BlueBoard-RL78/G12/G13/G14_30pin

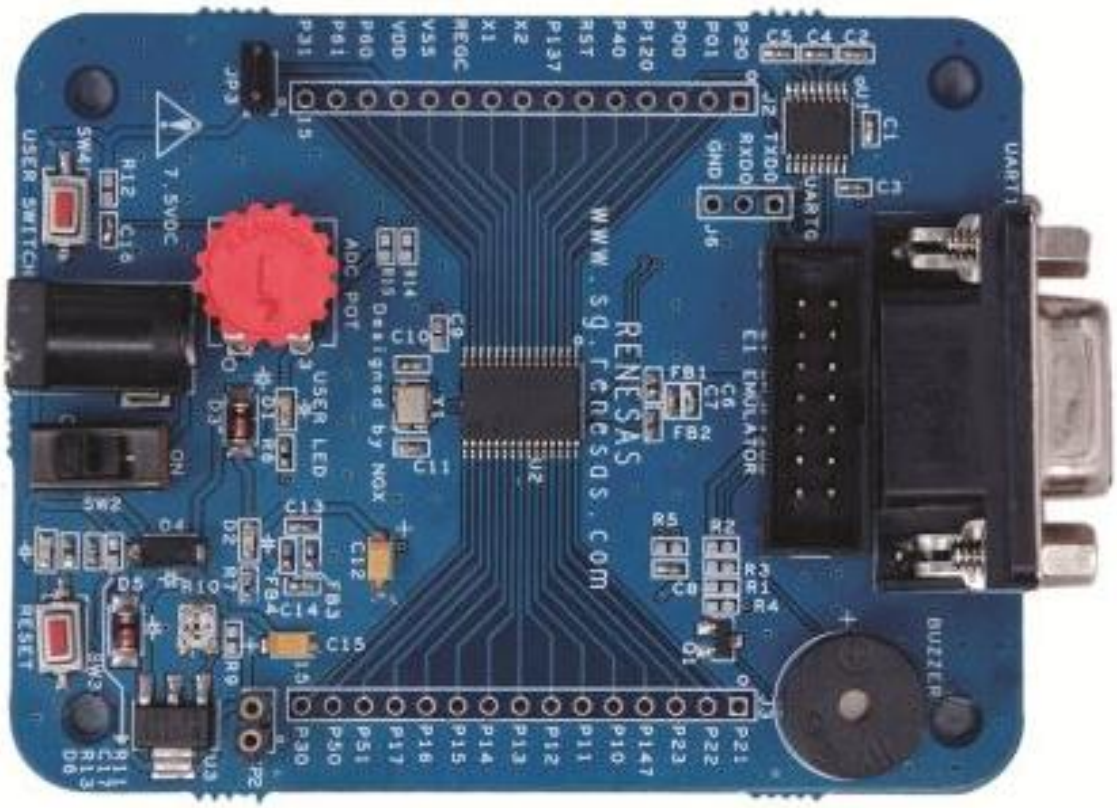

Fig. 1

About NGX Technologies

NGX Technologies is a leader in embedded microcontroller product development. We supply reference designs and evaluation modules to silicon companies. Our customers include industry leaders like NXP and RENESAS. Our core business is in helping our customers realize their embedded products.

Contact Information:

NGX Technologies Pvt. Ltd.
No.216, 5th main Road, R.P.C. Layout,
Vijayanagar 2nd Stage,
Bangalore – 560 104
Phone : +91-80-40925507
email:sales@ngxtechnologies.com

Table of Contents

1.0 INTRODUCTION

This document is the User Manual for BB-RL78/G12/G13/G14_30pin; a cost effective evaluation platform for RENESAS's RL78/G12/G13/G14_30pin MCUs. This document reflects its contents which include system setup, debugging, and software components. This document provides detailed information on the overall design and usage of the board from a systems perspective.

Before proceeding further please refer the quick start guide for BB-RL78/G12/G13/G14_30pin features and hardware verification.

For BB-RL78/G12/G13/G14_30pin quick start guide: Click here.

2.0 BLUEBOARD-RL78/G12/G13/G14_30pin Development Tool Setup

2.1 IDE and debugger

The following sections will explain the setup for CUBESUITE+ and E1 EMULATOR as the IDE and debugger respectively.

Other tool options that could be considered are:

- E1 Emulator and High Performance Embedded Workshop

2.2 Installation & Configuration of CUBESUITE+ software

The Installation of CubeSuite+ software is explained below:

Note: We have used CubeSuite+ version V1.02.00 while creating the User manual for this evaluation kit. Please ensure that you are using CubeSuite+ version V1.02.00 or above.

