

Development Kit S128 (DK-S128)

Quick Start Guide

Renesas Synergy™ Platform
Synergy Tools & Kits
Kits: DK-S128

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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.

1. Introduction

This is the Quick Start Guide for the Renesas Synergy™ Development Kit S128 (DK-S128).

2. In the box

The following components are included in the Development Kit (DK-S128):

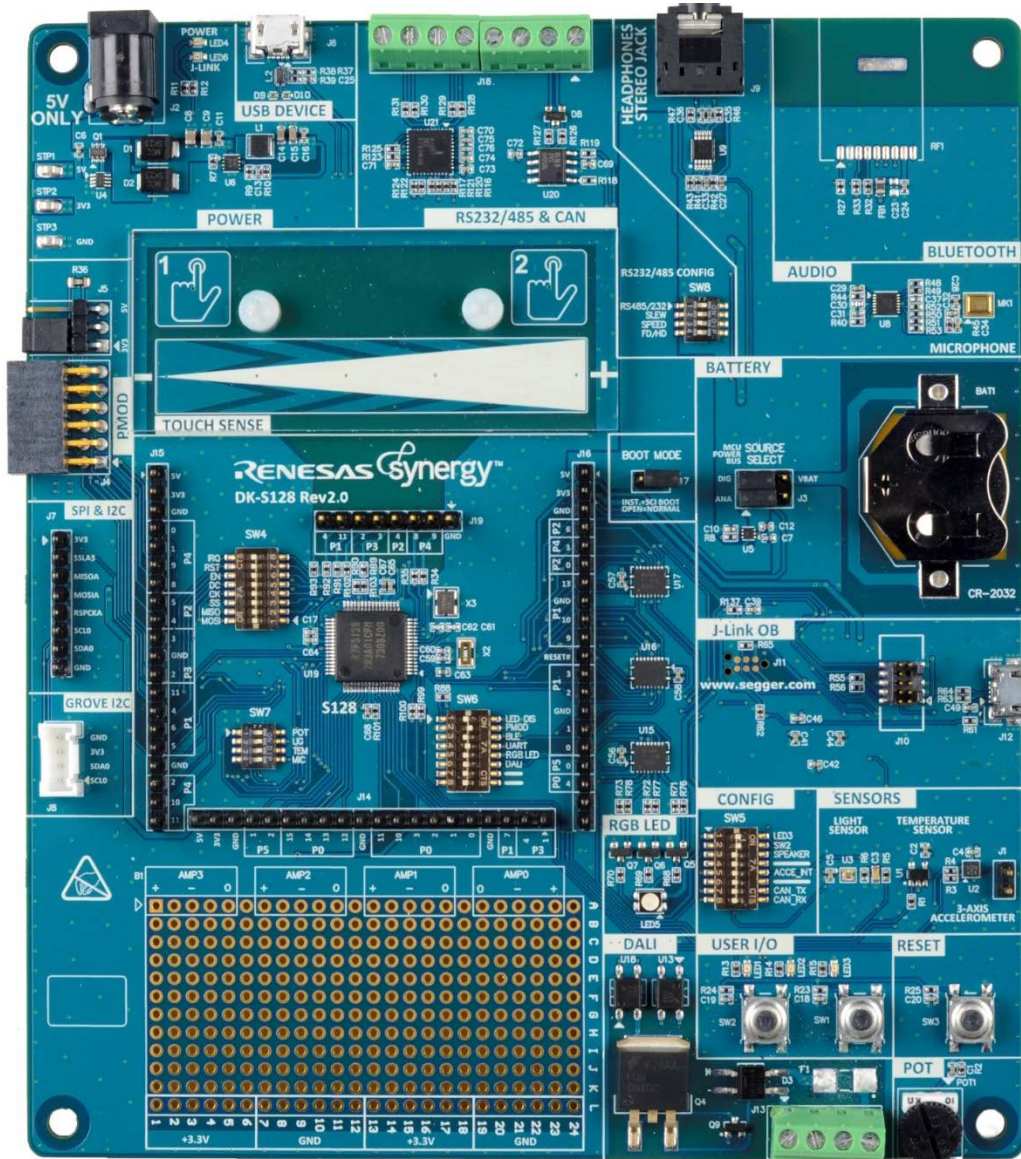
- DK-S128 Main Board
- One USB Type A to Micro-B cable
- One Pmod™ LCD screen
- Quick Start Guide (QSG, this document)

