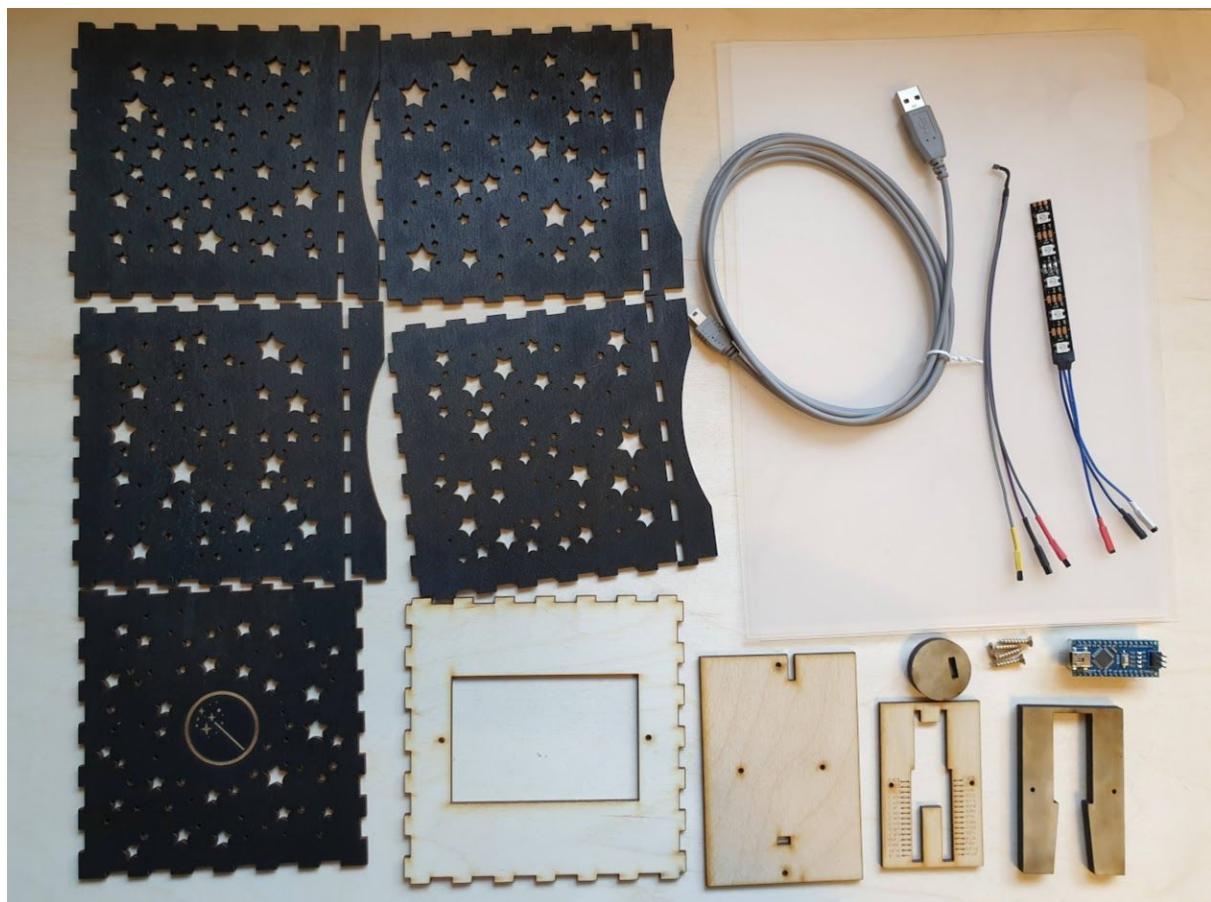


DIY Wizard Lamp

Assembly Instructions

Parts included



1x Magic Wand Sensor

1x LED Strip

1x Arduino Nano

1x USB cable

4x Screws

Plywood

Diffusion Paper

Tools (not included)

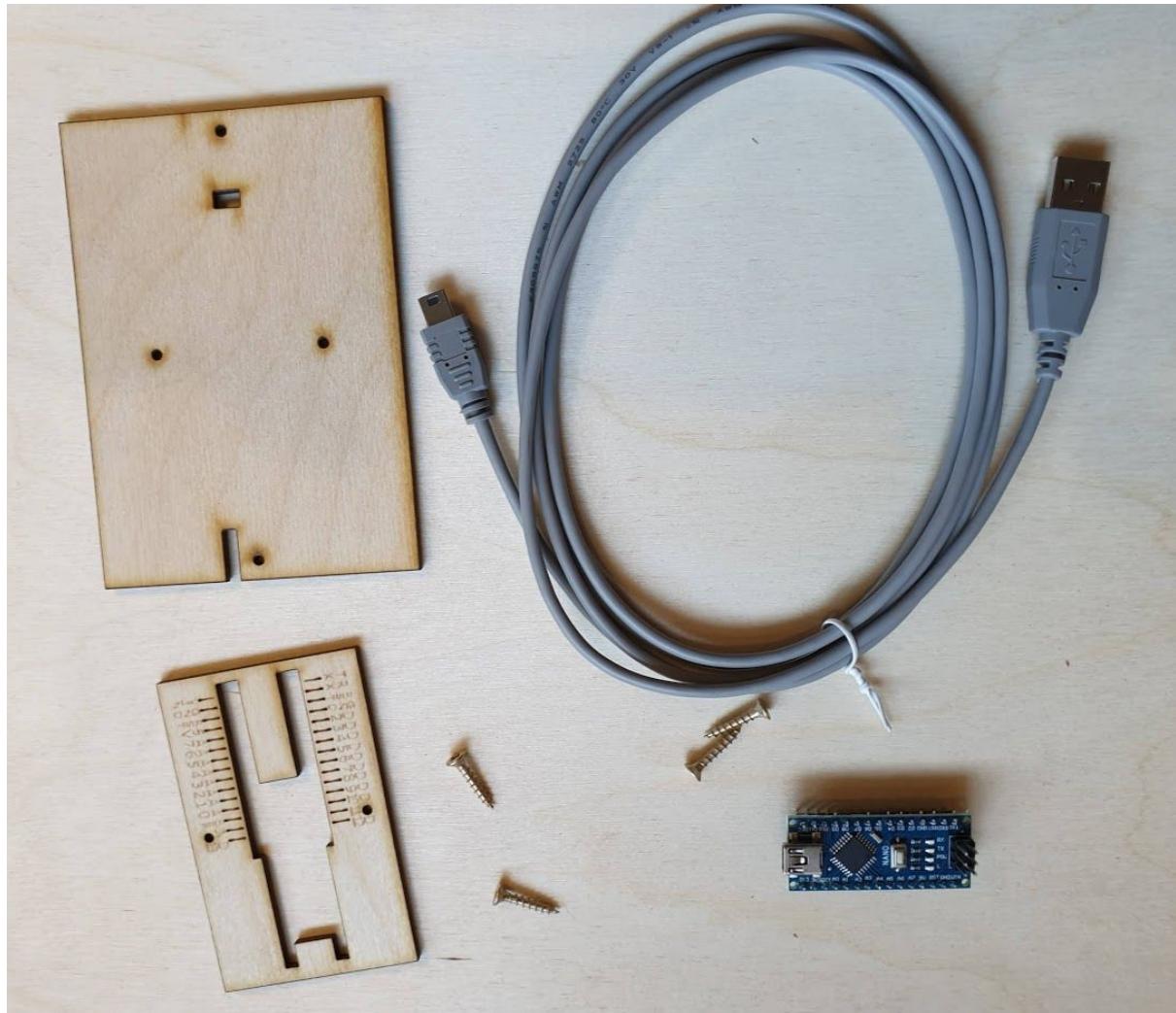
Any glue of your choice. Kids should not use superglue.

