

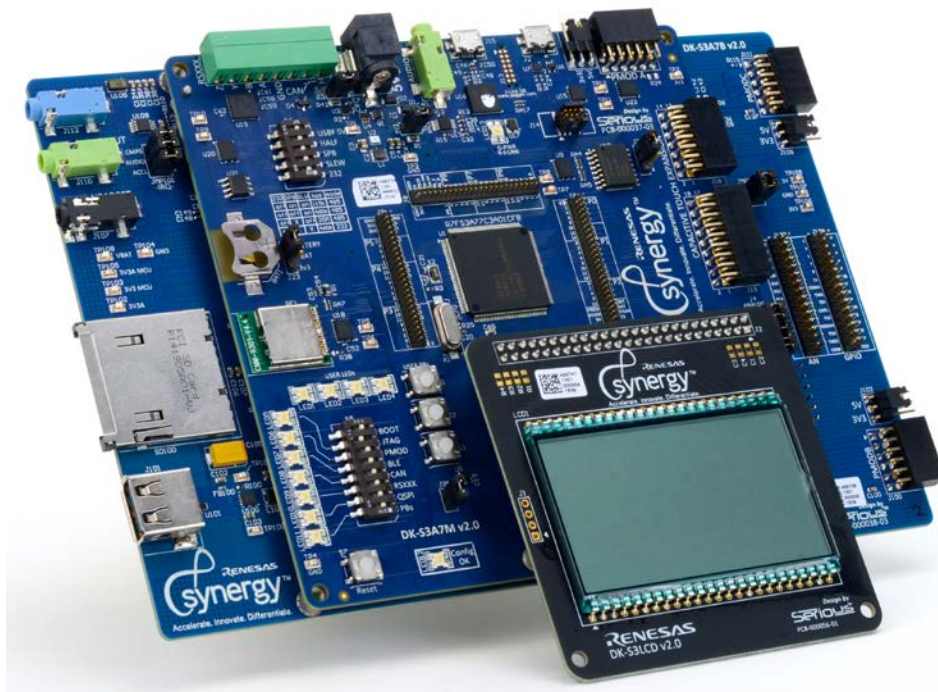
## DK-S3A7

January 8, 2016

### In the box

The following components are included in the DK-S3A7 Development Kit:

- DK-S3A7 Main Board (DK-S3A7M)
- DK-S3A7 Breakout Board (DK-S3A7B)
- DK-S3A7 Segment LCD panel (DK-S3A7LCD)
- One USB Type A to Micro-B cable
- Multi-region 5V, 2.0A power supply
- Quick Start Guide (this document)



### Overview

This kit and the associated development tools provide the user with a platform to develop products with the Renesas Synergy™ S3 microcontrollers. This Quick Start Guide walks you through using the out-of-box demo then provides step-by-step directions to develop, configure, generate, build, download and execute the Blinky Project on the Renesas Synergy™ Software Package (SSP).

## DK-S3A7 Kit

**NOTE:** This Quick Start Guide is for the DK-S3A7 Development Kit.

## Prerequisites

### Required software and tools

- Minimum workstation requirements: Microsoft® Windows® 7 with Intel® Core™ family processor running at 2.0 GHz or higher (or equivalent processor), 8 GB memory, 250 GB hard disk or SSD, USB 2.0, Internet connection
- Renesas e<sup>2</sup> studio Integrated Solution Development Environment (ISDE)
- Renesas Synergy™ Software Package (SSP)

## Installation

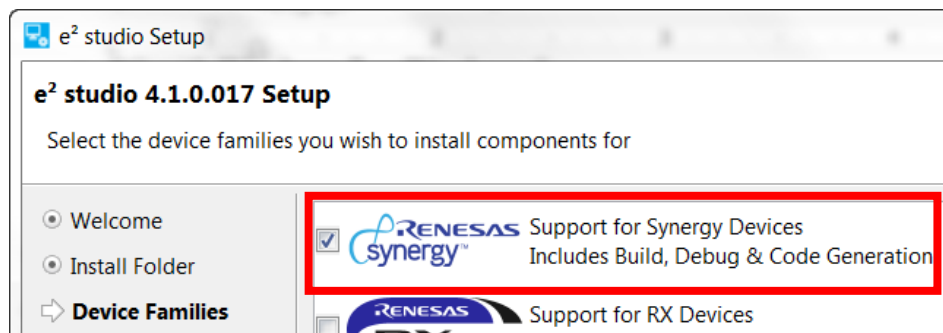
Tools are available for download at: <https://synergygallery.renesas.com>.

