

DK-S3A7 v2.0

Rev 1.00

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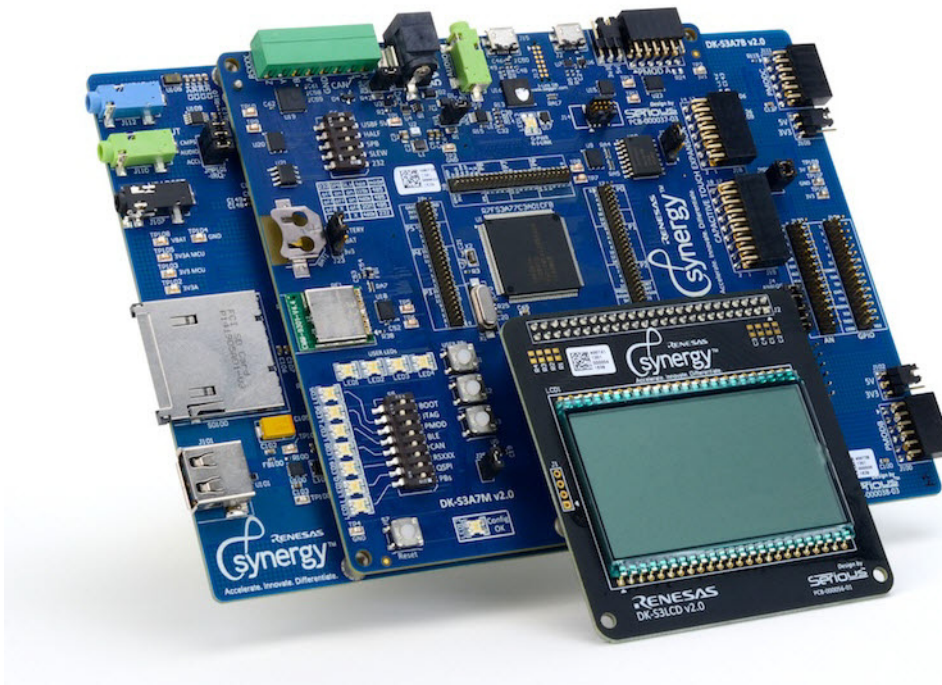
Overview

The DK-S3A7 is a development kit for the Renesas Synergy™ S3A7 microcontroller in a LQFP144 package. It contains two boards: the Main Board and the Breakout Board. The boards together provide easy-to-access interfaces and connectors for all peripherals of the S3A7 for application development and testing: USB Host and Device, SEGGER J-Link on-board debug, three Pmod™ Compatible connectors, an SD card connector, and multiple LED indicators.

The Main Board of the DK-S3A7 kit includes a connector for an LCD display and capacitive-touch expansion and three connectors for direct access to the S3A7 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-S3A7 Main Board connects to a Breakout Board and multiple additional ports for serial communications and analog I/O.

The DK-S3A7 is supported by the e² studio Integrated Solution Development Environment (ISDE) from Renesas.



