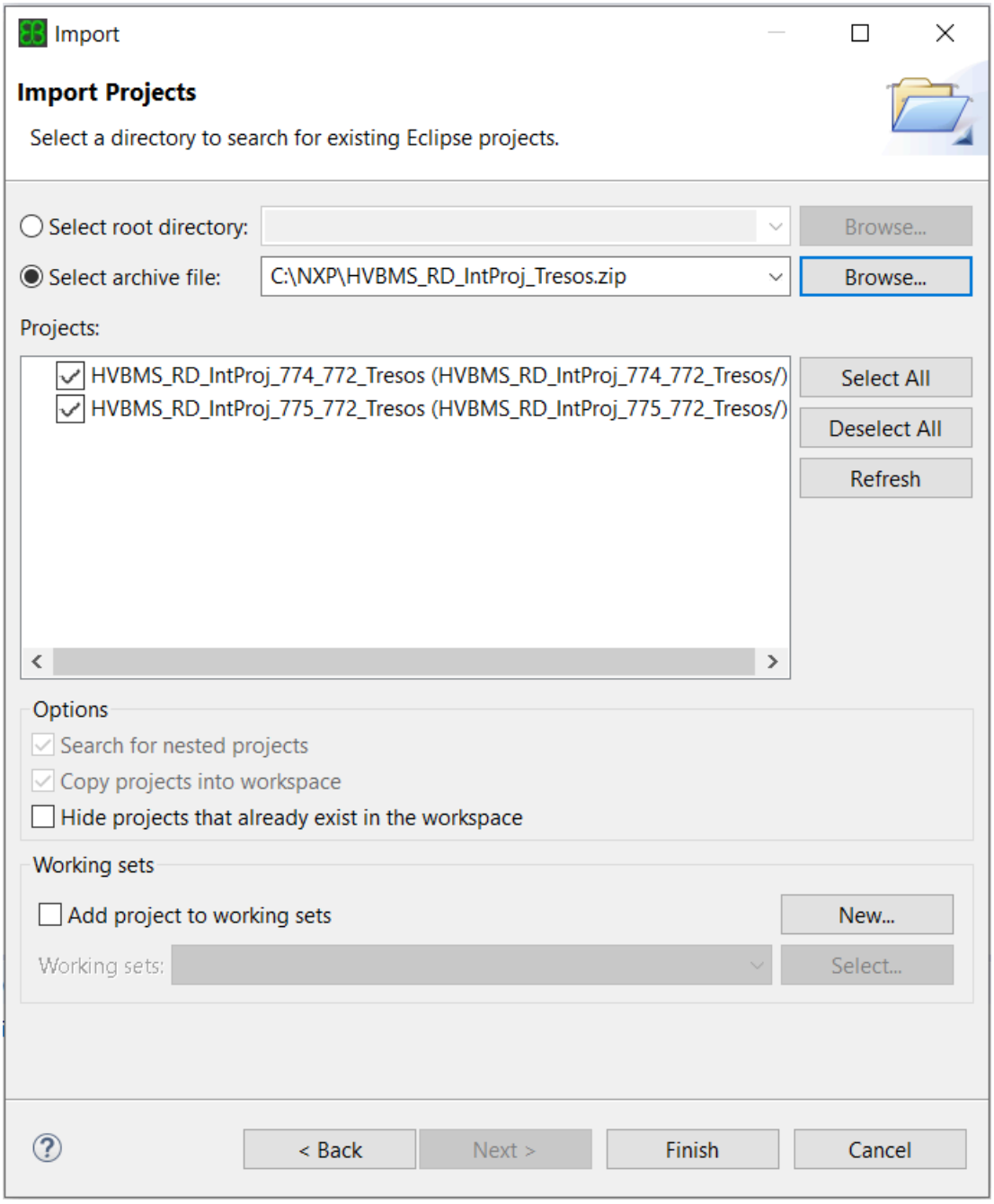


Figure 28. HVBMS Import Application

5.2.2 Apply Patches

Prior to building and running the application a series of patches need to be applied.

