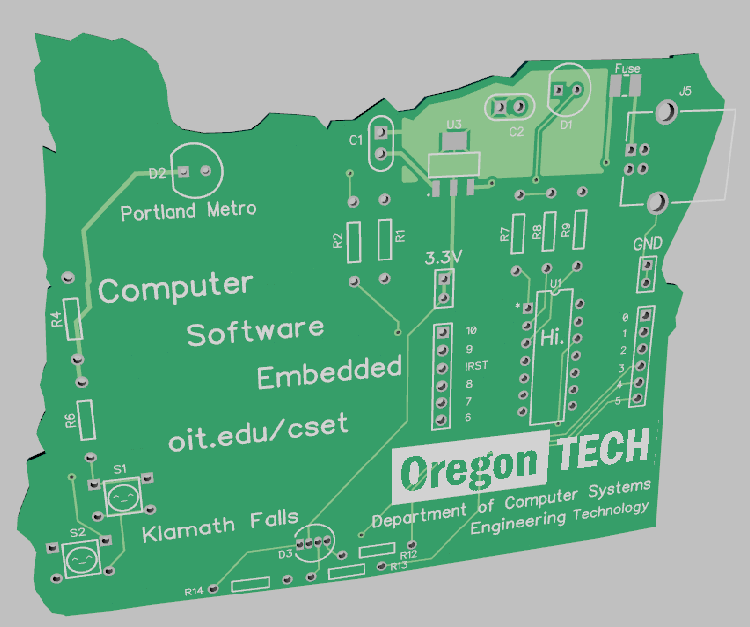
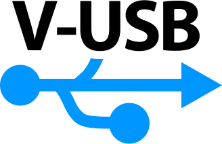


|  |
| --- |
| Oregon Institute of Technology |
| Owlboard Jr. v4.0 / Oregon shape board v1.0 |
| Users Guide / Assembly Guide / Tutorials |
|  |



# Note

Portions of software and hardware design originated from Digispark, a product of Digistump. The Owlboard Jr. and Oregon Shape board are not products of Digistump. Do not contact them for any support.



The USB bootloader uses V-USB, available from: https://www.obdev.at/products/vusb/index.html

# Safety and Liability

If you are participating in the soldering portion of the workshop, you must do the following:

1. Listen to and follow instructions from faculty and student assistants.
2. Wear personal protective equipment such as safety glasses.
3. Use the fume extractor to blow smoke away from you.
4. Be aware that the soldering iron is hot, and you should be careful when using it.
5. Be aware that the flux and solder fumes, while not hazardous can cause respiratory distress.
6. Wash your hands after the workshop and after handling your board.

Be aware that you are putting together a board which may be plugged into your computer. While the faculty and student assistants involved will try and make sure that the board is properly assembled, note that improperly assembled boards or improperly handled boards may cause damage to your computer.

Oregon Institute of Technology is not responsible for any damage to your personal computer.

# Owlboard Jr. v4.0 and Oregon board v1.0 Features

The owlboard Jr. and Oregon board are community outreach boards designed at Oregon Tech. They are open sourced boards using the VUSB bootloader. The software and hardware are available at the link below.

<https://github.com/kevin-oit/owletBoard_attiny84>

Features of the Owlboard Jr v4.0 / Oregon board v1.0

* ATTINY84 microprocessor in dip package
* One 3mm LED
* One 5mm RGB LED
* Two push buttons
* Integrated USB bootloader (V-USB)
* Built-in USB connector on Owlboard Jr.
* USB-B connector on Oregon board v1.0
* 350 mA poly fuse
* 3.3 V System voltage

