

ARM[®] ARM926EJ-S
32-bit Microprocessor

NuMaker NuEZCam
Samples

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Table of Contents

1	INTRODUCTION	3
1.1	NuEZCam Solution with Arduino	3
2	NUEDU UNO BOARD	6
2.1	Board schematics.....	6
2.2	Requirement	7
2.2.1	Hardware	7
2.2.2	Software	7
2.3	Purchasing information	7
2.4	Arduino IDE installation	8
2.5	Sample code building	10
3	Q&A	14
4	REVISION HISTORY	15

1 INTRODUCTION

We define the NuEZCam solution is that NuEZCam board connects NuWicam debug board.

Within the solution of AVI encoder with Arduino, user could run UART protocol to communicate between NuEdu UNO board and NuEZCam solution. AVI encoder could be executed on NuEZCam solution, the Arduino sample NuMaker_NuEZCam_Arduino_UNO.ino could be executed on the NuEdu UNO board to control the AVI encoder of NuEZCam solution by using UART protocol. The operations of UART protocol use the button and the specified flash time of LED for NuEdu UNO board. NuEdu UNO board is compatible with Arduino UNO board. Therefore we could use Arduino sample and library to do it, in order to save the development time of Arduino sample.

In this document, we will describe how to construct the samples of NuEZCam solution with Arduino. These samples includes NuMaker_NuEZCam_Arduino_UNO.ino for Arduino IDE, and Non-OS Keil BSP for NuEZCam solution. The sample NuMaker_NuEZCam_Arduino_UNO.ino has the functions of one LED controlling and one button. The sample can be executed on NuEdu UNO (or Arduino UNO) board.

1.1 NuEZCam Solution with Arduino

NuEZCam solution with Arduino uses GPIO 2 to be the button, GPIO 13 to be the LED for NuEdu UNO board. The following Figure 1–1 is the front view and back view of NuEZCam board. The pin TX of NuEdu UNO board connects the pin RX of NuEZCam board. The pin RX of NuEdu UNO board connects the pin TX of NuEZCam board. The pin 3.3V of NuEdu-UNO board connects the pin V3.3 of NuEZCam board. The pin GND of NuEdu UNO board connects the pin GND of NuEZCam board. The NuEdu UNO board is shown as Figure 1–2.

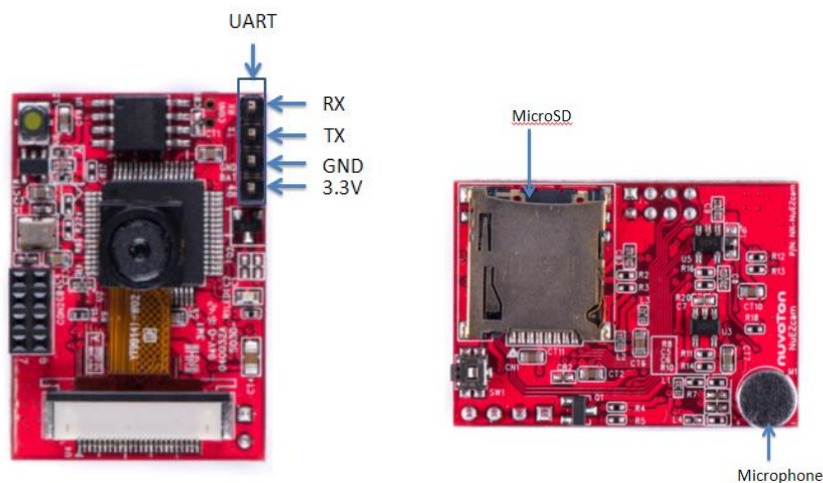


Figure 1–1 NuEZCam board.