1. Remove folder *CanTrcv_43_tja1145a_TS_T40D34M8I0R0* from *TRESOS_STUDIO_INSTALLATION_PATH \plugins*

2. Copy the patches from the tresos Studio *IntProj\plugins* (*HVBMS_RD_IntProj_775_772_Tresos\patches* | HVBMS_RD_IntProj_774_772_Tresos\patches) to *TRESOS_STUDIO_INSTALLATION_PATH\plugins*
3. Set *TOOLPATH_COMPILER* and *TRESOS_BASE* variables from the tresos Studio *IntProj\util* (e.g. *HVBMS_RD_IntProj_775_772_Tresos\util\launch_cfg.bat* | *HVBMS_RD_IntProj_774_772_Tresos\util\launch_cfg.bat*):
   - *TOOLPATH_COMPILER* - path to *GHS* compiler
   - *TRESOS_BASE* - set to *TRESOS_STUDIO_INSTALLATION_PATH*

```
1  IF "%TARGET%"=="" SET TARGET=CORTEXM
2  IF "%DERIVATE%"=="" SET DERIVATE=S32K34X
3  IF "%TOOLCHAIN%"=="" SET TOOLCHAIN=multi
4  IF [%TOOLPATH_COMPILER%]==[] SET TOOLPATH_COMPILER=C:\ghs\comp_202114
5  IF [%TRESOS_BASE%]==[] SET TRESOS_BASE=TRESOS_STUDIO_INSTALLATION_PATH
6  IF [%PLUGINS_BASE%]==[] set PLUGINS_BASE=%TRESOS_BASE%\plugins
7
```

Figure 29. Set tool paths

5.2.3 Building and running the project

In order to build and run the project, go through the following steps:

1. Open the project by double-clicking on *ECU (CORTEXM, S32K34X)*
2. Click on the *Unattended wizard configuration* drop-down arrow from *tresos Studio*'s toolbar and run *MultiTask_Sysimport*

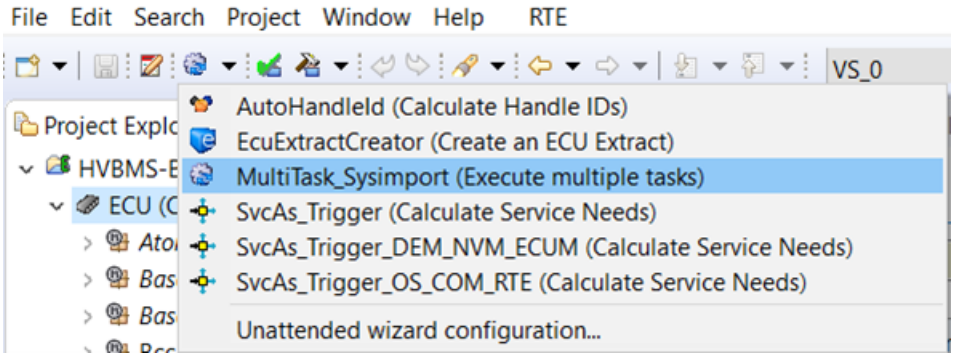


Figure 30. Run MultiTask_Sysimport wizard

3. Click on the *Generate code for the currently selected projects* from *tresos Studio*'s toolbar

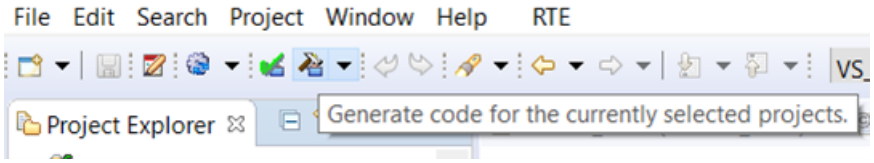


Figure 31. Generate code

4. Execute launch.bat from tresos Studio *IntProj\util* (e.g. *HVBMS_RD_IntProj_775_772_Tresos\util\launch.cfg* | *HVBMS_RD_IntProj_774_772_Tresos\util\launch.cfg*) and run the following command: *make -j* to build the project
5. Open *Trace32*
6. Run the following CMM script: *IntProj\source\boards\S32K344EVB_Q172_SCOS\S32K34X.cmm* (e.g. *HVBMS_RD_IntProj_775_772_Tresos\source\boards\S32K344EVB_Q172_SCOS\S32K34X.cmm* | *HVBMS_RD_IntProj_775_772_Tresos\source\boards\S32K344EVB_Q172_SCOS\S32K34X.cmm)*