ADD PICTURE OF OWLBOARD and OREGON board

# Circuit and component primer

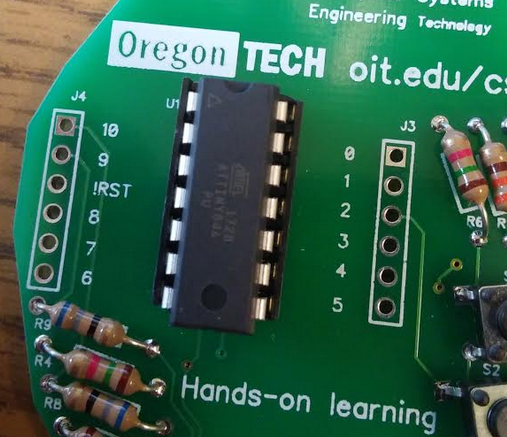
# Assembly Instructions

Add schematic and bill of materials

# Board setup – Buttons, LEDs, and pin locations

When writing code for the Owlboard Jr. or Oregon shaped board, please use the pin numbers below in Arduino IDE.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Arduino Pin Number | Owlboard Jr. | Oregon shaped board | Logic | |
| 0 | Right Eye LED | Portland Metro LED | ‘1’ = ON; ‘0’ = OFF | |
| 1 | Switch 1 | Switch 1 | PUSHED = ‘1’; ELSE = ‘0’ | |
| 2 | Switch 2 | Switch 2 | PUSHED = ‘1’; ELSE = ‘0’ | |
| 3 | Red RGB | Red RGB | ‘0’ = ON; ‘1’ = OFF | |
| 4 | Blue RGB | Blue RGB | ‘0’ = ON; ‘1’ = OFF | |
| 5 | Green RGB | Green RGB | ‘0’ = ON; ‘1’ = OFF | |
| 6 | Pinout to header | | |  |
| 7 | Pinout to header | | |  |
| 8 | Pinout to header | | |  |
| 9 | Pinout to header | | |  |
| 10 | Pinout to header | | |  |



For example, if you wish to turn the Portland Metro or Right Eye LED on, you would need to:

1. Set pin 0 to an output

pinMode(0, OUTPUT);

1. Write in the loop logic ‘1’.

digitalWrite(0,HIGH);

If you wish to configure the button S1, you would need to:

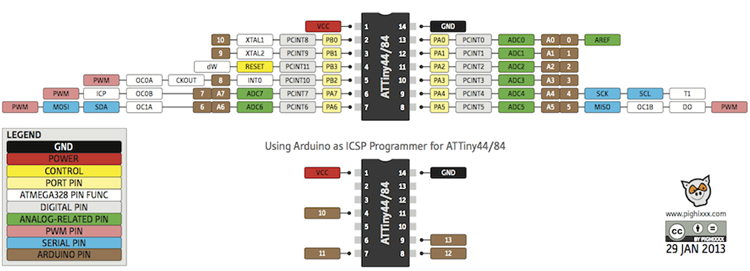
1. Set switch 1 to input

pinMode(1, INPUT);

1. Read the button

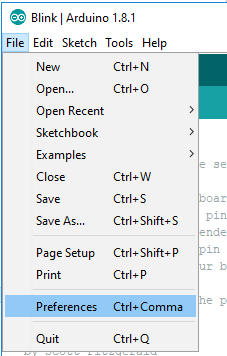
digitalRead(1);

# Pinout of ATTINY84

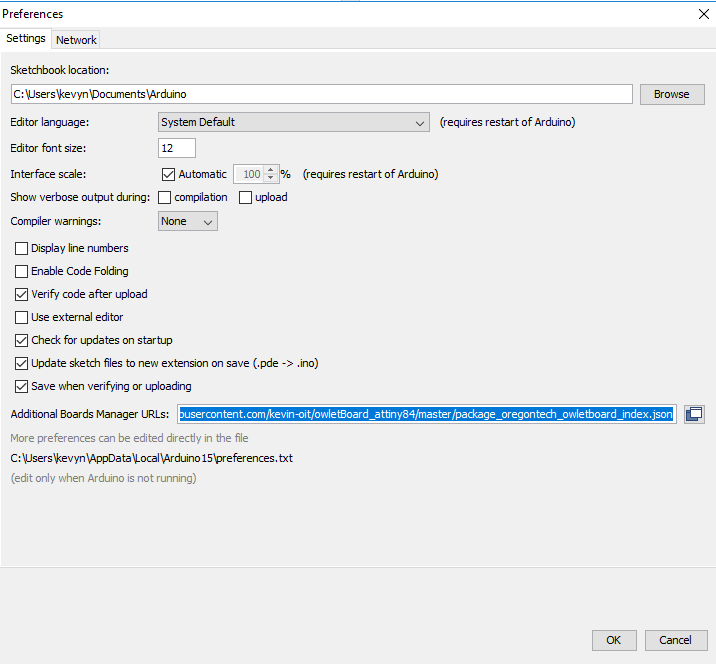


# Installation

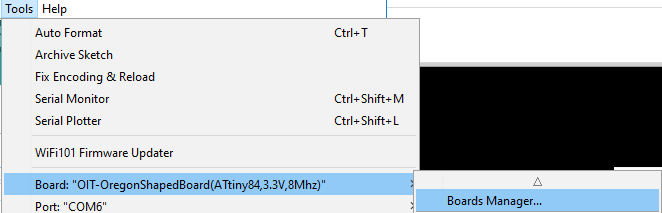
1. Install Arduino IDE from this link: <https://www.arduino.cc/en/Main/Software>
2. After Arduino IDE is installed, launch Arduino IDE.
3. Go to File > Preferences.



