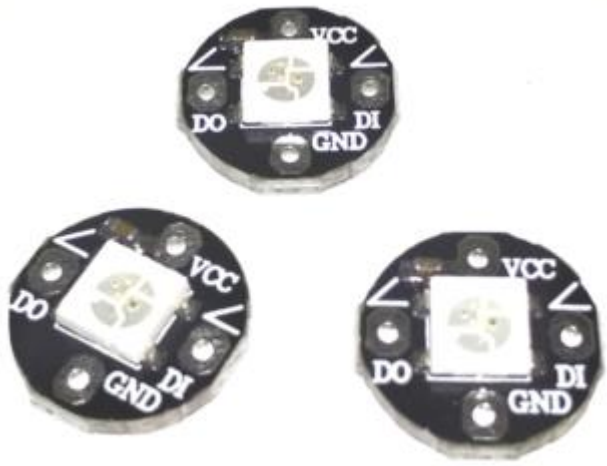
User Guide

WS2812B RGB Neopixel Single Display

These single LED are just about the best way to get tons of colorful LED light with a minimum of wiring and fuss! Each module is with diameter of Ø12mm with single LED element. Each element contains a red, green, and blue LED, as well as a tiny WS2812 controller chip. This means that each element is individually addressable and can accept brightness values of 0-255 for each of its LEDs, giving you 24 bits of color precision overall. Each LED is activated by using a special serial data protocol. This protocol allows many LEDs to be daisy chained together so that one microcontroller can control the whole lot – with a single data signal. Any number of these LEDs can be chained together by connecting one module's data-out (DO) pin to another's data-in (DI) pin. This LED is compatible with Neopixel & FastLED Arduino Library.



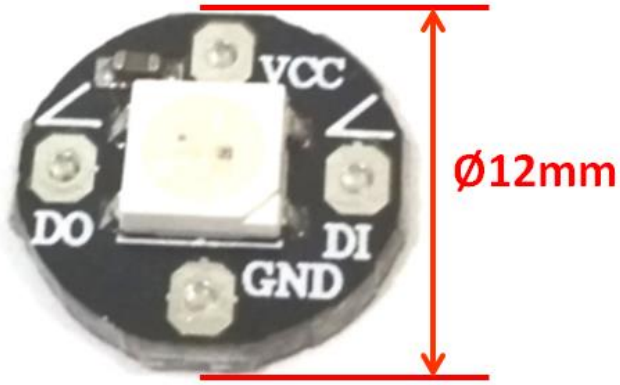
SKU: DSP1201

Brief Data:

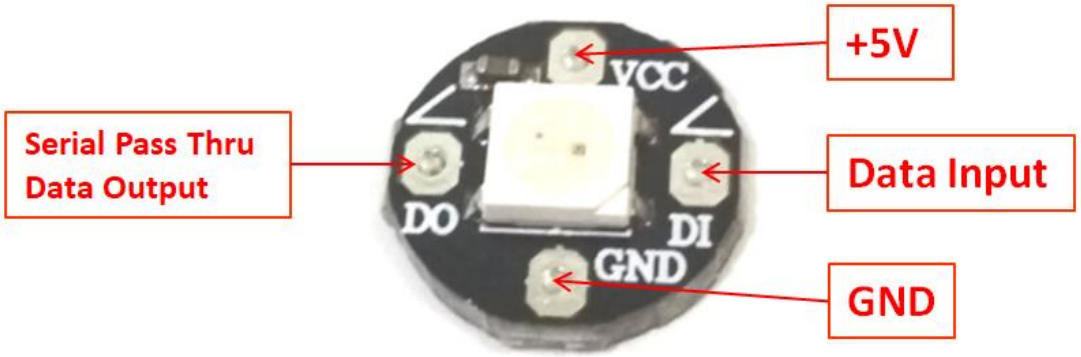
- Module Diameter: Ø12mm.
- Board of 1 piece of 5050 WS2812 Smart LEDs.
- Each LED element is individually addressable with 24-bit color (8 bits each for R, G & B), 16 million colors.
- 3-Wires easy connection: 2-power supply lines and 1 data line.
- Interface: Serial (Shift Register).
- Compatible with Neopixel & FastLED Arduion Library.
- Data Speed: 800Kbps.
- Power Supply: 5V.