5.2.4 Canoe GUI connect

While the application is executing on the BMU board, the Green LED must be on. In order to see the measurements performed by the HVBMS Reference Design application follow the next steps:

1. Run *CANFD.cfg* from tresos Studio *IntProj\tools\NXP_HVBMS_RestBusSimulation* (e.g. *HVBMS_RD_IntProj_775_772_Tresos\tools\NXP_HVBMS_RestBusSimulation\CANDF.cfg* | *HVBMS_RD_IntProj_774_772_Tresos\tools\NXP_HVBMS_RestBusSimulation\CANDF.cfg*)

Note: Ensure that the Vector hardware tools are properly connected and configured in the simulation.

5.3 HVBMS-RD Bring-up example

The HVBMS-RD Bring-up example is an easy to understand, easy to use bare metal application, developed using S32DS IDE, that has the following main features:

- Cell Monitoring Unit (CMU):
  - Cell voltage measurement, and pack voltage measurement
  - Temperature measurement
  - Broken chain detection and recovery (only for the TPL examples)
- Battery Junction Box (BJB):
  - Pack current measurement
  - Temperature measurement
  - High-voltage measurements
- Other Battery Management Unit (BMU) functionalities:
  - UART communication with the PC to showcase the measured values in FreeMASTER application
  - SBC watchdog refresh

Follow the next section steps in order to get started with this example application.

System variants vs bring-up example

Nr	Bring-up Example Name	Bundle description on Nxp.com
1	HvBms400_775_772_TPL_Bring_up	RD-HVBMSCTBUN Bundle
2	HvBms400_775_772_CAN_Bring_up	HWRD-HVBMSCC Bundle
3	HvBms400_774_772_TPL_Bring_up	
4	HvBms800_774_772_TPL_Bring_up	RD-HVBMSCT800BUN Bundle

5.3.1 Import the project

In order to import the project, go through the following steps.

1. Open S32DS.
2. Click *File*, *Import*, and then *Existing Projects into Workspace*.
3. Select the option *Select archive file*, browse for the .zip file, *Select the project desired to be imported*.
4. Select the example based on your system 400_CAN/TPL, 800_TPL examples.
5. Click *Finish*.

