

User Manual

LED Cube

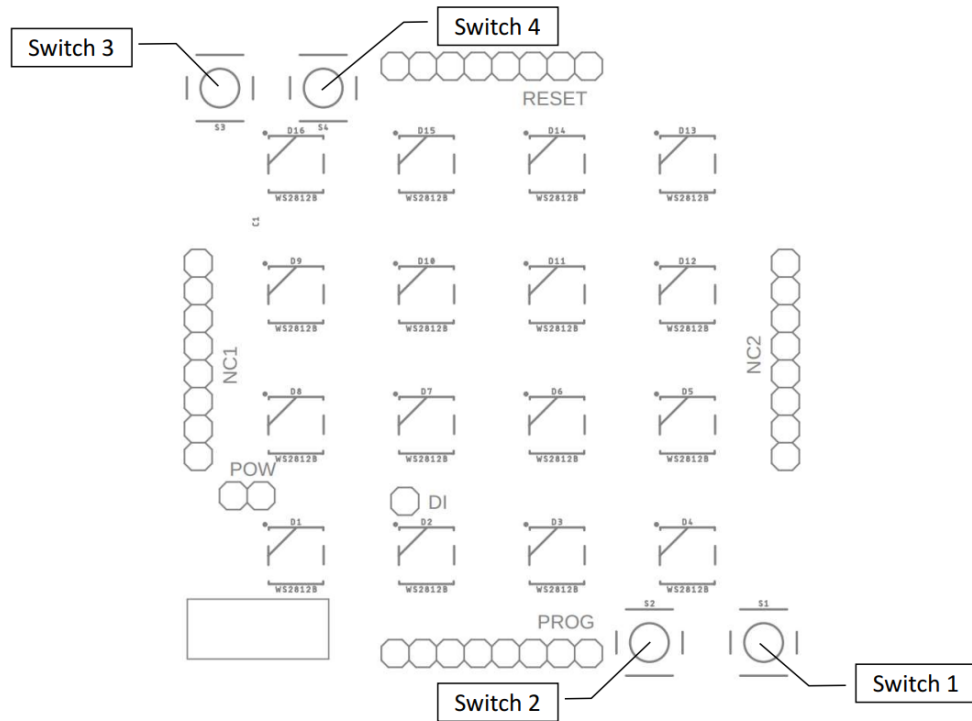
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1 Schematic



2 TL;DR

Switch 1 cycles through the effect.

Switch 2 cycles through the submodes.

Switch 3 slows down the effect.

Switch 4 speeds up the effect.

3 User Settings

The User Settings mode has the most complicated options. Upon exiting the mode and moving to the rainbow effect, the settings are saved to EEPROM. Pressing **Switch 2** cycles through the submodes detailed in Table 1. The operation of these submodes is outlined below.

Table 1: User Settings

ID	Name	Description
1	Color 1	This submode sets the hue and saturation for the primary color used in other effects.
2	Color 2	This submode sets the hue and saturation for the accent color used in other effects.
3	Brightness	This submode allows for the selection of the brightness(value) used for other effects.
4	Dot Num	This submode controls the number of dots generated per update cycle.

3.1 Primary and Accent Color

The currently defined primary and accent colors are displayed on the top face of the cube.

Pressing **Switch 3** will increase the hue by 1 with a debounce timer of 50 milliseconds.

Holding the switch will increase the hue at a rate of 20 per second. Hue ranges from 0-255.

Pressing **Switch 4** will increase the saturation by 1 with a debounce timer of 50 milliseconds. Holding the switch will increase the saturation at a rate of 20 per second. Saturation ranges from 0-255.

When the hue or saturation is increased past 255, it wraps back to 0.

3.2 Brightness

The entire cube lights with the currently selected brightness. High brightness values will drain the battery value but replicate colors more accurately. Pressing **Switch 3** will increase the

brightness (debounce 50 milliseconds) at a rate of 20 per second. Pressing **Switch 4** will decrease the brightness at the same rate. The brightness does not wrap.

3.3 Dot Num

The current number of dots is shown on the faves of the cube. Pressing **Switch 3** will increase the number of dots by 1 and pressing **Switch 4** will decrease the number of dots by 1 (debounce 300 milliseconds, 3.3 dots per second).

3.4 Reset

Pressing all four buttons will reset the cube's user defined values to those specified in the program. A detail of these values and their locations in EEPROM is listed below (Table 2). It is recommended to press the switches in the order **3, 4, 2, 1** as pressing 1 will exit the user settings mode and prevent resetting the cube. After a successful reset, the cube waits 3 seconds before entering the rainbow effect. The reset can be verified by power cycling the cube.

Table 2: EEPROM

EEPROM Location	Variable Name	Default Value
14	Dot Drop Num	6
15	Brightness	100
16	Color 1 Hue	120
17	Color 1 Sat	255
18	Color 2 Hue	205
19	Color 2 Sat	255

4 Overview

Pushing **Switch 1** cycles the cube through several effects. The summary of these effects is shown in Table 3. A more detailed description of each of these effects can be found in the following sections. The code for these effects are in ino files found in the supplemental files. There are a couple other effects that could be implemented.

The “m” versions of the top board contain a 128mbit eeprom module that is accessible over SPI. This feature has not been tested. If desired, an effect could be added that reads the eeprom to generate a display. There are several formatting options that could compress the data or make playback more readily implemented. Please contact me if you are interested in helping me develop this effect.

Table 3: RGB Effects

ID	Name	Description
1	User Settings	This mode allows the user to define a primary and accent color and set some of the parameters used by the other effects.
2	Rainbow	In this mode, all of the leds are the same color. They cycle through a color palette.
3	Rainbow Horizontal Wave	In this mode, leds in a vertical line are all the same color and cycle through a color palette.
4	Fire	This mode attempts to calculate the propagation of heat upwards as if by fire.
5	Dots	This mode creates random dots.
6	Drops	This mode creates drops that fall down the faces of the cube.
7	Black	In this mode, the cube is still on but all leds are set to black.