Renesas Synergy™ Platform

Out-of-Box (OoB) Demonstration (Blinky) Application for S1/S3/S5 Target Board Kits

Introduction

This application note provides the implementation details of the Out-of-Box (OoB) Demonstration (Blinky) application that comes pre-programmed on the Synergy Target Board Kits. This application note also provides step-by-step instructions to:

1. Import and build the application project using the Synergy Software Package and e² studio Integrated Solutions Development Environment (ISDE) or IAR Embedded Workbench® for Renesas Synergy™ (IAR EW for Synergy).
2. Download and execute the application on Synergy Target Board Kits.
3. Recreate, generate, and build the application with any modifications that you intend to make in the application provided.

Required Resources

To build and run the application, you need the following:

	Hardware	Software and Development Tools
System	**Host PC** • At least 8 GB of RAM • At least 2 GB of free hard disk space • One USB 2.0 (or later) port	**Operating system** • Windows® 7 (or later)
Embedded	**One of the following Target Board Kits**	
	TB-S3A6, TB-S5D5, TB-S3A3	• e² studio ISDE v5.4.0.023 or later • IAR EW for Synergy v7.71.3 or later • Synergy Software Package (SSP) v1.3.0 or later • Synergy Standalone Configurator (SSC) v5.4.0.023 or later
	TB-S3A1	• e² studio ISDE v6.2 or later • IAR EW for Synergy v8.2 or later • Synergy Software Package (SSP) v1.4.0 or later • Synergy Standalone Configurator (SSC) v6_2_0_R20180102 or later
	TB-S1JA, TB-S5D3	• e² studio ISDE v6.2.1 or later • IAR EW for Synergy v8.23.1 or later • Synergy Software Package (SSP) v1.5.0 or later • Synergy Standalone Configurator (SSC) v6_2_1 _R20180629 or later

Estimated time required is 30 minutes (assuming all the necessary hardware is available, software is installed and ready to use).

Prerequisites and Assumptions

Software and Tool readiness: It is assumed that the Synergy Software Package, J-Link drivers, and development tools are installed on the Windows® PC. The software and tools are bundled and can be downloaded using one of the two platform installers:

A. **e² studio Platform Installer** installs Synergy Software Package and e² studio for Synergy IDE with IAR complier and J-Link USB drivers.
Download from www.renesas.com/synergy/e2studio.

B. **IAR Platform Installer** installs Synergy Software Package and IAR Embedded Workbench® for Renesas Synergy™ IDE with IAR complier and J-Link USB drivers.
Download from www.renesas.com/synergy/ewsynergy.

Synergy Standalone Configurator (SSC) (Optional)
SSC can be used with IAR Embedded Workbench® for Renesas Synergy™ IDE and can be downloaded from www.renesas.com/synergy/ssc.

Tool experience: It is assumed that the user has prior experience working with embedded development environments such as the e² studio Integrated Solutions Development Environment (ISDE).

Subject knowledge: It is assumed that the user has basic knowledge about the Synergy Software Package and principles of capacitive touch operation.

Contents

1. Application Project Overview

This application project is typically the very first application that you are suggested to work with if you are new to the Renesas Synergy™ Platform. By running this application project, you become familiar with Synergy Software Package, Synergy MCUs, and the associated e² studio ISDE or IAR Embedded Workbench® for Renesas Synergy™ development toolchain.

1.1 Application Software Architecture

Figure 1 shows the software components of the Blinky application. Here, the Blinky thread toggles the LED by calling the HAL driver.