Screwdriver

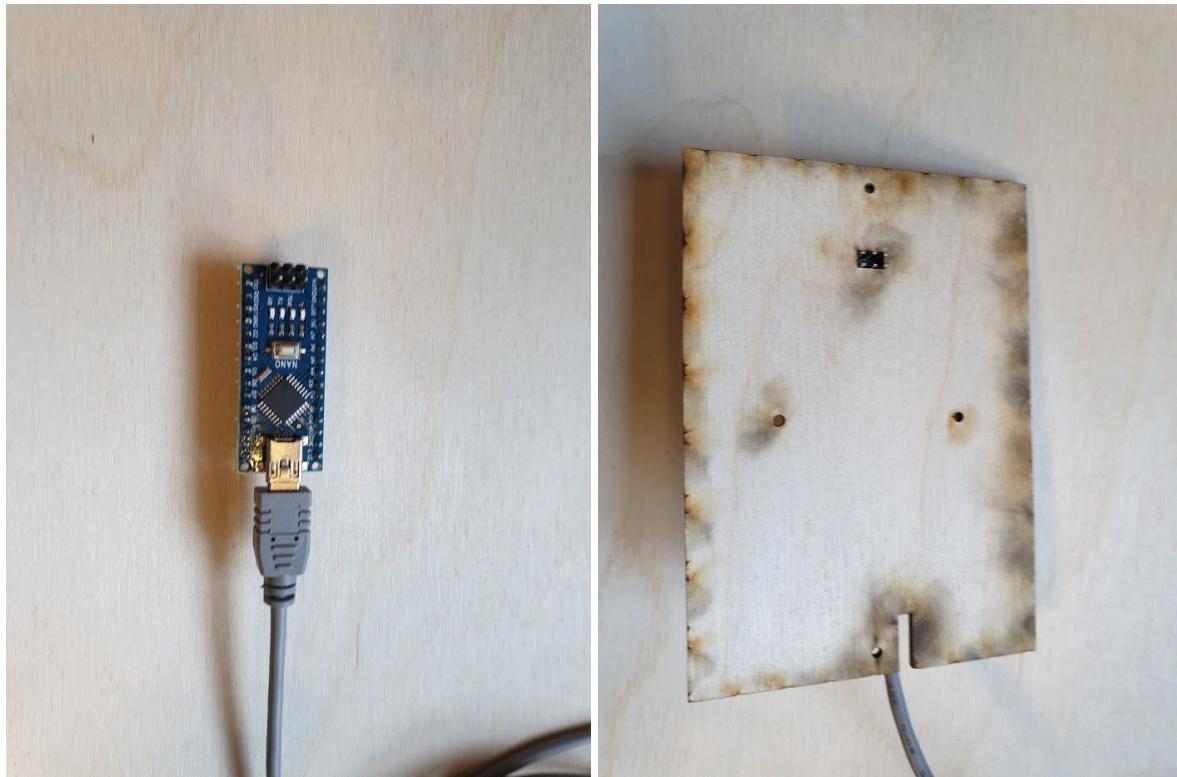
Scissors

Assembly

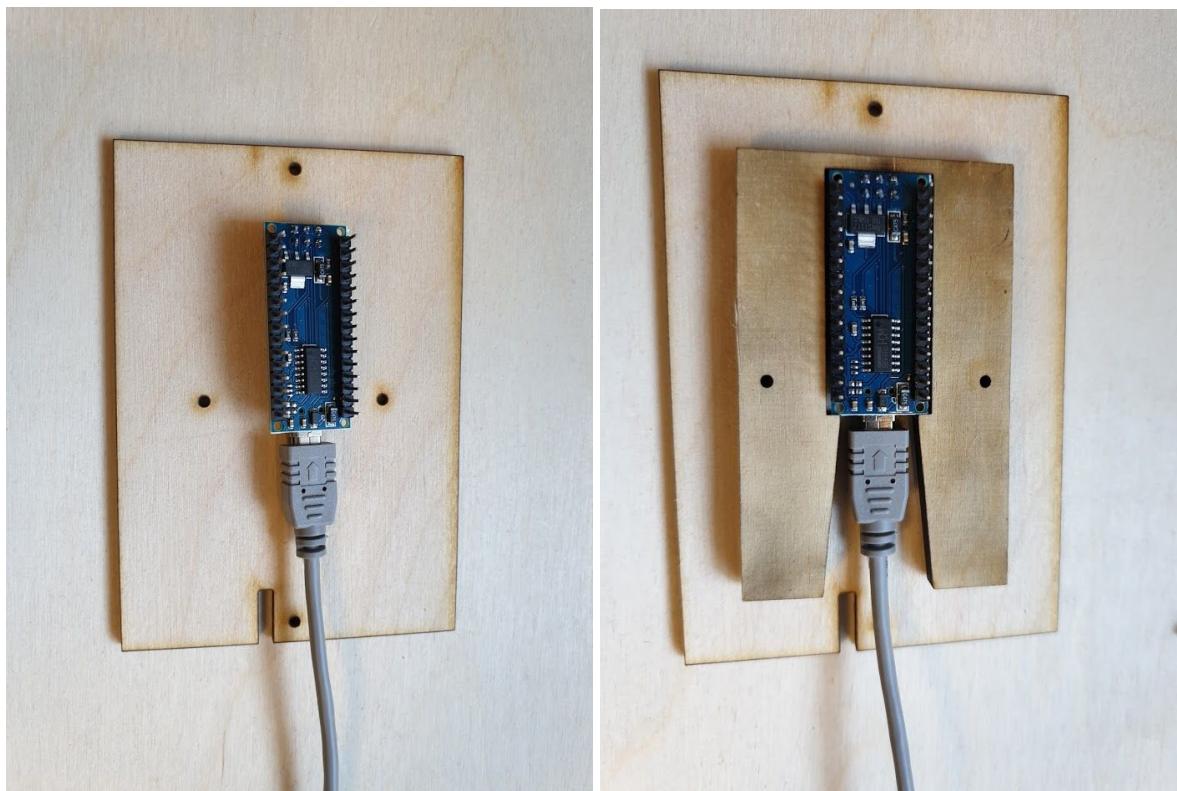
Start by assembling the electronics holder.



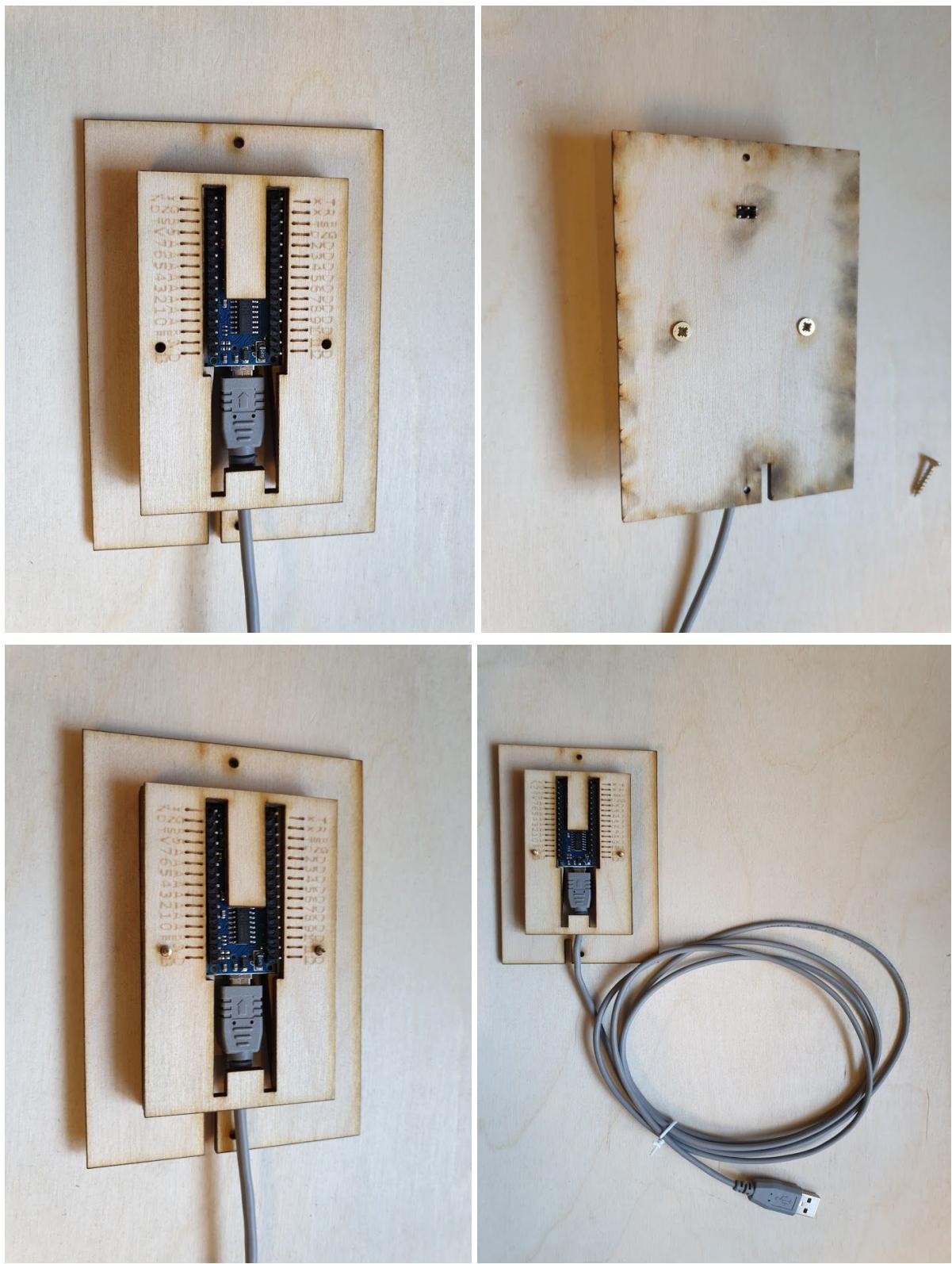
Plug in the Nano to the mini USB cable and place it on top of the 3mm plywood holder, there is a cutout for the SPI pins.



Then place the 6mm plywood spacer around the Nano.



Add the LED strip holder on top of that and screw it in place with 2 screws.



Next step cut the diffusion paper with scissors into 5 squares approximately 120mm by 120mm each.