Mechanical Dimension:

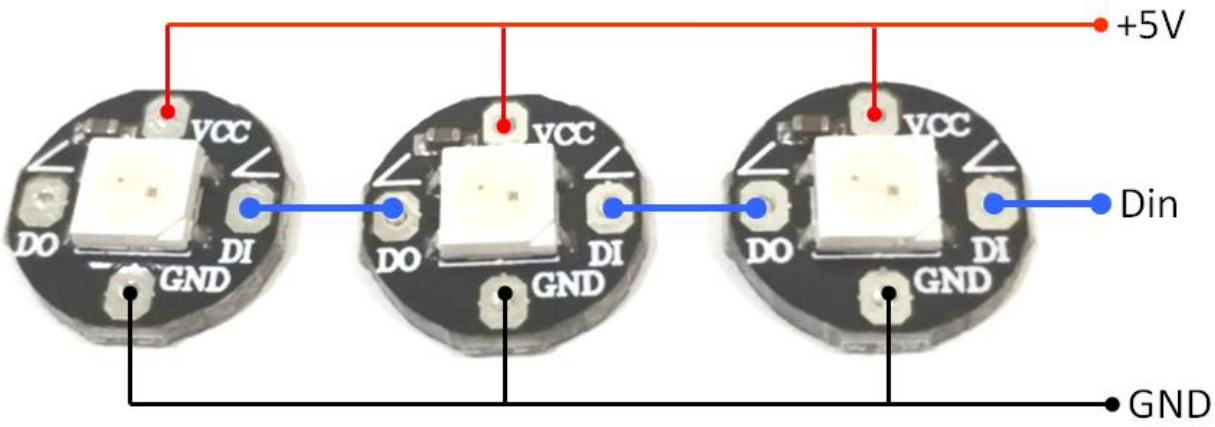
Unit: mm



Functional Pin Assignment:



Cascading 3-Leds Connection:



Application Introducing to WS2812B LED Strip with Arduino:

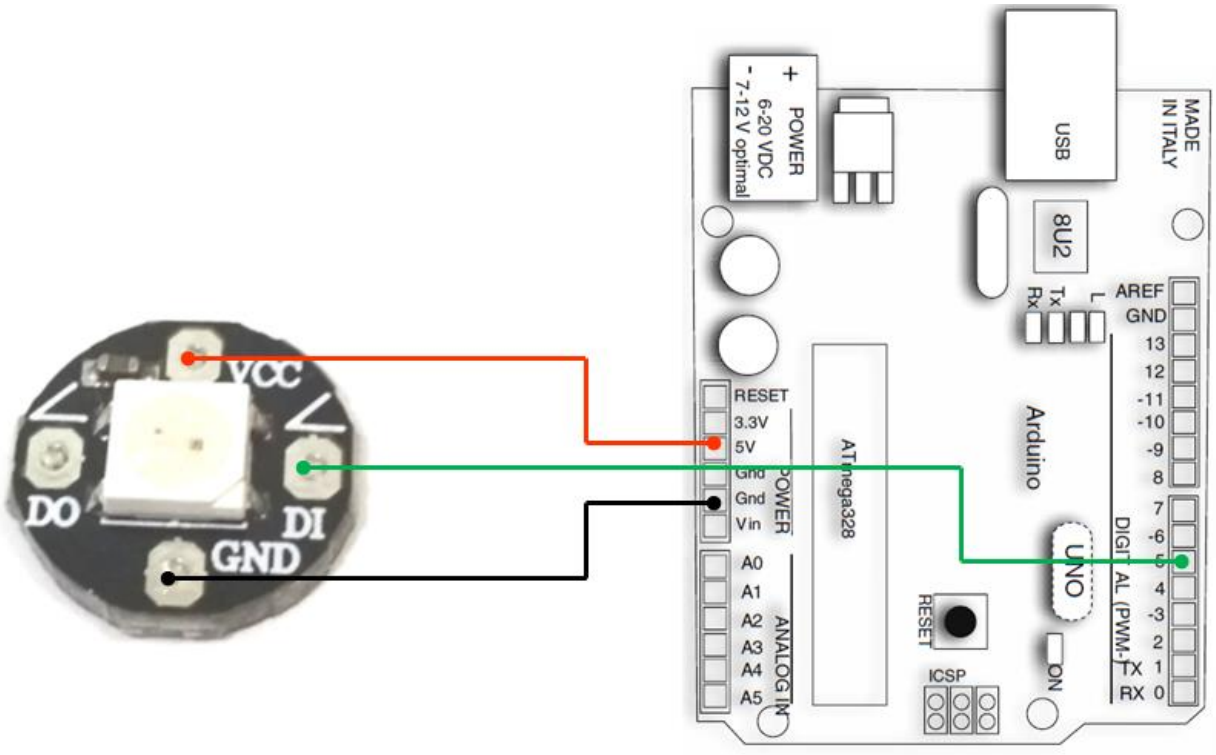
This is the coolest type of LED strips in the market today. You can control the brightness and the color of each LED individually, which allows you to produce amazing and complex effects in a simple way. This LED strip is made by WS2812B LEDs wired in series. These LEDs have a IC built right into the LED. This allows a communication via a one-wire interface. This means that you can control lots of LEDs using just one digital pin of your Arduino. In the following figure you can see the chip inside the LED. The LED is an RGB LED and works like so.

