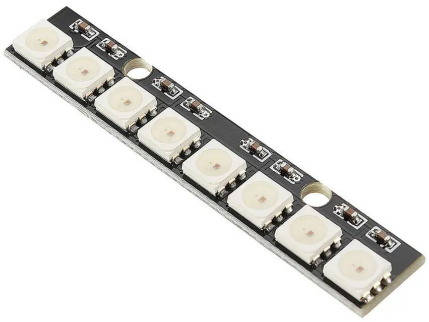
NeoPixel LED
(Technical Note)

Introduction

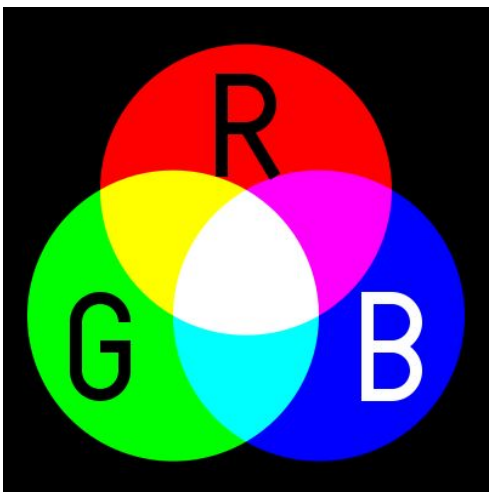


NeoPixel is the Adafruit brand for addressable LEDs. Addressable LEDs are a new generation of multi-coloured or RGB (red, green, blue) LEDs that include a controller IC. This controller IC, usually WS2812, allows you to access multiple LEDs with a single digital pin by assigning an address to each LED and providing one wire communication. This means one pin can control which and when LEDs colours are on. NeoPixels are available in the various shapes and sizes like rings, strips, and squares.

Scientific Fact and Applications

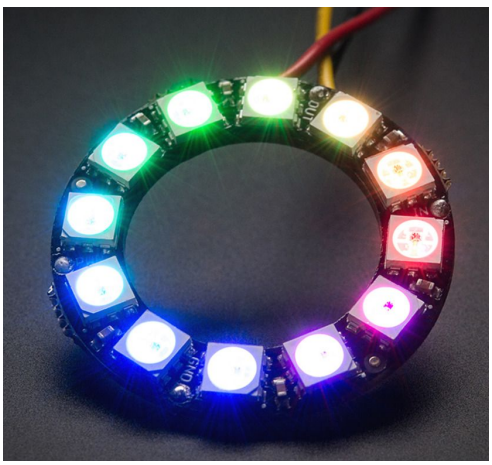
The RGB LED creates all the colours based on the three colours of red, green, and blue. In this model, each colour has a value between 0 and 255 for each RGB colour. For example, the combination of red and blue produces magenta. This translates to a value of 255 0 255 (maximum red, minimum green, and maximum blue). This numeric value is expressed by the Hex code (2550255 = # FF00FF).

Since the IC is embedded into each LED, NeoPixels are small in size with less circuitry and almost no messy wires and hence commonly used in the applications belows.



Applications

- Wearable electronics
- Linear clocks
- Mood lamps
- Digital posters
- Electronic/Digital advertisements



References

1. https://electropeak.com/learn/control-ws2812-rgb-led-neopixel-w-arduino-tutorial/#What_You_Will_Learn
2. https://components101.com/displays/neopixel-led-strip

AN-046 Rev 1.0

Z2M Part Number:
EMA-00003-B to E

NeoPixel LED
(Application Note)

Project

Neopixel LED to display in different colors.

Components Required

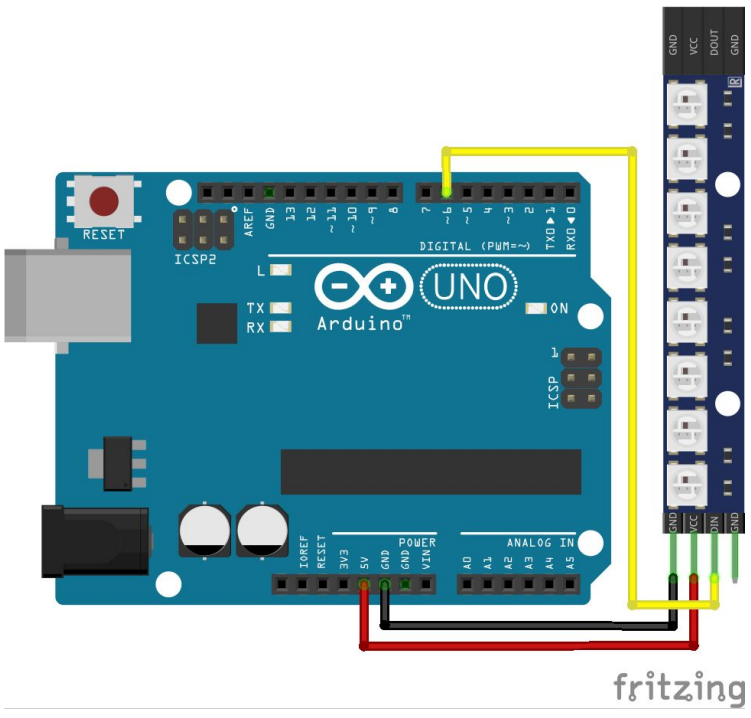
Component	Part No.	Qty
Arduino UNO	EMX-00001-A	1
Neopixel LED Bar	EMA-00003-B	1

Procedure

**The schematic and procedure is applicable to EMA-003-A to D*

1. Connect Neopixel LED Bar to Arduino
   - VCC -> 5V
   - GND -> GND
   - DIN -> Pin 6

Schematic



Challenge Yourself

1. Make the led bar to show rainbow color.
2. Create a sound level meter in which the led bar display warmer color when loud noise is detected.

Code

```
/* Include these library*/
#include <Adafruit_NeoPixel.h>
#ifdef __AVR__
  #include <avr/power.h>
#endif

/* Pin on the Arduino is connected to the NeoPixels.*/
#define PIN            6
/* Number of NeoPixels are attached*/
#define NUMPIXELS      8

/* Set up and name the NeoPixels*/
Adafruit_NeoPixel pixels = Adafruit_NeoPixel(NUMPIXELS, PIN, NEO_GRB + NEO_KHZ800);
/* delay for half a second*/
int delayval = 500;

void setup()
{
    /* Initiate the Neopixels*/
    pixels.begin();
}

void loop() {
  /* For a set of NeoPixels the first NeoPixel is 0, second is 1, all the way up to the count of pixels minus one.*/
  for(int i=0;i<NUMPIXELS;i++)
  {
    /* pixels.Color takes RGB values, from 0,0,0 up to 255,255,255*/
    pixels.setPixelColor(i, pixels.Color(0,150,0)); /* Moderately bright green color.*/
    /* Sends the updated pixel color to the NeoPixels*/
    pixels.show();
    /* Delay for a period of time (in milliseconds).*/
    delay(delayval);

  }
}
```