

Introduction

This guide will show you how to get started with the Synergy SK-S7G2 Starter Kit. You will learn how to connect your board to Renesas IoT Sandbox and easily view data being sent from the board to the cloud through dashboard widgets. For this kit, you will see a heartbeat sent every minute.



Here's What You Need:

1. Renesas Synergy SK-S7G2 Starter Kit
2. Micro USB cable to power up the board
3. One of the following:
 - a. Renesas WiFi adaptor for GT202
 - b. Ethernet connection
4. WiFi Internet access (2.4GHz only)
5. SK_S7_Heartbeat_Kit.srec file – [download](https://github.com/Medium-One/heartbeat-sks7/releases) (Last Updated 3/23/2017)

Prerequisites

- [How to flash the SK-S7 board](http://renesas-blog.mediumone.com/how-to-flash-the-sk-s7g2-board/) (Required)
- Renesas IoT Sandbox [Getting Start Guide](http://renesas-docs.mediumone.com/) (Optional)
- In addition to SSP 1.2.0, “Wi-Fi Framework (with GT202 Drivers)” version 1.0.0-b.3 or later (Required)

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1. Step 1: Program the SK-S7G2 Board with Heartbeat Image

Program the SK_S7_Heartbeat_Kit image to the SK-S7 board following the instructions in the “[How to flash the SK-S7 board](http://renesas-blog.medium.com/how-to-flash-the-sk-s7g2-board/)” (<http://renesas-blog.medium.com/how-to-flash-the-sk-s7g2-board/>) tutorial. Be sure to download the latest release .srec file that is specific to this kit. This can be found under the HERE’S WHAT YOU NEED TO GET STARTED section.

2. Step 2: Activate Kit in Renesas IoT Sandbox

[Click here to activate the kit](https://medium.com/partner/activate-ma.php?partner=renesas&boardtype=sks7g2&kit=heartbeat) (<https://medium.com/partner/activate-ma.php?partner=renesas&boardtype=sks7g2&kit=heartbeat>) and complete the registration process to create a Renesas IoT Sandbox account preloaded with the Heartbeat kit workflows. Once activation is completed, you will receive an email with your account credentials needed to provision the kit and access the cloud portal.

This email will include your:

- Renesas IoT Sandbox web login
- API Key
- Device username and password

3. Step 3: Connect the Sk-S7 Kit to the Cloud

Note: The SK-S7 kit only works with 2.4-GHz WiFi.

The board can be connected to the internet via Ethernet (requires Ethernet cable) or WiFi (requires WiFi adaptor). Figure 1 shows WiFi adaptor, Ethernet connector, and micro USB cable connections into the board. The micro USB cable is necessary to power up the board.

To read a quick summary on how the board connects to a network, go to Appendix A.

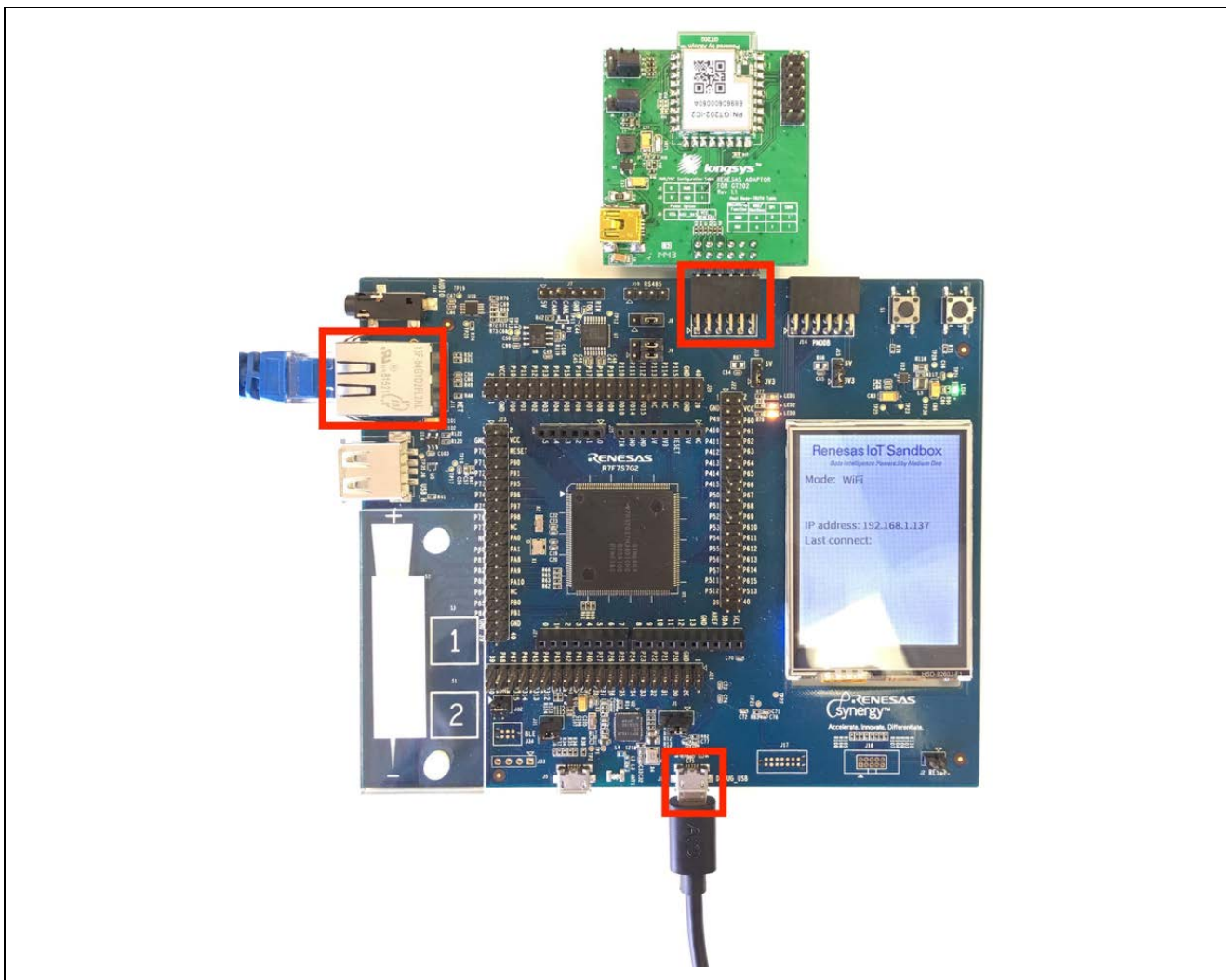


Figure 1 Cable connections

Note: Ensure your board is powered by 3.3V. To do so, connect pins 0 and 1 of jumper J13; similarly, connect pins 0 and 1 of jumper J15 to select 3.3V option. See Figure 2.

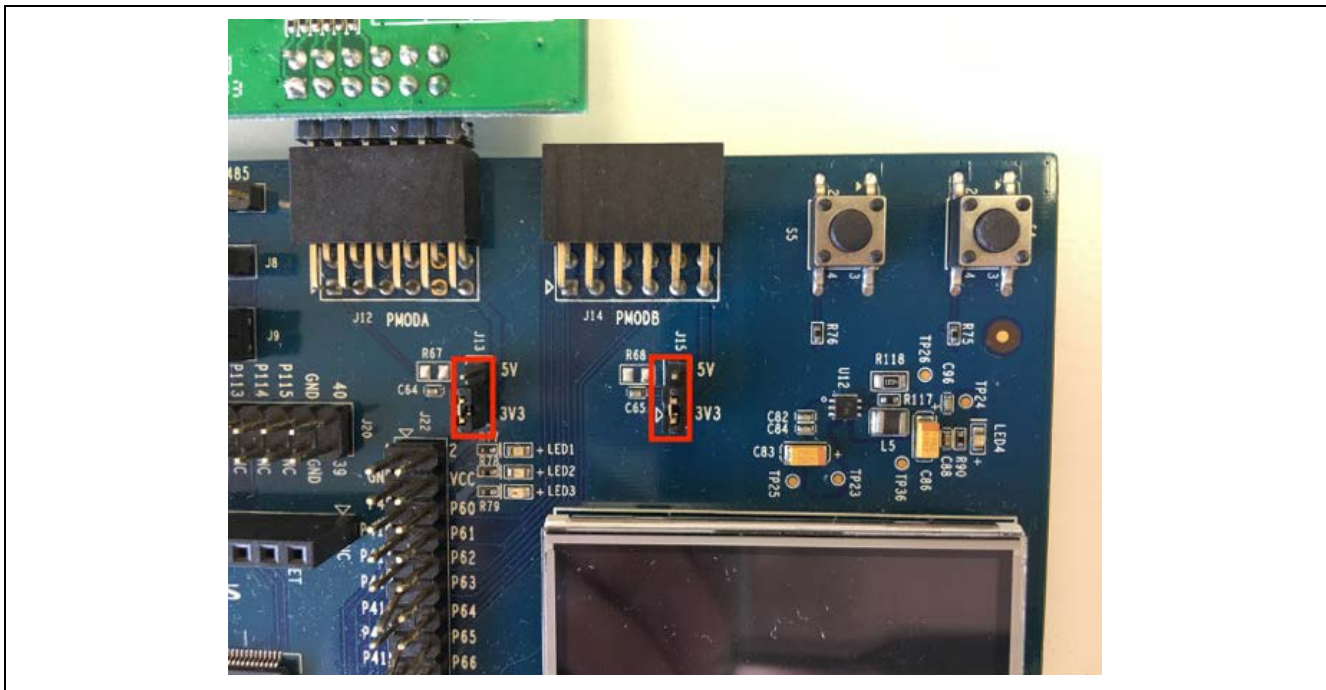


Figure 2 Jumpers for 3.3 V

The following pictures depict three different ways (Ethernet, WiFi, and Access Point) your board display may look like upon powering the SK-S7 board. This also determines what provisioning you are required to do.

Note: Ethernet connection takes precedence over WiFi connection.

3.1 Option 1: Provision the board for Ethernet access

- Connect the Ethernet cable at J11 Ethernet port.
- Power up the board by connecting the micro USB cable into J19 (DEBUG_USB) on the board. Once Ethernet is detected, the board will boot up in provisioning mode.
- When you see the screen as shown in Figure 3, connect to the IP address printed on the screen using the browser on your computer. Make sure your computer is on the same network as the board. This will connect you to the provisioning page of the board to set up the IoT Sandbox credentials. **Note: Keep a copy of your activation email readily available.**

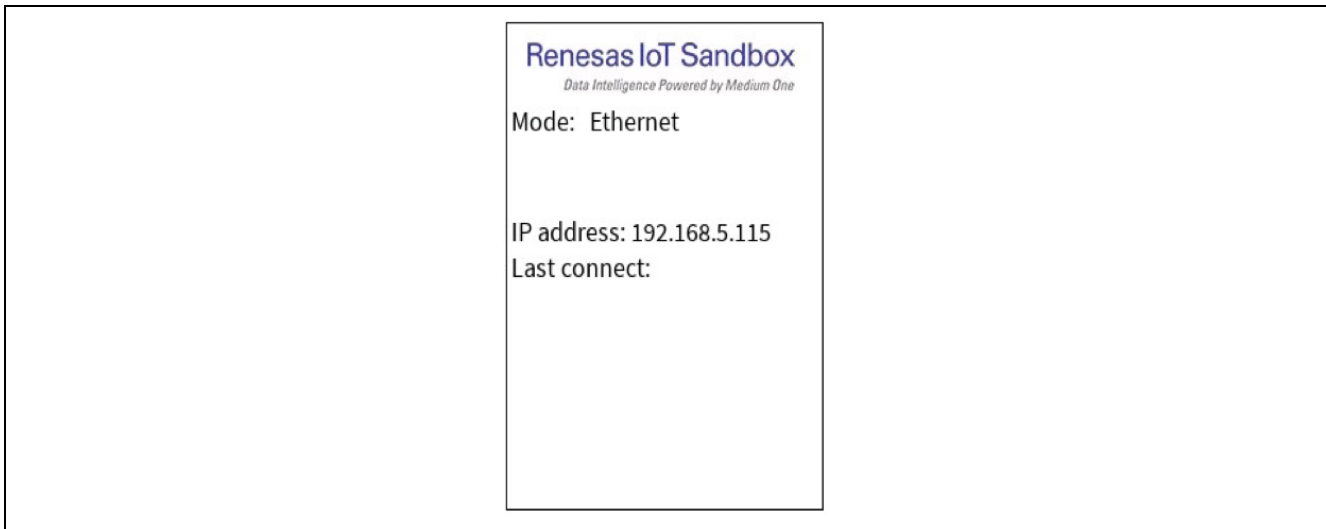


Figure 3 Ethernet mode

3.2 Option 2: Provision the Board for WiFi

- Connect the Renesas WiFi Adaptor for GT202 to J12 (PMODA) on the board and disconnect the Ethernet cable.
- Power up the board by connecting the micro USB cable into J19 (DEBUG_USB) on the board. Once the WiFi Adaptor is detected, the board will boot up in provisioning mode and become a WiFi Access Point.



Figure 4 WiFi mode

3.3 Option 3: Access Point:

- If this is your first time provisioning the board with a WiFi adapter, you will see the picture as shown in Figure 5. Connect your computer to the board's WiFi access point using the WiFi on your computer. The SSID and password is printed on the SKS7 display. This is a WiFi Access Point served by the board and is a unique SSID. **Note: Keep a copy of your activation email readily available. Once connected to the board's WiFi Access Point, you will not have internet access on your computer.**

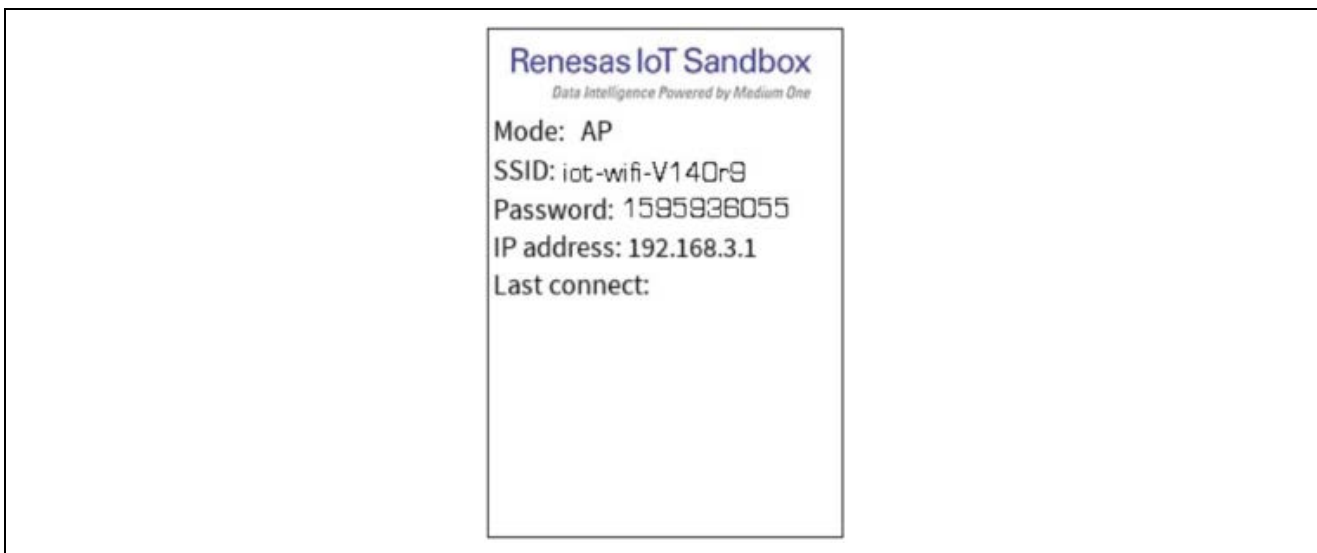


Figure 5 Access point mode

Once the provisioning page is loaded, you will see a form similar to the image below. Enter your credentials provided in your activation email.

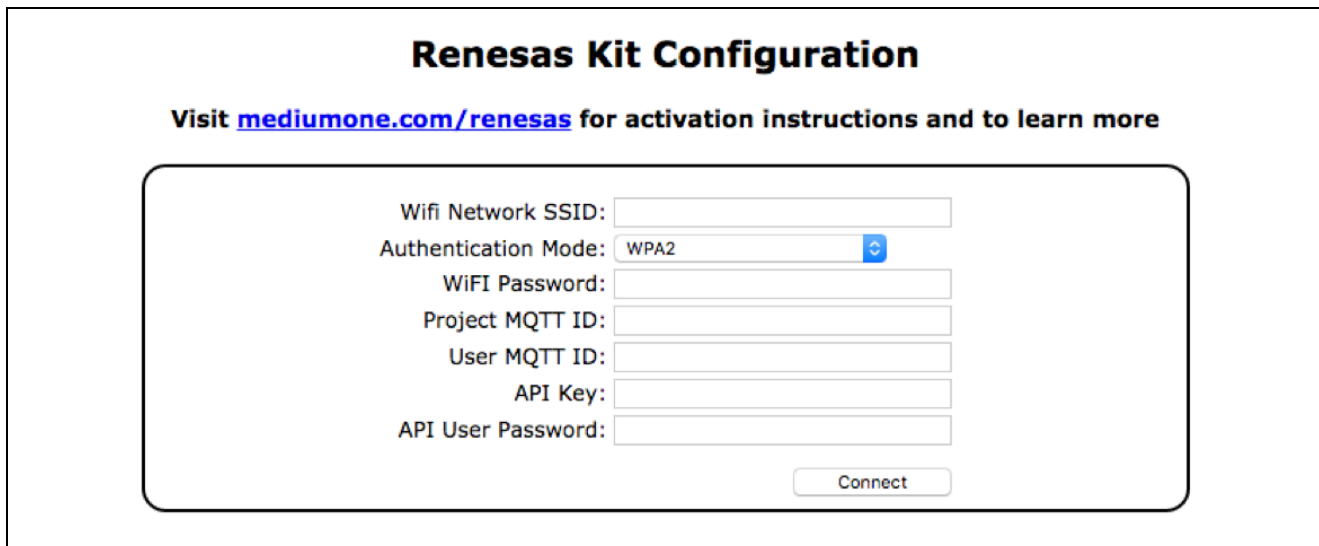


Figure 6 Provisioning page

Note: You need to re-provision your board every time you want to switch your projects by simply going to the provided IP address and reenter the login credentials.

Note: If you accessed this page before, Renesas Kit Configuration will remember your previously entered login credentials, such as Project MQTT ID, User MQTT ID, API Key, and API User Password.

After clicking ‘Connect’, you will get a message: Provisioning complete. Please reset board to continue.

Reset your board by re-inserting the micro USB cable. Now you are ready to login to Renesas IoT Sandbox and visualize data on dashboard.

4. Step 4: Visualize Data on Dashboard

Log in to [Renesas IoT Sandbox \(https://app-renesas-na-sandbox.mediumone.com/login\)](https://app-renesas-na-sandbox.mediumone.com/login) with your web credentials.

Note: If you have more than one Renesas IoT Sandbox project, make sure you select this project in the top right drop down. After selecting your project, refresh your browser. If you forgot the name of your project, it can be found in the activation email.

Select Dashboard from the left navigation sidebar. On the main view, you will see the Dashboard with multiple widgets (at the bottom).

This project’s dashboard comes with two preloaded widgets – **Real Time Line Chart** and **Real Time Events Stream**.

Now, let’s confirm our connection to the cloud works. As you can see from the events log in Figure 7, a heartbeat is sent from the board to the Renesas IoT Sandbox cloud every minute. The same events are viewable in the table as shown below.

