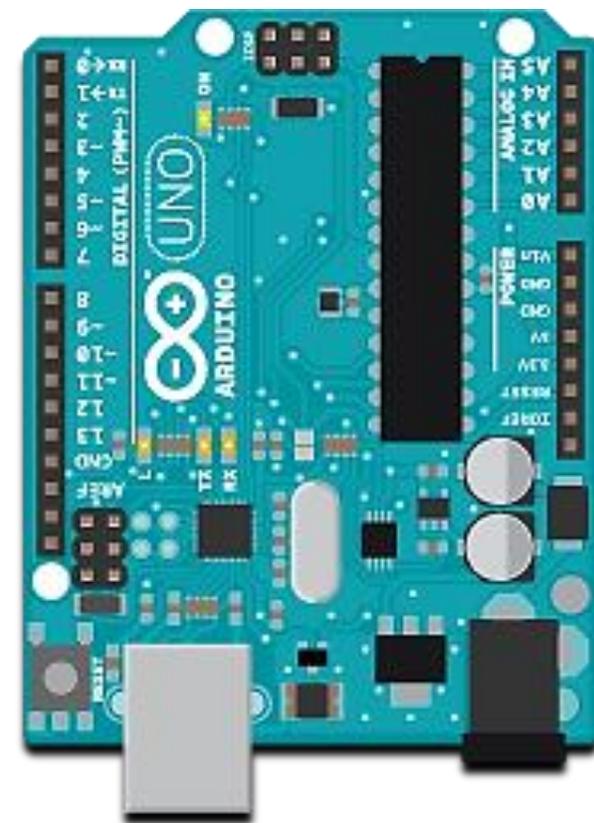
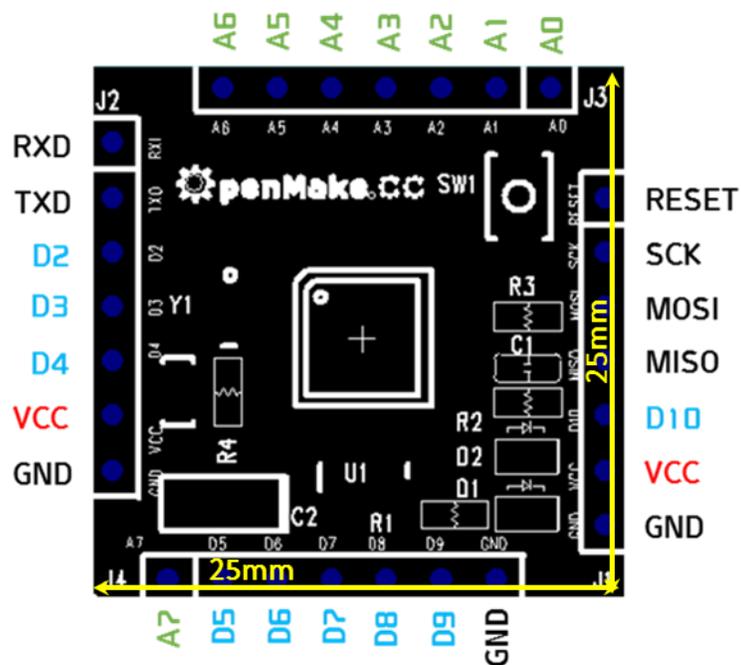
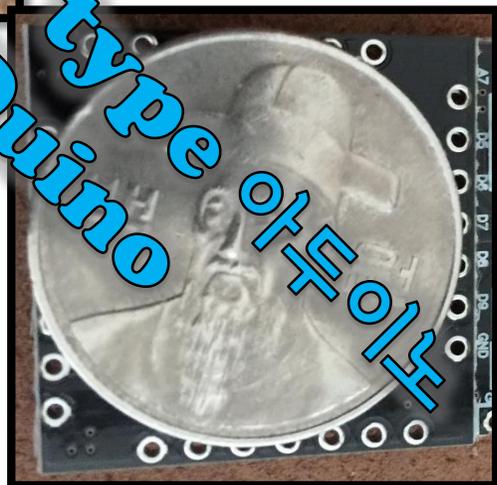
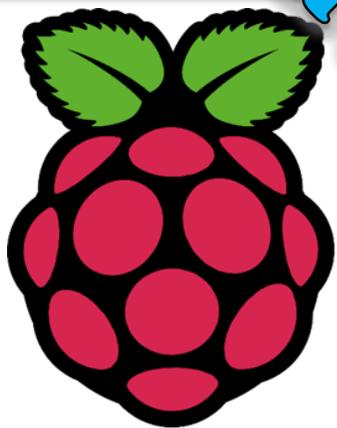
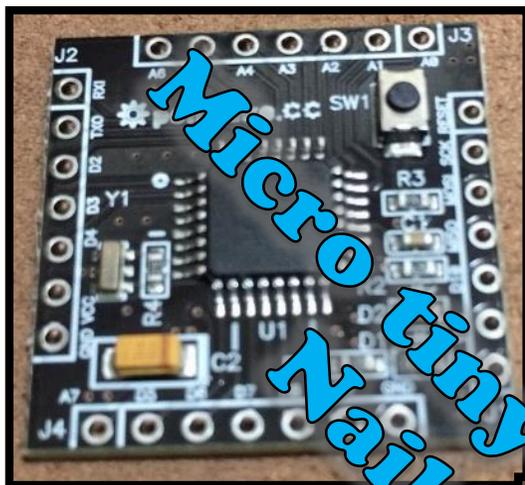


# 손톱두이노(Nail Duino) 사용자 메뉴얼



2015. 04

# 손톱두이노 제품설명



※ 손톱두이노는 반듯이 라즈베리파이 또는 AVR ISP를  
 이용해 부트로더를 업로드 후 사용이 가능합니다.

## 제품명

## 손톱두이노

MCU	Atmega328p-AU
동작속도	16 MHZ
동작전압	3.3V - 5V
Digital I/O	14 Pin
Analog Input	8 Pin
Flash Memory	32KB
Switch	RESET Switch

- Tiny Size 아두이노 플랫폼(25mm x 25mm)
- **라즈베리파이를 활용한 부트로더 업로드 기능**
- 아두이노 IDE에서 부트로더 및 소스 업로드 기능
- **사용자가 원하는 아두이노로 변형가능**(UNO, NANO, MINI, PROMINI)
- 라즈베리파이 외 윈도우, 리눅스, 맥 OS 지원