3. Overview

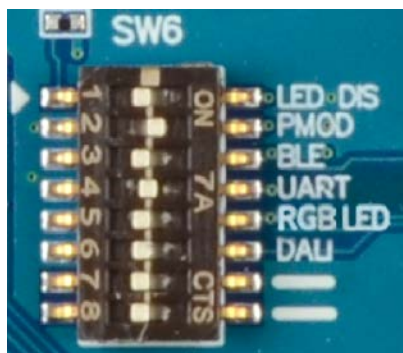
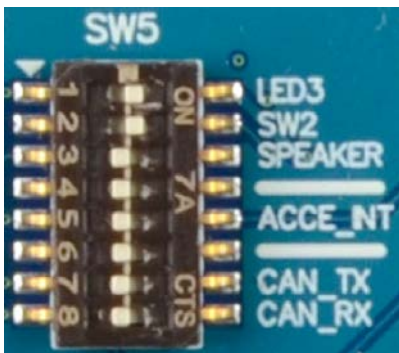
This Synergy Development Kit and the associated development tools allow you to evaluate the Synergy Platform using the DK-S128. This development board uses a device from the Synergy S128 Microcontrollers (MCUs) Group. This QSG walks you through the Out-of-Box Demonstration application. It also points you to the website that guides you through downloading and installing additional software.

4. Connecting the board components

To power up the board and get started with the preloaded Out-of-Box Demo, follow these steps:

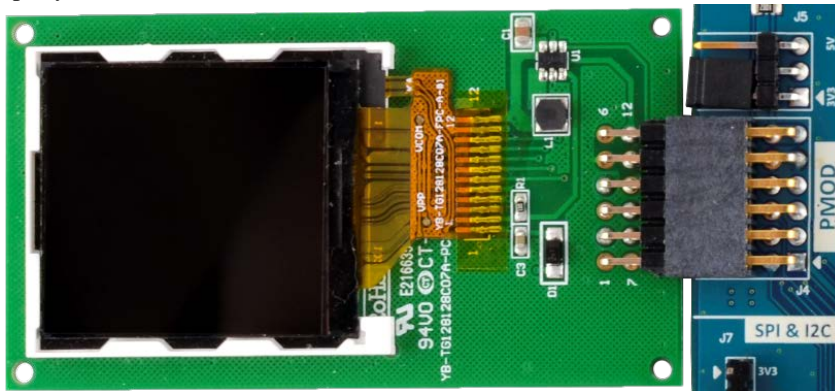


1. Ensure that the jumper settings on your board are in the configuration as shown in the following configuration. This should be the default out-of-box configuration.

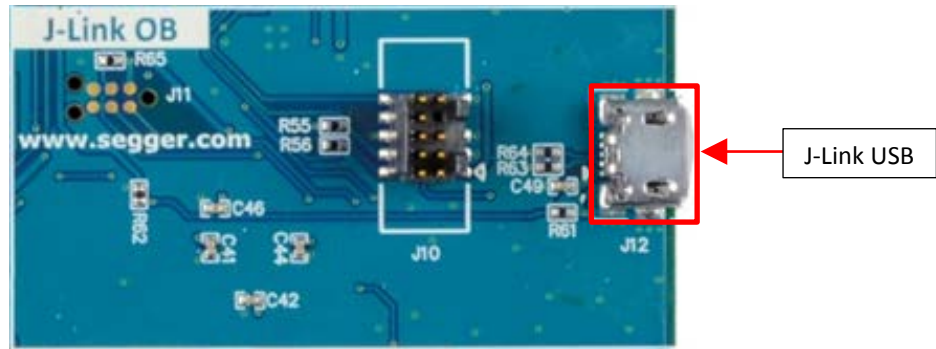


SW5			SW6			SW7		
Switch Number	Function	Default State	Switch Number	Function	Default State	Switch Number	Function	Default State
1	LED3 Enable	On	1	LED1 Disable	OFF	1	Potiometer Enable	On
2	SW2 Enable	On	2	PMOD Enable	On	2	Light Sensor Enable	On
3	Speaker Enable	OFF	3	RSPI Enable	OFF	3	Temperature Sensor Enable	On
4	Not used	OFF	4	UART Enable	On	4	Microphone Enable	On
5	Accelerometer INT	OFF	5	RGB LED Enable	OFF			
6	Not used	OFF	6	DALI Enable	OFF			
7	CAN TX	OFF	7	Not used	OFF			
8	CAN RX	OFF	8	Not used	OFF			