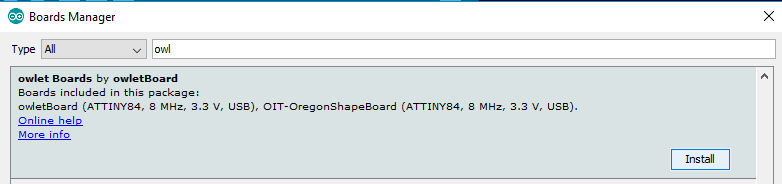
1. You should see the following screen.



1. Under Additional Boards Manager URL paste this: <https://raw.githubusercontent.com/kevin-oit/owletBoard_attiny84/master/package_oregontech_owletboard_index.json>
2. Click OK.
3. Go to Tools > Boards > Board Manager



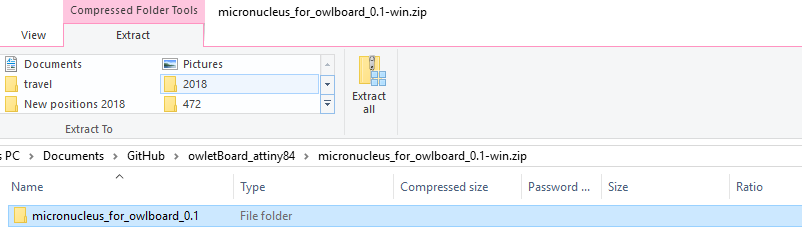
1. Type owl into the menu bar and you should see owlet Boards by owletBoard. Click install.



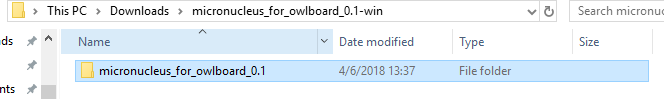
1. Download this file:

<https://github.com/kevin-oit/owletBoard_attiny84/blob/master/micronucleus_for_owlboard_0.1-win.zip>

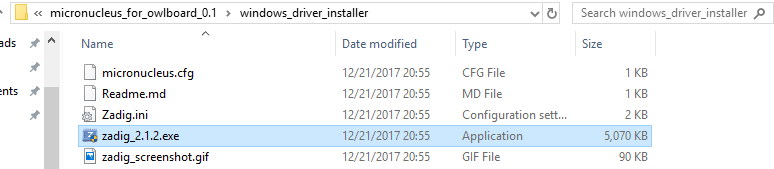
1. **Unzip the file.**



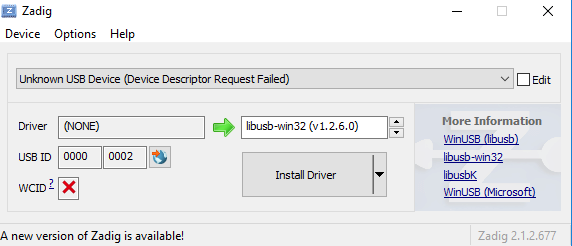
1. When the files are extracted, a new window will open up.



1. Navigate to the windows\_driver\_installer folder.



1. Double-click on zadig\_2.1.2.exe. The window below should launch.



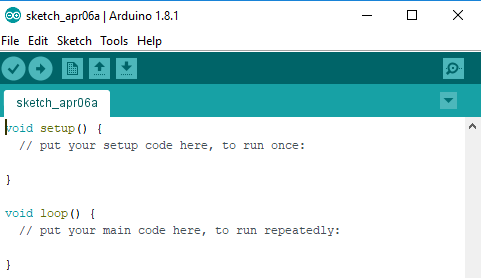
1. Plug your board into the computer. Within 5 seconds, switch to the unknown device and then click Install Driver. You may need to try more than once to install the driver.
2. Wait for success.

Congratulations.

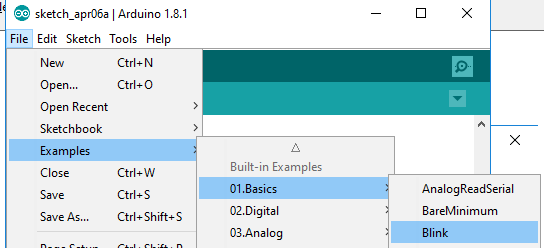
**You have now installed all the software required to use the Owlboard Jr. or the Oregon shape board.**

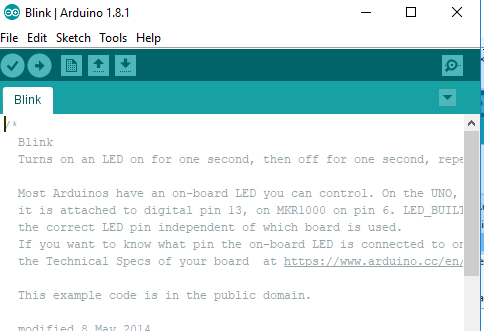
# **Tutorial 1: Uploading code to the board**

