

# Development Kit S7G2 (DK-S7G2)

Quick Start Guide

Renesas Synergy™ Platform  
Synergy Tools & Kits  
Kits: DK-S7G2

All information contained in these materials, including products and product specifications, represents information on the product at the time of publication and is subject to change by Renesas Electronics Corp. without notice. Please review the latest information published by Renesas Electronics Corp. through various means, including the Renesas Electronics Corp. website (<http://www.renesas.com>).

## Notice

1. Descriptions of circuits, software and other related information in this document are provided only to illustrate the operation of semiconductor products and application examples. You are fully responsible for the incorporation or any other use of the circuits, software, and information in the design of your product or system. Renesas Electronics disclaims any and all liability for any losses and damages incurred by you or third parties arising from the use of these circuits, software, or information.
  2. Renesas Electronics hereby expressly disclaims any warranties against and liability for infringement or any other claims involving patents, copyrights, or other intellectual property rights of third parties, by or arising from the use of Renesas Electronics products or technical information described in this document, including but not limited to, the product data, drawings, charts, programs, algorithms, and application examples.
  3. No license, express, implied or otherwise, is granted hereby under any patents, copyrights or other intellectual property rights of Renesas Electronics or others.
  4. You shall not alter, modify, copy, or reverse engineer any Renesas Electronics product, whether in whole or in part. Renesas Electronics disclaims any and all liability for any losses or damages incurred by you or third parties arising from such alteration, modification, copying or reverse engineering.
  5. Renesas Electronics products are classified according to the following two quality grades: "Standard" and "High Quality". The intended applications for each Renesas Electronics product depends on the product's quality grade, as indicated below.

"Standard": Computers; office equipment; communications equipment; test and measurement equipment; audio and visual equipment; home electronic appliances; machine tools; personal electronic equipment; industrial robots; etc.

"High Quality": Transportation equipment (automobiles, trains, ships, etc.); traffic control (traffic lights); large-scale communication equipment; key financial terminal systems; safety control equipment; etc.

Unless expressly designated as a high reliability product or a product for harsh environments in a Renesas Electronics data sheet or other Renesas Electronics document, Renesas Electronics products are not intended or authorized for use in products or systems that may pose a direct threat to human life or bodily injury (artificial life support devices or systems; surgical implantations; etc.), or may cause serious property damage (space system; undersea repeaters; nuclear power control systems; aircraft control systems; key plant systems; military equipment; etc.). Renesas Electronics disclaims any and all liability for any damages or losses incurred by you or any third parties arising from the use of any Renesas Electronics product that is inconsistent with any Renesas Electronics data sheet, user's manual or other Renesas Electronics document.
  6. When using Renesas Electronics products, refer to the latest product information (data sheets, user's manuals, application notes, "General Notes for Handling and Using Semiconductor Devices" in the reliability handbook, etc.), and ensure that usage conditions are within the ranges specified by Renesas Electronics with respect to maximum ratings, operating power supply voltage range, heat dissipation characteristics, installation, etc. Renesas Electronics disclaims any and all liability for any malfunctions, failure or accident arising out of the use of Renesas Electronics products outside of such specified ranges.
  7. Although Renesas Electronics endeavors to improve the quality and reliability of Renesas Electronics products, semiconductor products have specific characteristics, such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Unless designated as a high reliability product or a product for harsh environments in a Renesas Electronics data sheet or other Renesas Electronics document, Renesas Electronics products are not subject to radiation resistance design. You are responsible for implementing safety measures to guard against the possibility of bodily injury, injury or damage caused by fire, and/or danger to the public in the event of a failure or malfunction of Renesas Electronics products, such as safety design for hardware and software, including but not limited to redundancy, fire control and malfunction prevention, appropriate treatment for aging degradation or any other appropriate measures. Because the evaluation of microcomputer software alone is very difficult and impractical, you are responsible for evaluating the safety of the final products or systems manufactured by you.
  8. Please contact a Renesas Electronics sales office for details as to environmental matters such as the environmental compatibility of each Renesas Electronics product. You are responsible for carefully and sufficiently investigating applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive, and using Renesas Electronics products in compliance with all these applicable laws and regulations. Renesas Electronics disclaims any and all liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations.
  9. Renesas Electronics products and technologies shall not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable domestic or foreign laws or regulations. You shall comply with any applicable export control laws and regulations promulgated and administered by the governments of any countries asserting jurisdiction over the parties or transactions.
  10. It is the responsibility of the buyer or distributor of Renesas Electronics products, or any other party who distributes, disposes of, or otherwise sells or transfers the product to a third party, to notify such third party in advance of the contents and conditions set forth in this document.
  11. This document shall not be reprinted, reproduced or duplicated in any form, in whole or in part, without prior written consent of Renesas Electronics.
  12. Please contact a Renesas Electronics sales office if you have any questions regarding the information contained in this document or Renesas Electronics products.
- (Note 1) "Renesas Electronics" as used in this document means Renesas Electronics Corporation and also includes its directly or indirectly controlled subsidiaries.
- (Note 2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics.

