

2015

Arduino for Beginners

Hacker Lab

Sign In Process

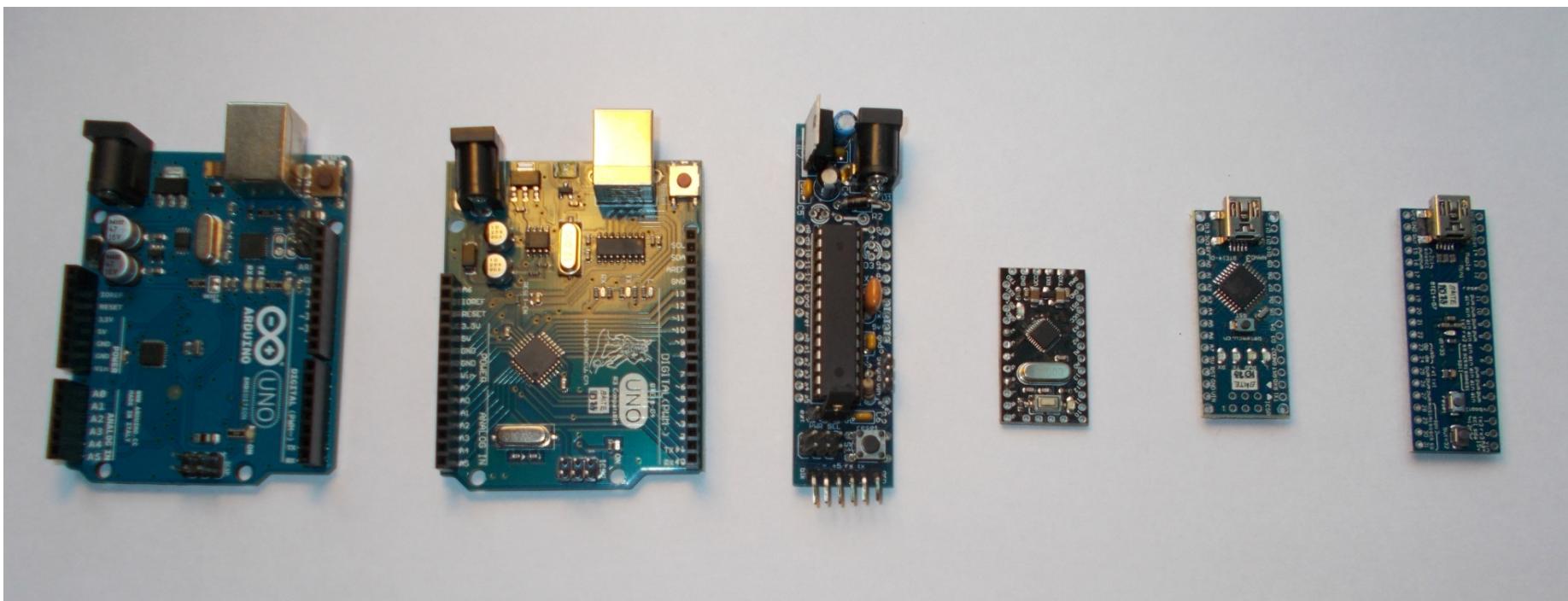
- ▶ Login to: “The Lab – New & Fast”
- ▶ Password: “H4x0rL@b!”
- ▶ Send Email with the following info,
- ▶ To: “MrJimCarroll@gmail.com”
- ▶ Send Name
- ▶ Phone
- ▶ How paid ? Online or In class

FEES	Class	Materials	Total
Member	\$ 0	\$ 25	\$ 25
Regular	\$ 50	\$ 25	\$ 75

What is an Arduino ?