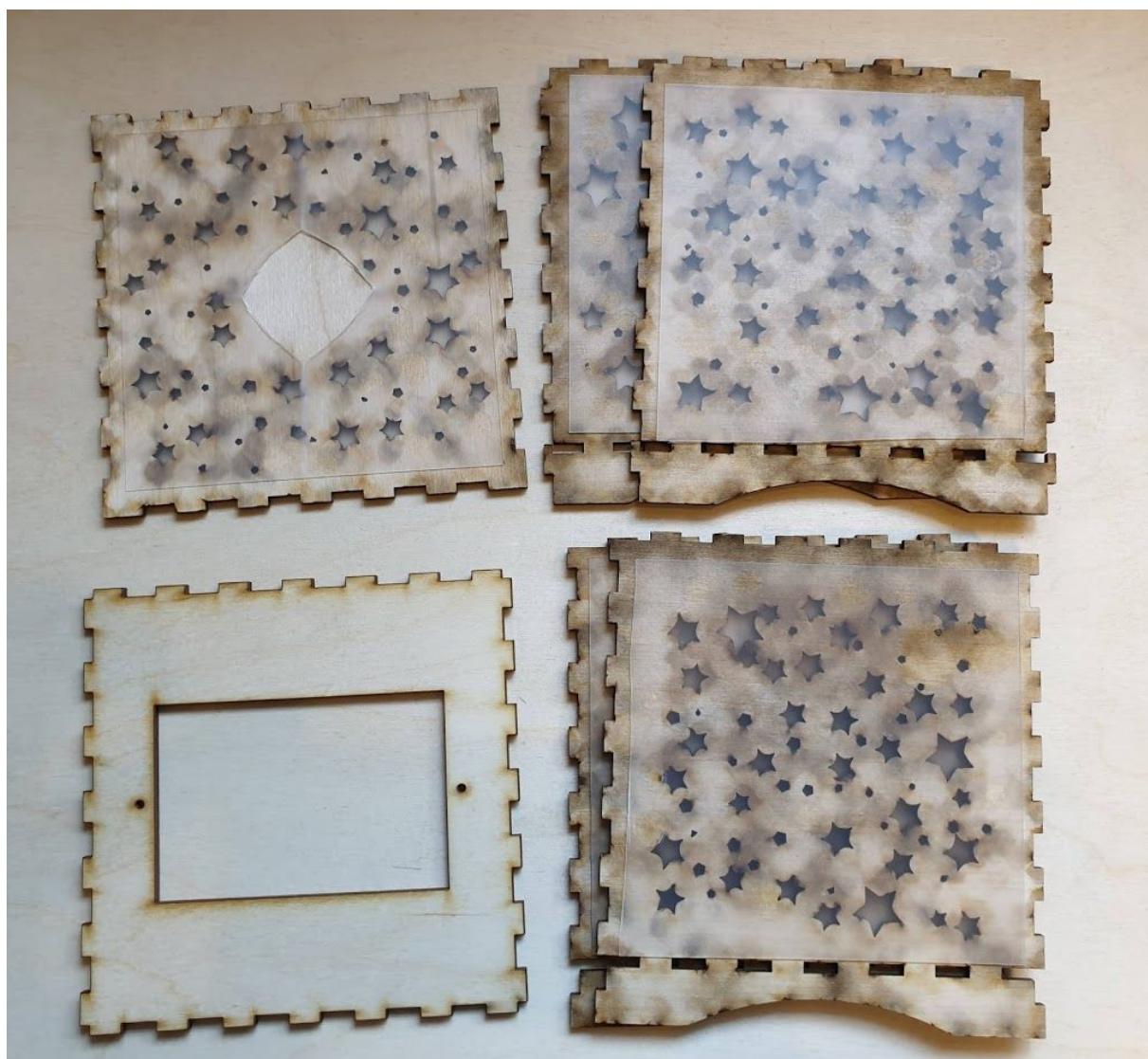
Make a 30mm diameter hole in the centre of one of the squares for the sensor. You can do this with an exacto knife or fold the paper twice and cut the corner in the middle.



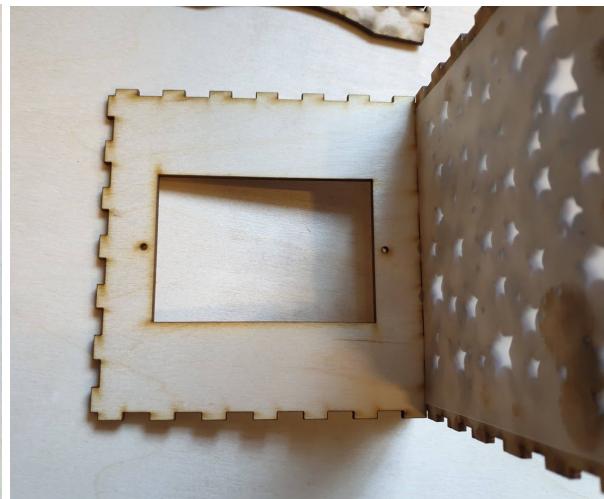
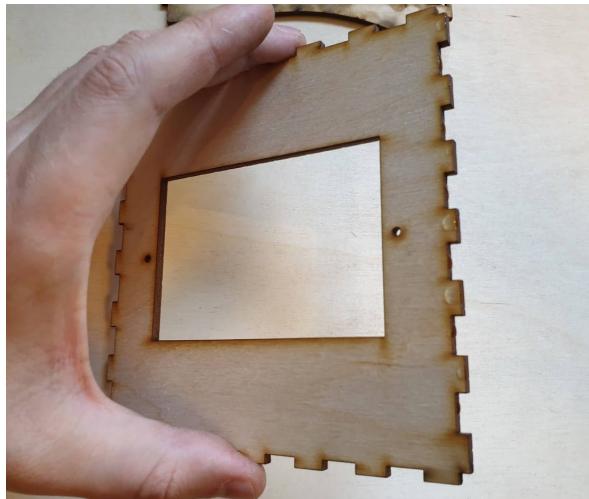
Glue the diffusion paper on all sides except the base. Glue the diffusion paper with a hole on the top panel.



Start assembling the box together. You have a top panel, base panel and four sides with opposite sides being the same.



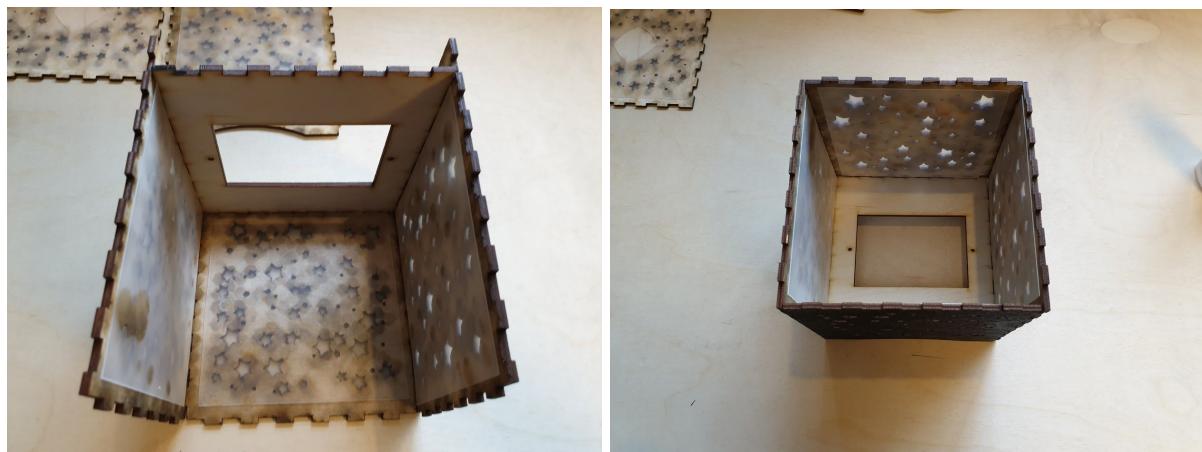
Add some glue on the finger joints for one of the sides and glue it in place. It doesn't matter which side you start with, the base panel is symmetrical.



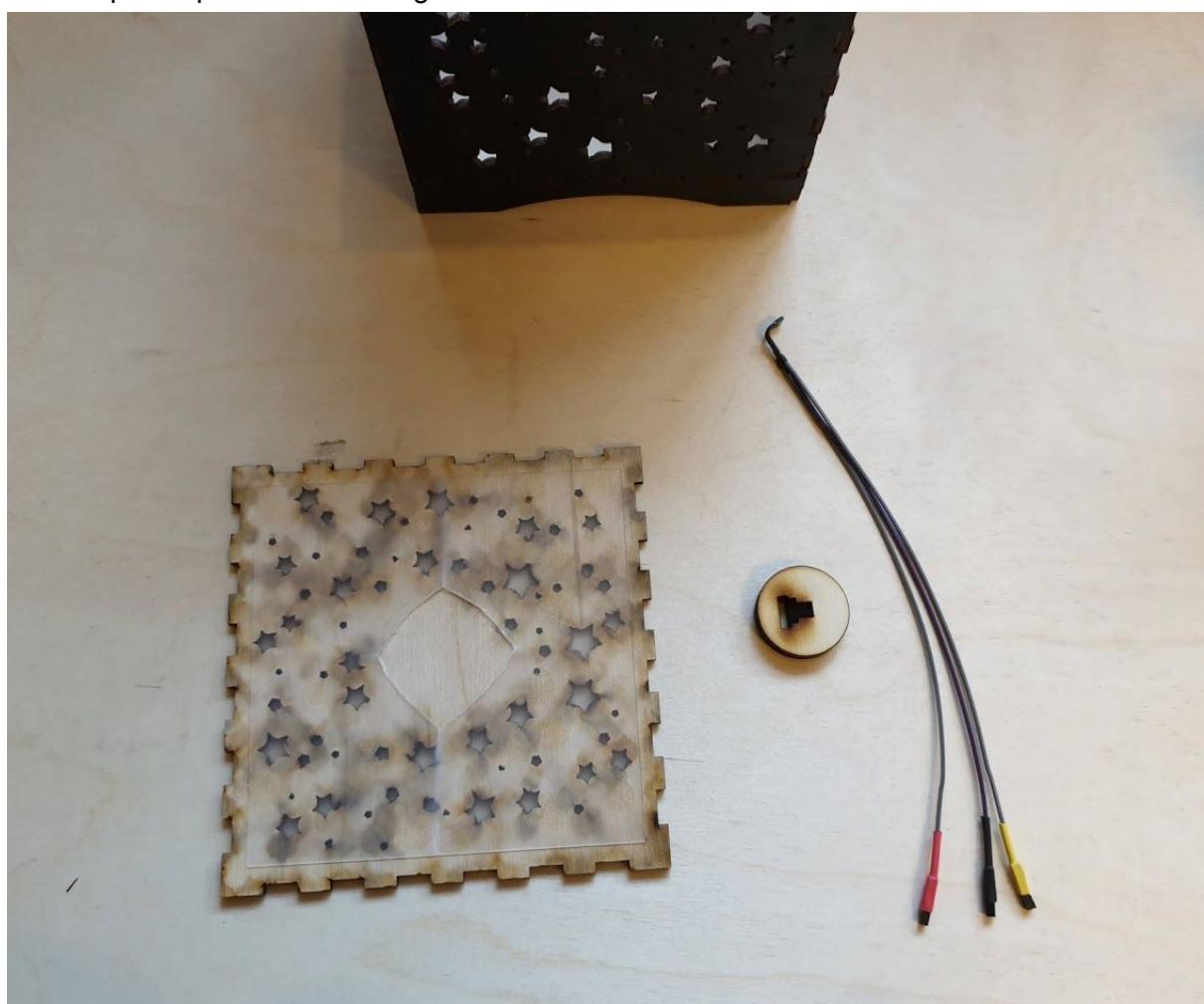
Do the same for the adjacent panel. Don't forget to put glue on all joints that are interlocked.