Step 1: Open the CubeSuite+ setup

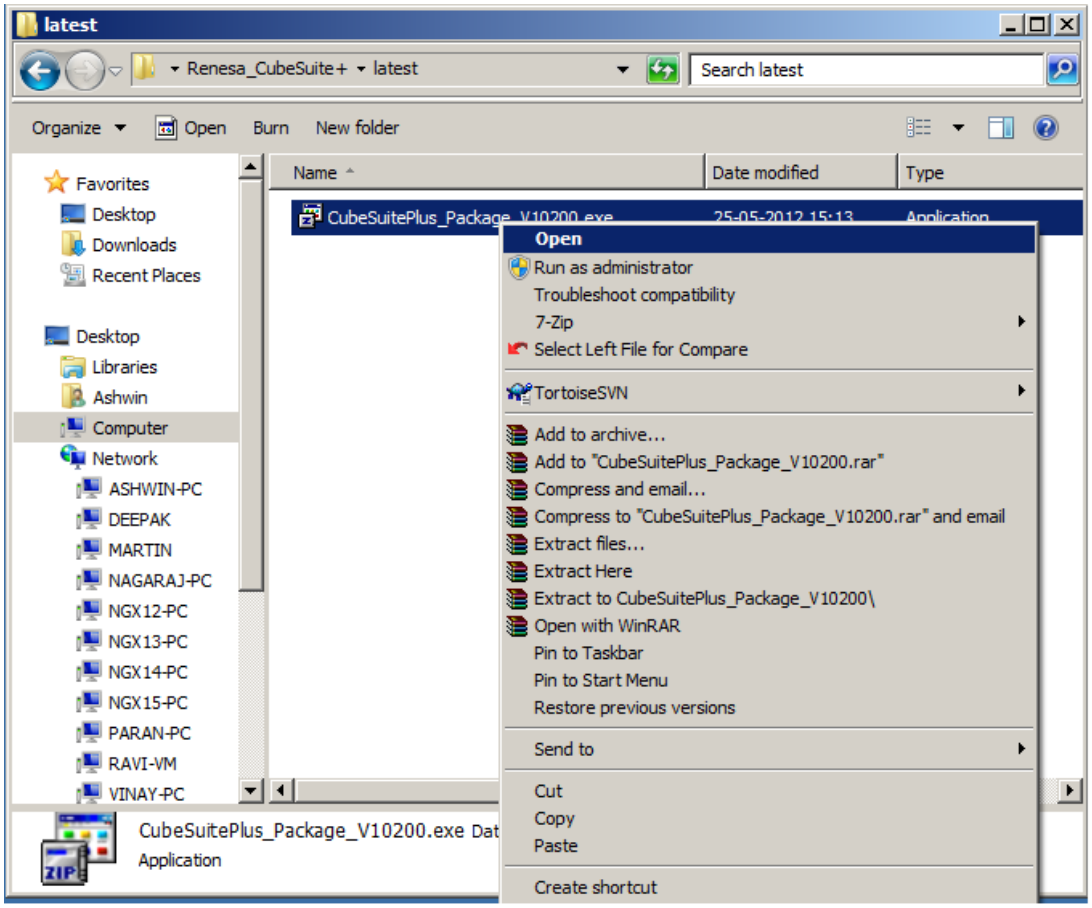

Fig. 2

Step 2: Click on Run

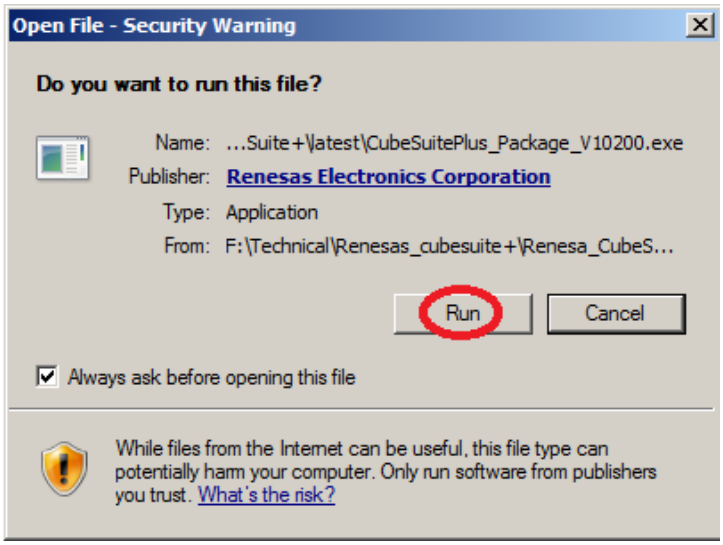

Fig. 3

Step 3: Click on Begin CubeSuite+ Setup

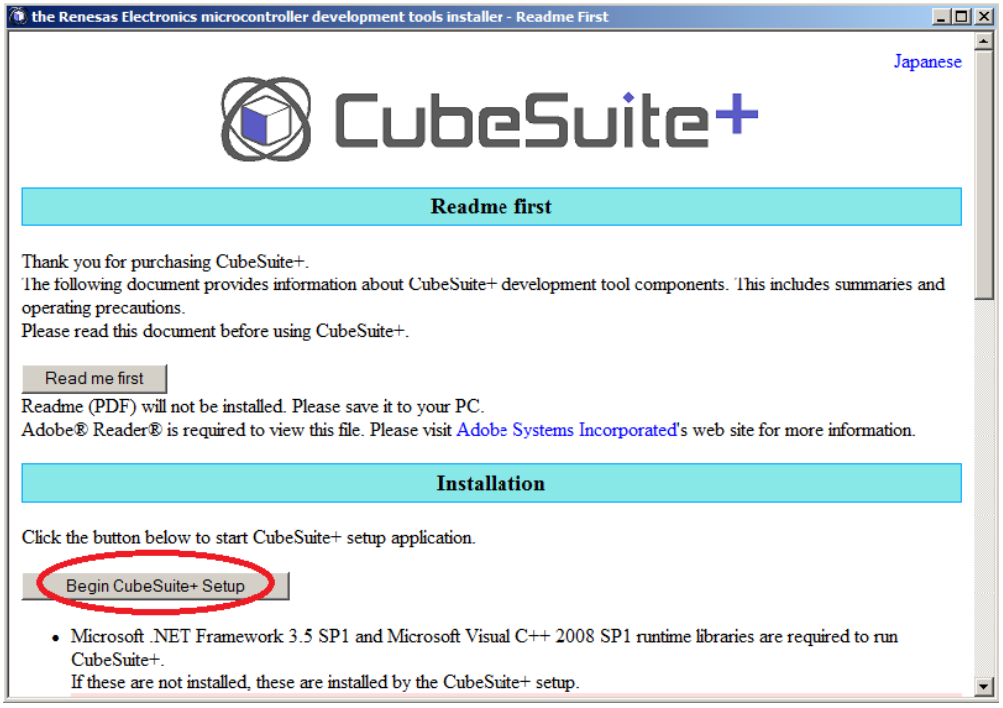

Fig. 4

Step 4: Click on Next

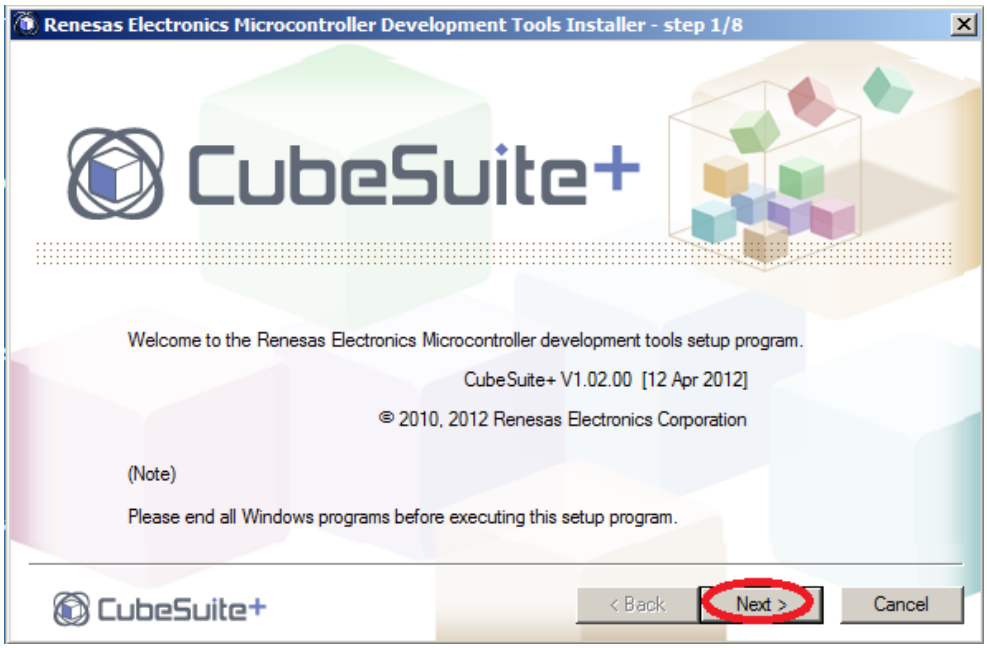

Fig. 5

Step 5: Accept the end user license agreement and click Next

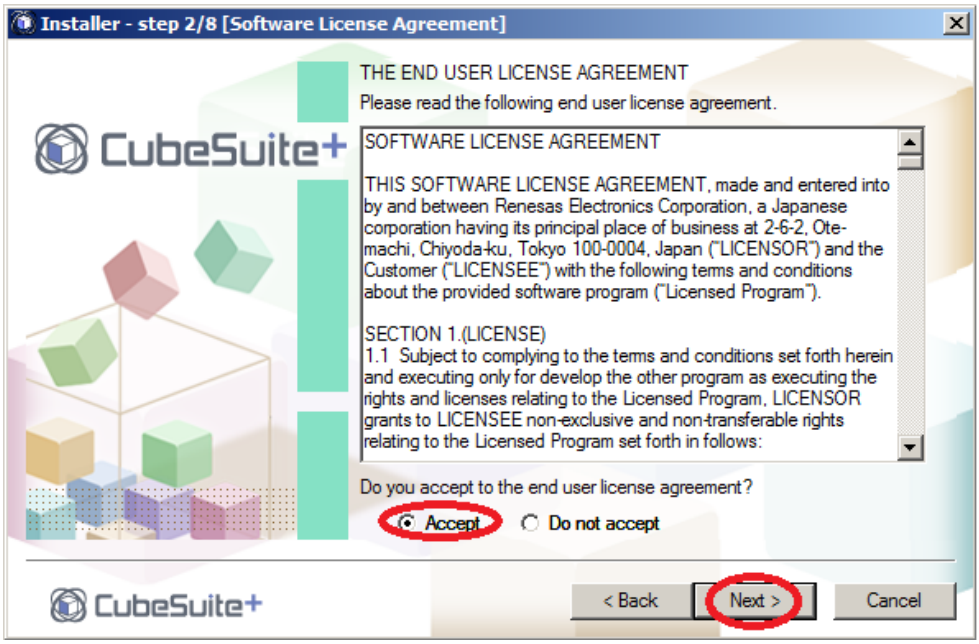

Fig. 6

Step 6: Click Next

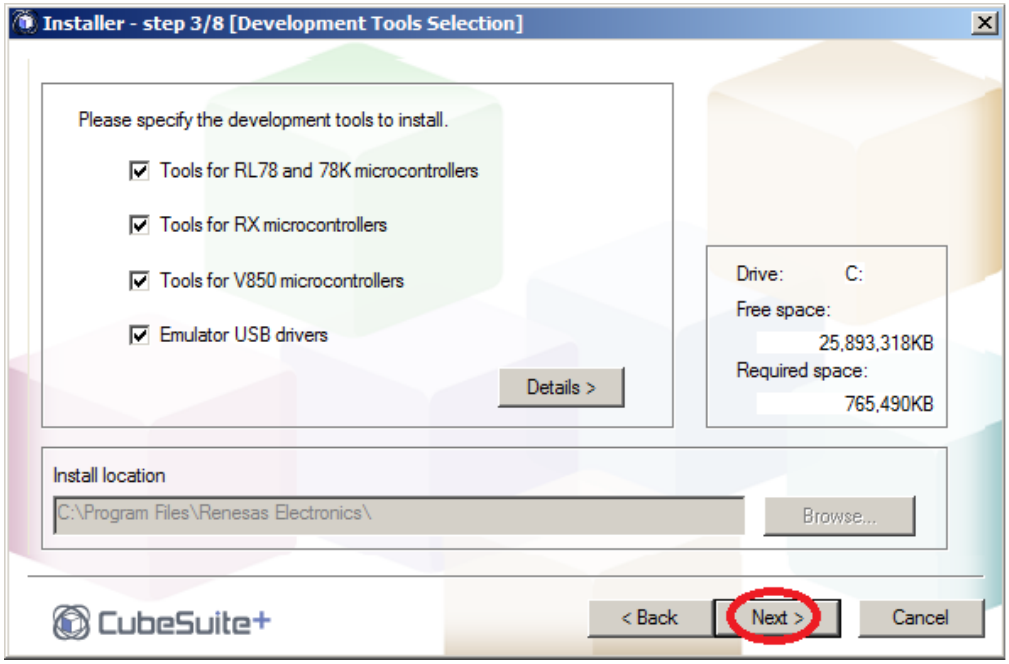

Fig. 7

Step 7: Click Next

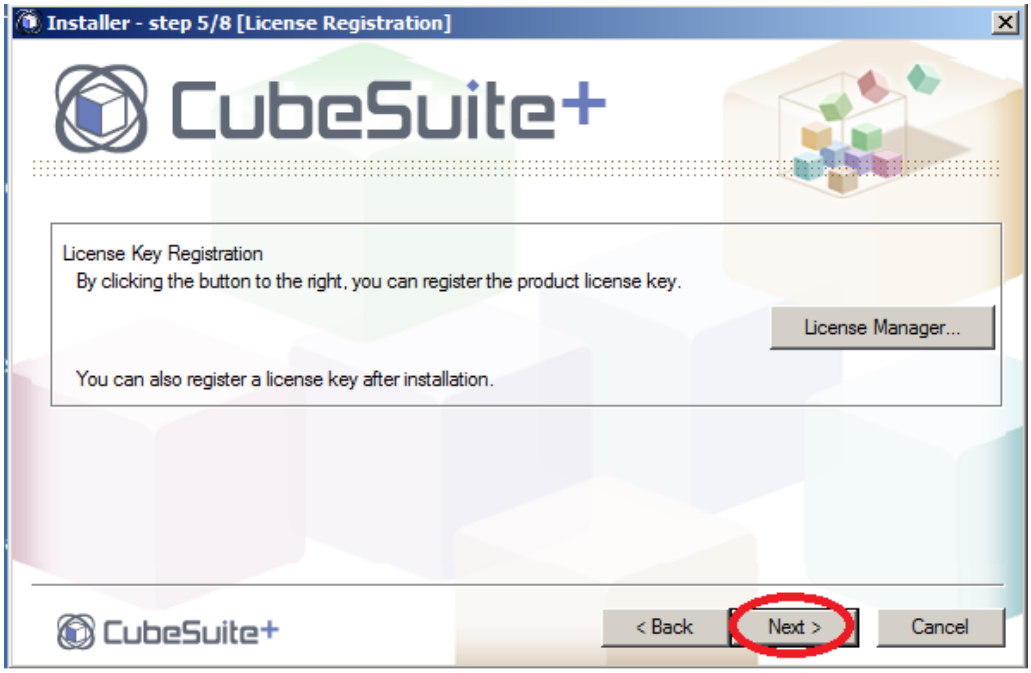

Fig. 8

Step 8: Click Next

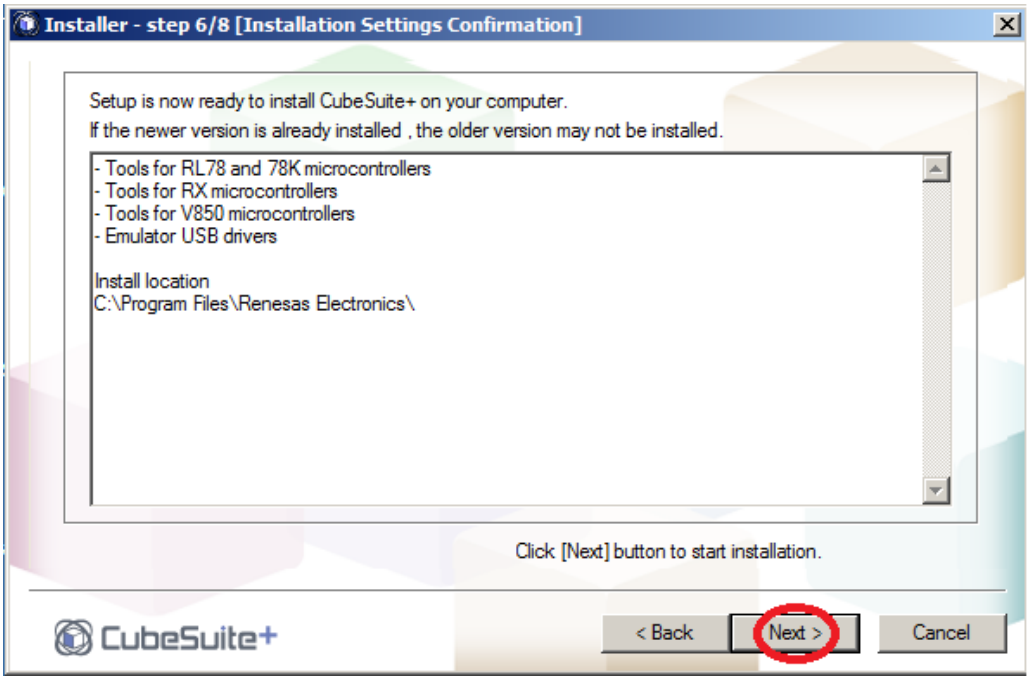

Fig. 9