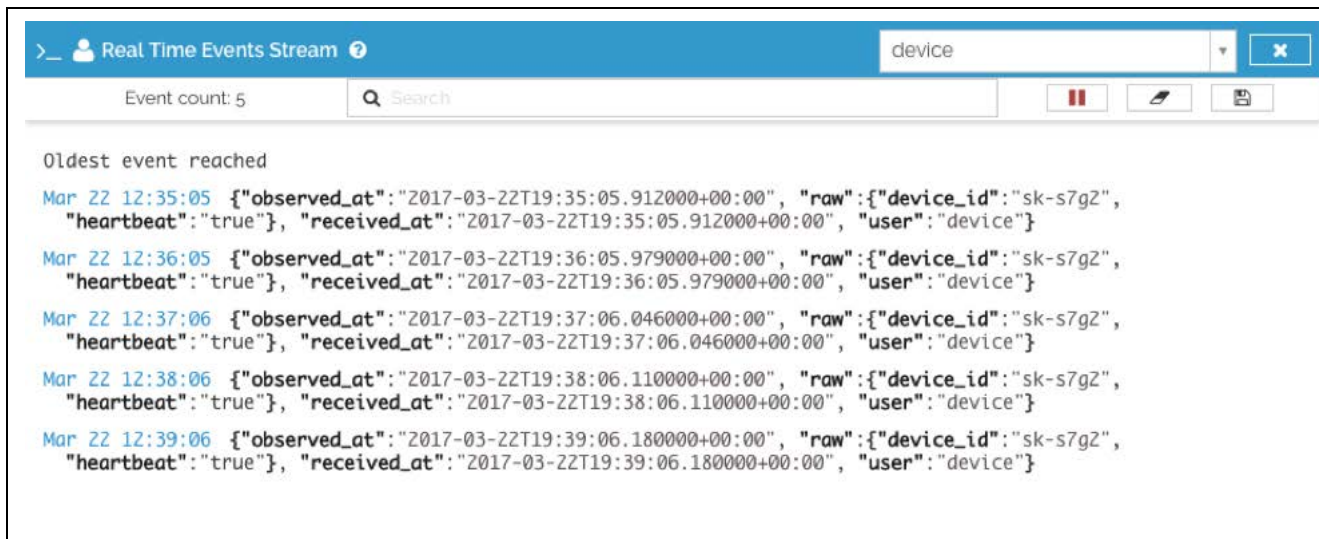


Figure 7 Events log

In addition to the Events Stream, you can also see the heartbeat on the Real Time Line Chart as well. If the board is connected, you should see this widget alternate between '0' and '1' every minute:

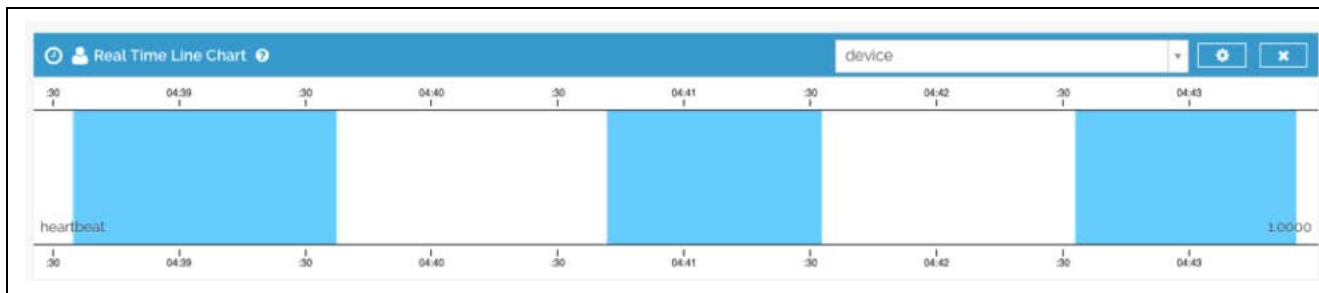


Figure 8 Line chart

On the board, LED1 should be flashing about every 2 seconds. If the board is disconnected or turned off, this will be reflected with the heartbeat no longer being sent to the cloud.

Note: The board display shows some connectivity information such as mode (Ethernet or WiFi), IP address, and Last Connect (date and time) of last successful connection to your board.



Figure 9 Board display

Congratulations! You just learned how to easily detect a board set heartbeat and visualize its ‘beats’ via widgets provided in the Renesas Iot Sandbox.

You’re now familiar with SK-S7G2 Starter Kit, Renesas IoT Sandbox platform, and just tapped into the possibility of exciting new projects.

5. Loading Project into e² studio

5.1 Development Software Requirements

- e² studio version 5.3.1.xxx or newer.
- Synergy SSP v1.2.0
- ARM GCC compiler version 4.9.3.20150529 (4.9 2015 q3)

5.2 Importing Project

Refer to application note [Importing a Renesas Synergy™ Project](#) for instructions on importing projects.

6. Appendix A

6.1 Summary of how the board connects to the network

In SK-S7G2 Starter Kits, the network connection is “auto-detected”:

- First, a wired **Ethernet** connection is attempted. If the wired connection link is up within 5 seconds, then DHCP resolution is attempted. If an IP address is resolved within 10 seconds, the wired connection is used and mode shows “Ethernet”.
- Otherwise, a **WiFi** connection is attempted and mode shows “WiFi”. If the WiFi credentials have been provisioned and the board is able to associate with the AP within 10 seconds, the WiFi connection is used.
- Otherwise, the board enters **Access Point** mode and mode shows “AP”.

A network connection must be found before the kit will run.

Regardless of the network connection, the provisioning server is always running. You can access the provisioning page by navigating to the board's IP in the browser.

Website and Support

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

Technical Contact Details:

- America: https://renesas.zendesk.com/anonymous_requests/new
- Europe: <https://www.renesas.com/en-eu/support/contact.html>
- Japan: <https://www.renesas.com/ja-jp/support/contact.html>

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Revision History

Rev.	Date	Description	
		Page	Summary
1.00	Jun 29, 2017	-	Initial version

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