**NOTE:** Version numbers of the tools may change. Following we show the versions that were available when this document was developed.

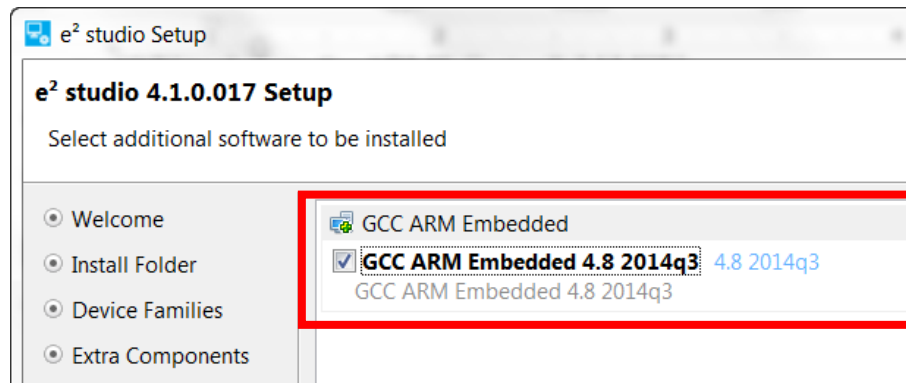
Download and install the latest revision of the e<sup>2</sup> studio (ISDE) as follows:

**NOTE:** Unless informed otherwise in the following steps, use the default options.

- 1) In the e<sup>2</sup> studio Setup dialog, select at least the **Renesas Synergy™** Device Family when the following dialog box appears.



- 2) Select the additional software **GCC ARM Embedded 4.8.2014q3** when the following dialog box appears:

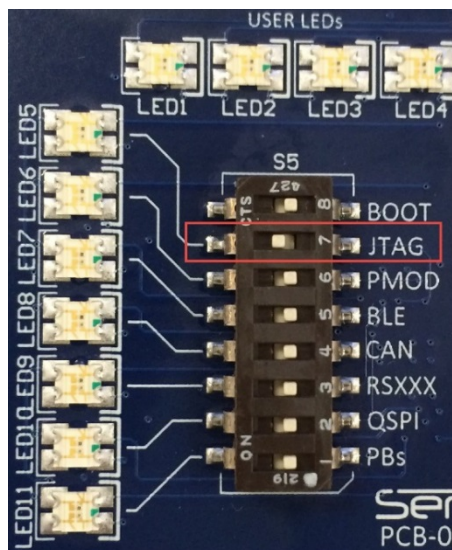


- 3) Download and install the latest revision of the SSP using the default options.

## Connecting the board components

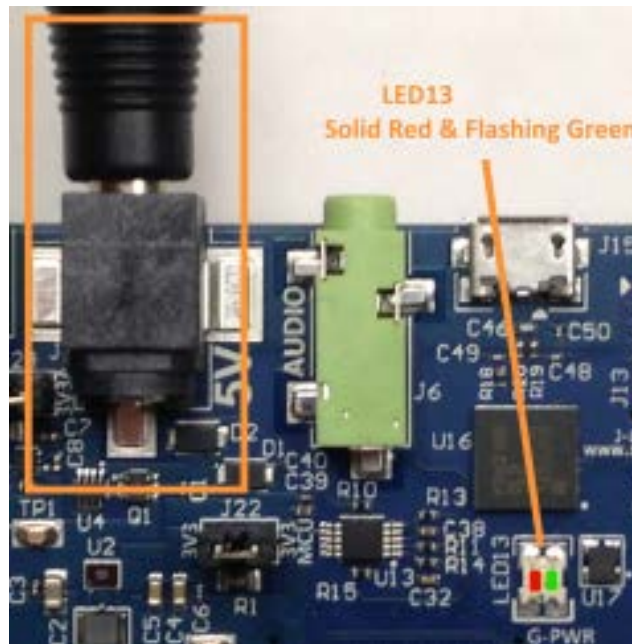
To power the boards and connect the boards to the PC, follow these steps:

- 1) Set the JTAG DIP switch 7 on S5 to ON, toward the LEDs.

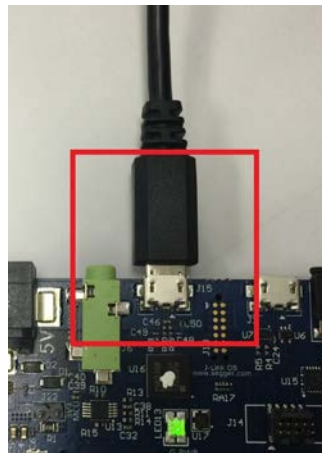


- Using the power supply provided with the DK-S3A7 kit, apply power through the 5V barrel connector (J1) on the Main Board.

LED13 turns green with a flashing red beside it. The solid green and flashing red LED13 means that the kit cannot communicate with the PC on the debug port. This is normal.



- Connect the USB cable provided with the DK-S3A7 to the J-Link OB (J15) on the Main Board.

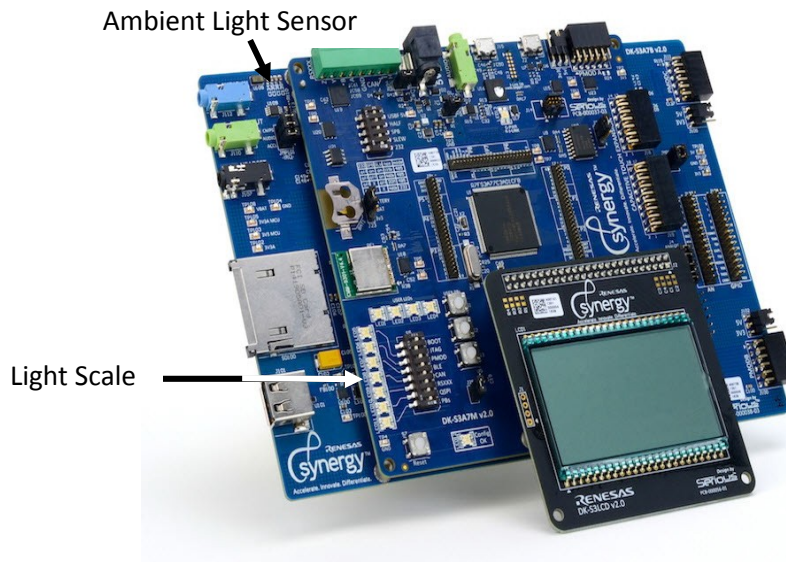


- Connect the other end of the USB cable to a USB port of the workstation.

Now, LED13 turns green with no flashing red. This indicates a good connection.

## Running the Out-of-Box Demo

The Out-of-Box Demo starts by flashing the Configuration (Light Scale) and USER LEDs for about 6 seconds. It then turns on and off all segments of the segment LCD. This is actually a configuration test that is verifying performance of the hardware. If a problem is found, then USER LED 1 and 2 are red. If no problems exist, then USER LED 3 and 4 are green.



After about 12 seconds, the S3 MCU starts sensing the amount of light at the Ambient Light Sensor, U105. The Demo takes the A/D reading and uses it to display a Light Scale on the Configuration LEDs and as a battery level and digital count on the segment LCD. The elapsed time of the Demo is also shown on the segment LCD.