Step 9: Wait to complete the installation of all the required drivers

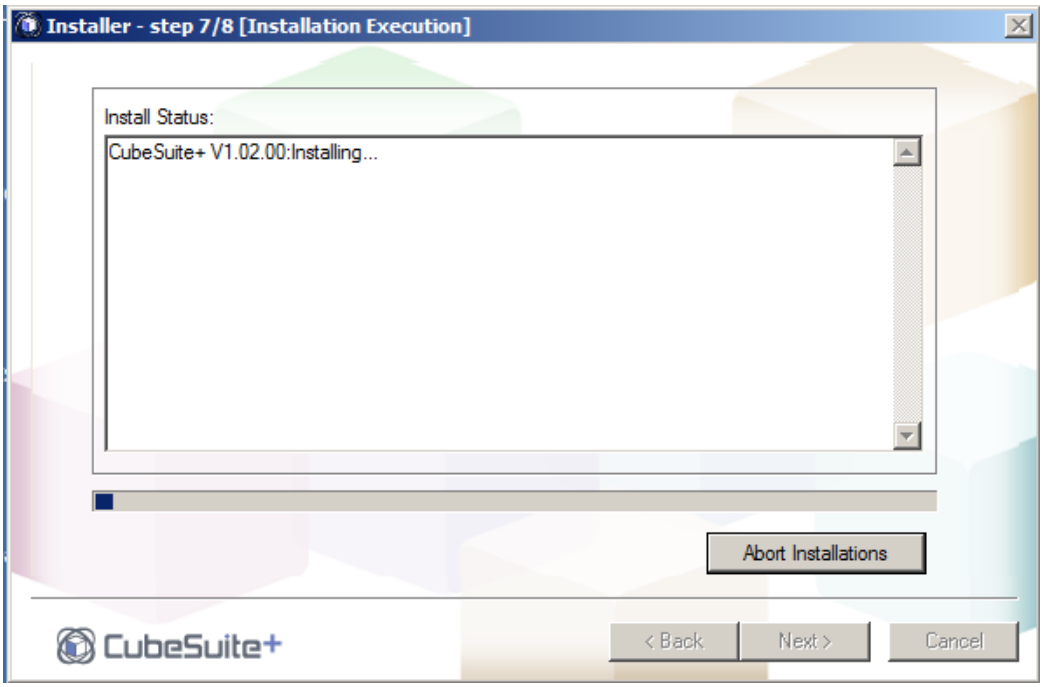

Fig. 10

Step 10: Click Next

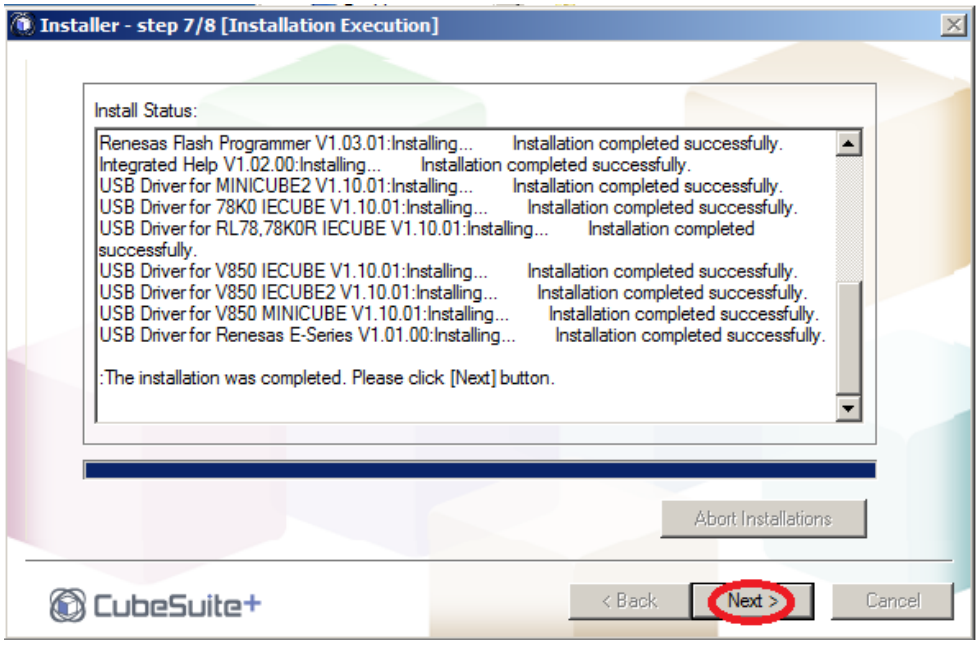

Fig. 11

Step 11: Click on Finish to complete the installation

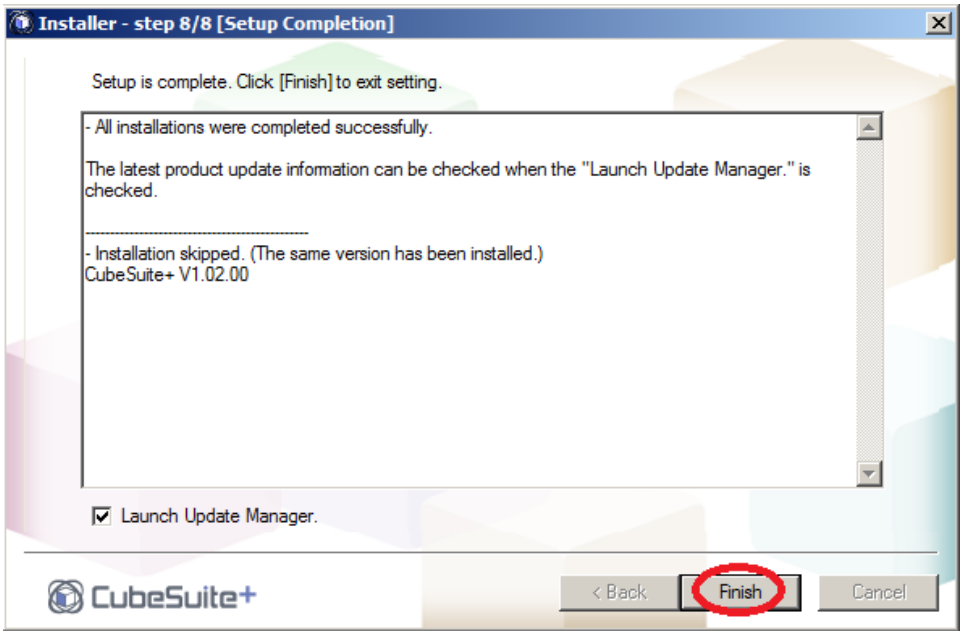

Fig. 12

2.3 Configuration of E1 Emulator

Connecting the E1 Emulator to the target board is as shown in the below image

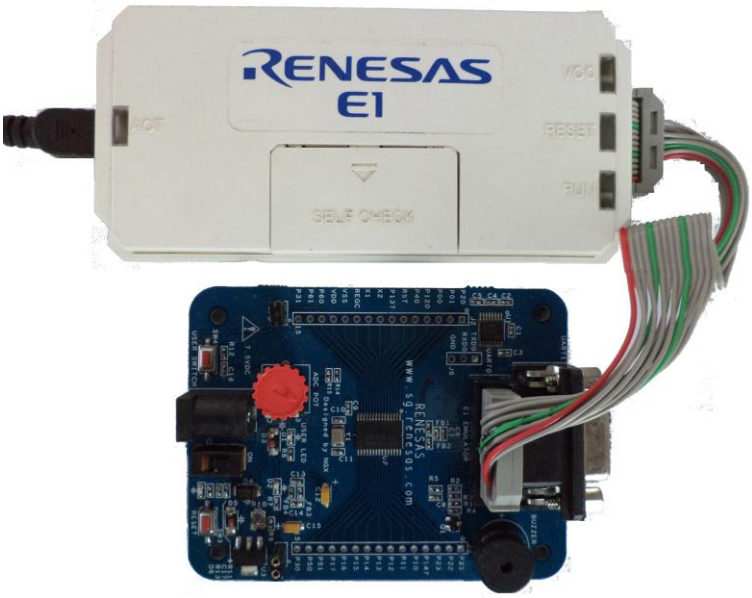

Fig.13

The configuration flow of E1 Emulator is explained below:

Step 1: Open the CubeSuite+ Workspace then right click on the Debug Tool option, click on Using Debug Tool, select RL78 E1(Serial) as shown in below image.