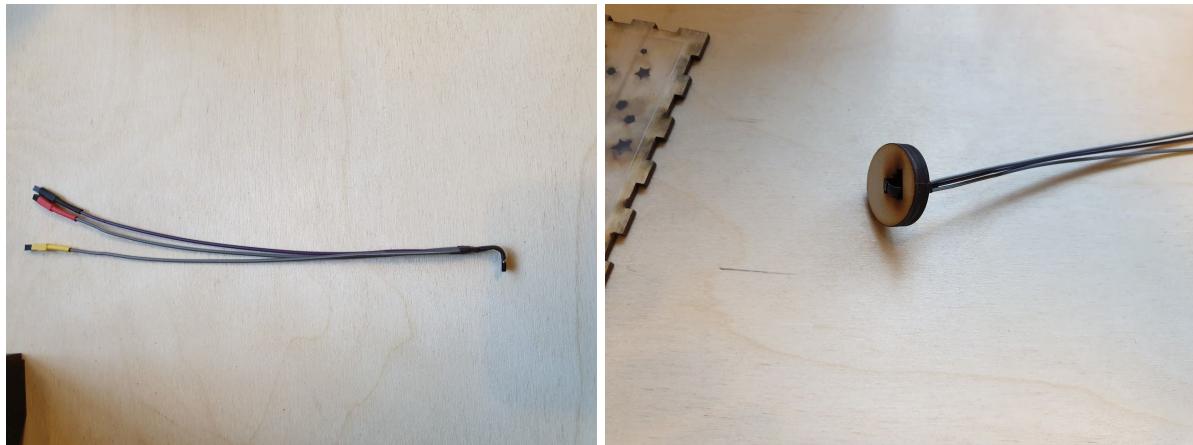
Do the same for the rest of the side panels.



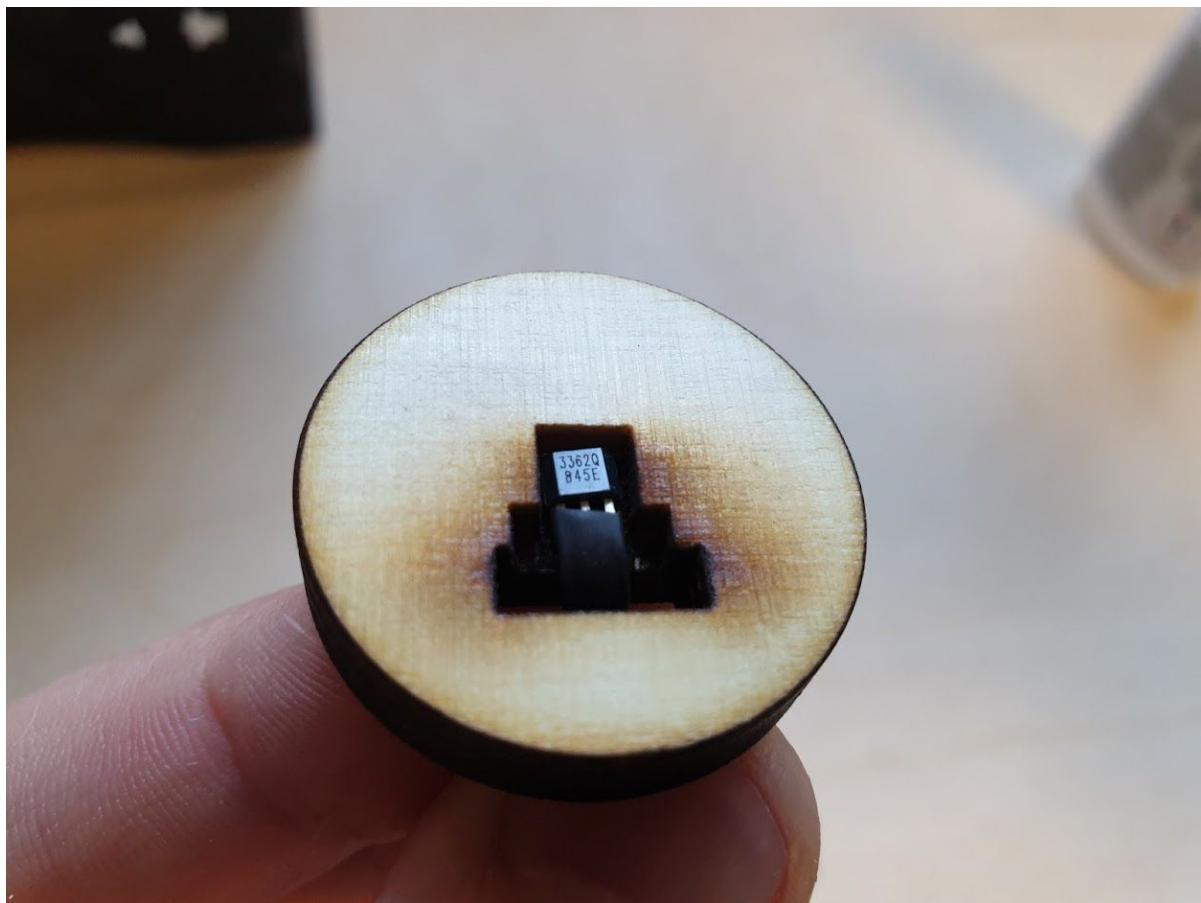
Next step is to put the sensor together.



Bend the sensor 90° with the text on the sensor pointing up.



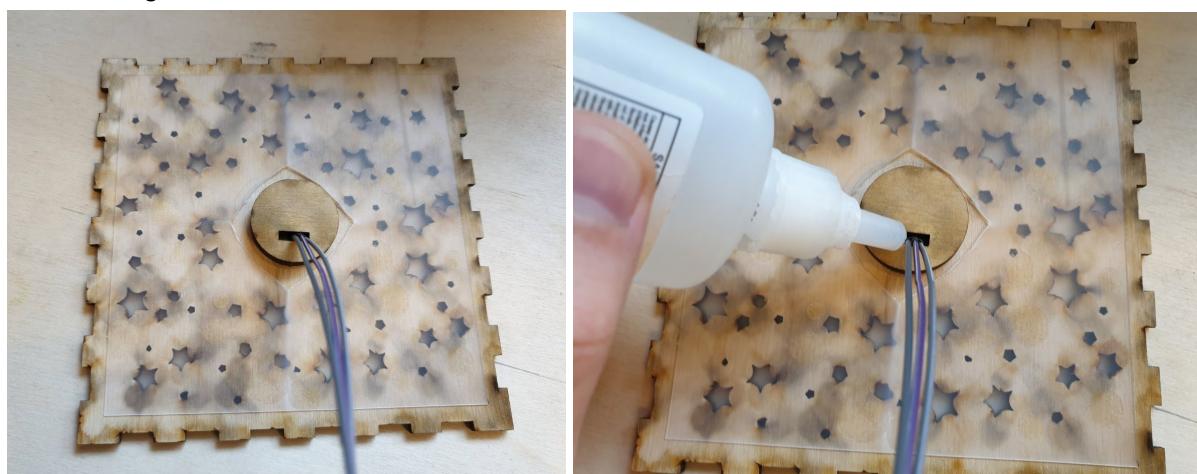
Tread the sensor through the 6mm plywood holder. Make sure that the side of the sensor with text on is pointing up as that is the side that will detect the magic wand.