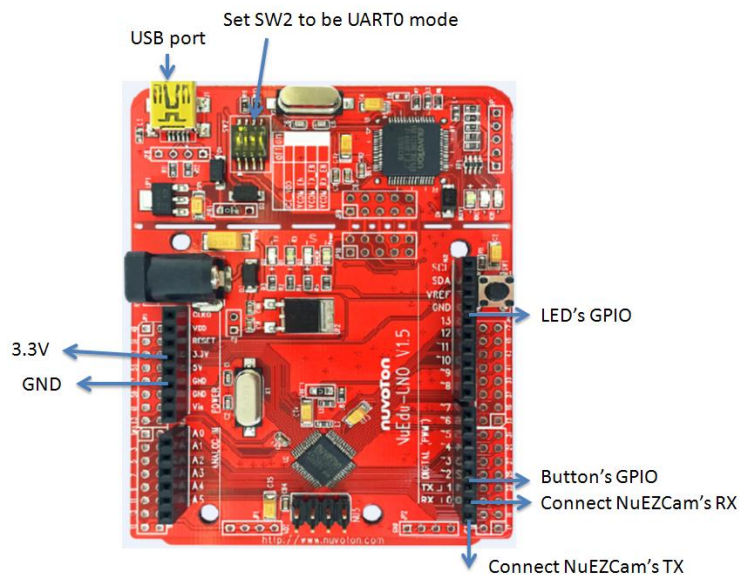


Figure 1-2 NuEdu UNO board.

After connecting between NuEdu UNO board and NuEZCam board, please make sure to set SW2 to be UART0 mode as the following Figure 1-3.

Switch Pin Number	Function Name	UART0 Mode	VCOM Mode
1	ICE_VCC	On	On
2	VCOM_En	Off	On
3	VCOM_TX	Off	On
4	VCOM_RX	Off	On

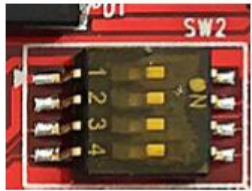


Figure 1-3 UART0 mode of NuEdu UNO board.

The NuEZCam solution includes NuEZCam board and NuWiCam debug board, the both boards connect together as shown in Figure 1-4.

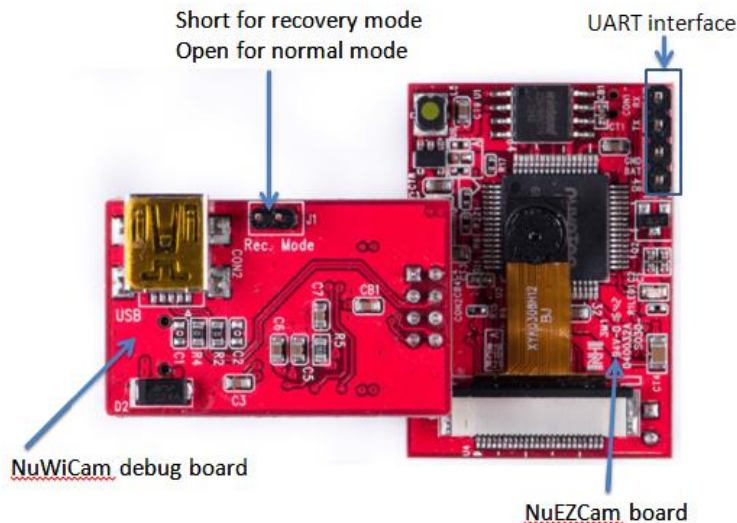


Figure 1-4 View of NuEZCam solution.

The purposes of NuWicam debug board do USB applications and set booting modes including normal mode and recovery mode. Currently the power of NuEZCam solution is provided by USB VCOM of NuWicam debug board, USB VCOM also shows UART log for NuEZCam solution.

Then RX/TX of NuEdu UNO could communicate with NuEZCam board by using UART mode, 115200 baud rate. User could press down the button of NuEdu UNO board, set the specified flash time of LED and release the button, then the specified flash time of LED is the input of options for UART log.

When the solution runs, user presses down the button and LED flashes. LED flashes one time and release the button, it means to input 1 to UART log, and later LED flashes 3 times to acknowledge. What times does LED flash and release the button ? it means input the specified flash times to UART log, and later LED flashes 3 times to acknowledge. If the acknowledgement does not display, the input of UART log must fail. User must restart NuEZCam solution and NuEdu UNO board. Don't type in any data to input within UART log while Arduino code is running.

