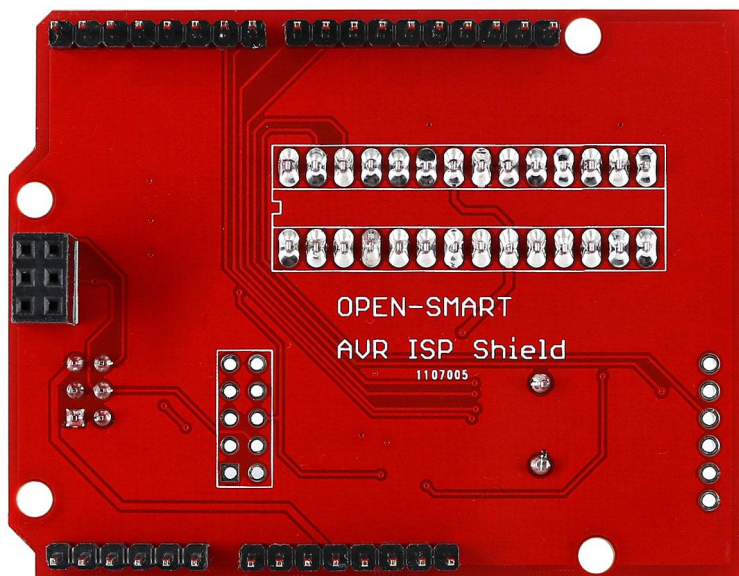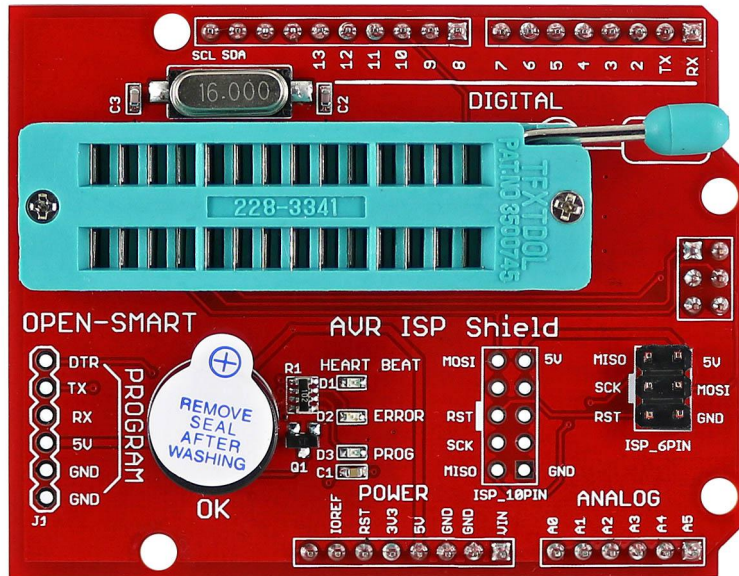# OPEN-SMART

Name: AVR ISP Shield manual

Version: v1.0

Date: Nov 18, 2016

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1 Description

This is a programmer expansion shield that allows your Arduino board to modify the fuse bits and burn bootloader into external chip and other Arduino boards.

On-board buzzer and LED indicators, indicating whether the burning is successful, it is convenient for Arduino board designers to batch burning. According to OPEN-SMART user manual, it is very easy to use.

Features:

- Compatibility: As it uses SPI pins of ICSP   interface, compatible with Arduino UNO R3 / Arduino Mega2560, can change to the bootloader burner when it is directly plugged onto the two boards.

- Operating voltage: 5V

- Operating current: 500mA (max)

- Arduino board to be burned: support Arduino UNO R3 / Mega2560 / Nano / pro mini (5V 16M)

- On-board buzzer, if the fuse bit is successfully modified, it will sound once, and then if burning bootloader is OK, it will sound once again. If it is not two beeps, burning is failed. You can capture the sound instead of LED lights, so this will improve the efficiency of burning.

- On-board LED indicators, HEART BEAT led lights up like a breathing light when powered normally. During programming, the PROG indicator flashes until it finishes. If the programming is unsuccessful, the ERROR indicator (red) will light.