## 1. 라즈베리파이에서 손톱두이노 사용법

1-0. 라즈베리파이 와 손톱두이노 연결하기

1-1. 손톱두이노 세팅하기

1-2. 아두이노 IDE 실행하기

1-3. 손톱두이노 설정 및 아두이노 부트로더 업로드하기

1-4. 아두이노 IDE 로 소스 업로드하기

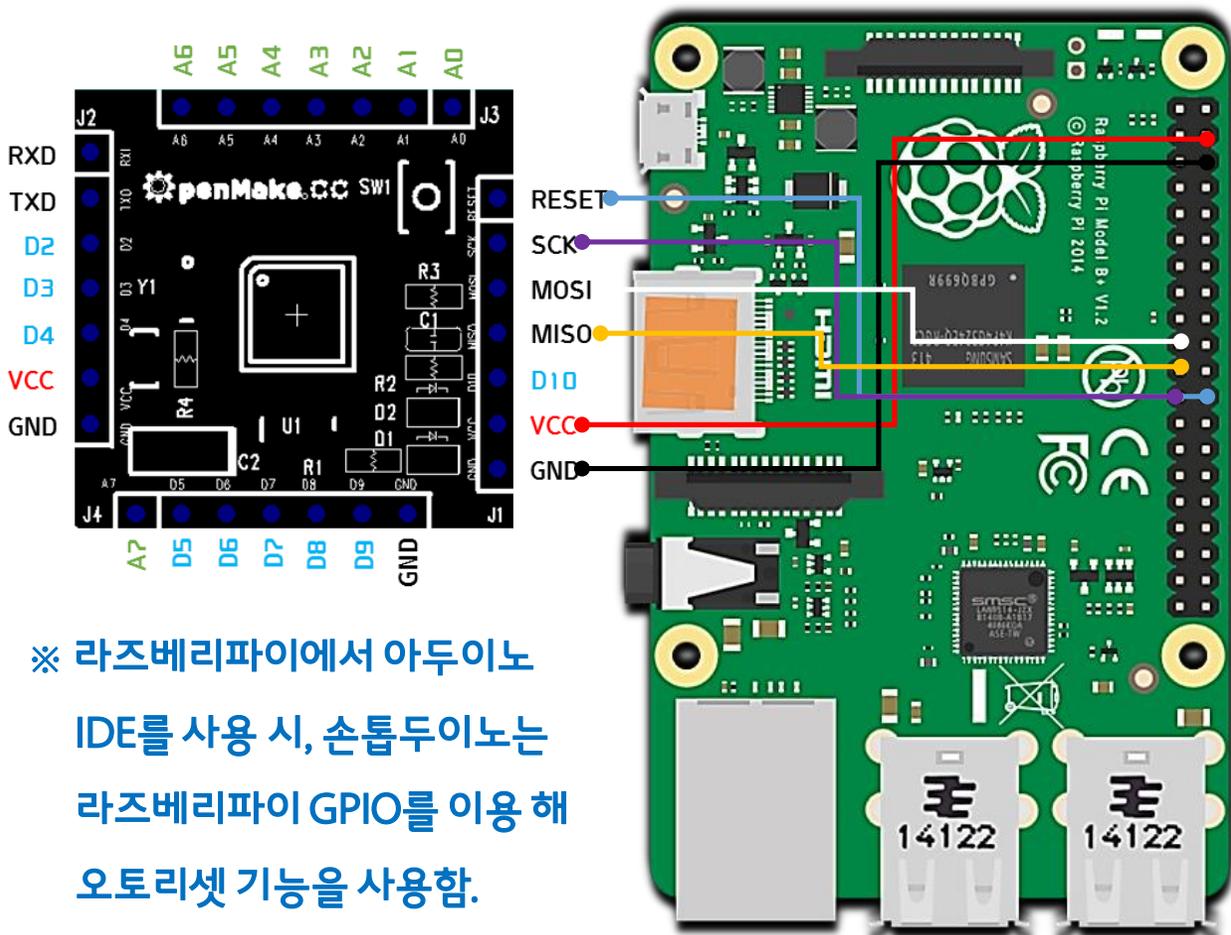
## 2. 데스크탑에서 손톱두이노 사용법

1. 데스크탑에 아두이노 IDE 설치하기

2. 데스크탑에 손톱두이노 연결하기

3. 아두이노 IDE로 소스 업로드하기

# 1-0. 라즈베리파이 와 손톱두이노 연결 하기



※ 라즈베리파이에서 아두이노 IDE를 사용 시, 손톱두이노는 라즈베리파이 GPIO를 이용해 오토리셋 기능을 사용함.

구분	손톱두이노	라즈베리파이	비고
PIN 1	VCC	3.3V or 5V	
PIN 2	GND	GND	
PIN 3	MISO	MISO	
PIN 4	MOSI	MOSI	
PIN 5	SCK	SCK	
PIN 6	RESET	GPIO 8	

```
pi@openmake ~ $ git clone https://github.com/rasplay/nail_duino
```

```
pi@openmake ~ $ cd nail_duino
```

```
pi@openmake ~ $ sudo sh ./nail_duino.sh
```

```
[JaeSang.openmake] > ssh pi@192.168.100.12
Linux openmake 3.18.7-v7+ #755 SMP PREEMPT Thu Feb 12 17:20:48 GMT 2015 armv7l

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Mon Feb 16 14:05:02 2015 from 192.168.100.2
pi@openmake ~ $ git clone https://github.com/rasplay/nail_duino
Cloning into 'nail_duino'...
remote: Counting objects: 48, done.
