LED Blinker Sample Code for RE01 1500KB Group

LED Blinker Sample Code

Summary

This application note describes a sample code using the RE01 1500KB Group CMSIS driver package. The sample code can be found in the project delivered with this application note.

The overview of this sample code is shown in the table below.

Contents

1. Specifications

1.1 Project Description

LED Blinker sample code is programmed to make LED0, 1, and 2 blink. This sample code was developed in Evaluation Kit RE01 1500KB.

In the main file, the output level of LED0, 1, and 2 are toggled endlessly with waiting time of 50,000 loop iteration.

1.2 Pins Used

The pins used by the sample code are shown below.

Pin Used	Purpose of Use
P007	LED2
P008	LED1
P009	LED0

This sample code controls LED pin through PDR and PODR register. The initial setting of PDR is 0 (set as input) and the initial value of PODR is 0 (low output). The schematic diagram of LED pin is shown in Figure 1.1.

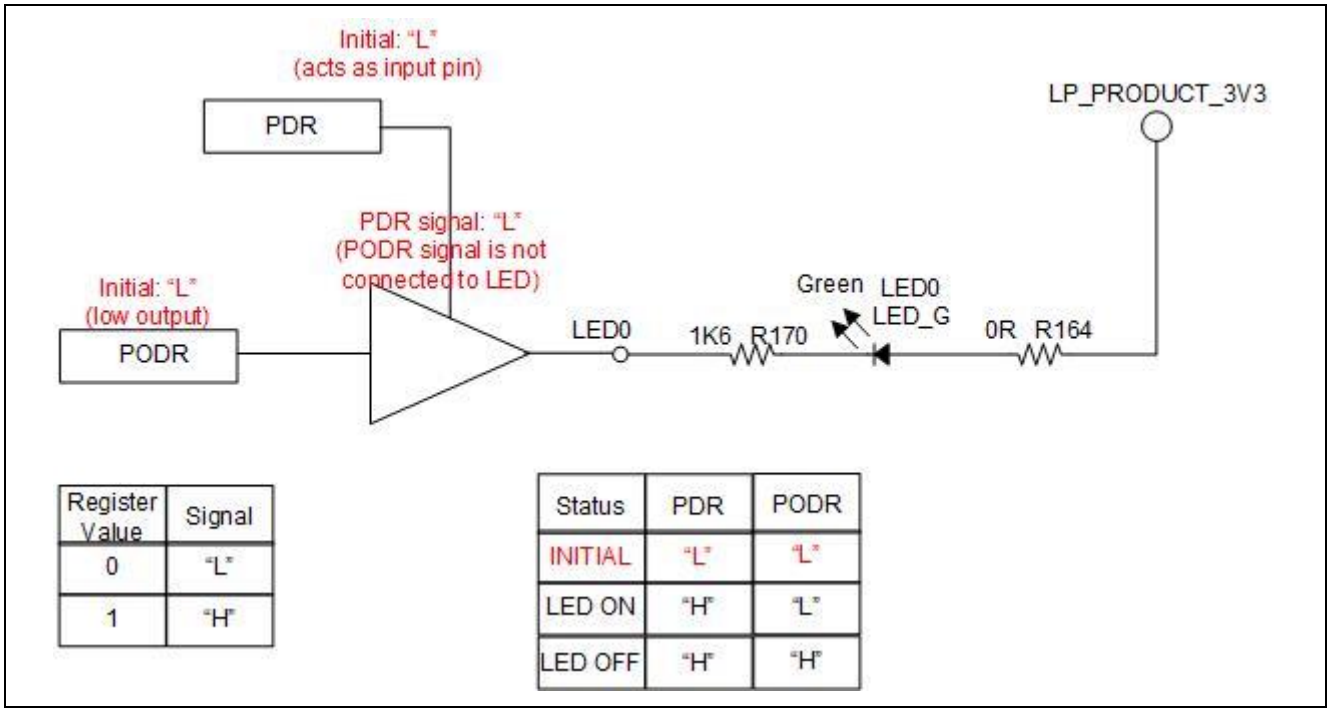

Figure 1.1 LED Pin Schematic Diagram

Steps to toggle LED on and off are described below.

1. Enabling pin output mode (Setting PDR to 1)
   In this step, PDR signal changed from "L" to "H". This enables the integrated circuit to connect PODR with LED area.
2. Toggling LED signal (turn on/off)
   LED can be toggled on and off by controlling PODR register. When PODR is set to "L", the current flows from LP_PRODUCT_3V3 ("H"), through LED0, and to PODR. As a result, LED0 turns on. On the other hand, when PODR is set to "H", the current doesn't flow through LED0. Hence, LED0 turns off.

2. Operating Environment

2.1 Device

RE Family RE01 1500KB Group

2.2 Development Environment

The sample code was developed with the following environment (Table 2-1).

Table 2-1 LED Blinker Sample Code Operating Environment

IDE	Compiler	Debugger
IAR EWARM V8.3 or later (IAR Embedded Workbench® for ARM)	IAR v8.32 or Later	IAR I-Jet
		Segger J-Link(OB)
Renesas e2 studio V.7 or later	GCC V.6 GNU 6-2017-q2-update	Segger J-Link(OB)

2.3 Target Board

Evaluation Kit RE01 1500KB

Products type: RTK70E015DSxxxxxBJ

3. Restrictions

Improvements have been made to previously known restrictions. There are currently no known restrictions.

4. Sample Code

Sample code can be downloaded from the Renesas Electronics website.

5. Reference Documents

User's Manual: Hardware

RE01 1500KB Group User's Manual: Hardware R01UH0796

(The latest version can be downloaded from the Renesas Electronics website.)

Technical Update/Technical News

(The latest version can be downloaded from the Renesas Electronics website.)

User's Manual: Development Tools

(The latest version can be downloaded from the Renesas Electronics website.)

Website and Support

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http://www.renesas.com/

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Revision History

Rev.	Date	Description	
		Page	Summary
1.00	Sept 27, 2019	—	First edition issued

General Precautions in the Handling of Microprocessing Unit and Microcontroller Unit Products

The following usage notes are applicable to all Microprocessing unit and Microcontroller unit products from Renesas. For detailed usage notes on the products covered by this document, refer to the relevant sections of the document as well as any technical updates that have been issued for the products.

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.

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