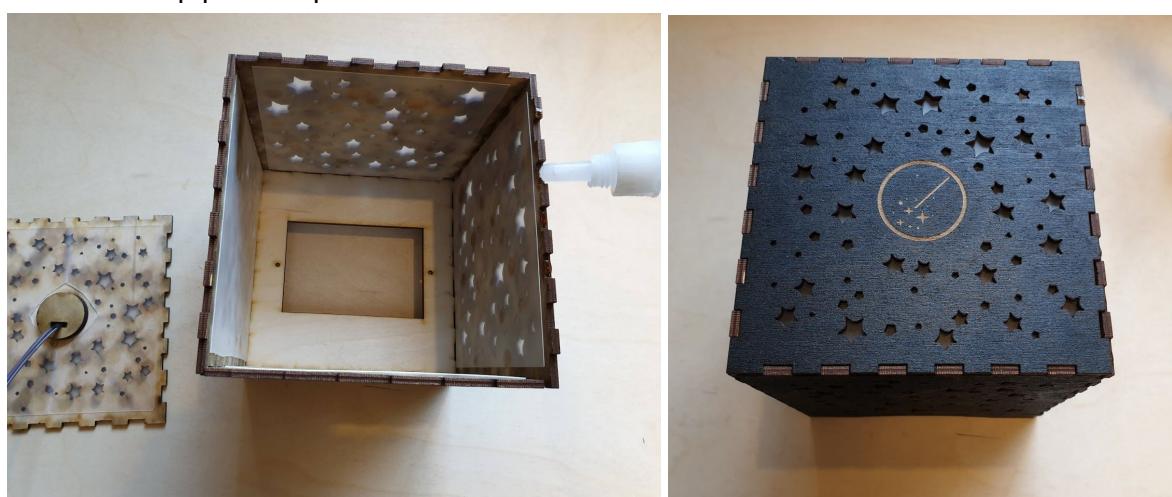
Add plenty of glue around it and glue it to the middle of the top panel where we made a cutout earlier.



Add some glue in the cutout at the back of the sensor holder for cable strain relief.

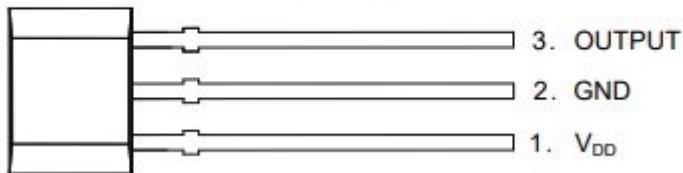


Glue in the top panel in place.



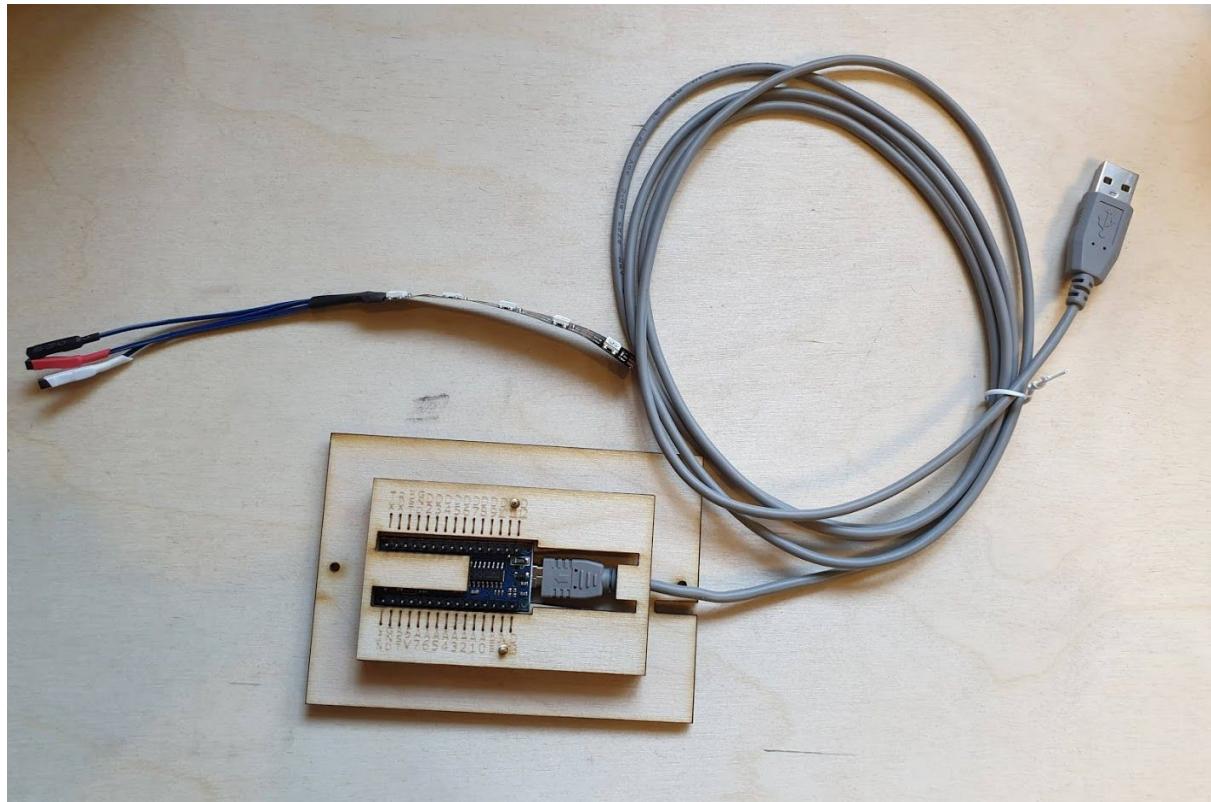
Wiring

(Top View)



- | | | |
|-------------|---|----------------------------------|
| Nano 5V | > | Sensor VDD (RED connector) |
| Nano GND | > | Sensor GND (BLACK connector) |
| Nano PIN D8 | > | Sensor OUTPUT (Yellow connector) |
| | | |
| Nano VIN | > | LED Strip +5V (RED connector) |
| Nano PIN D3 | > | LED Strip Din (White connector) |
| Nano GND | > | LED Strip GND (BLACK connector) |

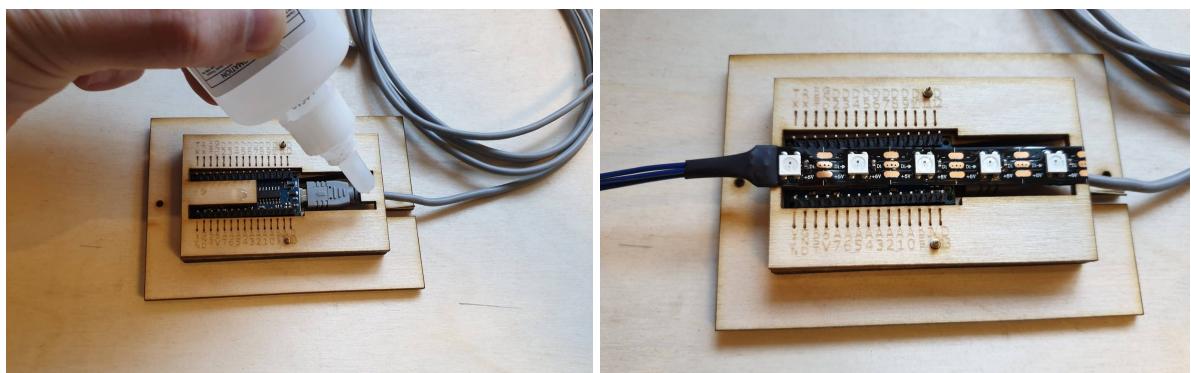
Wiring the led strip.