Do the following steps:

- 1) Move a light source closer and farther from the Ambient Light Sensor and observe the LEDs and LCD values.
- 2) When the light sensors output reaches or exceeds their maximum value, the MCU flashes the LCD cycles on and off quickly.

## Running the Blinky Project

The Blinky Project in the SSP provides a simple example of an SSP application and familiarizes you with the e2 studio environment. Before running the project, ensure that the J-Link On-Board is connected to the workstation. See the steps in *Connecting the board components* on page 3.

To run the Blinky Project, first create a Renesas Synergy Project in the e<sup>2</sup> studio ISDE. You can then debug and run the project on the DK-S3A7.

## Creating the Blinky Project

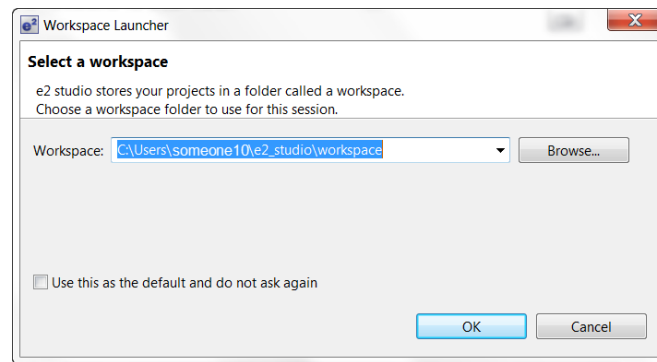
To create a project, do the following steps:

- 1) Start the e<sup>2</sup> studio ISDE by clicking **Start Menu > Renesas Electronics e2studio > e2 studio**.

### NOTES:

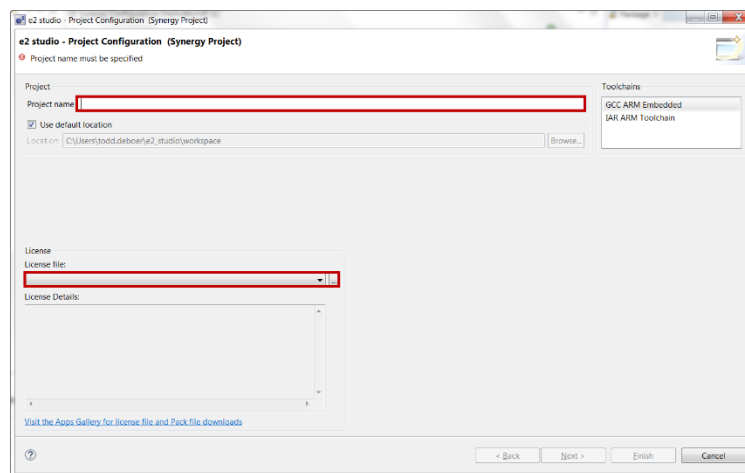
- The e<sup>2</sup> studio ISDE confirms the installed tool chain(s) the first time it is started after installing the toolchains.
  - The e<sup>2</sup> studio ISDE displays the **Welcome to e<sup>2</sup> studio** screen by default. If you click the [X], it does not display again.
  - If you do not have a compatible tool chain installed, see *Prerequisites* on page 2.
- 2) If the **Workspace Launcher** dialog box displays, click **OK**.

**NOTE:** If you select **Use this as the default (workspace) and do not ask again**, the **Workspace Launcher** window does not display.



- 3) Start a new Synergy Project by clicking **File > New > Synergy Project**.

The ISDE displays the **Project Configuration (Synergy Project)** dialog box:



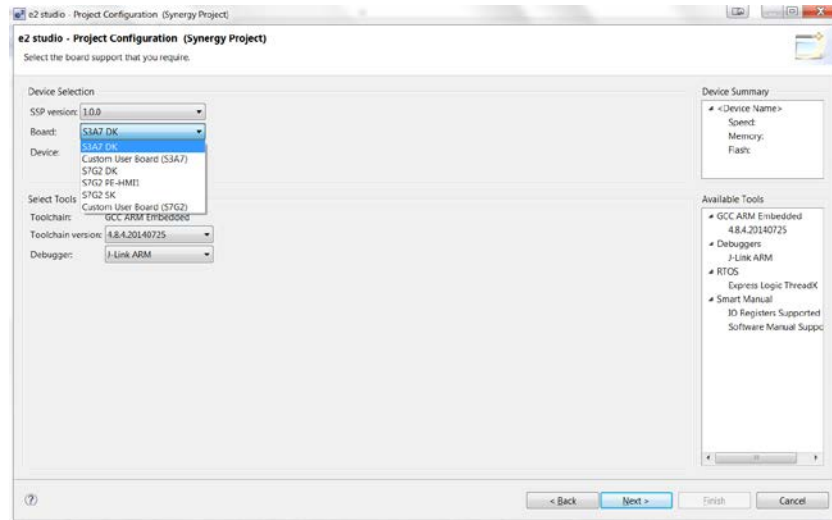
- 4) Enter **Blinky\_DK\_S3A7** as the **Project name**.

- 5) The first time you configure a project you need to load a license file. Click the browse icon of the **License File** field and, if needed and you installed to the default locations, browse to `C:\Renesas\e2_studio\internal\projectgen\arm\Licenses\`.

**NOTE:** After you have loaded the license file, it is loaded and displayed in the **License** window by default.

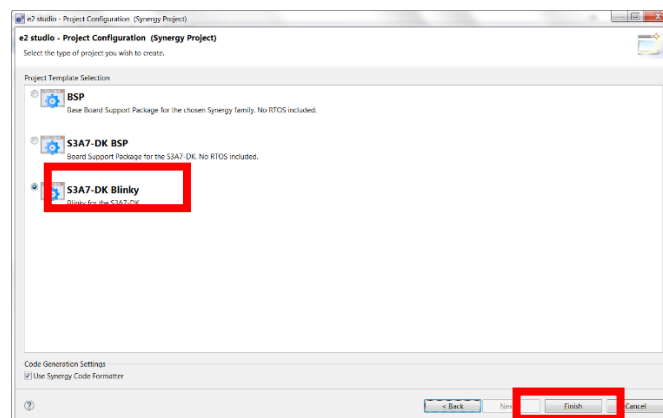
- 6) Click **Next**.

The ISDE displays the **Project Configuration (Synergy Project)** window with the **Board** options.



- 7) Select **S3A7 DK** and leave all other options at their default settings.
- 8) Click **Next**.

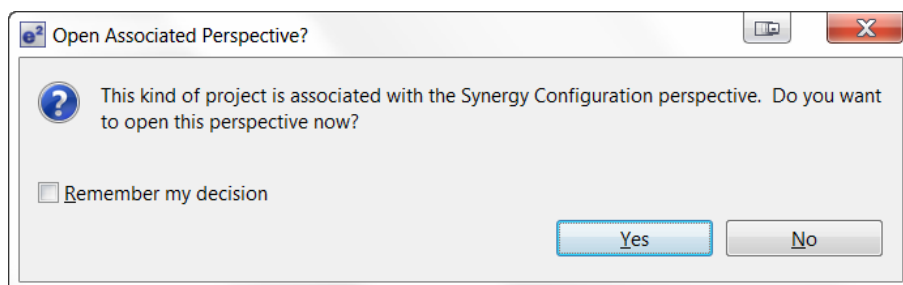
The ISDE displays the **Project Configuration (Synergy Project)** window with the **Project Template Selection** options.



- 9) Select **S3A7-DK Blinky**.
- 10) Click **Finish**.

11) If the **Open Associated Perspective** dialog box appears, click **Yes**.