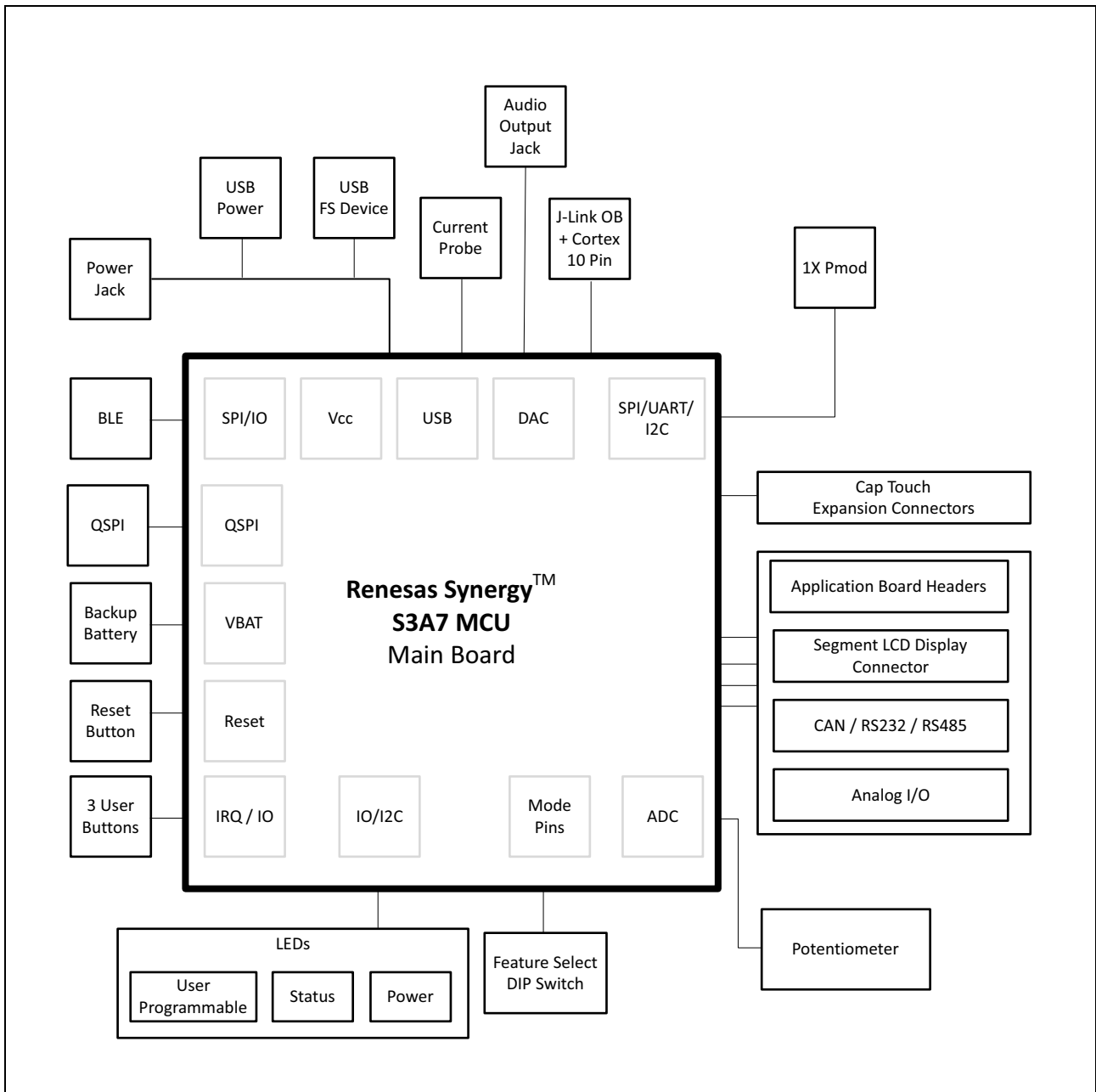
Key features

- Renesas Synergy™ S3A7 48-MHz ARM® Cortex®-M4 microcontroller
- Main Board with Breakout Board and DIP switches for selecting features
- Pin connectors for access to all S3A7 I/O pins
- LCD display
- Wired connectivity
 - One each: Full-Speed USB Host and Device
 - CAN interface, RS-232/485
- Wireless connectivity through on-board Bluetooth® Low-Energy (BLE)
- Support for precision current measurement
- On-board memory and memory interfaces
 - Serial flash, EEPROM
 - Full-size SD card connector
 - QSPI flash
- On-board sensors: Compass, accelerometer, ambient light, temperature
- Capacitive-touch sensor expansion port
- ARM® Debug connector and SEGGER J-Link On-Board

