**Interfacing LED Strip (WS2812) with Arduino**

**Index:**

* What is ws2818
* Working of ws2812
* What we need
* Making ASCII Display
* Designing of the Display
* Interfacing with Arduino
* Working Model
* Implementing Arduino Code
* Practical demo

**What is ws2812?**

WS2812 is an intelligent control LED light source. The control circuit and RGB chips are in a package of 5050 components.

**Note:** 5050 means 5.0mm width and 5.0mm length. Other package includes 2835 means 2.8mm width and 3.5mm length.

The data transfer protocol use single NZR communication mode.

After the pixel power-on reset, the DIN port receive data from controller, the first pixel collect initial 24bit data then sent to the internal data latch, the other data which reshaping by the internal signal reshaping amplification circuit sent to the next cascade pixel through the DO port.







**Note: The data of D1 is send by MCU and D2, D3, D4 through pixel internal reshaping amplification to transmit.**



**Working of ws2818**

Every pixel of ws2812 is connected in cascaded manner.

Each pixel contains a controller circuit and RGB chip. Controller circuit of each pixel latches 24 bit of the binary data for each RED, GREEN and BLUE LEDs.

First 8 bit is to for GREEN, next 8 bit is for RED and last 8 bit is for BLUE. As shown below



For white light:

G=255, 0b11111111

R=255, 0b11111111

B=255, 0b11111111

MCU will transmit 11111111-11111111-11111111

MCU (Arduino) sends bit of stream to D1 then first pixel latches first 24 bit of the data and rest is pass to second pixel then second pixel latches second 24 bit of data and rest is pass to the third pixel and so on.



24-bit 24-bit 24-bit

**What we need**

* ws2818
* Arduino
* Jumper Wires
* External 5V, 1A-2A Power Supply
* Cardboard sheet
* Cello tape

**Designing of ASCII Display**

In this project, we will create entire display with a single strip without **cutting it.**

We will make 60x5 pixel display that is 60 LED long and 5 LED wide

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |