

Written By Avery Louie: CC BY NC SA

TSK x REVO

0.0:

Welcome. These handouts are supposed to be a reference to the lecture parts of this class. Feel free to copy, distribute or reuse parts of these handouts under a CC: BY NC SA license. A copy of this text can be found at www.tequals0.wordpress.com

0.1:

Lets install the arduino IDE, and modify it to work with the Secret Knowledge Arduino. Follow the instructions for your OS. The large portions of copy-paste text can be found for your copy-paste convenience at www.tequals0.wordpress.com

Windows/Mac:

Download the arduino IDE from arduino.cc

go to wherever you installed it, and find a folder called arduino. Go to /arduino/hardware/arduino/boards.txt, and open it up in notepad or notepad++ (notepad++ recommended). Add the following to the bottom of the document and save it:

```
#####
```

```
usnoobie.name=Secret Knowledge Arduino
usnoobie.upload.protocol=usbasp
usnoobie.upload.maximum_size=28672
usnoobie.upload.speed=115200
usnoobie.upload.disable_flushing=true
usnoobie.bootloader.low_fuses=0xFF
usnoobie.bootloader.high_fuses=0xD8
usnoobie.bootloader.extended_fuses=0xFF
usnoobie.bootloader.path=usnoobie
usnoobie.bootloader.file=usnoobie_atmega328p_12mhz.hex
usnoobie.bootloader.unlock_bits=0x3F
usnoobie.bootloader.lock_bits=0x0F
usnoobie.build.mcu=atmega328p
usnoobie.build.f_cpu=12800000L
usnoobie.build.core=arduino
```

Now start up the arduino IDE, go to tools>board>Secret Knowledge Arduino, and you should be ready to go!

Linux:

For linux users, this can all be achieved without messy downloads and installation dialogs. Just use these commands:

```
$: sudo apt-get install arduino
```

```
$: gksudo gedit /usr/share/arduino/hardware/arduino/boards.txt
```

then add:

```
#####
```

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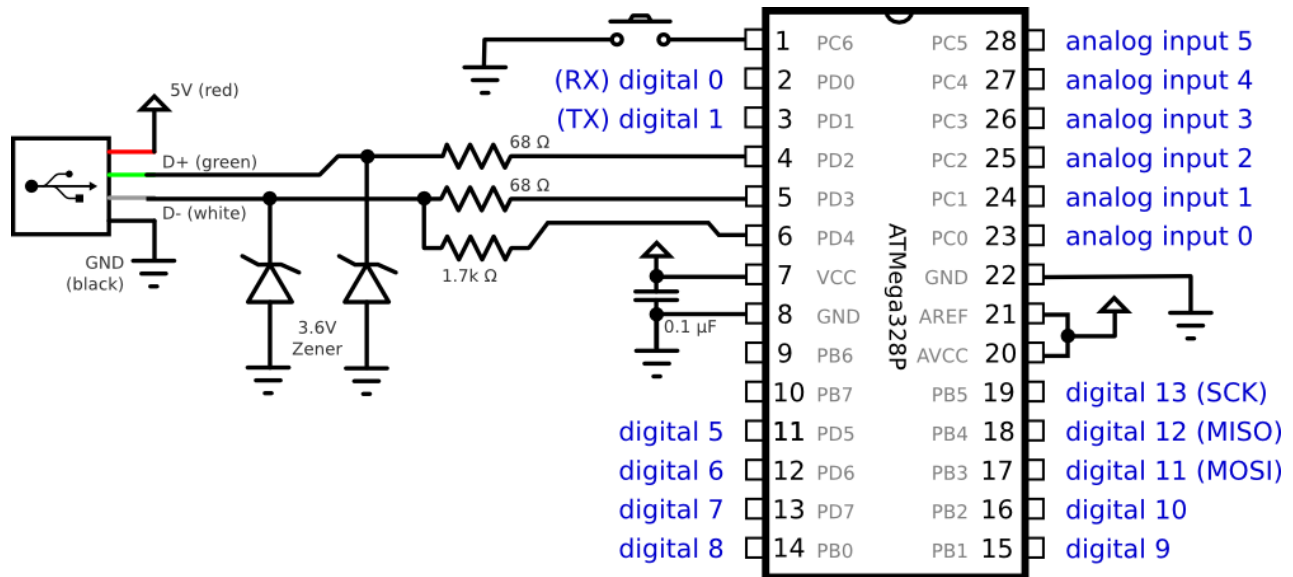
```
usnoobie.name=Secret Knowledge Arduino
usnoobie.upload.protocol=usbasp
usnoobie.upload.maximum_size=28672
usnoobie.upload.speed=115200
usnoobie.upload.disable_flushing=true
usnoobie.bootloader.low_fuses=0xFF
usnoobie.bootloader.high_fuses=0xD8
usnoobie.bootloader.extended_fuses=0xFF
usnoobie.bootloader.path=usnoobie
usnoobie.bootloader.file=usnoobie_atmega328p_12mhz.hex
usnoobie.bootloader.unlock_bits=0x3F
usnoobie.bootloader.lock_bits=0x0F
usnoobie.build.mcu=atmega328p
usnoobie.build.f_cpu=12800000L
usnoobie.build.core=arduino
```

To the bottom of the document, and save it. Then open up the arduino IDE and go to tools>board>Secret Knowledge Arduino. You may have to run the arduino IDE with super user privileges.

Ok, now you are ready to run the Secret Knowledge Arduino! There are some other things we will install later for USB support, but for now lets get cracking on building the physical board.

0.2:

Now we need to put the board together. Pay attention here, because it is easy to mess it up. For your convenience, several schematics and diagrams have been provided.

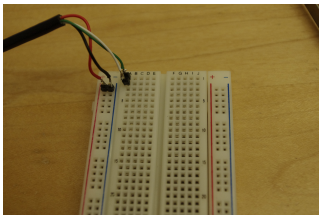
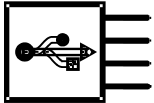
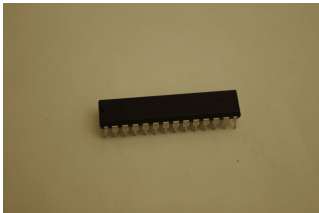
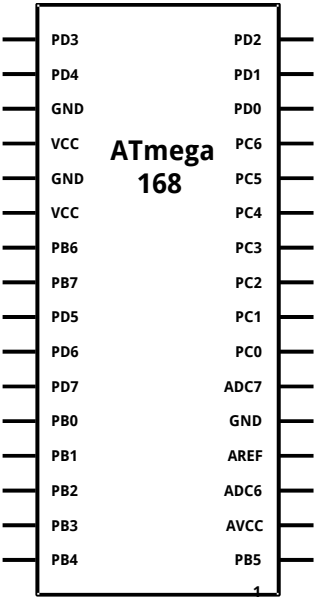


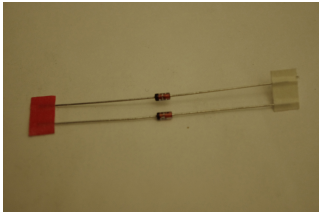

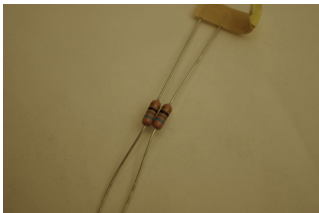



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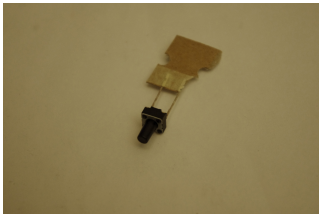

There will be an additional LED from digital pin 8 to ground.

Ok, lets break down the parts you have. Part numbers and sources can be found on the wordpress blog above.