2 NUEDU UNO BOARD

2.1 Board schematics

Figure 2-1 is the NuEZCam solution with NuEdu UNO board. The four pins RX/TX/GND/V3.3 of NuEZCam solution connects the four pins TX/RX/GND/V3.3 of NuEdu UNO board, it is shown in the following Figure 2-2.

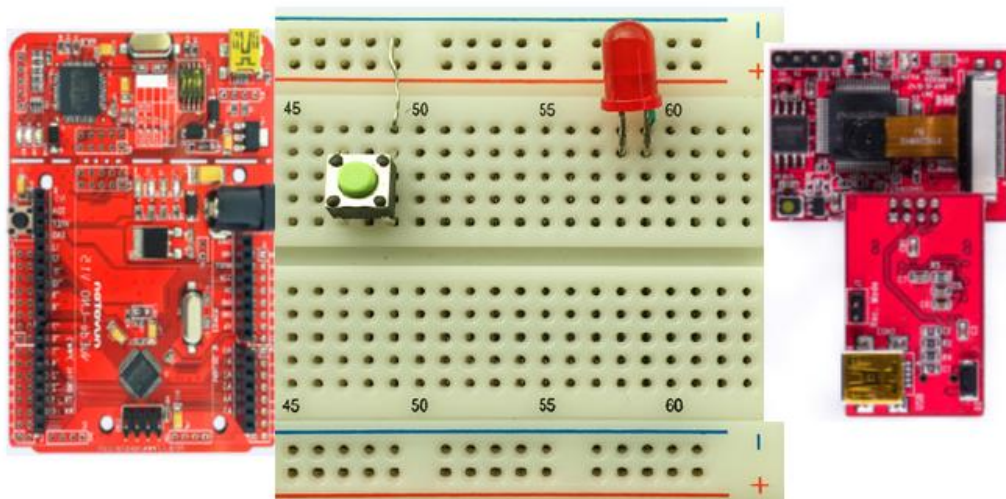


Figure 2-1 NuEZCam solution with NuEdu UNO board

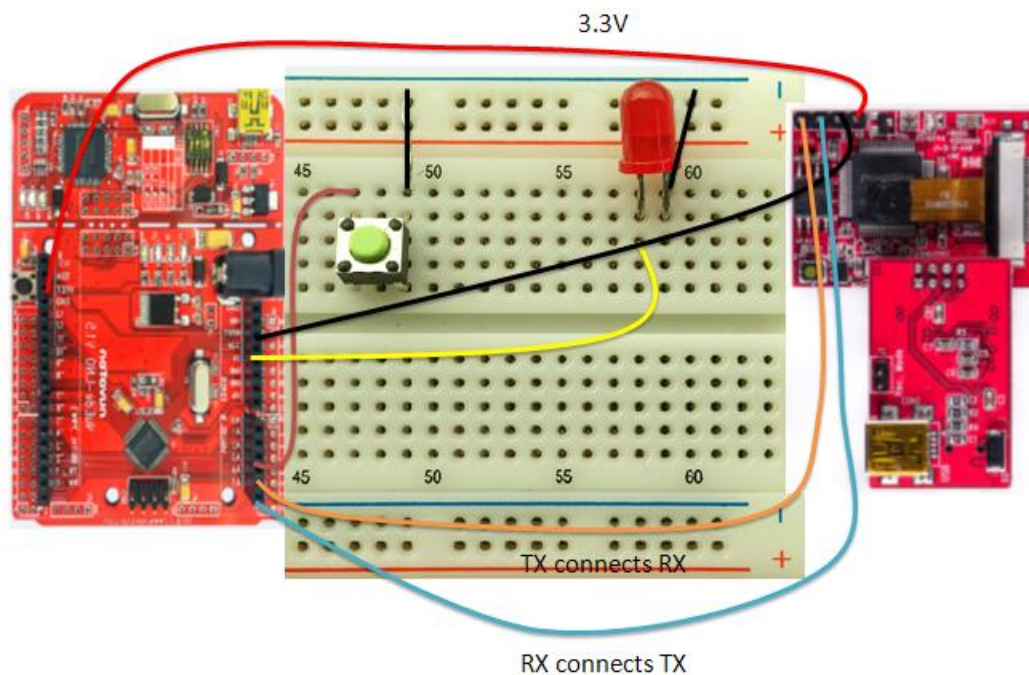


Figure 2-2 NuEZCam solution with NuEdu UNO board after connecting the components

2.2 Requirement

2.2.1 Hardware

- NuWicam debug board and NuEZCam board with firmware x 1
- Nn-Edu UNO board x 1 or Arduino UNO board x 1
 - **If your board is Nu_Edu UNO, please remember to switch 2, 3 and 4 of SW2 to 'OFF' on the board.**
- Red LED x 1.
- One button

2.2.2 Software

- Arduino IDE v1.6.9 (or later)
 - You can refer to the page to install arduino IDE for NuEdu UNO board.
