ARM® ARM926EJ-S

32-bit Microprocessor

NuMaker NuEZCam Samples

For additional information or questions, please contact: Nuvoton Technology Corporation.

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Table of Contents

1 INTRODUCTION

In NuEZCam samples, we use UART protocol to communicate between NuEdu-UNO board and N32903 board. AVI encoder could be executed on N32903 board, the sample NuMaker_NuEZCam_Arduino_UNO.ino could be executed on the NuEdu-UNO board to control the functions of AVI encoder by using UART protocol. 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 NuEZCam samples. These samples includes NuMaker_NuEZCam_Arduino_UNO.ino for Arduino IDE, and Non-OS Keil BSP for N32903 board. The sample NuMaker_NuEZCam_Arduino_UNO.ino has the functions of one LED controlling and one button. These sample can be executed on NuEdu-UNO (or Arduino UNO) board.

1.1 Sample NuEZCam

NuEZCam uses GPIO 2 to be the button, GPIO 13 to be the LED. The following Figure 1-1 is the connector of partial schematics for N32903 board. The pin TX of NuEdu-UNO board connects the pin 54 (GPD2) of N32903 board. The pin RX of NuEdu-UNO board connects the pin 53 (GPD1) of N32903 board. The pin 3.3V of NuEdu-UNO board connects the pin 15 (VDD33) of N32903 board. The pin GND of NuEdu-UNO board connects the pin 16 (VSS) of N32903 board.

CON12 (Top board, 1D12) Header 29x2, 2.54mm Male:

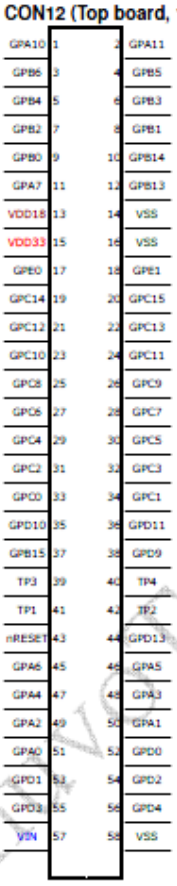


Figure 1-1 connector of N32903

After connecting between NuEdu-UNO and N32903 board, please make sure to set SW2 to be UART0 mode as the following Figure 1-2.

Then RX/TX of NuEdu-UNO could communicate with N32903 board by using UART mode, 115200 baud rate, user could create UART log for N32903 to see the status.

When the program is running, 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 times to UART log, and later LED flashes 3 times to acknowledage. If the acknowledage does not display, the input of UART log must fail. User will see the result from the UART log of N32903 board.

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 1-2 UART0 mode of NuEdu-UNO board