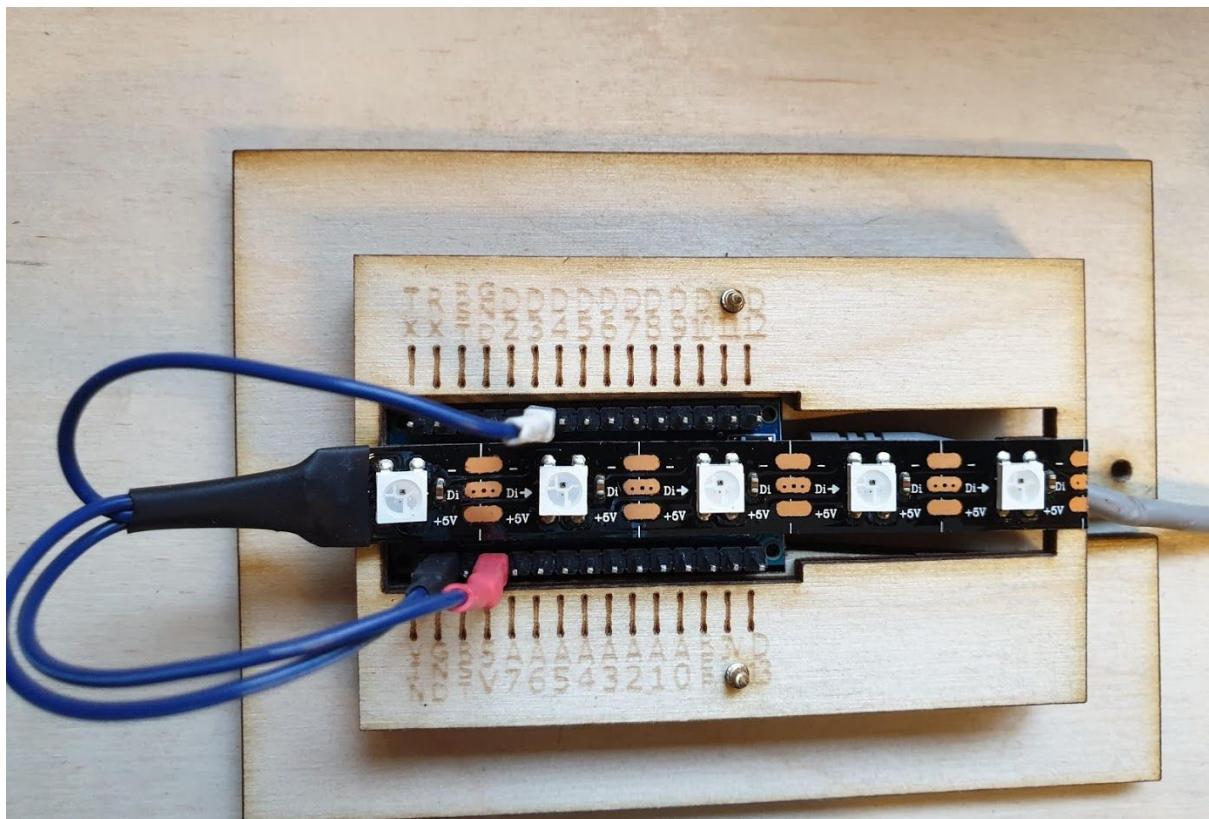
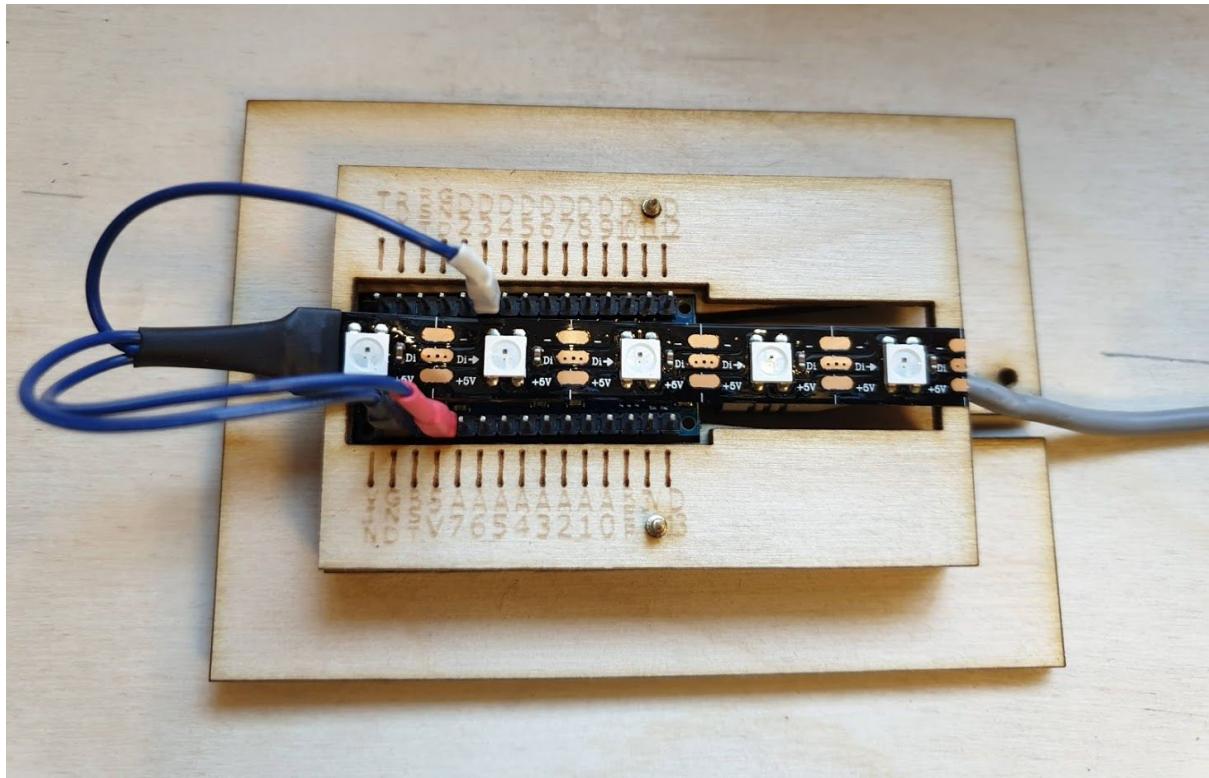
If the led strip has an adhesive at the back remove the protective film first.



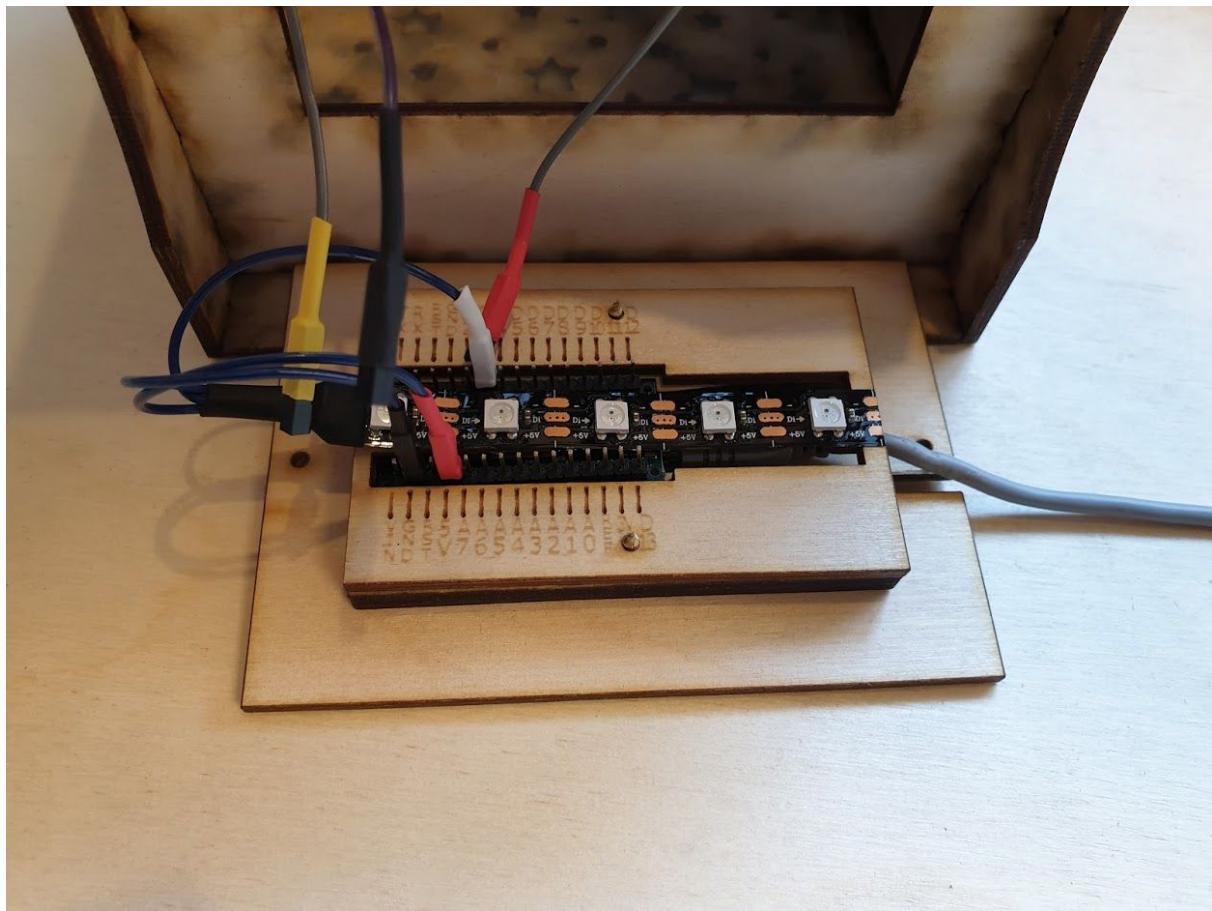
Add some glue to the 3mm ply and glue in the led strip in place with the wires coming out of the opposite side of the USB.



