BlueBoard-RX62N-H

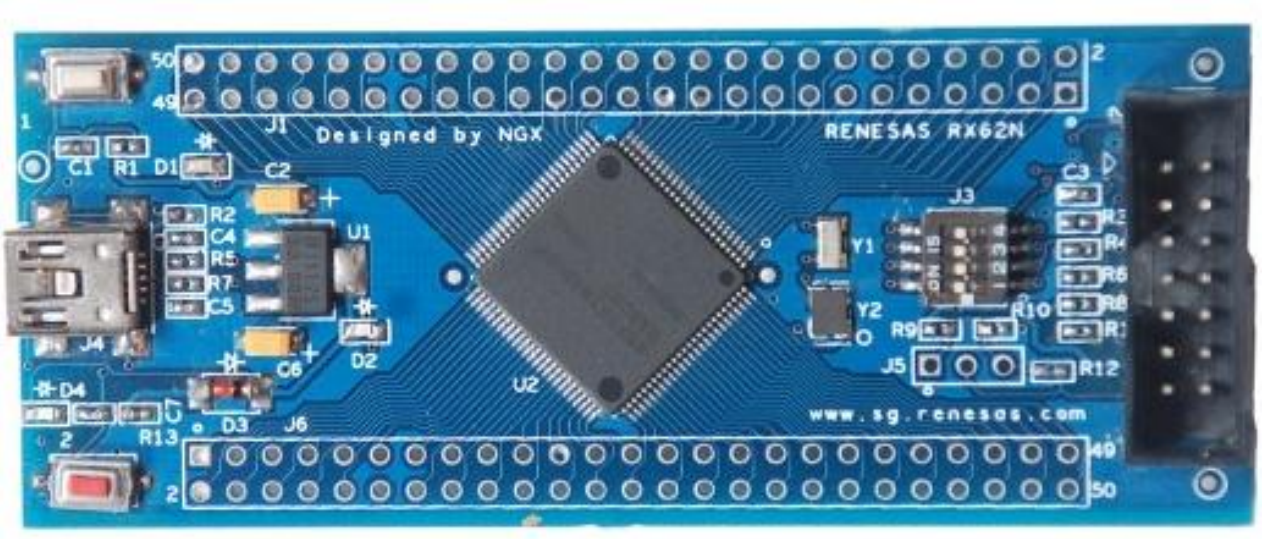

Fig. 1

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-RX62N-H; a cost effective evaluation platform for RENESAS's RX62N 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-RX62N-H features and hardware verification.

For BB-RX62N-H quick start guide: Click here.