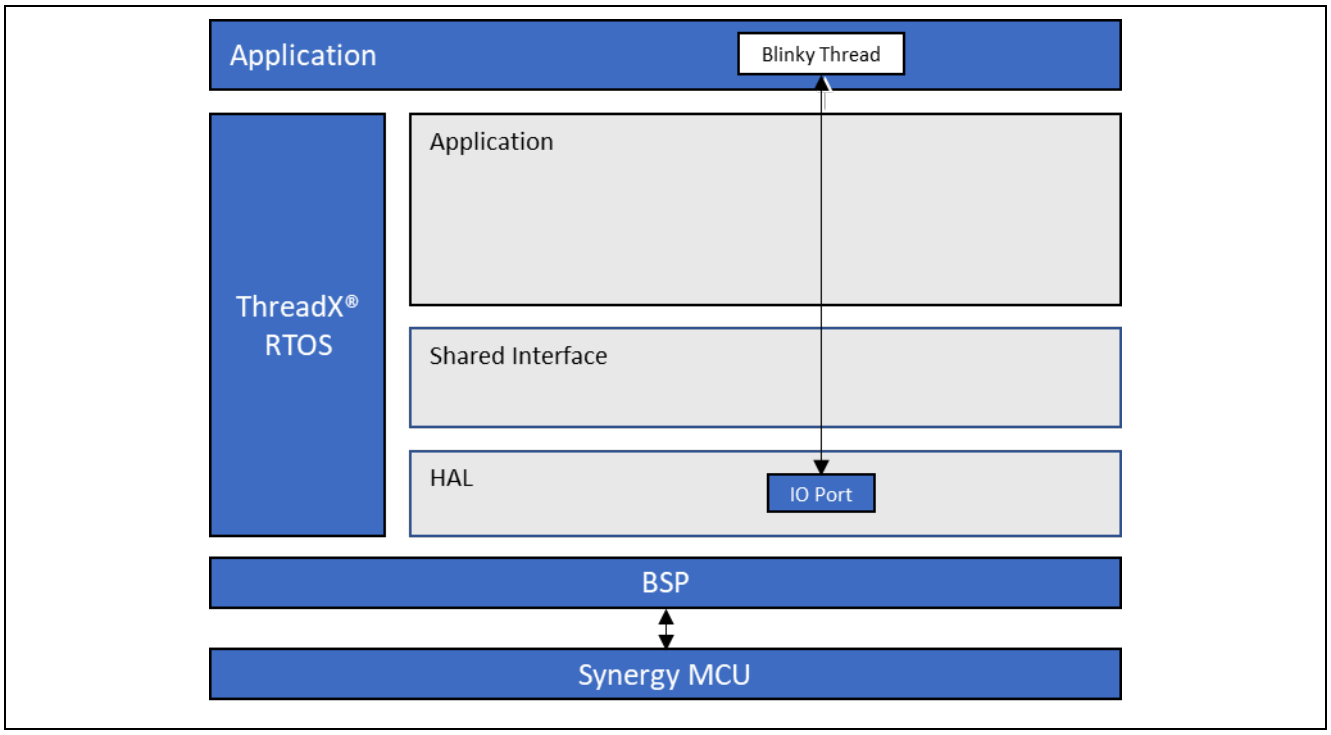

Figure 1. Blinky Application Software Architecture

2. Powering up the Board

Power up the Target Board by connecting it to the USB port on the PC using the USB Type-A to USB Micro-B cable. Connect the Micro USB end of the cable to connector J11 (DEBUG USB located in the DEBUG area) on the Target Board. Connect the other end of the cable to the USB port of a host PC. LED2 (PWR) on the Target Board lights up solid green indicating that the Target Board is powered on.

Note: The Target Board uses SEGGER J-Link® On-board (OB) as the debug interface. Make sure that the J-Link drivers are installed on your computer by checking for them in the Windows Device Manager. If J-Link drivers are not installed on the PC, LED2 (DEBUG) blinks orange. If J-Link drivers are installed on the PC and detected by the Target Board, the LED2 (DEBUG) blinks orange with a very small duty cycle that is barely noticeable.

3. Importing, Building, and Downloading the Application Project

Refer to the *SSP Import Guide* (r11an0023eu0121-synergy-ssp-import-guide.pdf) for instructions on importing the bundled application project into e² studio ISDE or IAR EW, to build and run the project. The SSP Import Guide is included in the zipped folder along with this application note.

Note: You need to select the **OoB_Demo_TBxxx Debug** option from the GDB Hardware Debugging configuration window based on the kit for debugging.

4. Running the Application Project

On running the Out-of-Box (OoB) Demonstration (Blinky) application project, the LED 1 flashes red at an interval of 0.5 seconds using the RTOS times.

