mX-BaseBoard with mX-LPC1343-S
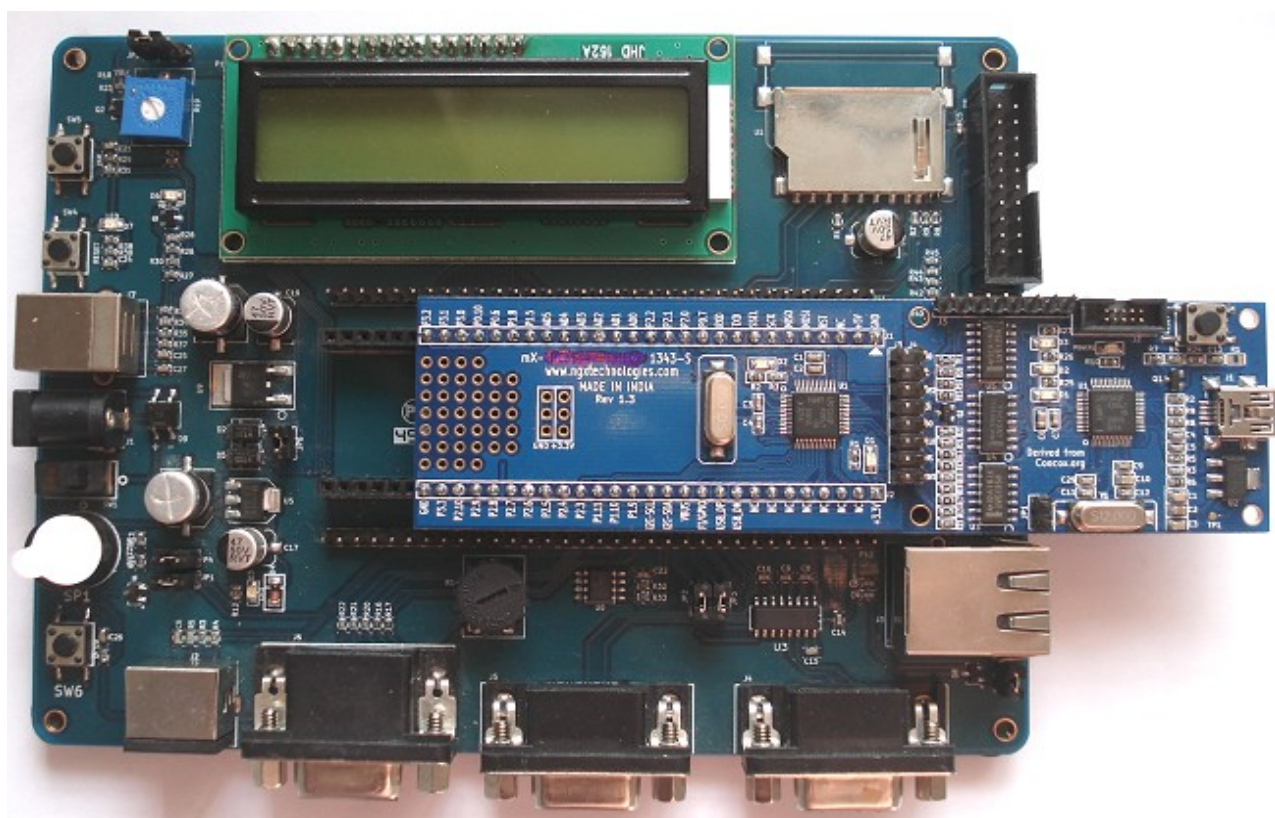
USER MANUAL

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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-LPC1343-S board. mx-LPC1343-S along with pinout for LPC1343 includes a on board programmer/debugger which can be used with CoIDE. 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