- Onboard 28P locking seat for Atmega328P, Atmega168P, Atmega8 bootloader burning

- Onboard ISP_6PIN interface, for the external Arduino board bootloader burning

- On-board ISP_10PIN interface

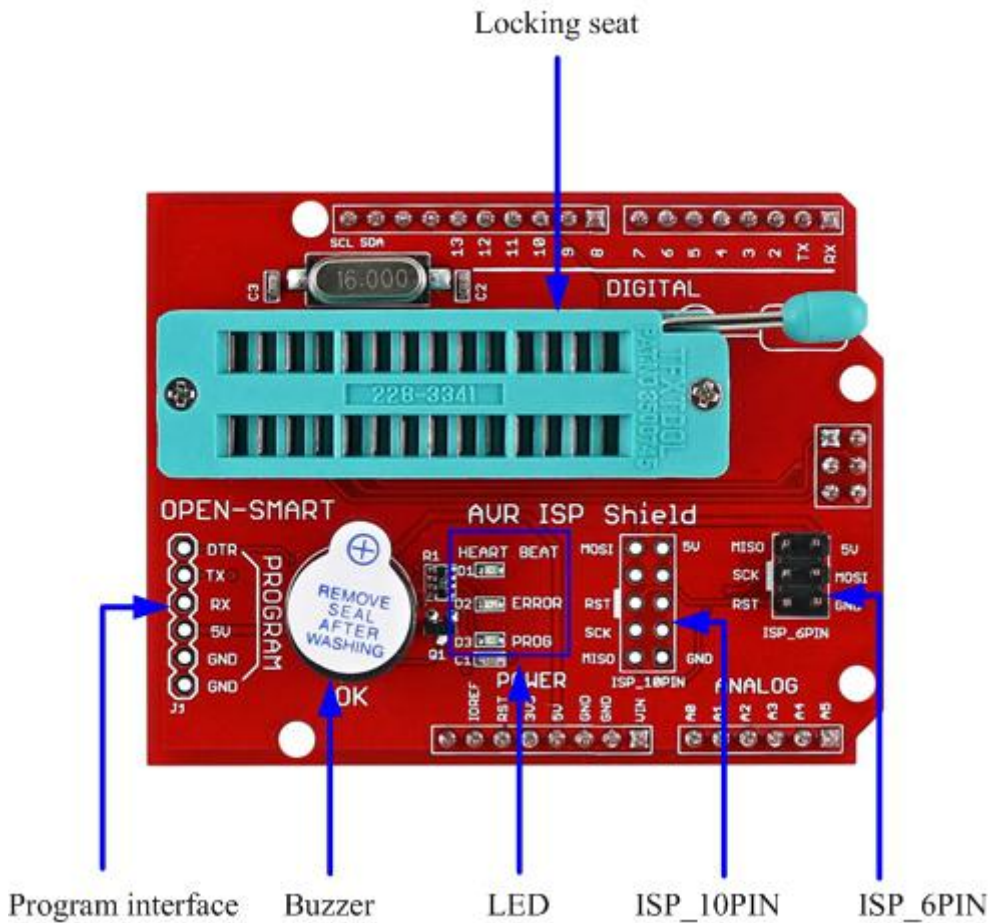- On-board FT232RL and CH340G USB to TTL programmer interface for uploading code to the chip on the 28P locking seat.

2 Please read me first!

(1) If you do not get the Arduino IDE, please download it here.

(2) You should get an Arduino UNO R3 board or Arduino Mega2560(You may borrow it from your friends) to change it into an Arduino booloader burner with the AVR ISP Shield.

3 Specification

Item	Min	Typical	Max	Unit
Power Supply(VCC)	4.75	**5**	5.25	VDC
Current (@VCC=5V)	/	10	500	mA
Logic interface	5V TTL			/
28P locking seat support chip	Atmega328P, Atmega168P, Atmega8			/
ISP_6PIN support board	Arduino UNO R3 / Mega2560 / Nano / pro mini (5V 16M)			/
Board stackable	Arduino UNO R3 / Arduino Mega2560			/
Dimensions	54X69X22			mm

4 Interface

Locking seat

Program interface   Buzzer   LED   ISP_10PIN   ISP_6PIN

Locking seat: you can plug ATmega328P / ATmega168P / Atmega8 into the seat.

Program interface: FT232RL and CH340G USB to TTL programmer interface for uploading code to the chip on the 28P locking seat.

Buzzer: If the fuse bit is successfully modified, it will sound once, and then if burning bootloader is OK, it will sound once again. If it is not two beeps, burning is failed.

LED: HEART BEAT led lights up like a breathing light when powered normally. During programming, the PROG indicator flashes until it finishes. If the programming is unsuccessful, the ERROR indicator (red) will light.