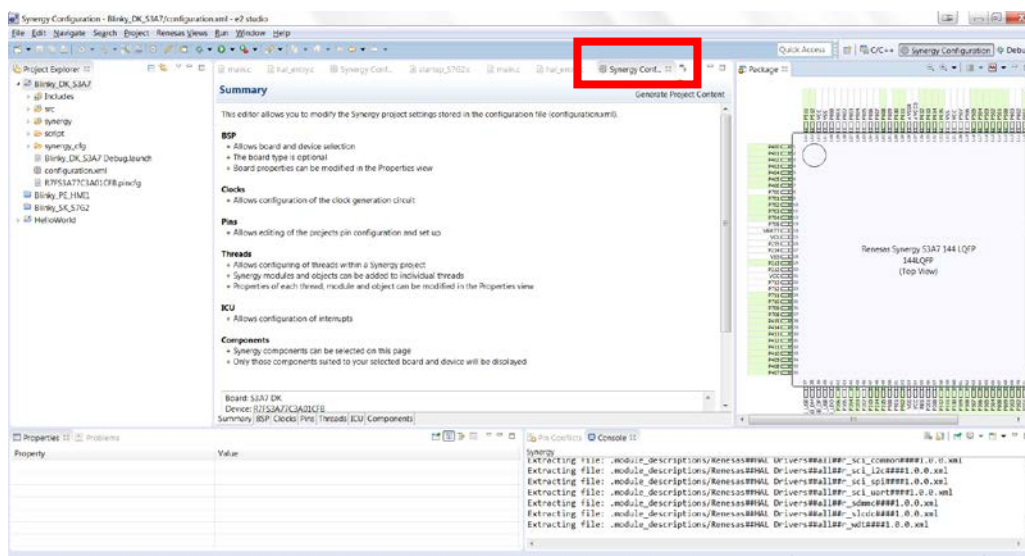
**NOTE:** The e<sup>2</sup> studio ISDE has built in Perspectives. Until you inform the tool to **Remember my decision**, it asks if it can use the **Synergy Configuration perspective**:




The ISDE automatically configures the SSP to load and generate the necessary configuration files for the microcontroller hardware associated with the selected board.

The ISDE displays the **Synergy Project Editor** where you can see all generated files and configurations by selecting the **Clocks**, **Pins**, **Threads**, **ICU**, and **Components** tabs.

**NOTE:** Do try different things. **Edit > Undo** reverses almost any action you most recently performed.



12) Generate the project content by clicking  **Generate Project Content**.

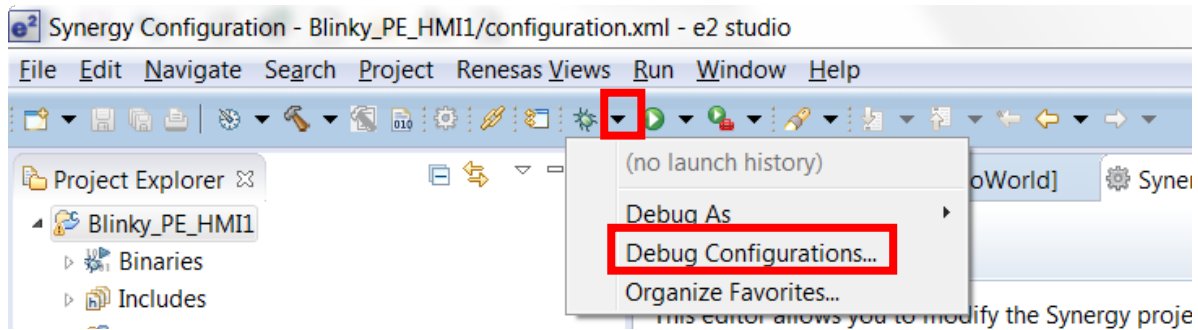
13) Build the project by clicking **Project > Build Project** or clicking on the Build icon, .