Powering the WS2812B LED Strip:

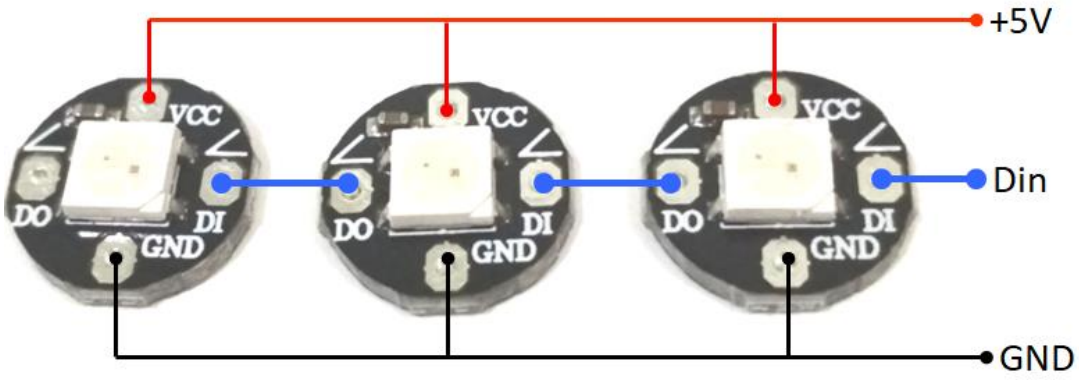
The LED ring should be powered using a 5V power source. At 5V, each LED draws about 50mA, when set to its full brightness. This means that for every 24 LEDs, the strip may draw as much as 1.2 A. Make sure you select a power source that matches the module's needs. If you end up using an external supply, don't forget to connect the power supply ground to the Arduino ground.

Arduino Schematics:

In this example, the WS2812B LED ring will be powered using the 5V from Arduino board. In this case, we are controlling 1-LED. Bear in mind that if you want to control many LEDs, you'll need to use an external power supply.



