

BlueBoard-RX62N-H

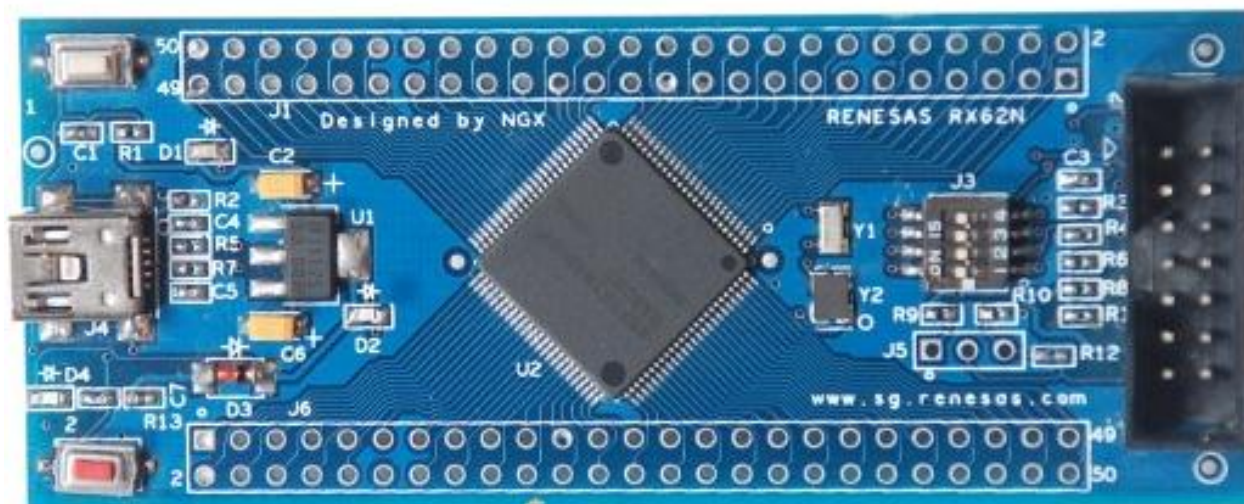


Fig. 1

User Manual for BlueBoard-RX62N-H:

For CubeSuite+ with E1 Emulator: [Click here](#)

For Renesas Flash Programmer with E1 Emulator: [Click here](#)

Sample projects for BlueBoard-RX62N-H:

For CubeSuite+: [Click here](#)

Schematic for BlueBoard-RX62N-H:

[Click here to download Schematic.](#)

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.

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1.0 INTRODUCTION

This document is the quick start guide for the BB-RX62N- H, a low cost RENESAS RX62N based board by NGX Technologies. This document reflects its contents which include MCU features, hardware description, and hardware verification. This document provides detailed information on the board features and hardware verification and possible debuggers and IDEs that can be used with this board.

1.1 Possible Debuggers and IDEs that can be used

- [E1 Emulator](#) with [CubeSuite+](#)
- [E1 Emulator](#) with [High-Performance Embedded workshop](#)

1.2 E1 Emulator and CuibeSuite+

Board has 14 pin emulator connector, connect the one end of 14 pin cable to E1 emulator and other end to the 14 pin connector on the board, connect usb cable to E1 emulator and PC and connect the power supply to the board as shown in the below image

Note: E1 Emulator, 14 pin cable and USB cable are not a part of the BB-RX62N-H board package.

