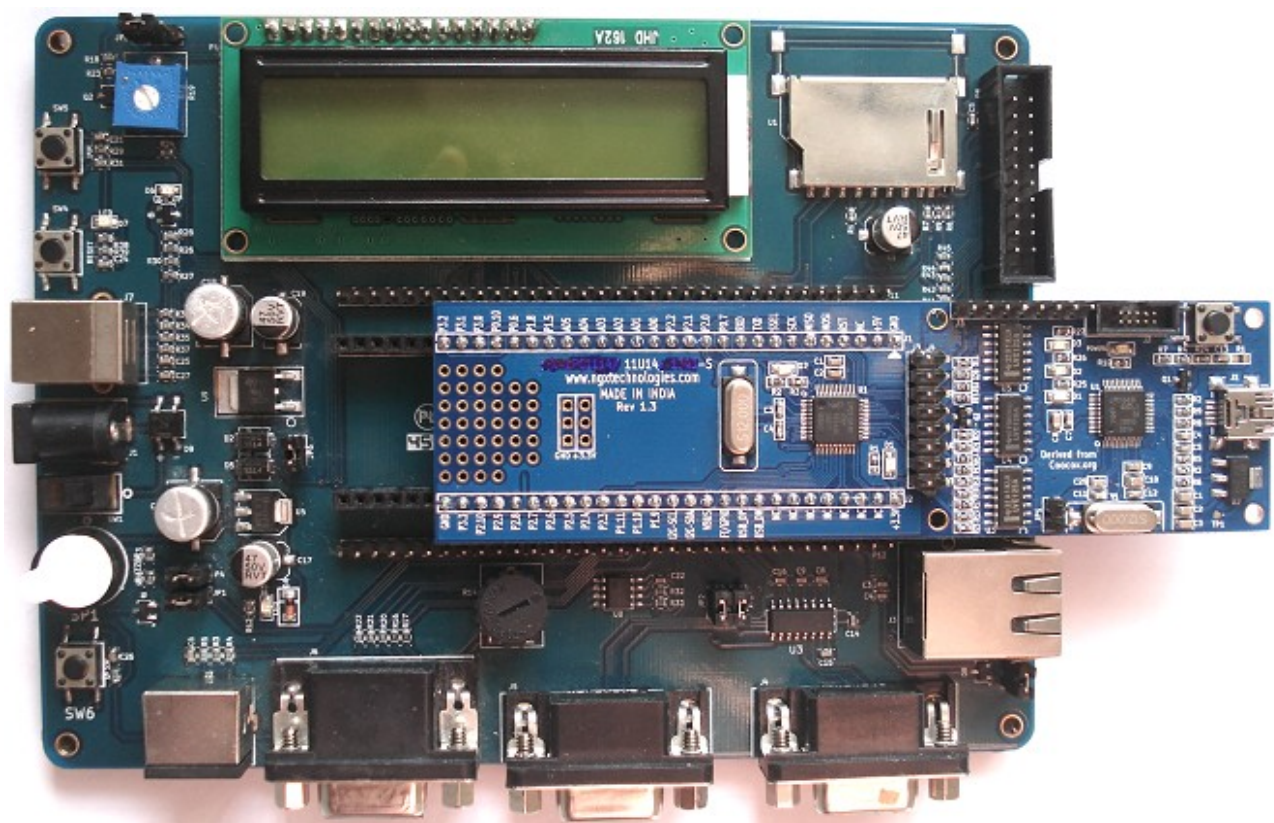


# **mX-BaseBoard with mX-LPC11U14-S**



USER MANUAL

## Table of Contents

Introduction.....	3
Features.....	3
Getting Started.....	4
Requirement.....	4
Hardware .....	4
Software .....	4
Setup.....	4
Mounting the mX-LPC11U14-S Board.....	4
Validating the mX-BaseBoard.....	5
LED Blink.....	6
LCD .....	6
SD card.....	6
I2C.....	6
UART .....	7
Buzzer.....	7
Ext Int.....	7
ADC.....	7
PS/2.....	8
ISP Programming.....	8
Compiling the Workspace.....	10
Schematics.....	11
Information.....	12
Revision History.....	12
Legal.....	12
Disclaimers .....	12
Trademarks .....	12