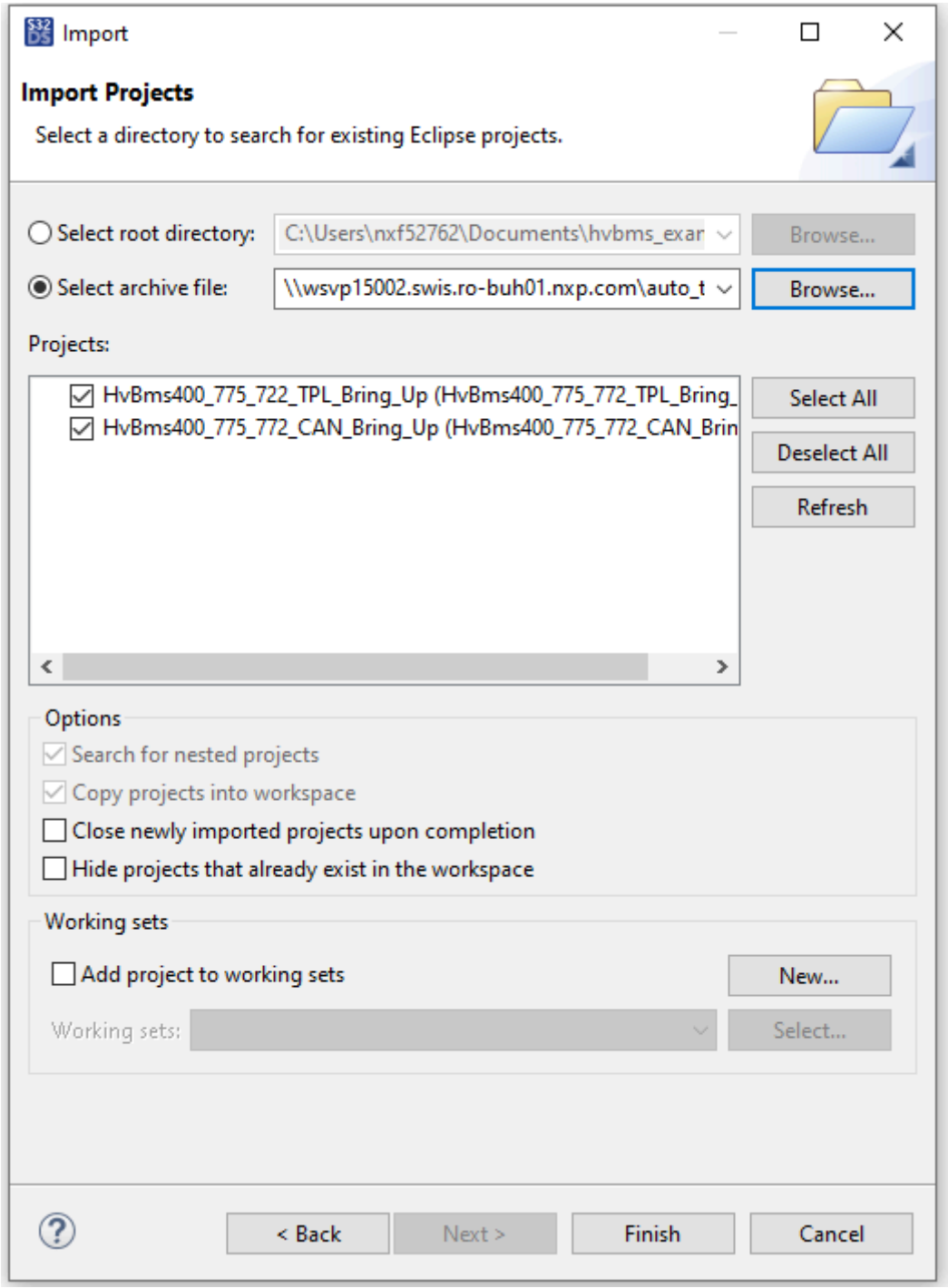


Figure 32. HVBMS Import Example

5.3.2 Building and running the project

In order to build and run the project, go through the following steps:

1. Click the drop-down list near the *Build* icon and select *Debug_FLASH* to build the project.

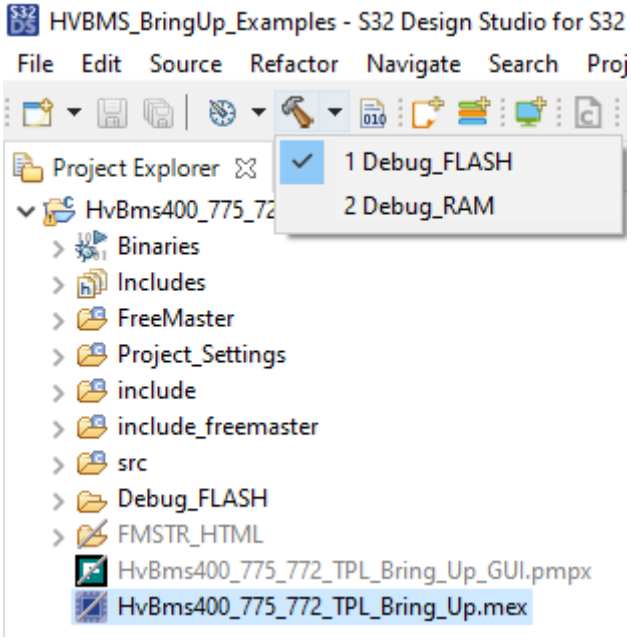


Figure 33. HVBMS-RD Bring-Up Example build

2. Start the board with FS26 SBC in *Debug mode* (this is required for flashing the code via debugging interface)
   - BMU V 2.0: press the **SW1** button on the BMU board
   - BMU V 3.0: switch ON **SW2** on the BMU board
3. Click the drop-down list near the *Debug* button and select *Debug Configurations*.
4. Select e.g *HvBms400_775_772_TPL_Bring_Up_Debug_FLASH* and click *Debug*. If the *C/C++ Application* field is empy, select the appropriate .elf file browsing the project location.