<https://www.arduino.cc/en/Main/Software>
- NuMaker_NuEZCam_Arduino_UNO sample code for Arduino UNO/NuEdu UNO board.
 - Please download source on github server.
 - Path: https://github.com/OpenNuvoton/NuMaker_NuEZCam_Samples
- Non-OS_Keil BSP
 - Please download Non-OS BSP on github server.
Path: https://github.com/OpenNuvoton/NuMaker_NuEZCam_Samples
- Windows tool AutoWriter
 - Please download AutoWriter tool on github server.
Path: https://github.com/OpenNuvoton/NuMaker_NuEZCam_Samples

2.3 Purchasing information

- NuEdu UNO board
URL: <https://world.tmall.com/item/523268526584.htm?spm=a312a.7700824.w4011-6765047385.25.2qjfiz&id=523268526584&rn=93873a1038dd4952f86ee4c2766ccae0&abucket=10>

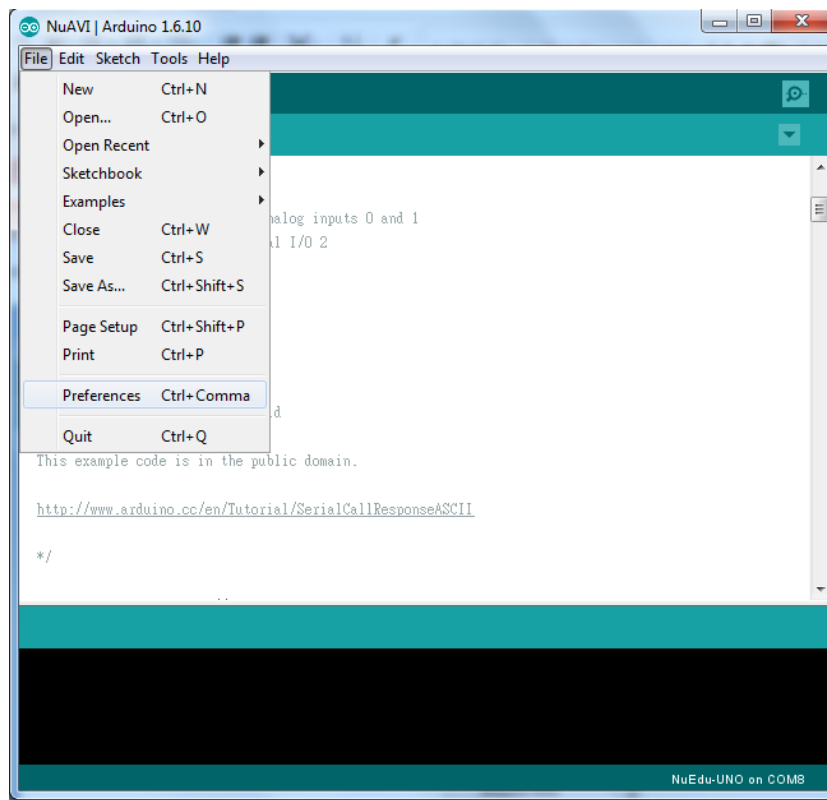
2.4 Arduino IDE installation

Step 1: Download Arduino 1.6.10 IDE from <https://www.arduino.cc/en/Main/Software>