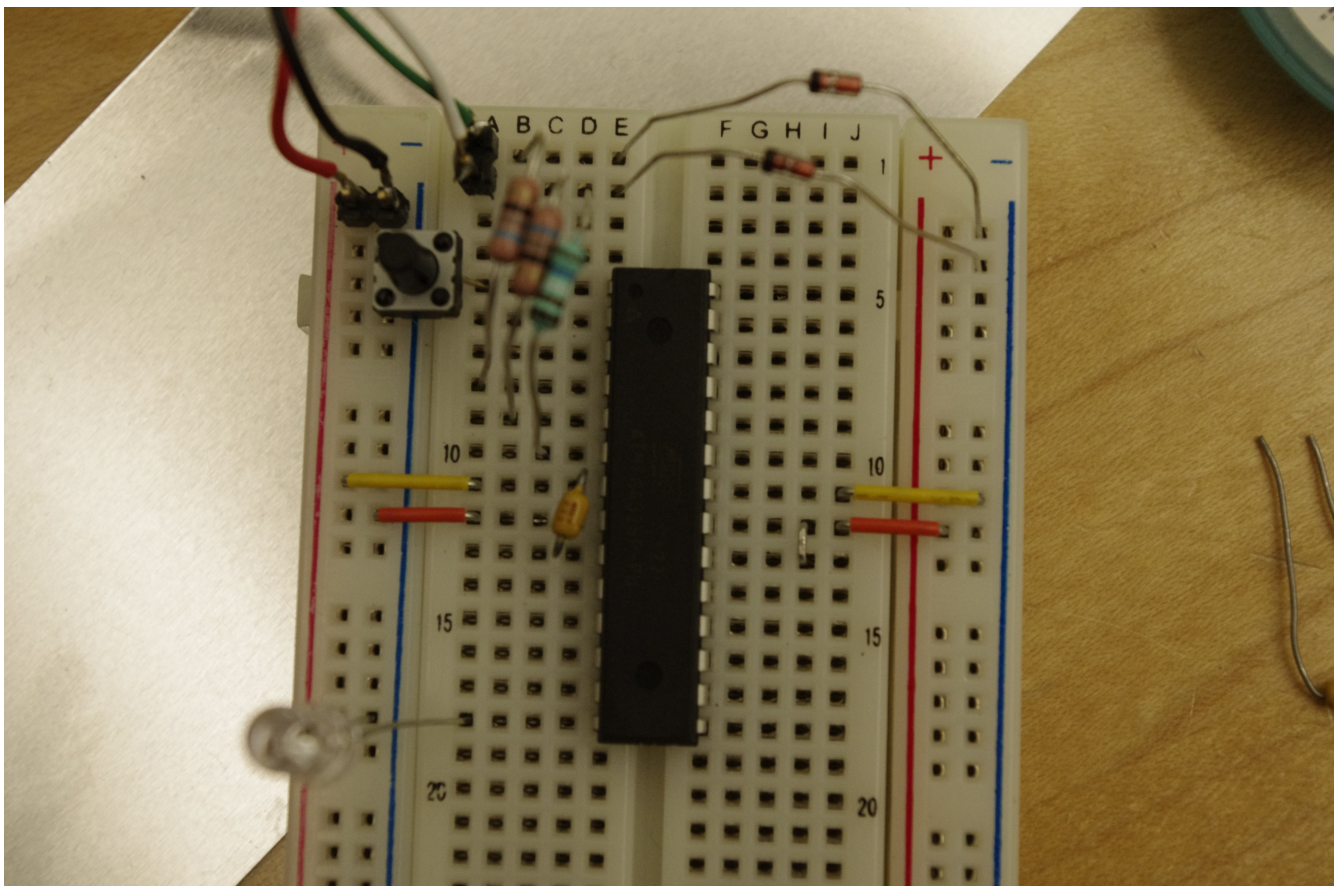
Part	quantity	Description	Schematic Drawing
------	----------	-------------	-------------------

Male USB A breakout cable	1		
ATMEGA328P	1		 <p>Like this only it says Atmega 328P on it</p>
.01 uF capacitor	1		
3.6 V zener diode	2		
68 Ohm Resistor	2		

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1K7 Ohm Resistor	1		
N/O SPST momentary pushbutton switch	1		

Additionally, here is a picture:



Note LED from pin 8 to ground.

0.3:

Sweet. Now that it is all put together, lets test it out. Plug the device into your USB port, and try

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“verifying” the below code with this button of the IDE. This will let you know if you have any bugs in your code.

```
void setup(){  
  pinMode(6,OUTPUT);  
}
```



```
void loop(){  
  analogWrite(6,250);  
}
```

Ok, if that worked (and it should) add another LED to pin 6 of your microcontroller. Use the Arduino pin 6, not pin 6 of the microcontroller. The arduino mapping of pins is in blue on the large schematic above, and is referred to as “digital pin 6”. The lead coming out of the flat side of the LED should go to ground, and the other lead should go to the uC. Press the button on the TSK arduino; the first LED should start to flash. That means the bootloader is ready to receive the program! Now try hitting the “upload” button (shown below).



That should make a bunch of output in the console looking area at the bottom of the IDE, and then your LED should turn on! Play with the number on the line `analogWrite(6,XXX);`, see what it does!