5. Recreating, Generating, and Building the Application Project

You can make modifications to the source code of the provided application project if needed. The procedures for recreating, generating, and building the project using the e² studio ISDE or Synergy SSC for IAR EW are explained in the following sections.

5.1 Recreating the Application Project

1. In e² studio ISDE, click **File** > **New** > **Synergy C/C++ Project**.
2. For IAR EW for Synergy, click **Renesas Synergy** > **New Synergy Project**. Select the name as described in the figure that follows and select the license file and SSC version.
3. Choose **Renesas Synergy C Executable Project** and **click Next (**see Figure 2).

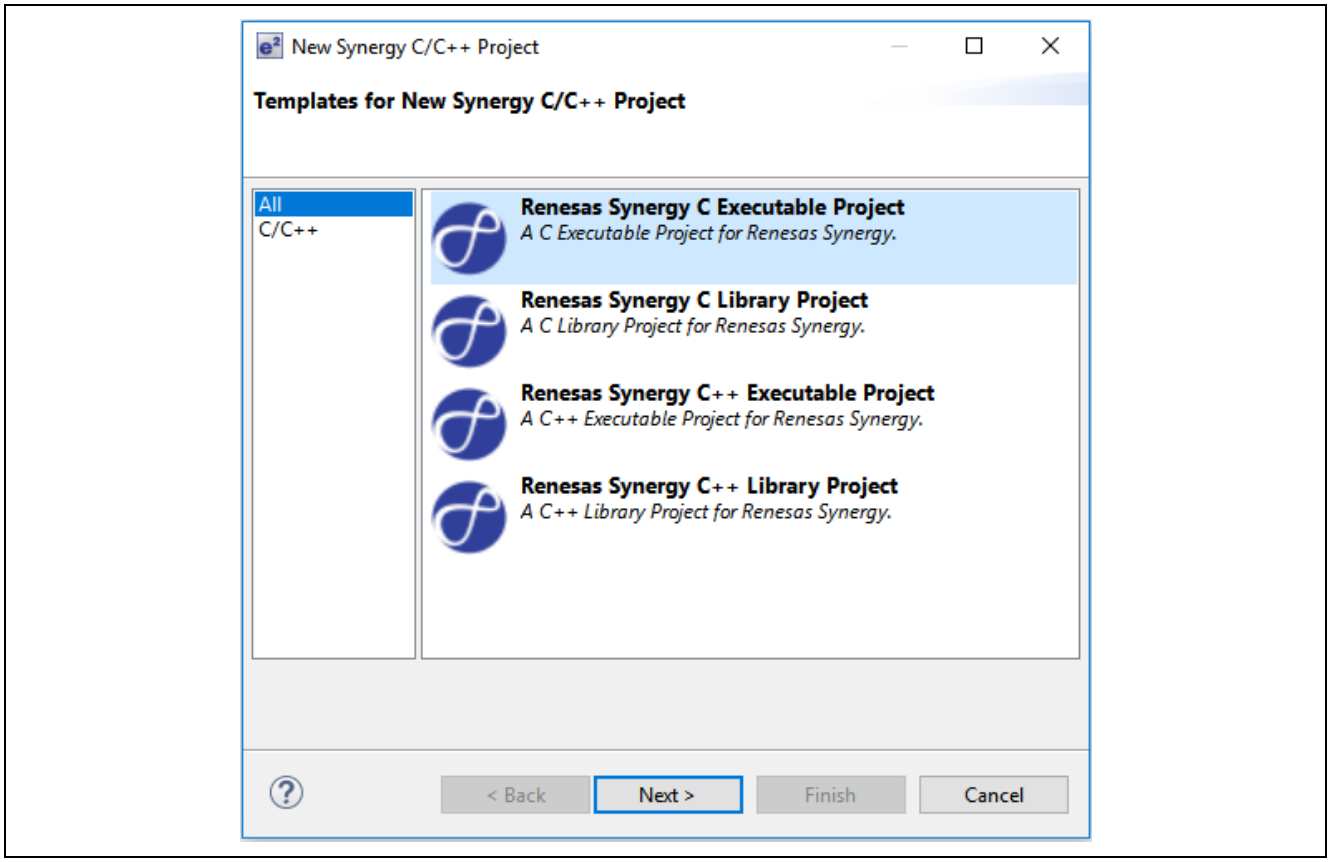

Figure 2. Choose "Renesas Synergy C Executable Project"

4. Assign a name to use for this tutorial, for example, **Blinky**.
5. Identify the license file if the license window is empty. You can locate the license file in your ISDE base directory at **ISDE\internal\projectgen\arm\Licenses\SSP_License_Example_EvalLicense_<rev>.xml**.