ISP_10PIN: can connect to ISP_10PIN of some AVR development board.

ISP_6PIN: for the external Arduino board bootloader burning.

5 Usage

## 5.1 Make Bootloader Burner

Step 1: Things that are required

1) 1 x Arduinio UNO R3 and USB cable
2) 1 x PC
3) 1 x AVR ISP Shield

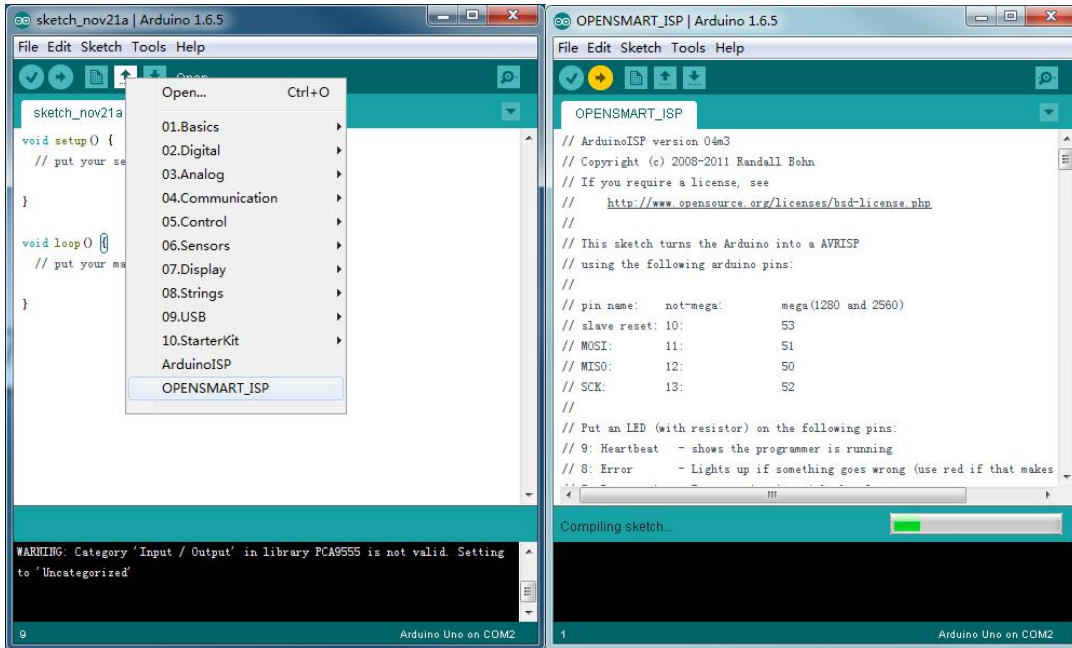**Step2:** Borrow an Arduino UNO R3 or buy other compatible board, such as OPEN-SMART UNO

Step3: Copy the file folder "OPENSMART_ISP" and put it in the directory of \arduino-1.6.x\examples.

Step4: Plug the AVR ISP Shield onto Arduino UNO R3 directly.

Step5: Connect the USB cable. Open the Arduino IDE and select the correct board (Arduino Uno), and the serial port that it occupies. Note that you should select Arduino AVRISP mkII when uploading the sketch.
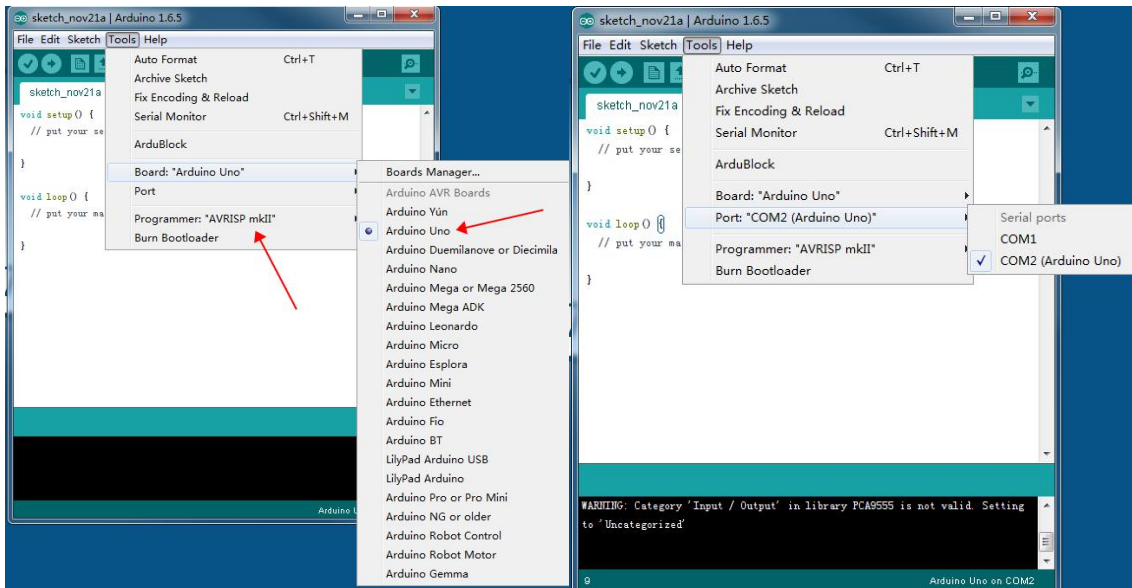
Step6: Open OPENSMART_ISP sketch, and upload the sketch to the Arduino UNO R3 to use it as an in-system programmer (ISP). When you has done uploading, you can see the HEART BEAT led is beating like a heart. At this time you have successfully made the bootloader burner.