2.0 BB-RX62N- H BOARD 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

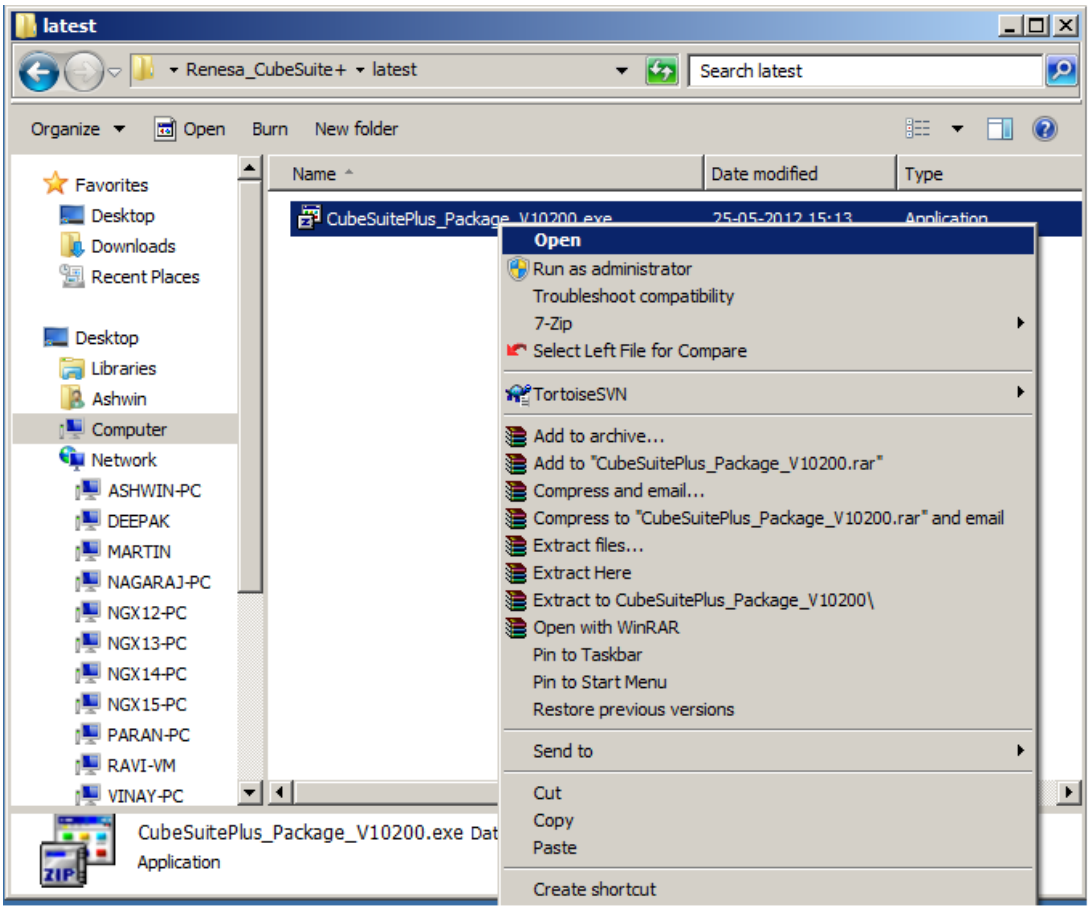

Fig. 2

Step 2: Click on Run

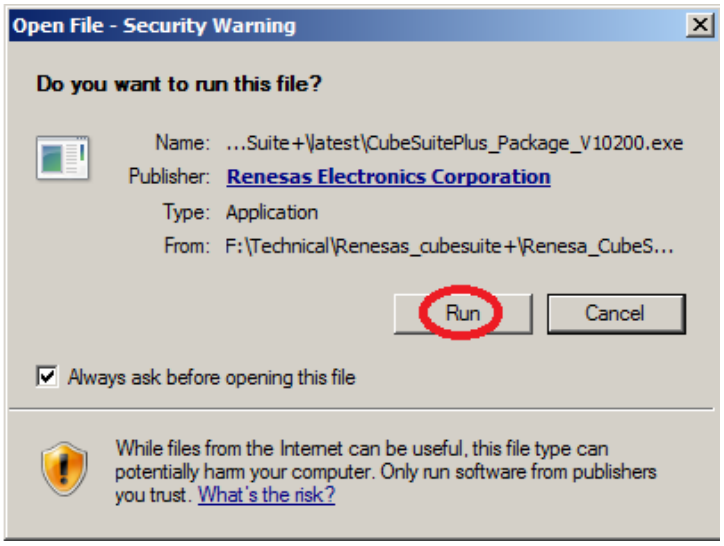

Fig. 3

Step 3: Click on Begin CubeSuite+ Setup

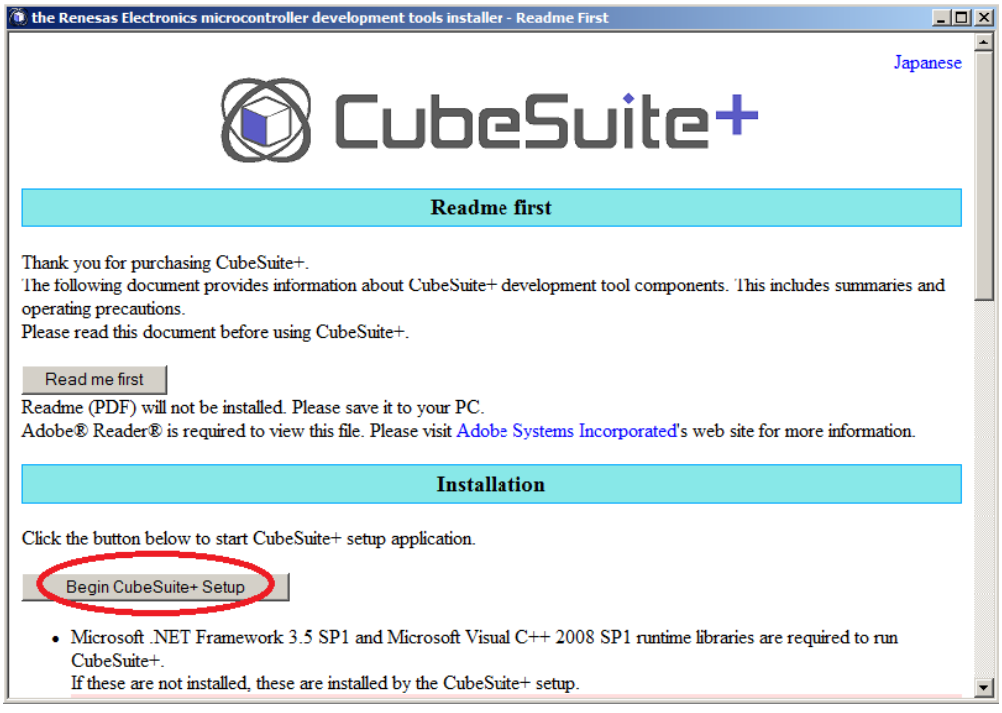

Fig. 4

Step 4: Click on Next

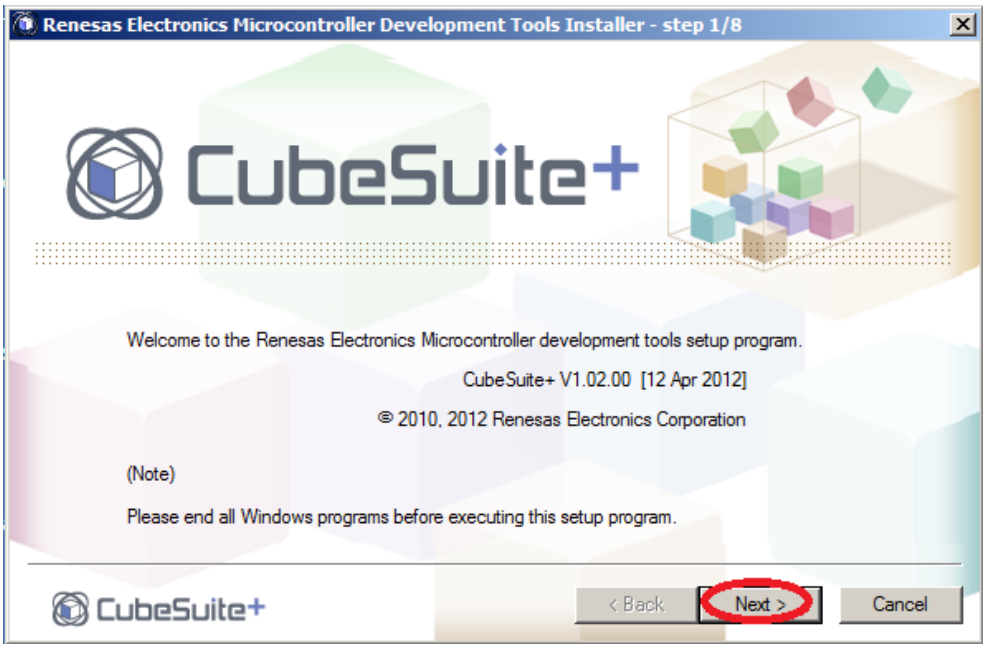

Fig. 5

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

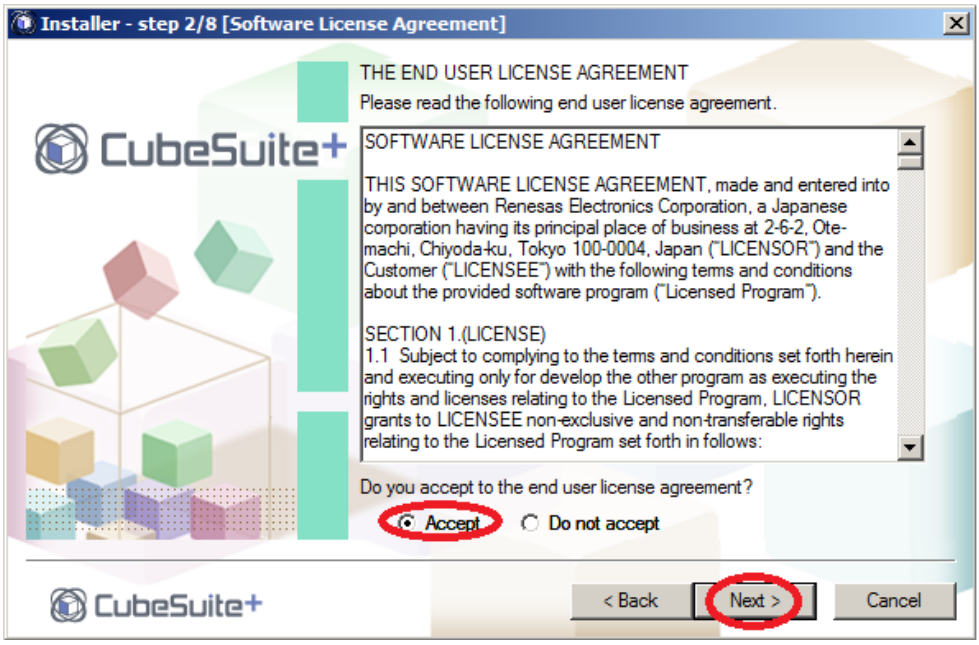

Fig. 6

Step 6: Click Next

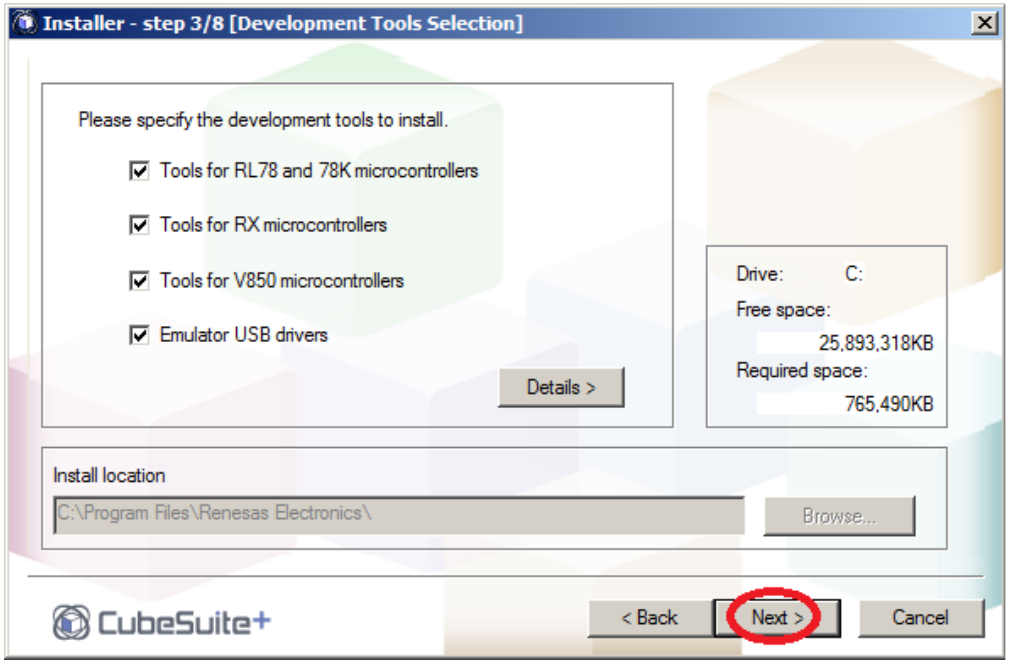

Fig. 7

Step 7: Click Next

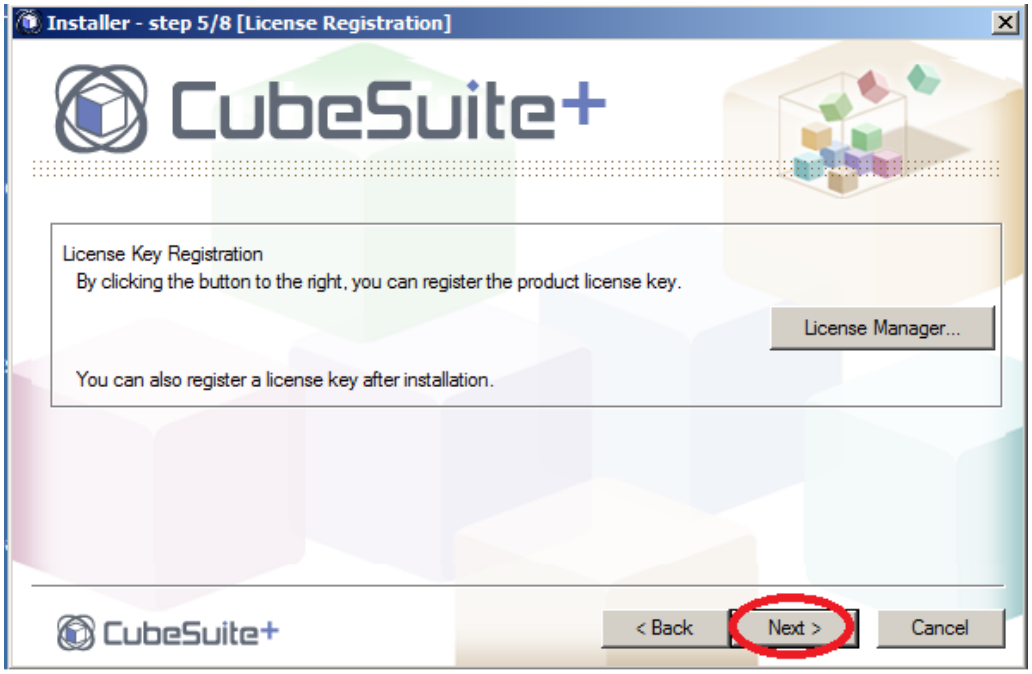