## General Precautions

### 1. Precaution against Electrostatic Discharge (ESD)

A strong electrical field, when exposed to a CMOS device, can cause destruction of the gate oxide and ultimately degrade the device operation. Steps must be taken to stop the generation of static electricity as much as possible, and quickly dissipate it when it occurs. Environmental control must be adequate. When it is dry, a humidifier should be used. This is recommended to avoid using insulators that can easily build up static electricity. Semiconductor devices must be stored and transported in an anti-static container, static shielding bag or conductive material. All test and measurement tools including work benches and floors must be grounded. The operator must also be grounded using a wrist strap. Semiconductor devices must not be touched with bare hands. Similar precautions must be taken for printed circuit boards with mounted semiconductor devices.

### 2. Processing at power-on

The state of the product is undefined at the time when power is supplied. The states of internal circuits in the LSI are indeterminate and the states of register settings and pins are undefined at the time when power is supplied. In a finished product where the reset signal is applied to the external reset pin, the states of pins are not guaranteed from the time when power is supplied until the reset process is completed. In a similar way, the states of pins in a product that is reset by an on-chip power-on reset function are not guaranteed from the time when power is supplied until the power reaches the level at which resetting is specified.

### 3. Input of signal during power-off state

Do not input signals or an I/O pull-up power supply while the device is powered off. The current injection that results from input of such a signal or I/O pull-up power supply may cause malfunction and the abnormal current that passes in the device at this time may cause degradation of internal elements. Follow the guideline for input signal during power-off state as described in your product documentation.

### 4. Handling of unused pins

Handle unused pins in accordance with the directions given under handling of unused pins in the manual. The input pins of CMOS products are generally in the high-impedance state. In operation with an unused pin in the open-circuit state, extra electromagnetic noise is induced in the vicinity of the LSI, an associated shoot-through current flows internally, and malfunctions occur due to the false recognition of the pin state as an input signal become possible.

### 5. Clock signals

After applying a reset, only release the reset line after the operating clock signal becomes stable. When switching the clock signal during program execution, wait until the target clock signal is stabilized. When the clock signal is generated with an external resonator or from an external oscillator during a reset, ensure that the reset line is only released after full stabilization of the clock signal. Additionally, when switching to a clock signal produced with an external resonator or by an external oscillator while program execution is in progress, wait until the target clock signal is stable.

### 6. Voltage application waveform at input pin

Waveform distortion due to input noise or a reflected wave may cause malfunction. If the input of the CMOS device stays in the area between  $V_{IL}$  (Max.) and  $V_{IH}$  (Min.) due to noise, for example, the device may malfunction. Take care to prevent chattering noise from entering the device when the input level is fixed, and also in the transition period when the input level passes through the area between  $V_{IL}$  (Max.) and  $V_{IH}$  (Min.).

