8×8 Neo-pixel Matrix Face Mask Using WS2812 + ESP-0 and WLED Firmware

by AdityaG116

In this article, we will learn how to make an 8×8 Neo-pixel Face mask using an ESP-01 wireless module and how to control it via WLED firmware. The WS2812 LEDs are easy to use and work on almost every IoT module. I will be using 60 led's/m strips in this project and the total count of LEDs will be 64.

The circuit is powered by a 3.7 V battery with a battery recharging module and a couple of switches. The effects and colors will be controlled through WIFI via the WLED HTML page on various devices.

Supplies:

1.Soldering Iron

2.Wires

3.Pushbuttons or Slideswitch

4.Heat shrink tubes

5.Transperant insulating tape

6.Hot Air Gun

7.Velcro

8.Dark coloured cloth (I will be using Black colour cloth)

9.Flat Elastic thread

10.ESP-01 - https://www.amazon.com/dp/B01EA3UJJ4?ref_=cm_sw_r_cp_ud_dp_EPXF638KDPX2VMPMP6ZK

11.LD1117 3.3V Voltage Regulator - https://www.amazon.com/dp/B07MVV3JGP?ref_=cm_sw_r_cp_ud_dp_GY8HT281BJ62ASSKPRMW

12.WS2812 Neo-pixel Led's - https://www.amazon.com/dp/B01CDTEJBG?ref_=cm_sw_r_cp_ud_dp_FYPMQNAF3BH7VK6MDRJQ

13.3.7 Lithium ion battery - https://www.amazon.com/dp/B086Q7FJDT?ref_=cm_sw_r_cp_ud_dp_XWC365HCKP55GCAMTDE9

14.TP4056 1A Li-Ion Battery Charging Board Micro USB with Current Protection - https://www.amazon.com/dp/B00LTQU2RK?ref_=cm_sw_r_cp_ud_dp_9BRN4MZJAJQ6XS9MD2P6

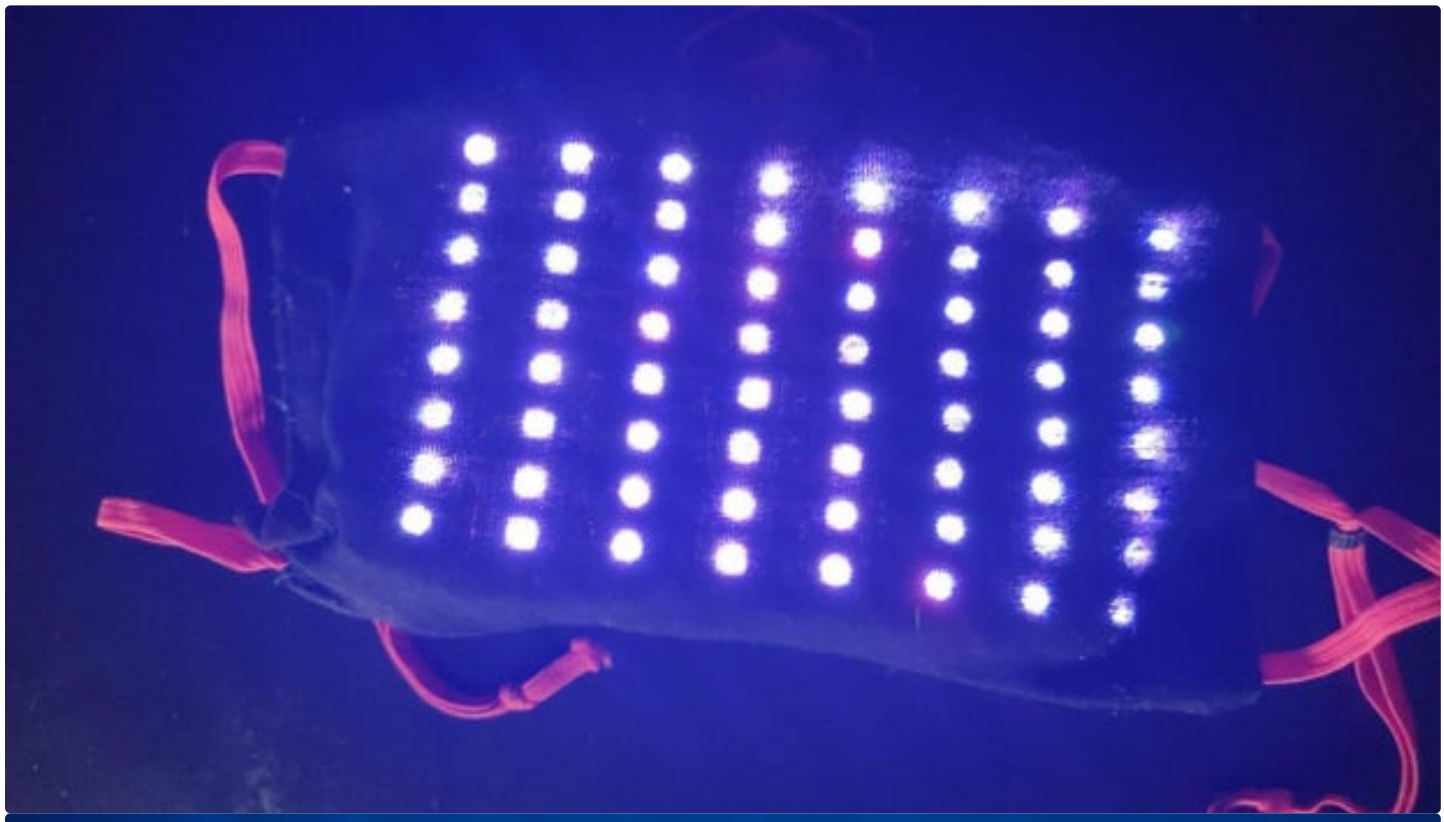
==========*Links***==========**

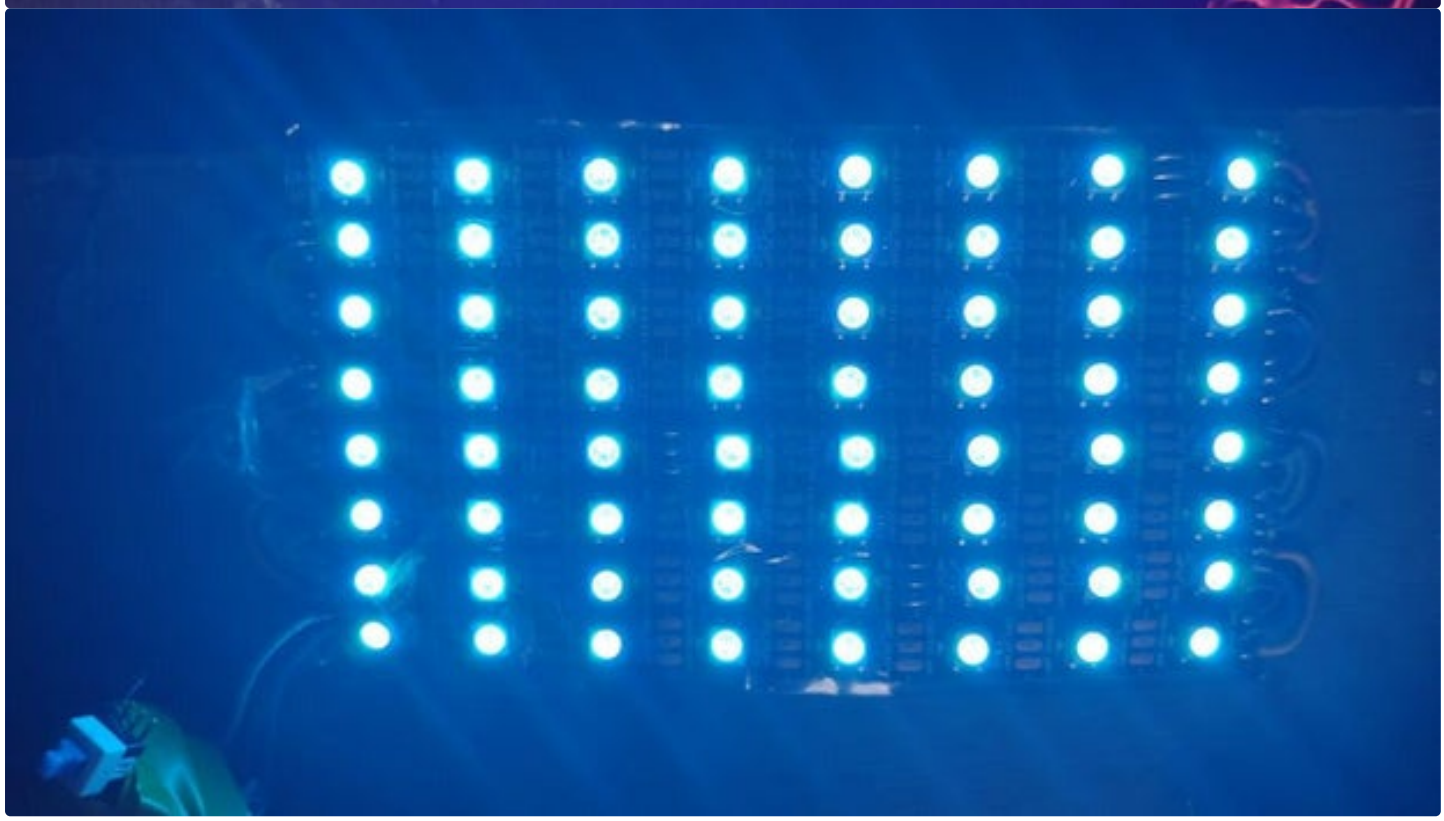
1.Arduino IDE/ NodeMCU-PyFlasher-4.0-x64 (I have used NodeMCU-PyFlasher-4.0-x64 to flash WLED Firmware)