Fig. 8

Step 8: Click Next

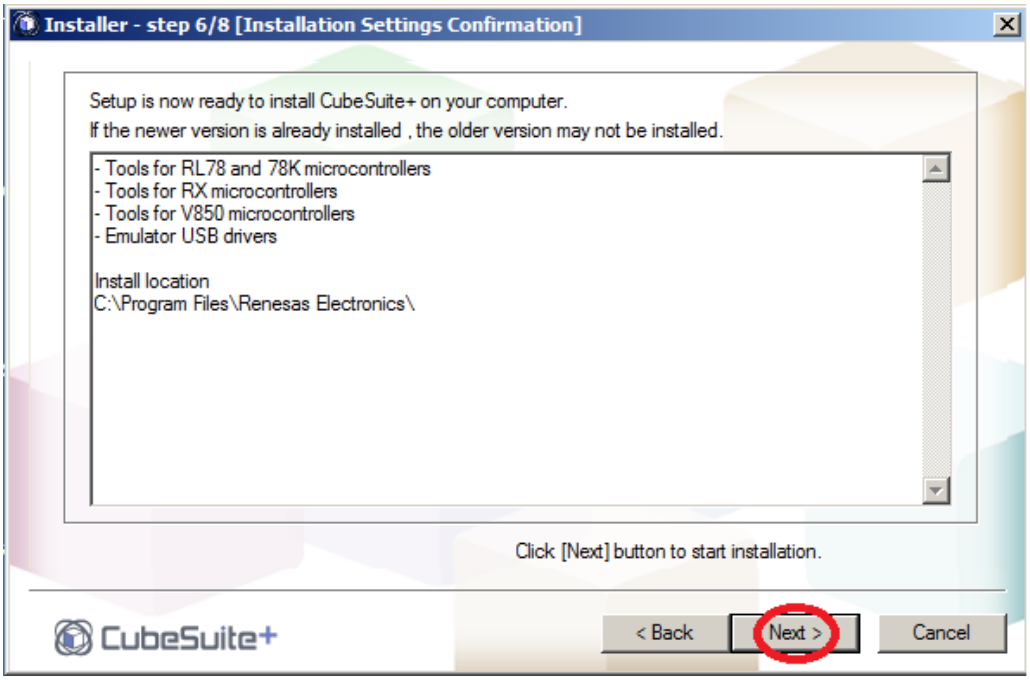

Fig. 9

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

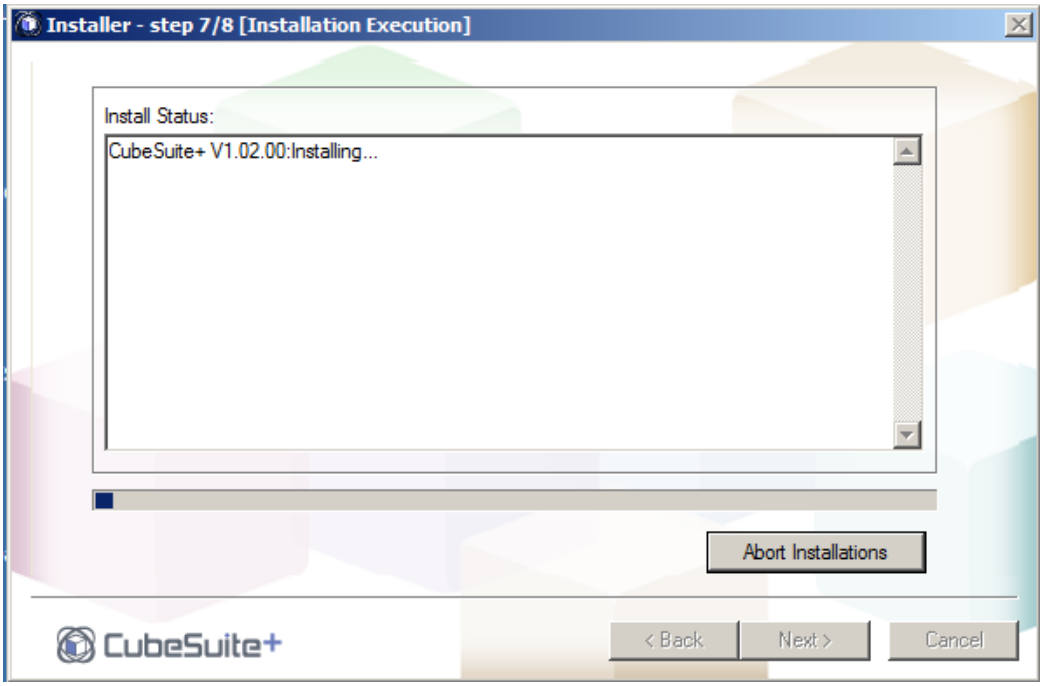

Fig. 10

Step 10: Click Next

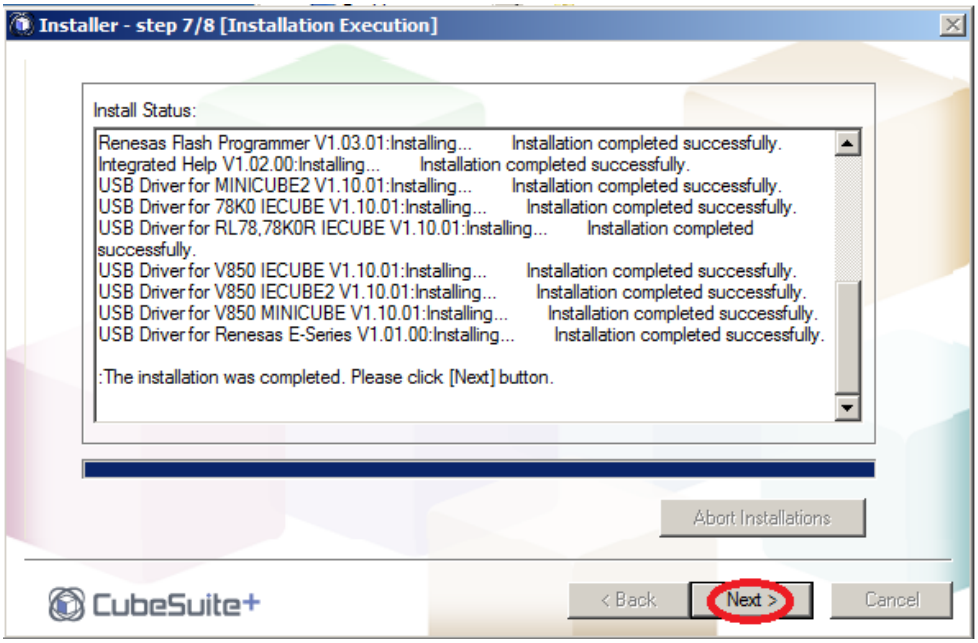

Fig. 11

Step 11: Click on Finish to complete the installation

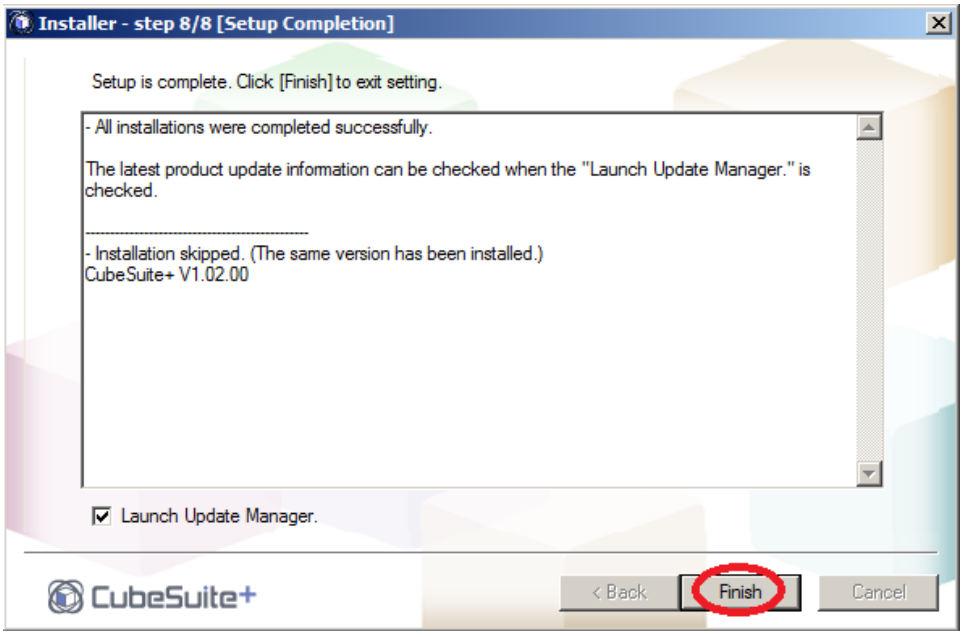

Fig. 12

2.3 Configuration of E1 Emulator

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

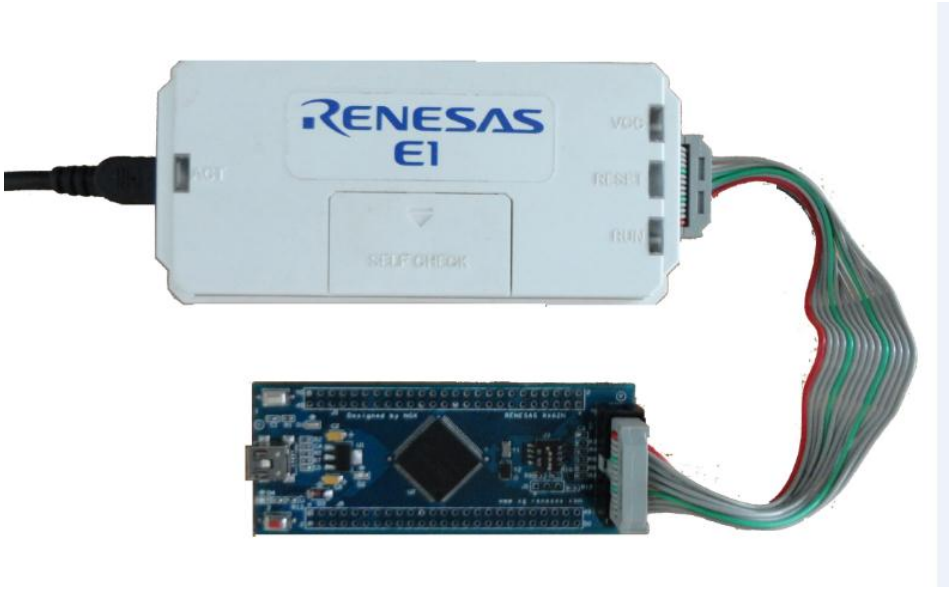

Fig.13

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 RX E1(JTAG) as shown in below image.