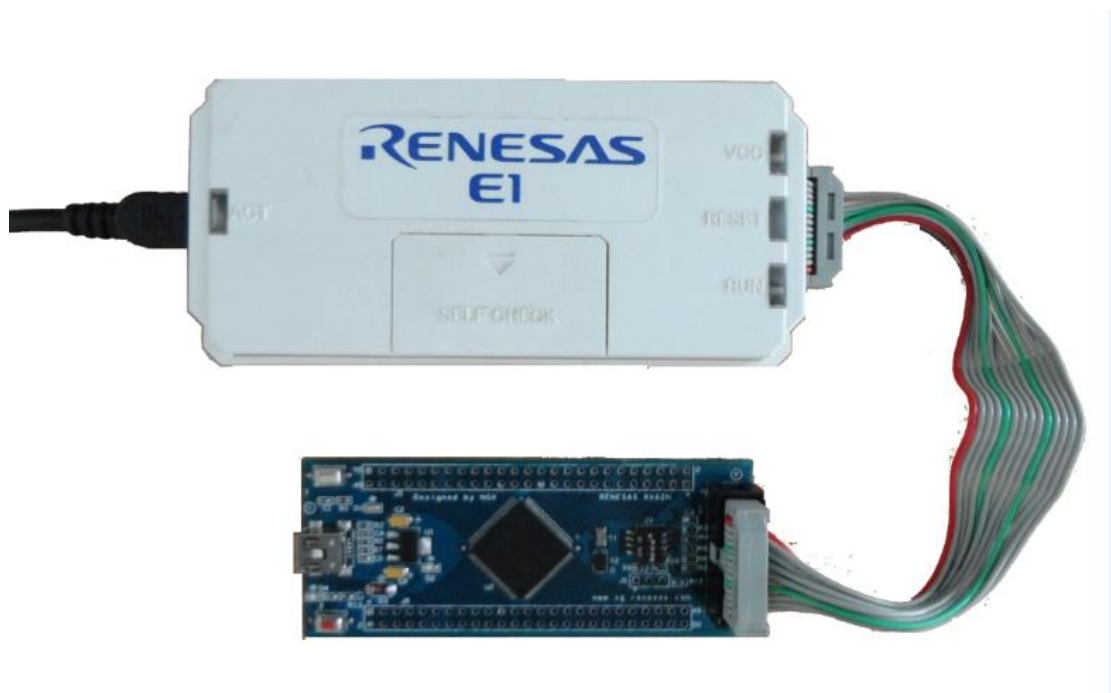


Fig. 2

2.0 BB-RX62N- H BOARD OVERVIEW

2.1 INTRODUCTION

The NGX BB-RX62N- H BOARD is a compact and versatile evaluation platform for the RENESAS's RX62N MCU. RENESAS's evaluation platforms are generally tied up to CubeSuite+ and High Performance Embedded Workshop compiler/IDE and E1 Emulator. For our development we use E1 Emulator and CubeSuite+ as the debugger and compiler/IDE respectively. The board is supported by extensive sample examples allowing you to focus on the application development.

2.2 Board Features

Following are the salient features of the board

- ⤴ Dimensions: 86mmX 33mm
- ⤴ Two layer PCB (FR-4 material)
- ⤴ Power: +5V/500mA from power supply USB connector
- ⤴ 14 pin debug connector for Emulator connection
- ⤴ User Switch and reset switch
- ⤴ 12.0000 MHz crystal for MCU
- ⤴ Extension headers for all MCU pins
- ⤴ USB type-B mini connector
- ⤴ User LED

