

RGB2048

Information and Assembly Guide



Sleepy Pony Labs

www.sleepyponylabs.com

Document Revision 1 for Board Revision 1

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<https://www.sleepyponylabs.com/>

Introduction

Welcome and thank you for purchasing the RGB2048 soldering kit from Sleepy Pony Labs! The RGB2048 is an RGB version of the famous 2048 game (available at play2048.co) powered by an ATtiny84A microcontroller and 16 WS2812 addressable LEDs.

This kit is designed for beginners practicing through-hole soldering. Apart from the RGB LEDs with a little bit tighter pin spacing, the rest should be easy. The board also features a variety of parts such as resistors, capacitors, buttons, LEDs, regulators, and ICs to help you get more experience.

Specifications

- **PCB board:** Black FR4 board of size 57*87 mm
- **Parts count:** 66 pieces
- **Power supply:** 9v battery (not included)

- **Soldering Difficulty:** 2/10
- **Soldering Type:** Through-hole only

- **Firmware parts:** ATtiny84A x1 (with ICSP header)

Unpacking List / Bill of Materials (BOM)

References	Description	Quantity
C1 – C17	100nF Ceramic Capacitor	17
C18 – C19	10uF Electrolytic Capacitor	2
R1 – R16	100 Ω Resistor	16
R17 – R22	4.7 k Ω Resistor	6
D1 – D16	WS2812D-F5 Addressable RGB LED	16
D17	5mm Red LED	1
U1	ATtiny84A-PU Microcontroller	1
U2	L7805 5v Regulator	1
SW1 – SW5	6mm Push Button	5
BT1	9v Battery Clip	1
	Total	66

Note: High-Res image of the PCB is on page 11.

Note: We strongly recommended that you use the interactive BOM during unpacking and assembling. It will make your life much easier. It is available here: https://www.sleepyponylabs.com/ibom/html/ibom_rgb2048_rev_1.html

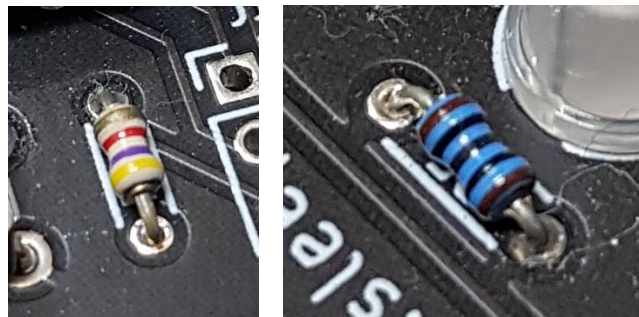
Assembly Guide

The general guide in soldering anything is to solder components with the lowest profile (least in height) first before soldering other taller components.

This guide sums up my experience in soldering the board during the testing. Follow the steps here to reduce possible problems.

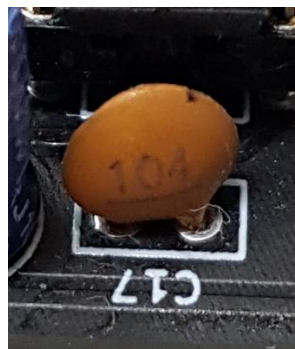
1. Resistors

Fold the resistor's legs even with its body, then insert it through the hole. Hold it with tape then solder them. There is no polarity.



2. Ceramic Capacitors

Insert it through the hole. Hold it with tape then solder them. There is no polarity.



3. Buttons

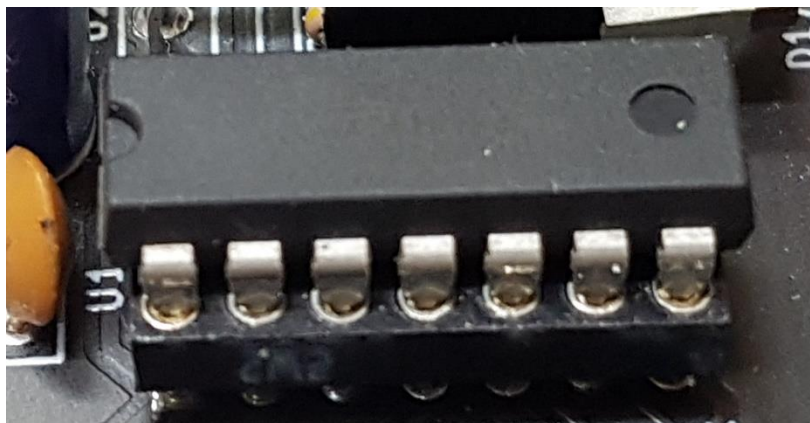
Insert it through the hole. It is NOT square and will only go in one way. Push the button in firmly until it clicks onto the board. You can solder without holding them.