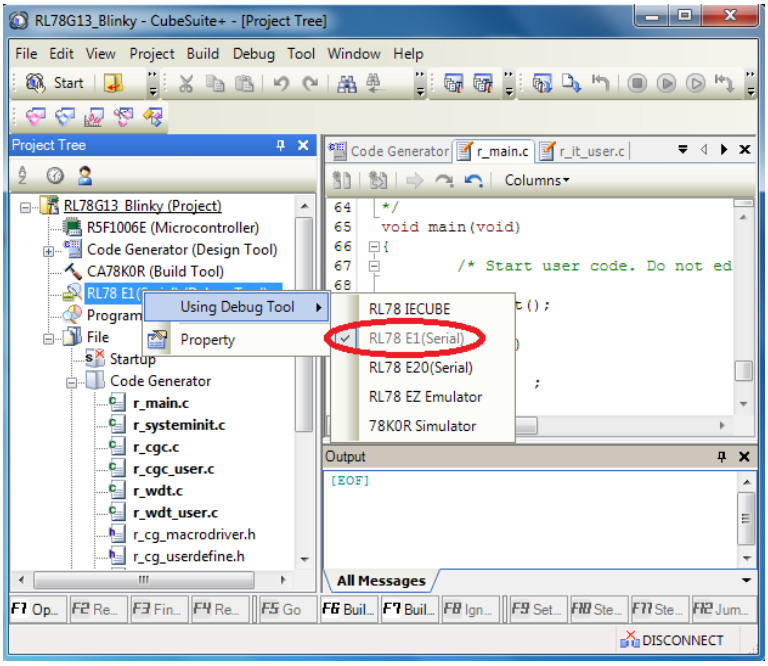

Fig.14

Step 2: Right click on Debug Tool option, click on property and set the property value as shown in below image

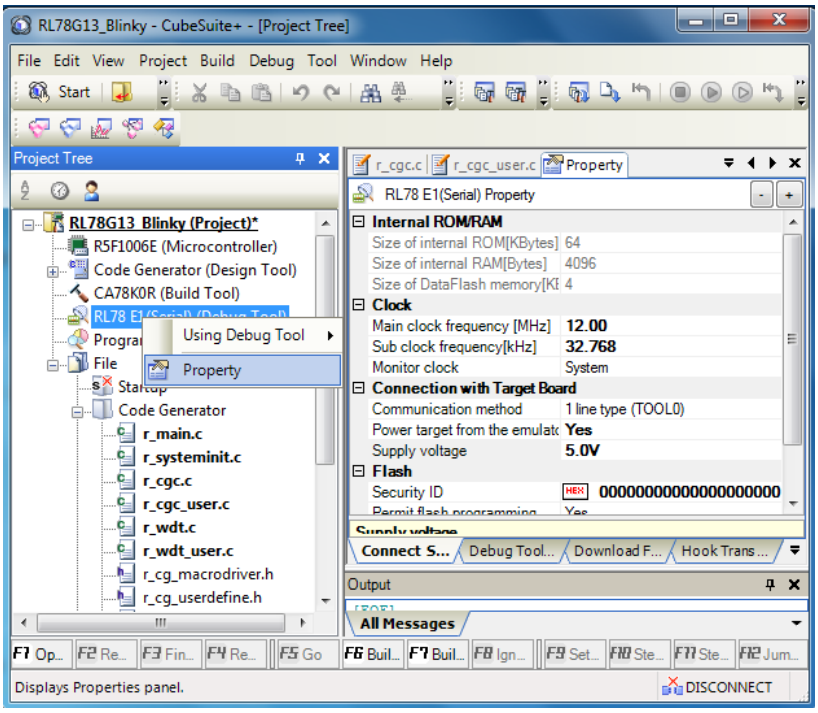

Fig.15

Note: Target Board can be powered through Emulator or External DC power supply. When you powered the board through Emulator make sure that the External power supply is not connected.

3.0 BLUEBOARD-RL78/G12/G13/G14_30pin Programming

3.1 Programming options

BLUEBOARD-RL78/G12/G13/G14_30pin can be programmed using the

- Emulator (E1 Emulator) with CubeSuite+
- E1 Emulator with Renesas Flash Programmer

Programming using Renesas Flash Programmer with E1 Emulator Please refer Renesas Flash Programmer user manual

3.2 Programming the board using E1 Emulator

Note: To programming the board using E1 Emulator, configure the E1 Emulator as shown in the section 2.3.

Step 1: Build the workspace as shown in below image

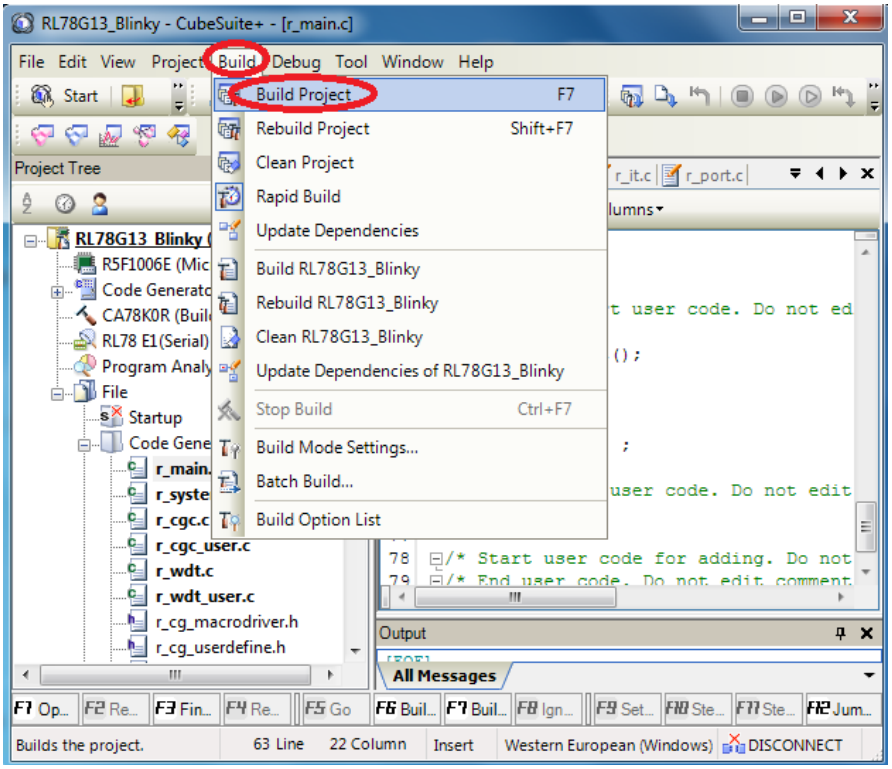

Fig. 16

Step 2: After configuring the Emulator (E1 Emulator) connect the Debug tool (E1 Emulator) to the workspace as shown in below image.

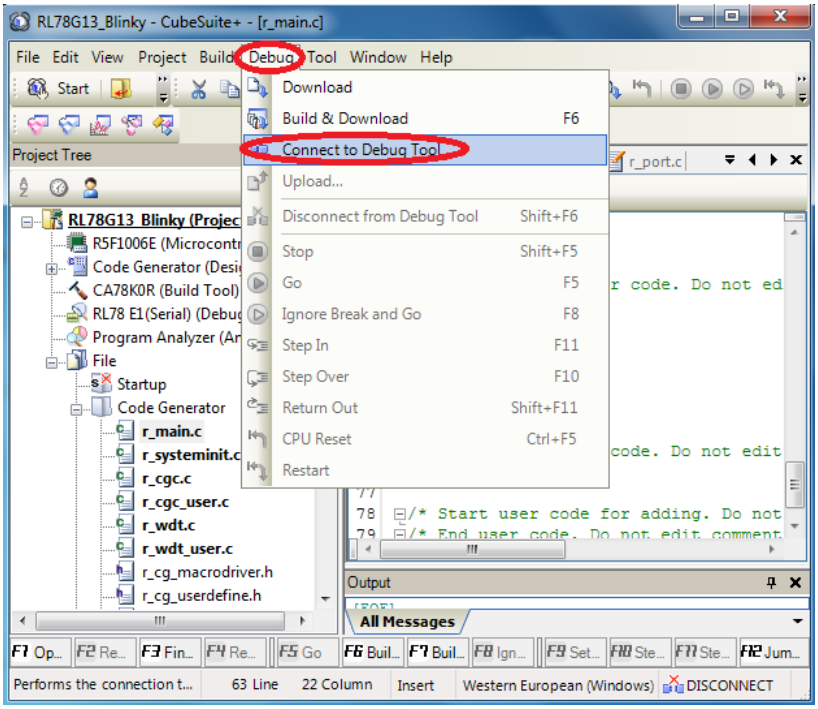

Fig. 17

Step 3: After success of the connection, click on Download to download the code into target board as shown in the below image. To run the code press F5.