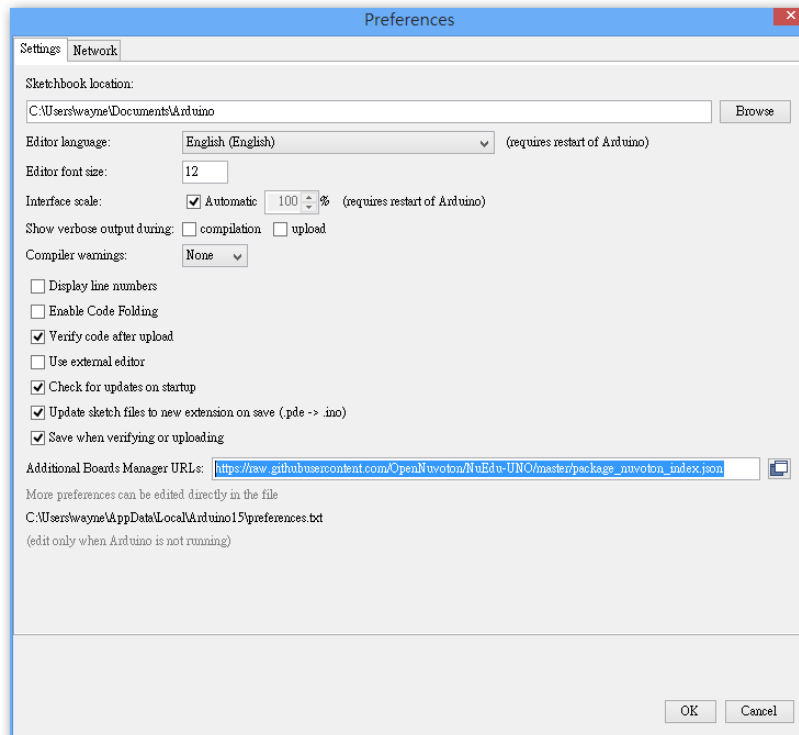
Step 2: Extract arduino-1.6.10-windows.zip to c:\arduino-1.6.10.

Step 3: Double-click arduino.exe, and then go to File->Preferences.

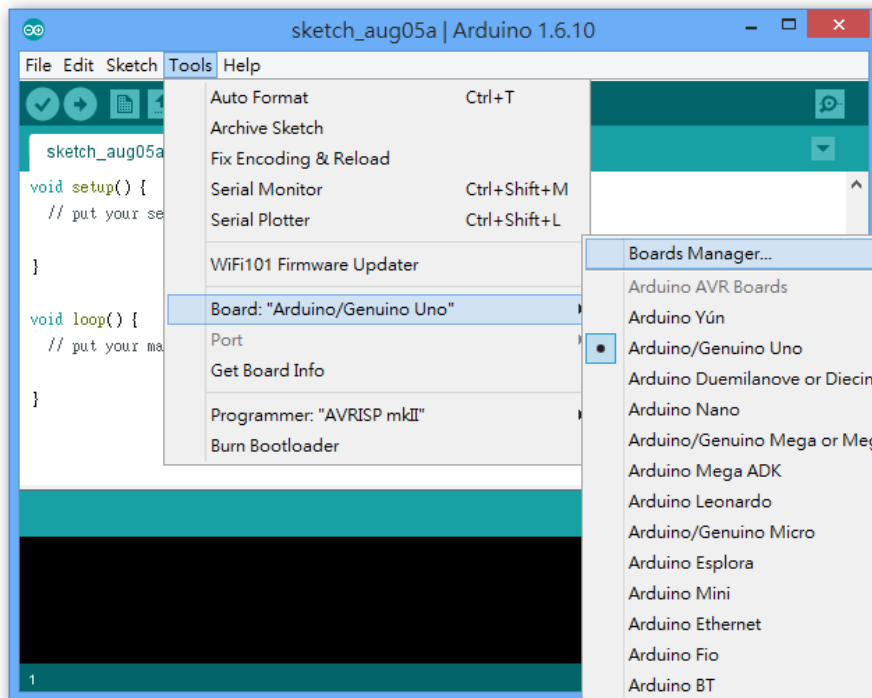


Step 4: Paste following URL to 'Additional Boards Manager URLs' input field:

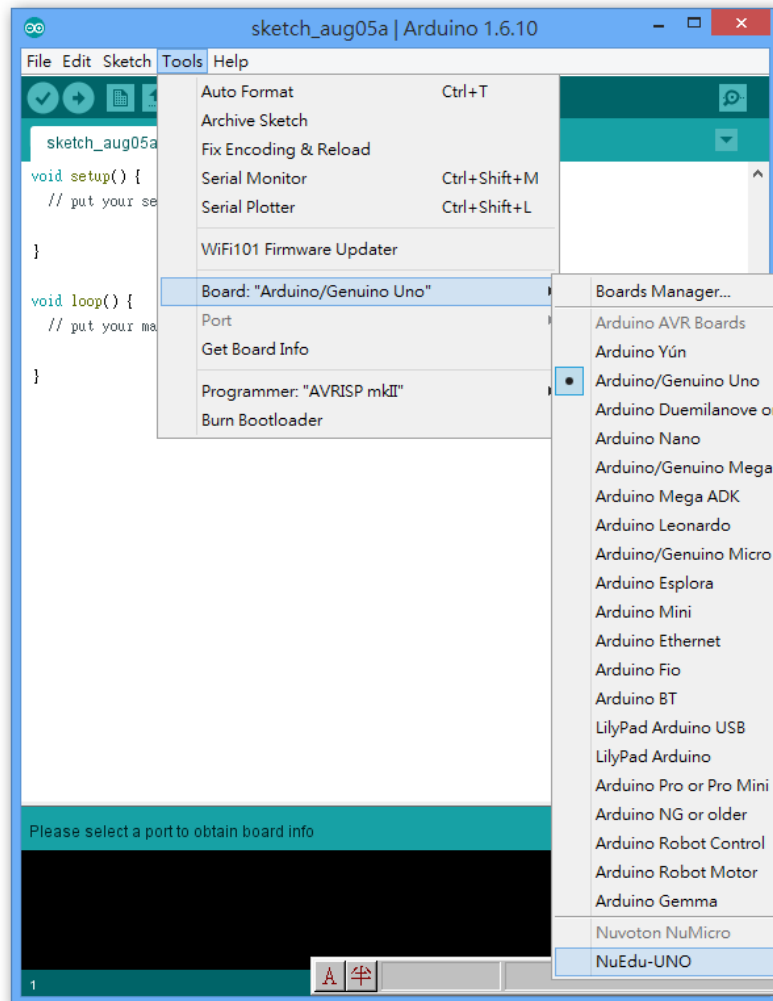
https://raw.githubusercontent.com/OpenNuvoton/NuEdu-UNO/master/package_nuvoton_index.json



Step 5: Under Tools->Board->Boards Manger, search NuEdu-UNO by Nuvoton, click Install



Step 6: You can select NuEdu-UNO in Arduino IDE now.

