RL78/G13

Utilising the I2C in Master Mode Sample Code

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Introduction

The purpose of this Application Note is to show the user how to add the associated RL78G13 sample code to a new or existing CubeSuite+ workspace; as well as give an explanation of what the sample code does.

The sample code provided with this Application Note demonstrates usage of the I2C Interface in Master Mode. The program runs on the RL78G13 RSK and demonstrates usage of the I2C interface in Master Mode, by reading and writing to an EEPROM device.

Target Device

RL78G13

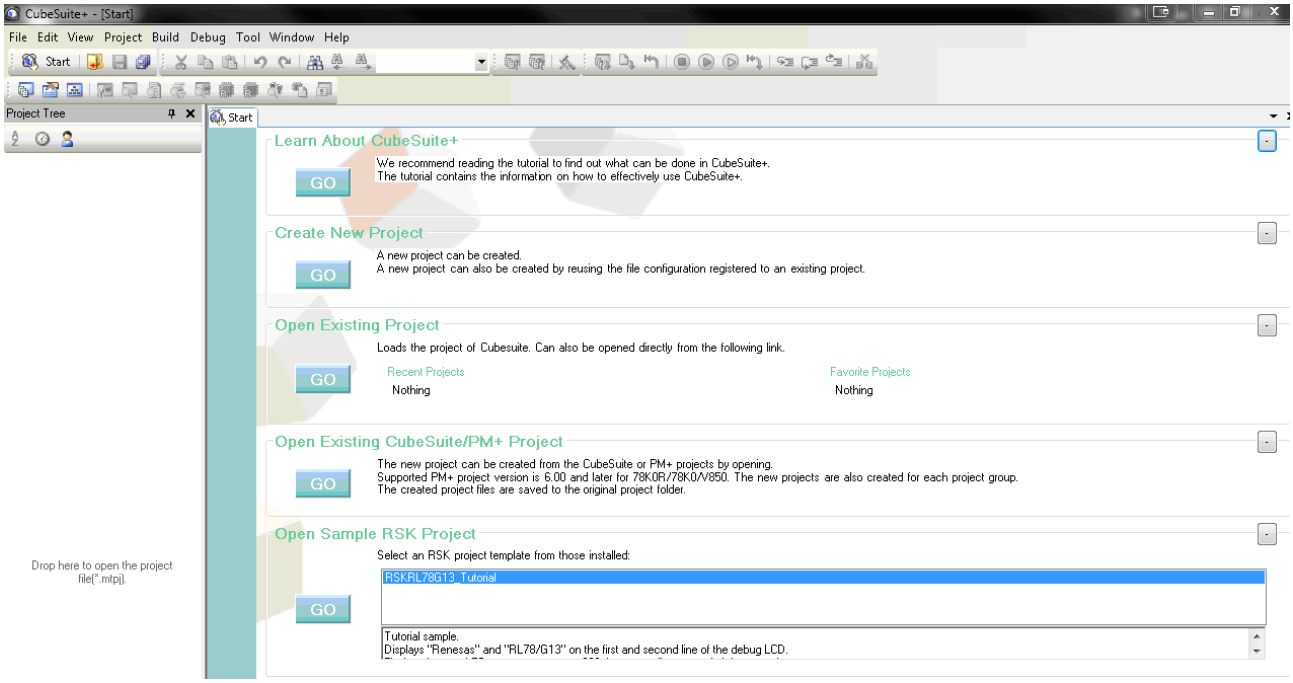
Contents

1. Installation

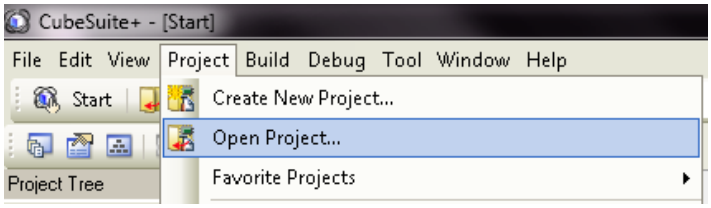
This section assumes CubeSuite+ IDE is already installed on the user's personal computer (PC). Create a new folder and name it as 'RSKRL78G13_Workspace'. Copy the zipped file IIC_Master.zip, available in the Application Note package downloaded from the website, to this folder. Extract the IIC_Master.zip file to the RSKRL78G13_Workspace folder.