2.3 Block Diagram

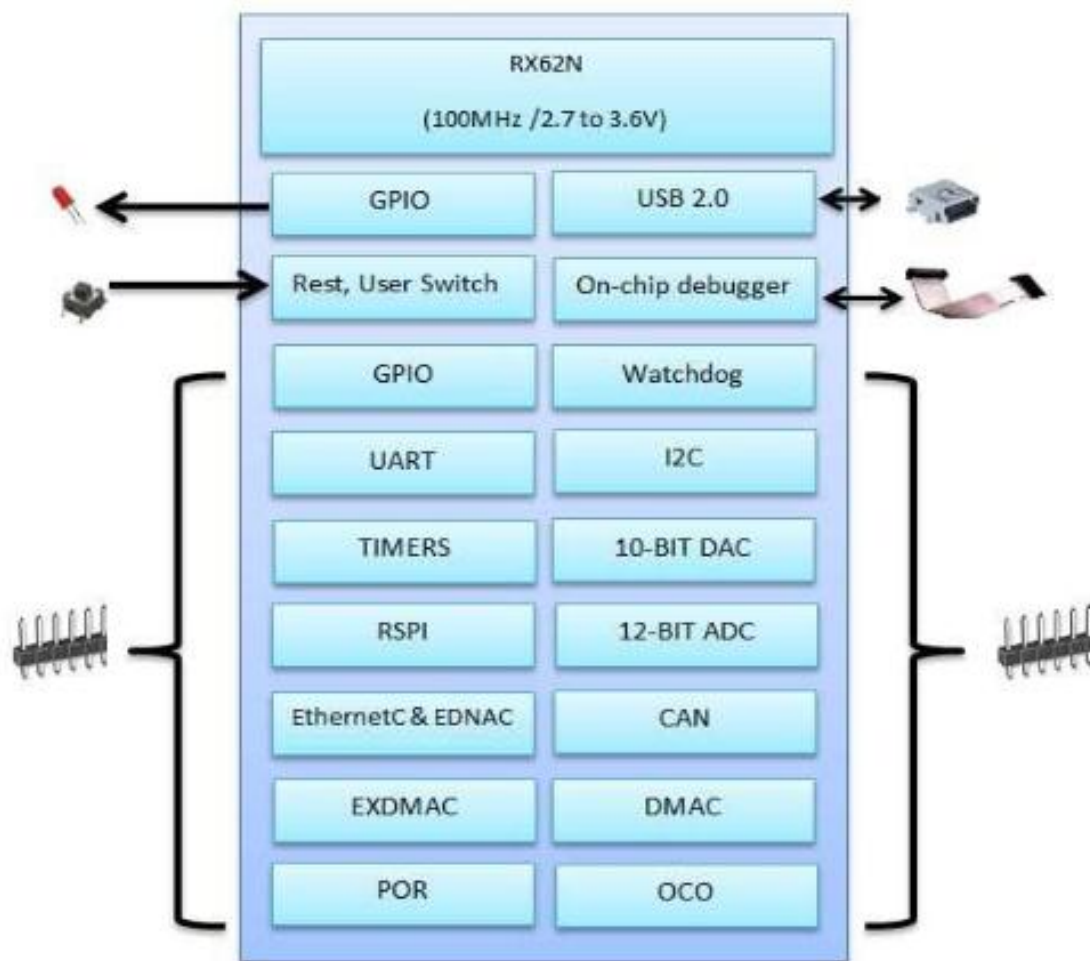


Fig. 3

2.4 MCU Features

32-bit RX CPU Core

- Delivers 165 DMIPS at a maximum operating frequency of 100 MHz
- Single Precision 32-bit IEEE-754 Floating Point
- Accumulator: 32×32 to 64-bit result, one instruction
- Mult/Divide Unit, 32×32 Multiply in one CPU clock for multiple instructions
- Interrupt response in as few as 5 CPU clock cycles
- CISC-Harvard Architecture with 5-stage pipeline
- Variable length instructions, ultra compact code
- Supports the Memory Protection Unit (MPU)
- Background JTAG debug plus high-speed trace

Low Power Design and Architecture

- 2.7V to 3.6V operation from a single supply
- 480 μ A/MHz Run Mode with all peripherals on
- Deep Software Standby Mode with RTC
- Four low power modes

Main Flash Memory, no Wait-State

- 100 MHz operation, 10 nsec read cycle
- No wait states for read at full CPU speed
- 256K, 384K, 512K Byte size options
- For Instructions or Operands
- Programming from USB, SCI, JTAG, user code

Data Flash Memory

- Up to 32K Bytes with 30K Erase Cycles
- Background Erase/Program does not stall CPU

SRAM, no Wait-State

- 64K or 96K Byte size options
- For Operands or Instructions
- Back-up retention in Deep Software Standby Mode

DMA

- Four fully programmable internal DMA channels
- Two EXDMA channels for external-to-external transfers
- Data Transfer Controller (DTC)

Reset and Supply Management

- Power-On Reset (POR) monitor/generator
- Low Voltage Detect (LVD) with precision setting

System Clocking with Clock Monitoring

- External crystal, 8 MHz to 14 MHz to Internal PLL
- PLL source to system, USB, and Ethernet
- Internal 125 kHz LOCO for IWDT
- External crystal, 32 kHz for RTC

Real Time Clock

- Full calendar function, BCD format

Two Independent Watchdog Timers

- 125-kHz LOCO operation

Up to 14 Communication Interfaces

- USB 2.0 Full-Speed interfaces with PHY (2ch) Supports Host/Function/OTG 10 endpoints for types: Control, Interrupt, Bulk, Isochronous
- Ethernet MAC 10/100 Mbps, Half or Full Duplex Supported.
(1ch) Dedicated DMA with 2-Kbyte transmit and receive FIFOs.
RMII or MII interface to external PHY

- CAN ISO11898-1, supports 32 mailboxes (1ch)
- SCI channels: Asynchronous, clock sync, smartcard, and 9-bit modes (6ch)
- I2C interfaces up to 1M bps, SMBus support (2ch)
- RSPI (2ch)

External Address Space

- Eight CS areas (8×16 Mbytes)
- 128-Mbyte SDRAM area
- 8-/16-/32-bit bus space selectable for each area

TFT-LCD up to WQVGA resolution

Up to 20 Extended Function Timers

- 16-bit MTU2 Input capture, Output Compare, PWM output, phase count mode (12ch)
- 8-bit TMR (4ch)
- 16-bit CMT (4ch)

1-MHz ADC units with two combination choices

- 12-bit $\times 8$ ch. unit with single sample/hold circuit
- or (2) 10-bit $\times 4$ ch units each with a sample/hold circuit
- AD-converted value addition mode (12-bit A/D converter)

10-bit DAC, 2 channels

Up to 128 GPIO

- 5V tolerant, Open-Drain, Internal Pull-up

Operation Temp

- -40°C to $+85^{\circ}\text{C}$

For the most updated information on the MCU please refer to [RENESAS's website](http://www.renesas.com).