remote: Compressing objects: 100% (15/15), done.
remote: Total 48 (delta 4), reused 0 (delta 0), pack-reused 33
Unpacking objects: 100% (48/48), done.
pi@openmake ~ $ cd nail_duino
pi@openmake ~/nail_duino $ ls
nail_duino.sh  README.md
pi@openmake ~/nail_duino $ sudo sh nail_duino.sh
Get:1 http://raspberrypi.collabora.com wheezy Release.gpg [836 B]
Get:2 http://mirrordirector.raspbian.org wheezy Release.gpg [490 B]
Get:3 http://mirrordirector.raspbian.org wheezy Release [14.4 kB]
Get:4 http://raspberrypi.collabora.com wheezy Release [7,514 B]
```

```
Arduino IDE: OK
Fetching files:
boards.txt
programmers.txt
avrsetup
Replacing/updating files:
inittab: OK
cmdline.txt: OK
boards.txt: OK
programmers.txt: OK

avrdude: AVR device initialized and ready to accept instructions

Reading | ##### | 100% 0.00s

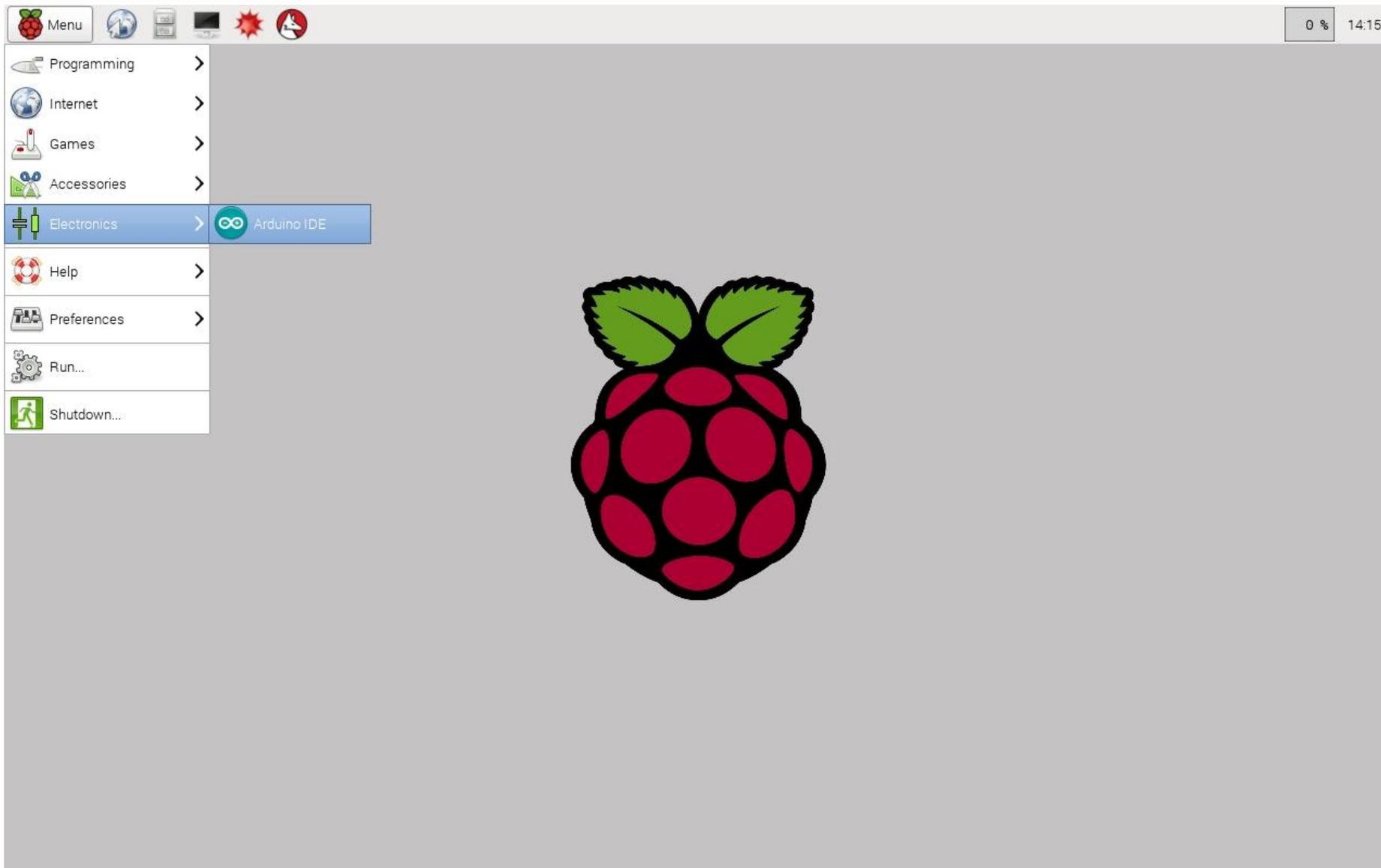
avrdude: Device signature = 0x1e950f

avrdude: safemode: Fuses OK

avrdude done. Thank you.

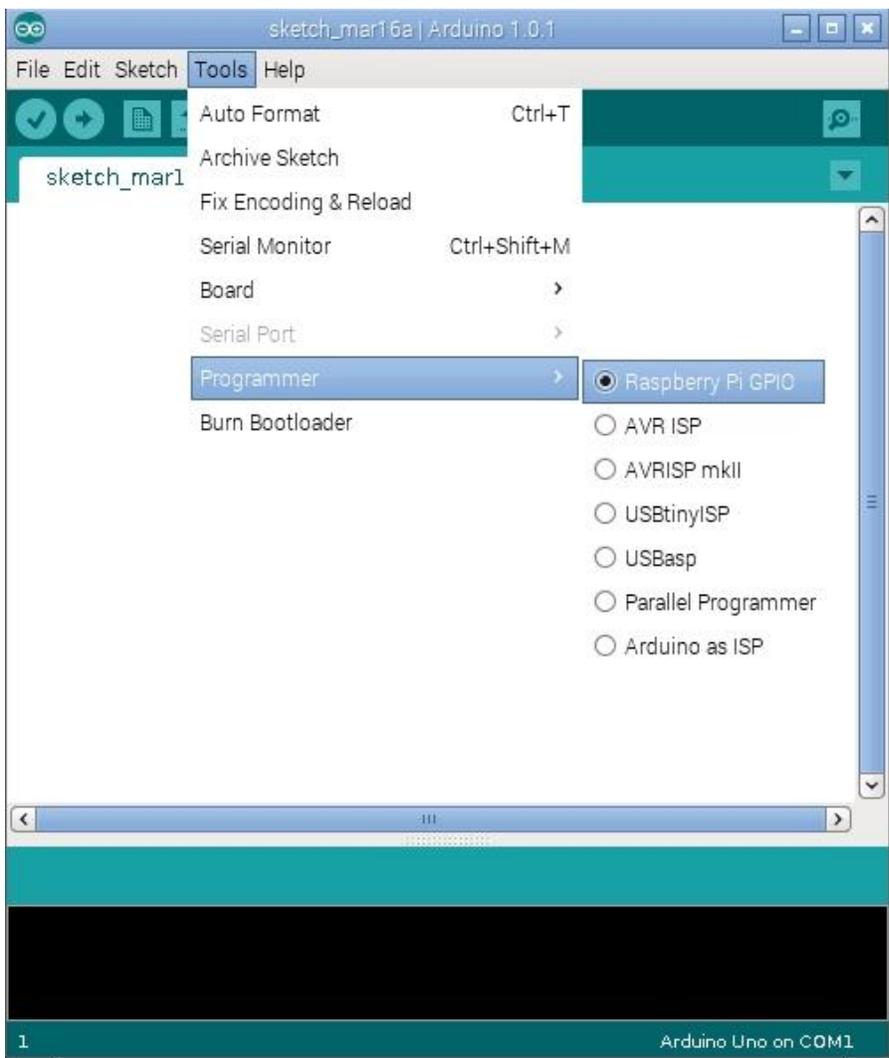
All Done.
Check and reboot now to apply changes.
You must reboot
```