5.2 Burn "Arduino UNO" bootloader to ATmega328P Chip

Step 1: Other things that are required

1) 1 x ATmega328P-PU

Step2: Plug the ATmega328P-PU onto the green locking seat and pay attention to the orientation of the chip.

Step3: You can select which bootloader to burn to the Chip. We select Arduino Uno here.

Step4: Select programmer "Arduino as ISP" and click Tools/Burn Bootloader to burn the booloader via the ICSP interface.
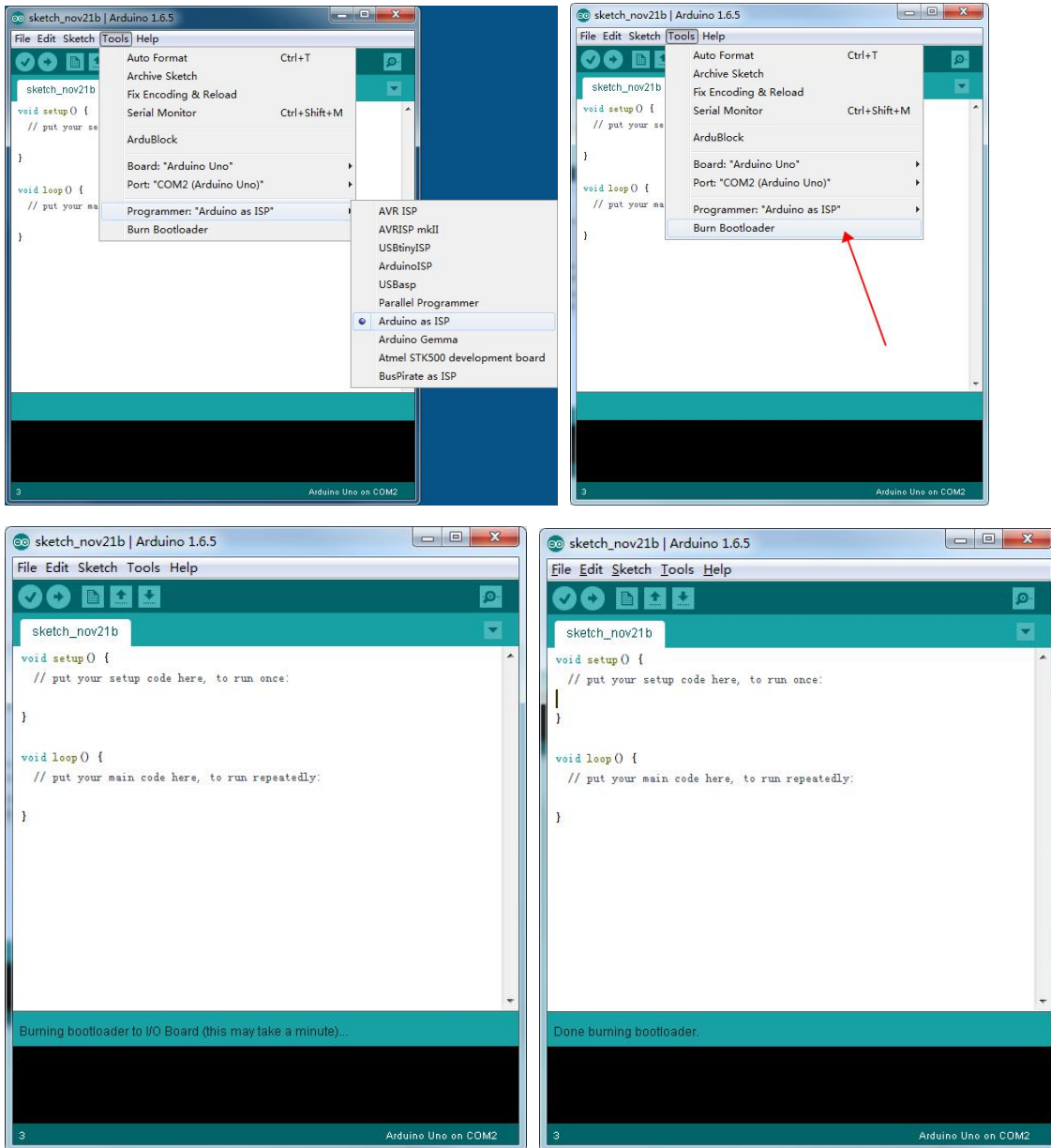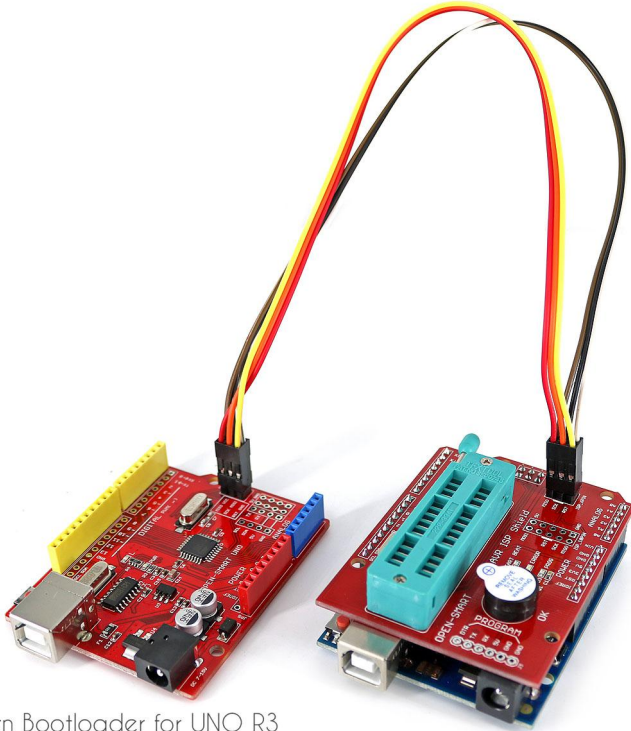