3.0 BB-RX62N- H BOARD Hardware Description

3.1 Introduction

The NGX BB-RX62N- H BOARD is based on RX62N microcontroller from RENESAS. RX62N offers 32-KB Flash memory, 100-MHz operation, I2C controller with data rate of up to 1 Mbit/s, USB 2.0 Full-Speed Host/Function/OTG, CAN, 12-bit ADC, TFT-LCD, RTC, up to 14 communication channels and wide range of peripherals. Refer to the RX62N data sheet for complete device details.

BB-RX62N- H BOARD microcontroller is factory-programmed with a quick start demo program. The quick start program resides in RX62N on-chip Flash memory and runs each time power is applied, unless the quick start has been replaced with a user program.

3.2 Board Image with pointer to each peripheral & connectors

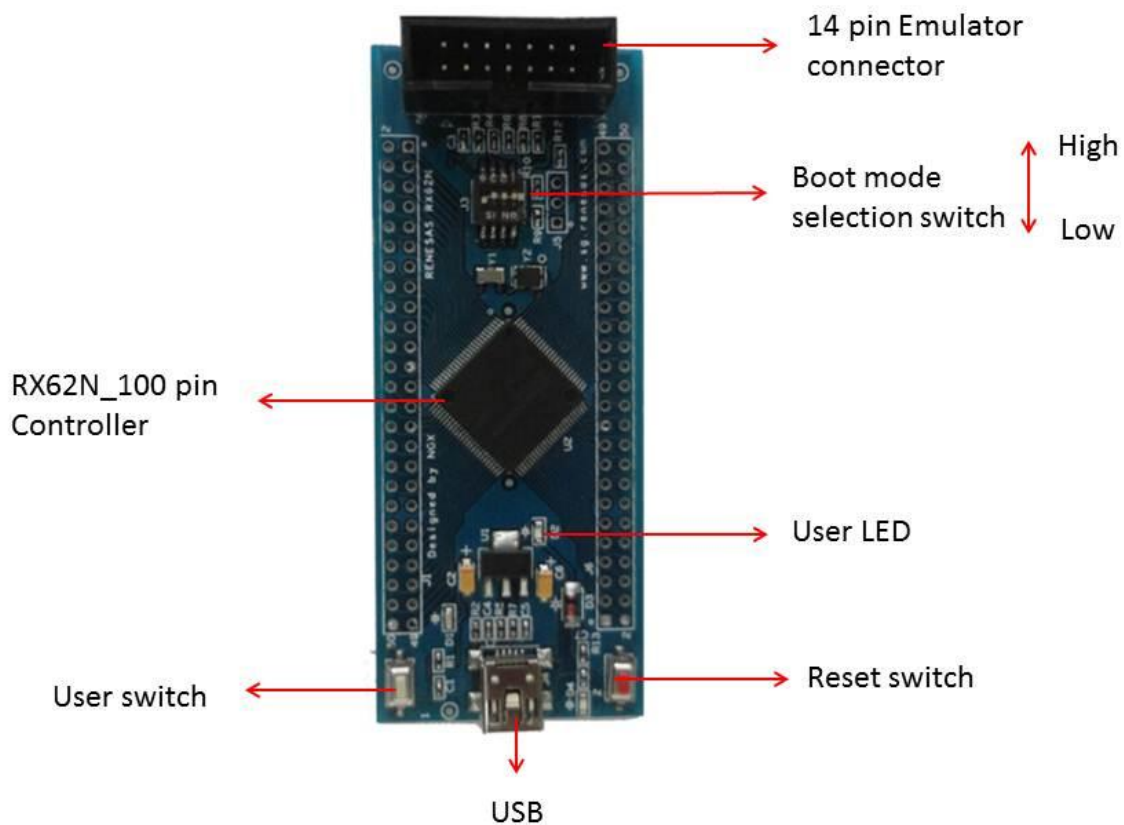


Fig 4

4.0 BB-RX62N-H BOARD hardware verification

RENESAS's BB-RX62N-H board evaluation platforms ship with a factory-programmed test firmware that verifies the board peripherals. It is highly recommended that you verify the board, before you start programming. Also this exercise helps you get acclimatized with the board quickly.