### 7. Prohibition of access to reserved addresses

Access to reserved addresses is prohibited. The reserved addresses are provided for possible future expansion of functions. Do not access these addresses as the correct operation of the LSI is not guaranteed.

### 8. Differences between products

Before changing from one product to another, for example to a product with a different part number, confirm that the change will not lead to problems. The characteristics of a microprocessing unit or microcontroller unit products in the same group but having a different part number might differ in terms of internal memory capacity, layout pattern, and other factors, which can affect the ranges of electrical characteristics, such as characteristic values, operating margins, immunity to noise, and amount of radiated noise. When changing to a product with a different part number, implement a system-evaluation test for the given product.

# Development Kit S7G2 (DK-S7G2)

## 1. Introduction

This document is the Quick Start Guide (QSG) for Renesas Synergy™ Development Kit DK-S7G2.

## 2. Kit Contents

The following components are included in the DK-S7G2 Kit:

- DK-S7G2 board
- Detachable CMOS VGA camera module
- One USB Type A to Micro-B cable
- One Ethernet cable
- Multi-region 5 V power supply
- Quick Start Guide (QSG, this document)

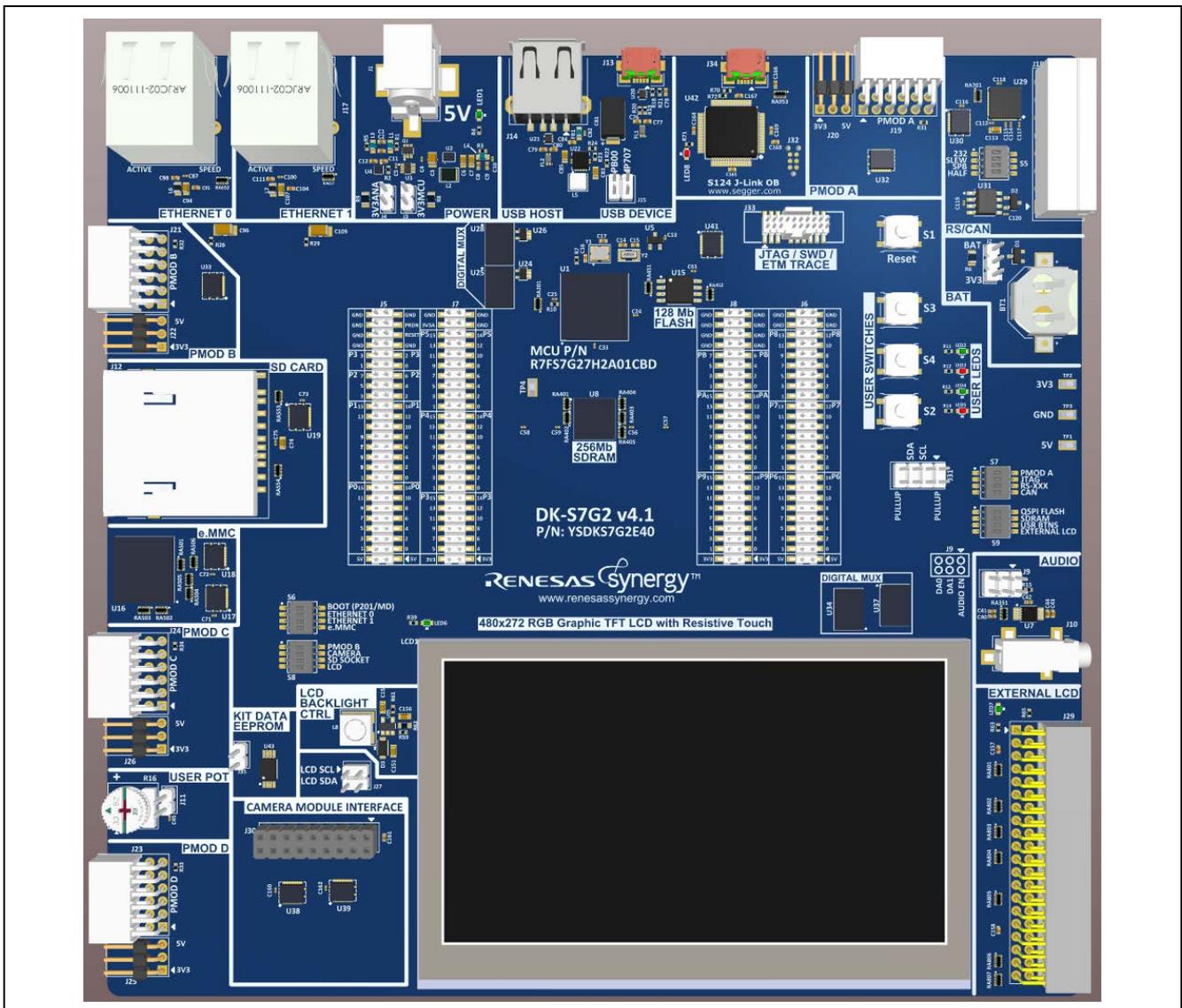


Figure 1 DK-S7G2 Board

### 3. Overview

The Synergy Development Kit DK-S7G2 along with the associated software and development tools enables users to evaluate most features of the Synergy Platform and specifically develop applications using the Synergy S7 Series Microcontrollers. The Quick Start Guide walks users to setting up the development board and running the Out-of-Box Demo that the development kit comes pre-programmed with.