Module can be easily chain:



Code:

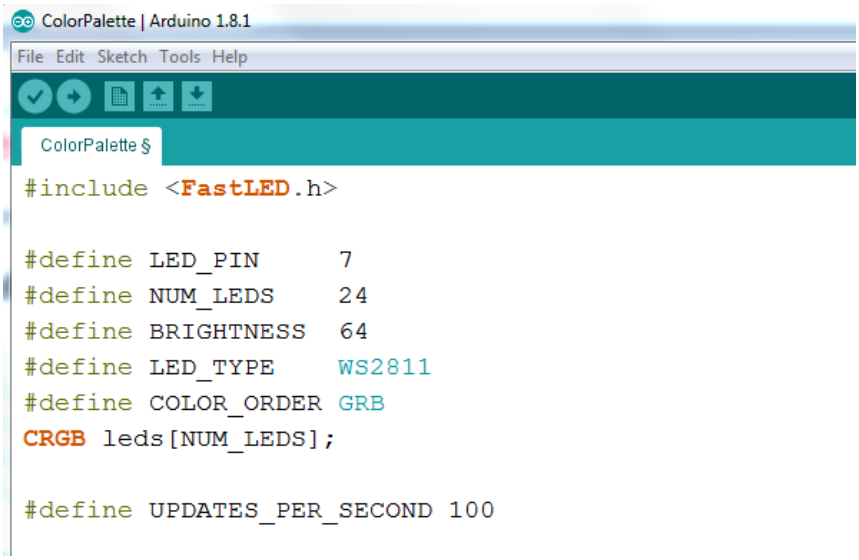
To control the WS2812B LED ring, you'll need to download the **FastLED** library.

Installing the FastLED library

1. Click here to download the FastLED library. You should have a .zip folder in your Downloads folder
2. Unzip the .zip folder and you should get **FastLED-maste**r folder
3. Rename your folder from ~~**FastLED-master**~~ to **FastLED**
4. Move the **FastLED** folder to your Arduino IDE installation **libraries** folder
5. Finally, re-open your Arduino IDE

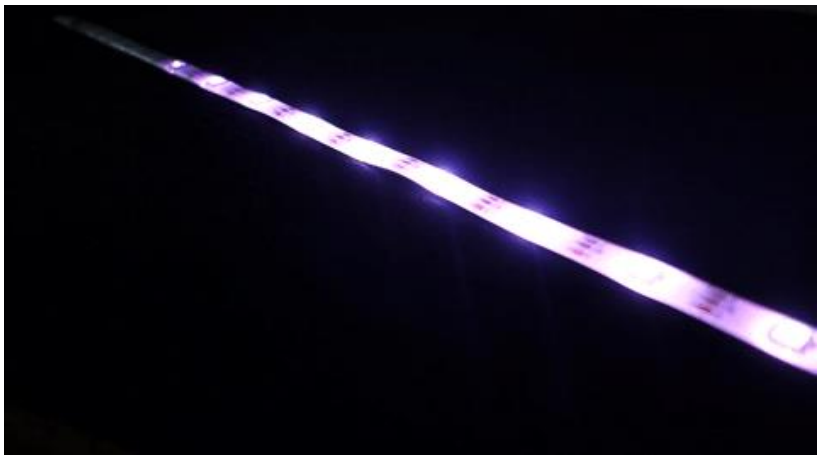
After installing the needed library, upload the following code to your Arduino board (this is an example sketch provided in the library examples folder). Go to File > Examples > FastLED > ColorPalette .

Remember to make modification on the "LED_PIN" and "NUM_LEDS" according to your Arduino board connection and number of LEDs on the ring. Below example: we are using D7 pin to DI and 24x LEDs on the ring.



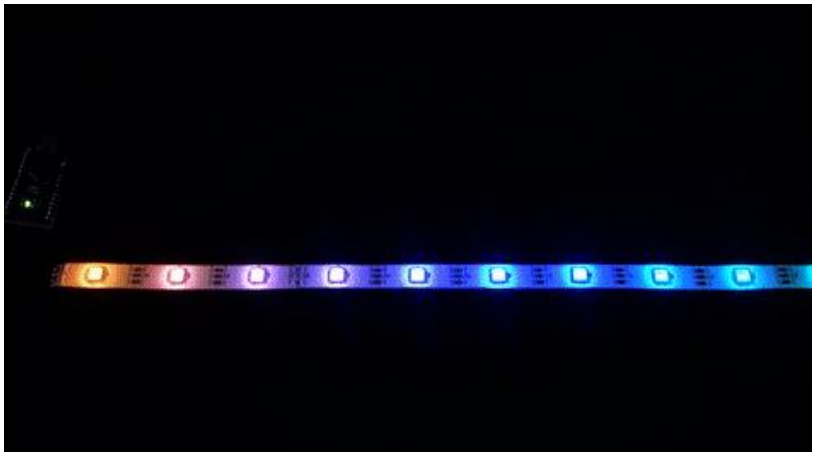
Demonstration:

In the end, this is what you'll have. Amazing effects like this one:



Or this one…

And so on…



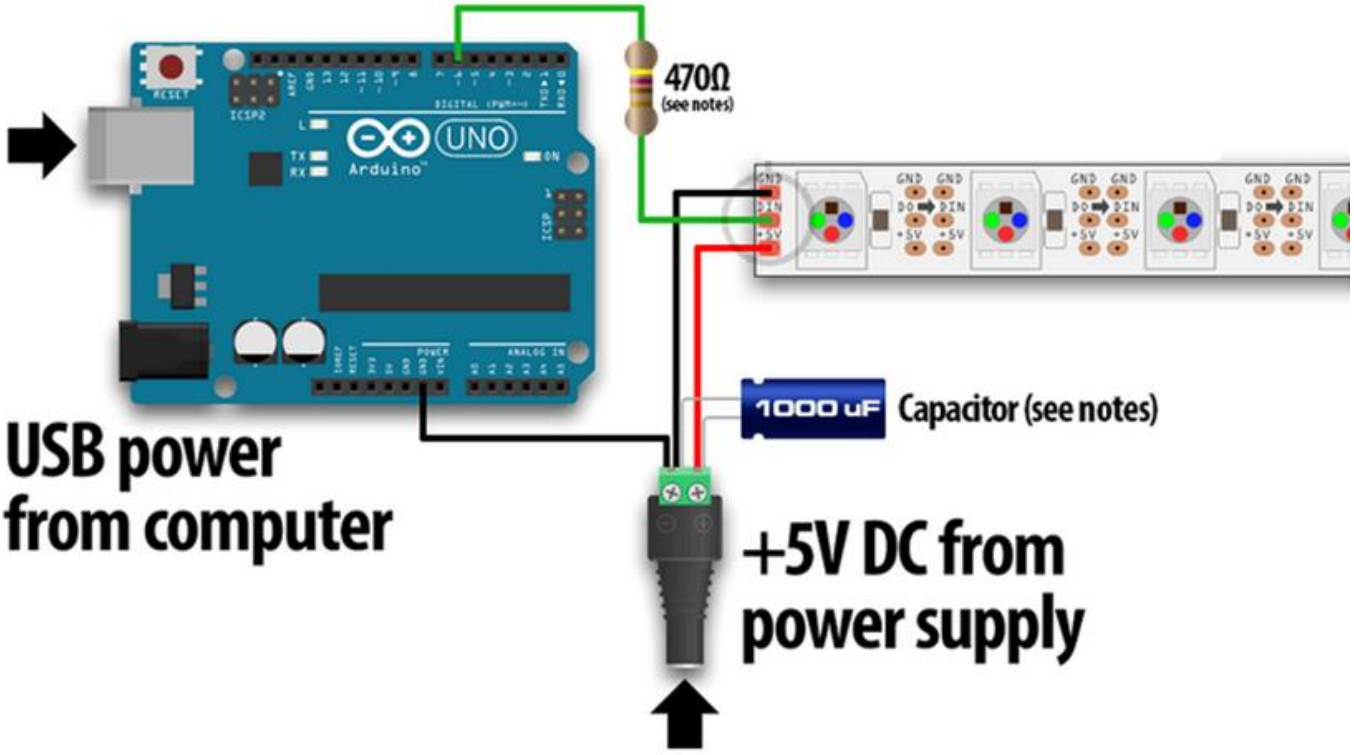
Youtube Video Demo

Suggest Connection Using External Power Supply:

For Arduino boards with a separate +5V DC power supply for the WS2812B RGB Strip: connect the +5V input on the strip to the + (positive) terminal on the power supply (don't connect to the Arduino), DIN to digital pin 6 (or any

digital of your choice) on the Arduino, and – (minus or GND) on the strip must connect to both the minus (–) terminal on the DC supply and a GND pin on the Arduino (there are usually several — any will do).