4. IC

First, find the pin 1 mark. It will be a dimple or indent on one side of the chip. Align it with the pin 1 mark on the PCB. Insert the chip into the holes. Be careful not to break any pin. Hold it in and solder two diagonal pins, then solder the rest of the pins.

Note: IC socket is not included.



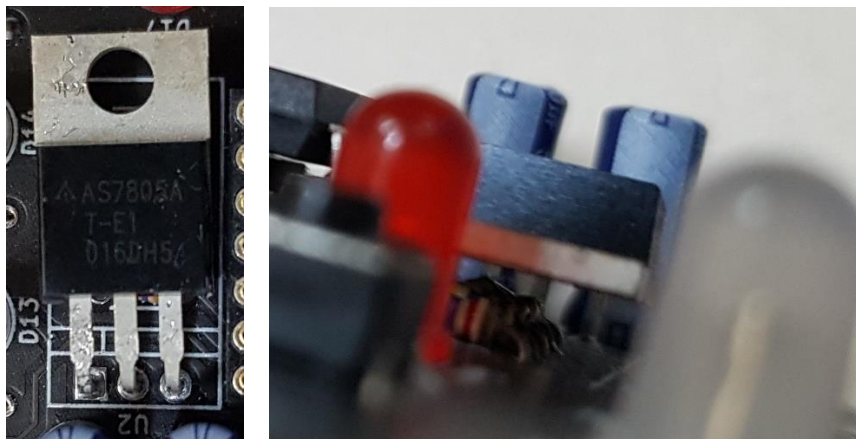
5. LEDs

Insert it through the hole and be careful of the polarity. Align the flat side with the PCB as shown. Hold it with tape then solder them.



6. Regulator

Bend the device backward 90 degrees like in the picture. Insert it through the hole. Make sure it does not touch the resistors below. Hold it then solder them.



7. Electrolytic Capacitors

Insert it through the hole and be careful of the polarity. Hold it with tape then solder them.



8. Battery Clip

Put both power cables through the hole from the back. Insert them through the hole and solder them. The red wire goes in + hole and the black wire goes in – hole.














How to Use

After all the parts were soldered, connect a 9v battery. If two RGB LEDs light up **Red** or **Yellow**, you are good to go.

Move the pieces around with arrow buttons. All the lights should slide in that direction, then a new **Red** or **Yellow** LED will light up, adding a new number to the board.

If you reached 2048 or ran out of moves, the red LED will light up. Press the reset button to play again.

The colors display by the game are as follows:

Color Name	Web Color Name	Number		Color Name	Web Color Name	Number	
Red	Red	1		Cyan	Cyan	64	
Orange	Orange	2		Cy-Blue	Blue	128	
Yellow	Yellow	4		Blue	Royal Blue	256	
Yl-Green	Chartreuse	8		Purple	Indigo	512	
Green	Lime	16		Magenta	Violet	1024	
Gr-Cyan	Dark Green	32		White	White	2048	



Two red LEDs lights up (correct power-on behavior)

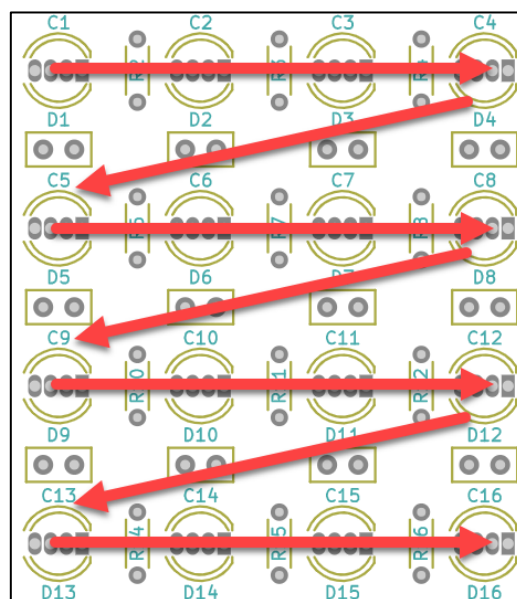
Troubleshooting

In case your circuit does not work, the list below contains some possible causes of the issue from most likely to least likely:

- Bad solder joints (Cold joints, Short between joints, Unconnected joints)
- Incorrectly installed components (Wrong location or orientation)
- Bad power supply (Battery dry, Wrong type, Wrong polarity)
- Components damaged by soldering heat.
- Components damaged by static electricity or broken from the factory.
- PCB damaged by soldering heat or impact (Broken pads or traces).

