

DK-S7G2

Rev 1.00

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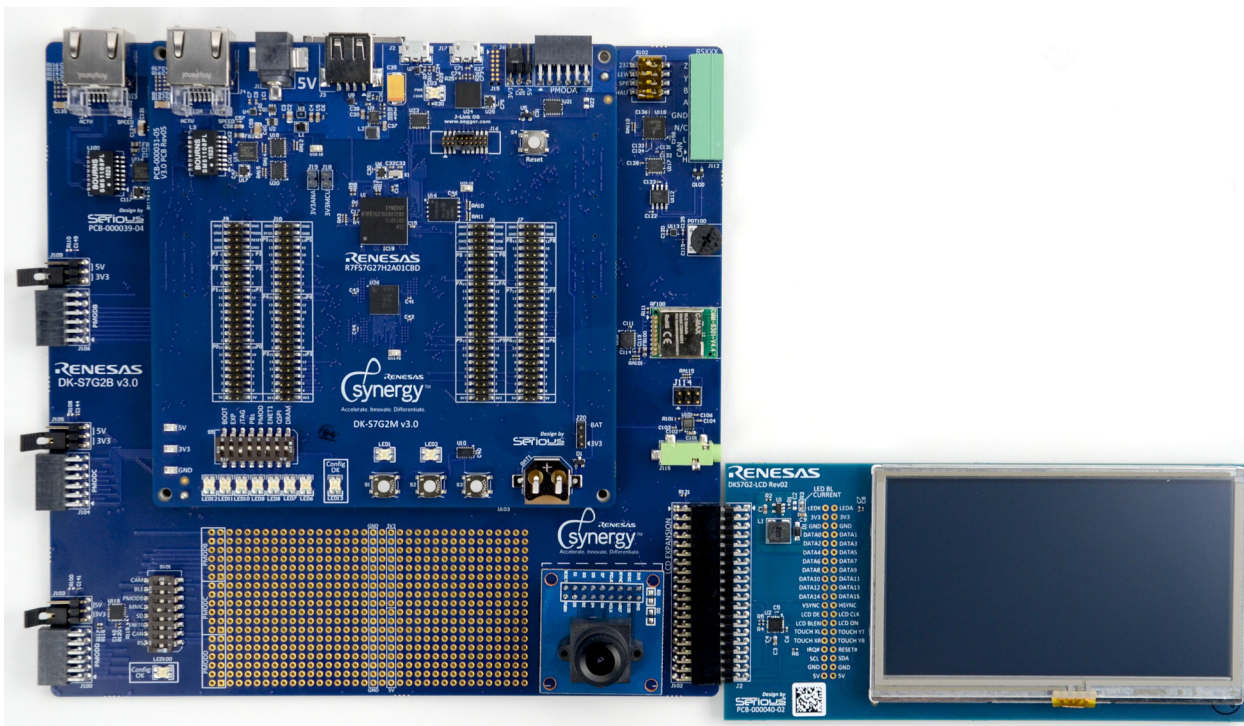
Overview

The DK-S7G2 is a development kit for the Renesas Synergy™ S7G2 microcontroller in a BGA224 package. It contains two boards: the Main Board and the Breakout Board. The boards together provide easy-to-access interfaces and connectors to the peripherals of the S7G2 for application development and testing: TFT LCD graphics, Ethernet, USB Host and Device, SEGGER J-Link® OB (on-board) debug, four Pmod™ Compatible connectors, an SD card socket, and multiple LED indicators.

The Main Board of the DK-S7G2 kit includes four 50-pin connectors for direct access to the S7G2 microcontroller I/O pins. A row of DIP configuration switches allows easy selection of different board configurations and ensures that the signal lines are always properly connected.

The DK-S7G2 Main Board connects to a Breakout Board which features dedicated connectors for a 4.3-in. resistive-touch WQVGA TFT LCD display panel, a camera module, and multiple additional ports for serial communication.

The DK-S7G2 is supported by the e² studio Integrated Solution Development Environment (ISDE) from Renesas.