## Introduction

mX-BaseBoard is a new addition to the BlueBoard line from NGX Technologies. This board is intended to extend the functionality of the mX-LPC11U14-S board. The board is a stamp for LPC 11U14. mX-BaseBoard can be used to extend the features of the stamp by providing connectors and interface to various peripherals of the stamp and provide power to the peripheral interface.

## Features

- 2x16 with contrast control & back light
- SD Card connector
- USB
- Power Jack
- Power Switch
- Reset Button
- ISP Button
- External Interrupt Button
- Buzzer
- PS/2
- Serial Connector 0
- Preset for ADC
- On board EEPROM

## Getting Started

Before starting you would need the following things handy and ready. For compiling and debugging programs refer to *CoIDE User Guide*. The CoIDE User Guide is for Nuvton, the same procedure follows for NXP. The user needs to select the appropriate part number. Make sure that you have read the CoIDE user guide carefully before you proceed further.

## Requirement

The requirement is put in two sections.

### Hardware

- Power adapter – rating 7.5 V, 1 AMP
- SD card
- USB mini cable
- Serial cable
- PS/2 Keyboard

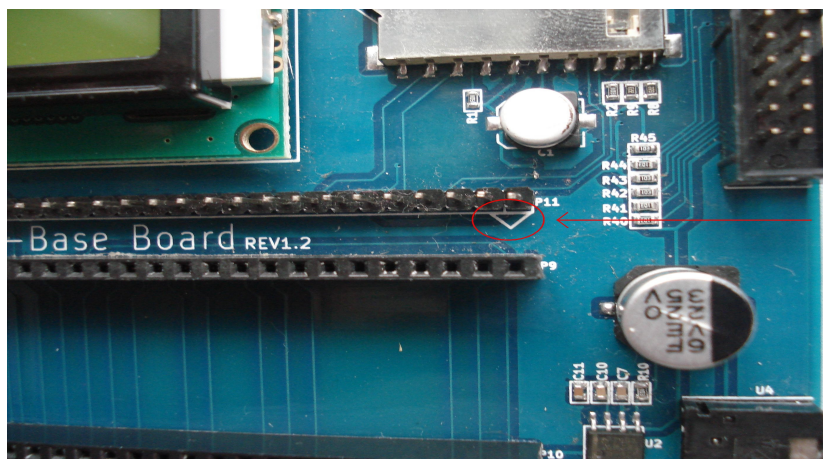
### Software

- PC with Windows OS
- Use HyperTerminal as terminal software
- mX-LPC11U14-S CoIDE workspace from NGX Technologies
- Flash Magic

## Setup

### Mounting the mX-LPC11U14-S Board

The mX-LPC11U14-S board should be mounted on the mX-BaseBoard with a particular alignment.





*Improper mounting of the mX-LPC11U14-S board on mX-BaseBoard may damage the mX-LPC11U14-S board and / the mX-BaseBoard.*

The GND pin on mX-LPC11U14-S board should be aligned with the pin 1 of P9 female header on BaseBoard. Refer to the marking as shown in the image above.

## Validating the mX-BaseBoard

Download the workspace as .zip form [here](#).

Download the Binary as .zip form [here](#).

For flashing the Binary files please refer to [CooCox CoFlash Quick Start with GUI](#).



- 1. You need to flash the mX-LPC11U14-S board with the required firmware according to the functionality.*
- 2. The CooCox CoFlash Quick Start with GUI is for Nuvton, the same procedure follows for NXP also.*

## **LED Blink**

PORTS used → PORT0

PINS used → PIO0\_7

Schematic net name → D2

A sample program to blink is provided, flash the '**mX-LPC11U14\_blinky.bin**' file onto mX-LPC11U14-S and RESET. The LED (D2) should start blinking.