- Micro Controller
- Hardware Control
- Sensor input
- Logic
- Timing

A few Version of Boards



Arduino Nano

Microcontroller Atmel ATmega328P-AU

Operating Voltage (logic level) 5 V

Input Voltage (recommended) 7–12 V

Input Voltage (limits) 6–15 V

Digital I/O Pins 14

of which 6 provide PWM output)

Analog Input Pins 8

DC Current per I/O Pin 40 mA

Flash Memory 32 KB (ATmega328)

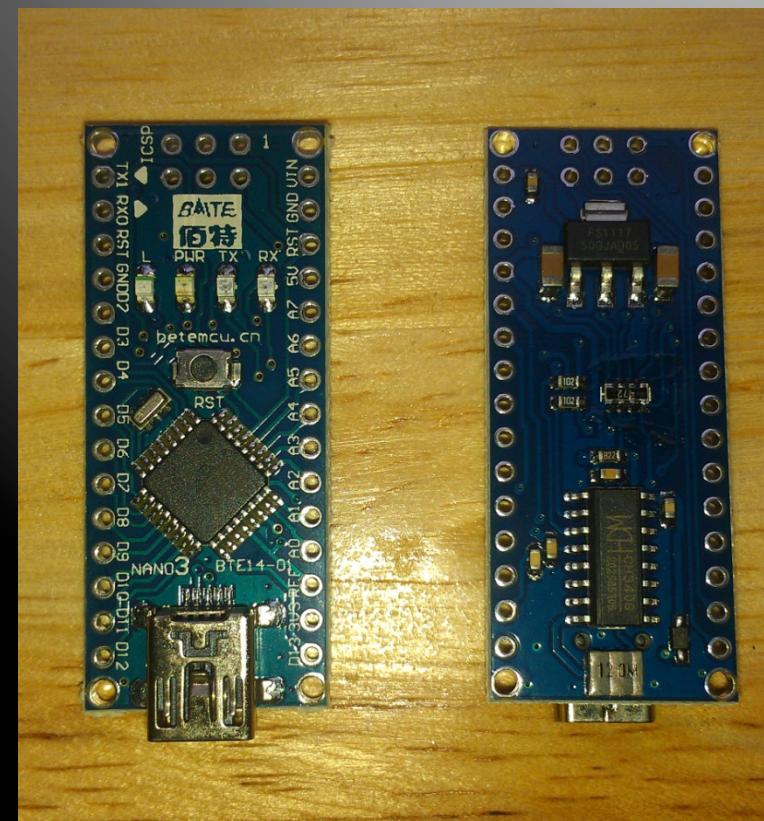
of which 2 KB used by boot loader

SRAM 2 KB (ATmega328)

EEPROM 1 KB (ATmega328)

Clock Speed 16 MHz

Dimensions 0.73" x 1.70"



Pin out Diagram

THE
UNOFFICIAL

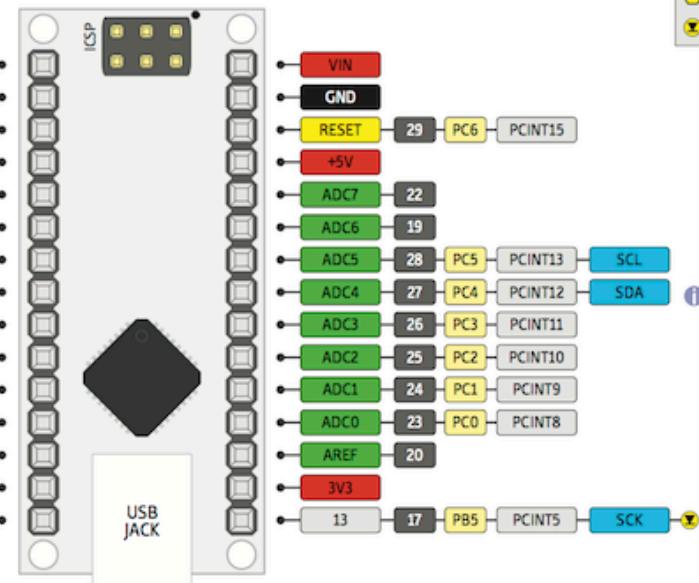
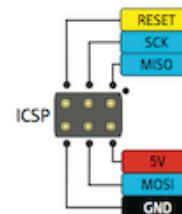
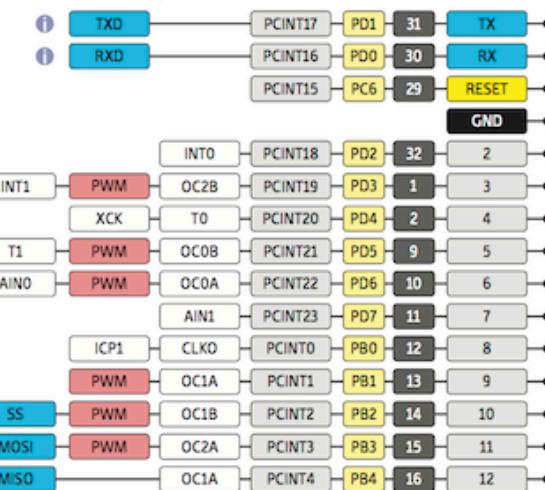
ARDUINO
NANO