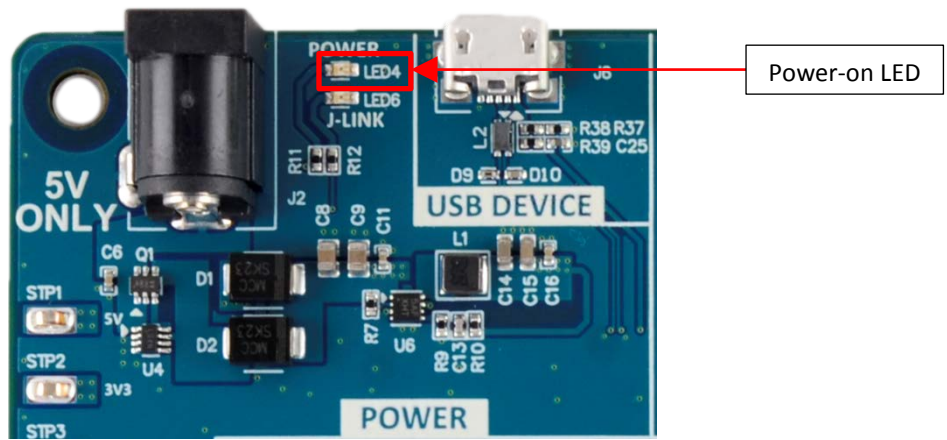
- With the screen facing upward, plug the enclosed Pmod LCD Display into the Pmod connector (J4). Make sure that the pins line up properly.



- Connect the Micro USB end of the supplied USB cable to the DK-S128 board J12 connector (DEBUG_USB).
 Note: The kit contains a SEGGER J-Link® OB (On-board). The J-Link provides full debug and programming capabilities for the DK-S128 kit.

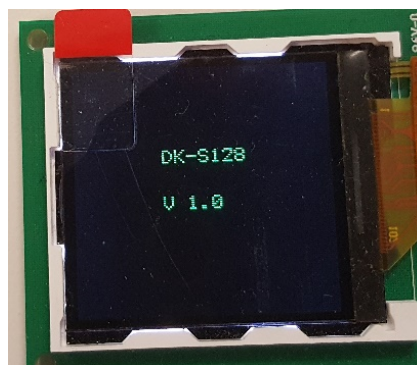


- 4. Connect the other end of the USB cable to the USB port on your workstation. LED4 turns green, indicating power is on. LED6 flashes red when communication between the J-Link OB and the workstation is not yet established, and turns off indicating a good data connection.

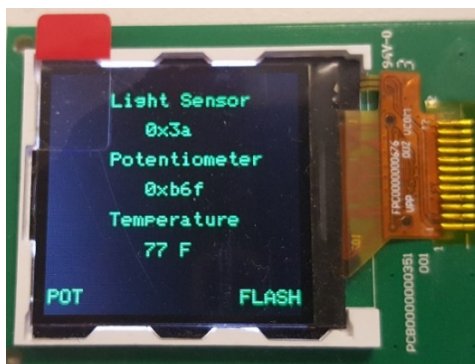


5. Running the Out-of-Box application

Once the DK-S128 is plugged-in, it powers up. It immediately starts flashing the three LEDs (LED1, LED2, and LED3) and displays a simple splash screen on the Pmod LCD for two seconds. This splash screen will show the board number and the version of the out-of-box demonstration software that shipped with the board shown as follows.



After two seconds, the screen will change to the measurement screen shown in the following image. The SSP Out-Of-Box Demonstration application uses the A/D converter to read the voltage values present on the Potentiometer (POT1), the Light Sensor U3 (APDS-9005), and the Temperature Sensor U1 (TMP35). The program displays the raw hex value read from the Light Sensor and the Potentiometer. It converts the raw value read from the Temperature Sensor to the equivalent Fahrenheit temperature.



You may interact with the Out-of-Box Demonstration program in the following ways:

1. The three LEDs, (LED1, LED2, and LED3) will all flash at once or chase each other. Pushing the momentary switch SW2 will alternate between flashing and chasing. The bottom right corner of the screen will indicate which mode the LEDs are operating in (FLASH/CHASE).
2. The flashing rate of the LEDs is determined by the value read from the Light Sensor or the Potentiometer. You toggle between these two by pushing momentary switch SW1. The bottom left corner of the screen will indicate which sensor is driving the LEDs flashing rate. (POT/LIGHT).
3. Push SW1 to select POT mode, then push SW2 to select FLASH mode. Rotate POT1 clockwise and counterclockwise. The flashing of the LEDs will increase or decrease appropriately. The screen will display the raw value reported by the A/D converter.
4. Push SW1 to select LIGHT mode, then push SW2 to select CHASE mode. Move a light source (a flashlight, for example) closer and farther away from the Light Sensor U3. Observe that the flashing rate of the LEDs will change while the raw hex value displayed to the screen also changes.

6. Next Steps

1. Visit: renesassynergy.com/tools to learn more about development Tools & Utilities. Visit <http://www.renesassynergy.com/gallery> to download them.
2. Visit: <http://renesassynergy.com/kits/dk-s128> for more information such as board schematics, application projects collateral about the DK-S128 Kit.
3. If you need technical support or want to live chat with a Synergy Platform Expert, visit: <http://renesassynergy.com/support>.
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Website and Support

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

Technical Contact Details:

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Revision History

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