For TB-S1JA Boards using e² studio, in order to build the project, you need to install the IAR compiler. You can install this as a plugin as referenced by the document, “Installing IAR Compiler into e² studio,” available at www.renesas.com. Follow the instructions and select the IAR Toolchain for ARM –(8.x), as shown in the following graphic.

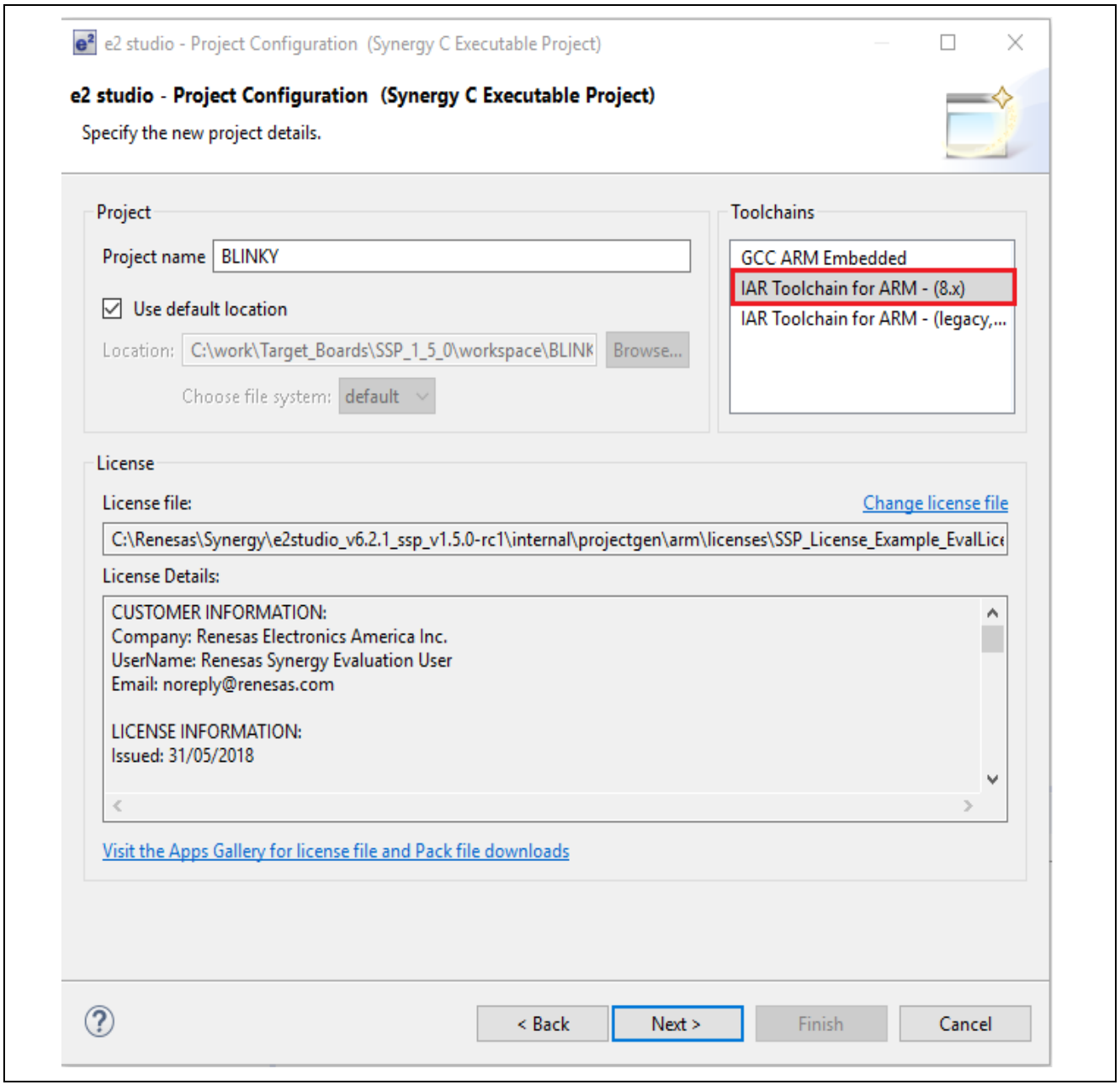

Figure 3. e² studio IAR Compiler Selection Window

6. The Project Configuration window shows your selection. Click **Next**.

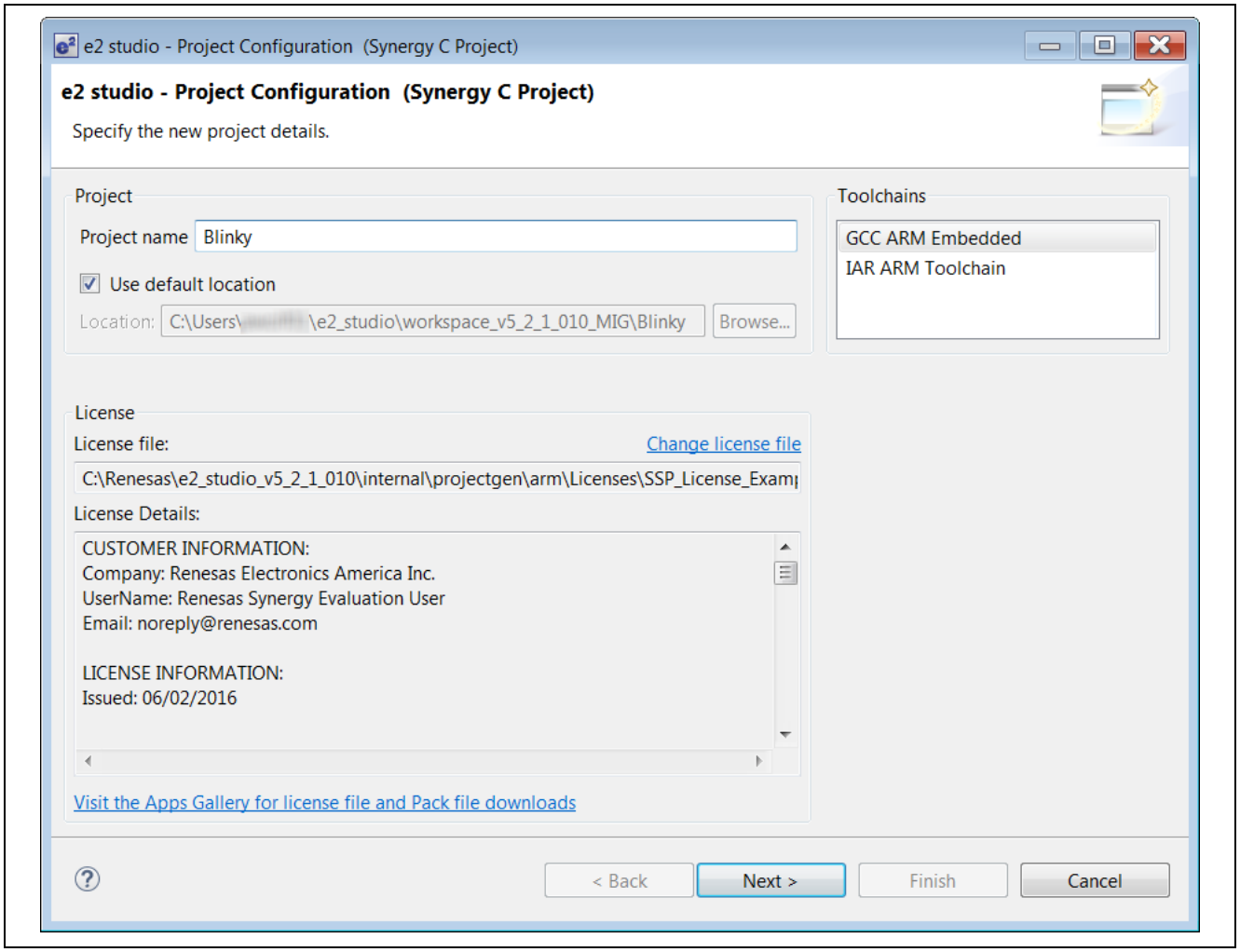

Figure 4. e² studio ISDE Project Configuration Window (part 1)