### 4. Description of the Out-of-Box Demo Application

The Out-of-Box Demo application shows a simplified HMI to demonstrate the capabilities of the Graphics LCD Controller of the S7G2 MCU Group. The application also utilizes GUIX to display static graphics on the QVGA capacitive touch screen. The graphic elements were developed using the GUIX Studio ([www.renesas.com/synergy/guixstudio](http://www.renesas.com/synergy/guixstudio)) tool. The demo application displays static JPEG images and graphical touch widgets on the touch screen. The user can touch the widgets to navigate through the different screens of a simulated thermostat GUI. The user can set up date, time, screen brightness, and so forth.

### 5. Setting up the DK-S7G2 Board Prior to Running the Out-of-Box Demo Application

Prior to powering on the board, set the jumpers at the positions mentioned as follows.

In DIP switch S7, move switch 2 (JTAG) to ON position. All other switches in this DIP switch should be set to OFF. The OFF position is marked by the white dot. In DIP switches S6, S7, S8 and S9, set all switches to OFF.



Figure 2 DIP Switch Settings

### 6. Powering the DK-S7G2 and Running the Out-of-Box Demo Application

Connect the power supply provided in the DK-S7G2 kit to the main power outlet. Power the DK-S7G2 by connecting the barrel connector to power socket J1 on the board. The green LED1 next to the power socket will light up.

Note: The red LED8 in the S124 J-Link OB section will flash, indicating that the kit cannot communicate with the host PC on the debug port. It is not necessary to connect the host PC to the DK-S7G2 to run the Out-of-Box Demo Application.