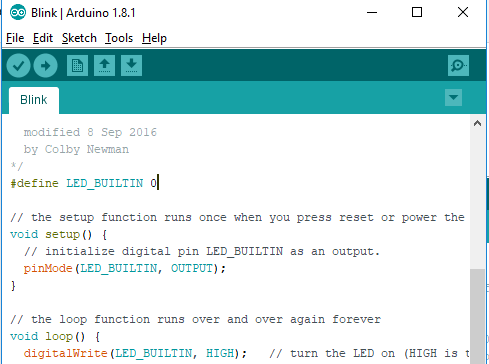
1. Make sure you have installed the driver, Arduino IDE, and installed the board file as listed in the previous section.
2. Launch Arduino IDE



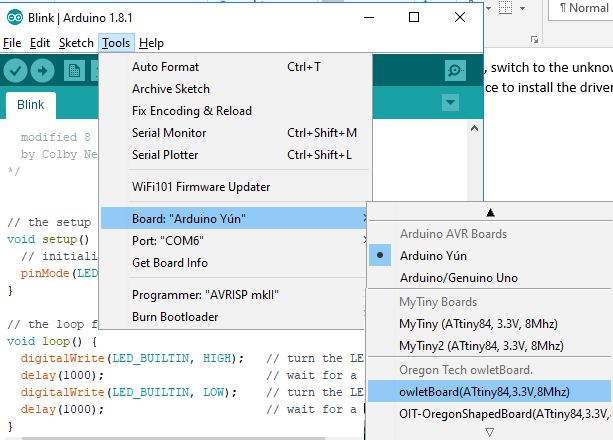
1. We’ll need something to program to the board, so navigate to the basic example.



1. The basic example should open. 
2. The basic example needs to be modified, because one of the LEDs on the Owlboard Jr. or Oregon board is set to pin 0. Add the line of code shown below.



1. Click on the owletBoard or OIT-OregonShapedBoard, depending on which board you have.

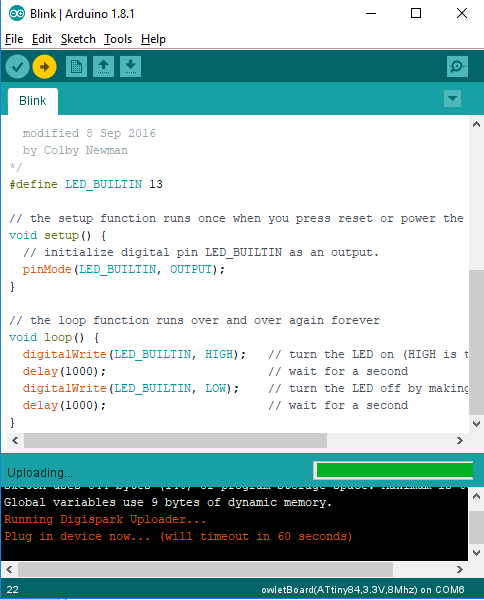
****

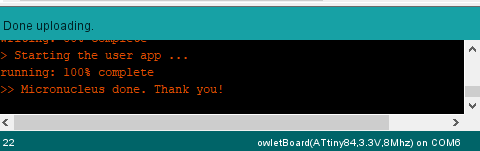
1. Make sure that the bottom lower right corner indicates that the correct board, owletBoard or OIT-OregonShapedBoard is selected.



1. Click the arrow button. This will compile and upload your code to the board. Note that it will ask you to plug in the device (‘Running Digispark Uploader… Plug in device now…). You must unplug and replug the device within 60 seconds or the system will timeout.

If the timeout occurs, press the arrow button again, remembering plug in the board when asked.

****

1. If it is successful you should see the following in the box below. 
2. On the Owlboard Jr, the right eye should now blink. On the Oregon shape board, the Portland Metro LED should now blink.

**Tutorial: Blinking an LED**

Tutorial on an example of how to blink it faster or slower. What about different on or off times?

# How to configure the button to turn on the LED

# How to configure the button to toggle the LED

# How to turn on the RGB LED?

# How to use the button to change the colour of the RGB LED?

# How to PWM the RGB LED?

More information

Make sure explain user this not normal Arduino, may need use different pins. This device have limited memory and MHz. Can try digistump libraries included but not guarantee to work.

How to program

1. Press the compile and upload button
2. Plug in digispark when asked to do so
   1. Make sure to disclaim all legal liability.
3. Windows will error with USB device but is ok.

Use material from:

From <https://digistump.com/wiki/digispark/tutorials/connecting>

and <https://learn.sparkfun.com/tutorials/how-to-install-an-attiny-bootloader-with-virtual-usb#resources-and-going-further>

to fill in the rest.