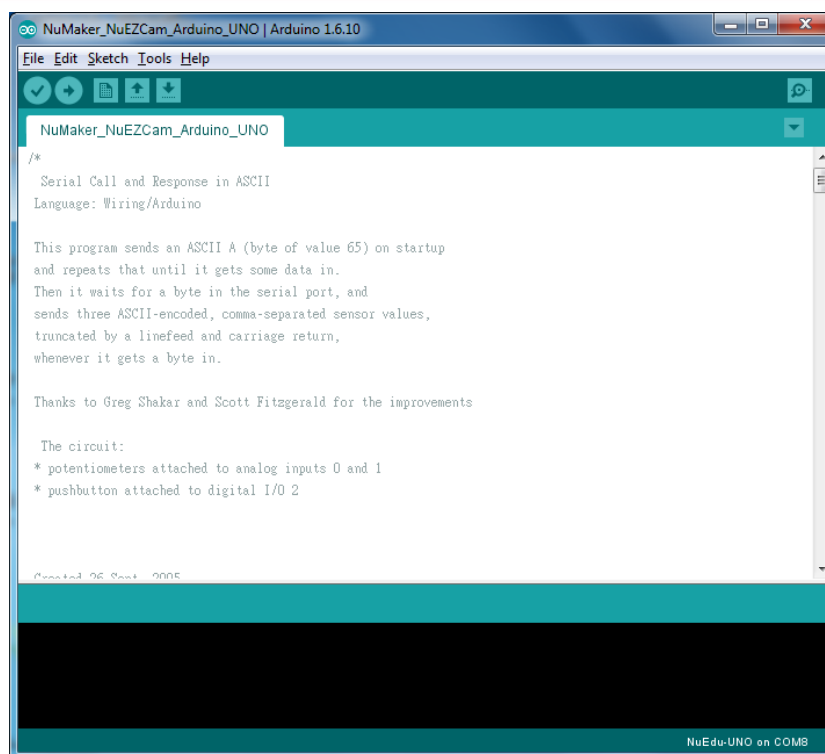


If you could not found the menu item NuEdu-UNO, please check your network.

2.5 Sample code building

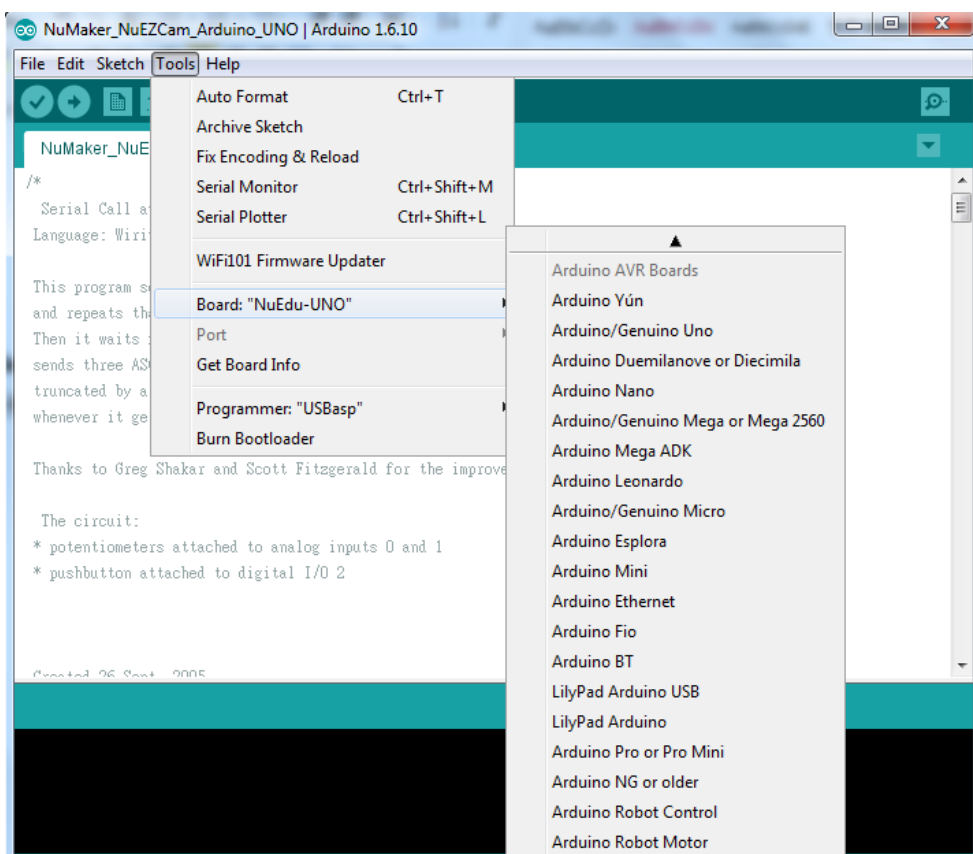
Please follow the below steps to build executable binary.