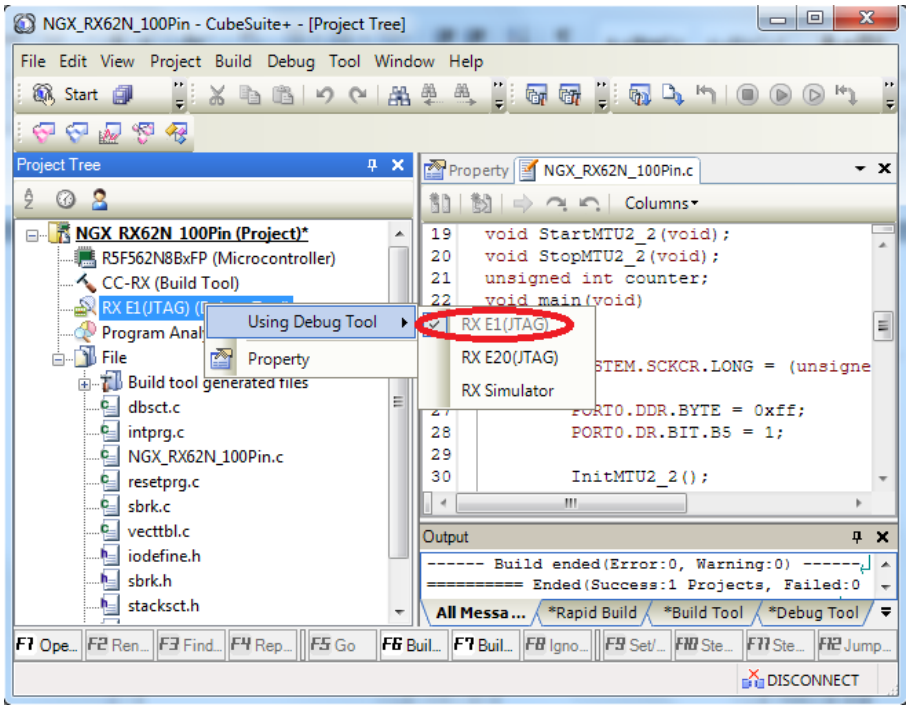

Fig.14

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

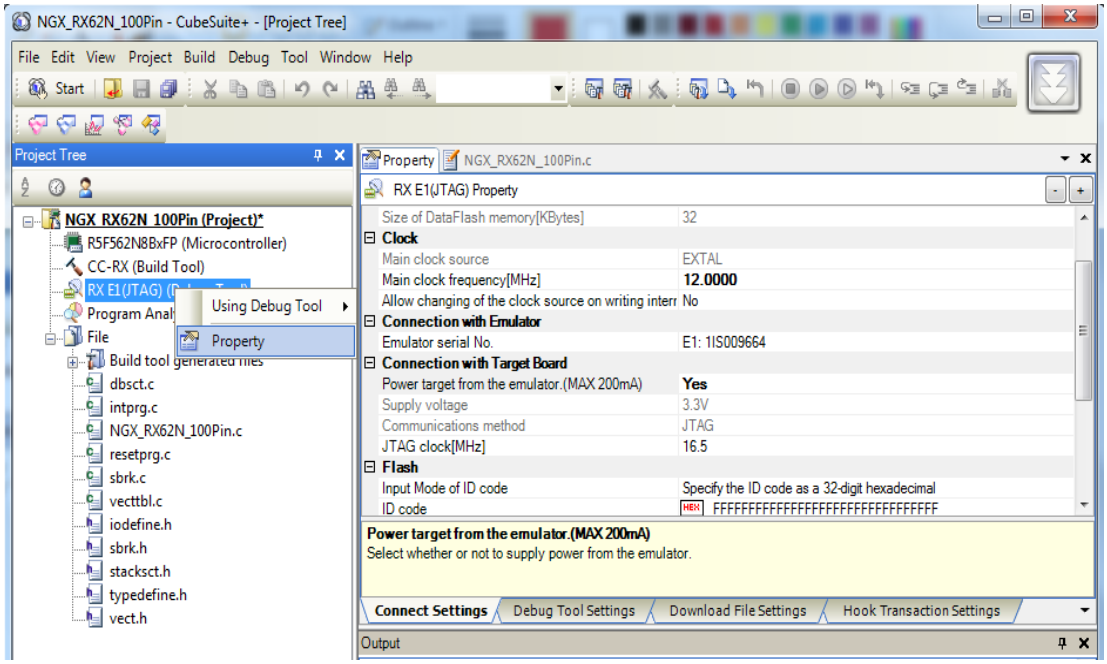

Fig.15

Note: Target Board can be powered through Emulator or USB. When you powered the board through Emulator make sure that the USB is not connected. When you powered the board through USB select the Power target from emulator property value as No.

3.0 BB-RX62N- H BOARD Programming

3.1 Programming options

BB-RX62N- H BOARD can be programmed using the

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

  For programming using E1 Emulator with Renesas Flash Programmer, refer Renesas Flash Programmer user manual

3.1.1 USB bootloader

The Bootloader enables the user to manage the erasing & programming of the RX62N FLASH memory, and the execution of any downloaded application.
This is achieved by a basic 5 option menu that can be viewed in a terminal emulator program, such as HyperTerminal.
The USB Function peripheral is used and is configured as CDC Class, thus making the USB Function peripheral appear as a COM port on a PC.
Please note that you will have to provide the CDC inf file for the PC, the first time the application is run.
** This is provided in the source code at the following location
.. \USB_Bootloader\USB_Bootloader\Host\Driver\ **

The basic operation of the Bootloader is detailed by the flow diagram in below figure.

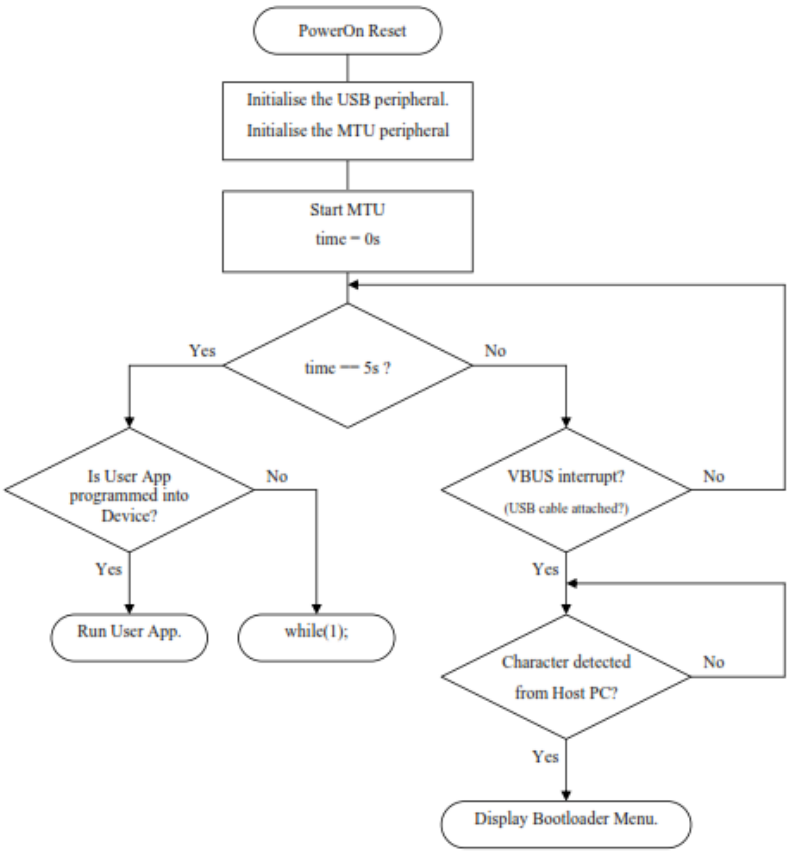

Fig.16

3.1.2 Flashing the board using USB

First load the Bootloader program using Emulator, Set the Boot mode select switch (J3) to 1100, If a USB cable is connected to the RSK within 5 seconds of Power-On, the RX62N will enumerate with the PC, configure the USB Function peripheral as a CDC Class device and then wait for a character to be received on the USB Com port.

Open the hyper terminal as shown in the below image.

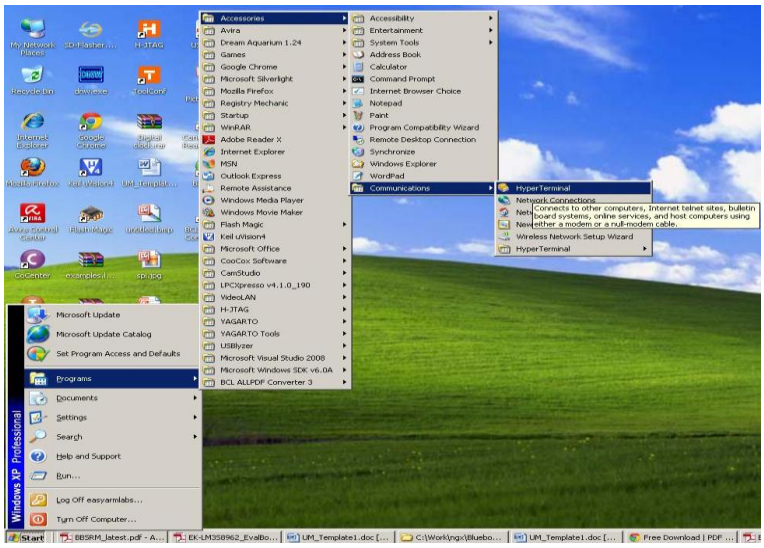

Fig.17

A ‘Connect To’ window opens where you have to select the COM port. In this example it is COM27. Click OK. A ‘COM27 Properties’ window appears. Set the values as shown below. Click OK.

Note: Please check for your machines COM port number. The COM port number can be different.

Fig. 18

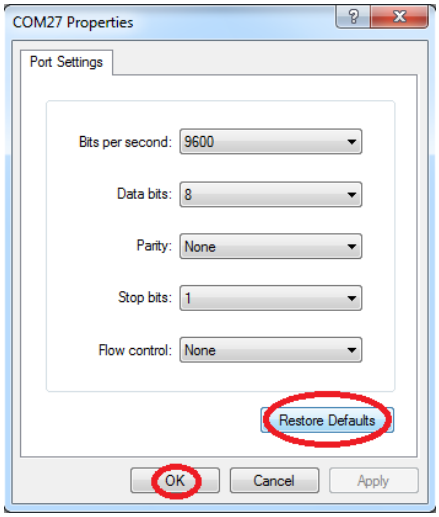

Fig. 19

Hyper Terminal window opens, press any key to display boot menu, when this is received it will display the menu as shown in below figure.

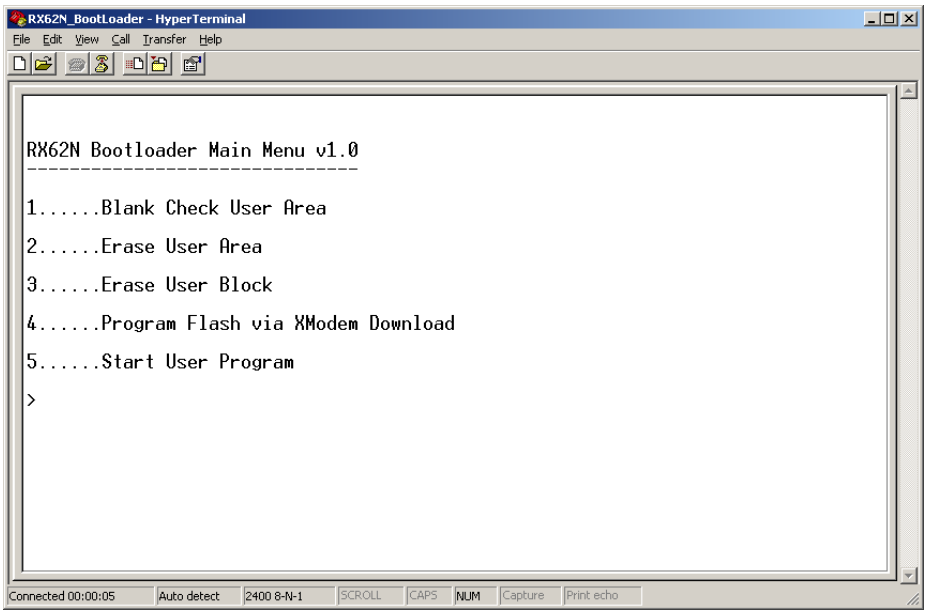

Fig. 20

3.1.2.1 Menu Explanation

1. . . . . Blank Check User Area
Reports back the status of the User Area

2 . . . . . Erase User Area
Erases the entire User Area

3. . . . . Erase User Block
Allows the User to erase a specific block

4. . . . . Program Flash via XModem Download
Transfer the binary image file of the User Application to the RX62N and program the FLASH memory.

5. . . . . Start User Program
Allows the User to start execution of the User Application, if code is detected in the User Area

3.1.2.2 Transferring a file in Hyperterminal via XModem Protocol

For Bootloader menu options 1, 2, 3 & 5, the User only need to enter data via the keyboard responses. Bootloader menu option 4 requires data from the keyboard and then for data to be transmitted via the XModem protocol.

When using Hyperterminal, this is achieved by the Transfer menu option.