7. Select the SSP version and the name of your board from the **Device Selection** drop-down list. Click **Next**.
   For the TB-S3A6, select **S3A6 TB** as shown in the following graphic. For any others, choose the applicable Target Board.
8. Select **Blinky with ThreadX** project template and click **Finish**.

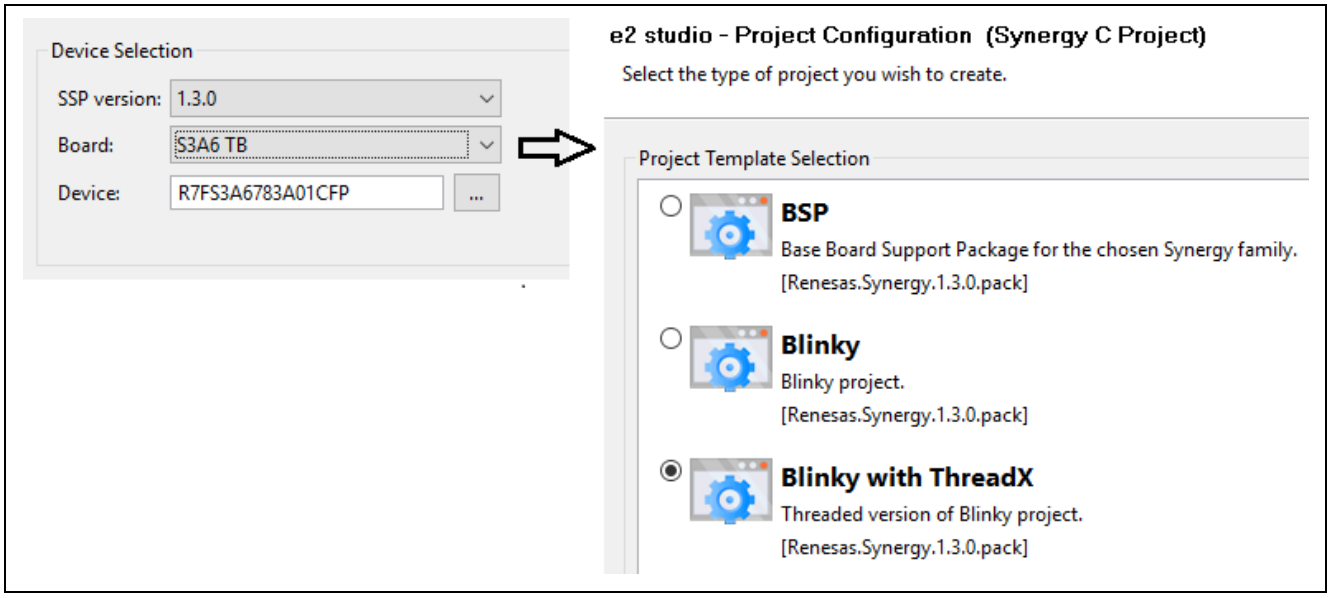

Figure 5. e² studio ISDE Project Configuration Window (part 2)

5.2 Generating Project Content

Click the **Generate Project Content** button.

The project files are generated with the configuration options you selected. Your new project is now created, configured, and ready to build.

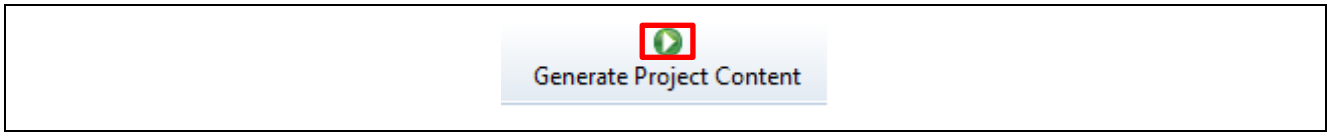

Figure 6. Generate Project Content Button

5.3 Building the Project

Build the application project by clicking the hammer  icon as shown in the following graphic.