Step 1: Load NuMaker_NuEZCam_Arduino_UNO sample code for Arduino UNO board.



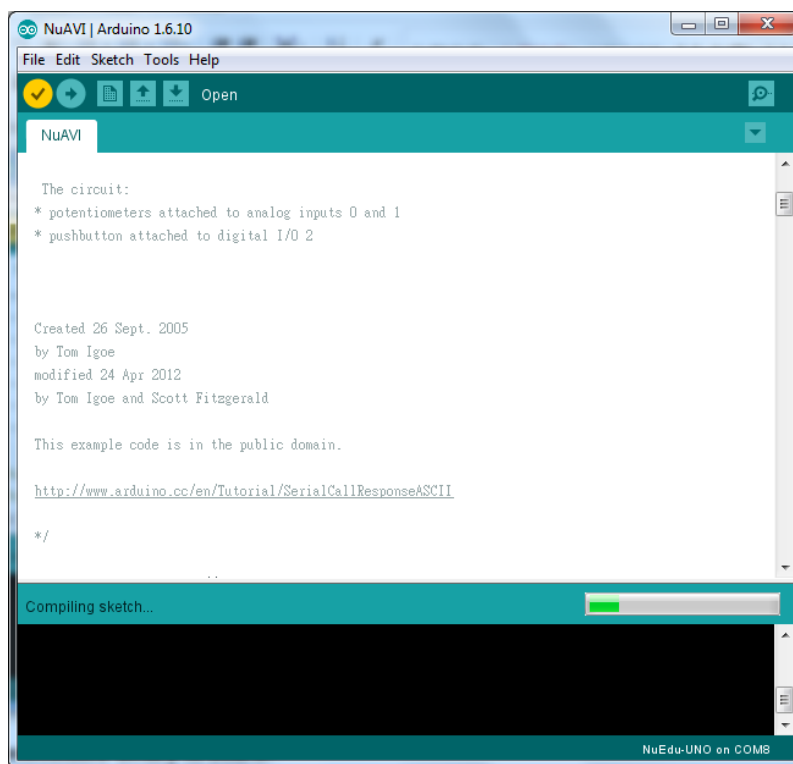
Step 3: Select configuration for Geduino UNO board.

<Tools> → <Board: "NuEdu UNO"> → Select NuEdu UNO.



Step 4: Build sample code.

<Sketch> → <Verify/Compile>



Step 5: Upload executable binary to board.

<Sketch> → <Upload>



3 Q&A

Q: How do test NuEdu UNO board alone by the UART log of Windows ?

A: Please go to the path https://github.com/OpenNuvoton/NuMaker_NuEZCam_Samples , to execute the file "Nu-Link_USB_Driver 1.2.exe" within the subfolder utility, in order to install the Windows driver of Nuvoton Virtual Com port. SW2 sets VCOM mode for the jumpers VCOM_En, VCOM_TX and VCOM_RX are on. Then the Uart log of Windows could set the commands to NuEdu UNO board. NuEdu UNO has two mode, VCOM mode and UART0 mode. Within VCOM mode, NuEdu UNO board as slave, and could connect the UART log of Windows. For UART0 mode, NuEdu UNO board as master could connect NuEZCam board

Q: Could the other Arduino board do the NuEZCam solution?

A: Currently Arduino UNO board has the UART function, the function could work the UART log of Windows. If the other Arduino board connects the NuEZCam board for four pins RX/TX/GND/V3.3, it could do the NuEZCam solution.

Q: How to do ARM mbed IDE

A: Please refer to the code in the path <https://developer.mbed.org/users/shliu1/code/mbed-os-example-NuEZCam/>, and refer to the folder NuMaker_NuEZCam_NuMaker_PFM_NUC472 within the path https://github.com/OpenNuvoton/NuMaker_NuEZCam_Samples.

4 REVISION HISTORY

Date	Revision	Description
2016.11.29	1.02	1. Support NuEZCam solution
2016.09.13	1.01	1. Initially issued

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