2 NUEDU UNO BOARD

2.1 Board schematics

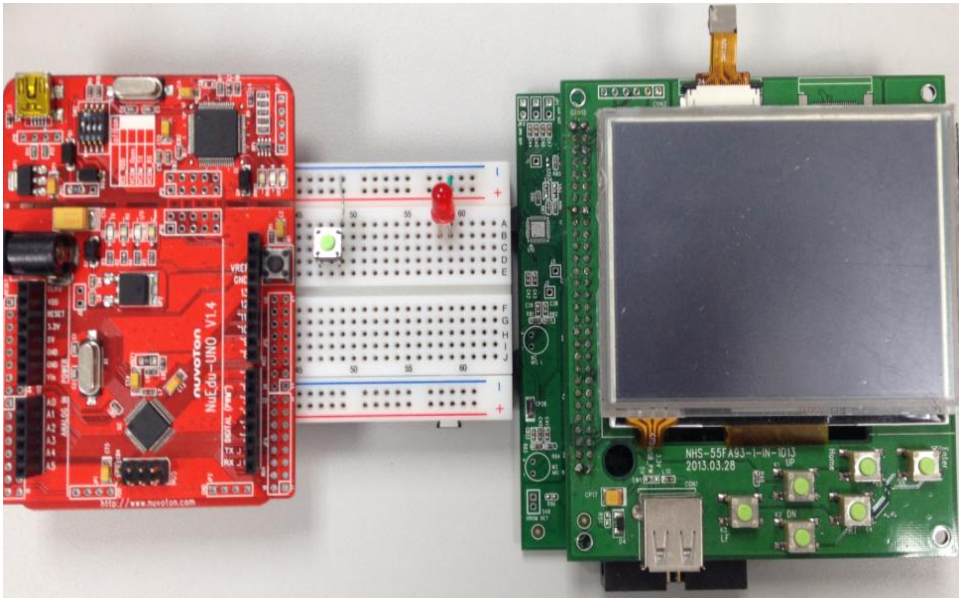


Figure 2-1 N32903 board with NuEdu UNO board

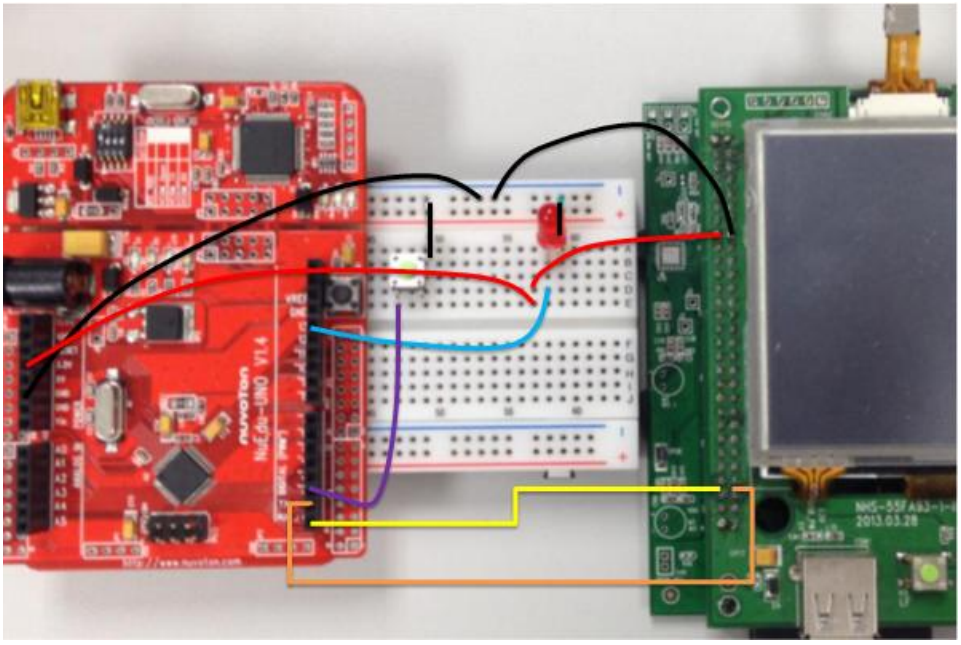


Figure 2-2 N32903 board with NuEdu UNO after connecting the components

2.2 Requirement

2.2.1 Hardware

- N32903 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 LEDs x 1.
- One button

2.2.2 Software

- Arduino IDE v1.6.9 (or later)
  - You can refer the page to install arduino IDE for NuEdu-UNO. https://www.arduino.cc/en/Main/Software
- NuMaker_NuEZCam_Arduino_UNO sample code for Arduino UNO/UnEdu UNO board.
  - Please download source on github server.
  - Path: https://github.com/OpenNuvoton/NuMaker_NuEZCam_Samples
- Non-OS_Keil BSP for N32903
  - 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

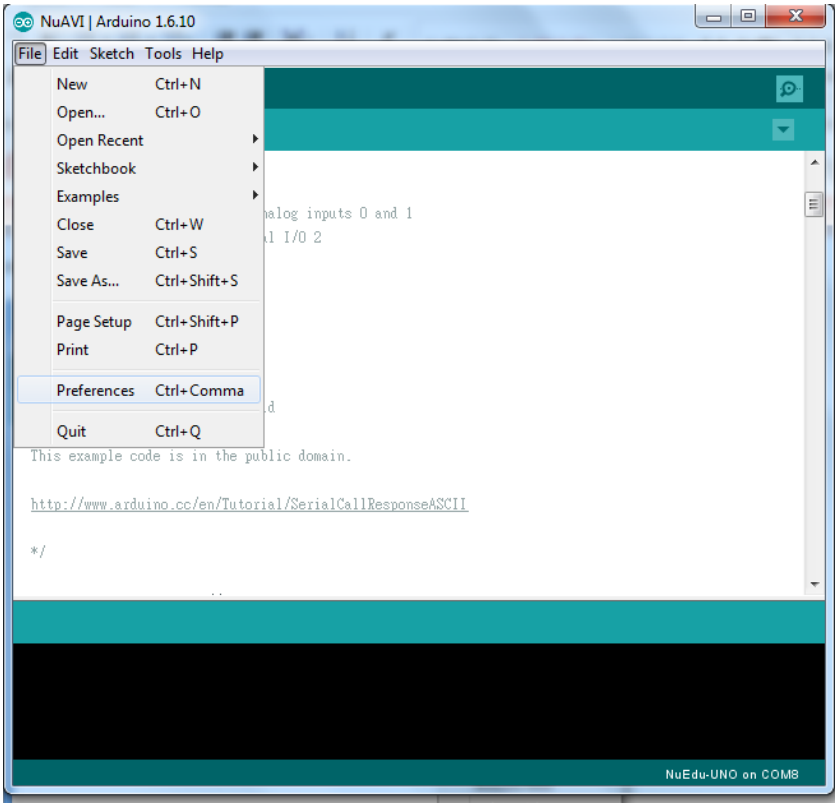
- **NuEdu UNO board**
  URL: https://world.tmall.com/item/523268526584.htm?spm=a312a.7700824.w4011-6765047385.25.2qjfiz&id=523268526584&rn=93873a1038dd4952f86ee4c2766ccae0&abbucket=10