# 1-2. 아두이노 IDE 실행하기

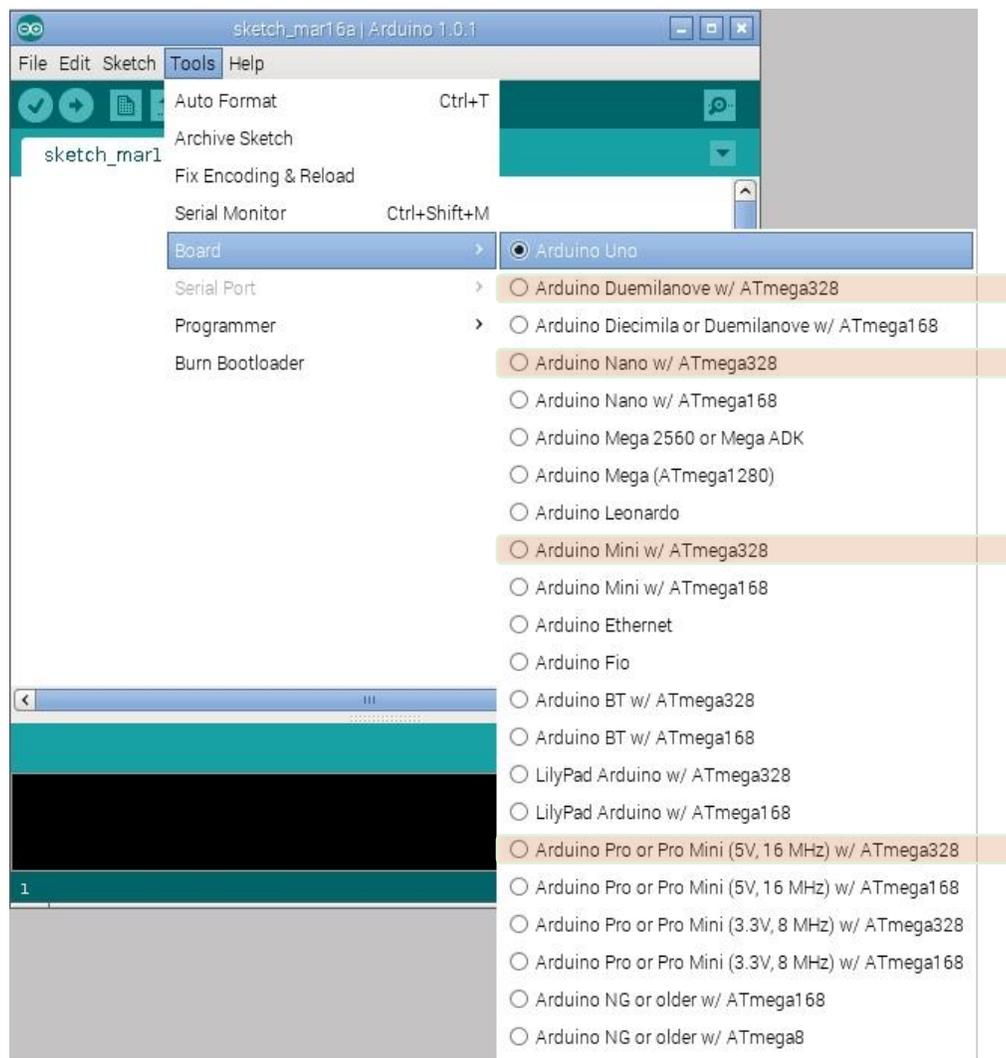


# 1-3. 손톱두이노 설정 및 아두이노 부트로더 업로드하기

## 프로그래머 선택하기



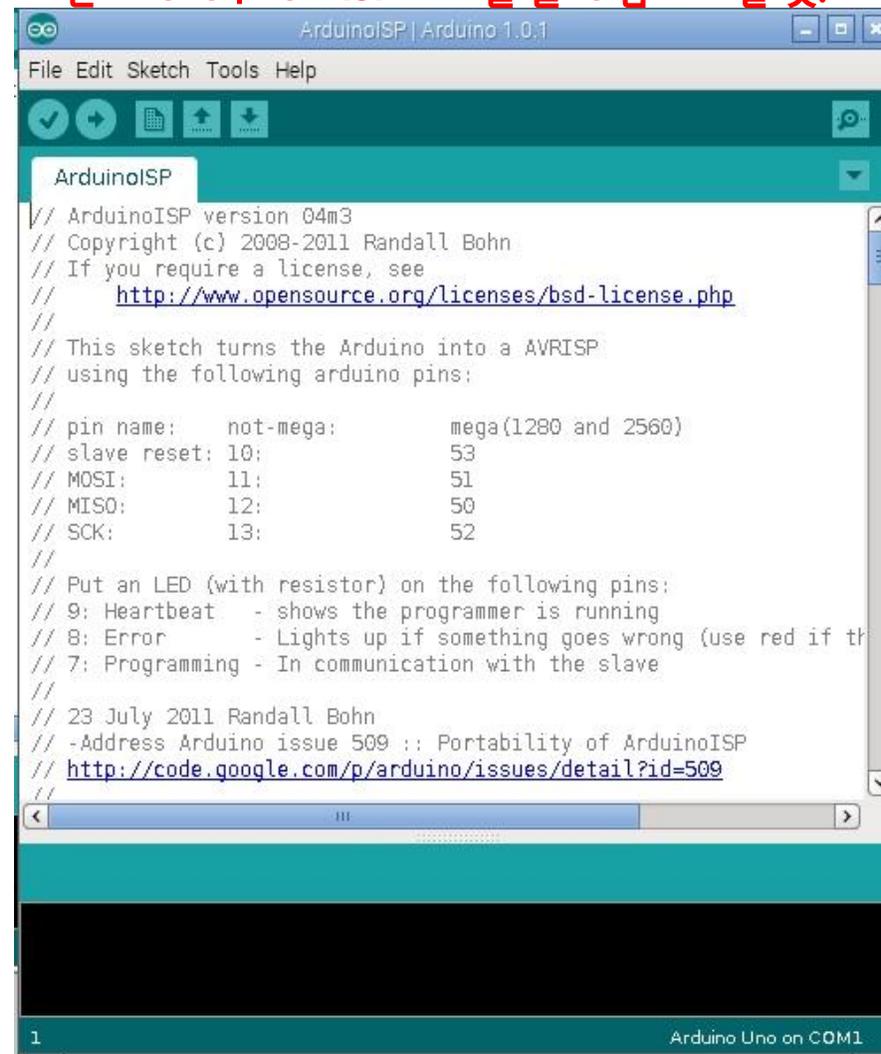
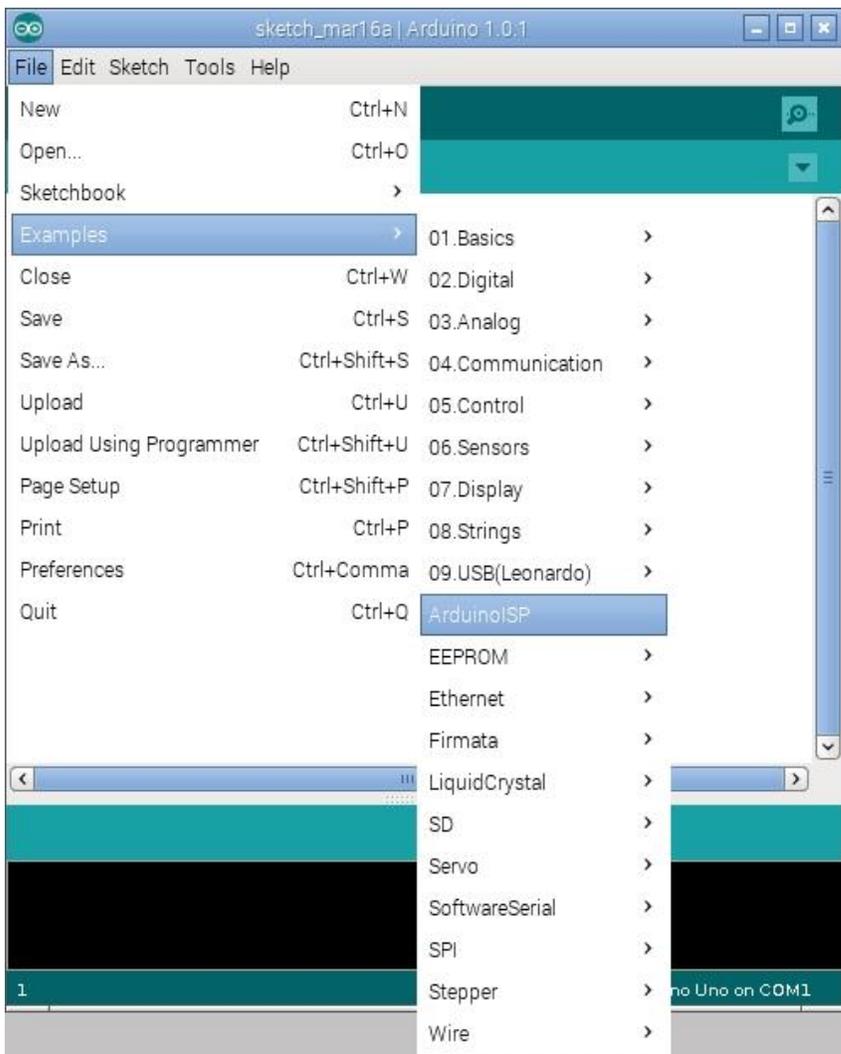
## 변경 할 타겟보드 선택하기



# 1-3. 손톱두이노 세팅 및 아두이노 부트로더 업로드하기

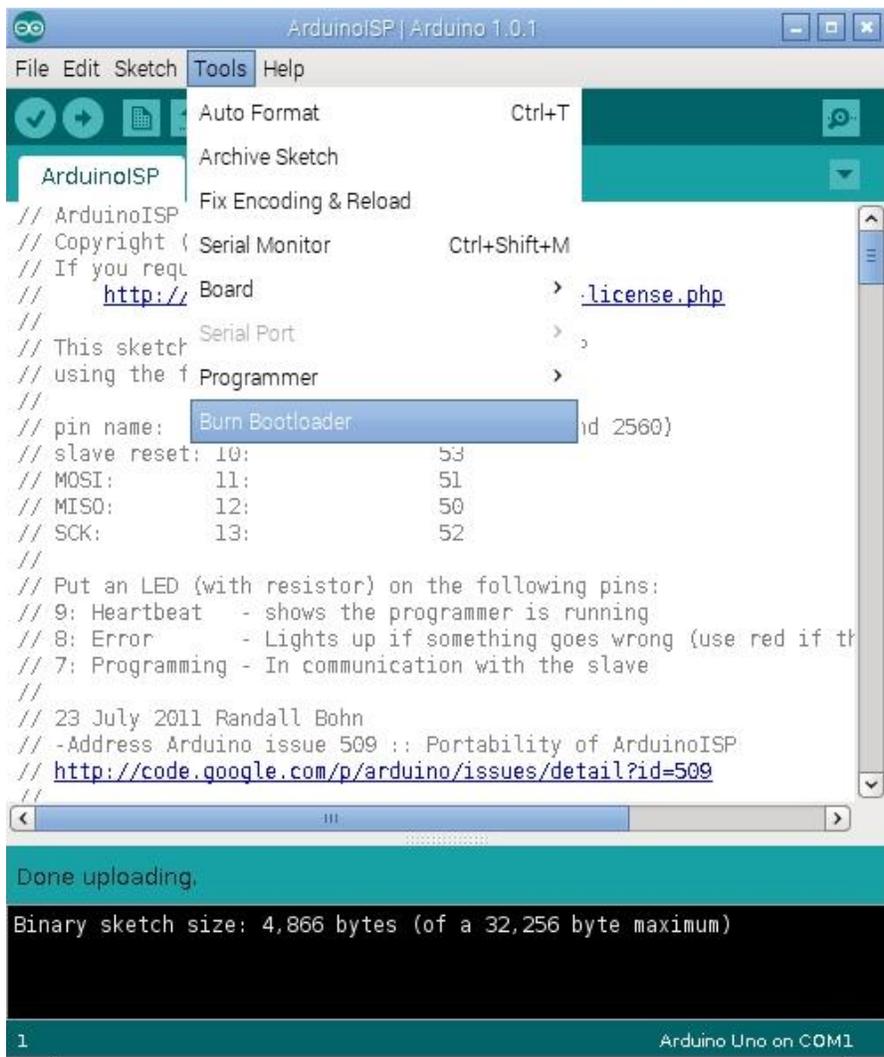
## 아두이노 ISP 소스 불러오기

※ 라즈베리파이에서 부트로더를 업로드 전에는 반드시 아두이노 ISP 소스를 불러 업로드 할 것.



# 1-3. 손톱두이노 세팅 및 아두이노 부트로더 업로드하기

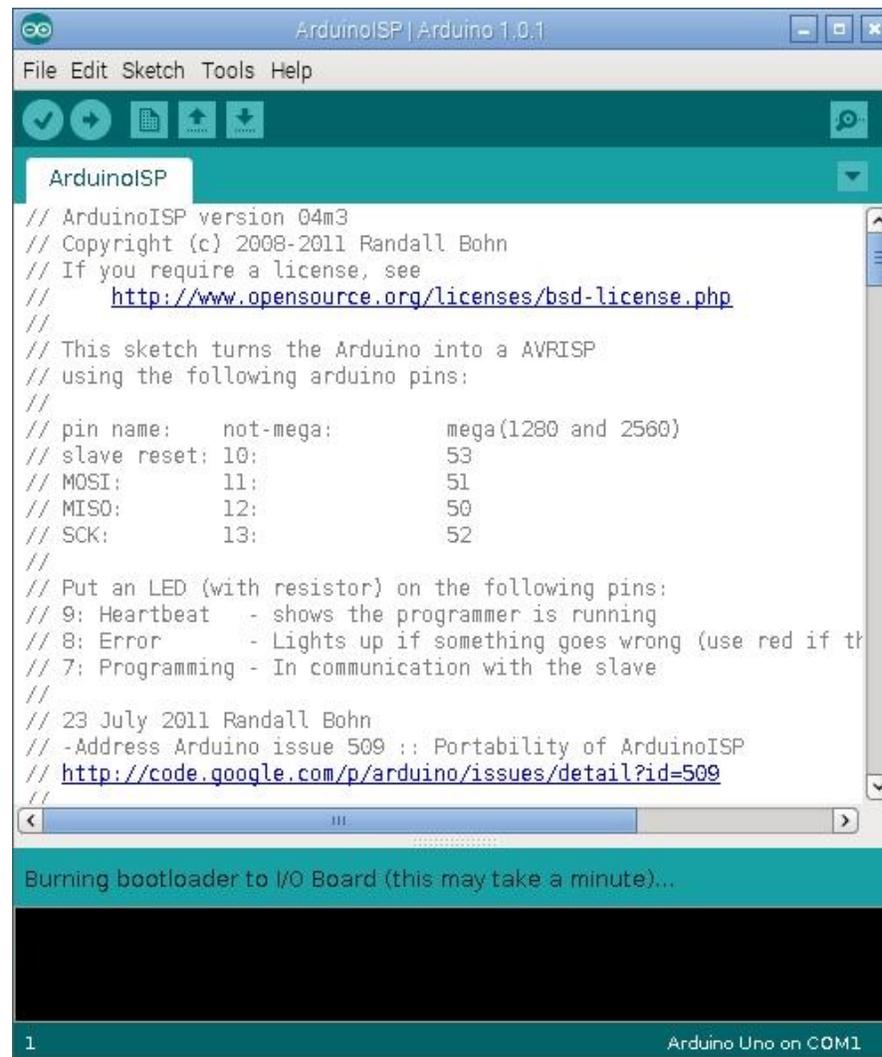
## 아두이노 부트로더 업로드



```

ArduinoISP | Arduino 1.0.1
File Edit Sketch Tools Help
Auto Format Ctrl+T
Archive Sketch
ArduinoISP
Fix Encoding & Reload
Serial Monitor Ctrl+Shift+M
Board > .license.php
Serial Port >
Programmer >
Burn Bootloader
pin name:
// slave reset: 10: 53
// MOSI: 11: 51
// MISO: 12: 50
// SCK: 13: 52
// Put an LED (with resistor) on the following pins:
// 9: Heartbeat - shows the programmer is running
// 8: Error - Lights up if something goes wrong (use red if th
// 7: Programming - In communication with the slave
// 23 July 2011 Randall Bohn
// -Address Arduino issue 509 :: Portability of ArduinoISP
// http://code.google.com/p/arduino/issues/detail?id=509
Done uploading.
Binary sketch size: 4,866 bytes (of a 32,256 byte maximum)
1 Arduino Uno on COM1
  
```

## 아두이노 부트로더 업로드 중

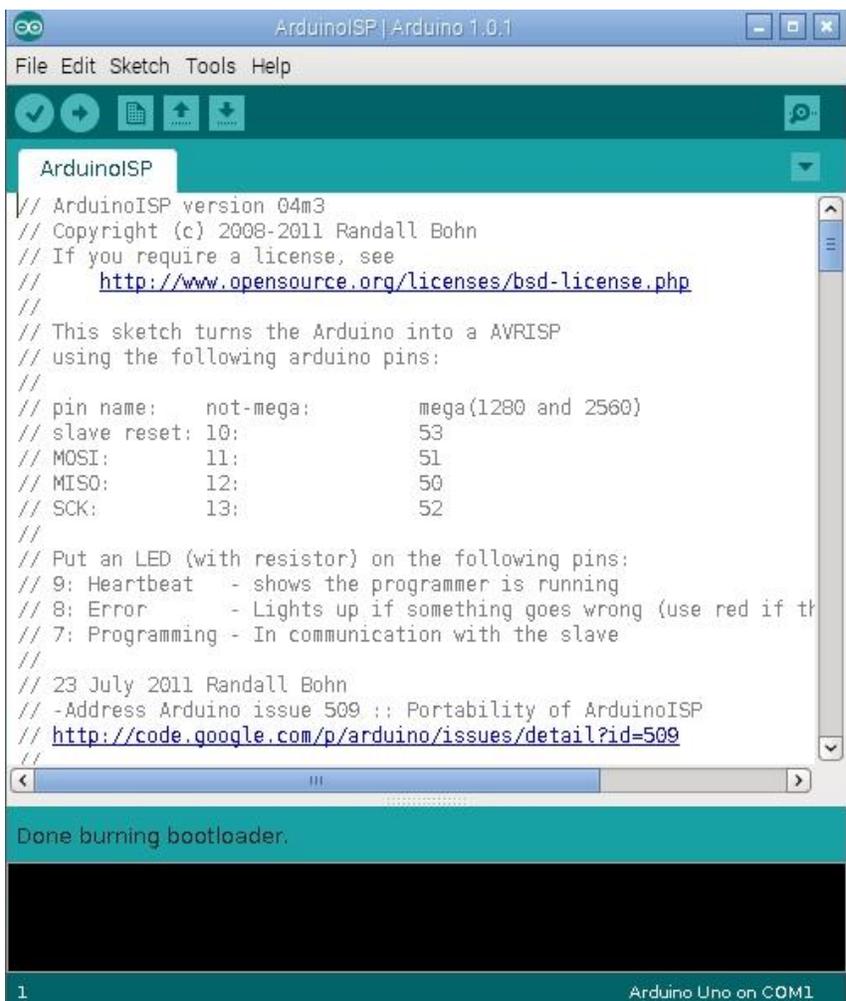


```

ArduinoISP | Arduino 1.0.1
File Edit Sketch Tools Help
ArduinoISP
// ArduinoISP version 04m3
// Copyright (c) 2008-2011 Randall Bohn
// If you require a license, see
// http://www.opensource.org/licenses/bsd-license.php
// This sketch turns the Arduino into a AVRISP
// using the following arduino pins:
// pin name: not-mega: mega(1280 and 2560)
// slave reset: 10: 53
// MOSI: 11: 51
// MISO: 12: 50
// SCK: 13: 52
// Put an LED (with resistor) on the following pins:
// 9: Heartbeat - shows the programmer is running
// 8: Error - Lights up if something goes wrong (use red if th
// 7: Programming - In communication with the slave
// 23 July 2011 Randall Bohn
// -Address Arduino issue 509 :: Portability of ArduinoISP
// http://code.google.com/p/arduino/issues/detail?id=509
Burning bootloader to I/O Board (this may take a minute)...
1 Arduino Uno on COM1
  