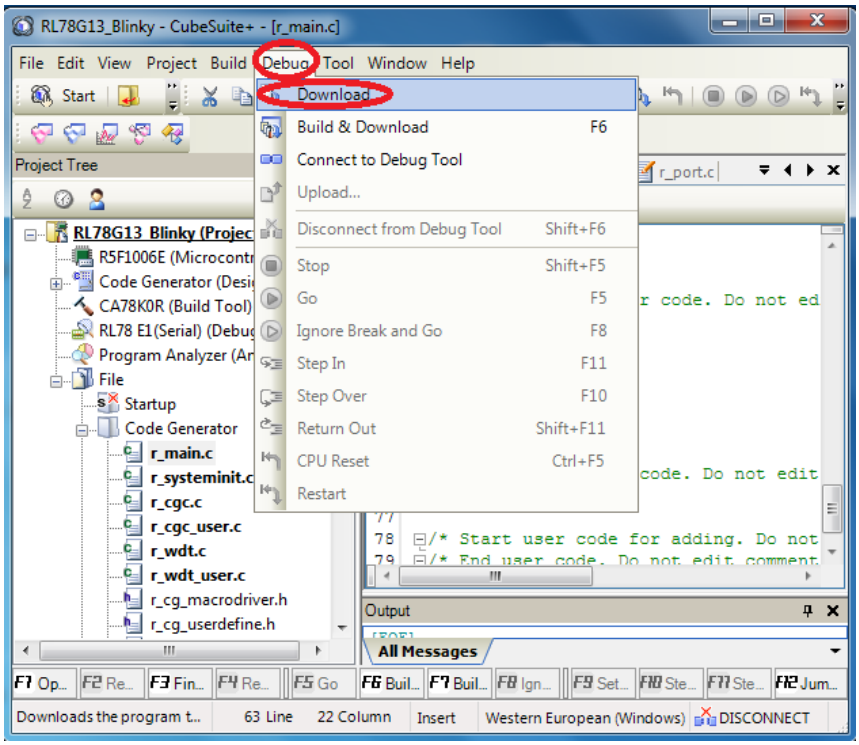

Fig. 18

4.0 BLUEBOARD-RL78/G12/G13/G14_30pin Software Development

4.1 Executing the sample projects

The sample projects are provided with the available kit.

Steps to execute the sample projects:

1. Open the project folder.
2. Then open the file project_name.mtpj eg RL78G13_Blinky.mtpj.

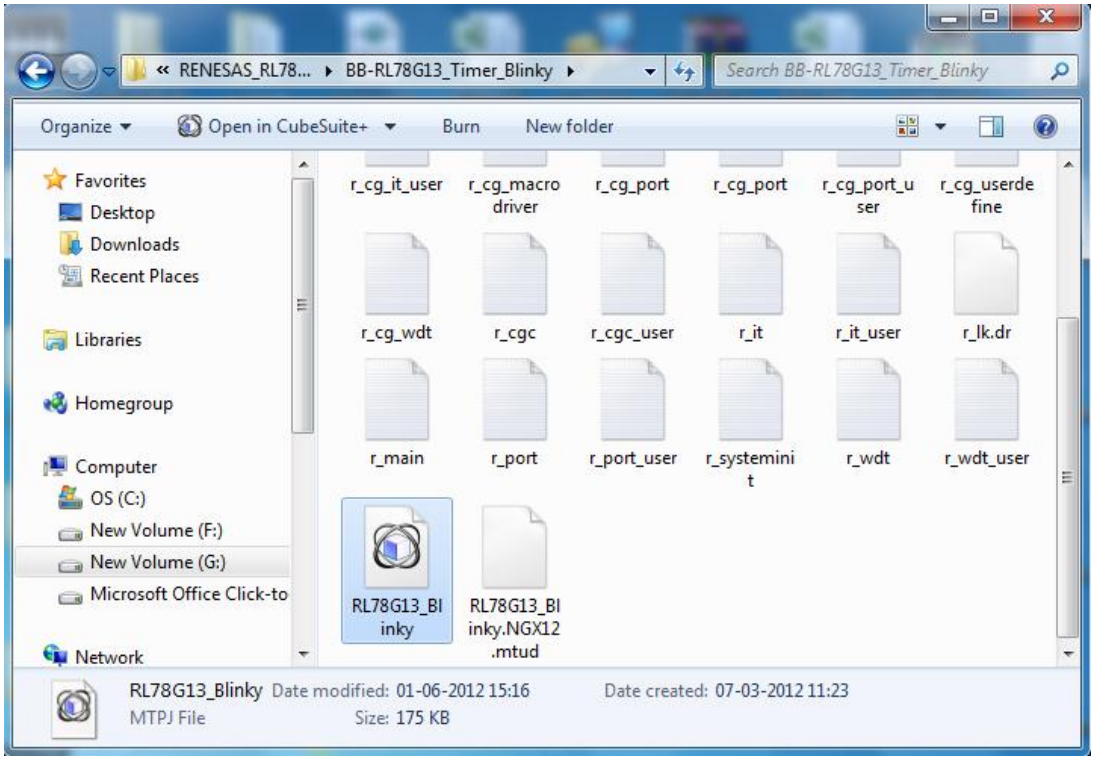

Fig. 19

3. This launches the IDE

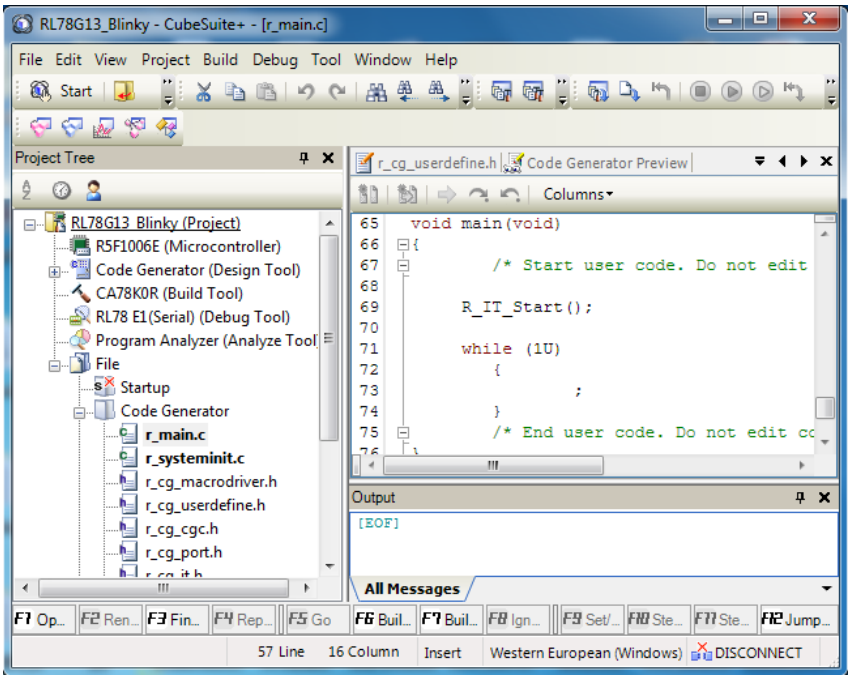

Fig. 20

4. To build and download the code using E1 emulator, follow the steps in section 3.2

4.2 Creating sample blinky project in CuibeSuite+

Follow the below steps, for creating blinky project:

Step 1: Open the CubeSuite+ IDE.

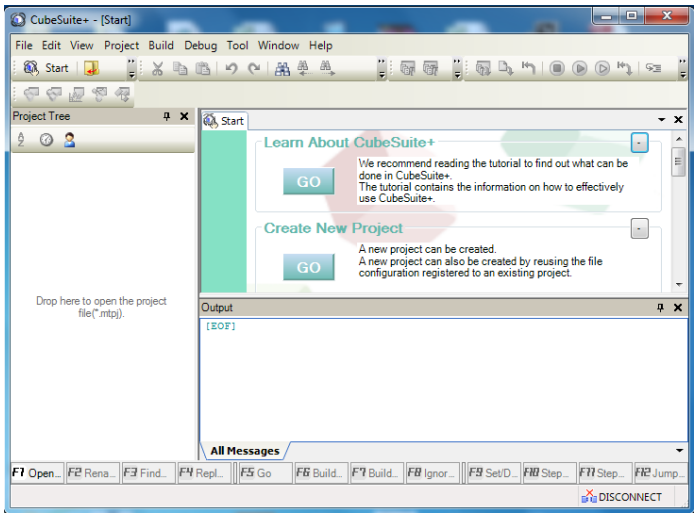

Fig. 21

Step 2: Click on to the Project tab – Create New project.

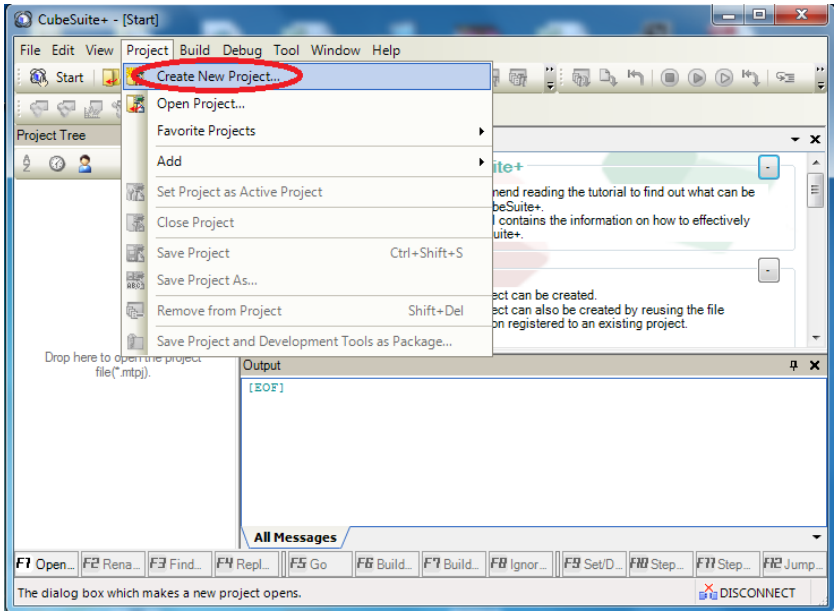

Fig. 22

Step 3: Select the controller and fill all the fields then click on Create to create new project.