2.4 Arduino IDE installation

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

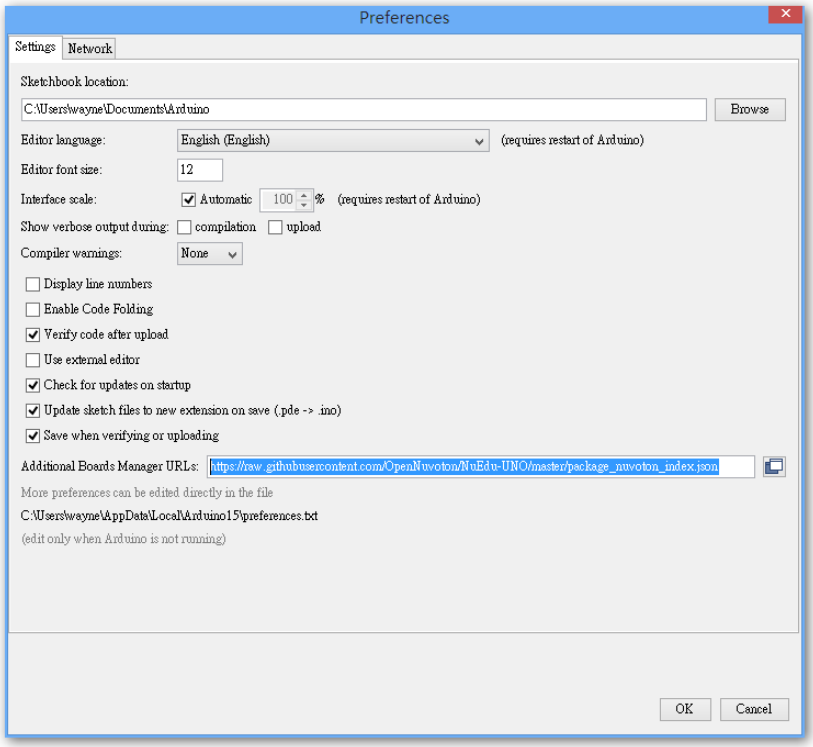
Step 2: Extract arduino-1.6.10-windows.zip to c:\arduino-1.6.10.