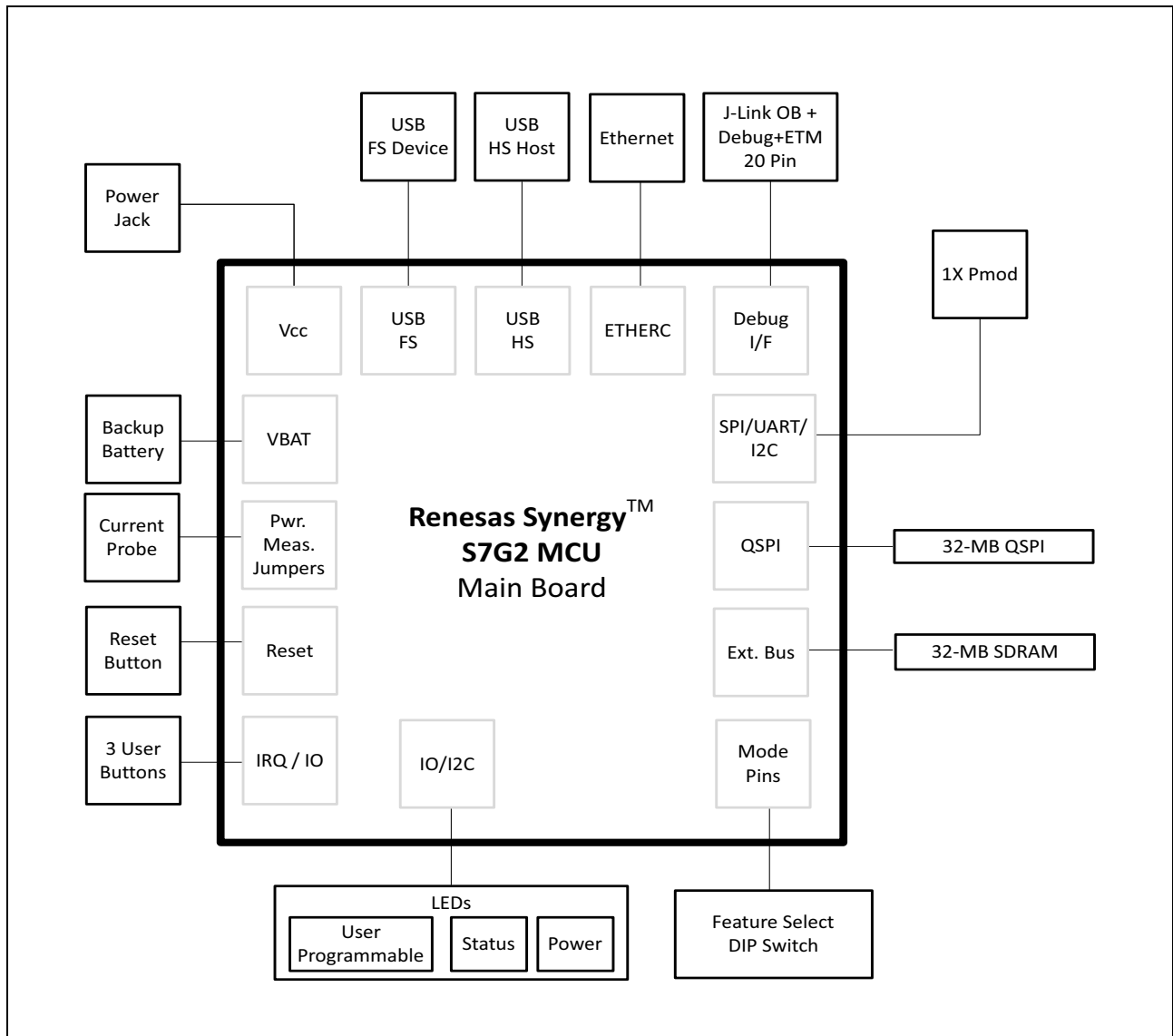
Key features

- Renesas Synergy S7G2 240-MHz ARM[®] Cortex[®]-M4 microcontroller
- Main Board with Breakout Board and DIP switches for selecting features
- Four 50-pin connectors for access to all S7G2 I/O pins
- Detachable color VGA camera
- Detachable resistive-touch 4.3-in. WQVGA (480x272) TFT LCD display panel
- Wired connectivity:
 - USB (1 x High-Speed, 1 x Full-Speed)
 - 2 x Ethernet
 - 4 x Type 2A Digilent Pmod[™] Compatible connectors
- Wireless connectivity through on-board Bluetooth[®] Low Energy (BLE) device
- Support for precision current measurements through jumpers and precision resistors
- On-board memory and memory interfaces: SDRAM, QSPI flash, full-size SD card socket
- ARM[®] Cortex[®] Debug+ETM connector and SEGGER J-Link OB
- Demonstration software: Thermostat and other applications using the ThreadX[®] RTOS