- Audio Jack

- 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
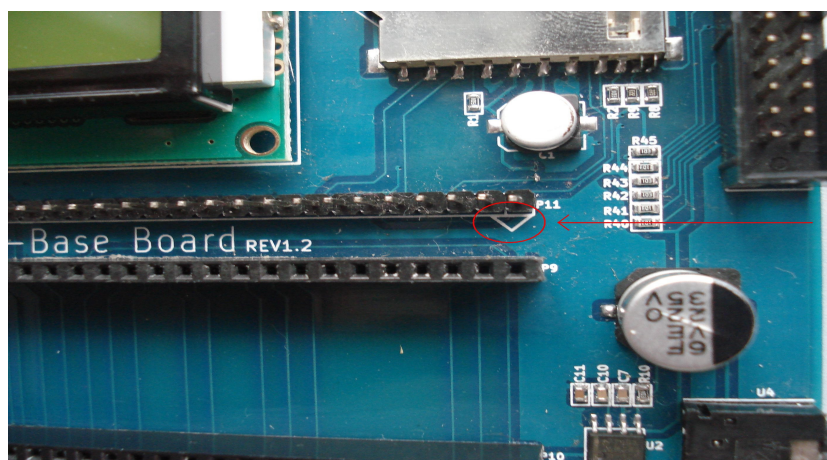- USB mini cable
- Serial cable
- PS/2 Keyboard

Software

- PC with Windows OS
- Use HyperTerminal as terminal software
- mX-LPC1343-S CoIDE workspace from NGX Technologies

Setup

Mounting the mX-LPC1343-S Board

The mX-LPC1343-S board should be mounted on the mX-BaseBoard with a particular alignment.

Improper mounting of the mX-LPC1343-S board on mX-BaseBoard may damage the mX-LPC1343-S board and / the mX-BaseBoard.

The GND pin on mX-LPC1343-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-LPC1343-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.*

Criteria for valid .bin file for LPC1343

The reserved ARM Cortex-M3 exception vector location 7 (offset 0x0000 001C in the vector table) should contain the 2's complement of the check-sum of table entries 0 through 6. This causes the checksum of the first 8 table entries to be 0. The bootloader code checksums the first 8 locations in sector 0 of the flash. If the result is 0, then execution control is transferred to the user code.

If the signature is not valid, the auto-baud routine synchronizes with the host via the serial port (UART) or boots from the USB port (PIO0_3 is sampled HIGH).

Led Blink

PORTS used → PORT0

PINS used → PIO0_7

Schematic net name → D2

A sample program to blink is provided, flash the **'mX-LPC1343_blinky.bin'** file onto mX-LPC1343-S and RESET. The LED (D2) should start blinking.

LCD

PORTS used → PORT2 for Data lines and PORT3 for Control lines.

PINS used → PIO2_6, PIO2_7, PIO2_8 and PIO2_9 for Data lines and PIO3_0, PIO3_1 and PIO3_2 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-LPC1343_lcd.bin'** file onto mX-LPC1343-S and RESET. The LCD should display "NGX TECHNOLOGIES".

SD card

PORTS used → PORT0 for MOSI,MISO and SSEL, PORT2 for SCK.

PINS used → PIO0_9,PIO0_8,PIO2_11 and PIO0_2.

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

A sample program to SD-card is provided, flash the **'mX-LPC1343_sdcard.bin'** file onto mX-LPC1343-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".

I²C

PORTS used → PORT0 for I2C-SDA and I2C-SCL.
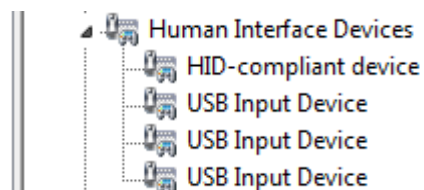
PINS used → PIO0_5 and PIO0_4.

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

A sample program to I²C is provided, flash the **'mX-LPC1343_i2c.bin'** file onto mX-LPC1343-S and RESET. The LCD should displays "I²C - PASS". Connected to the I²C lines is an EEPROM device. The program writes and reads back a piece of data to test.

USB

Schematic net name → USB_DM and USB_DP.

A sample program to USB is provided, flash the **'mX-LPC1343_usbhid.bin'** file onto mX-LPC1343-S and RESET, Connect a USB cable to connector J7 with PC. In the device manager in Windows it should be "HID-compliant device" as shown below.

Press and hold the RESET on the mX-BaseBoard, In the device manager in Windows it should be "HID-compliant device" as shown below.
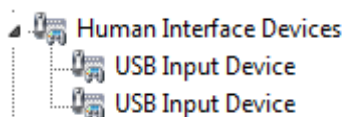
UART

PORTS used → PORT1 for TXD and RXD.

PINS used → PIO1_7 and PIO1_6.

Schematic net name → TXD and RXD.

A sample program to UART is provided, flash the **'mX-LPC1343_uart.bin'** file onto mX-LPC1343-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 → PORT1 for BUZZER.

PINS used → PIO1_11.

Schematic net name → BUZZER.