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

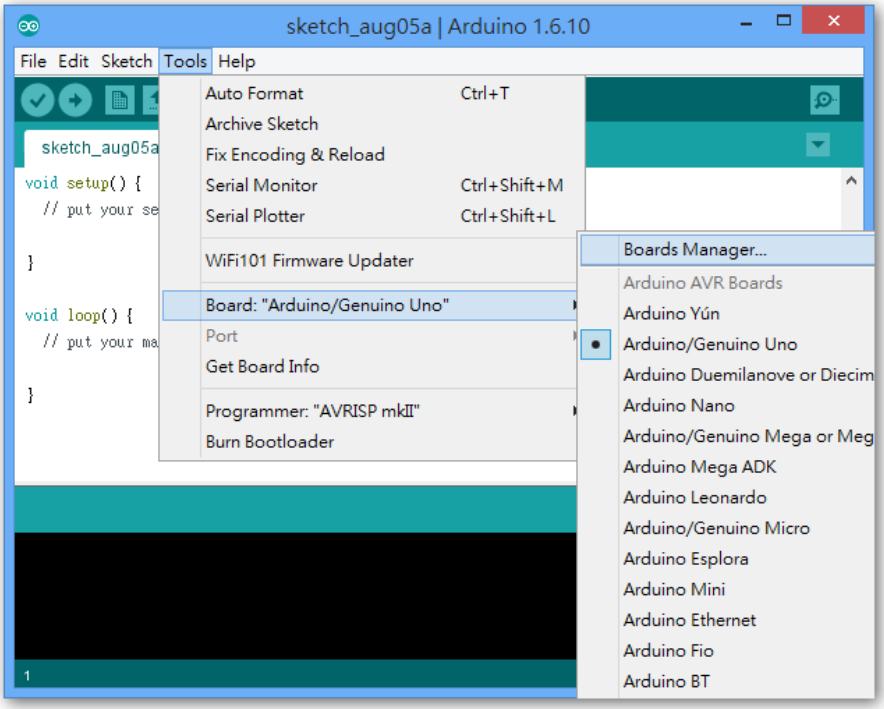


Step 4: Paste following URL to 'Additional Boards Manager URLs' input field:

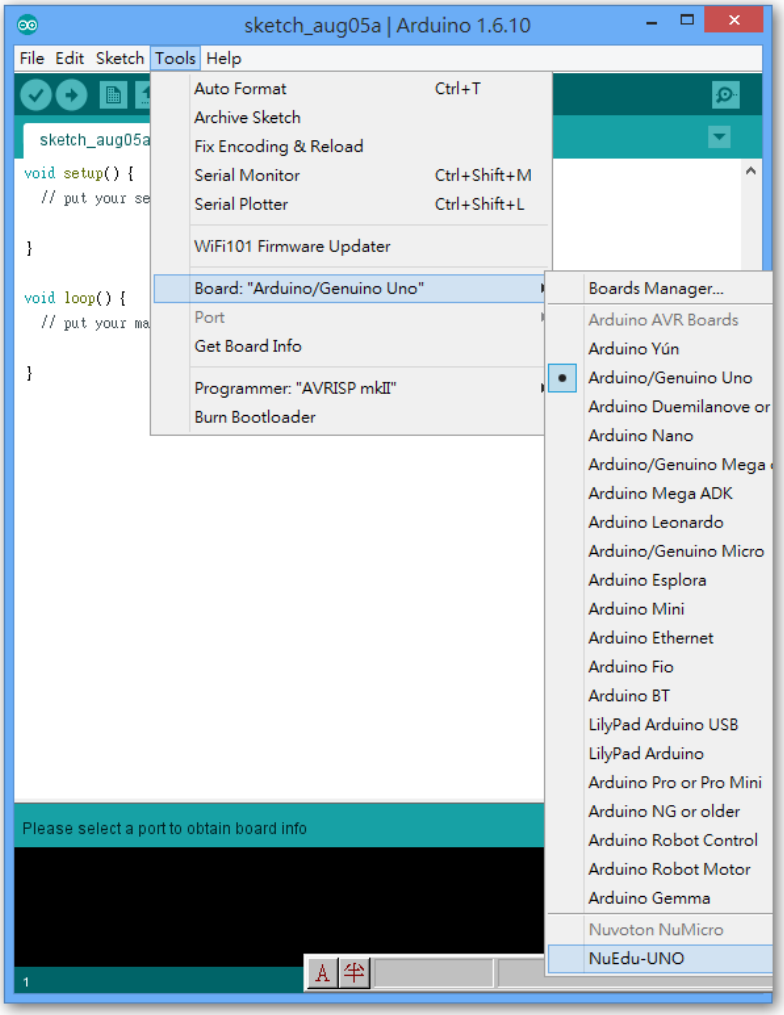
https://raw.githubusercontent.com/OpenNuvoton/NuEdu-UNO/master/package_nuvoton_index.json



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.



Sometimes the board NuEdu-UNO could be found under the menu item.