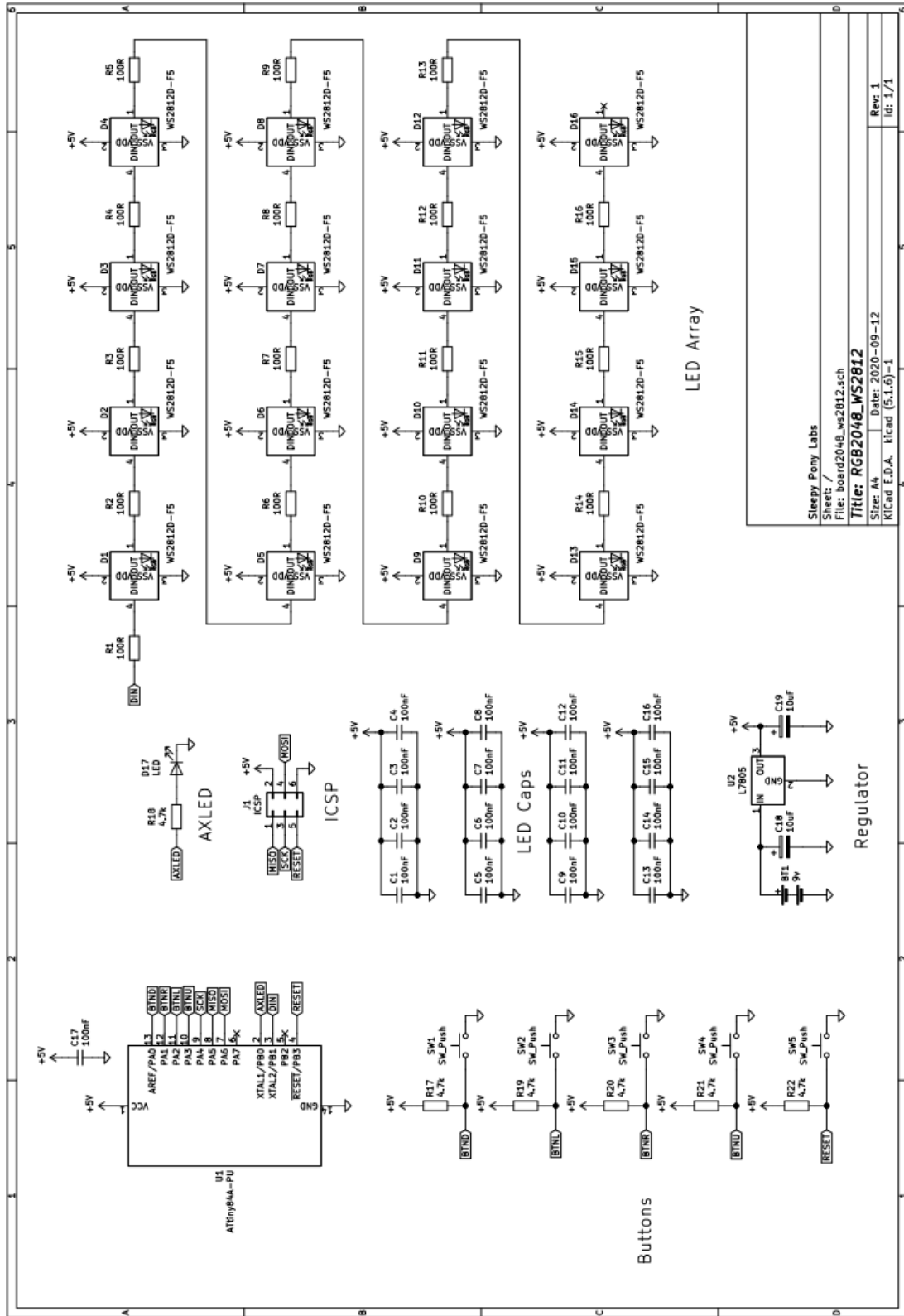
And these are possible causes specific to this kit:

- The WS2812 LEDs used in this kit are daisy-chained, meaning that the data input enters D1 LED, then leaves D1 and enters D2 LED, all the way to the last D16 LED. If one of the LEDs failed or the solder joints at that LED are bad, the data will fail to propagate to the rest, and they will not light up. If this happens to you, try checking the first non-functional LED and the one before it. Most of the time the LED itself will work fine after the bad joints are cleared.



If you still have questions, feel free to contact me on Tindie or my website.

Schematics



PCB Layout

Front