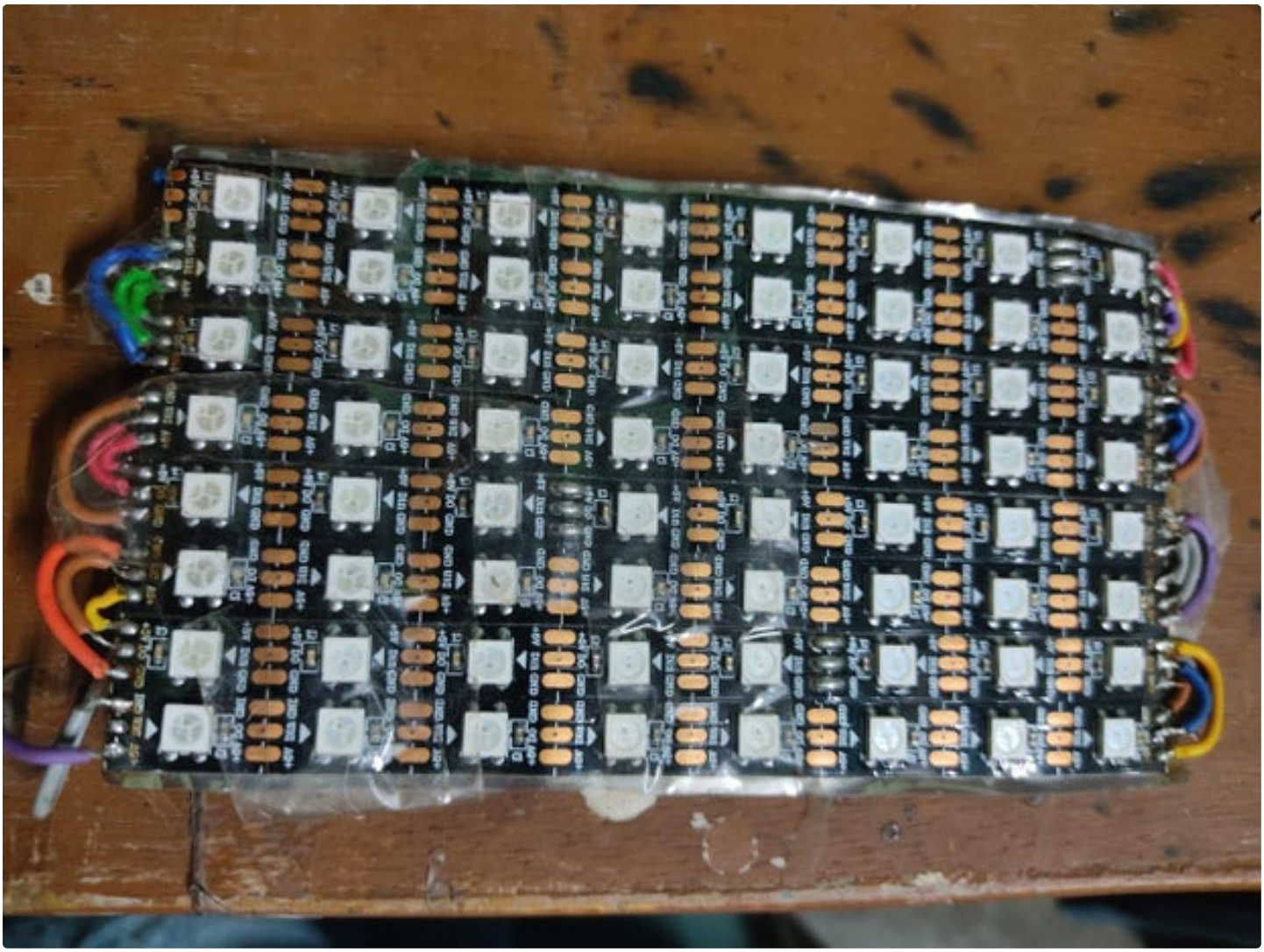
2.How to program an ESP - 01 module

1.https://github.com/Aircoookie/WLED (WLED github link)

2.https://github.com/Aircoookie/WLED/releases/download/v0.13.1/WLED_0.13.1_ESP01.bin (WLED Firmware for ESP-01)