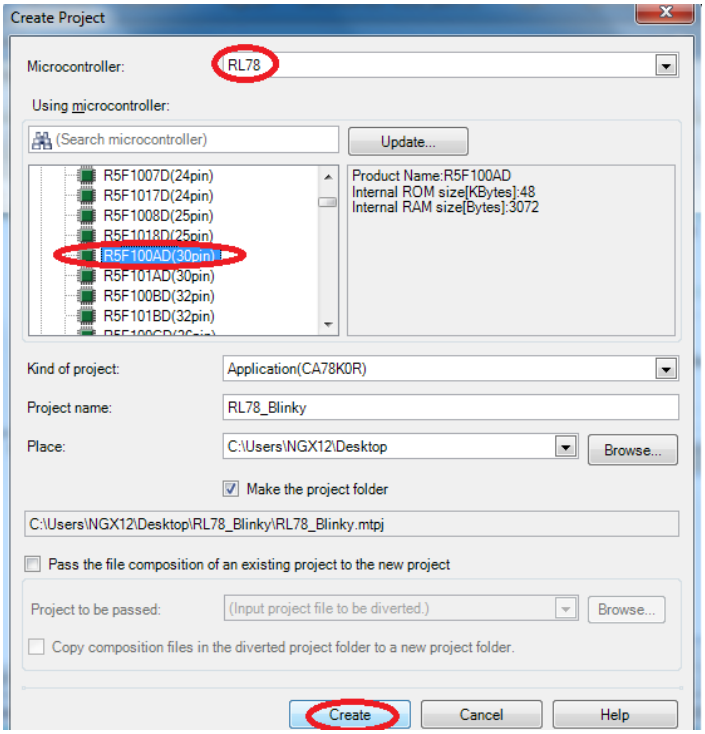

Fig. 23

Note: For BlueBoard-RL78/G12 board select R5F102AA (30pin) controller, for BlueBoard-RL78/G14 select R5F104AE (30pin) controller.

Step 4: To generate the code using code generator, first you need to generate code for clock. To generate Code for clock double click on clock generator option select the requires settings for pin assignment, clock setting, on-chip debug settings then click on Generate code option as shown in below images

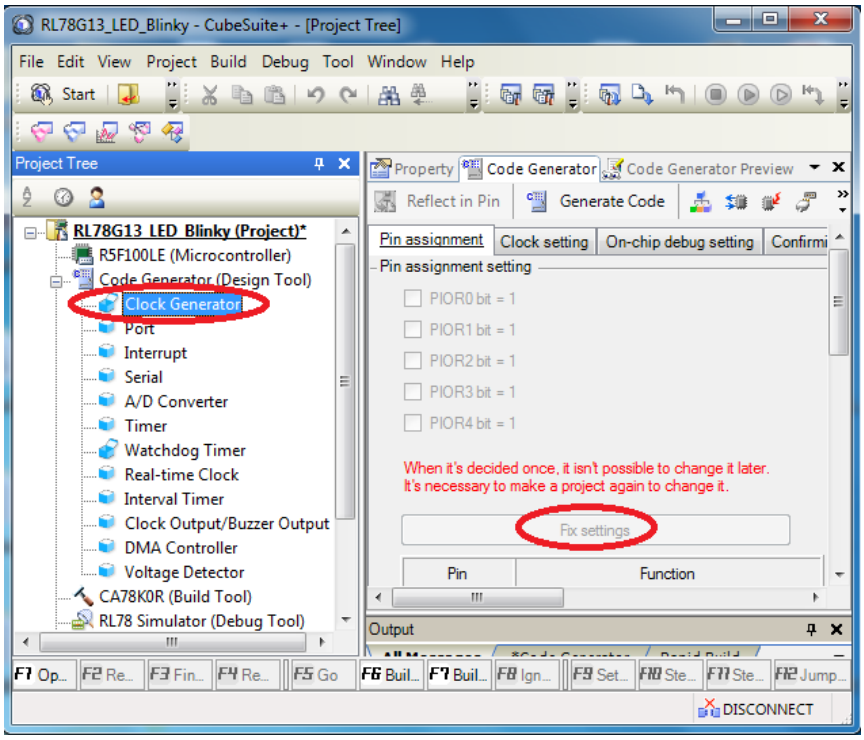

Fig. 24

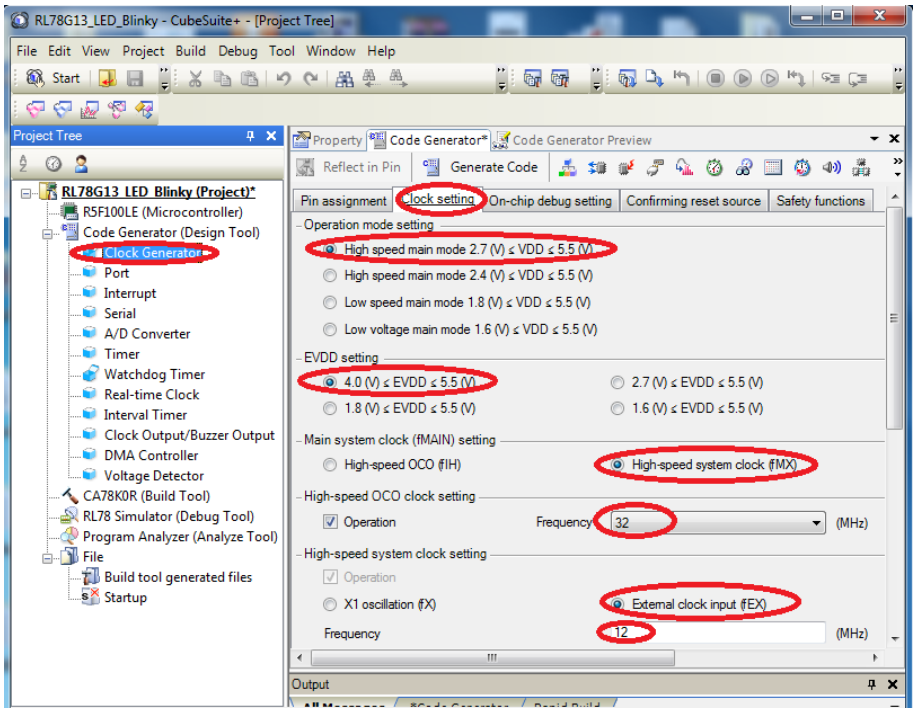

Fig. 25

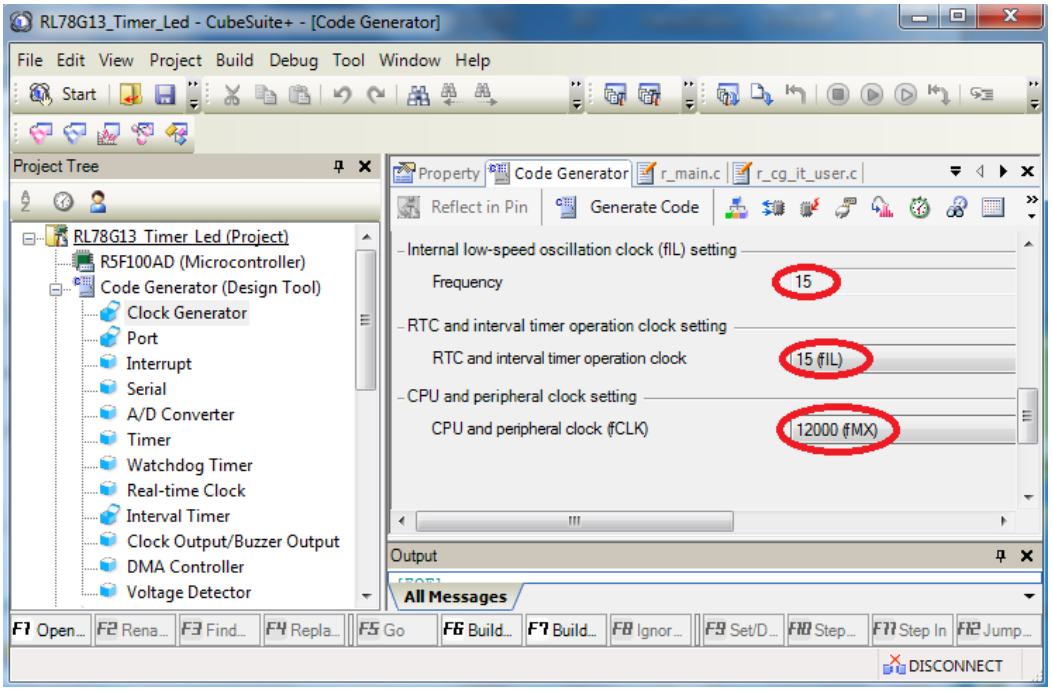
RL78G13_Timer_Led - CubeSuite+ - [Code Generator]
File Edit View Project Build Debug Tool Window Help
Start
Project Tree
RL78G13_Timer_Led (Project)
R5F100AD (Microcontroller)
Code Generator (Design Tool)
Clock Generator
Port
Interrupt
Serial
A/D Converter
Timer
Watchdog Timer
Real-time Clock
Interval Timer
Clock Output/Buzzer Output
DMA Controller
Voltage Detector
Property
Code Generator
r_main.c
r_cg_it_user.c
Reflect in Pin
Generate Code
Internal low-speed oscillation clock (fIL) setting
Frequency
15
RTC and interval timer operation clock setting
RTC and interval timer operation clock
15 (fIL)
CPU and peripheral clock setting
CPU and peripheral clock (fCLK)
12000 (fMX)
Output
All Messages
F1 Open...
F2 Rena...
F3 Find...
F4 Repla...
F5 Go
F6 Build...
F7 Build...
F8 Ignor...
F9 Set/D...
F10 Step...
F11 Step In
F12 Jump...
DISCONNECT

