SwitchDoc Labs

Features and Benefits:

- 8 Pixels - SK6812RGBW Serial LEDs
- Chainable
- Symmetric size for large display building
- ~18mA Constant Current Operation
- NeoPixel Compatible
- 3.5 - 5V operation
- Grove Connectors - No Soldering Required
- Quantity Discounts Available
- Immediate Availability

SwitchDoc Labs 8 Pixel Programmable RGBW Strip. This is a small chainable board with eight 5050 SK6812RGBW RGBW LEDs. The SK6812s are each individually addressable as the driver chip is located inside the LED. Each Stick has ~18mA constant current drive so the color will be very consistent even if the voltage varies, and requires near 5V.

Introduction

This stick is based on the SK6812RGBW LEDs.   RGBW means that you have the usual R, G and B LEDs, but you also have a seperate White LED. This allows you to have a very clear and pure white out of the stick, instead of just having the R,G and B mixed together to provide White.

Each stick is carefully sized so you can build evenly spaced larger displays out of these sticks.

This stick is NeoPixel compatible.

Each 8 Pixel stick has two Grove connectors. One for input and then one for output.   To chain thee stick you connect the output of one stick to the input of another stick and then so on. No soldering required!

Theory of Operation

The Grove 8 Pixel RGBW is based on 8 of the SK6812RGBW integrated assembly (otherwise known as NeoPixels).

The SK6812RGBW is a smart LED control circuit and light emitting circuit in one controlled LED source, which has the shape of a 5050 LED SMD package. Each lighting element is a pixel, and the intensities of the pixels are contained within the intelligent digital interface input. The output is driven by PWM (Pulse Width Modulation) technology, which helps guarantees high consistency of the color of the pixels. The control circuit consists of a signal shaping amplification circuit, a built-in constant current circuit, and a high precision RC oscillator.
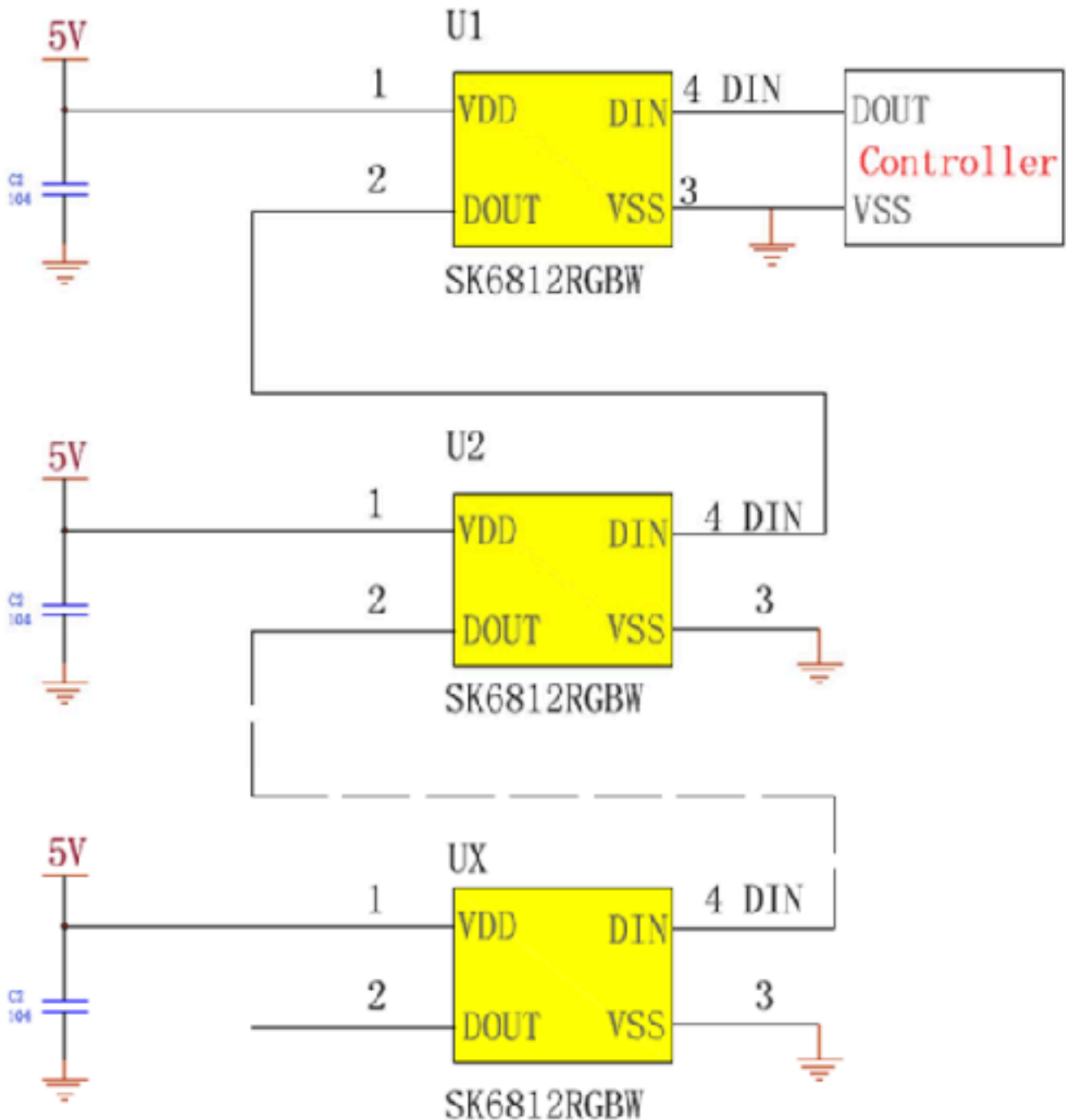
The serial data protocol being used is unipolar NRZ (Non Return to Zero) communication mode. The 32-bit data (8 bits for R,G,B,W) is transmitted from the controller to DIN of the first element, and if it is accepted it is propagated pixel to pixel. After an internal data latch in the device, the remaining data is passed through the internal amplification circuit and sent out on the DO port to the remaining pixels. The pixel is reset after the end of DIN. Using automatic shaping forwarding technology makes the number of cascaded pixels only limited by signal transmission speed.

R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4
G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
W7	W6	W5	W4	W3	W2	W1	W0				

The LED has a low driving voltage, high brightness, broad scattering angle, good consistency, low power, and long life. The control circuit is integrated in the SK6812RGBW package.

Operating Values

	Min	Normal	Max	Unit
VDD	3.5		5.25	V
Idd			~18mA per Pixel	A

Jumper Pin Functions

JP1 - Pin Header

NAME	PIN	I/O	DESCRIPTION
VDD	JP1 / 1	A	External VDD Power (Marked +) also can be used for optional 1000uF Capacitor
GND	JP1 / 2	A	GND (Marked -)

Grove Connectors On The Grove 8 Pixel RGBW Stick

There are two Grove Connectors on the Grove 8 Pixel Stick, both of which are Grove Digital connectors.

J1 - Grove Input - Digital

This Connector can be used to connect up to a processor such as the Raspberry PI, Arduino or ESP32.

| J1 - Grove Input Digital		
Pin 1	DIN	Digital Serial Input
Pin 2	N/C	No Connect
Pin 3	VDD	Power for Grove Module
Pin 4	GND	Ground

J2 - Grove Output - Digital

The Grove Output can be connected to an Input of additional 8 Pixel Sticks to build bigger displays.

J1 - Grove Output Digital		
Pin 1	DOUT	Digital Serial Output for Chaining
Pin 2	N/C	No Connect
Pin 3	VDD	Power for Grove Module
Pin 4	GND	Ground

Physical dimensions of board: 101.5mm x 12.5mm x 10.0mm(max). Two mounting holes.

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What is a Grove Connector?
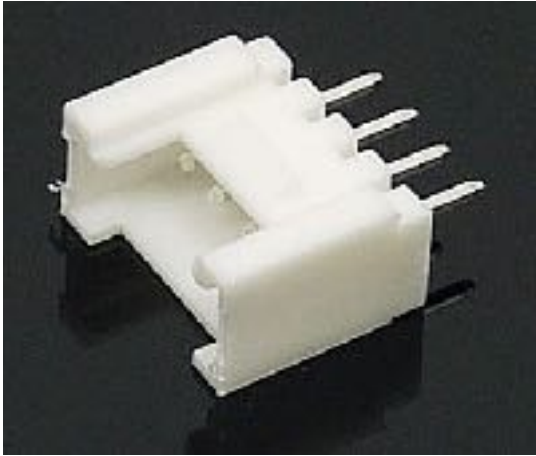
The way we have been wiring I2C connections before just didn't work for large projects. Basically, we used to put the I2C bus to screw terminals or snap down connectors and then ran wires to each device. This would not work for complex projects. Because of this, we moved to Grove connectors.

There are dozens of Grove I2C sensors out now.   Many different kinds of cables and I2C Hubs.

We quickly found the connectors and their respective cables very useful. With the large selection of Grove I2C devices available, we decided to include a Grove connector on all our future I2C boards. The white connectors on the Grove Lightning Detector board picture at the top are Grove connectors for easy, non-soldered connections to the I2C bus and for data inputs. The picture below shows the SunRover robot built using Grove connectors for the 8 different I2C busses in the robot. A Grove OLED display is shown underneath the picture.

Software

You can find the software for the Grove 8 Pixel Stick on the product page on shop.switchdoc.com.