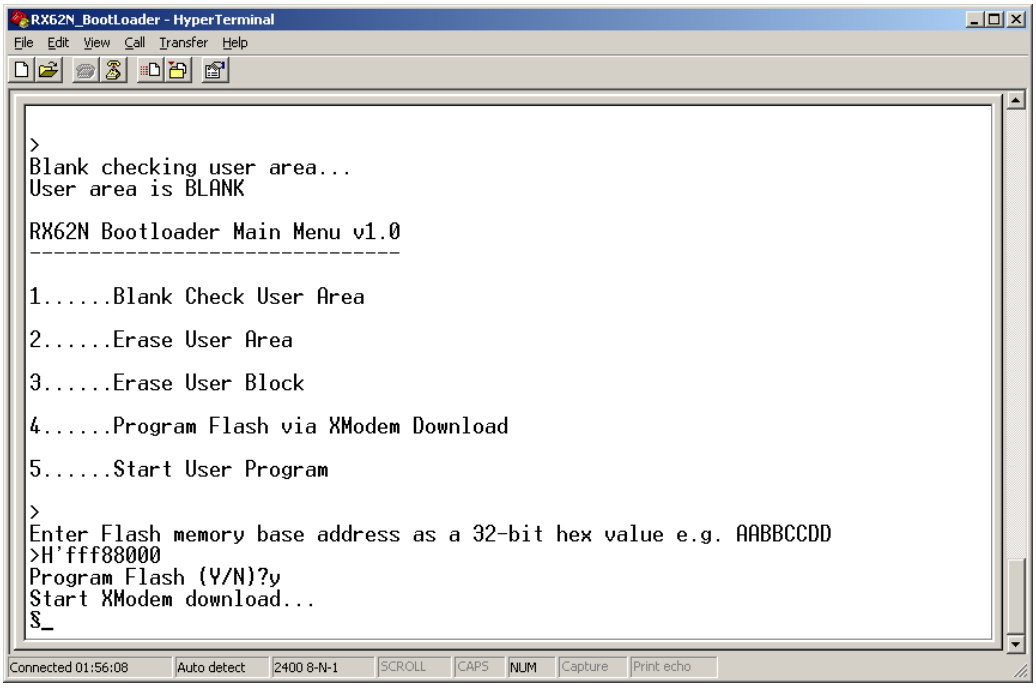

Fig. 21

When Option 4 is entered, the User will be prompted to enter the address to program code to, followed by a prompt to confirm the programming process.

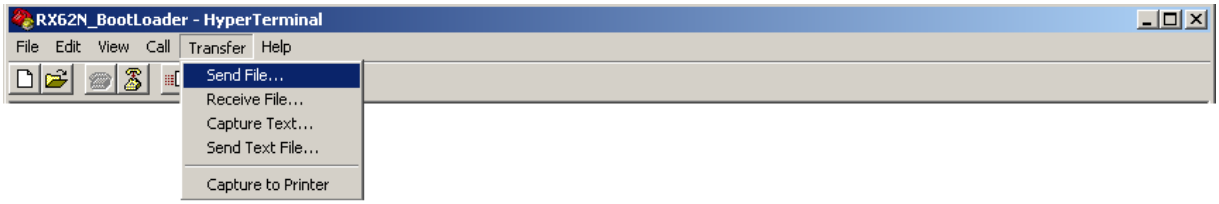

Fig. 22

When "Start XModem Download…" is displayed, select "Send File" from the "Transfer" menu option

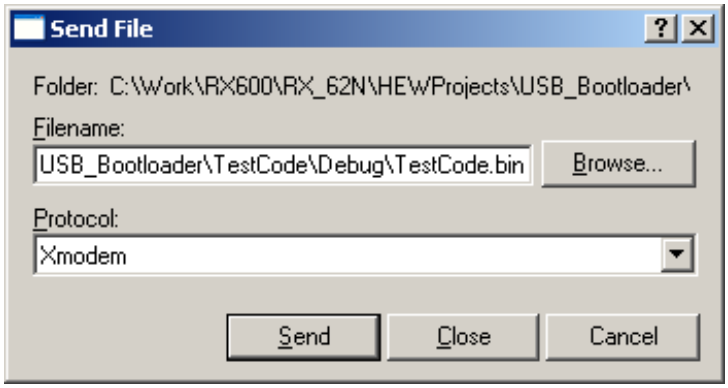

Fig. 23

From the “Send File” dialogue, select “XModem” from the “Protocol” list box and then “Browse” to the required file.
Note that this file has to be a binary file. Please see section 4.3 and 4.4 for details.
After pressing “Send” the progress dialogue is displayed.

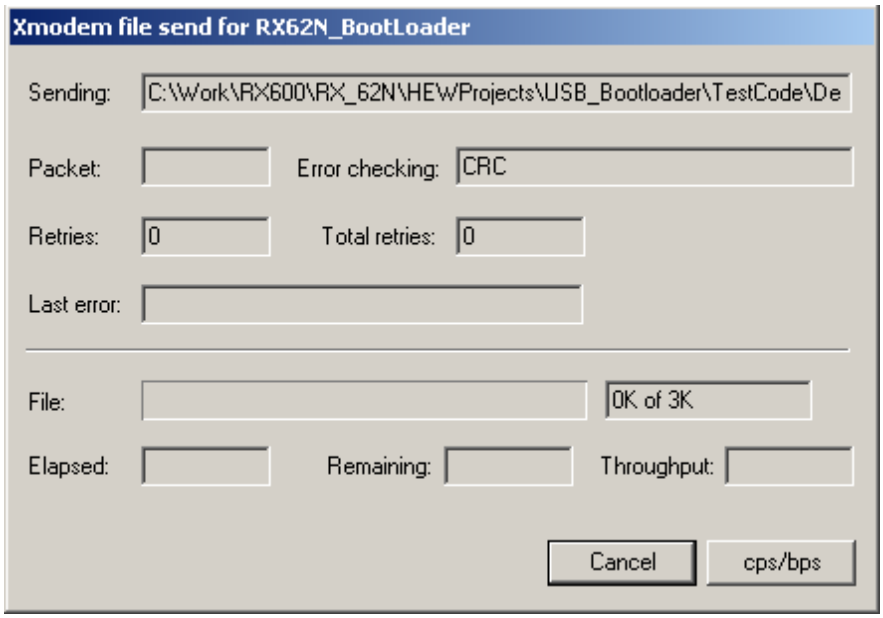

Fig. 24

When complete, the Bootloader will report back the status of the FLASH programming process.

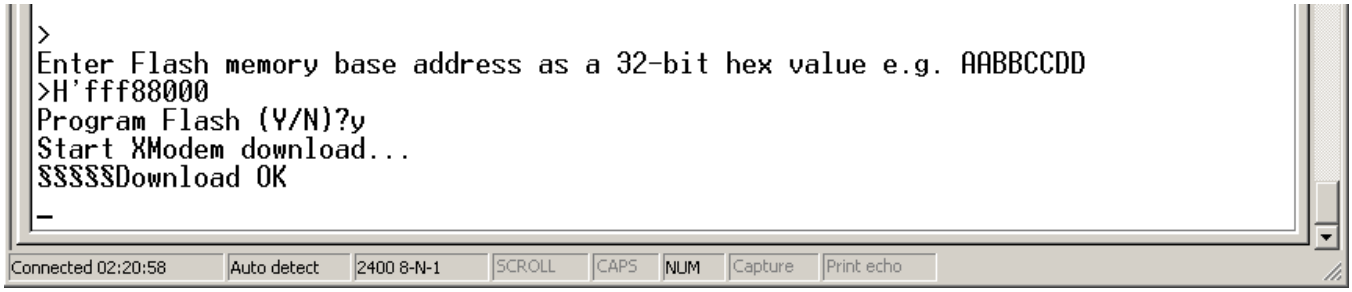

Fig. 25

Press any key on the Keyboard to display the Bootloader menu.
It is now possible to execute the new code using option 5.

3.2 Programming the board using Emulator

Note: To programming the board using E1 Emulator, set the Boot Mode Selection Switch (J3) to "0000".

Step 1: Build the workspace as shown in below image

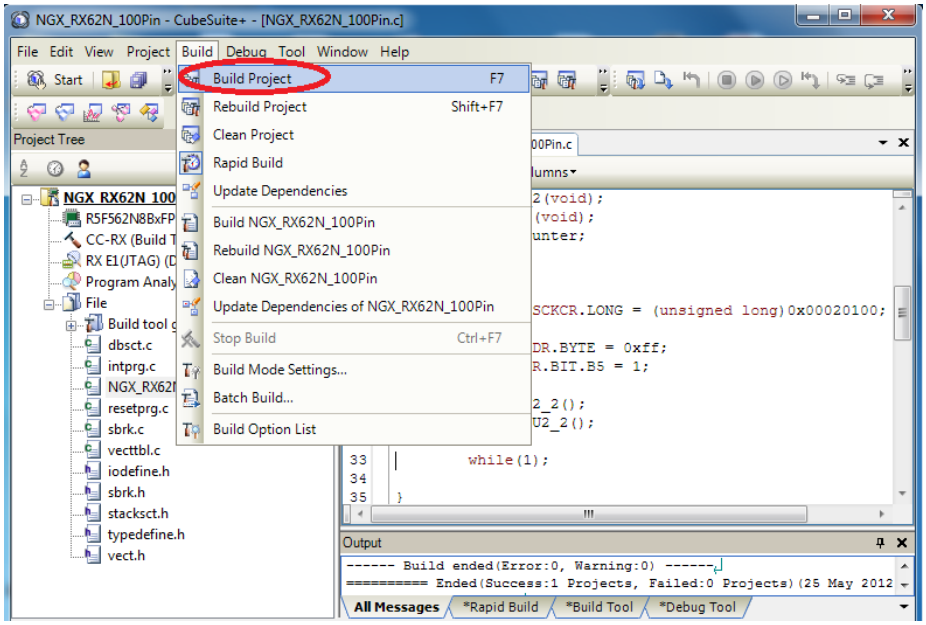

Fig. 26

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

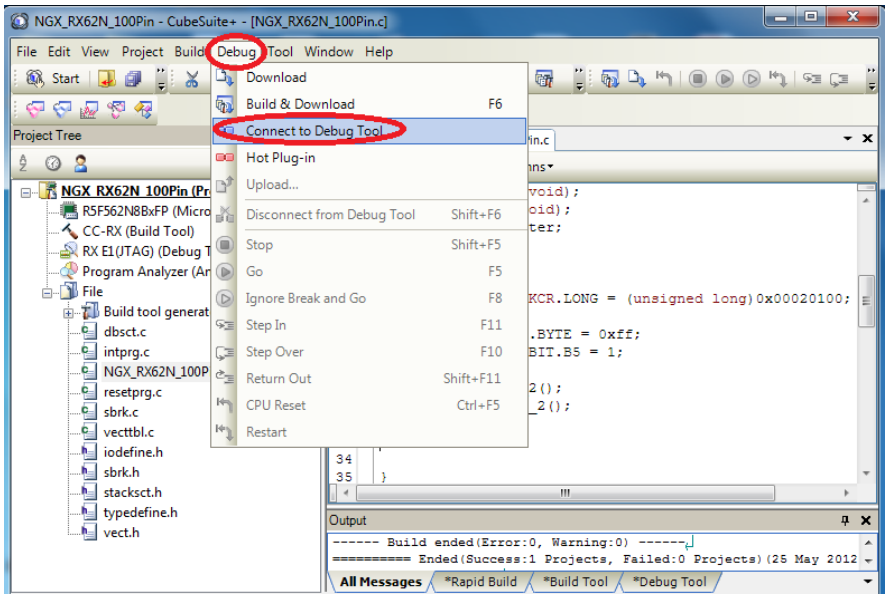

Fig. 27

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.