Block diagram

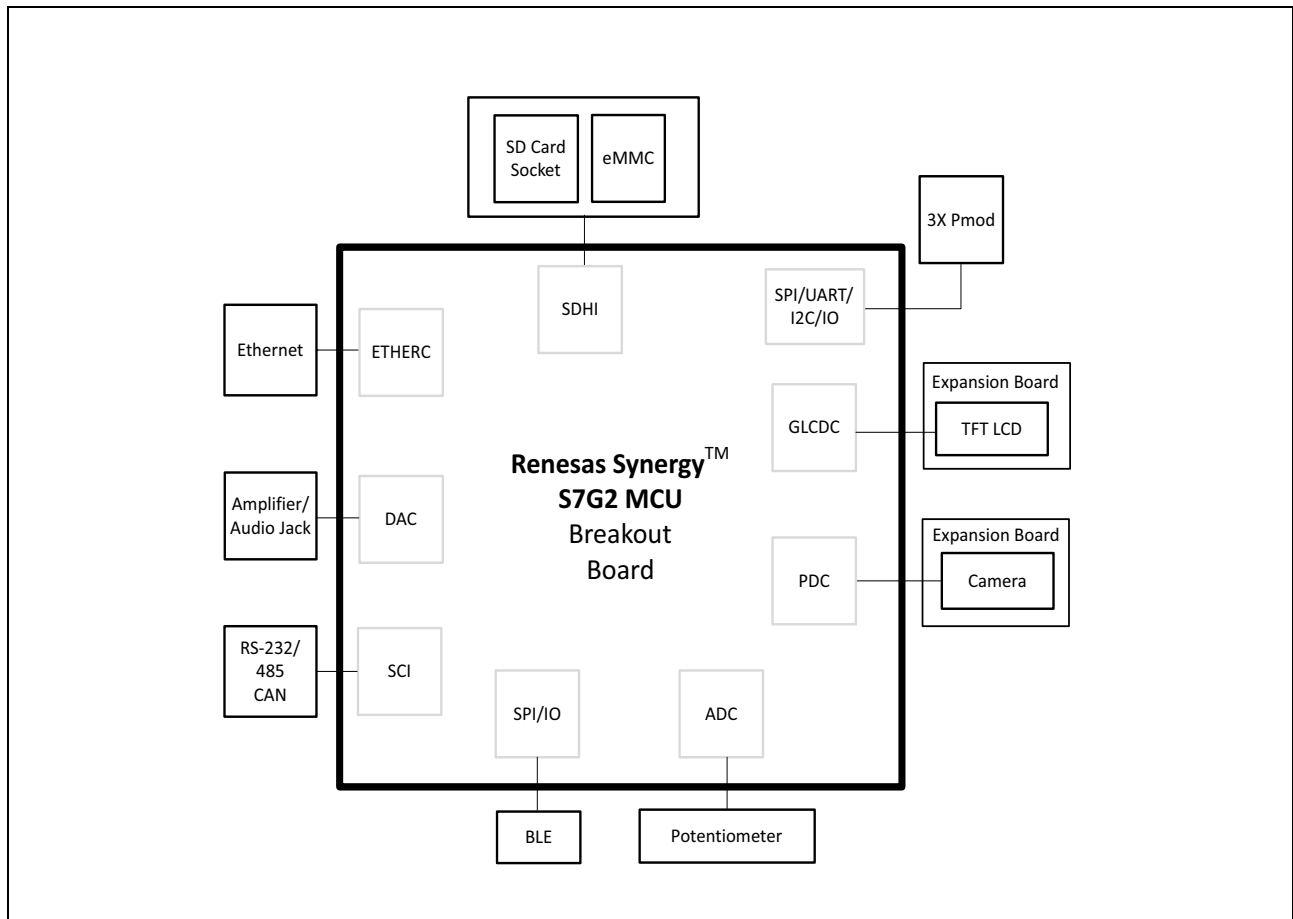
Main Board

Figure 1: Block diagram: Main Board



Breakout Board

Figure 2: Block diagram: Breakout Board



Hardware features

The DK-S7G2 uses the Renesas Synergy S7G2 240-MHz ARM[®] Cortex[®]-M4 microcontroller with 4 MB of flash, 640 KB of SRAM, and IEEE 754 single precision Floating Point Unit (FPU).