Fig. 26

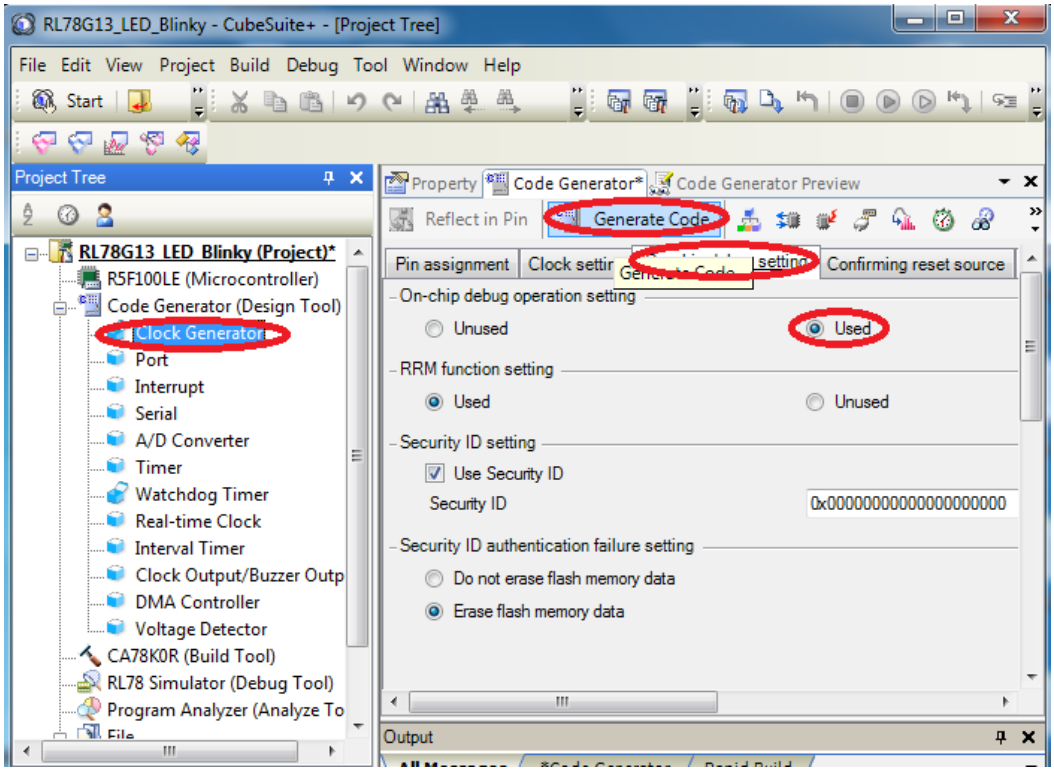
RL78G13_LED_Blinky - CubeSuite+ - [Project Tree]
File Edit View Project Build Debug Tool Window Help
Start
Project Tree
RL78G13_LED_Blinky (Project)*
R5F100LE (Microcontroller)
Code Generator (Design Tool)
Clock Generator
Port
Interrupt
Serial
A/D Converter
Timer
Watchdog Timer
Real-time Clock
Interval Timer
Clock Output/Buzzer Outp
DMA Controller
Voltage Detector
CA78K0R (Build Tool)
RL78 Simulator (Debug Tool)
Program Analyzer (Analyze To
Property
Code Generator*
Code Generator Preview
Reflect in Pin
Generate Code
Pin assignment
Clock settir
setting
Confirming reset source
On-chip debug operation setting
Unused
Used
RRM function setting
Used
Unused
Security ID setting
Use Security ID
Security ID
0x00000000000000000000
Security ID authentication failure setting
Do not erase flash memory data
Erase flash memory data
Output

Fig. 27

Step 5: Double click on Watchdog Timer; select unused then click on Generate Code as shown in below image.

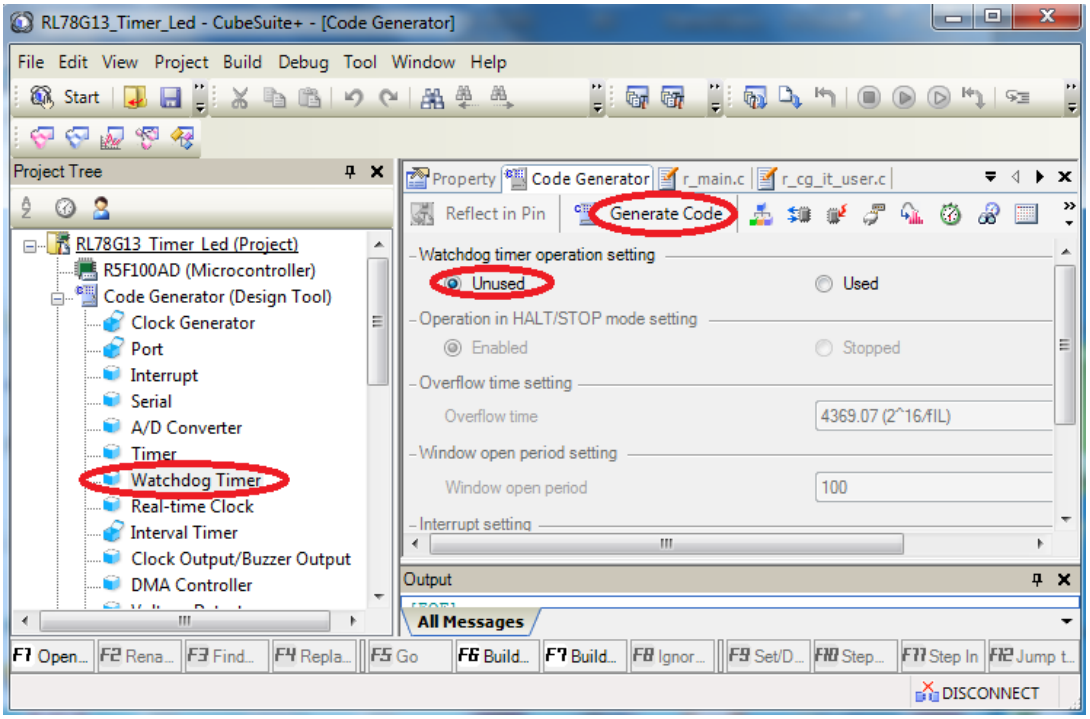

Fig. 28

Step 6: Generate the code for port and pin which is connected to user LED. On this board, the port is 1 and pin is 6. Double click on port, click on port1, select pin 6 as output and click on generate code as shown in the below image.

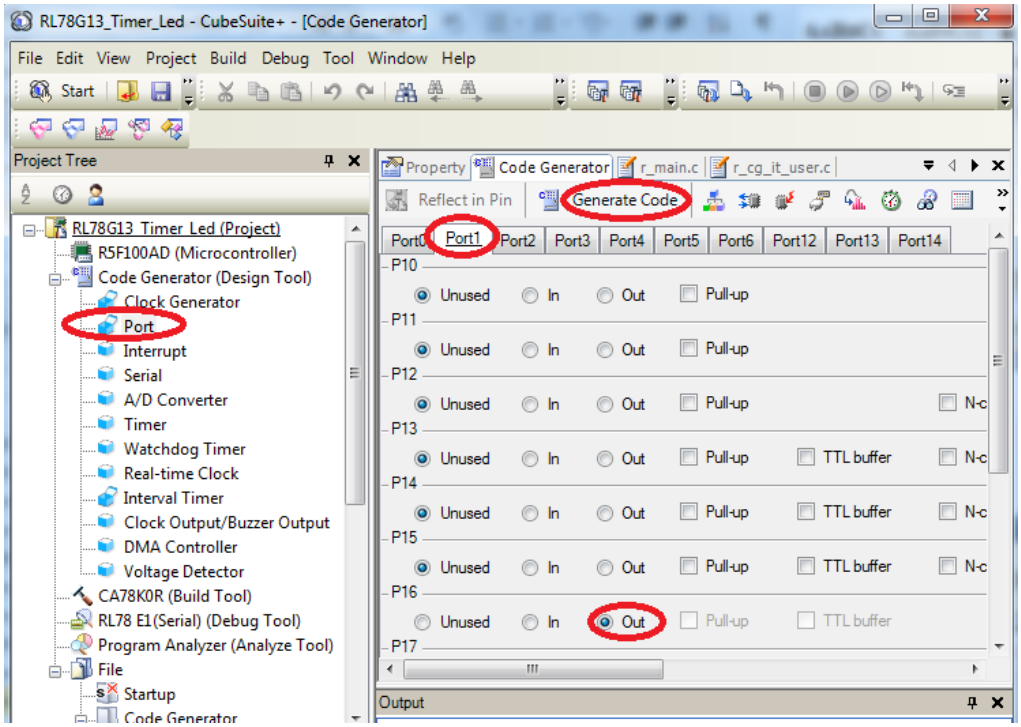

Fig. 29

Step 7: Generate the code for Interval timer as shown in the below image.

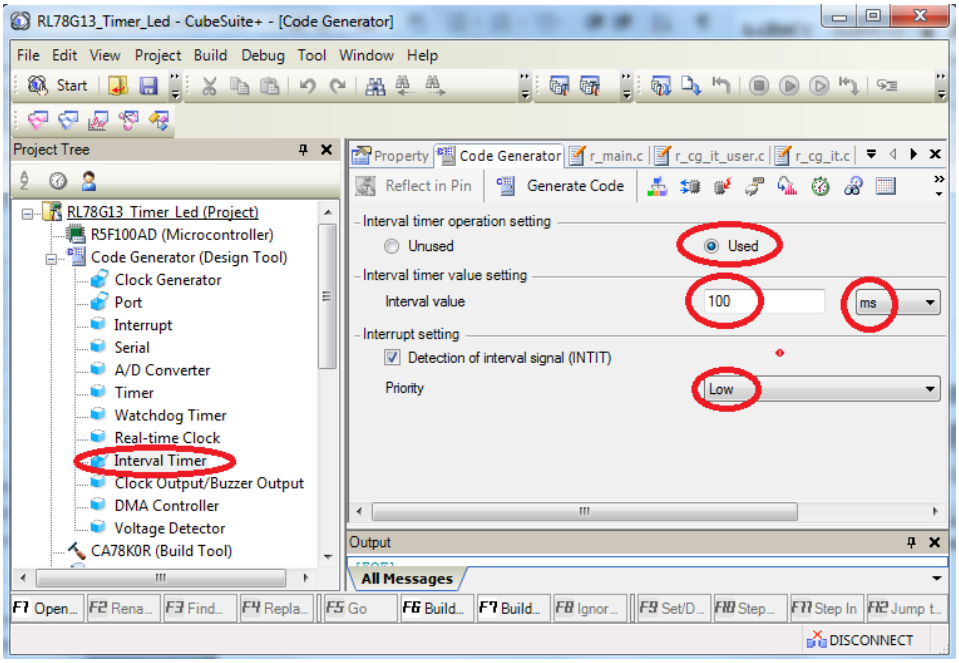

Fig. 30

Step 8: Write the blinky code in the generated code. For blinky code, refer RL78G13_Timer_Led sample program.