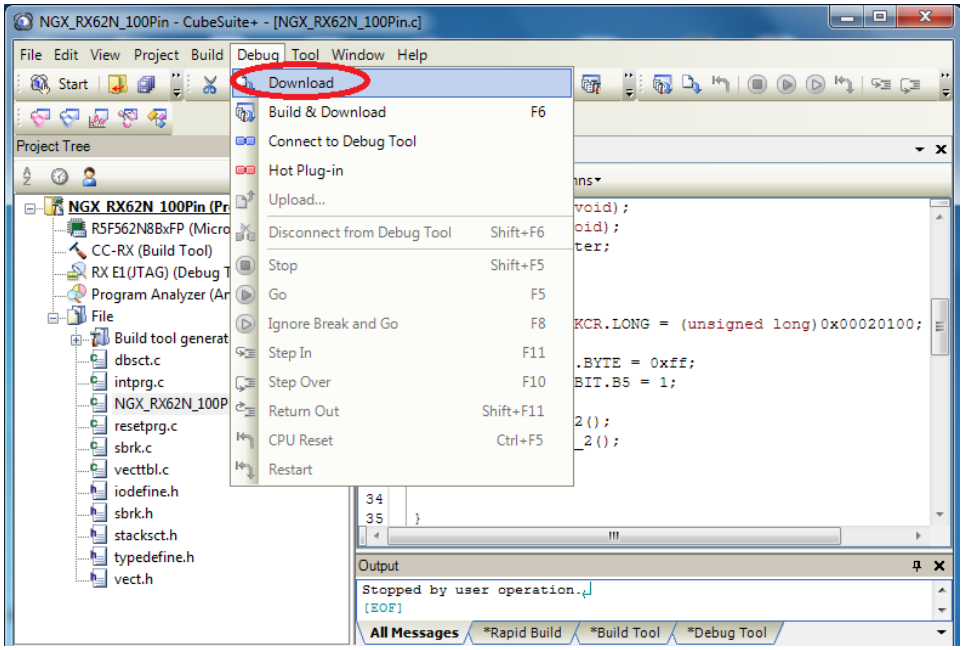

Fig. 28

4.0 BB-RX62N- H BOARD 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 NGX_RX62N_100pin_blinky.mtpj.

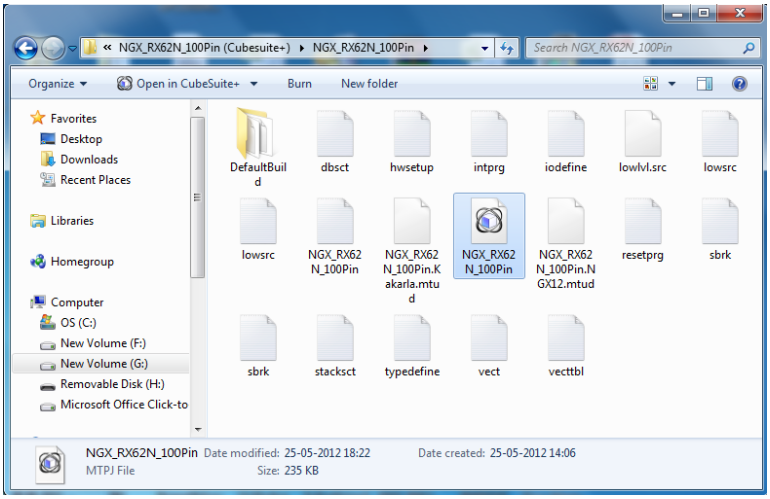

Fig. 29

3. This launches the IDE

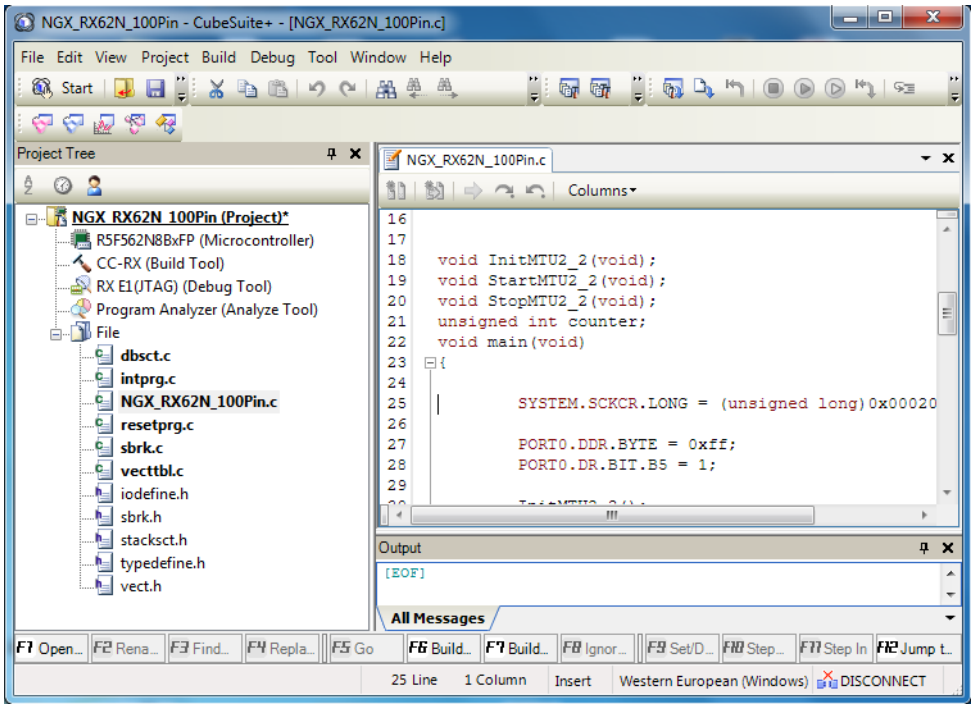

Fig. 30

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

4.2 Creating sample blinky project in CubeSuite+

Follow the below steps, for creating blinky project:

Step 1: Open the CubeSuite+ IDE.

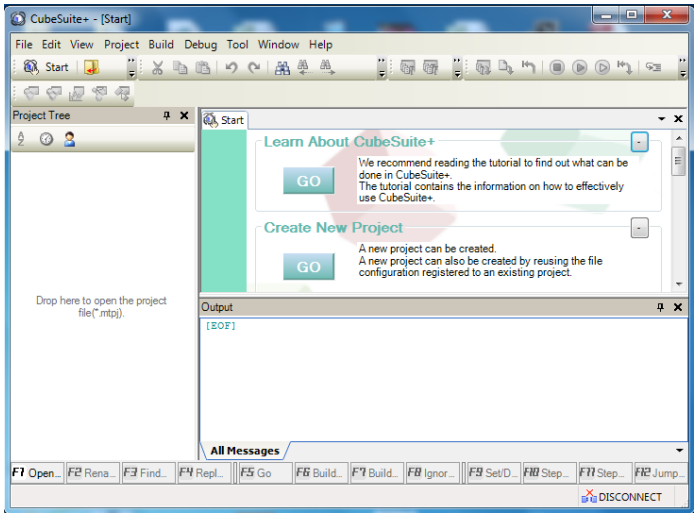

Fig. 31

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

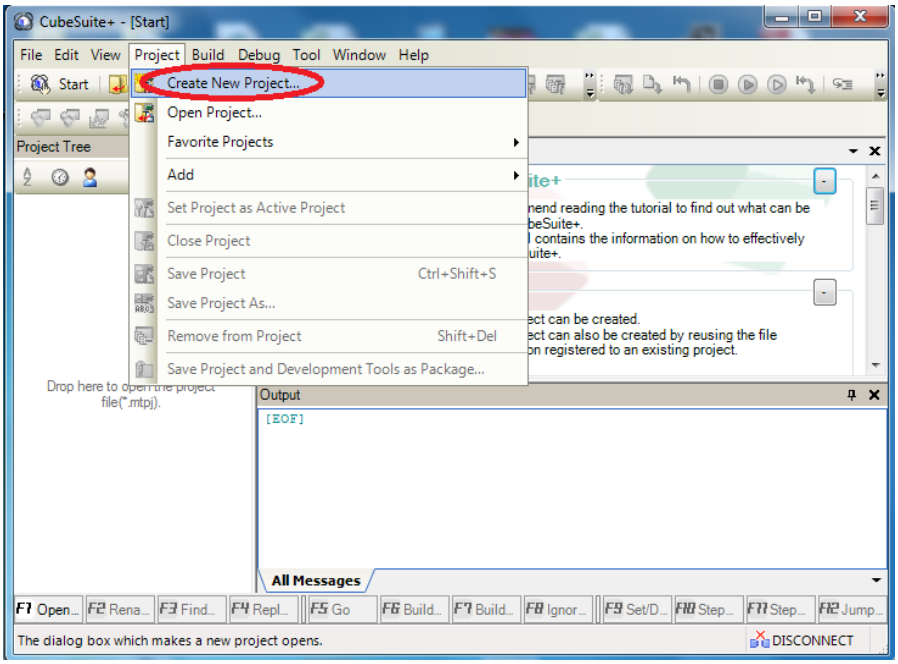

Fig. 32

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

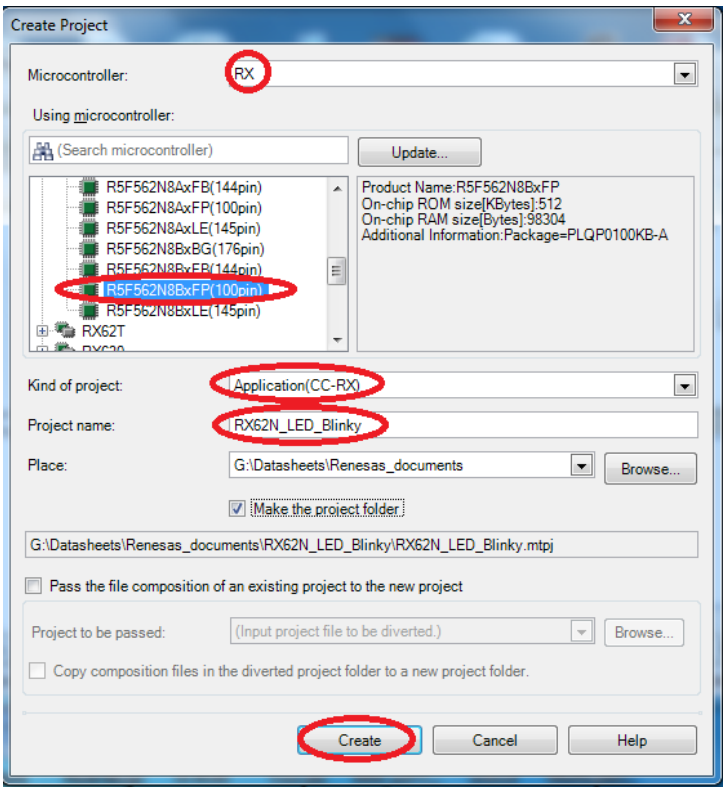

Fig. 33

Step 4: The following window opens, double click on RX62N_LED_Blinky.c file then write the blinky code. For blinky code refer BB-RX62N_100pin_blinky sample program.