PINOUT DIAGRAM

Absolute max per pin 40mA recommended 20mA

Absolute max 200mA for entire package

Connected to the ATMega and used for USB program and communicating with it

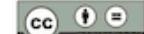


LEGEND	
GND	
POWER	
CONTROL	
PHYSICAL PIN	
PORT PIN	
ATMEGA328 PIN FUNC	
DIGITAL PIN	
ANALOG-RELATED PIN	
PWM PIN	
SERIAL PIN	
General Information	
Pay Attention	
No Really	
PAY ATTENTION	
LED	

On version 2
Analog Pins are reversed
e.g. A0>>A7, A7>>A0



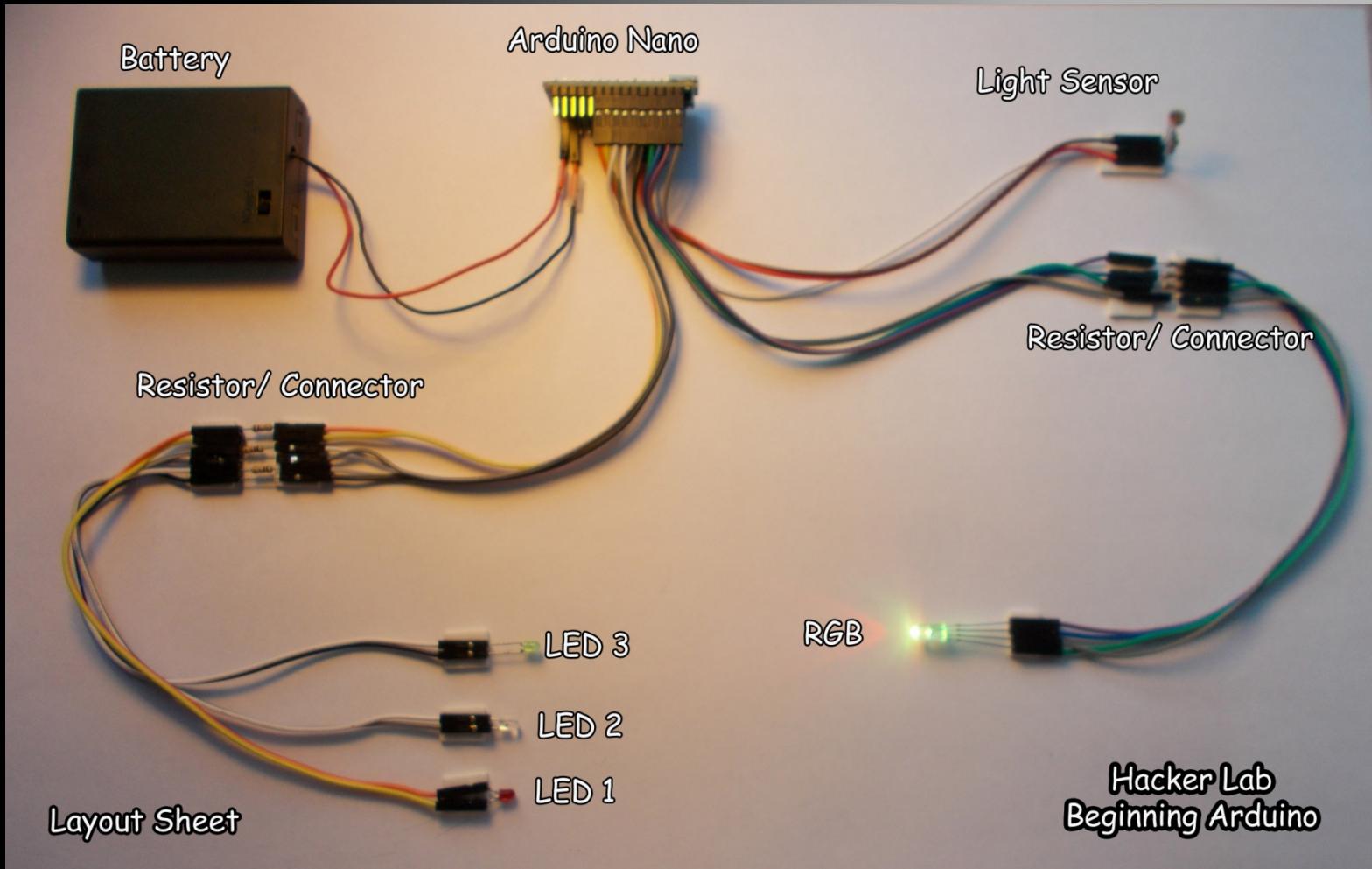
www.pighiboo.com



BY PIGHIBOO

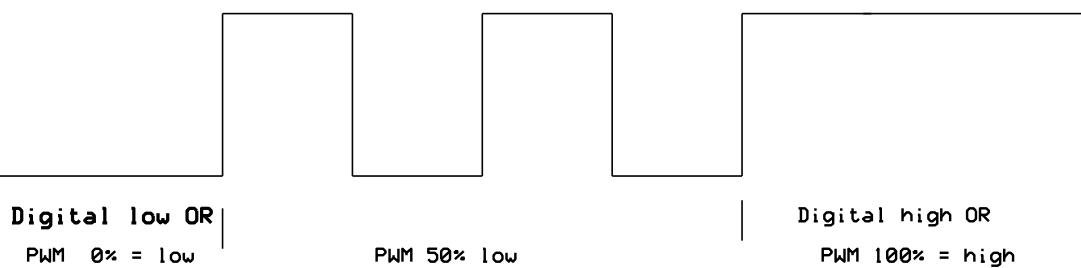
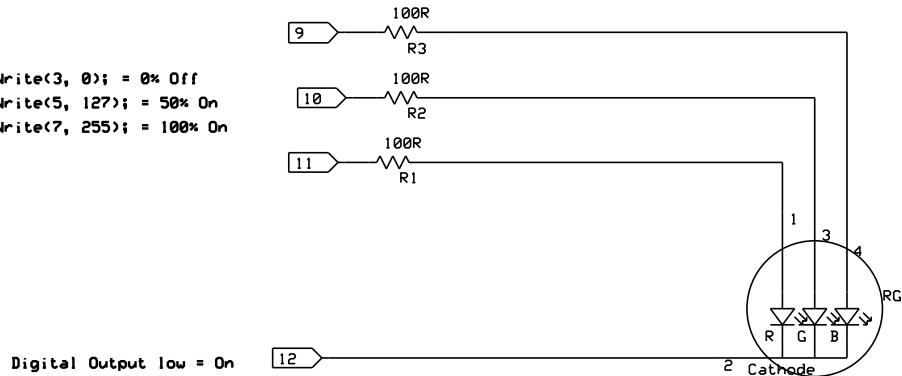
07 FEB 2013

Layout



RGB LED Connection

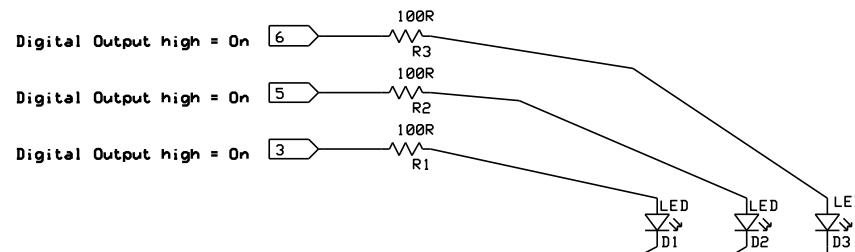
```
PWM analogWrite(3, 0); = 0% Off  
PWM analogWrite(5, 127); = 50% On  
PWM analogWrite(7, 255); = 100% On
```



LED Connection

```
PWM analogWrite(3, 0); = 100% OFF  
PWM analogWrite(3, 127); = 50% ON  
PWM analogWrite(3, 255); = 0% ON
```