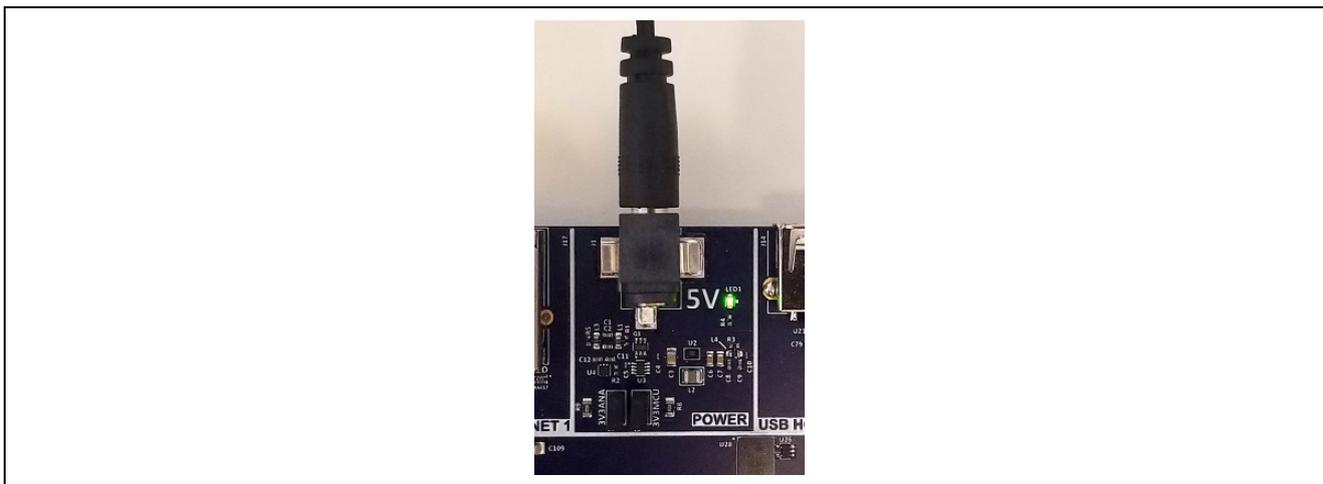


Figure 3 Power Supply Connection

After the kit executes an initialization sequence, the touch screen momentarily shows the Synergy logo splash screen followed by showing simulated temperature and settings button as shown in the following figures. Explore different menus of the GUI by navigating using the touch widgets.