A sample program to BUZZER is provided, flash the **'mX-LPC1343_buzzer.bin'** file onto mX-LPC1343-S and RESET,on the mX-BaseBoard a tone is heard from the buzzer. The jumper JP1 should be inserted.

Ext Int

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-LPC1343_exint.bin'** file onto mX-LPC1343-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 → PIO1_4.

Schematic net name → ADC.

A sample program to ADC is provided, flash the **'mX-LPC1343_adc.bin'** file onto mX-LPC1343-S and RESET, vary the pot R14 on the mX-BaseBoard . The change in value is displayed on the LCD.

PS/2

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

PINS used → PIO2_4 and PIO2_5.

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

A sample program to PS/2 is provided, flash the **'mX-LPC1343_ps2.bin'** file onto mX-LPC1343-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

Since the LPC1343 has the USB bootloader on the ROM, it is advisable and highly recommended to use USB interface for programming. If during reset the ISP line is held low and a USB cable is connected the LPC1343 enumerates as a mass storage device. All the user needs to do is just drag-n-drop the .bin file in order to program the LPC1343.
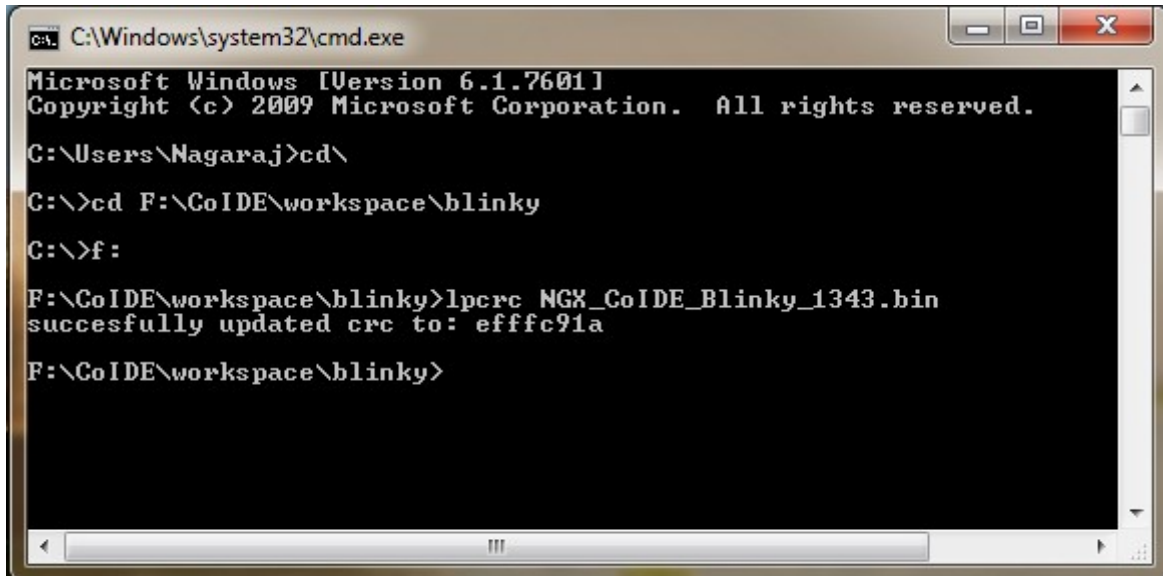
ISP using USB interface

The mX-LPC1343-S board can be programmed using USB interface. Connect a USB cable from the base board (J7) to the PC. On the base board press and hold SW5, then press reset switch SW4. Release the reset switch SW4 and then release SW5. The device will be detected as a external storage device.
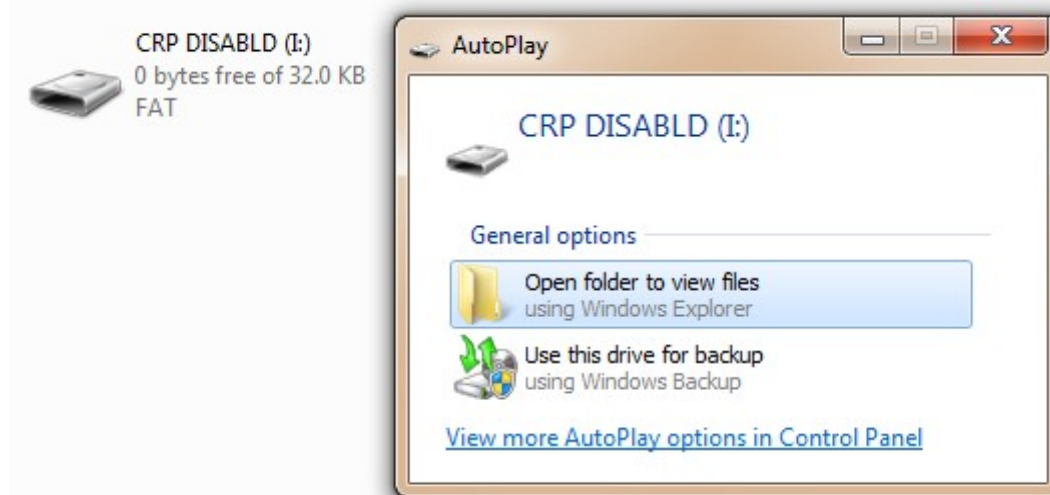
A file named firmware.bin is already present in this drive. Just delete this firmware.bin and copy a valid .bin file. The criteria for creating a valid .bin file as follows.