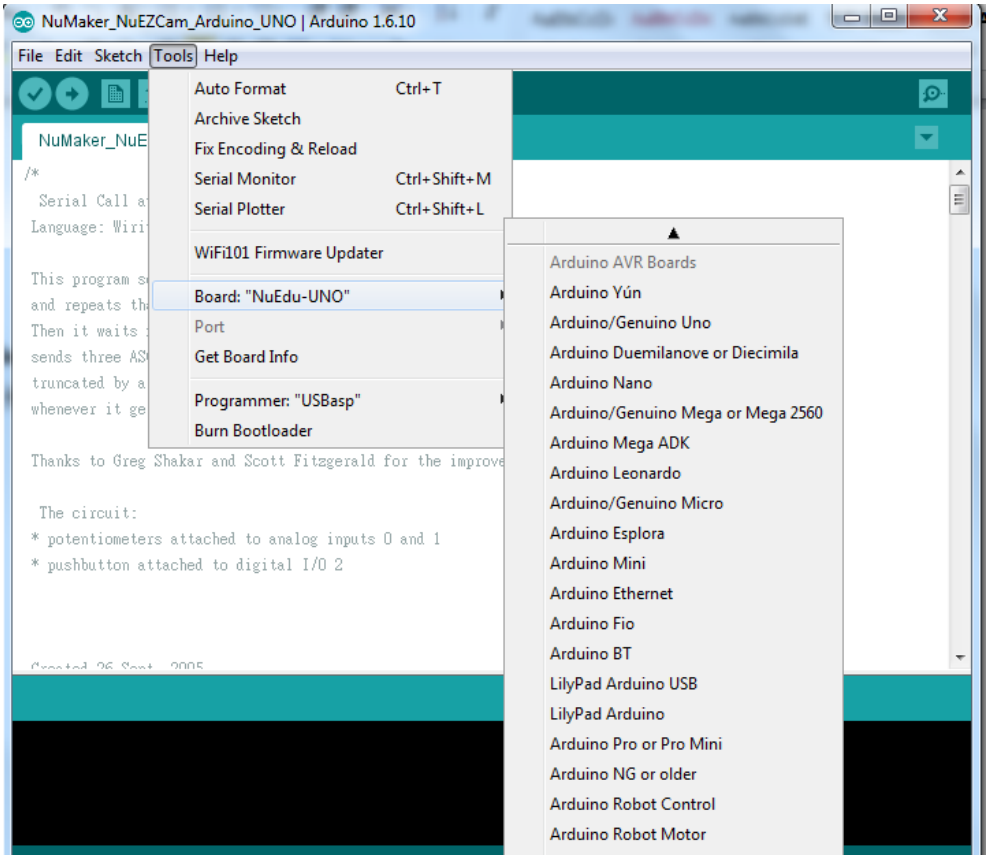
2.5 Sample code building

Please follow below steps to build executable binary.

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

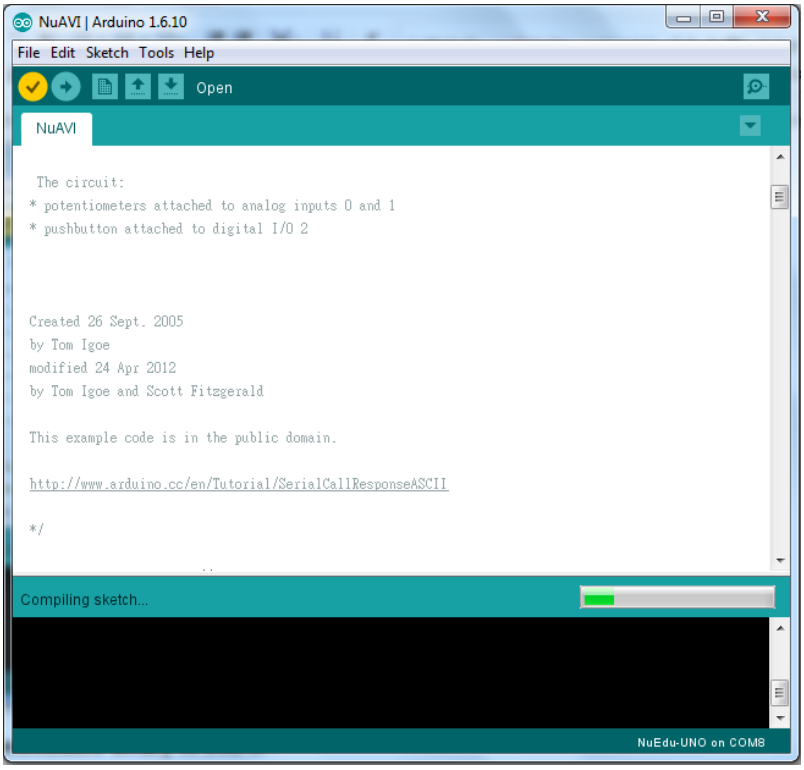
Step 3: Select configuration for Geduino UNO board.