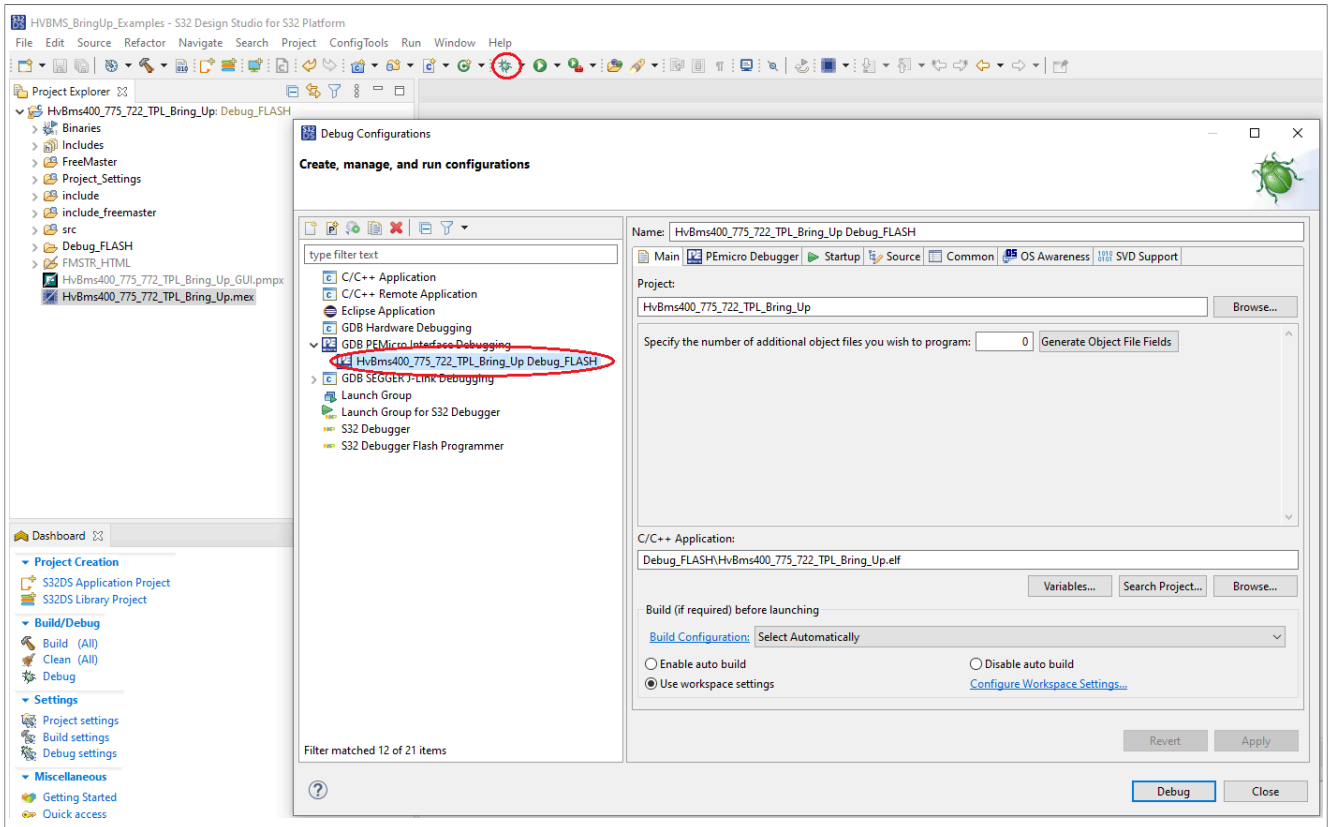


Figure 34. HVBMS-RD Bring-up Example Build, Debug, Run

5. In the newly opened *Debug* perspective, click the *Run* button to start the software.

5.3.3 FreeMASTER GUI connect

While application is executing on the BMU board, the Green LED must be on. In order to see the measurements performed by the HVBMS Reference Design application follow the next steps:

1. In S32DS, switch view from *Debug* view to *Project* view.
2. Double-click the e.g *HvBms400_775_772_TPL_Bring_Up_GUI.pmpx* file to open the FreeMASTER interface.