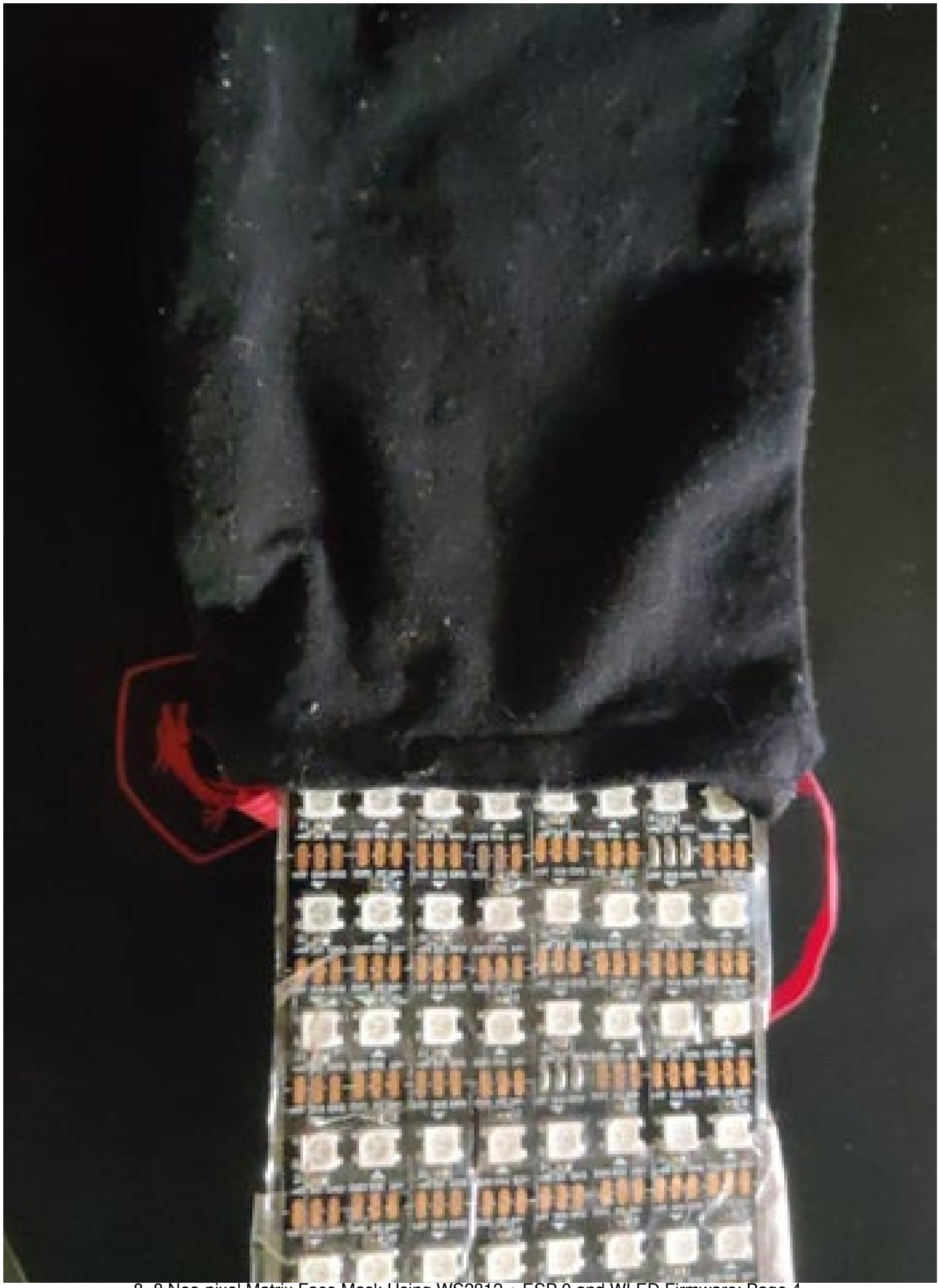


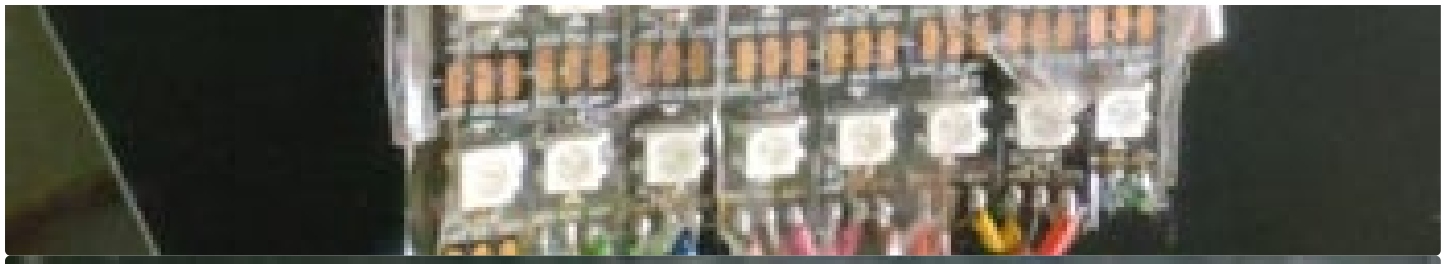


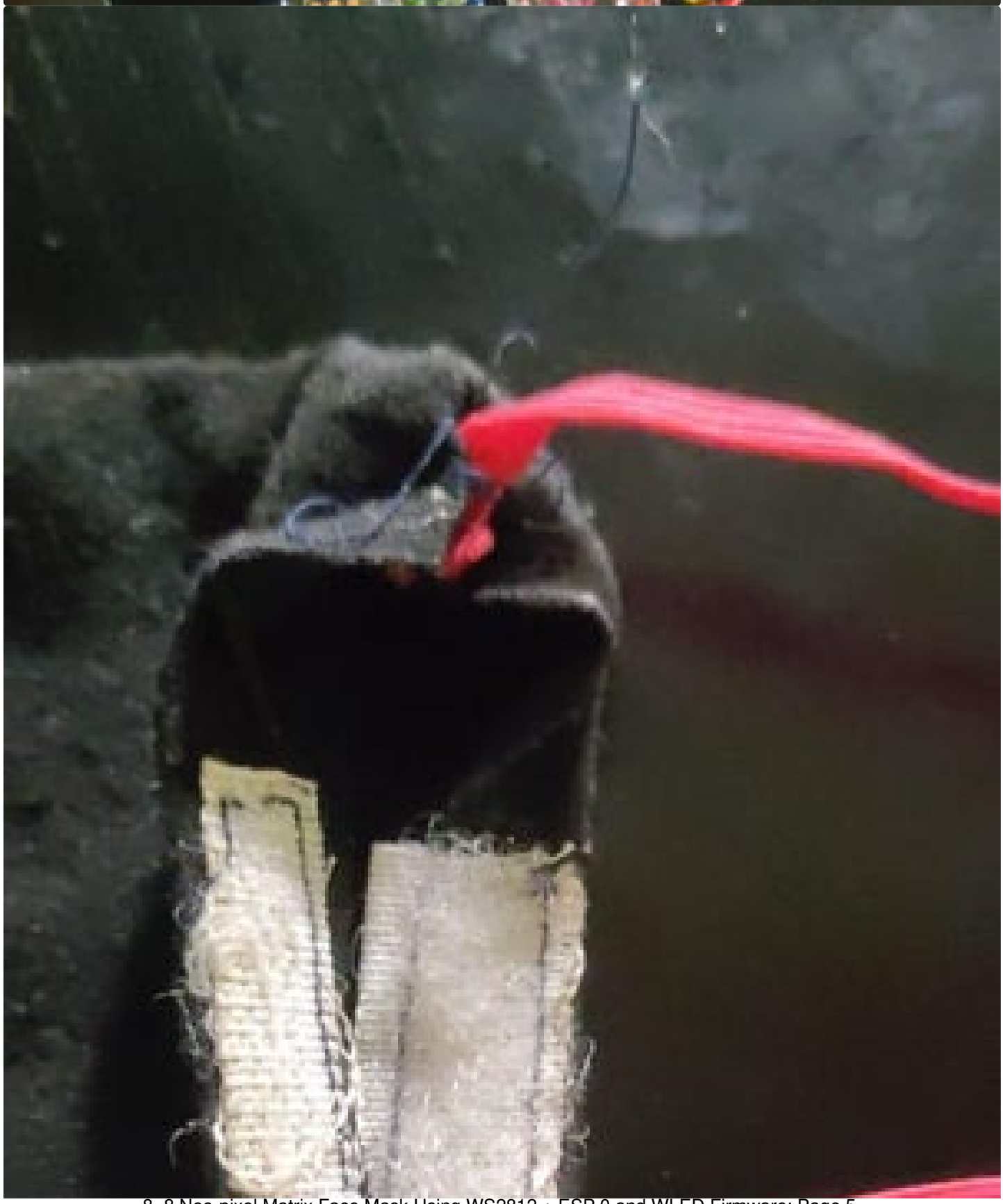


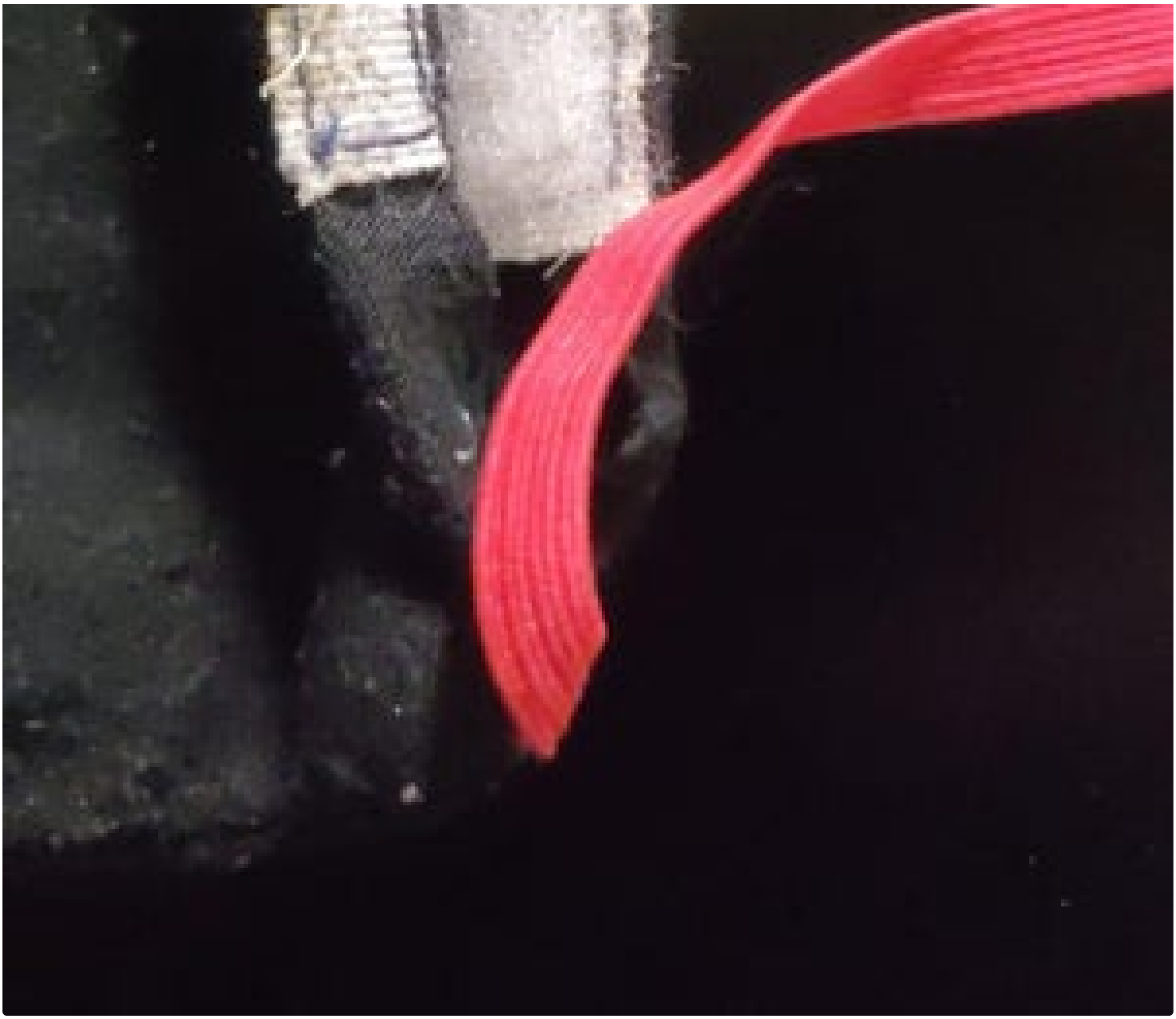
Step 1: Making Mask

- Make a face mask using any dark-colored cloth.
- I have used a black color cloth.
- Sew it as per your requirement and size.
- Make a pocket-like section for inserting the LED matrix.
- During the daytime, this section can be used to put a filter inside it.
- Since it is made up of cloth so it is washable and reusable.
- Add Velcro at inserting section by which we can insert the matrix in the section.



