

RL78/G1C

APPLICATION NOTE

Utilising the Real Time Clock Sample Code for e2studio

R01AN1770EG0100 Rev.1.00 Nov 01, 2013

Introduction

The purpose of this Application Note is to show the user how to add the associated RL78/G1C sample code to a new or existing e2studio workspace; as well as give an explanation of what the sample code does.

The sample code provided with this Application Note runs on the RL78/G1C RSK and demonstrates usage of the Real Time Clock (RTC) running from the 32.768 KHz sub-clock oscillator. The RTC includes an alarm feature, set for 07.00 am.

Target Device

RL78/G1C

Development environment

IDE: e2studio Compiler: GNURL78 v13.01 -ELF Hardware: Renesas Starter Kit for RL78/G1C

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1. Installation

This section assumes e2studio IDE is already installed on the user's personal computer (PC). Create a new folder and name it as 'RSKRL78G1C_Workspace'. Copy the zipped file RTC.zip, available in the Application Note package downloaded from the website, to this folder. Extract the RTC.zip file to the RSKRL78G1C_Workspace folder.

2. Creating the Project Workspace

Open E2studio IDE by clicking the Windows Start button, select All Programs > Renesas Electronics e2studio > Renesas e2studio.

e ² Workspace Launcher					
Select a wor	rkspace				
	res your projects in a folder called a workspace. orkspace folder to use for this session.				
<u>W</u> orkspace:	C:\Users\QATest\My Documents\e2studio\workspace	•	<u>B</u> rowse		
🕅 <u>U</u> se this a	s the default and do not ask again	ОК	Cancel		

Select <OK>.

e ² Administrator Privilege					
?	Administrative privileges are required for correct operation of e2Studio on Windows 7. Please ensure you have appropriate privileges (i.e., Right click renesas-eclipse.exe and choose "Run as Administrator")				
	Do you want to continue?				
	Yes <u>N</u> o				

Select <Yes> to Administrator Privilege dialog.





On the welcome screen select Go the Workbench icon as shown above.

1. Once the e2studio environment has initialised, right click in the project explorer window and click <Import...>

C/C++ - e2studio				
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2. The Import dialog will now appear. Expand the "General" folder icon, and select "Existing Projects into Workspace", then click 'Next'.

e² Import 🗖 🗖 💌				
Select Create new projects from an archive file or directory.				
Select an import source:				
Image: Constraint of the second state of the second sta				
< <u>B</u> ack <u>Next > E</u> inish	Cancel			

3. The Import Dialog will now appear ,specify the project to import .Click the "Browse" button and locate the directory: C:\Renesas\Workspace\RSK\RSKRL78G1C

Navigate to the unzipped RTC folder located folder located in RSKRL78G1C Workspace folder. Select the RTC folder located folder

And also ensure that the 'Copy projects into workspace' option is ticked, and then click <Finish>

The IDE e2studio will load the project.



RL78/G1C

e ² Import				
Import Projects Import Projects Select a directory to search for existing Eclipse projects. Import Projects				
 Select roo<u>t</u> directory: Select <u>a</u>rchive file: <u>P</u>rojects: 	C:\Renesas\Workspace\RSK\RSKRL78G1C\RTC	Browse		
₩ RTC (C:\Renesas	Workspace\RSK\RSKRL78G1C\RTC)	<u>S</u> elect All <u>D</u> eselect All R <u>e</u> fresh		
 Image: Copy projects into workspace Working sets Add project to working sets Working sets: Select 				
?	< <u>B</u> ack <u>N</u> ext > <u>Finish</u>	Cancel		



3. Opening Sample Code and Source Files

Once the project has been opened, the source code and all dependant files can be opened in the editor by expanding the folders in the Project Tree window and double clicking the files listed. All files have been grouped according to their file type.