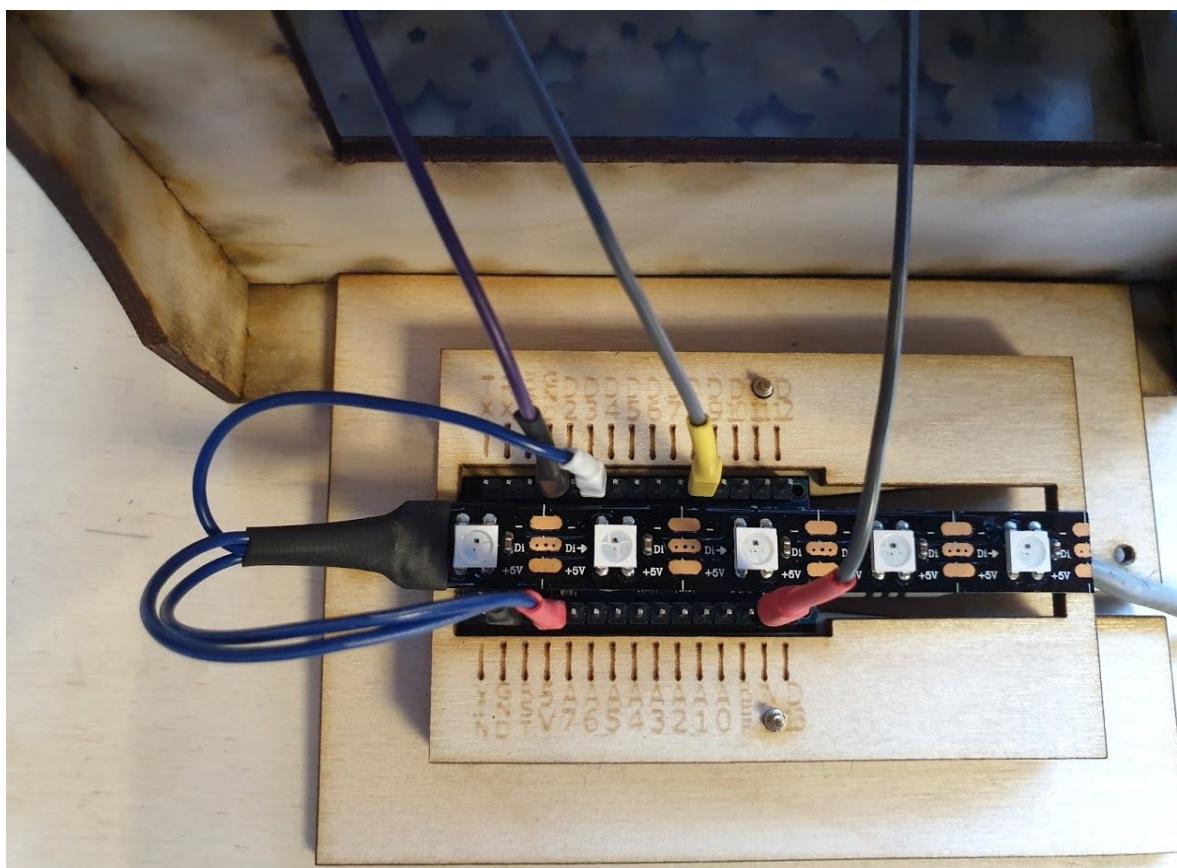
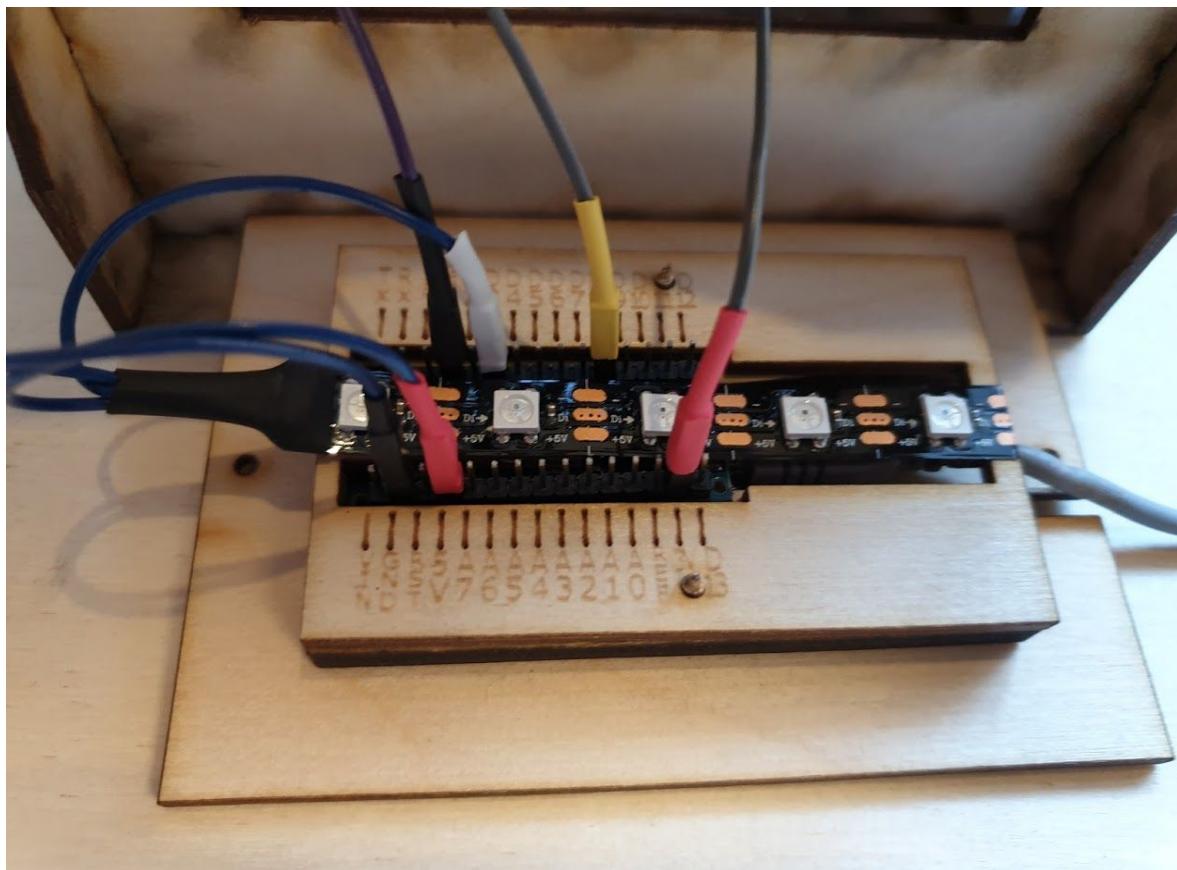
Connect the LED wires as shown in the image below. With the red connector going to the 5V pin, black connector going to the GND pin and the white connector going to D3 pin.



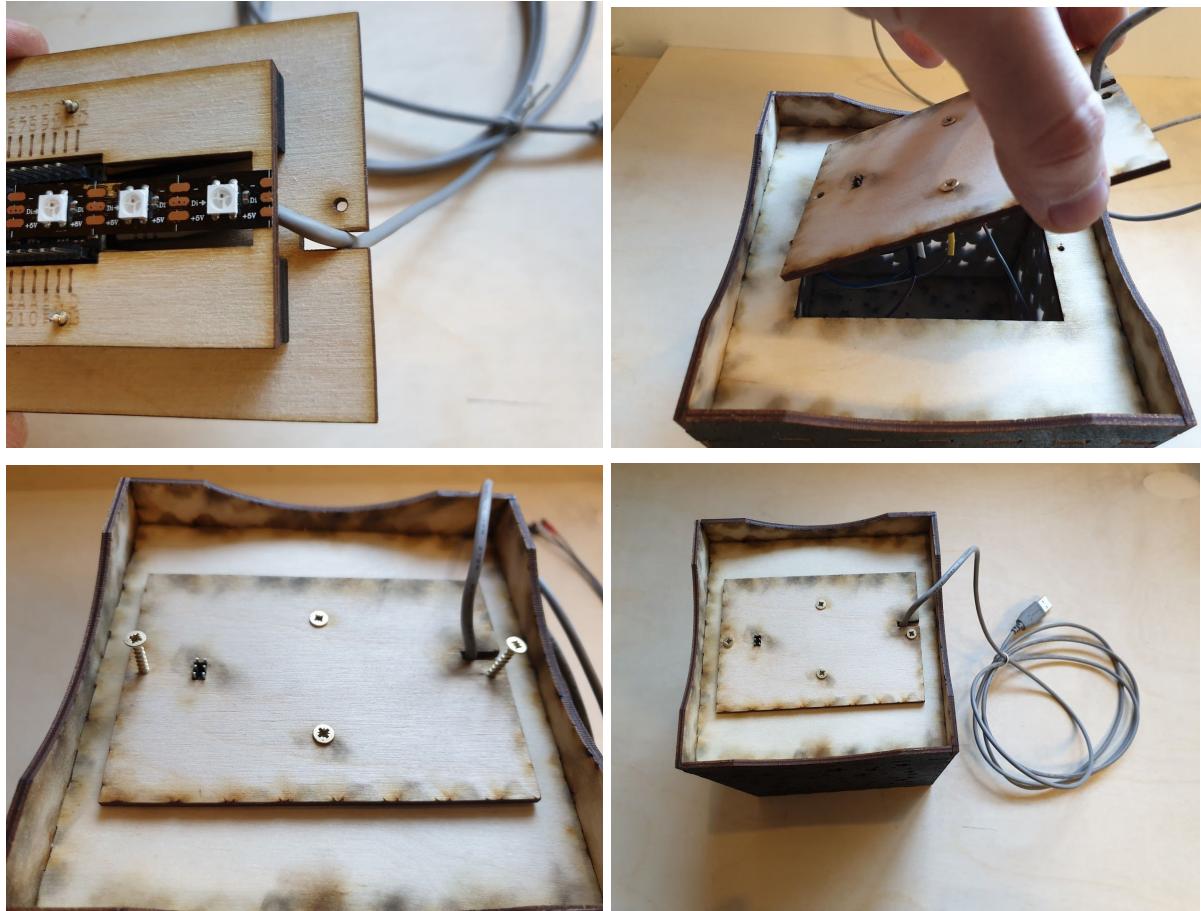
Next place the Nano close to the box and wire the sensor.



Connect the wires as shown in the images below. Red connector goes to 3V, yellow connector goes to D8 and black connector goes to GND pin.



Push the USB cable through the cutout and secure the electronics holder to the base with two screws. Be careful not to pinch any wires.



Congratulations, you have completed the assembly.

The lamp will turn on automatically once you plug it in and after that you can use the Magic Wand to turn it on or off. By default the colour is cool blue. You can change the colour by editing the Arduino code provided. Follow the instructions below on how to set up the Arduino programming environment and upload new code.