OR



Digital Output low = On

4

Digital Output low = On

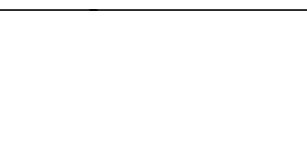
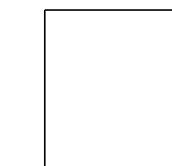
7

Digital Output low = On

8

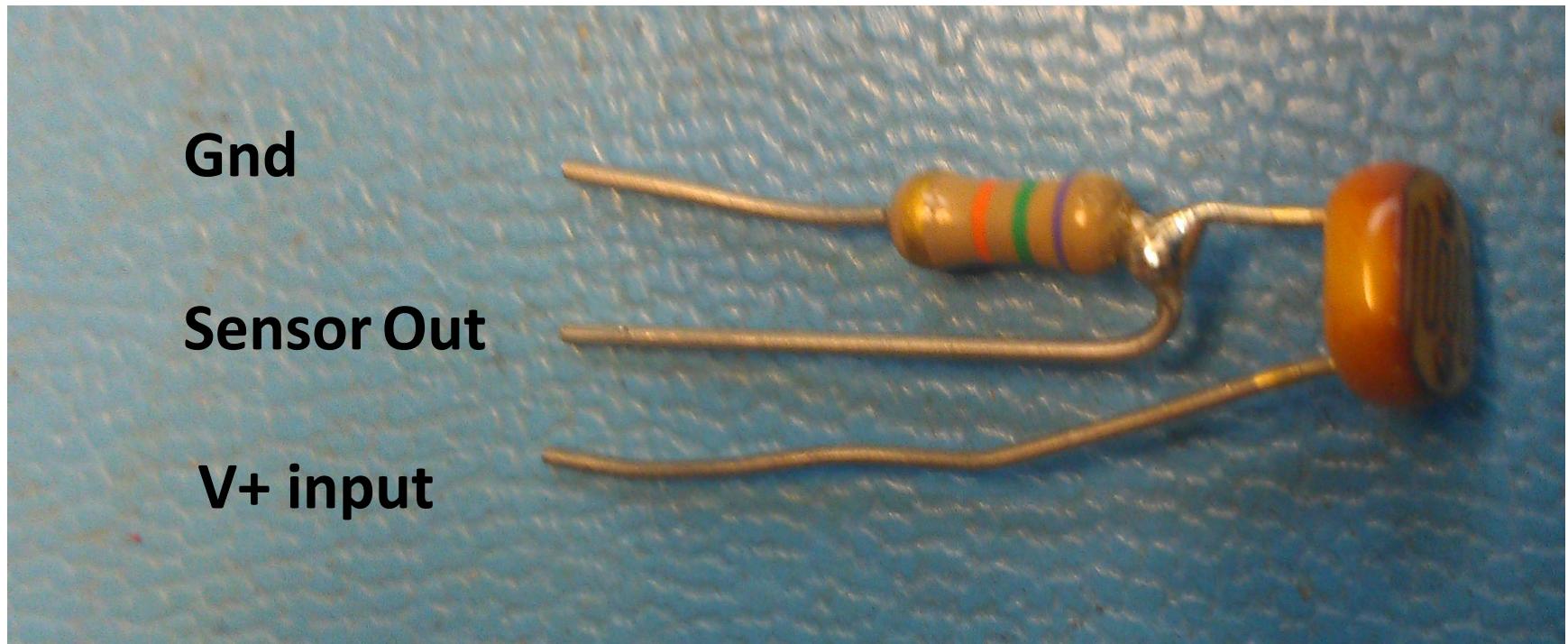


PWM 100% low

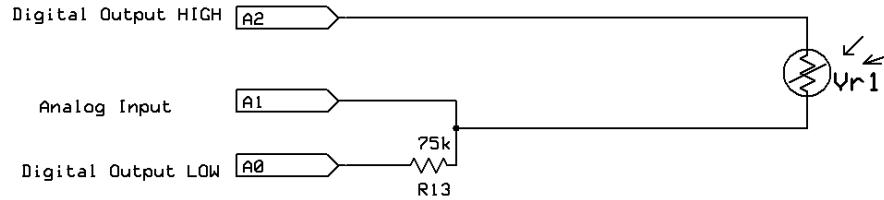


PWM 0% low

Light Sensor

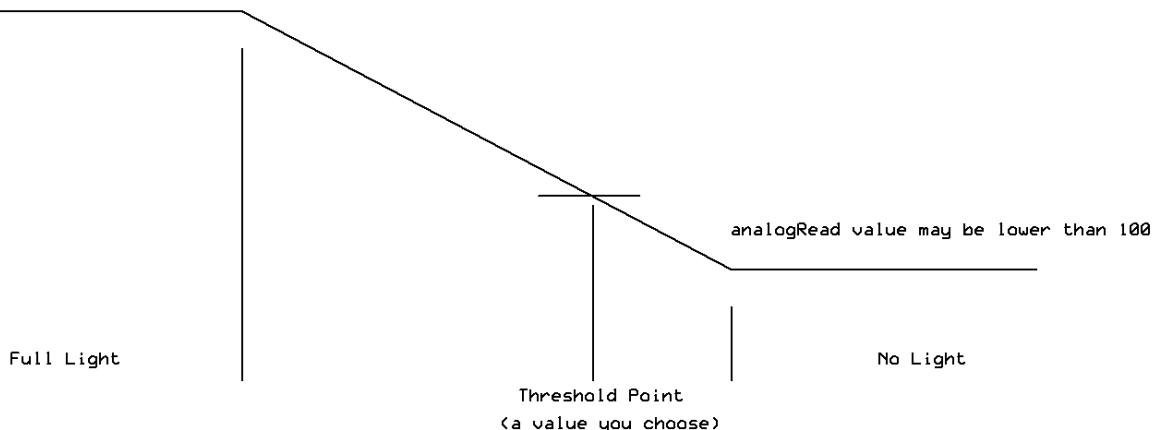


Light Sensor

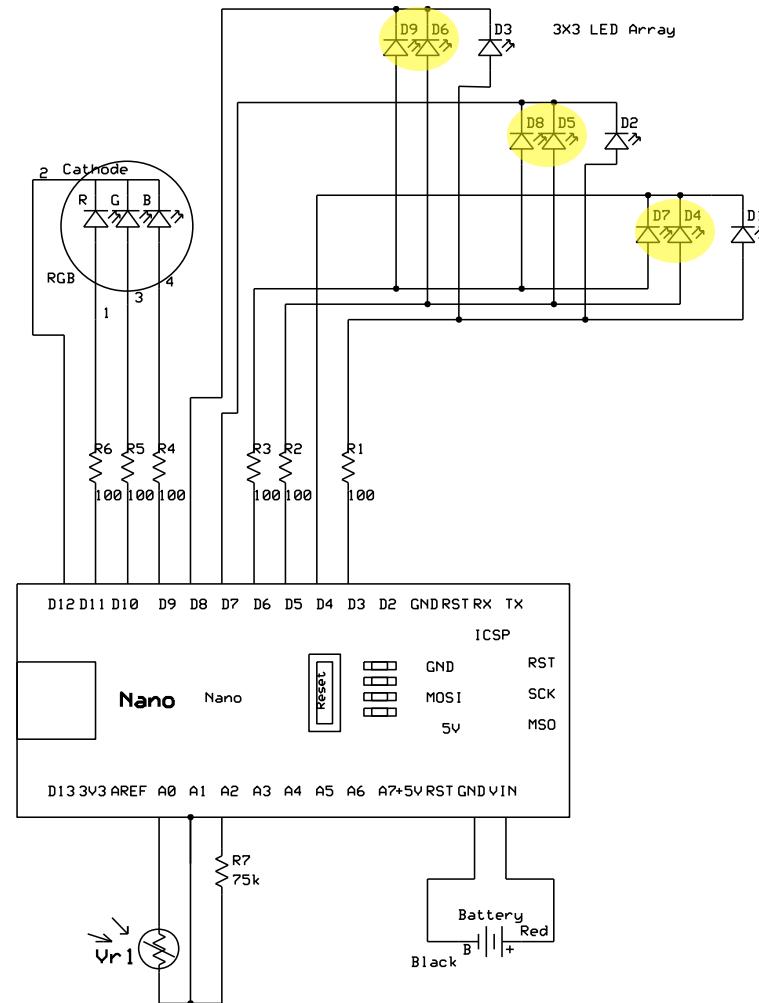


Analog Input Voltage

`analogRead` value may be higher than 800



Nano Work Sheet



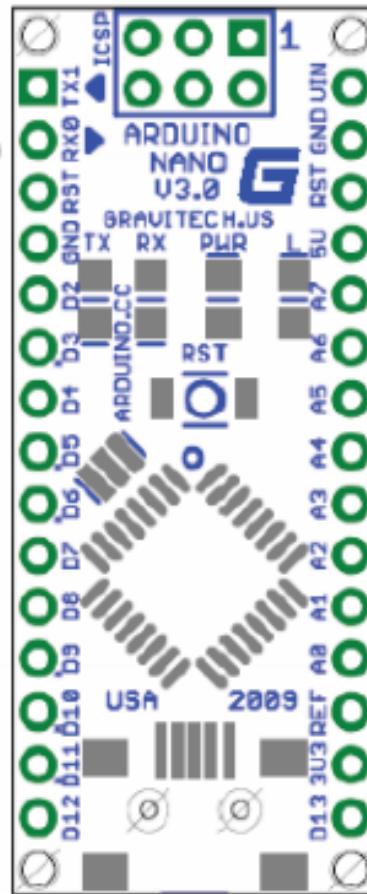
Nano Worksheet

SS
MOSI
MISO
SCK

support SPI

SCL support I2c "with wire library"
SDA

DIGITAL i/o	→ D1/TX	(1)	
DIGITAL i/o	→ D0/RX	(2)	
RESET		(3)	
GND		(4)	
DIGITAL i/o	→ D2	(5)	
PWM- DIGITAL i/o	→ D3	(6)	
SDA	DIGITAL i/o	→ D4	(7)