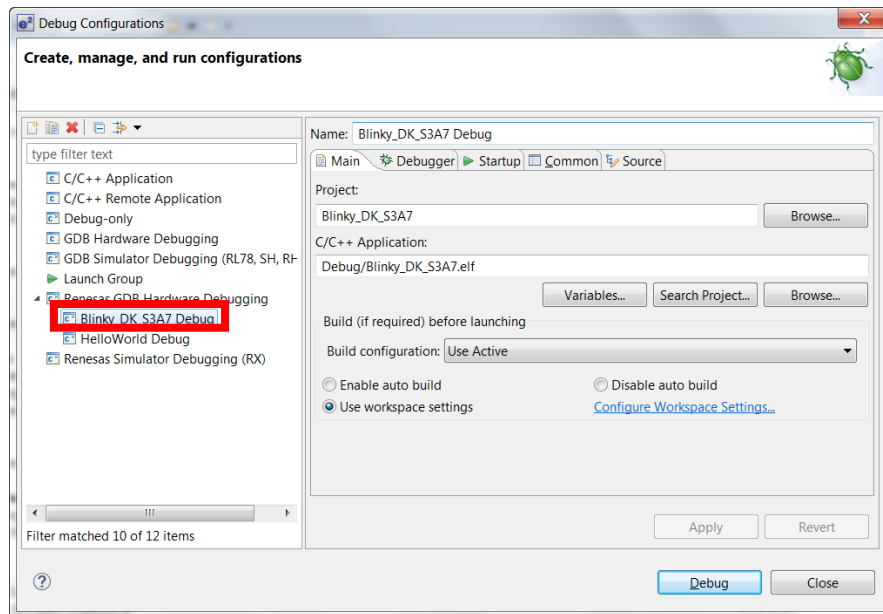
## Debugging and running the Blinky Project

To debug and run the project, do the following steps:

- 1) Configure the debugger by selecting the drop-down menu next to the debug icon and select **Debug Configurations**:



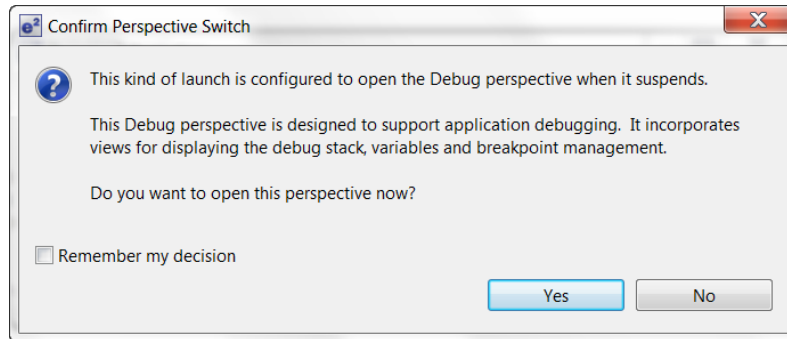
- 2) On the **Debug Configurations** dialog, select **Renesas GDB Hardware Debugging > Blinky\_DK\_S3A7 Debug**.



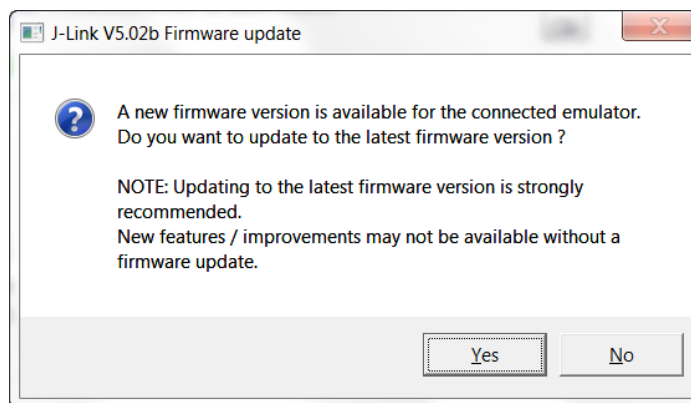
3) Click **Debug**.

- a. If the **Confirm Perspective Switch** dialog displays, click **Yes**.



**NOTE:** If you click the **Remember my decision** check box before clicking **Yes**, you will not see this dialog again.



- b. If the **J-Link Firmware update** dialog displays, we highly recommend that you click **Yes**.