## **LCD**

PORTS used → PORT1 for Data lines and Control lines.

PINS used → PIO1\_25, PIO1\_26, PIO1\_27 and PIO1\_28 for Data lines and PIO1\_13, PIO1\_14 and PIO1\_15 for Control lines

Schematic net name → LCD\_D4, LCD\_D5, LCD\_D6, LCD\_D7, LCD\_EN, LCD\_RW and LCD\_RS.

A sample program to LCD is provided, flash the '**mX-LPC11U14\_lcd.bin**' file onto mX-LPC11U14-S and RESET. The LCD should display “NGX TECHNOLOGIES”.

## **SD card**

PORTS used → PORT0 for MOSI,MISO, SSEL and SCK.

PINS used → PIO0\_9,PIO0\_8,PIO1\_29 and PIO0\_2.

Schematic net name → MOSI, MISO, SSEL and SCK.

A sample program to SD-card is provided, flash the '**mX-LPC11U14\_sdcard.bin**' file onto mX-LPC11U14-S, insert a SD card and RESET.

On the LCD it should display “SD card - PASS”.

Remove the card and RESET, on the LCD should display “SD card - FAIL”.

## **I<sup>2</sup>C**

PORTS used → PORT0 for I2C-SDA and I2C-SCL.

PINS used → PIO0\_5 and PIO0\_4.

Schematic net name → I2C-SDA and I2C-SCL.

A sample program to I<sup>2</sup>C is provided, flash the '**mX-LPC11U14\_i2c.bin**' file onto mX-LPC11U14-S and RESET. The LCD should displays “I<sup>2</sup>C - PASS”. Connected to the I<sup>2</sup>C lines is an EEPROM device. The program writes and reads back a piece of data to test.

## **UART**

PORTS used → PORT0 for TXD and RXD.

PINS used → PIO0\_19 and PIO0\_18.

Schematic net name → TXD and RXD.

A sample program to UART is provided, flash the '**mX-LPC11U14\_uart.bin**' file onto mX-LPC11U14-S and RESET, Connect the serial cable to J4 and PC serial port. Open a HyperTerminal with 115200 baud, 8N1. The typed characters on the keyboard are echoed on the HyperTerminal.

## **Buzzer**

PORTS used → PORT0 for BUZZER.

PINS used → PIO0\_23.

Schematic net name → BUZZER.

A sample program to BUZZER is provided, flash the '**mX-LPC11U14\_buzzer.bin**' file onto mX-LPC11U14-S and RESET, on the mX-BaseBoard a tone is heard from the buzzer. The jumper JP1 should be inserted.

## **Ext Int**

(The External Interuppt work space is in under development)

PORTS used → PORT0 for EXT\_SW.

PINS used → PIO0\_7.

Schematic net name → EXT\_SW.

A sample program to BUZZER is provided, flash the '**mX-LPC11U14\_exint.bin**' file onto mX-LPC11U14-S and RESET, on the mX-BaseBoard the BUZZER toggles between ON and OFF when the button SW6 is pressed.

## **ADC**

PORTS used → PORT1 for ADC.

PINS used → PIO0\_16.

Schematic net name → ADC.

A sample program to ADC is provided, flash the '**mX-LPC11U14\_adc.bin**' file onto mX-LPC11U14-S and RESET, vary the pot R14 on the mX-BaseBoard . The change in value is displayed on the LCD.

## **PS/2**

(The PS/2 work space is in under development)

PORTS used → PORT2 for PS2-DATA and PS2-CLK.

PINS used → PIO1\_23 and PIO1\_24.

Schematic net name → PS2-DATA and PS2-CLK.