Block diagram

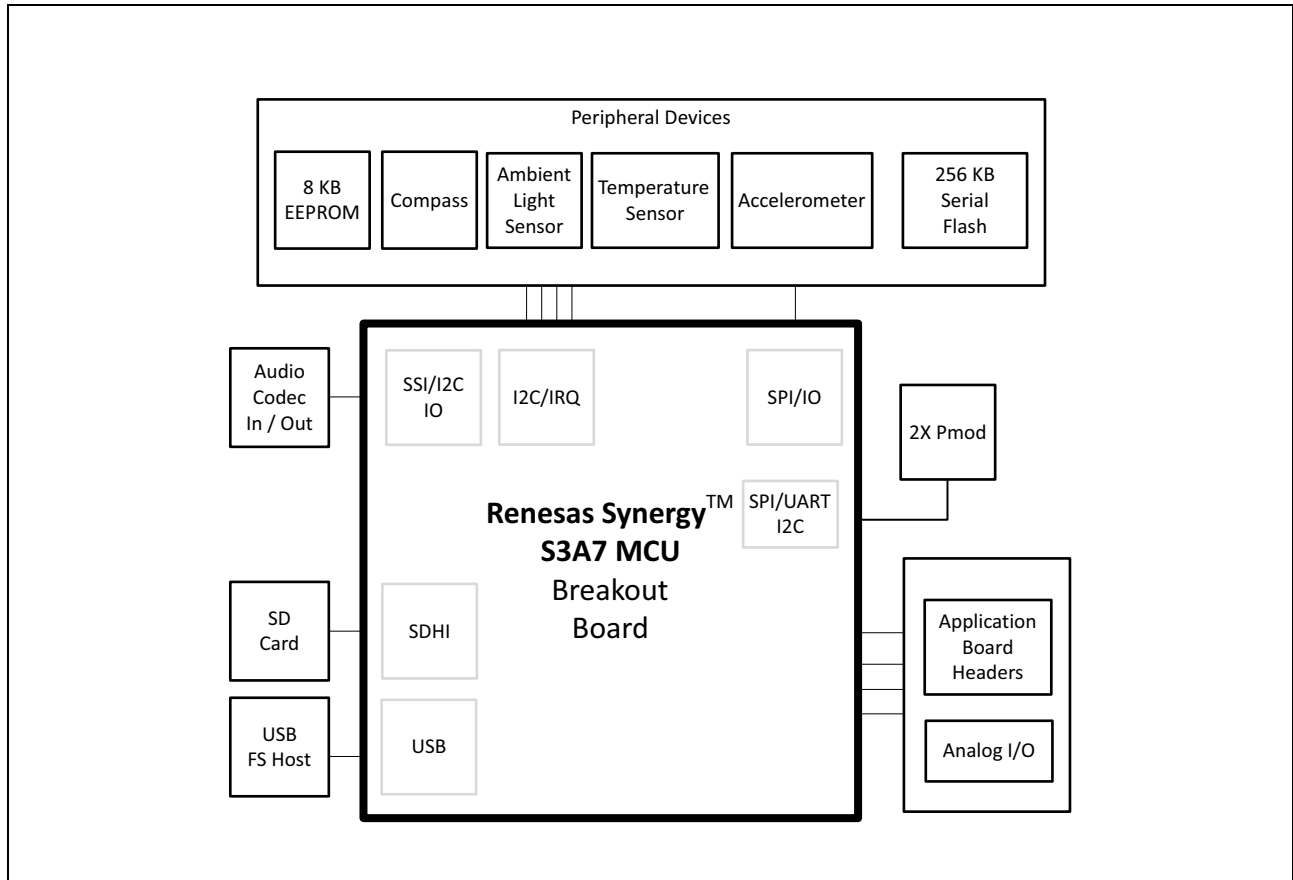
Main Board

Figure 1: Block diagram: Main Board



Breakout Board

Figure 2: Block diagram: Breakout Board



Hardware features

The DK-S3A7 uses the Renesas Synergy S3A7 48-MHz ARM® Cortex®-M4 microcontroller with 1 MB of code flash and 192 KB of SRAM.

For a list of S3A7 peripherals and hardware details, see the S3 Series User's Manual: Microcontrollers.

Main Board

- One Full-Speed Micro-B USB Device connector
- Micro-B USB connector and SEGGER J-Link On-Board (J-Link OB) for debug access
- One 12-pin Type A Pmod™ Compatible connector for SPI, IIC, and UART
- One CAN interface with CAN transceiver (1 Mbit/s)
- RS-232/485 interface with on-board transceiver
- Capacitive-touch expansion connectors compatible with the Renesas RX113 Capacitive-Touch Kit for touch buttons and sliders
- One LCD panel connector

- Configuration through DIP switches to select boot source and enable/disable board devices including Bluetooth Low Energy, QSPI flash, push buttons, J-Link OB, and Pmod Compatible connector
- Push buttons: Three user-configurable and one reset
- 10-k Ω potentiometer to ADC
- Eight user-programmable LEDs, one power indicator LED, and one J-Link operation LED
- Backup battery for the Realtime Clock (RTC)
- Bluetooth Low Energy (BLE) module
- Current sense resistors and power measurement test points for microcontroller current measurement
- Three connectors to provide direct access to the I/O pins of the S3A7 microcontroller

Breakout Board

- On-board peripherals: EEPROM, compass, accelerometer, ambient light and proximity sensor, temperature sensor, and a serial flash device
- One Full-Speed USB Host connector
- Two 12-pin Type 2A Pmod Compatible connectors
- Two additional extension connectors which include General Purpose I/O (GPIO), serial I/O, and analog I/O
- Full-size SD card socket
- Audio input and output through a codec device

LCD Panel

- 176-segment T6022A-1PRP0 LCD panel

On-board external memory

- 8-KB serial EEPROM
- 256-KB serial flash with advanced write protection

Power

The DK-S3A7 can be powered through a USB device connection or a 5-V, 2.1-mm center-positive barrel connector. An on-board, removable CR2020 battery provides backup power to the microcontroller's RTC.

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 kit.

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)

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- 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-S3A7:

- DK-S3A7 Main Board
- DK-S3A7 Breakout Board
- DK-S3A7 LCD panel
- One USB Type A to USB Micro-B cable
- 5-V/2.4-A, wall-mounted power supply
- Quick Start Guide

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