Code

Install Arduino IDE

You can follow the official guides on how to install the Arduino IDE for various systems at the following links:

How to install on Windows - <https://www.arduino.cc/en/Guide/Windows>

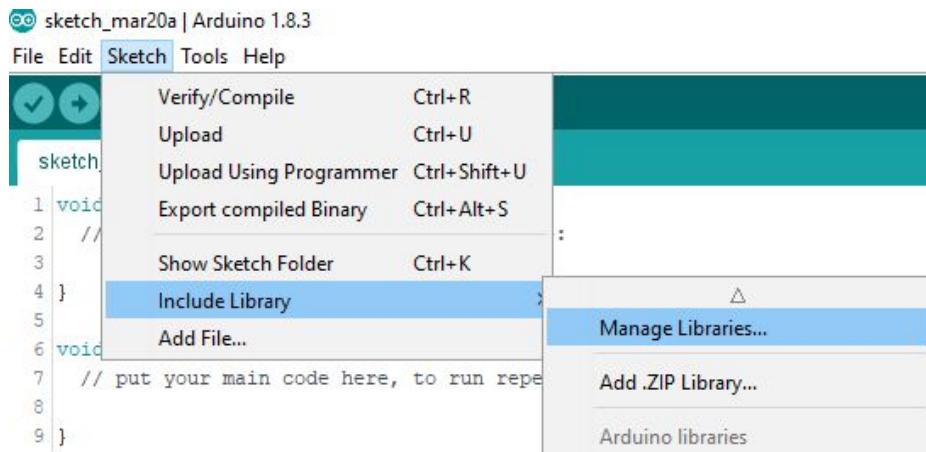
How to install on OS X - <https://www.arduino.cc/en/Guide/MacOSX>

How to install on Linux - <https://www.arduino.cc/en/Guide/Linux>

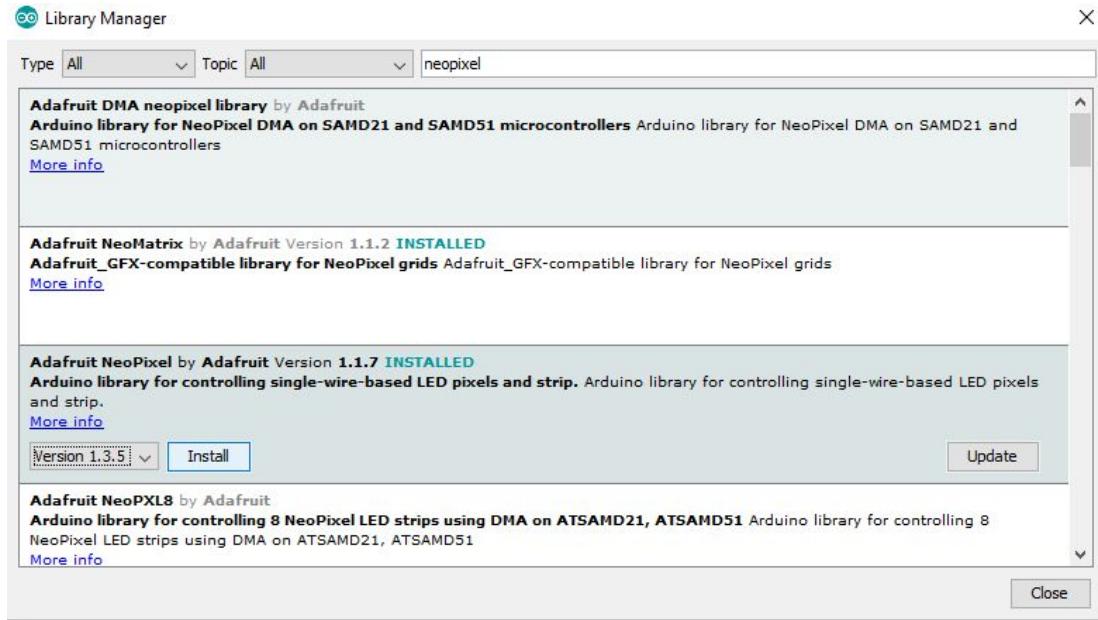
Install Adafruit NeoPixel Library

Install Adafruit NeoPixel Library

Open Arduino IDE and click Sketch -> Include Library -> Manage Libraries...



Type NeoPixel in the search bar, select the Adafruit NeoPixel from the results and click Install.



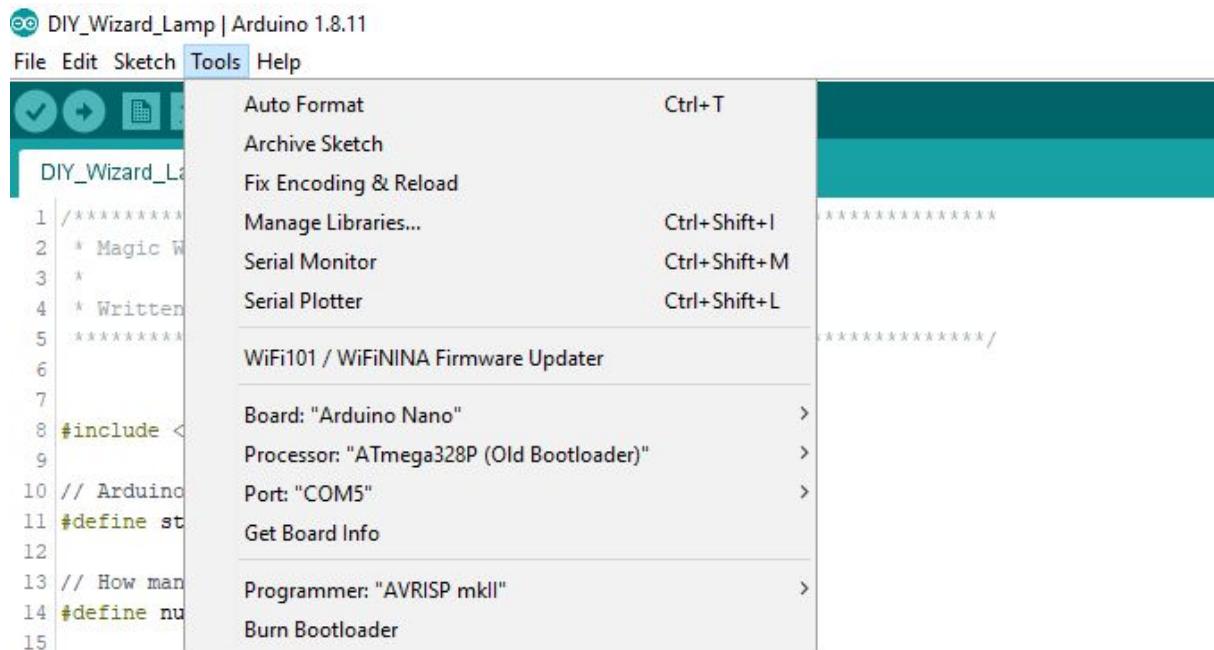
Download the code from
<https://github.com/TheMagicOfThings/wizard-lamp> by clicking
on Clone or download and then Download ZIP.

Open the DIY_Wizard_Lamp.ino file. The WS2812 is a full colour LED with red, green and blue LEDs integrated with a driver chip in a single package.

The following line sets the pixel colour. You can enter a value from 0 to 255 for the red green and blue LEDs. Zero means the colour is off and 255 means the colour is full brightness. For example setting the red value to full brightness($r = 255$) and the green and blue values to zero brightness($g = 0, b = 0$) will be shown as a red colour
`int r = 255, g = 0, b = 0;`. Setting red and green to full brightness and blue to zero `int r = 255, g = 255, b = 0;` will be yellow colour. There are over 16 million possible combinations(colours).

```
//Set the pixel colour  
  
// strip.Color takes RGB values, from 0,0,0 up to 255,255,255  
  
int r = 180, g = 255, b = 255;
```

Uploading the code to the board.



The screenshot shows the Arduino IDE interface with the title bar "DIY_Wizard_Lamp | Arduino 1.8.11". The "Tools" menu is open, displaying various options for board selection, processor, port, and programmer. The code editor on the left contains a sketch named "DIY_Wizard_Lamp" with C++ syntax highlighting for NeoPixel library usage. The code includes defines for board, processor, port, and programmer, along with setup and loop functions for a Hall effect sensor connected to pin 8.

```
DIY_Wizard_Lamp | Arduino 1.8.11
File Edit Sketch Tools Help
Auto Format Ctrl+T
Archive Sketch
Fix Encoding & Reload
Manage Libraries... Ctrl+Shift+I
Serial Monitor Ctrl+Shift+M
Serial Plotter Ctrl+Shift+L
WiFi101 / WiFiNINA Firmware Updater
Board: "Arduino Nano" >
Processor: "ATmega328P (Old Bootloader)" >
Port: "COM5" >
Get Board Info
Programmer: "AVRISP mkII" >
Burn Bootloader
// Setup the NeoPixel library with the number of pixels, pin and type of pixel
Adafruit_NeoPixel strip = Adafruit_NeoPixel(numberOfPixels, stripPin, NEO_GRB + NEO_KHZ800);
int sensorPin = 8; // Arduino pin connected to the Hall effect sensor
int currentState = HIGH; // the current state of the output pin
```

Click on Tools and from the drop down menu select:

- Board: "Arduino Nano"
- Processor: "ATmega328P(Old Bootloader)"
- Port will be selected automatically but if it doesn't work change it other available port.

After selecting the board, processor and port click on the arrow in the top left corner to upload the code.

You might need the CH340 USB drivers in order to upload to the bard. You can download them from here:

- [CH340 Windows](#)
- [CH340 Linux](#)
- [CH340 MAC](#)