A sample program to PS/2 is provided, flash the '**mX-LPC11U14\_ps2.bin**' file onto mX-LPC11U14-S and RESET, connect a PS/2 keyboard to mX-BaseBoard. Type the keys on the keyboard and the corresponding characters are displayed on the LCD.

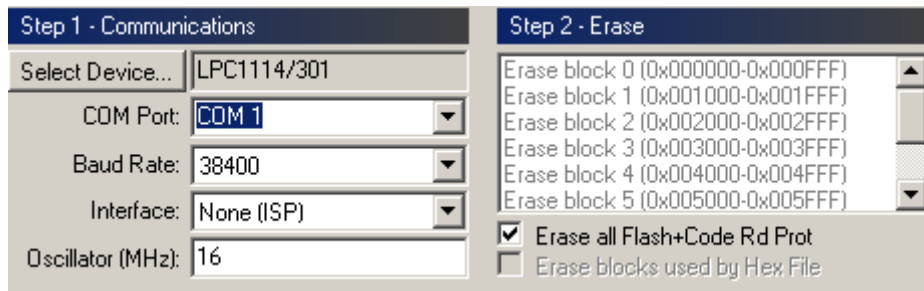
## **ISP Programming**

On the mX BaseBoard press and hold the ISP switch (SW5), then press and release reset switch (SW4), then release ISP switch (SW5). This put the micro-controller in ISP programming mode. Using flash magic flash the device. Refer below for settings in screen shots.

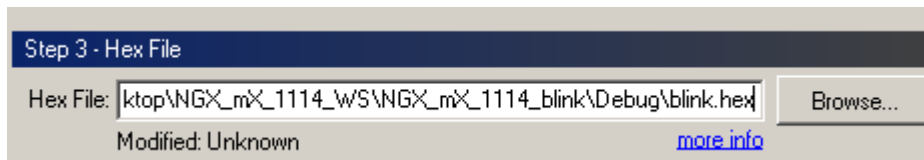
Start the Flash Magic tool.

Step 1: As in the screen shot select the device as “LPC11U14/201”. Select the com port to which the device is connected. Here it is “COM 1”. Set the baud rate to “38400”. Interface to “None (ISP)”. Set Oscillator MHz to “16”.

Step 2: Tick mark “Erase all Flash+Code Rd Prot”



Step 3: Select the path for the .hex file. Download [mX-LPC11U14\\_blinky.zip](#)



Step 4: Tick mark “Verify after programming”