You can hear two beeps, at this time, the Arduino UNO bootloader is burned OK.If it is not two beeps, burning is failed and the ERROR led will light on.

5.3 Burn "Arduino UNO" bootloader to Arduino Board
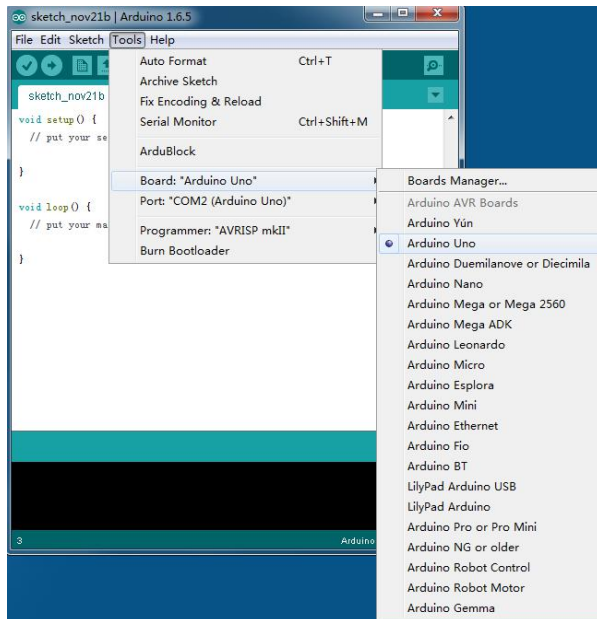
Step 1: Other things that are required