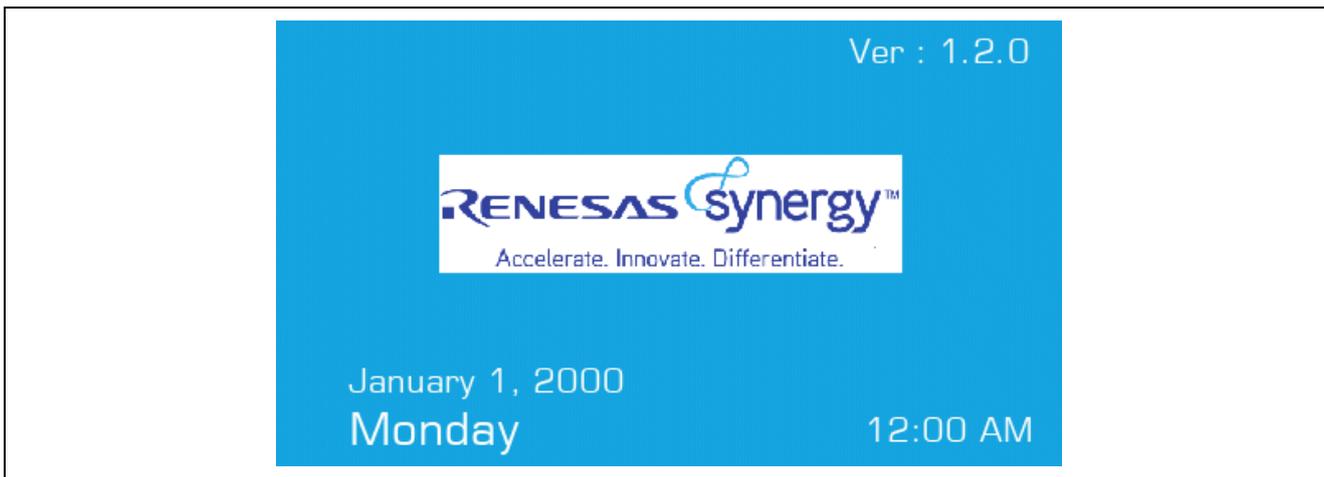


Figure 4 Splash Screen - OOB

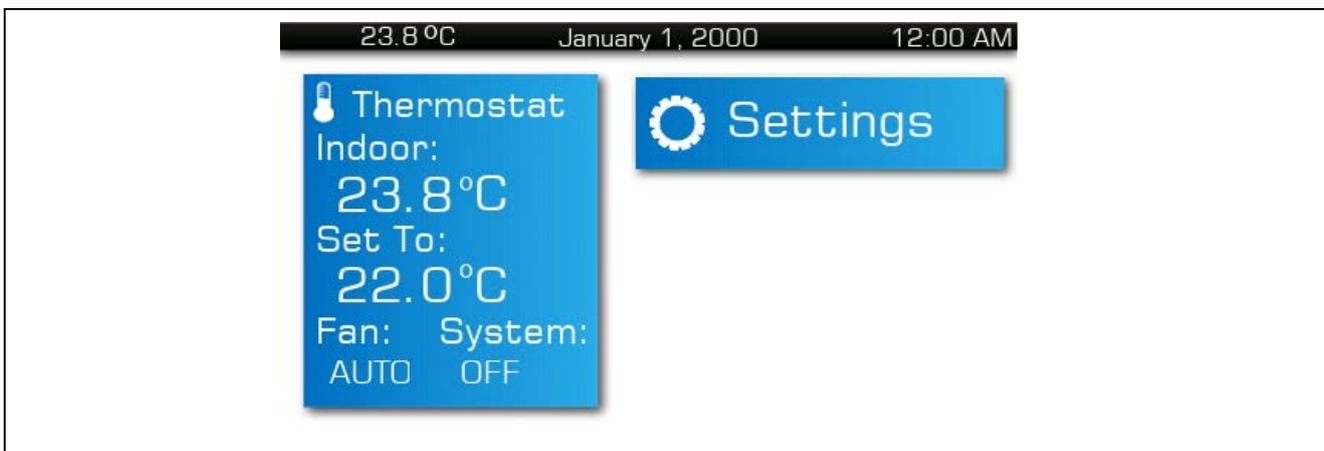


Figure 5 Temperature and Settings Screen - OOB

## 7. Next Steps

### 1. Learn more about DK-D7G2

Visit [www.renesas.com/synergy/dk-s7g2](http://www.renesas.com/synergy/dk-s7g2) to learn more about the DK-S7G2 Development Kit and download kit related documentation, schematics, design files, application projects, and so forth.

### 2. Explore more application projects for DK-S7G2

Renesas provides several application projects to demonstrate different capabilities of the S7G2 MCU group. These application projects can also serve as a good starting point for some users to develop their custom application.

Application projects available for DK-S7G2 are listed at [www.renesas.com/synergy/dk-s7g2](http://www.renesas.com/synergy/dk-s7g2).

### 3. Build and download an application project to DK-S7G2

Every application project includes the project files, an application note, and instructions to import the application project. Upon downloading the application project from the website to the computer, the application projects will have to be built using one of the two supported tool chains before they can be downloaded on to the DK-S7G2 board. Since the application projects include the embedded software developed using the Synergy Software Package, it is also necessary to install the Synergy Software Package on the computer. The Synergy Software Package and one of the two supported tool chains are bundled together and available as a single file to be downloaded as follows:

A. **IAR Platform installer** installs Synergy Software Package and IAR Embedded Workbench® for Renesas Synergy™ IDE with IAR compiler and J-Link USB drivers.

Download from [www.renesas.com/synergy/ewsynergy](http://www.renesas.com/synergy/ewsynergy).

B. **e<sup>2</sup> studio platform installer** installs Synergy Software Package and e<sup>2</sup> studio for Synergy IDE with IAR compiler and J-Link USB drivers.

Download from [www.renesas.com/synergy/e2studio](http://www.renesas.com/synergy/e2studio).