```

# 1-3. 손톱두이노 세팅 및 아두이노 부트로더 업로드하기

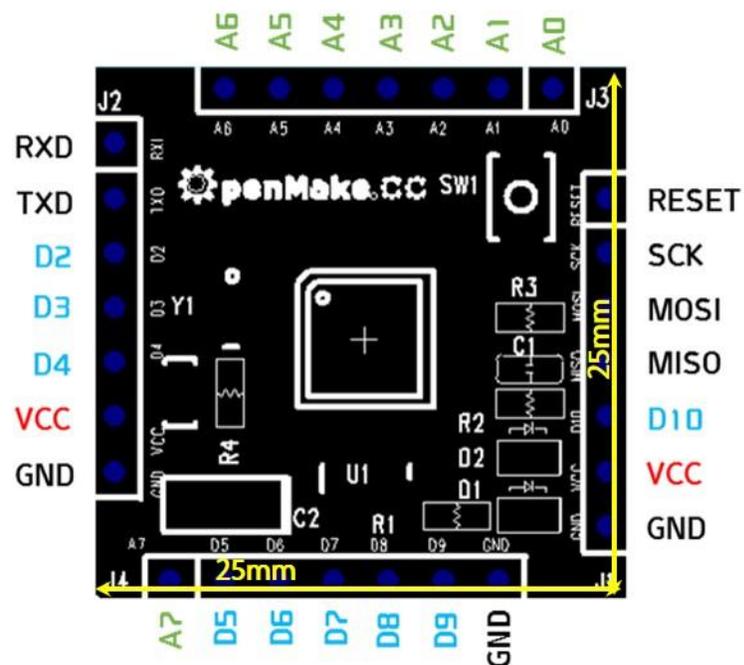
## 부트로더 업로드 확인



```

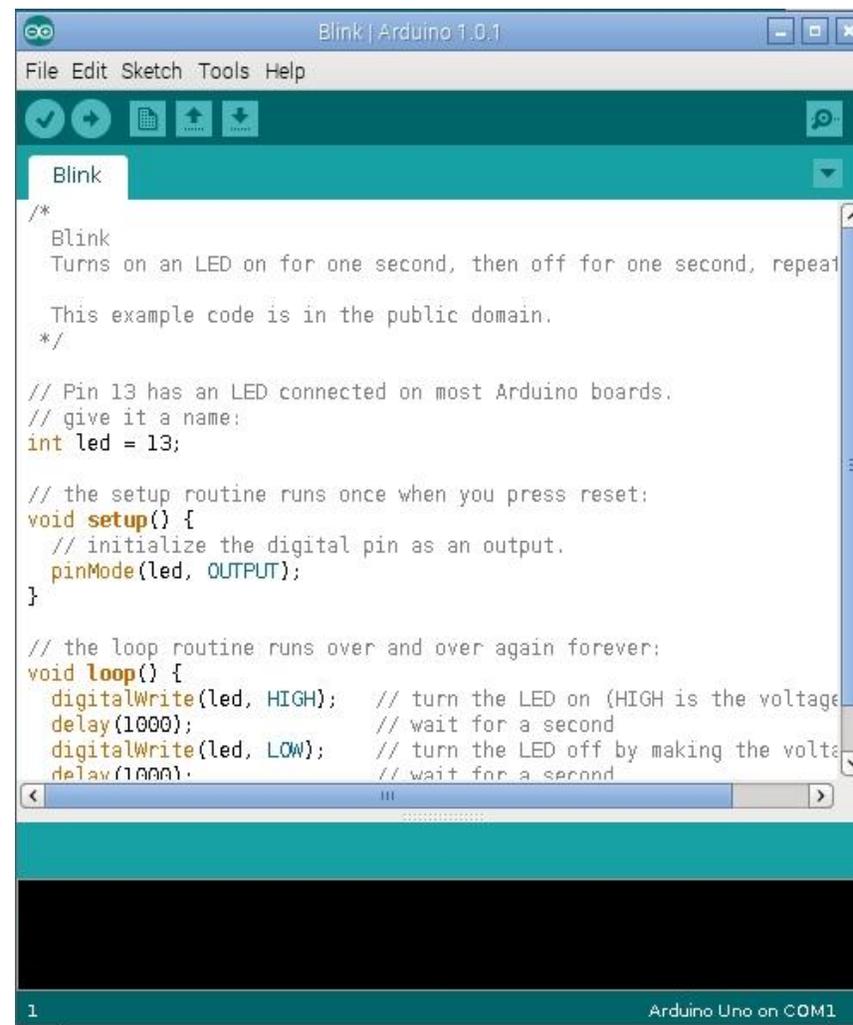
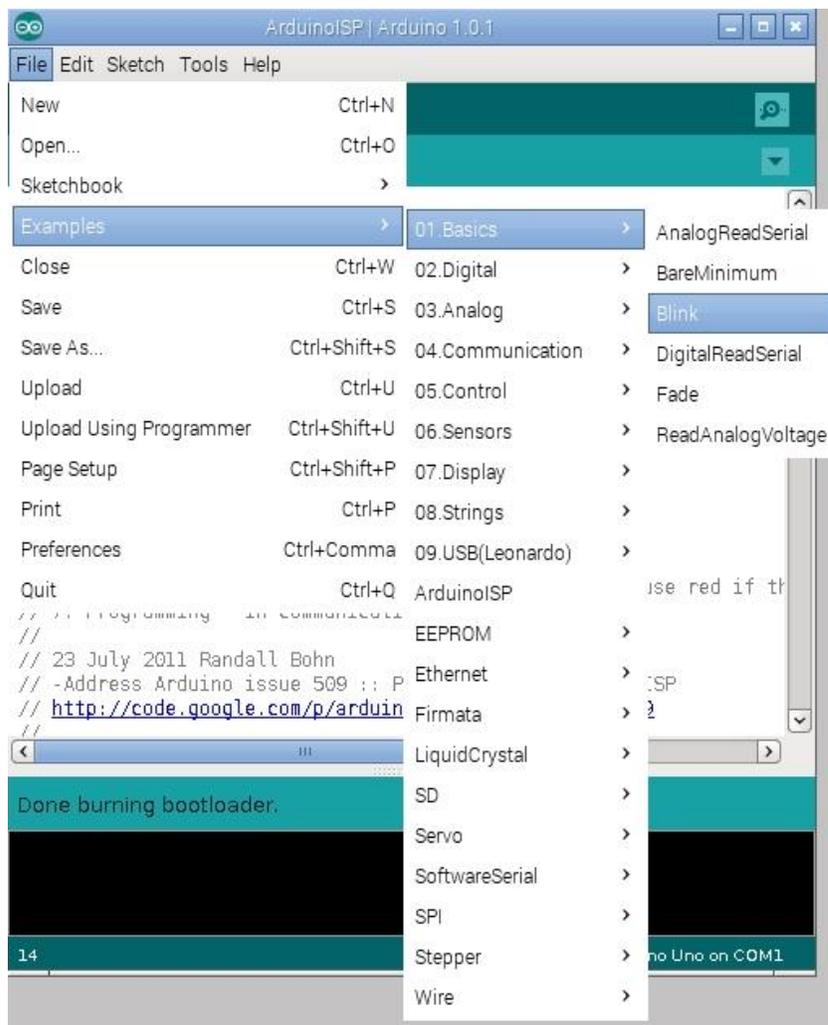
ArduinoISP
// ArduinoISP version 04m3
// Copyright (c) 2008-2011 Randall Bohn
// If you require a license, see
// http://www.opensource.org/licenses/bsd-license.php
//
// This sketch turns the Arduino into a AVRISP
// using the following arduino pins:
//
// pin name:      not-mega:      mega(1280 and 2560)
// slave reset:  10:             53
// MOSI:         11:             51
// MISO:         12:             50
// SCK:          13:             52
//
// Put an LED (with resistor) on the following pins:
// 9: Heartbeat - shows the programmer is running
// 8: Error     - Lights up if something goes wrong (use red if th
// 7: Programming - In communication with the slave
//
// 23 July 2011 Randall Bohn
// -Address Arduino issue 509 :: Portability of ArduinoISP
// http://code.google.com/p/arduino/issues/detail?id=509
//
Done burning bootloader.
Arduino Uno on COM1
  
```

※ 손톱두이노는 Atmega328p-au MCU를 채용하여, 간단한 설정 변경만으로 아두이노 UNO 뿐 아니라 NANO, Mini, PRO Mini(16Mhz) 중 원하는 아두이노 제품으로 사용이 가능토록 한 새로운 개념의 아두이노로 제작되었습니다.