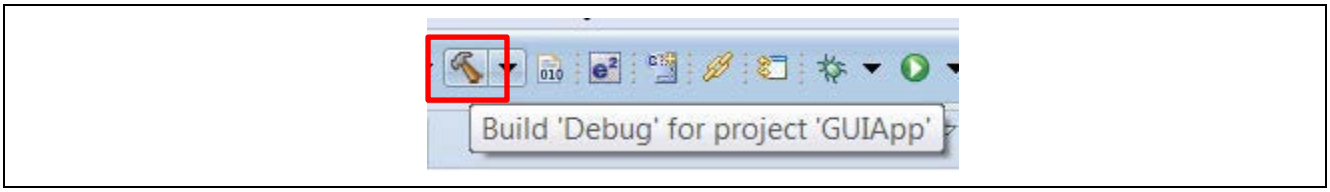

Figure 7. Build Button

5.4 Running the Application

Run the project and verify the functionality as per the modifications performed in the source code of the provided application project.

6. Next Steps

1. **Learn more about the Target Board Kit.**
   Visit the Target Board Kit webpage (www.renesas.com/synergy/tb-sXXX) to learn more about the kit and download documentation, schematics, design files, and so forth.
   For example, the TB-S5D5 Target Board Kit webpage is at www.renesas.com/synergy/tb-s5d5.
2. **Explore existing application projects for the Target Board Kit.**
   Renesas provides several application projects to demonstrate different capabilities of the S1/S3/S5 MCU Series. These application projects can also serve as a good starting point for you to develop your custom application. Application projects available for the Target Board Kit are listed on the Target Board Kit webpage (www.renesas.com/synergy/tb-sXXX).
   For example, TB-S5D5 Target Board Kit webpage is at www.renesas.com/synergy/tb-s5d5.
3. **Learn more about the Synergy Platform.**
   Visit the following URLs to learn about the following elements of the Synergy Platform and download different components:
   - Synergy Software: www.renesas.com/synergy/software
   - Synergy Hardware: www.renesas.com/synergy/hardware
   - Synergy Solutions Gallery: www.renesas.com/synergy/solutionsgallery

7. Limitations and Assumptions

None

Website and Support

Visit the following vanity URLs to learn about key elements of the Synergy Platform, download components and related documentation, and get support.

Synergy Software	www.renesas.com/synergy/software
Synergy Software Package	www.renesas.com/synergy/ssp
Software add-ons	www.renesas.com/synergy/addons
Software glossary	www.renesas.com/synergy/softwareglossary
Development tools	www.renesas.com/synergy/tools
Synergy Hardware	www.renesas.com/synergy/hardware
Microcontrollers	www.renesas.com/synergy/mcus
MCU glossary	www.renesas.com/synergy/mcuglossary
Parametric search	www.renesas.com/synergy/parametric
Kits	www.renesas.com/synergy/kits
Synergy Solutions Gallery	www.renesas.com/synergy/solutionsgallery
Partner projects	www.renesas.com/synergy/partnerprojects
Application projects	www.renesas.com/synergy/applicationprojects
Self-service support resources:	
Documentation	www.renesas.com/synergy/docs
Knowledgebase	www.renesas.com/synergy/knowledgebase
Forums	www.renesas.com/synergy/forum
Training	www.renesas.com/synergy/training
Videos	www.renesas.com/synergy/videos
Chat and web ticket	www.renesas.com/synergy/resourcelibrary

Revision History

Rev.	Date	Description	
		Page	Summary
1.00	Aug.29.17	-	Initial release
1.01	Oct.13.17	-	Updated the version information, SW architecture diagram, and added module guide collateral links.
1.02	Oct.26.17	-	Updated to SSP v1.3.2
1.03	Feb.27.18	-	Added support for TB-S3A1
1.04	Sep.17.18	-	Added Support for TB-S1JA, TB-S5D3
1.05	Feb.08.19	8	Updated Website and Support URLs

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