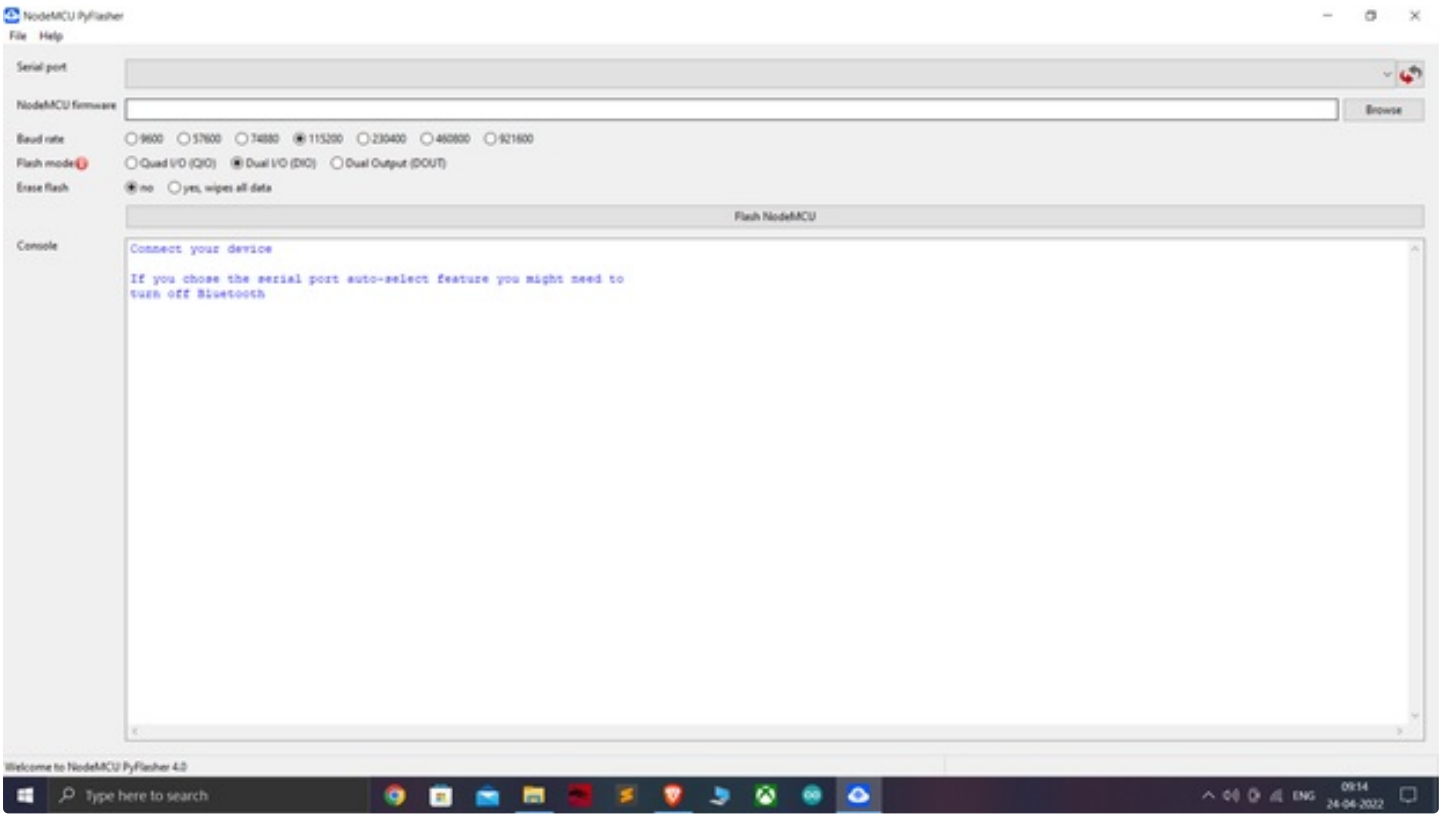


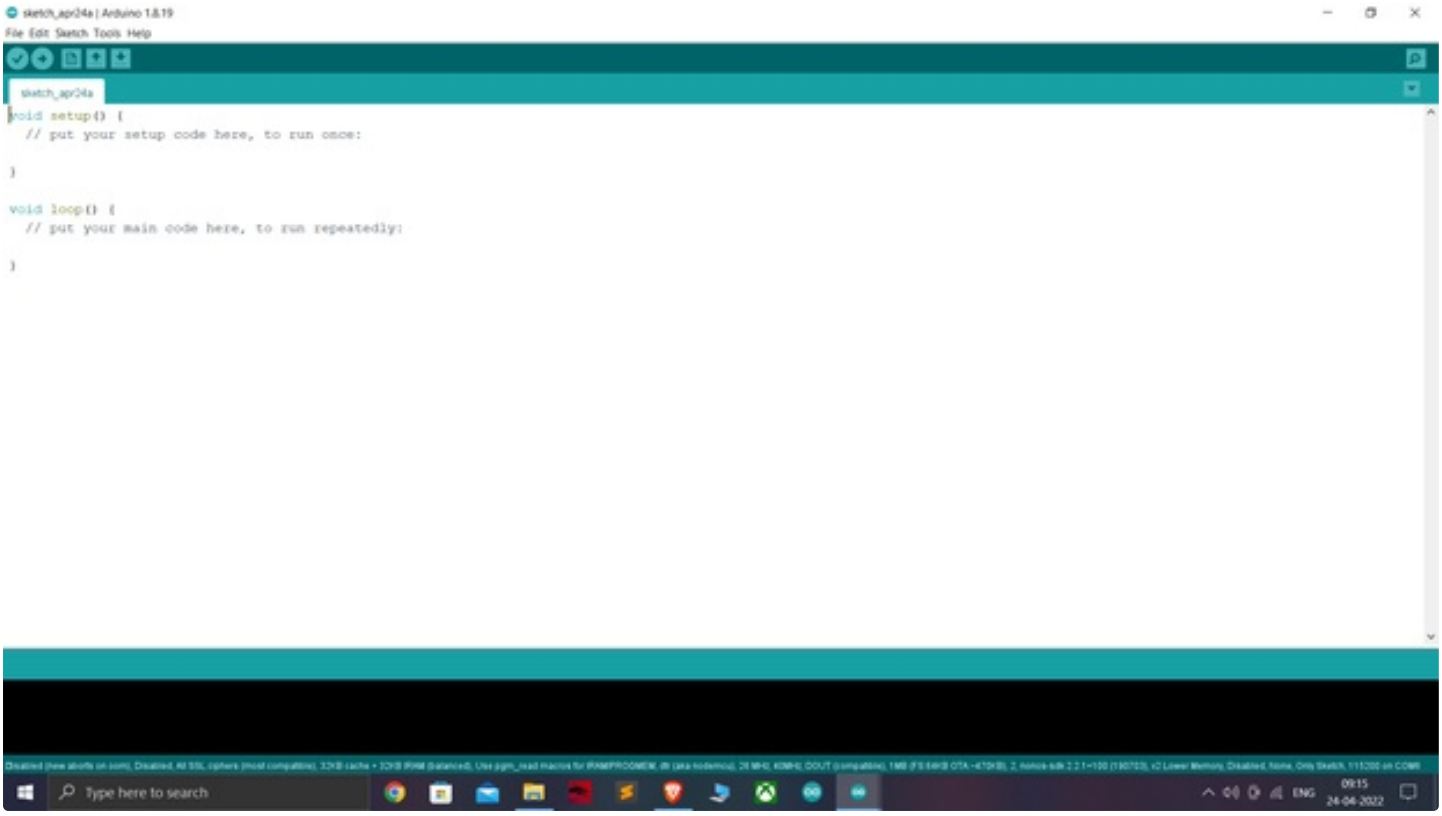




Step 2: Setting Up Esp-01 and Programming

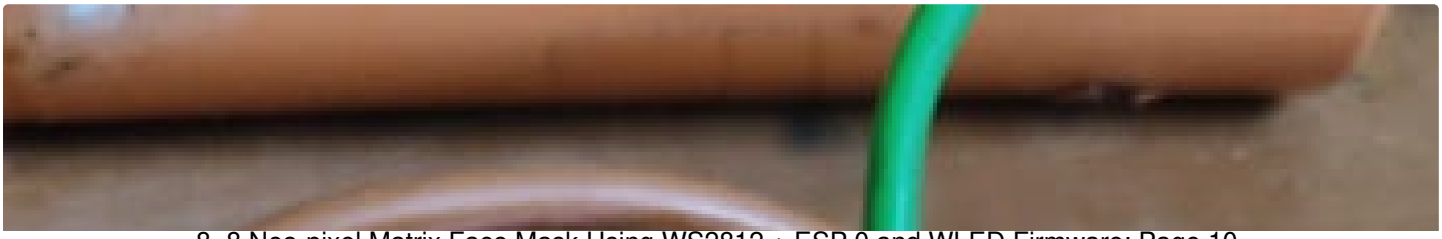
- Programming ESP-01 using NodeMCU software or Arduino IDE. Use the bin file for flashing after flashing don't forget to restart the module.