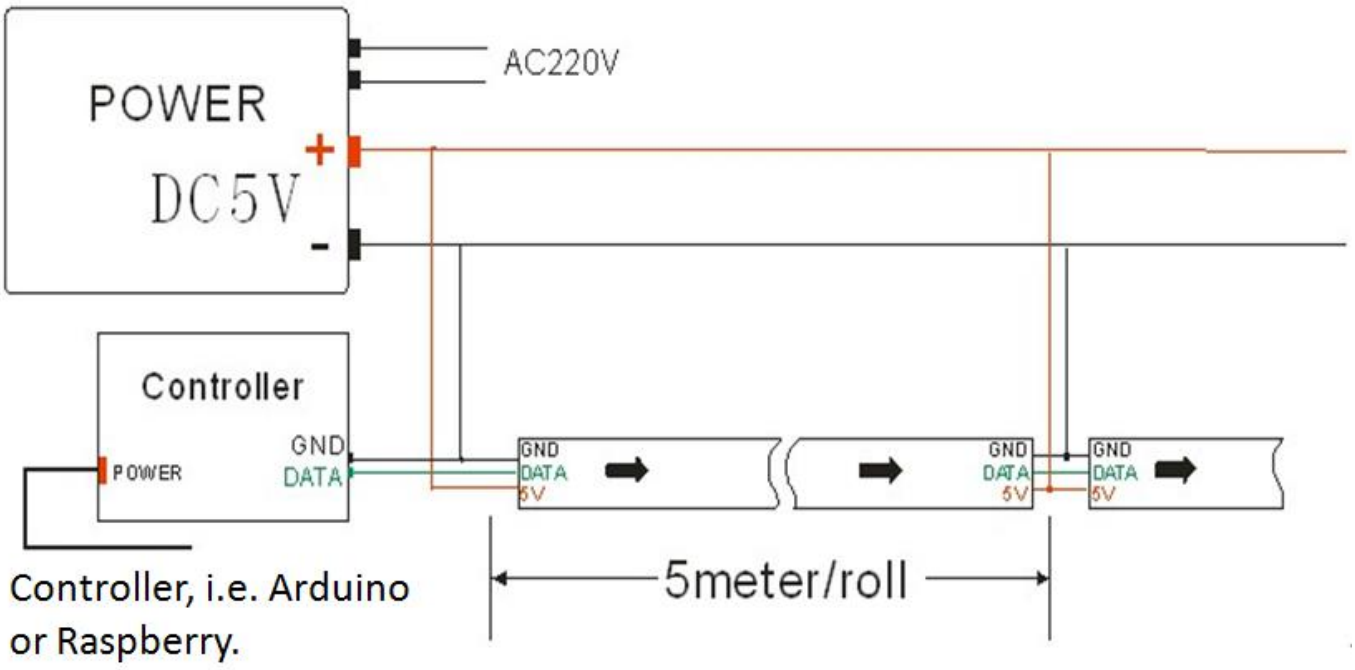
When using a DC power supply, or an especially large battery, we recommend adding a large capacitor (1000 µF, 6.3V or higher) across the + and – terminals. This prevents the initial onrush of current from damaging the LEDs.



Adding a ~470Ω resistor between the microcontroller's data pin and the data input on the RGB LED can help prevent spikes on the data line that can damage the first LED. Please add one between the micro and RGB LED!

Note: Suggest to use this external power supply connection if powering more that 60-LEDs as +5V on-board Arduino may not enough to power this.

Connecting Schematic Using 220VAC external Power Adapter:



Web Resources:

1. FastLED Wiki > https://github.com/FastLED/FastLED/wiki
2. Adafruit NeoPixel Userguide.
3. Adafruit NeoPixel Library.

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