The checksum generated by CoIDE(GCC) is not correct and unless the checksum of the .bin file is modified, the firmware will be rejected by the USB bootloader. There is a tool to fix the checksum, To download the free tool click *here*. To fix the checksum, simply go into the command-line and go to the root folder where both the lpcrc.exe tool and your .bin file are located and **Enter the following command:**

lpcrc mX-LPC1343_blinky.bin

Reset the board and program should start executing.

ISP using UART interface

LPC1343 also supports ISP over UART. If during reset the ISP line is held low and a **USB cable is NOT connected,** the LPC1343 enters into ISP over UART. A flashing tool like Flash Magic can be used to program the LPC1343.

Unfortunately due to some unknown reason, ISP over UART using mx-lpc1343-S and mx-baseboard does not seem to work reliably. We are investigating this issue and should soon have a solution for this. But since the ISP over USB works fine, ISP over UART not functioning should not be a major issue.

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.
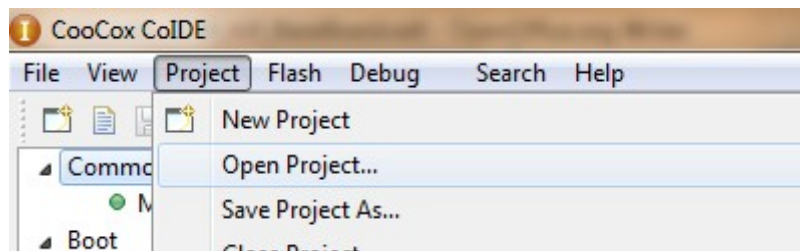
In CoIDE click on the build(or press F7) to build the project.
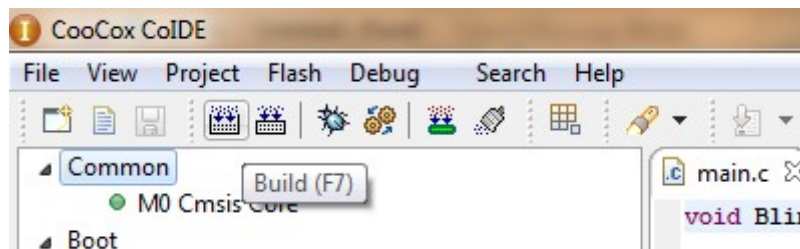
After building the project initiate debug to download the program to the target. Press F5 to run the program execution. This blinks the D2 on mX-LPC1343-S board.
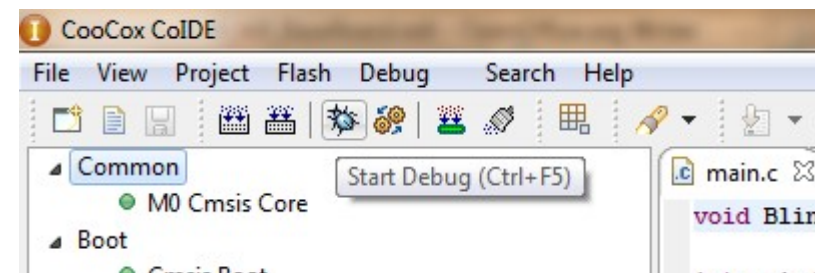
Schematics

mX BaseBoard

mX-LPC1343-S

Information

Revision History

*version: v*1.0 *author:* Nagaraj. M. Baddi

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