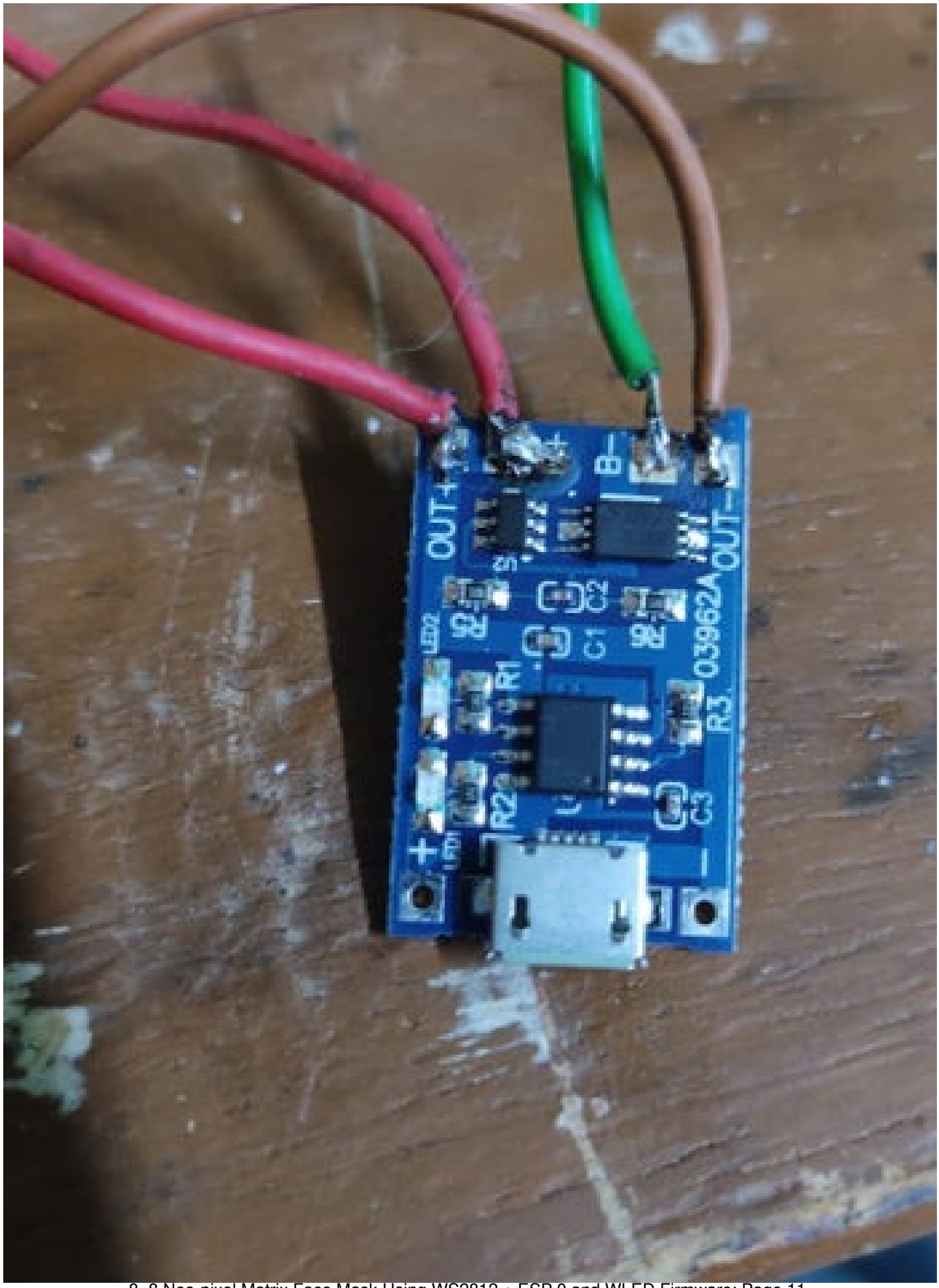


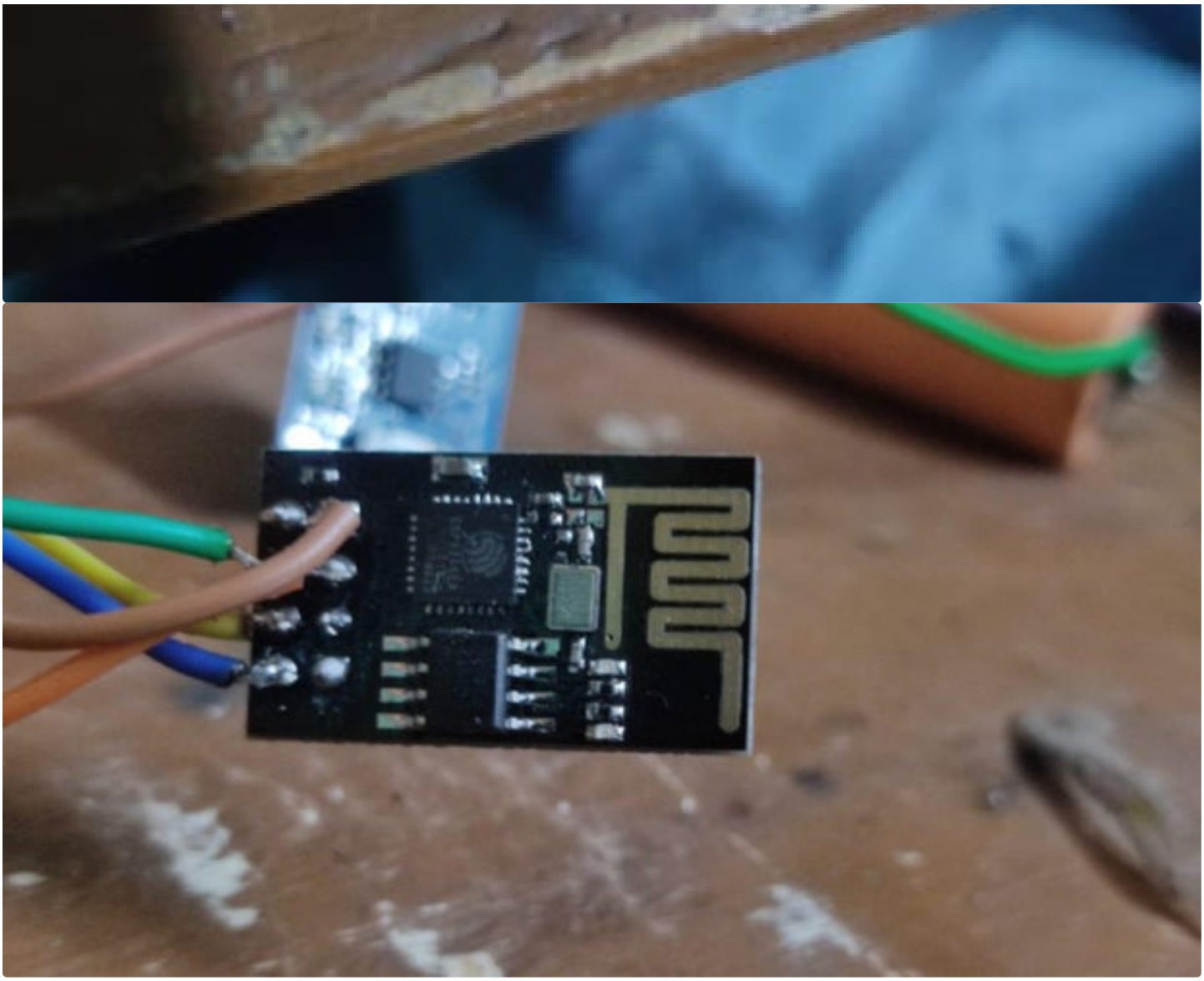


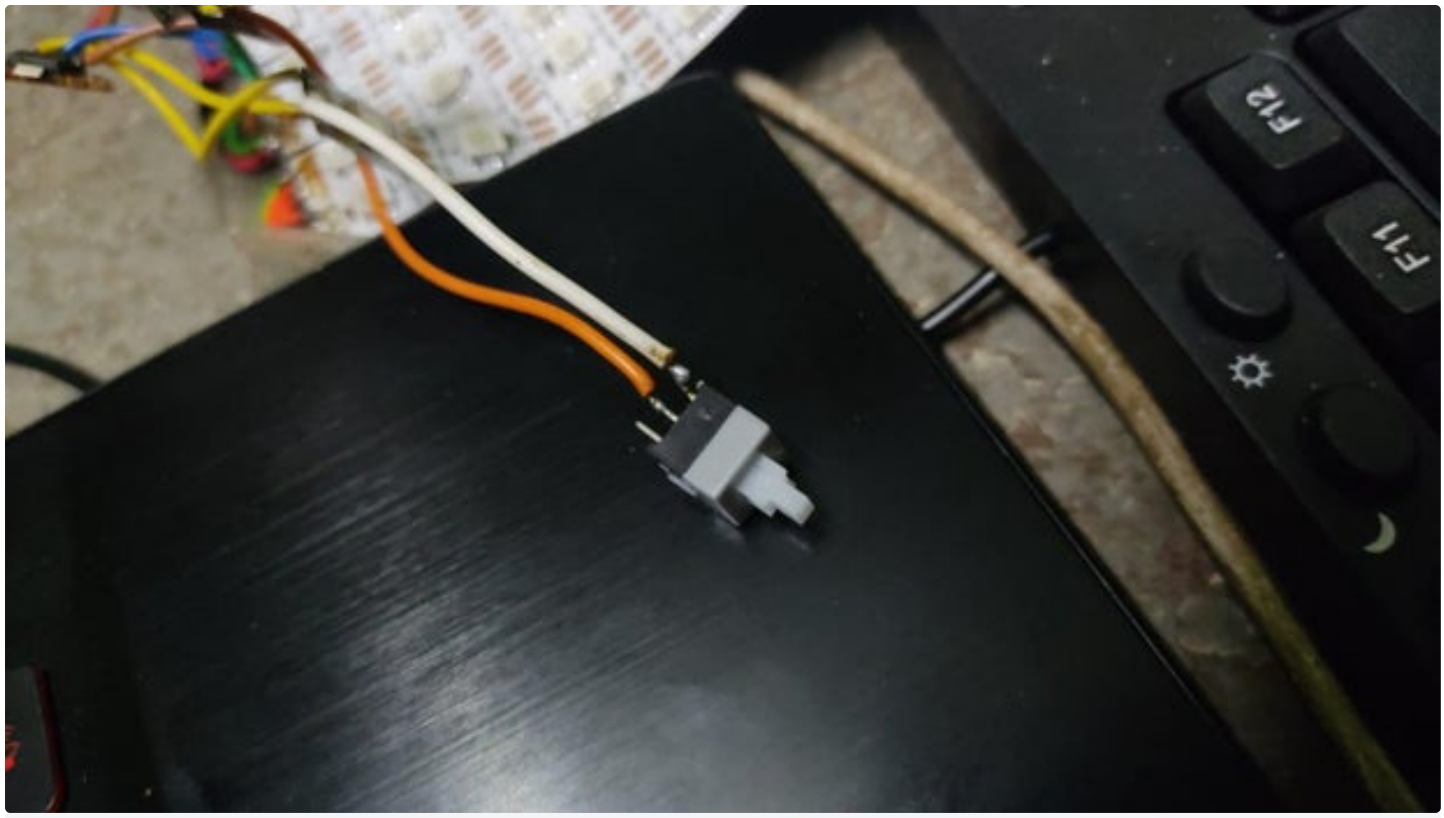
Step 3: Soldering

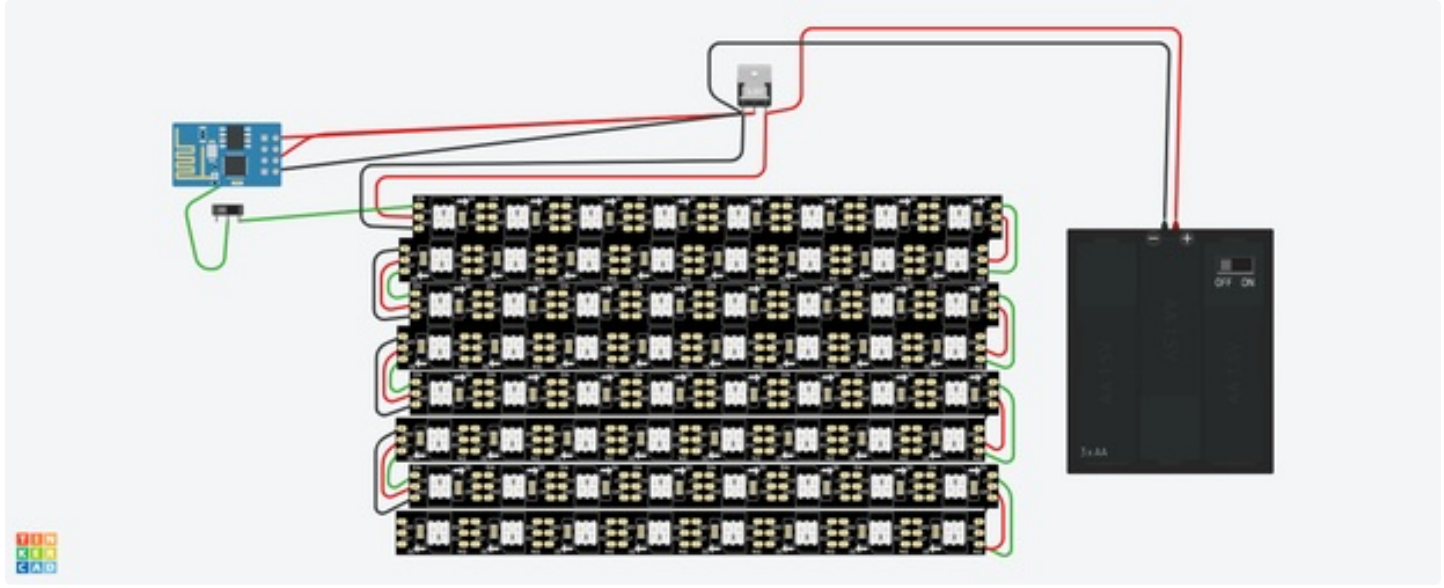
- Before soldering components please do check on a multimeter that all components are working fine because more than 4 V can damage the esp-01 module.
- Soldering all the components as given in the schematics/circuit diagram.
- After soldering cover all soldering points using insulating tape or heat shrink tubes to avoid a shock circuit.
- Do the connections as following
- Data In pin ==> GPIO2
- 5v ===> Vin of LD1117
- GND ==> GND of LD1117
- LD1117 3.3v Vout ====> ESP-01 VCC and EN/CH_PD pins
- TP4056 output ===> LD1117 Vin
- TP4056 GND===> LD1117 GND
- Battery +ve ===> TP4056 input
- Battery -ve ===> TP4056 GND
- Please connect buttons between battery and LD1117 as well as in between GPIO2 and Data In pin of LEDs.