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



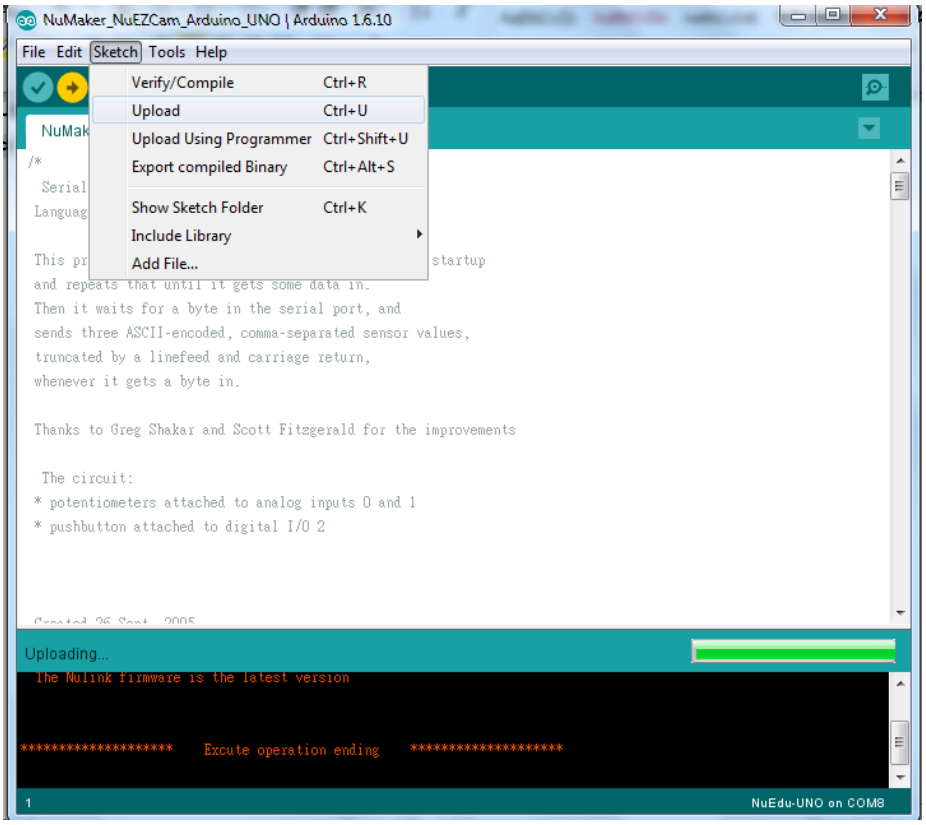
Step 4: Build sample code.

<Sketch> → <Verify/Compile>



Step 5: Upload executable binary to board.

<Sketch> → <Upload>


NuMaker_NuEZCam_Arduino_UNO | Arduino 1.6.10
File Edit Sketch Tools Help
Verify/Compile Ctrl+R
Upload Ctrl+U
Upload Using Programmer Ctrl+Shift+U
Export compiled Binary Ctrl+Alt+S
Show Sketch Folder Ctrl+K
Include Library
Add File...
Then it waits for a byte in the serial port, and
sends three ASCII-encoded, comma-separated sensor values,
truncated by a linefeed and carriage return,
whenever it gets a byte in.
Thanks to Greg Shakar and Scott Fitzgerald for the improvements
The circuit:
* potentiometers attached to analog inputs 0 and 1
* pushbutton attached to digital I/O 2
Uploading...
The Nu1nk firmware is the latest version
********** Excute operation ending **********
1
NuEdu-UNO on COM8

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 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-NO board. In short NuEdu-UNO has two mode, VCOM mode and UART0 mode. Within VCOM mode, NuEdu-UNO board as slave could connect the UART log of Windows. For UART0 mode, NuEdu-UNO board as master could connect N32903 board of NuMaker NuEZCam.

Q: Could the UART log of Windows set the commands to the N32903 board of NuMaker NuEZCom ?

A: Currently the function does not work. It means that NuEdu-UNO board has the both functions “UART mode” and “VCOM mode”, the NuEdu-UNO board has no such function.

Q: Could Arduino board do the solution of NuMaker NuEZCam ?

A: Currently Arduino UNO board has the functions of TX and RX, the functions connects the UART log of Windows. If Arduino board connects the N32903 board of NuMaker NuEZCam, user should find the 2 GPIOs to be TX and RX and uses the TX and RX to connect the RX and TX of N32903 board.

4 REVISION HISTORY

Date	Revision	Description
2016.09.13	1.00	1. Initially issued.

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