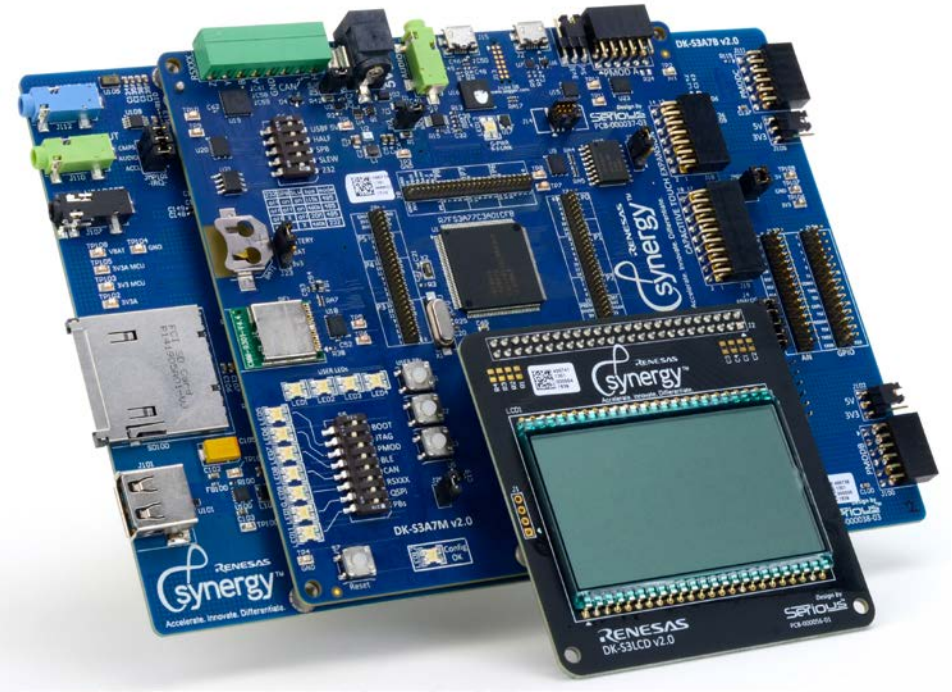
DK-S3A7

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^2 studio Integrated Solution Development Environment (ISDE)
- Renesas Synergy™ Software Package (SSP)

Installation

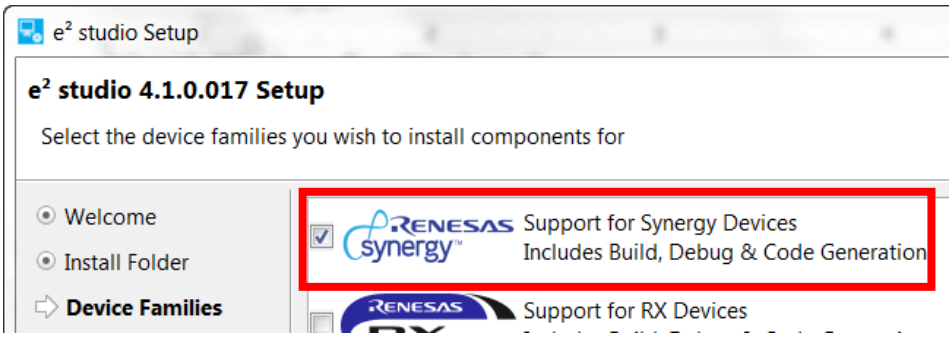
Tools are available for download at: https://synergygallery.renesas.com.

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

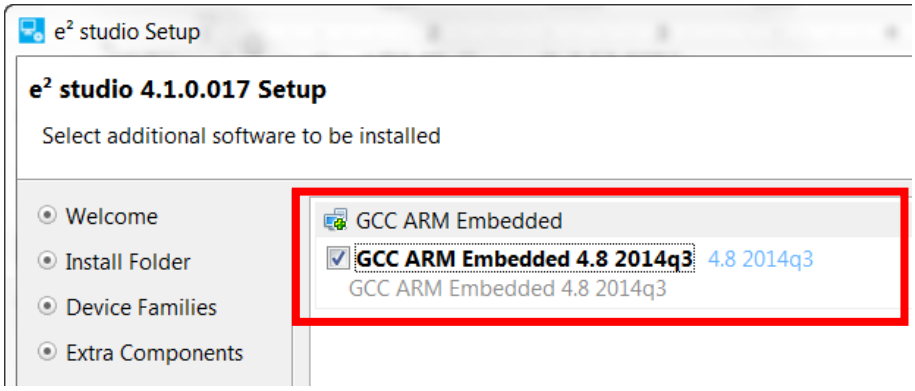
Download and install the latest revision of the e^2 studio (ISDE) as follows:

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

1) In the **e^2 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:

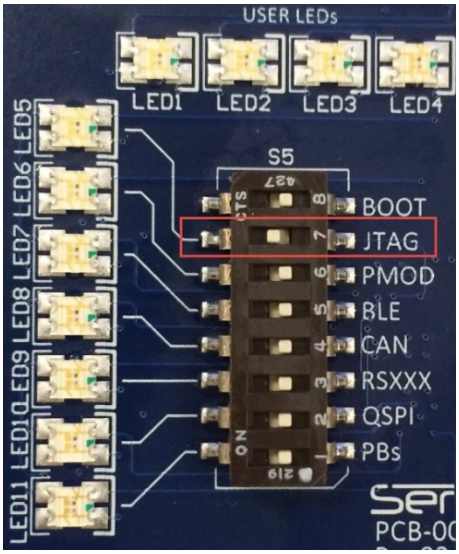


3) Download and install the latest revision of the SSP using the default options.

Connecting the board components

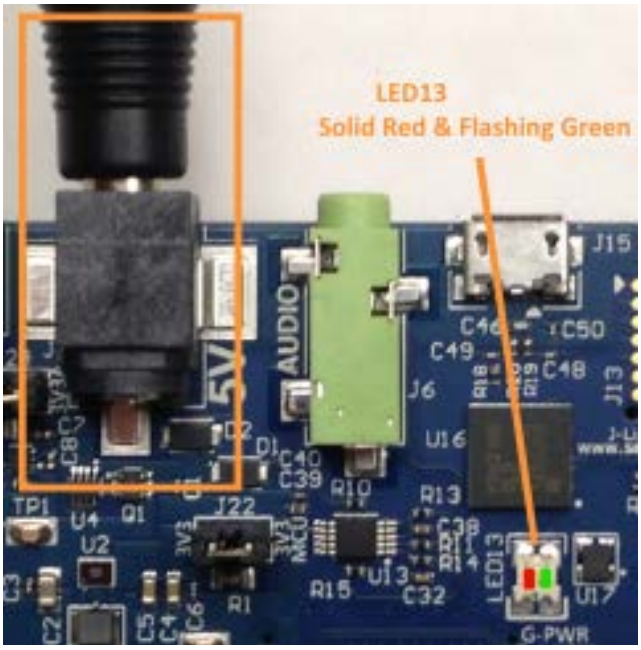
To power the boards and connect the boards to the PC, follow these steps:

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

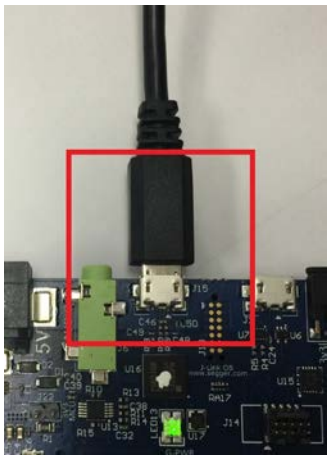


2) Using the power supply provided with the DK-S3A7 kit, apply power through the 5V barrel connector (J1) on the Main Board.

   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.



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

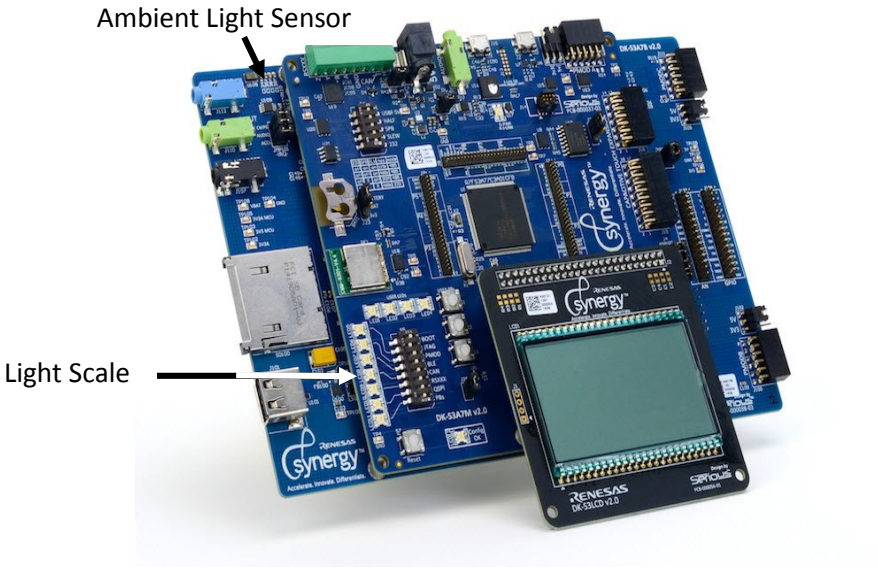


4) Connect the other end of the USB cable to a USB port of the workstation.

   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^2 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:

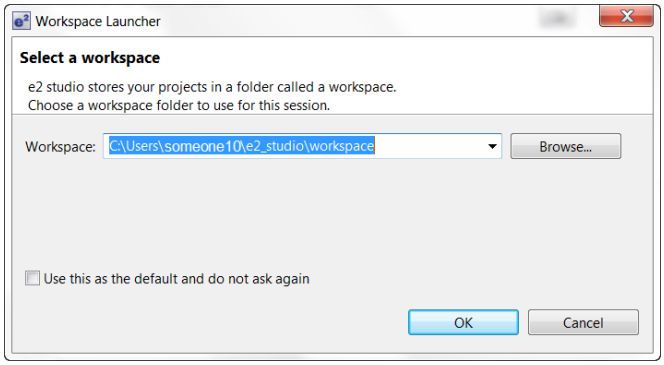
1) Start the e^2 studio ISDE by clicking **Start Menu** > **Renesas Electronics e2studio** > **e2 studio.**

NOTES:

- The e^2 studio ISDE confirms the installed tool chain(s) the first time it is started after installing the toolchains.
- The e^2 studio ISDE displays the **Welcome to e^2 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.

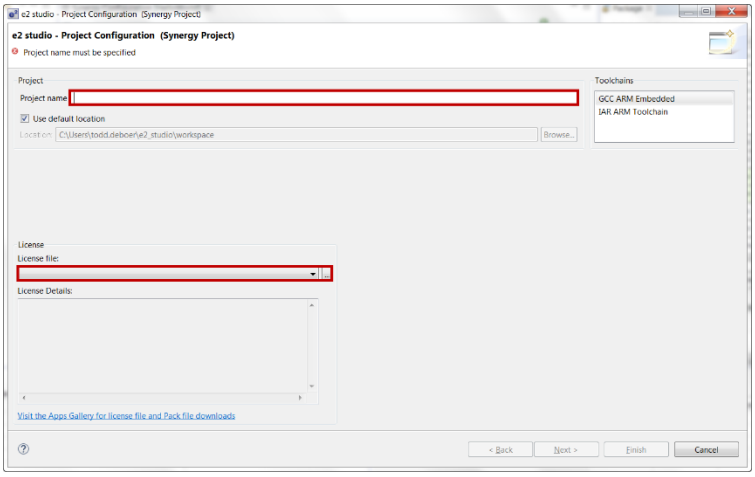
2) If the **Workspace Launcher** dialog box displays, click **OK**.

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:



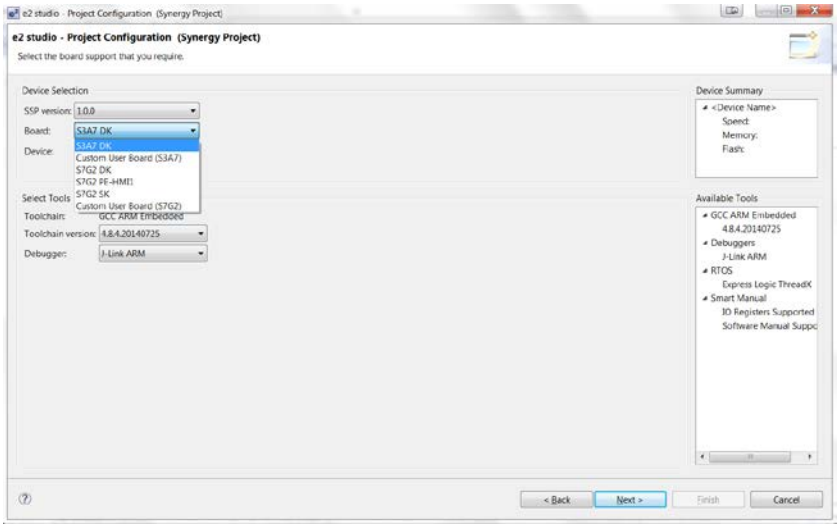
4) Enter **Blinky_DK_S3A7** as the **Project name**.

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**.

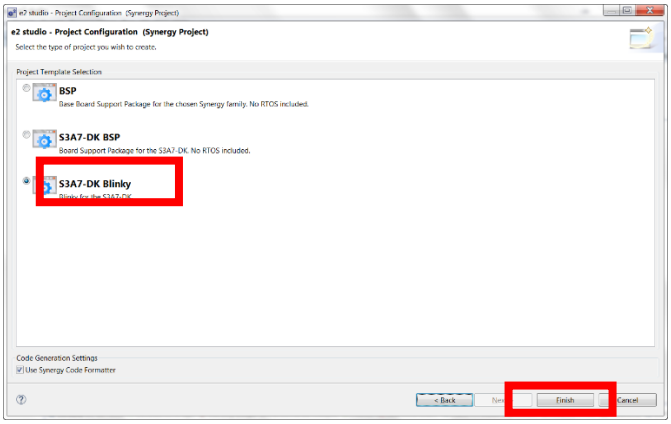
The ISDE displays the **Project Configuration (Synergy Project)** window with the **Board** options.



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.

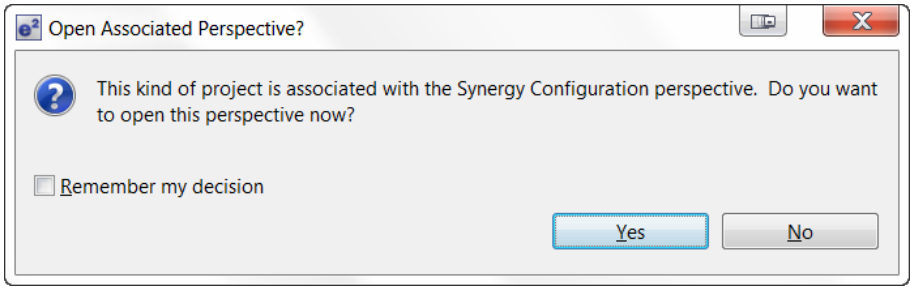


9) Select **S3A7-DK Blinky**.

10) Click **Finish**.

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

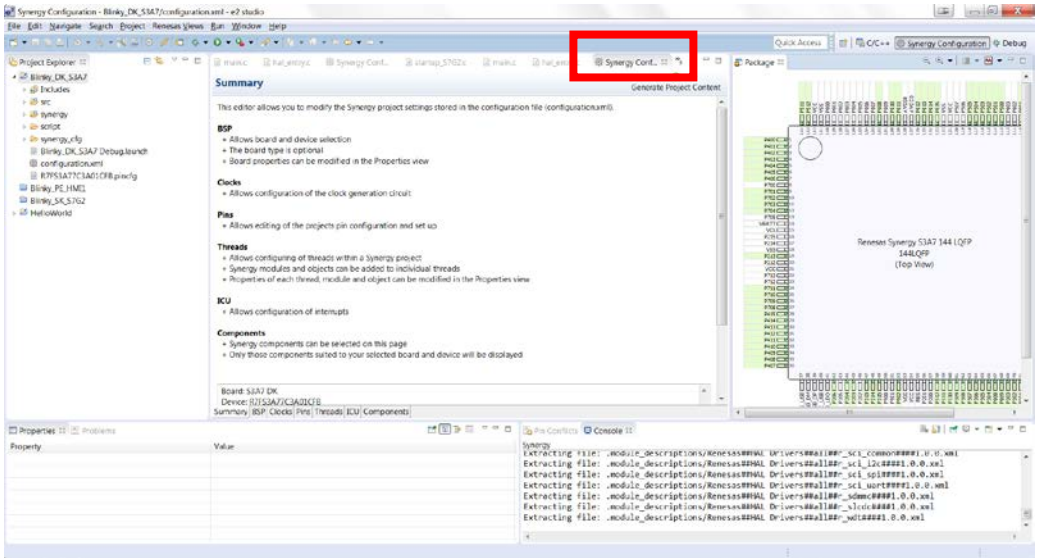
NOTE: The e² studio ISDE has built in Perspectives. Until you inform the tool to **Remember my decision**, it asks if it can use the **Synergy Configuration perspective**:



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 

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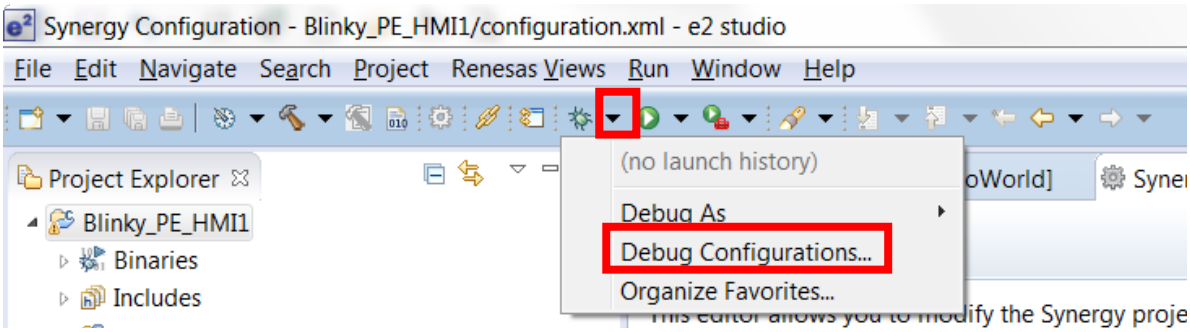
13) Build the project by clicking **Project** > **Build Project** or clicking on the Build icon,  .

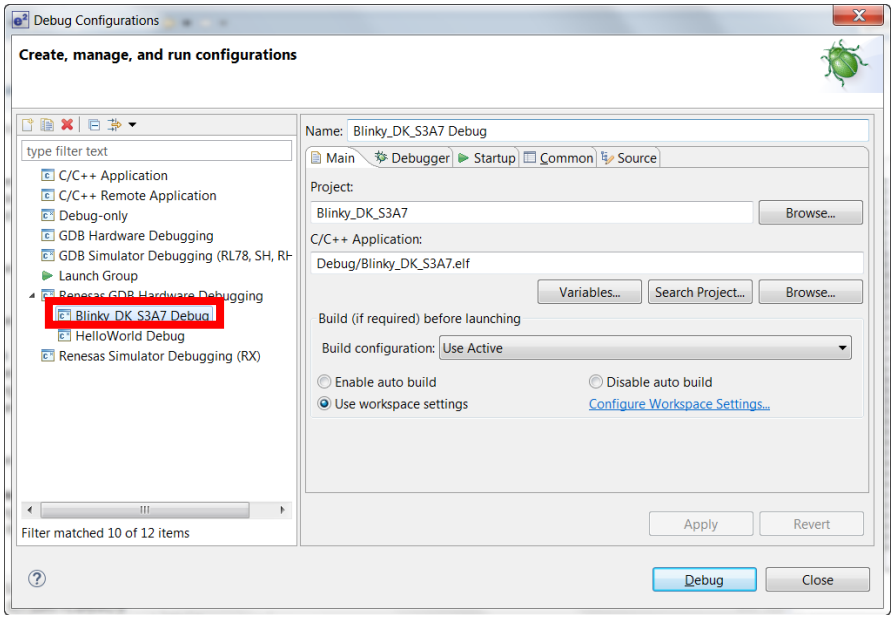
Debugging and running the Blinky Project

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 Configuration**s:



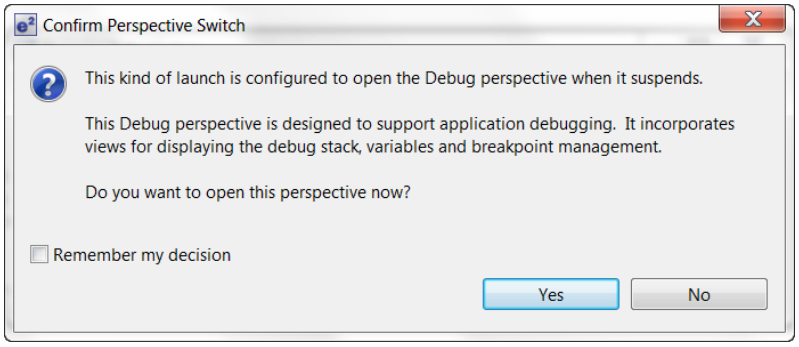
2) On the **Debug Configurations** dialog, select **Renesas GDB Hardware Debugging** > **Blinky_DK_S3A7 Debug**.



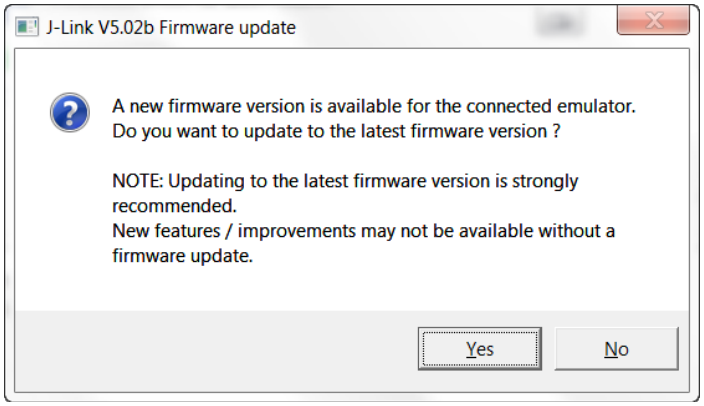
3) Click **Debug**.

   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**.



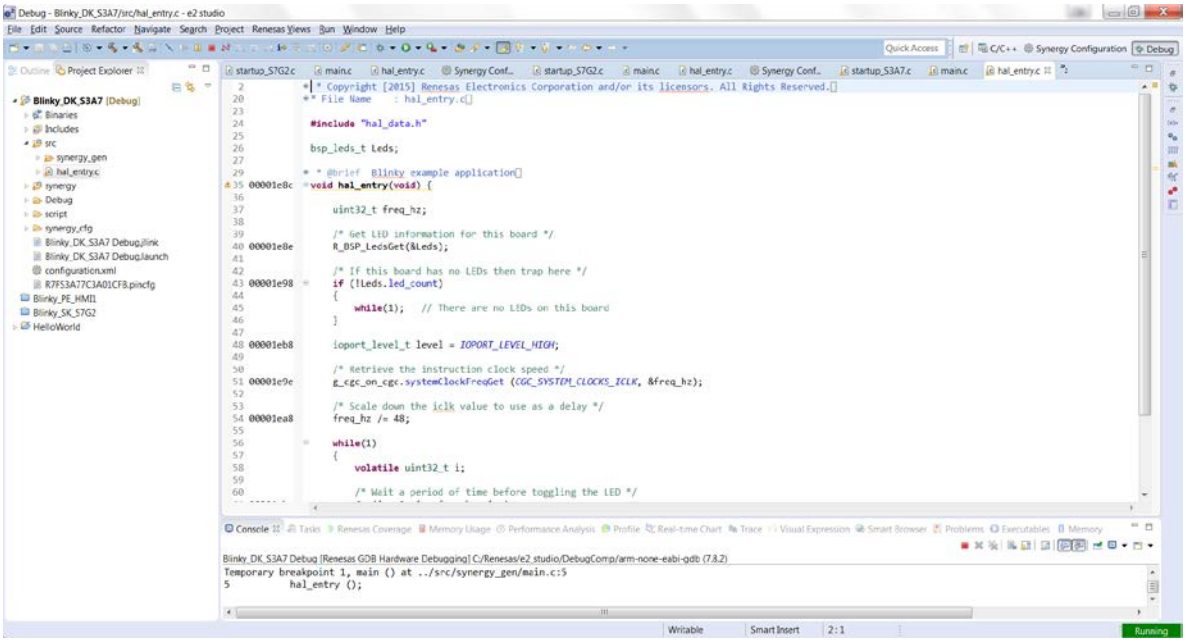
   The ISDE downloads the project onto the board.

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)
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- 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

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