To run the tests you will need the following:

- ⤴ NGX BB-RX62N-H BOARD
- ⤴ Power: +5V/500mA from power supply USB cable
- ⤴ PC
- ⤴ Mini USB type-B cable

4.1 Board connections

BlueBoard Peripheral	Schematic labels	MCU pins
User LED	R_LED	100
USB	USB0_DM USB0_DP VSS_BUS	36 37 38
User Switch	User Switch	73
E1 Emulator	MDE MD0 MD1 EMLE RES#	4 7 6 2 10

Table.1

4.2 Powering the Board

The board can be powered through USB, Alternatively the board could be powered through Emulator.

4.3 Verifying all the peripherals of the board

The following section focusses on the verification of all the peripherals supported on the board. The order of the tests is mentioned in the same manners as the flow of the test firmware. We highly recommend that you follow the order of the test. The test firmware is designed in a manner that the user needs to spend as minimum time as possible to verify all the peripherals.

Note: It is highly recommended that the user tests all the peripherals as soon as the board is received.

Power up the board and we are all set to verify the board peripherals. The order of the peripherals that are verified by the firmware are as follows:

Note: To execute the test firmware from the flash, set the Boot Mode Selection Switch (J3) to “1110”.

4.3.1 LED

Test setup and verification:

As soon as the board is turned ON or reset; the test LED (D2) go ON & OFF for a couple of times, this simple test validates the LEDs.

4.3.2 User Switch

Test setup and verification:

When you press the User Switch, LED (D2) toggles.

4.3.3 USB

Test setup and verification:

Set the Boot Mode Selection Switch (J3) to “0100”, Connect the USB cable to USB connector. The power LED (D1) turns ON. The USB enumeration can be checked in device manager. The board enumerates as a “Renesas USB1653 USB Boot Mode Device”. On a Windows machine this can be confirmed by looking in to the ‘Device Manager’ under ‘Universal Serial Bus Controllers’.

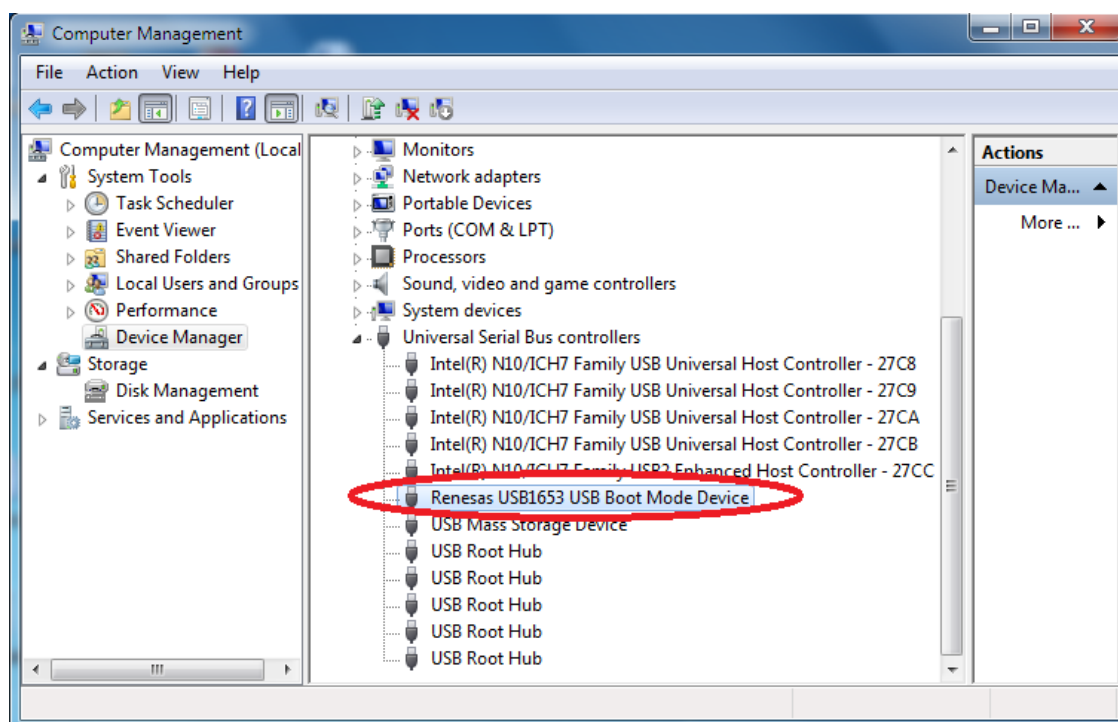


Fig 5

5.0 CHANGE HISTORY

5.1 Change History

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

6.0 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

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