For a list of S7G2 peripherals and hardware details, see the S7 Series User's Manual: Microcontrollers.

Main Board

- One High-Speed USB Host interface
- One Full-Speed USB Device interface
- One Micro-B USB connector for debug access
- One Ethernet 10/100 RJ45 socket with support for IEEE 1588 Precision Time Protocol (PTP)
- One 12-pin Type 2A Pmod[™] Compatible connector for SPI, IIC, and UART
- Up to 10 standard serial interfaces such as SPI, UART, and IIC
- Multiple LEDs to indicate power and status

- Two user-programmable LEDs
- Configuration DIP switches to enable Ethernet, QSPI flash, SDRAM, Debug, or Pmod Compatible connectors
- Four 50-pin connectors to S7G2 I/O pins
- Push buttons: three user-configurable and one reset
- Current sense resistors and power measurement test points for precision current consumption measurement

Breakout Board

- One Ethernet 10/100 RJ45 socket with support for IEEE 1588 (PTP)
- Three 12-pin Type 2A Pmod Compatible connectors
- One CAN interface with CAN transceiver (1 Mbit/s)
- RS-232/485 interface with on-board transceiver
- Bluetooth Low Energy (BLE) device
- Full-size SD card socket
- 10-k Ω potentiometer to ADC
- Dedicated expansion LCD connector with support for four common TFT LCD interfaces including a 4.3-in. resistive-touch WQVGA TFT LCD display panel
The LCD connector plugs into the Breakout Board and includes all signals required to connect a TFT display. It supports the LCD control signals (HSYNC, VSYNC, DISPLAY ENABLE, LCD CLK) and provides power (+5 V, +3.3 V).
- Camera connector with 8-bit parallel data capture and IIC camera configuration
- Audio amplifier and 3.5-mm audio jack
- Additional extension connectors including a serial communication interface

LCD panel

- WQVGA (480 x 272) TFT LCD
- Backlight driver
- IIC-controlled, four-wire resistive touch controller
- 16-bit data

Camera module

- CMOS image sensor
- Format VGA (640 x 480)
- Support for a maximum of 30 frames per second at VGA resolution
- 20- μ A standby current

On-board external memory

- 32-MB SDRAM
- 32-MB QSPI flash
- 4-GB eMMC

Power

The DK-S7G2 Main Board features a 5-V power input using a 2.1-mm center-positive barrel connector. An on-board backup battery provides power for the S7G2 Realtime Clock power domain, which remains powered even when the 5-V input power is removed.

Debugging

- SEGGER J-Link On-Board based on a RX621
- 19-pin (0.05") ARM[®] Cortex[®] Debug+ETM connector
- LED status indicator to support debugging

Software features

Demonstration software programs are available as downloads from the Renesas Synergy Gallery in the form of a Board Support Package (BSP) that can be imported into the e² studio Integrated System Development Environment (ISDE) to build and run on the DK-S7G2.

Application notes

Application notes and demonstration applications are available in the **Demos and Applications** tab of the Renesas Synergy website at <https://synergygallery.renesas.com/spp>. Examples of the categories we are developing are:

- Wired connectivity (CAN, RS-232/485, TCP/IP, web server, networking services)
- Bluetooth connectivity (Bluetooth Classic and Bluetooth Low Energy connection to mobile devices using various profiles)
- Wi-Fi connectivity (access point enumeration, access point connection using secure protocols, TCP/IP, web server, networking services)
- Multi-media (webcam, audio playback and record, audio processing, GUIX[™] tutorials)
- MCU performance and power measurement (thread, throughput, and I/O performance, low-power modes and power measurement)
- Security (protected memory and bus access examples, stack security examples, security protocols and services examples)

Suggested links

Renesas Synergy Gallery

- <https://synergygallery.renesas.com>

Support

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

Technical Contact Details

- America: https://renesas.zendesk.com/anonymous_requests/new
- Europe: <http://www.renesas.eu/support/index.jsp>
- Japan: <https://synergybeta.renesas.com>

In the box

The following components are included in the DK-S7G2:

- DK-S7G2 Main Board
- DK-S7G2 Breakout Board
- Detachable 4.3-in. resistive-touch WQVGA TFT LCD panel
- Detachable CMOS VGA camera module
- One USB Type A to Micro-B cable
- Multi-region 5-V power supply
- Quick Start Guide

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