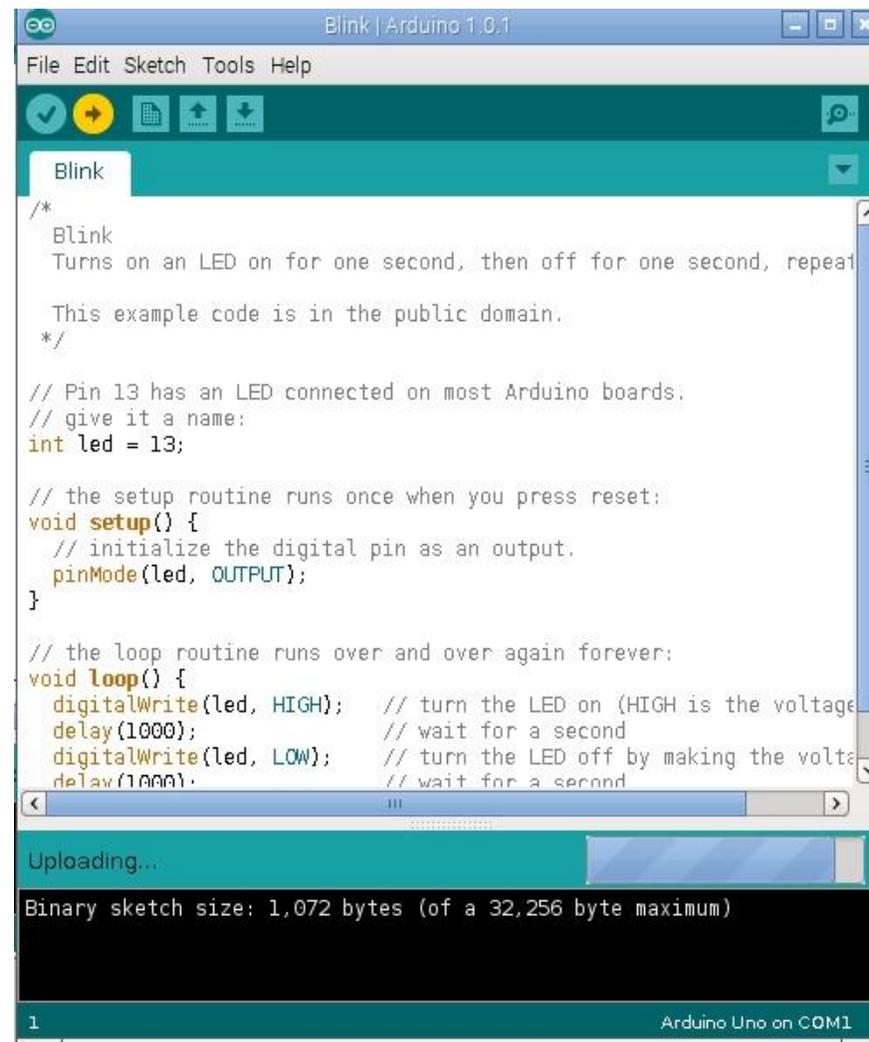
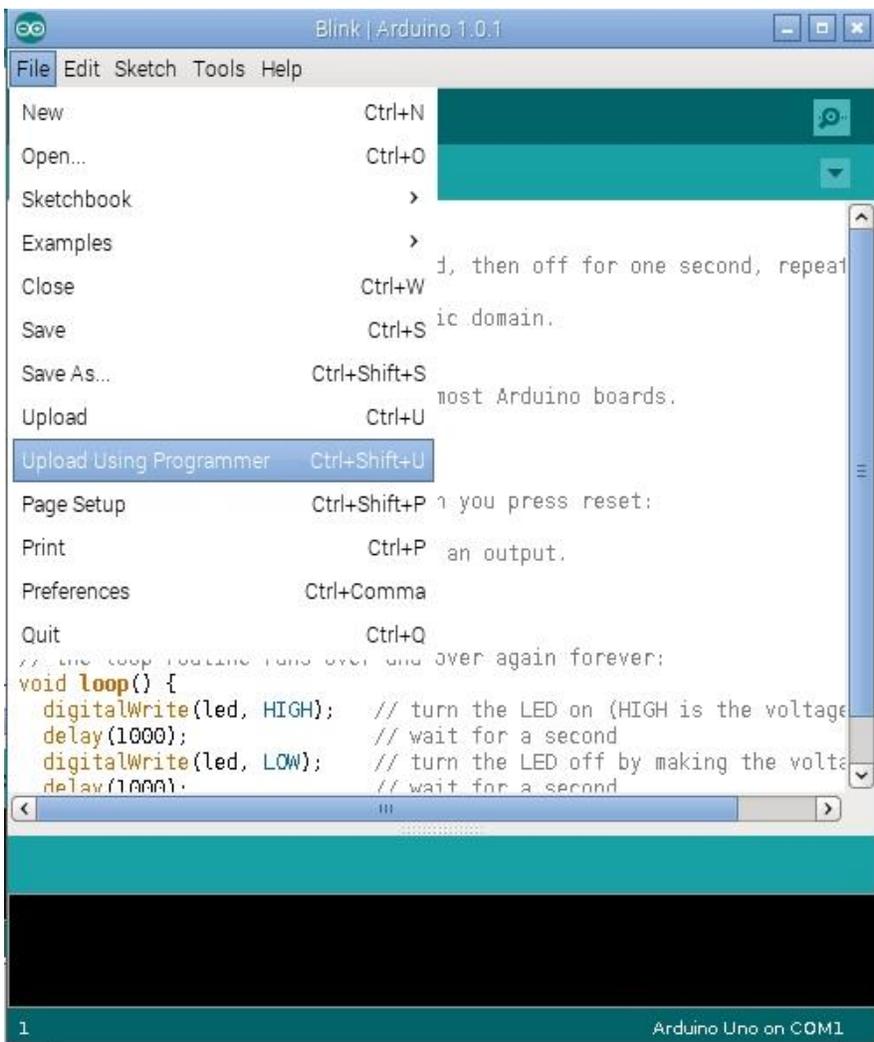


※ Burn Bootloader완료 후 Reset Switch 를 누르면 Green led가 깜빡인다.

## 아두이노 Blink 예제 불러오기



## Blink 소스 업로드 하기



# 1-4. 아두이노 IDE 로 소스 업로드 하기

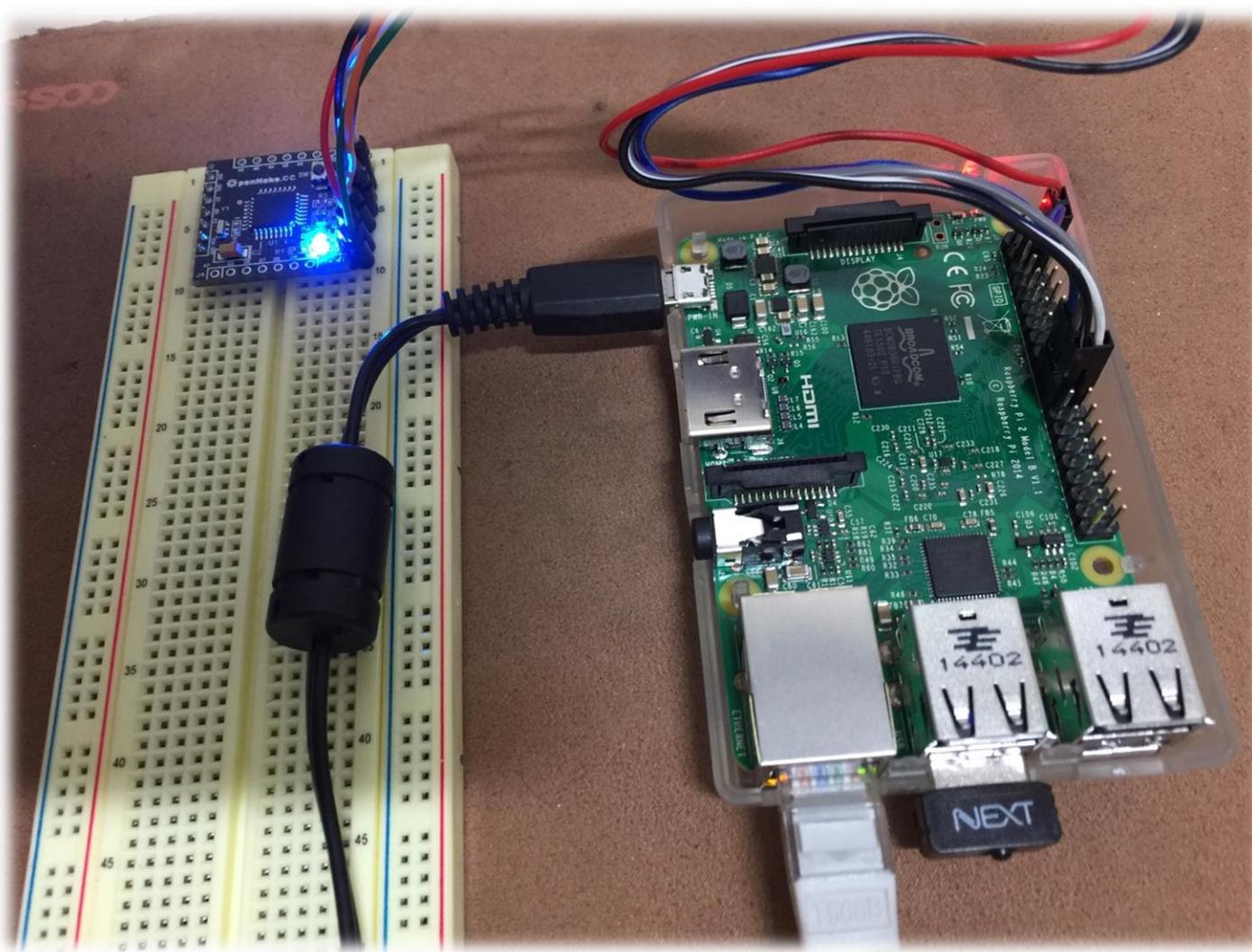
```
Blink | Arduino 1.0.1
File Edit Sketch Tools Help
Blink
/*
 * Blink
 * Turns on an LED on for one second, then off for one second, repeat
 *
 * This example code is in the public domain.
 */

// Pin 13 has an LED connected on most Arduino boards.
// give it a name:
int led = 13;

// the setup routine runs once when you press reset:
void setup() {
  // initialize the digital pin as an output.
  pinMode(led, OUTPUT);
}

// the loop routine runs over and over again forever:
void loop() {
  digitalWrite(led, HIGH); // turn the LED on (HIGH is the voltage)
  delay(1000); // wait for a second
  digitalWrite(led, LOW); // turn the LED off by making the voltage LOW
  delay(1000); // wait for a second
}

Done uploading.
Binary sketch size: 1,072 bytes (of a 32,256 byte maximum)
1 Arduino Uno on COM1
```



## 2-1. 데스크탑에 아두이노 IDE 설치하기



OS별 아두이노 IDE 설치하기

[윈도우](#) , [리눅스](#) , [Mac OSX](#)

### Download the Arduino Software



**ARDUINO 1.6.1**

The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. It runs on Windows, Mac OS X, and Linux. The environment is written in Java and based on Processing and other open-source software.