2. Creating the Project Workspace

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



From the menu bar select File > Project > Open Project…

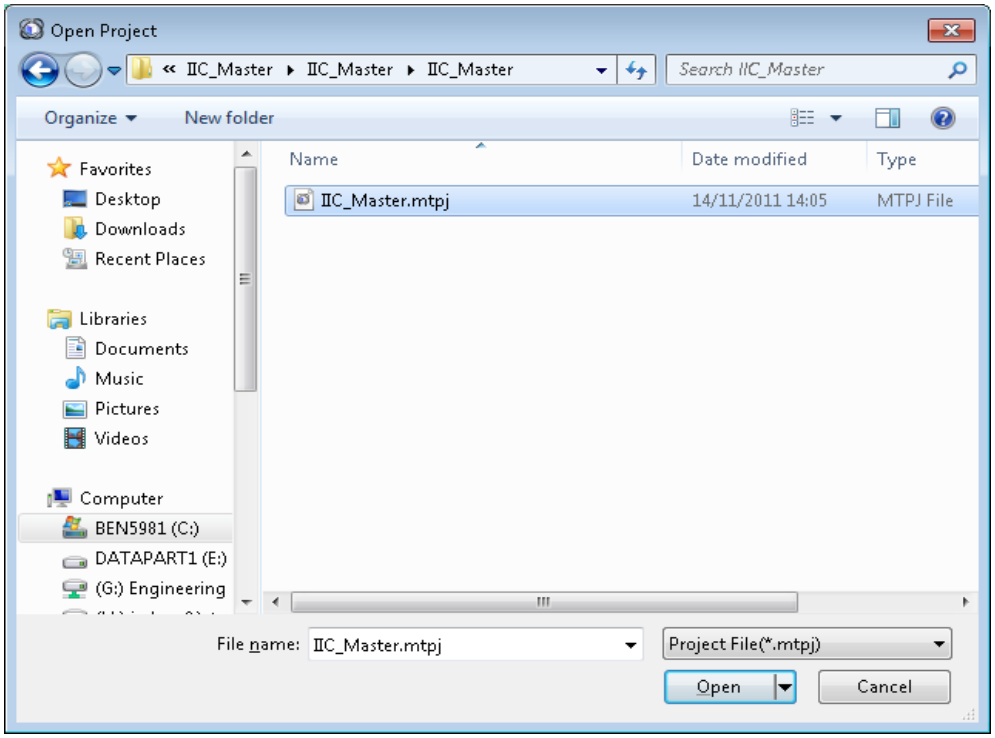


CubeSuite+ will open a dialog.

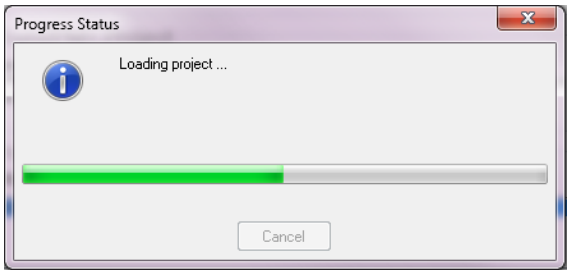
Navigate to the unzipped IIC_Master folder located in RSKRL78G13_Workspace.

Select the IIC_Master.mtpj file.

Click <Open>.