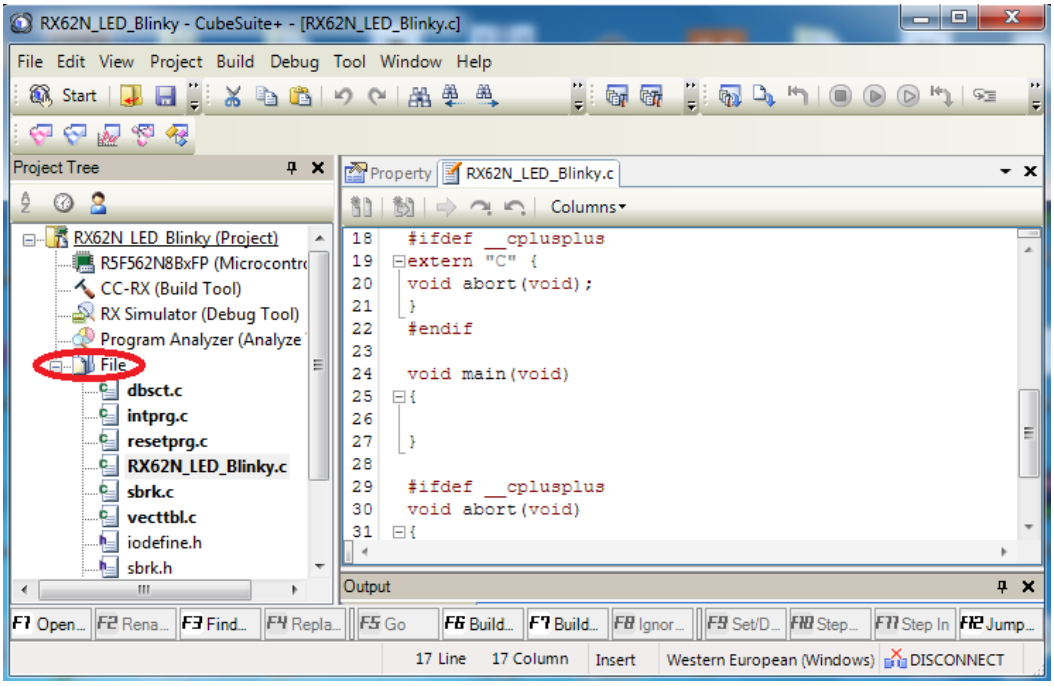

Fig. 34

Step 5: After writing the code save the code as shown in the below image

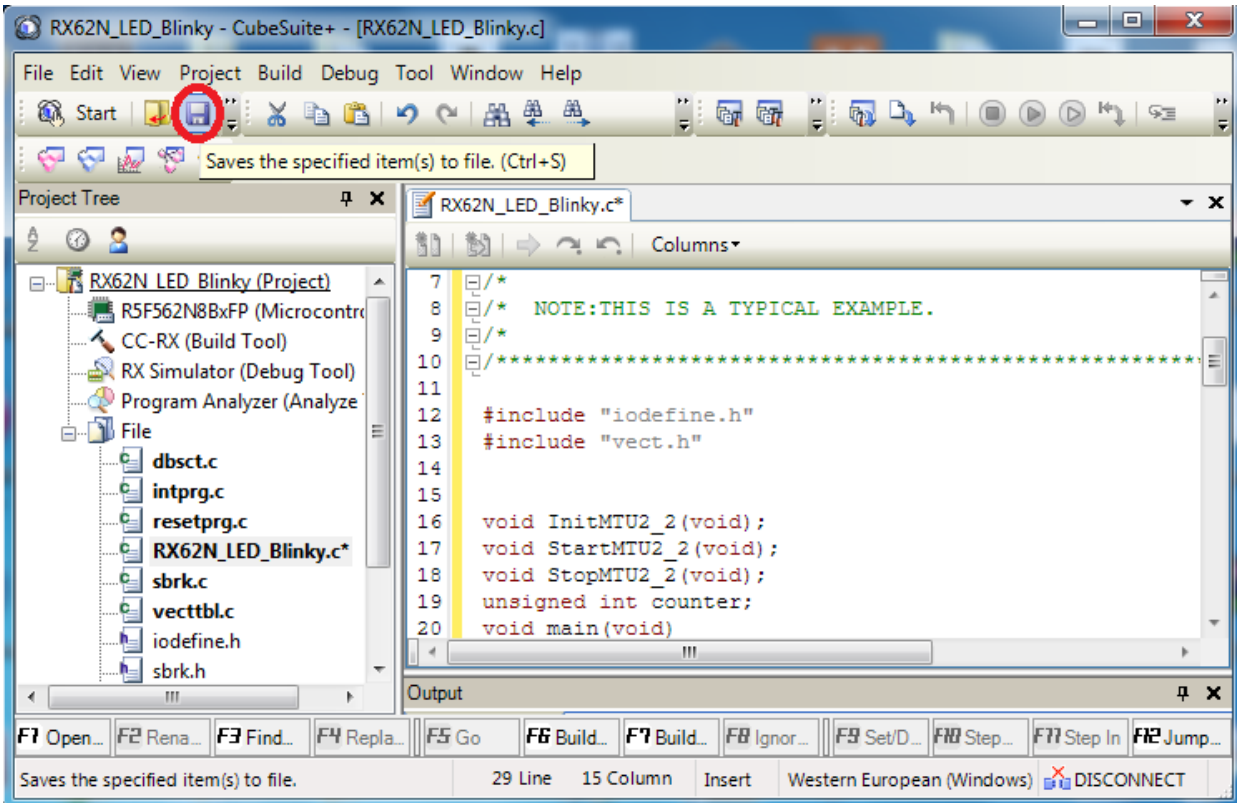

Fig. 35

Step 6: To select the debug tool right click on Debug Tool option and select RX E1(JTAG) as shown in the below image

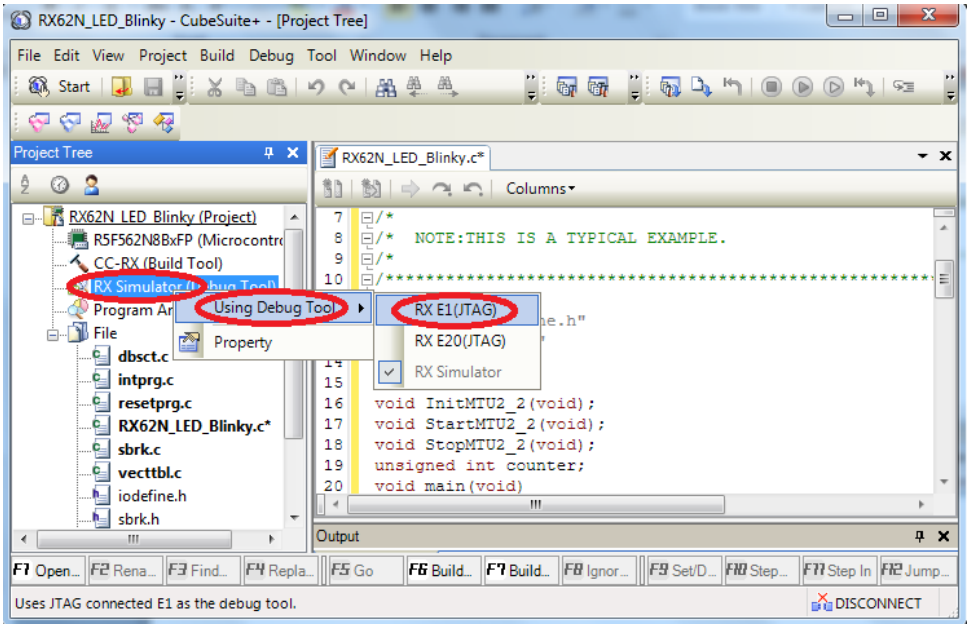

Fig. 36

Step 7: Right click on Debug Tool go to Property and select the property value as shown in the below image

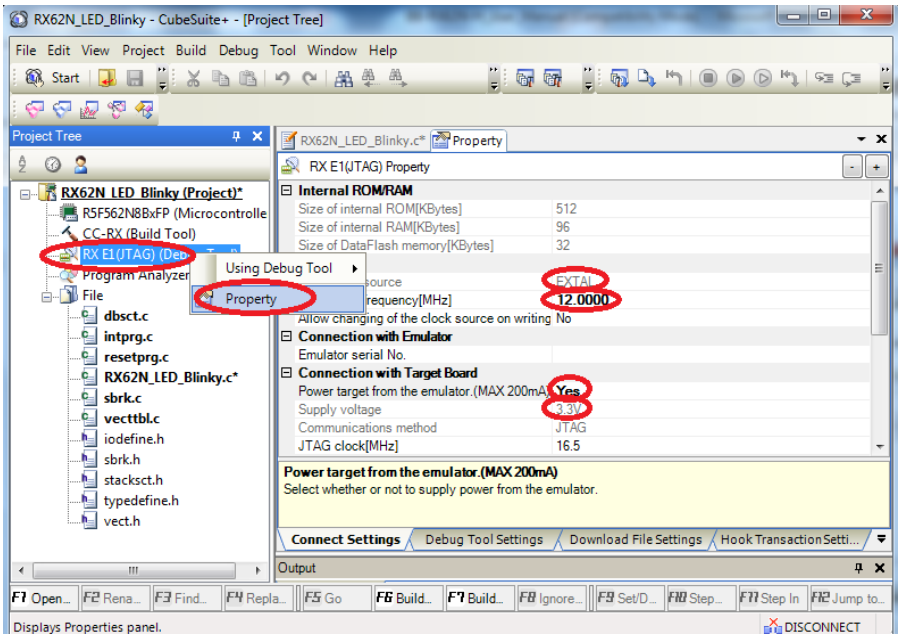

Fig. 37

Note: Target Board can be powered through Emulator or USB. When you powered the board through Emulator make sure that the USB is not connected. When you powered the board through USB select the Power target from emulator property value as No.

Step 8: To build and download, follow the steps in section 3.2.

4.3 Creating Bin File

For creating bin file follow the below steps:

Step 1: Right click on Build Tool option, click on property as shown in below image.

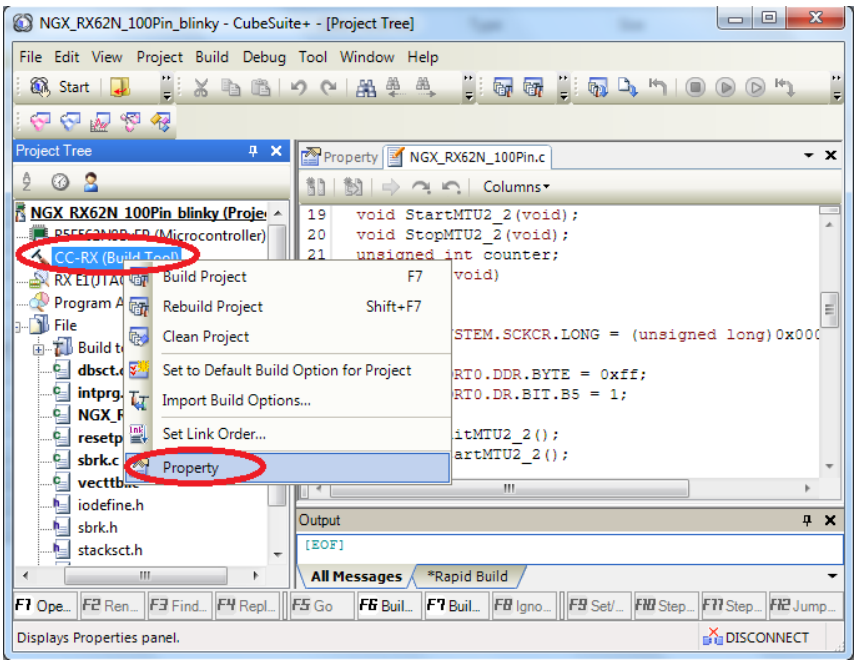

Fig. 38

Step 2: Click on Link options and select the Load module file convert format as “Binary data file”

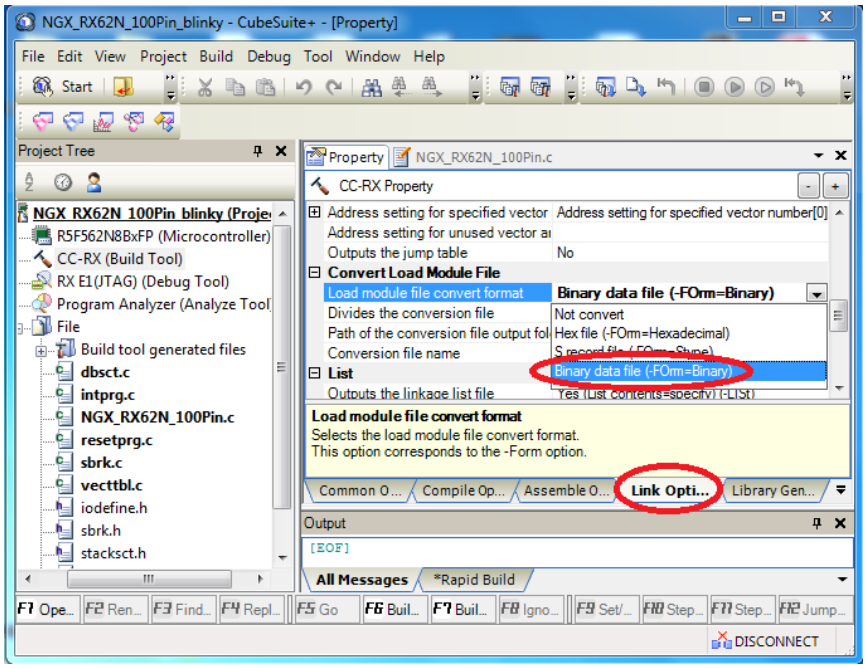

Fig. 39

4.4 Creating a Bootloader Compliant Application

The Bootloader application allows a user to easily program a User Application into the RX62N.
However, this User Application has to be developed with the following constraints.

a) Reduced Code Space

b) Interrupt handling of the fixed vector table
The Bootloader expects the User Application to provide ISR handlers for the
Privileged Instruction Exception,
Undefined Instruction Exception,
Floating Point Exception,
NMI Exception,
at specific addresses.
If not, then these Exceptions will not be handled correctly, causing the User Application to fail.

c) The output of the project has to be a binary file (.bin), not an absolute file (.abs)
The project TestCode supplied with the source code download shows how to create a Bootloader compliant application.

The Reduced Code Space is handled by the linker settings.
As the Bootloader uses FLASH blocks, the first available address for the User App is H'FFF88000.
It is at this address that the Bootloader expects the Fixed Vector Table to be located.
This can be seen in the Link Options Section dialogue, at address 0xFFF88000 FIXEDVECT.

Right click on Build Tool and select Property, click on Link Options then modify the FIXEDVECT address as shown in below image.

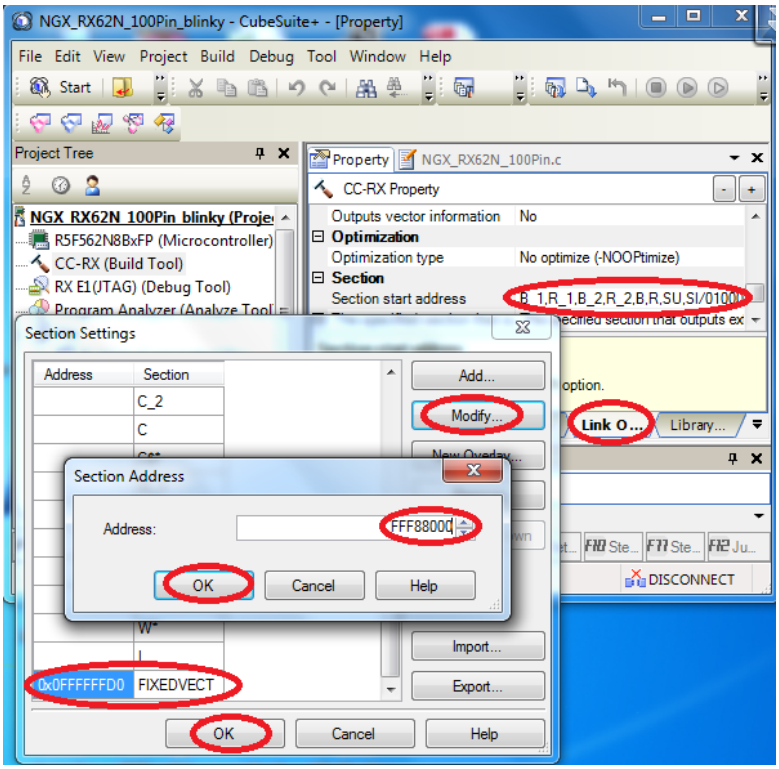

Fig. 40

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

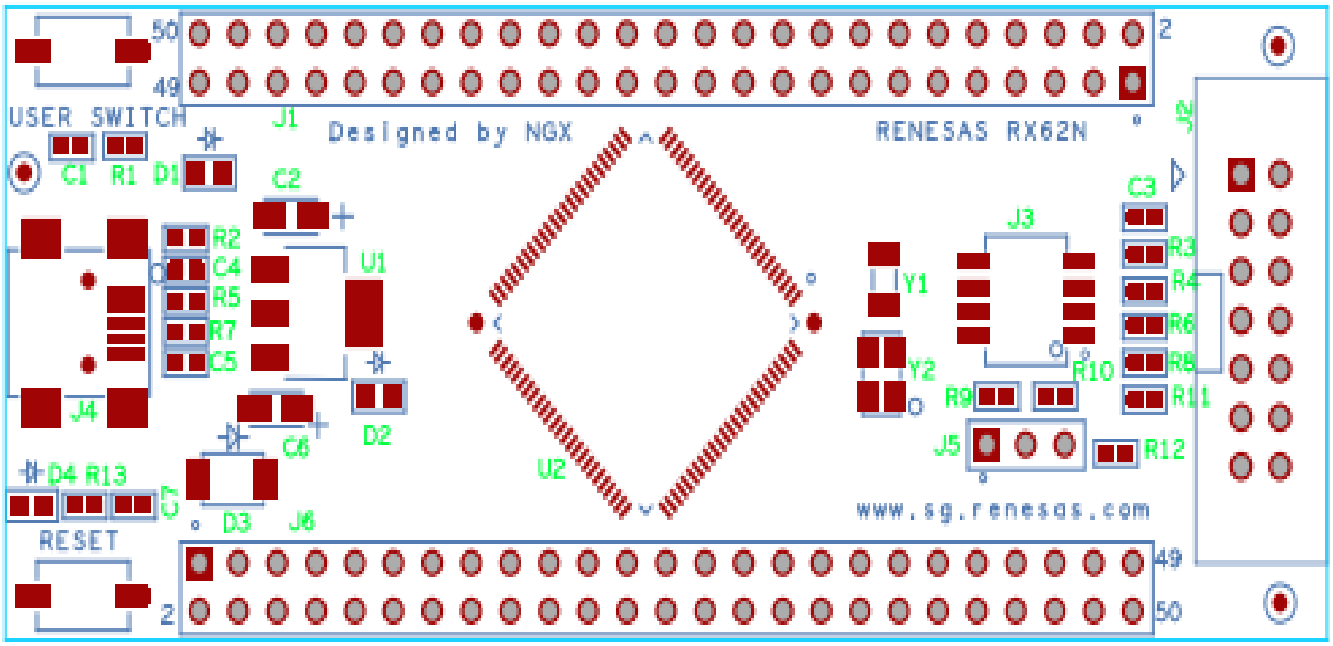

Fig. 41

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 BB-RX62N- H BOARD product and can also be downloaded from www.ngxtechnologies.com:

- NGX BB-RX62N- H BOARD 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.