This software can be used with any Arduino board. Refer to the [Getting Started](#) page for Installation instructions.

**Windows Installer**  
**Windows ZIP file for non admin install**

**Mac OS X for Java 6 (recommended)**  
**Mac OS X for Java 7+ (experimental)**

**Linux 32 bits**  
**Linux 64 bits**

[Release Notes](#) [Source Code](#)

ARDUINO 1.0.x / 1.5.x / 1.6.0

**PREVIOUS RELEASES**

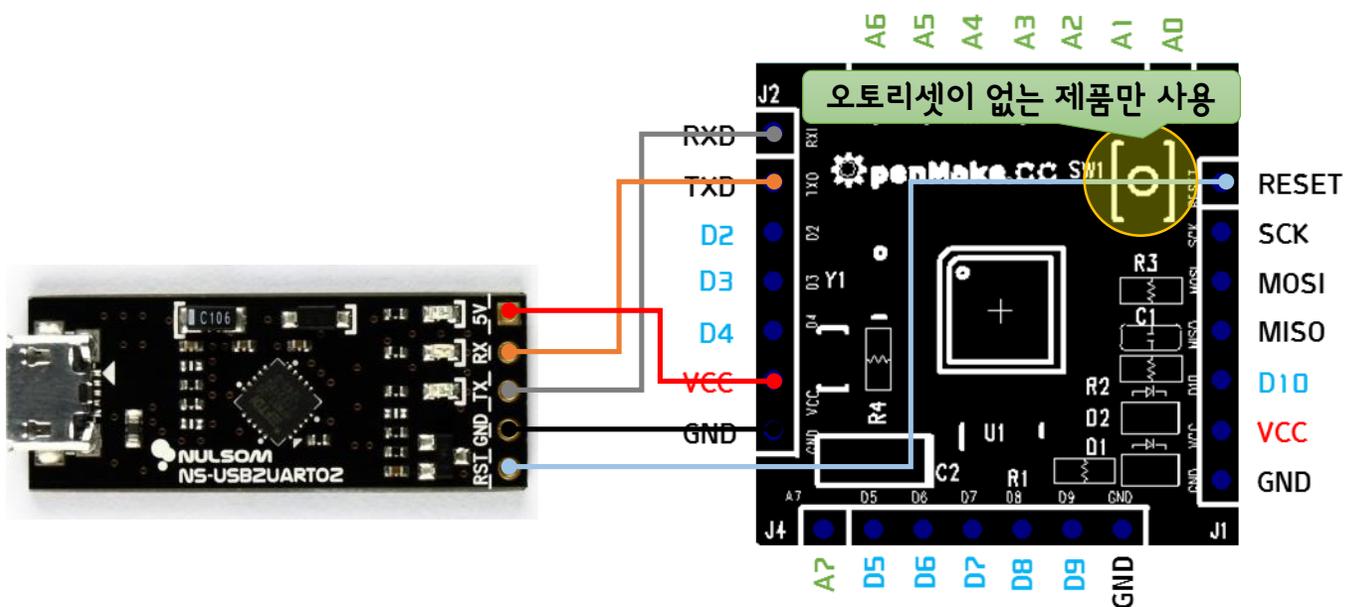
Download the Arduino 1.0.6 and all the previous versions of the Arduino Software. Available for Windows, Linux, and Mac OS X.

ARDUINO IDE

**INTEL GALILEO AND EDISON**

Download the Arduino IDE that supports the Intel Galileo and the Intel Edison boards. Available for Windows, Linux, and Mac OS X.

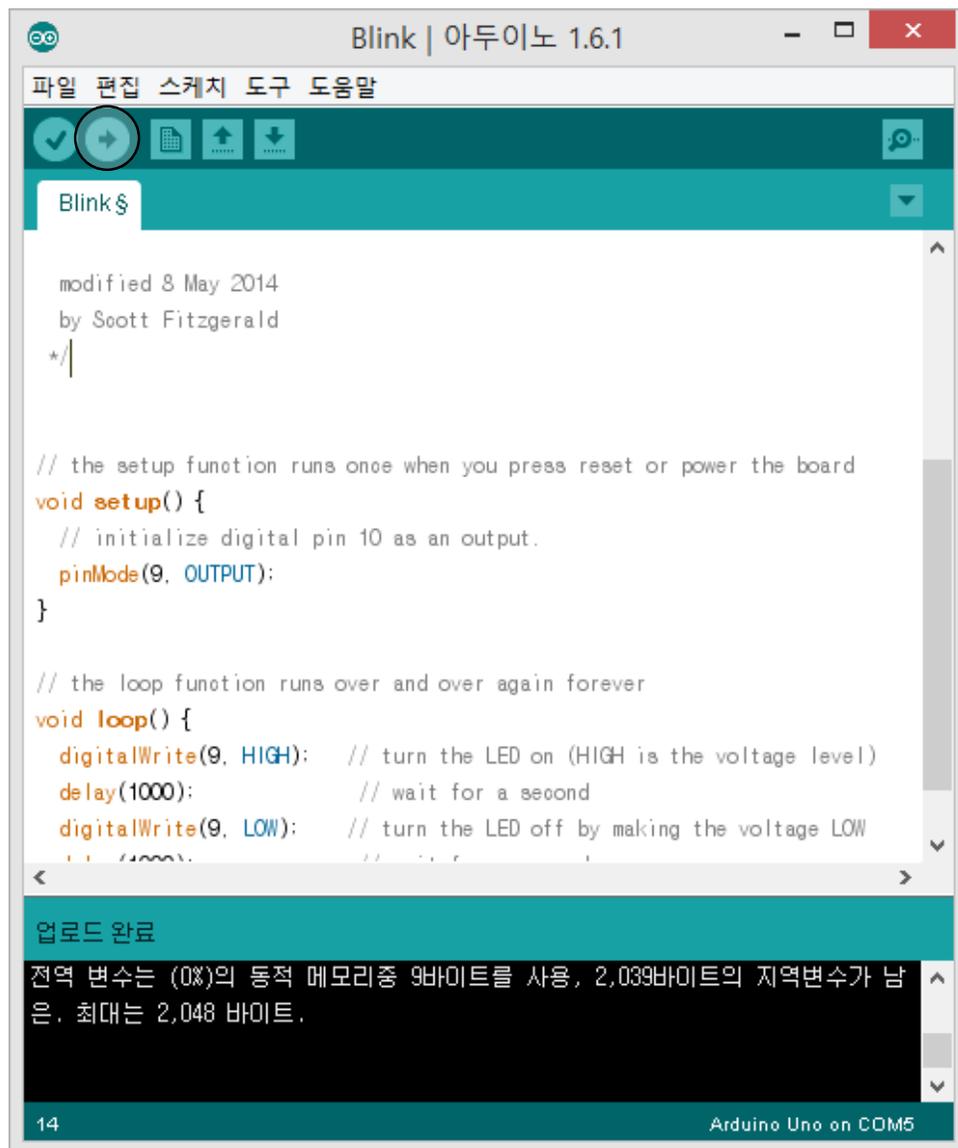
## 2-2. 데스크탑에 손톱두이노 연결하기



구분	손톱두이노	USB to Serial	비고
PIN 1	VCC	5V	
PIN 2	GND	GND	
PIN 3	RX	TX	
PIN 4	TX	RX	
PIN 5	RESET	RESET	

※ PIN5 번인 RST(RESET) 버튼이 없는 제품은 아두이노 스케치 업로드 시, 손톱두이노의 S/W 입력 타이밍을 잘 맞추어야 한다.

# 2-3. 데스크탑에 손톱두이노 연결하기



Blink | 아두이노 1.6.1

파일 편집 스케치 도구 도움말

Blink \$

```

modified 8 May 2014
by Scott Fitzgerald
*/

// the setup function runs once when you press reset or power the board
void setup() {
  // initialize digital pin 10 as an output.
  pinMode(9, OUTPUT);
}

// the loop function runs over and over again forever
void loop() {
  digitalWrite(9, HIGH); // turn the LED on (HIGH is the voltage level)
  delay(1000);           // wait for a second
  digitalWrite(9, LOW);  // turn the LED off by making the voltage LOW
  delay(1000);           // wait for a second
}

```

업로드 완료

전역 변수는 (0%)의 동적 메모리중 9바이트를 사용, 2,039바이트의 지역변수가 남  
은, 최대는 2,048 바이트.

14 Arduino Uno on COM5