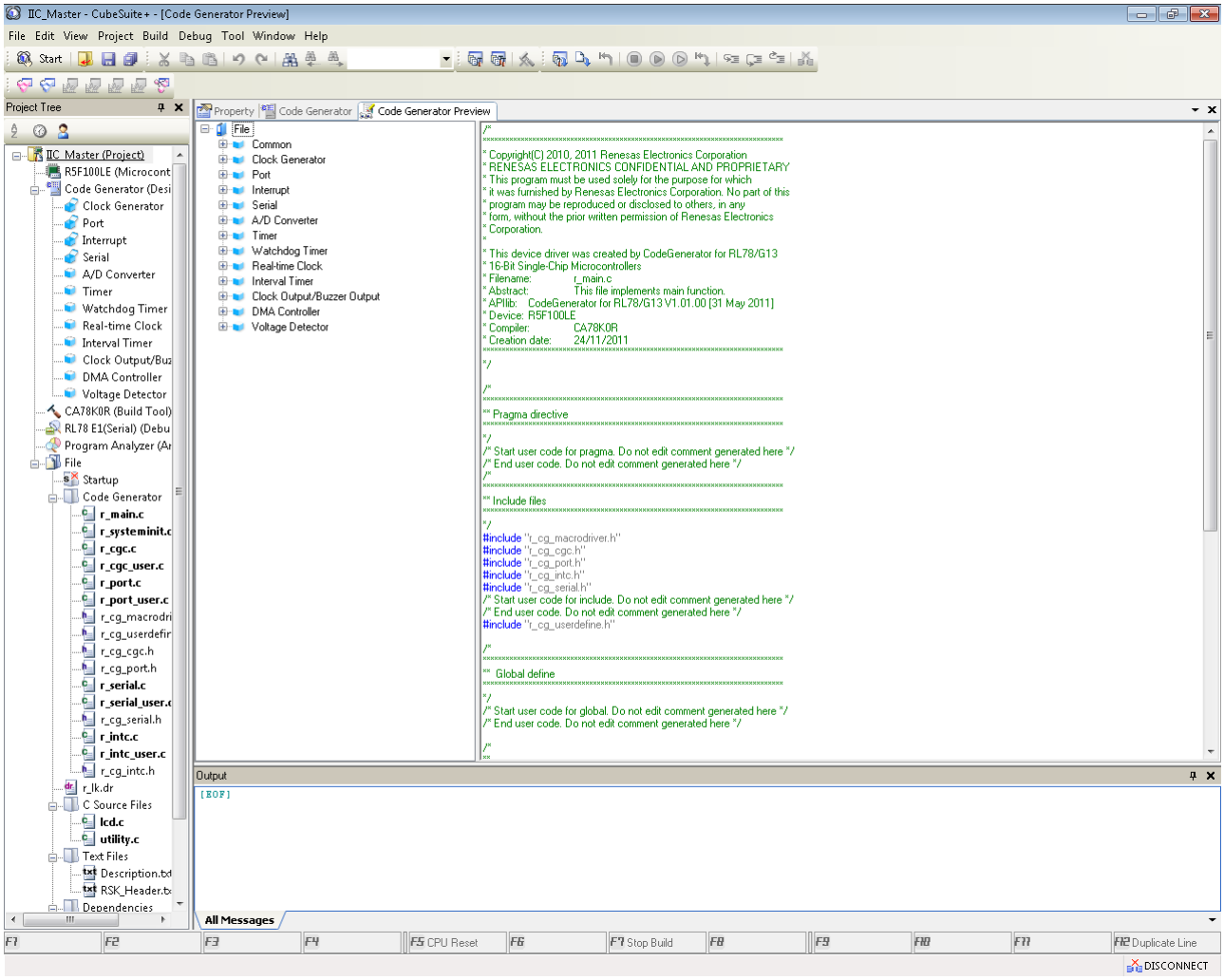


A Progress Status dialog will appear briefly whilst CubeSuite+ loads the project.



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.



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 dependant files whose filenames are prefixed with ‘r_’ were generated using Code Generator.

5. Code Execution

This sample code requires an external 5V regulated power supply.

Works with the Renesas R1EX24xxx series, 16Kbit EEPROM and compatible devices. The EEPROM device should be in a circuit recommended by the manufacturer to ensure it is operational. By default, the project is configured to work with another RSKRL78G13 running the slave program. The user can select the appropriate slave device by the inclusion or exclusion of the macro definition '#define SLAVE_RL78/G13, which is found in the r_cg_userdefine.h header file.

1. Connect the 5V regulated power supply.

2. Build and download the sample code to the RSK.

3. Connect a compatible EEPROM memory device as follows:

EEPROM	RSK
SDA	-> SDA (JA1, pin 25)
SCL	-> SCL (JA1, pin 26)
GND	-> Any ground point.

4. Click 'Go' to start the program execution. The name of the sample will by displayed on the debug LCD.

5. Press switch SW1 to perform a write operation. If the write is successful, the data written will be displayed on the debug LCD. Repress SW1 to do another write.

6. Press switch SW3 to perform a read operation. If the read is successful, the data read will be displayed on the debug LCD. Repress SW3 to repeat the read instruction.

7. Press SW2 to recall the last data written to the EEPROM slave device.

8. If data written and data read differ, information will be displayed on the debug LCD to inform of this occurrence. A write operation should always precede a read operation. If the first operation carried out is a read operation, the debug LCD will ask the user to press SW1 followed by a press on SW3.

Note: In the case of the RSKRL78G13 becoming unresponsive, stop the sample and disconnect power to the RSK, recheck the EEPROM connections, then reconnect power and start from step 1 again.

6. Website, Inquiries and Support

Renesas Electronics Website
http://www.renesas.com/
Inquiries
http://www.renesas.com/inquiry
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7. Revision Record

Rev.	Date	Description	
		Page	Summary
1.00	Nov 23, 2011	—	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 manual, refer to the relevant sections of the manual. If the descriptions under General Precautions in the Handling of MPU/MCU Products and in the body of the manual differ from each other, the description in the body of the manual takes precedence.

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 one with a different type number, confirm that the change will not lead to problems.
   — The characteristics of MPU/MCU in the same group but having different type numbers may differ because of the differences in internal memory capacity and layout pattern. When changing to products of different type numbers, implement a system-evaluation test for each of the products.

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