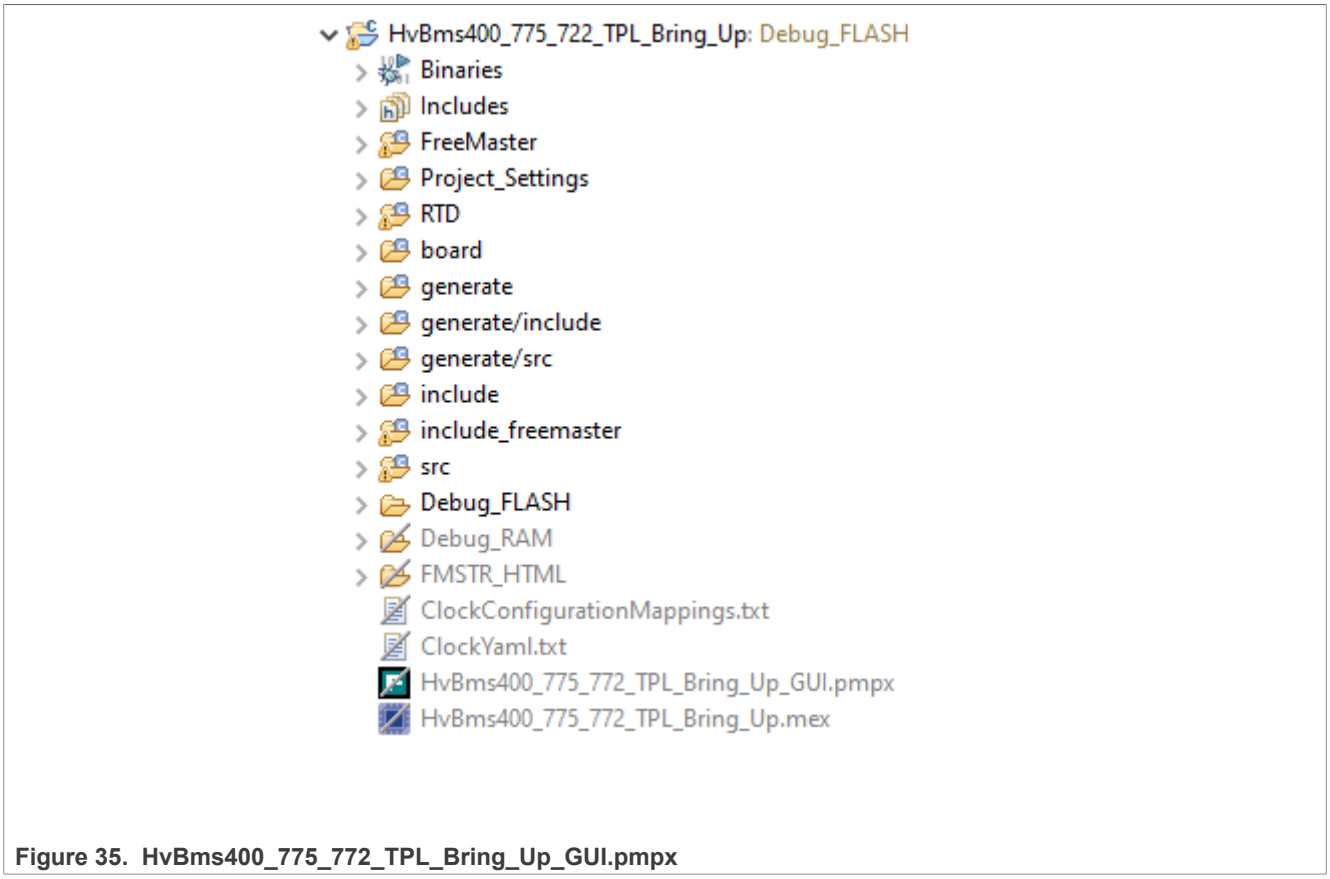


Figure 35. HvBms400_775_772_TPL_Bring_Up_GUI.pmpx

3. In FreeMASTER, click *Tools*, and then *Connection Wizard*, a new window opens.
4. Click *Next*, then select *Use direct connection to on-board USB port* and click *Next*.
5. Select the correct COM port and make sure that the selected Baud-rate is 115200, click *Next*.