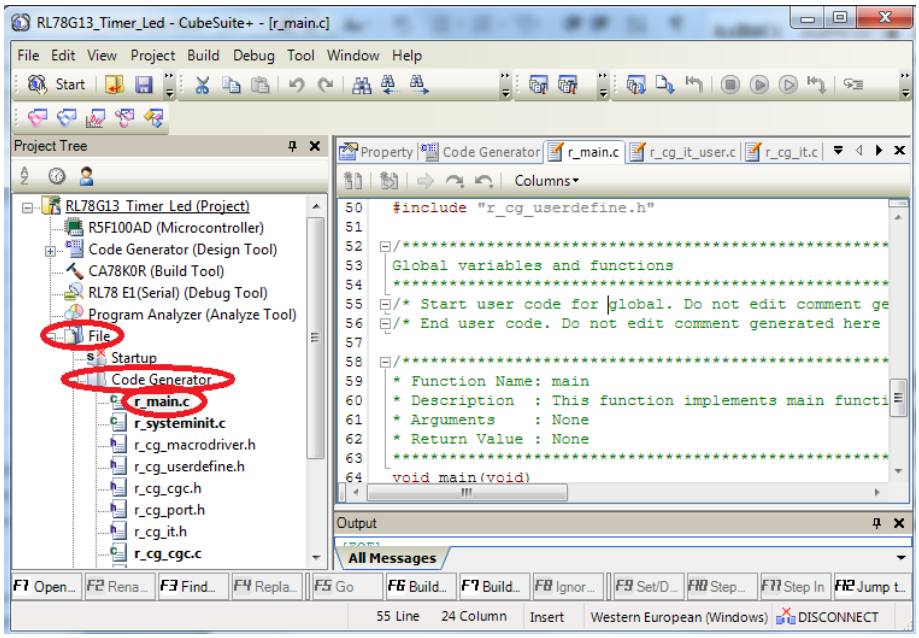

Fig. 31

Step 9: After writing the code save the code as shown in the below image.

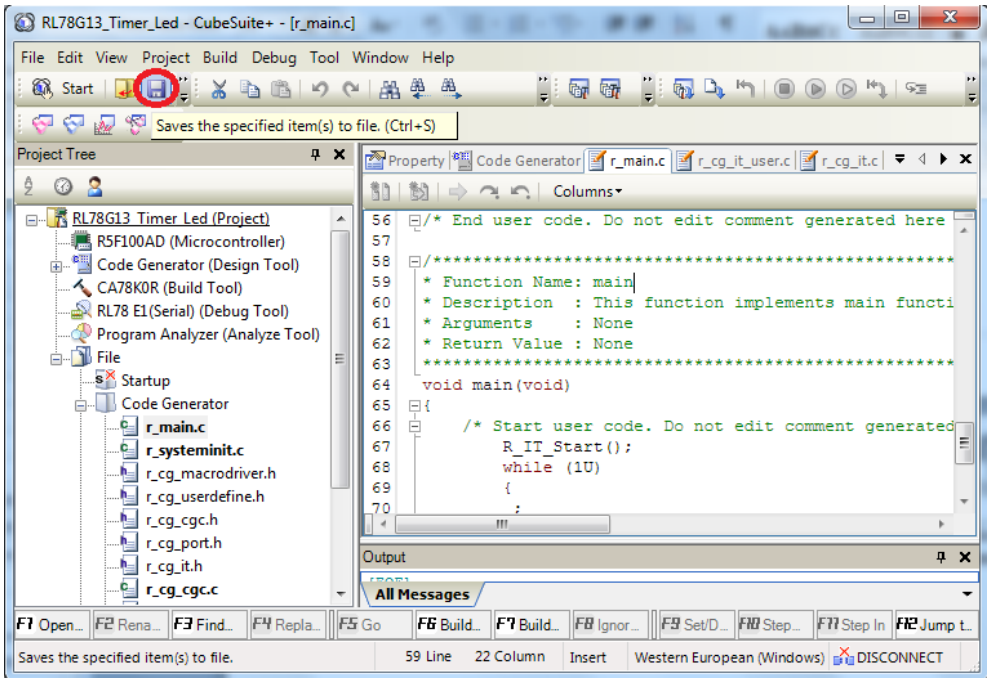

Fig. 32

Step 10: To build and download the code follow the steps in section 3.2.

5.0 Schematic & Board Layout

5.1 Schematic

This manual will be periodically updated, but for the latest documentations please check our website for the latest documents. The Board schematic and sample code are available after the product has been registered on our website.

5.2 Board layout

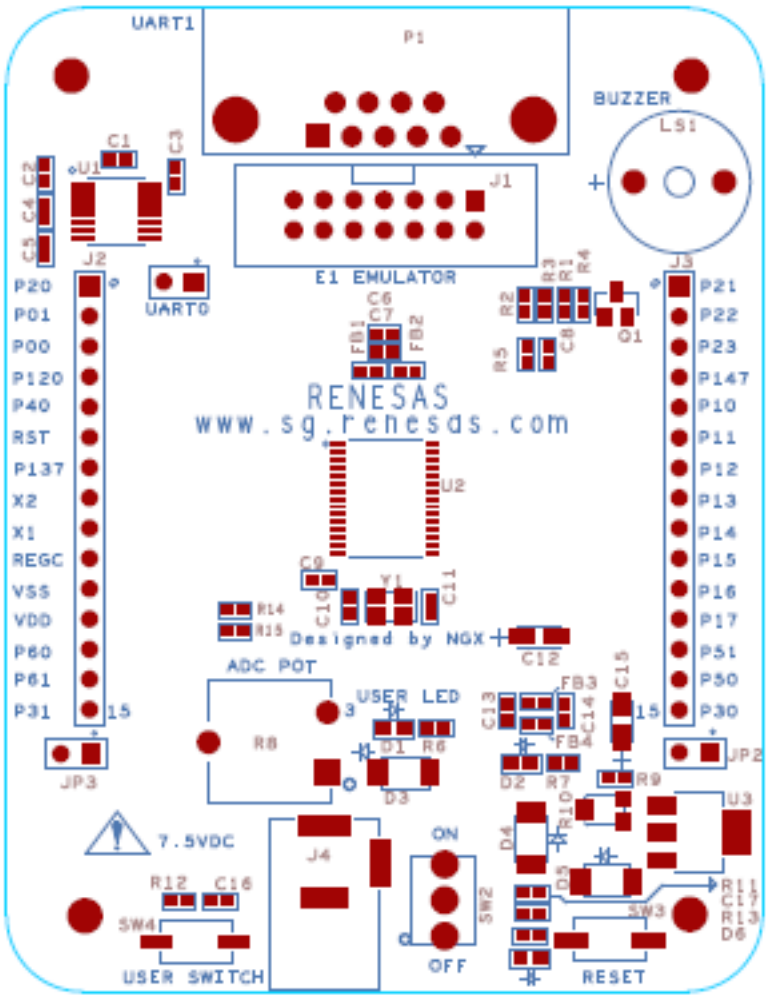

Fig. 33

6.0 CHANGE HISTORY

6.1 Change History

Rev	Changes	Date (dd/mm/yy)	By
1.0	Initial release of the manual	28/05/2012	Veeresh Tumbaragi

7.0 REFERENCES

In addition to this document, the following references are included on the NGX BLUEBOARD-RL78/G12/G13/G14_30pin product and can also be downloaded from www.ngxtechnologies.com:

- NGX BLUEBOARD-RL78/G12/G13/G14_30pin schematic for the Development board.

Additional references include:

- Information on development tool being used:
  - CubeSuite+, http://sg.renesas.com/products/tools/ide/ide_cubesuite_plus/

About this document:

Revision History

Version: V1.0 author: Veeresh Tumbaragi

Company Terms & Conditions

Legal

NGX Technologies Pvt. Ltd. provides the enclosed product(s) under the following conditions:
This evaluation board/kit is intended for use for ENGINEERING DEVELOPMENT, DEMONSTRATION, and EDUCATION OR EVALUATION PURPOSES ONLY and is not considered by NGX Technologies Pvt. Ltd to be a finished end-product fit for general consumer use. Persons handling the product(s) must have electronics training and observe good engineering practice standards. As such, the goods being provided are not intended to be complete in terms of required design-, marketing-, and/or manufacturing-related protective considerations, including product safety and environmental measures typically found in end products that incorporate such semiconductor components or circuit boards. This evaluation board/kit does not fall within the scope of the European Union directives regarding electromagnetic compatibility, restricted substances (RoHS), recycling (WEEE), FCC, CE or UL and therefore may not meet the technical requirements of these directives or other related directives.

The user assumes all responsibility and liability for proper and safe handling of the goods. Further, the user indemnifies NGX Technologies from all claims arising from the handling or use of the goods. Due to the open construction of the product, it is the user's responsibility to take any and all appropriate precautions with regard to electrostatic discharge.

EXCEPT TO THE EXTENT OF THE INDEMNITY SET FORTH ABOVE, NEITHER PARTY SHALL BE LIABLE TO THE OTHER FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.

NGX Technologies currently deals with a variety of customers for products, and therefore our arrangement with the user is not exclusive. NGX Technologies assumes no liability for applications assistance, customer product design, software performance, or infringement of patents or services described herein.

Please read the User's Guide and, specifically, the Warnings and Restrictions notice in the User's Guide prior to handling the product. This notice contains important safety information about temperatures and voltages.

No license is granted under any patent right or other intellectual property right of NGX Technologies covering or relating to any machine, process, or combination in which such NGX Technologies products or services might be or are used.

Disclaimers

Information in this document is believed to be reliable and accurate. However, NGX Technologies does not give any representations or warranties, expressed or implied, as to the completeness or accuracy of such information and shall have no liability for the consequences of use of such information.
NGX Technologies reserves the right to make changes to information published in this document, at any time and without notice, including without limitation specifications and product descriptions. This document replaces and supersedes all information supplied prior to the publication hereof.

Trademarks

All referenced trademarks, product names, brands and service names are the property of their respective owners.