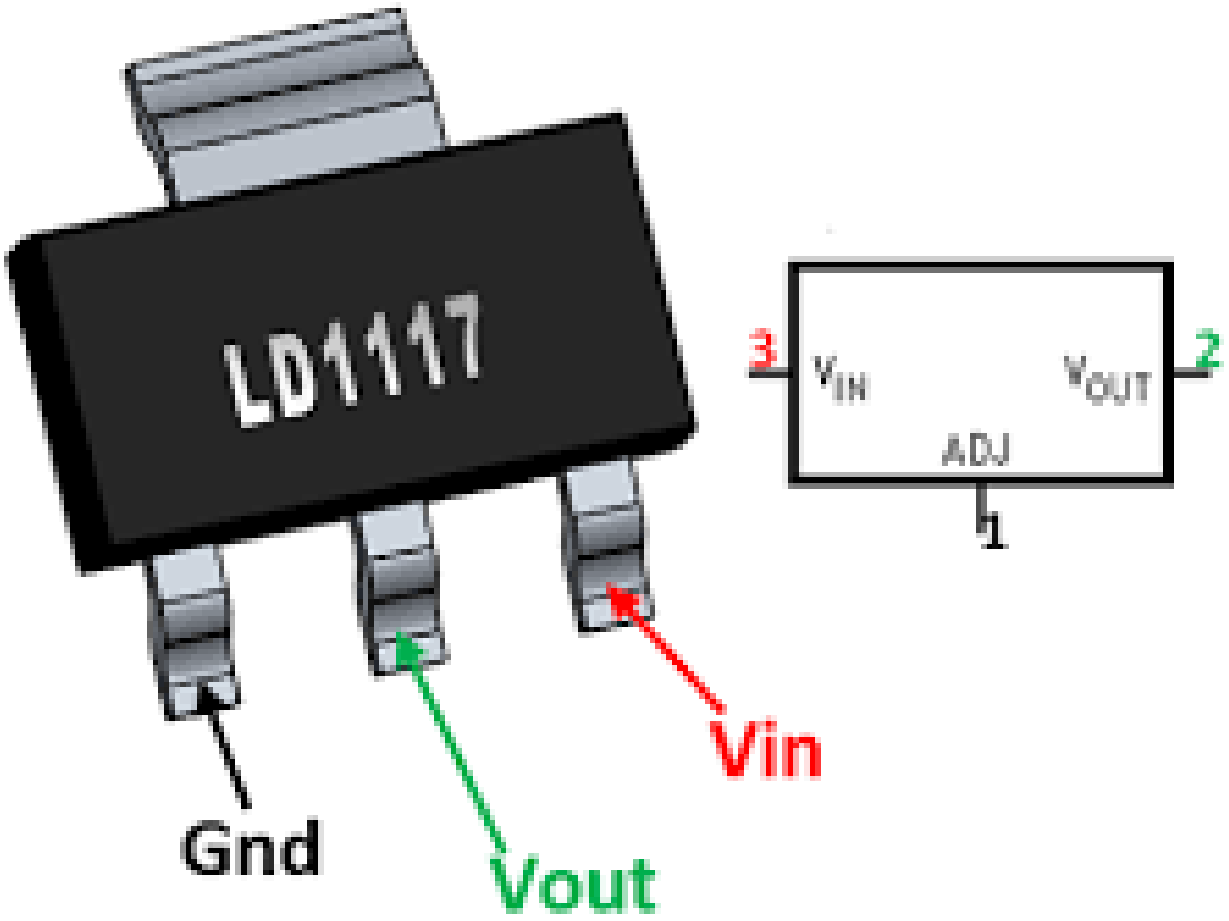


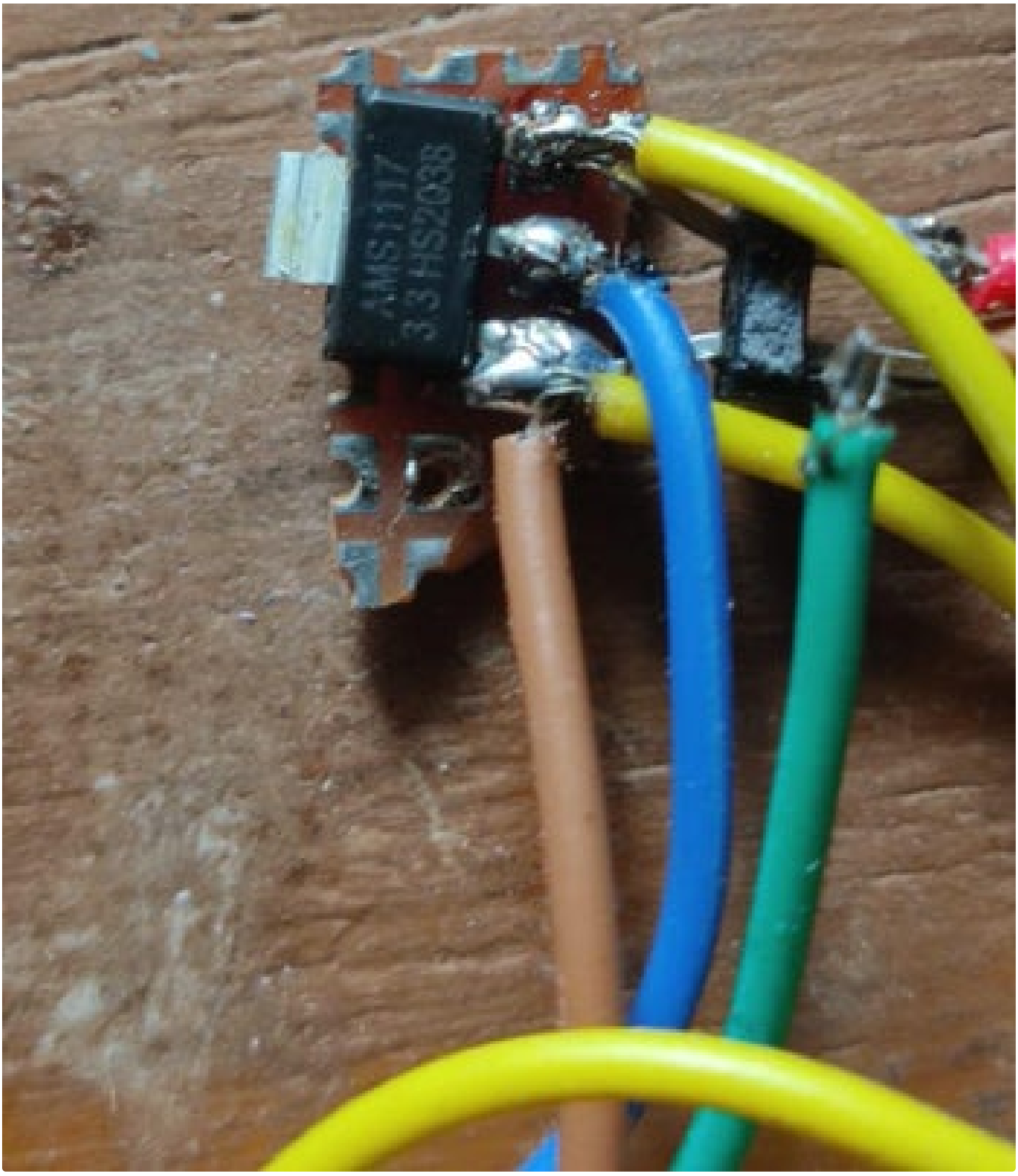

OUT+
B-
OUT-
LED2
R5
R6
C1
R1
R2
C2
C3
R3
03962A
+
-