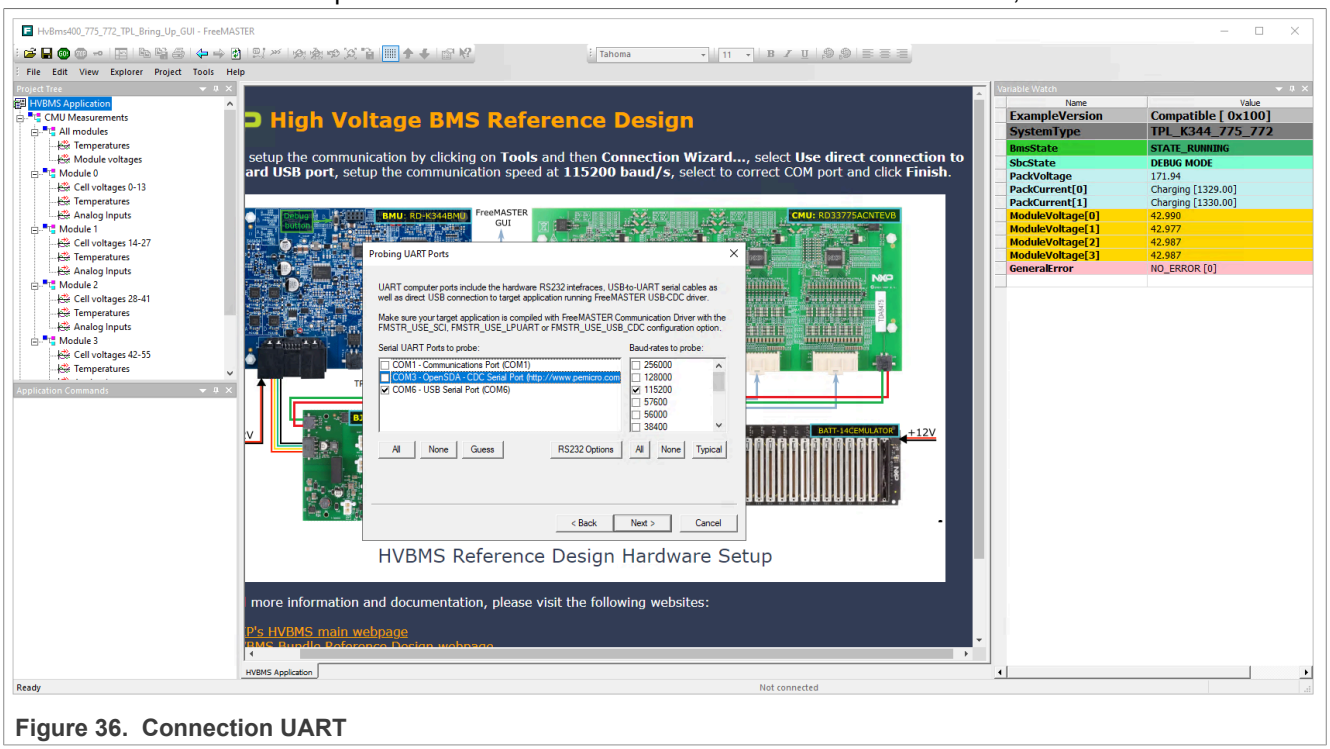


Figure 36. Connection UART

6. A board should be detected. Select *Yes, use detected port settings and start using FreeMASTER tool* and click *Finish*.
7. The GUI is connected to the HVBMS application running on the hardware.

Figure 37. HVBMS GUI

Revision history

Revision history

Rev	Date	Description
v1.0	2023/07/14	Initial version
v2.0	2023/09/15	Add support for BMS/BMS SL SDK 1.0.1

Revision history

Rev	Date	Description
v1.0	2023/07/14	Initial version
v2.0	2023/10/06	Add support for BMS/BMS SL SDK 1.0.1 Add support for RTD 3.0 Add support for MC33774

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