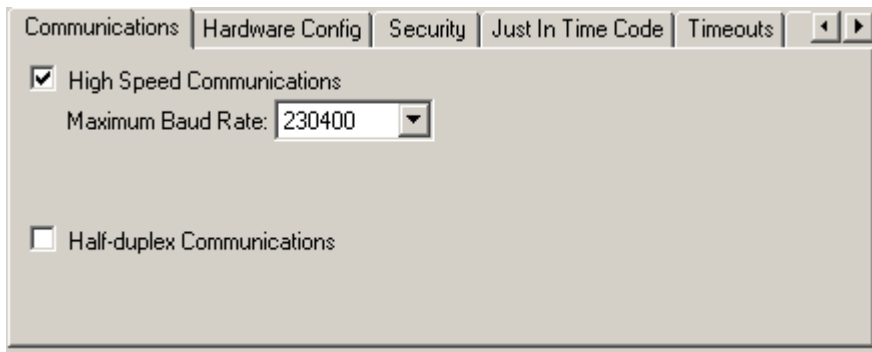




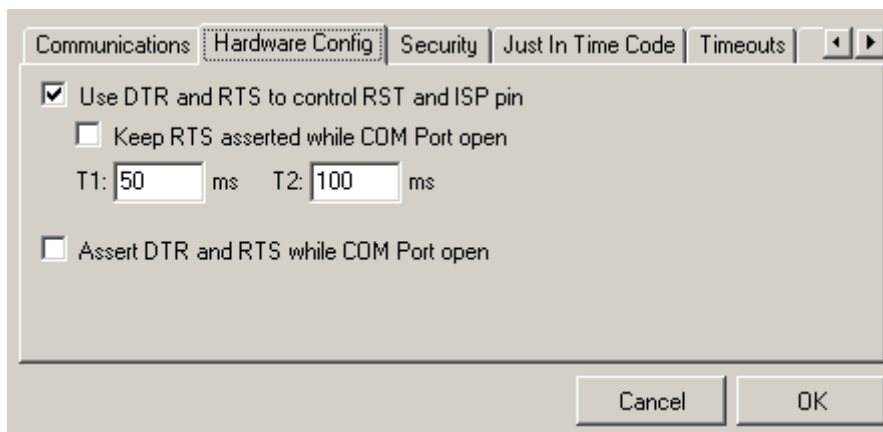
Before starting to program in the Options → Communications tab



Tick mark “High Speed Communications”

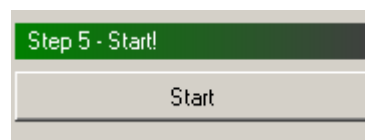


Options → Hardware config



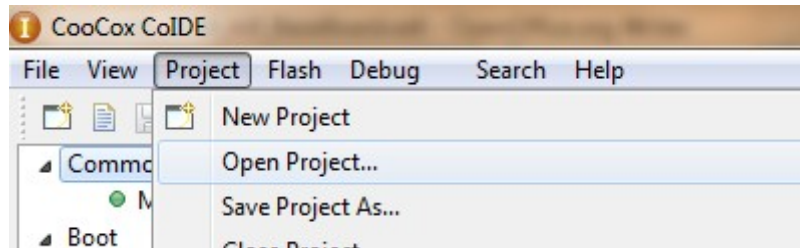
Tick mark “Use DTR and RTS to control RST and ISP pin”.

Step 5: After this start the programming.

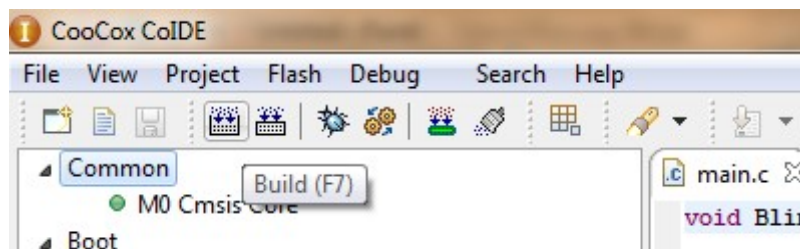


## Compiling the Workspace

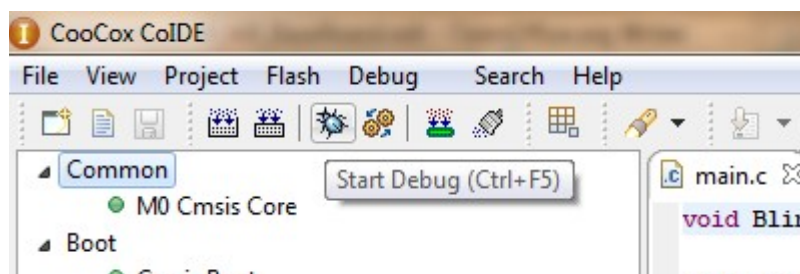
Download the workspace from [here](#) and unzip it. Start the CoIDE and Click Project to open a directory path where the work space is unzipped and open a blinky workspace.



In CoIDE click on the build(or press F7) to build the project.



After building the project initiate debug to download the program to the target. Press F5 to resume the program execution. This blinks the D2 on mX-LPC11U14-S board.



## **Schematics**

[\*mX BaseBoard\*](#)

[\*mX-LPC11U14-S\*](#)

## **Information**

### **Revision History**

*version: v1.0 author: Nagaraj Baddi*

### **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, 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 supercedes 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.