1) 6 x Dupont wire

2) 1 x OPEN-SMART UNO board

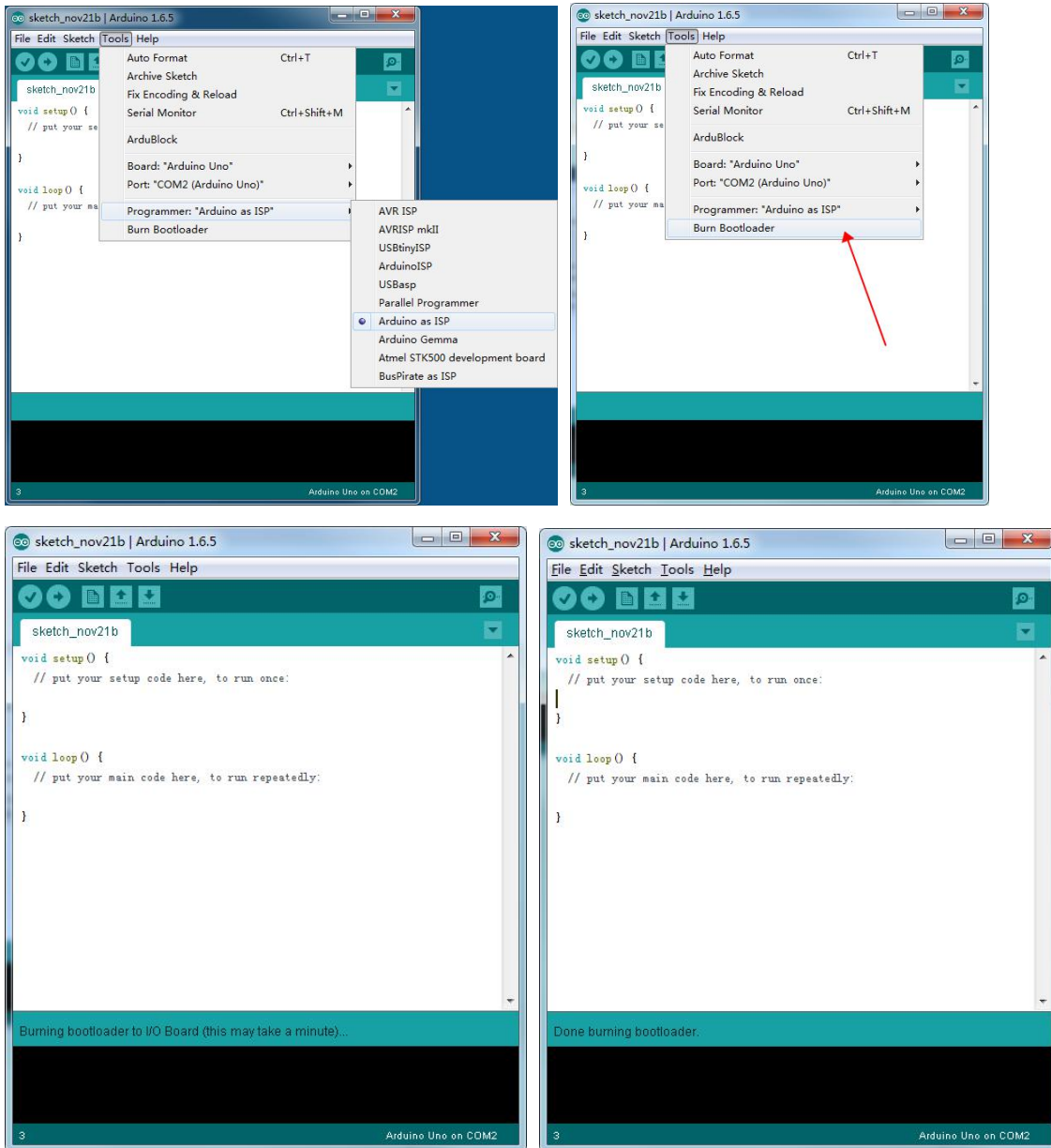**Step2: Connect ISP_6PIN to OPEN-SMART UNO board with the dupont wire**

Burn Bootloader for UNO R3

Step3: You can select which bootloader to burn to the Chip. We select Arduino Uno here.

Step4: Select programmer "Arduino as ISP" and click Tools/Burn Bootloader to burn the booloader via the ICSP interface.

You can hear two beeps, at this time, the Arduino UNO bootloader is burned OK.If it is not two beeps, burning is failed and the ERROR led will light on.

6 Last Word

Documents download link:

https://drive.google.com/drive/folders/0B6uNNXJ2z4CxeVZ2TzRqRGpWRVk?usp=sharing

Technical Support:

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