SCL	PWM- DIGITAL i/o	→ D5	(8)
PWM- DIGITAL i/o	→ D6	(9)	
DIGITAL i/o	→ D7	(10)	
DIGITAL i/o	→ D8	(11)	
PWM- DIGITAL i/o	→ D9	(12)	
SS- PWM- DIGITAL i/o	→ D10	(13)	
MOSI- PWM- DIGITAL i/o	→ D11	(14)	
MISO-	DIGITAL i/o	→ D12	(15)



- (30) VIN ← 6-20 volt ext power supply
 (29) GND
 (28) RESET
 (27) +5V ← +5 volt input or +5volt output
 (26) A7
 (25) A6
 (24) A5
 (23) A4
 (22) A3
 (21) A2
 (20) A1
 (19) A0
 (18) AREF
 (17) 3V3
 (16) D13 ← DIGITAL i/o -SCK

+5 volt input
or
+5volt output

i/o ANALOG PINS
10 bit of resolution

PWM is only analogWrite value , pinmode=OUTPUT

PWM 8 BIT of resolution

Online Tutorials

- Download Arduino Integrated Development Environment (IDE)
 - <http://arduino.cc/en/Main/Software>
- View online tutorials:
 - <http://www.youtube.com/watch?v=09zfRaLEasY> view 1 thru 14 (*Very Helpful!*)
 - (Optional) Darlington Transistors
<http://www.youtube.com/watch?v=COsIn3vFUyY>
 - (Optional) Bipolar Junction Transistor
<http://www.youtube.com/watch?v=ZEDdFjvnAAo>

Arduino Fix links

1. IDE slow response in Windows,
 - a. <http://www.hobbyist.co.nz/?q=slow-response-arduino-ide-in-windows>
 - b. <http://forum.arduino.cc/index.php/topic,46977.0.html>
2. Load MAC drivers
 - a. **[Jan 03, 2015, 06:23 pm](#)** Last Edit: by Daniel2
 - b. 1. Install the driver package from
<http://www.wch.cn/downloads.php?name=pro&proid=178>

2. Run command line instruction in "Terminal"
sudo nvram boot-args="kext-dev-mode=1"
 3. Restart

The Nano's then appear in the port menu as

"dev/tty.wchusbseiral1411310"