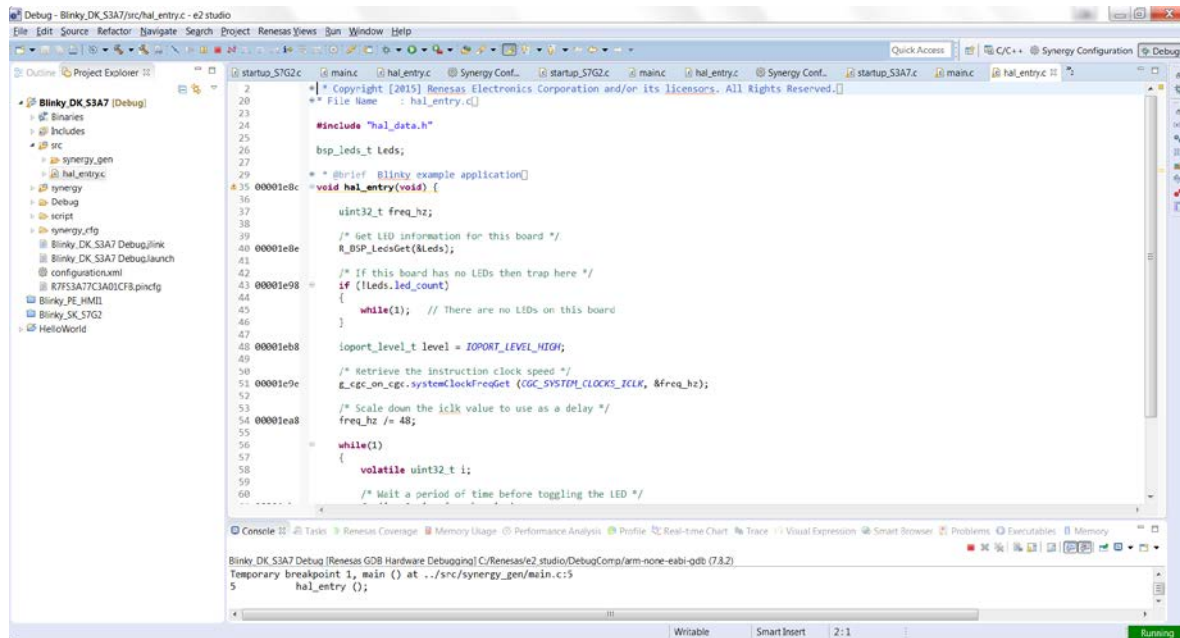


The ISDE downloads the project onto the board.

- 4) Click on the Resume icon,  and the software runs until `hal_entry ()`.
- 5) Click on the Resume icon, , and the software runs turning LED1 on and off.

## Next steps

You can review the code for the Blinky Project in the src directory of your project:



Application Notes and Demonstration Applications are available from <https://synergygallery.renesas.com/ssp>.

Examples of the categories that Renesas is developing are:

- Wired connectivity (CAN, RS232/485, TCP/IP, Web Server, networking services)
- Bluetooth connectivity (Bluetooth Classic and Bluetooth Low Energy connection to mobile devices using various profiles )
- WiFi connectivity (Access Point Enumeration, Access Point connection using secure protocols, TCP/IP, Web Server, networking services)
- Multi-media (webcam, audio playback & record, audio processing, GUIX tutorials)
- MCU performance & power measurement (thread, throughput, and I/O performance, low-power modes & power measurement)
- Security (protected memory and bus access examples, stack security examples, security protocols and services examples)

## Reloading the Out-of-Box Demo

Should you desire to reload the original Out-of-Box Demo application, you can find it and the instructions to reload it from <https://synergygallery.renesas.com/ssp>.

**NOTE:** The Out-of-Box Demo on the Synergy Gallery may be an updated and improved demo. This kit contains version 1.0 of the DK-S3A7 Out-of-Box Demo.

## Support

Support: <https://synergygallery.renesas.com/support>

Technical contact details:

- America: [https://renesas.zendesk.com/anonymous\\_requests/new](https://renesas.zendesk.com/anonymous_requests/new)
- Europe: <http://www.renesas.eu/support/index.jsp>
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