C++ - RTC/Description.txt - e2studio		
Edit Source Refactor Navigate Se		計 屆 C/C++
	Description.bt X	
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😤 RTC	* This software is supplied by Renesas Electronics Corporation and is only	
b	* intended for use with Renesas products. No other uses are authorized. This	
a 🕮 src	* software is owned by Renesas Electronics Corporation and is protected under	
iodefine_ext.h	* all applicable laws, including copyright laws.	
⊳ 脑 iodefine.h	* THIS SOFTWARE IS PROVIDED "AS IS" AND RENESAS MAKES NO WARRANTIES REGARDING * THIS SOFTWARE, WHETHER EXPRESS, IMPLIED OR STATUTORY, INCLUDING BUT NOT	
⊳ 💽 lcd.c	* LINIS SOFTWARE, WHETHER EXPRESS, LINELED ON STATUTORY, INCLUDING BOT NOT * LINITED TO WARRANTES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE	
⊳ 🚡 lcd.h	* AND NON-INFRINGEMENT. ALL SUCH WARRANTIES ARE EXPRESSLY DISCLAIMED.	
> 🛄 r_cg_cgc_user.c	* TO THE MAXIMUM EXTENT PERMITTED NOT PROHIBITED BY LAW, NEITHER RENESAS	
r_cq_cqc.c	* ELECTRONICS CORPORATION NOR ANY OF ITS AFFILIATED COMPANIES SHALL BE LIABLE	
▶ 🔚 r_cq_cqc.h	* FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR	
Image: setup.c	* ANY REASON RELATED TO THIS SOFTWARE, EVEN IF RENESAS OR ITS AFFILIATES HAVE * BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.	
Image: Interrupt_handlers.h	* BEEN ADVISED OF THE POSSIBILITY OF SUCH DANAGES. * Renesas reserves the right, without notice, to make changes to this software	
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	* Copyright (C) 2013 Renesas Electronics Corporation. All rights reserved.	
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▷ i r_cg_main.c	* File Name : Description.txt	
Image:	* Version : Applilet4 for RL78/GIC V1.00.00.01 [28 Dec 2012]	
r_cg_port.c	* Device(s) : R5F10JGC	
▷ h r_cg_port.h	* Tool-Chain : gccrl78 * H/W Platform : RSKRL78G1C	
Is r_cg_reset_program.asm	* Note : Application Leading Tool (Applilet) is used to generate code	
r_cg_rtc_user.c	* for this sample program. The name Applilet is used hereafter.	
⊳ 💽 r_cg_rtc.c	* The Applilet details and version number are given in the file	
⊳ 🛅 r_cg_rtc.h	* header for each relevant module.	
r_cg_tau_user.c	* Description : Demonstrates usage of the Real Time Clock (RTC) running from the 32.768 KHz sub-clock oscill	a
⊳ 💼 r_cg_tau.c	* The RTC includes an alarm feature, set for 07.00 am.	
⊳ 庙 r_cg_tau.h	* Instructions :	
h r_cg_userdefine.h	* 1. Compile the sample code, and download to the RSK. Click the 'Go'	
Image: Image: text control in the second	* button to start program execution. Click again if the program stops at main().	
b In rskrl78g1cdef.h	*	
Iswitch.c	 2. Observe the 24-hour digital clock on the LCD display. The name of the sample is displayed at the distribution of the sample is displayed at 	
b in switch.h	 the first line of the display. When the time reaches 07:00:00, the alarm condition will become active. At this time LED1 will flash for a duration of 15 seconds or until switch SW2 is pre- 	
📄 Description.txt	*	
📄 RSK_Header.txt	· · · · · · · · · · · · · · · · · · ·	
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4. Source Code Functionality

The source code project is specifically written to run on the appropriate RSK. However this source code can be useful as an example even without the RSK.

The project was written using source files containing API functions generated using Code Generator. The project will contain a C source file 'r_main.c'. This source file includes the C function main(). All source files and dependent files whose filenames are prefixed with 'r_' were generated using Application Leading Tool. For more information, refer Description.txt.



5. Code Execution

The sample code demonstrates usage of the Real Time Clock (RTC) running from the 32.768 KHz sub-clock oscillator. The RTC includes an alarm feature, set for 07.00 am.

Instructions:

1. Compile the sample code, and download to the RSK. Click the 'Resume' button to start program execution. Click again if the program stops at main().

2. Observe the 12-hour digital clock on the LCD panel. The name of the sample is displayed at the bottom of the LCD panel. When the time reaches 07:00:00, the alarm condition will become active. At this time LED1 will flash for a duration of 15 seconds or until switch SW2 is pressed.



6. Website, Inquiries and Support

Renesas Electronics Website <u>http://www.renesas.com/</u> Inquiries <u>http://www.renesas.com/inquiry</u> Support <u>http://www.renesas.com/rskrl78g1c</u>

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Revision Record

		Descrip	Description	
Rev.	Date	Page	Summary	
1.00	November 01, 2013		First edition issued	

General Precautions in the Handling of MPU/MCU Products

The following usage notes are applicable to all MPU/MCU 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. Handling of Unused Pins
 - Handle unused pins in accord 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 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. Unused pins should be handled as described under Handling of Unused Pins in the manual.
- 2. Processing at Power-on

The state of the product is undefined at the moment 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 moment 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 moment 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 moment when power is supplied until the power reaches the level at which resetting has been specified.

- 3. Prohibition of Access to Reserved Addresses
 - Access to reserved addresses is prohibited.
 - The reserved addresses are provided for the possible future expansion of functions. Do not access
 these addresses; the correct operation of LSI is not guaranteed if they are accessed.
- 4. Clock Signals

After applying a reset, only release the reset line after the operating clock signal has become stable. When switching the clock signal during program execution, wait until the target clock signal has 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. Moreover, 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.

5. Differences between Products

Before changing from one product to another, i.e. to a product with a different type number, confirm that the change will not lead to problems.

— The characteristics of an MPU or MCU in the same group but having a different part number may differ in terms of the 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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