Run the platform installer to install the necessary components on to your computer. Follow the instructions provided in the documentation included in the application project folder.

### 4. Learn more about 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](http://www.renesas.com/synergy/software)
- Synergy Hardware: [www.renesas.com/synergy/hardware](http://www.renesas.com/synergy/hardware)
- Synergy Solutions Gallery: [www.renesas.com/synergy/solutionsgallery](http://www.renesas.com/synergy/solutionsgallery)

**Orderable Part Number**

The part number for the DK-S7G2 is YSDKS7G2E31.

**FCC Compliance**

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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

**Revision History**

Rev.	Date	Description	
		Page	Summary
1.00	Oct 9, 2015	–	Initial release
1.01	May 2, 2017	All	Fixed terminologies
1.10	Dec 11, 2018	All	Revised for v4.1

All trademarks and registered trademarks are the property of their respective owners.

---

Development Kit S7G2 (DK-S7G2) Quick Start Guide

Publication Date: Rev.1.10 Dec 11, 2018

Published by: Renesas Electronics Corporation

---



## SALES OFFICES

Renesas Electronics Corporation

<http://www.renesas.com>

---

Refer to "<http://www.renesas.com/>" for the latest and detailed information.

**Renesas Electronics Corporation**

TOYOSU FORESIA, 3-2-24 Toyosu, Koto-ku, Tokyo 135-0061, Japan

**Renesas Electronics America Inc.**

1001 Murphy Ranch Road, Milpitas, CA 95035, U.S.A.

Tel: +1-408-432-8888, Fax: +1-408-434-5351

**Renesas Electronics Canada Limited**

9251 Yonge Street, Suite 8309 Richmond Hill, Ontario Canada L4C 9T3

Tel: +1-905-237-2004

**Renesas Electronics Europe Limited**

Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K

Tel: +44-1628-651-700

**Renesas Electronics Europe GmbH**

Arcadiastrasse 10, 40472 Düsseldorf, Germany

Tel: +49-211-6503-0, Fax: +49-211-6503-1327

**Renesas Electronics (China) Co., Ltd.**

Room 1709 Quantum Plaza, No.27 ZhichunLu, Haidian District, Beijing, 100191 P. R. China

Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

**Renesas Electronics (Shanghai) Co., Ltd.**

Unit 301, Tower A, Central Towers, 555 Langao Road, Putuo District, Shanghai, 200333 P. R. China

Tel: +86-21-2226-0888, Fax: +86-21-2226-0999

**Renesas Electronics Hong Kong Limited**

Unit 1601-1611, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong

Tel: +852-2265-6688, Fax: +852 2886-9022

**Renesas Electronics Taiwan Co., Ltd.**

13F, No. 363, Fu Shing North Road, Taipei 10543, Taiwan

Tel: +886-2-8175-9600, Fax: +886 2-8175-9670

**Renesas Electronics Singapore Pte. Ltd.**

80 Bendemeer Road, Unit #06-02 Hyflux Innovation Centre, Singapore 339949

Tel: +65-6213-0200, Fax: +65-6213-0300

**Renesas Electronics Malaysia Sdn.Bhd.**

Unit 1207, Block B, Menara Amcorp, Amcorp Trade Centre, No. 18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia

Tel: +60-3-7955-9390, Fax: +60-3-7955-9510

**Renesas Electronics India Pvt. Ltd.**

No.777C, 100 Feet Road, HAL 2nd Stage, Haldiranagar, Bangalore 560 038, India

Tel: +91-80-67208700, Fax: +91-80-67208777

**Renesas Electronics Korea Co., Ltd.**

17F, KAMCO Yangjae Tower, 262, Gangnam-daero, Gangnam-gu, Seoul, 06265 Korea

Tel: +82-2-558-3737, Fax: +82-2-558-5338

---

Renesas Synergy™ Platform  
Development Kit S7G2 (DK-S7G2)



Renesas Electronics Corporation

R12QS0001EU0110