F12
F11


OFF ON

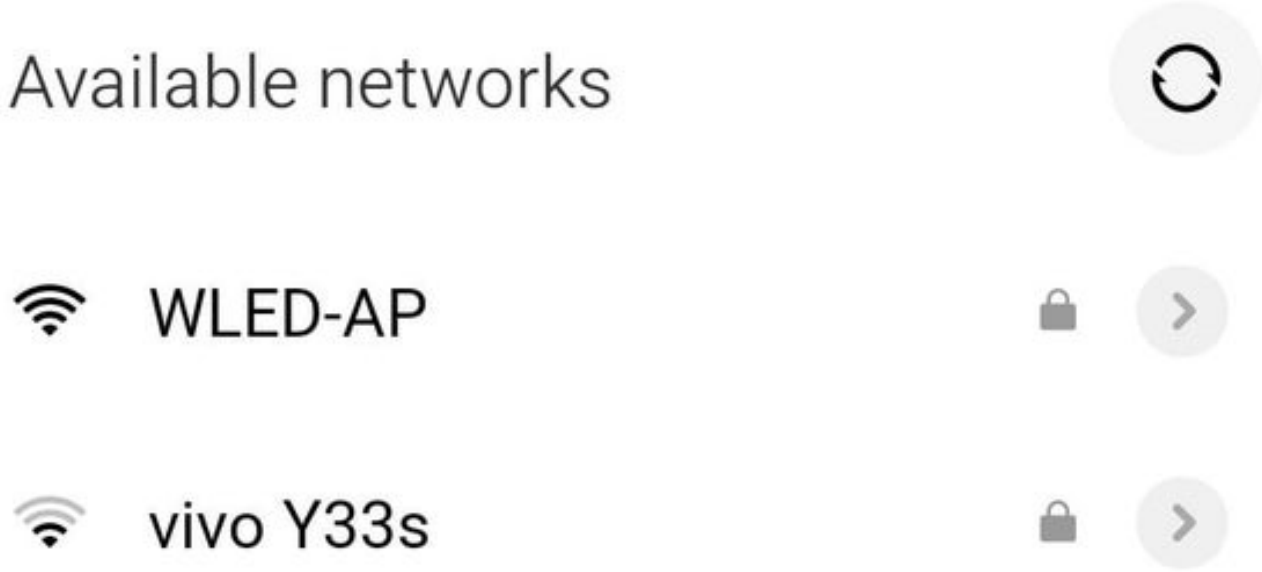

LD1117
3
VIN
VOUT
2
ADJ
1
Vin
Gnd
Vout

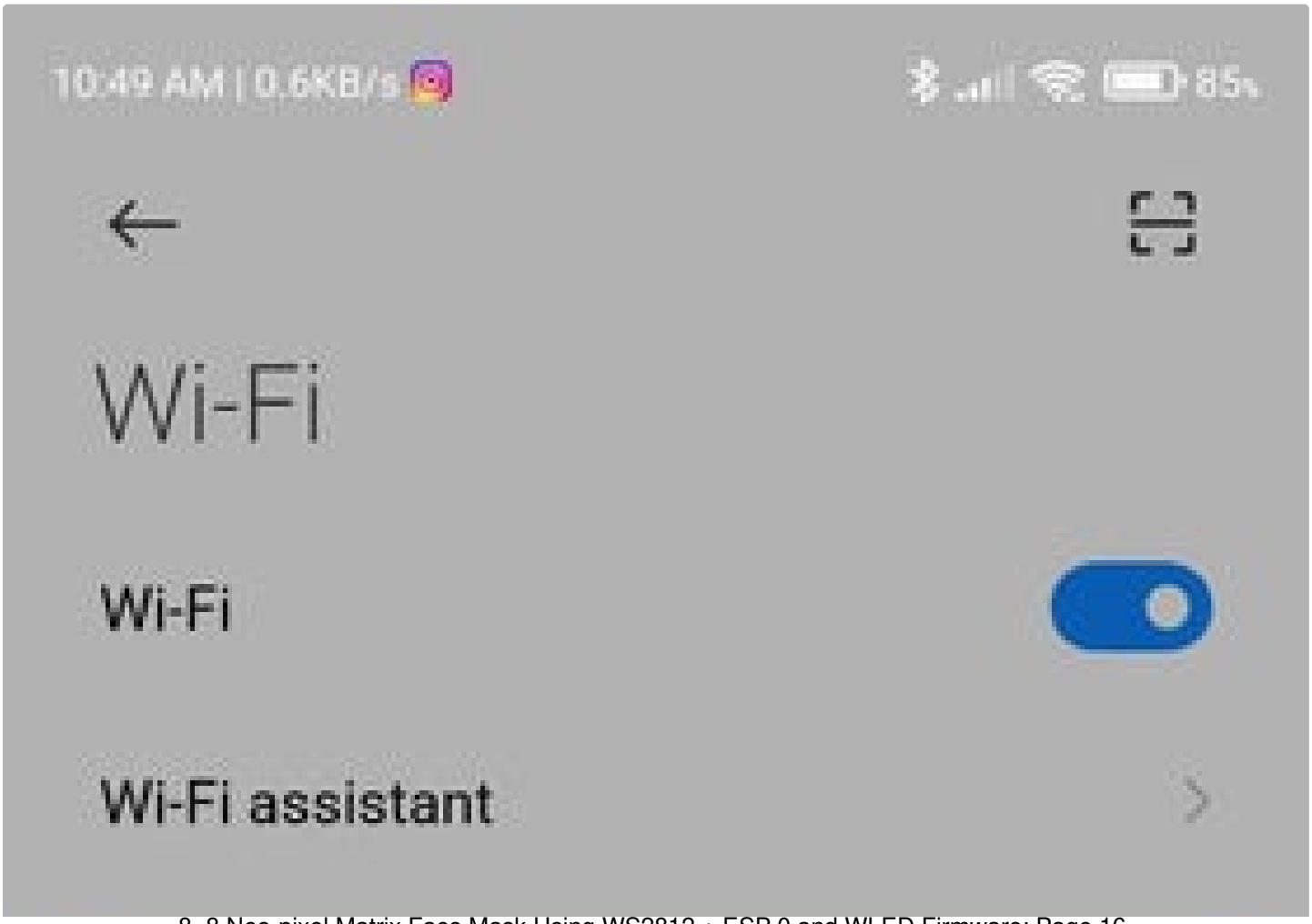


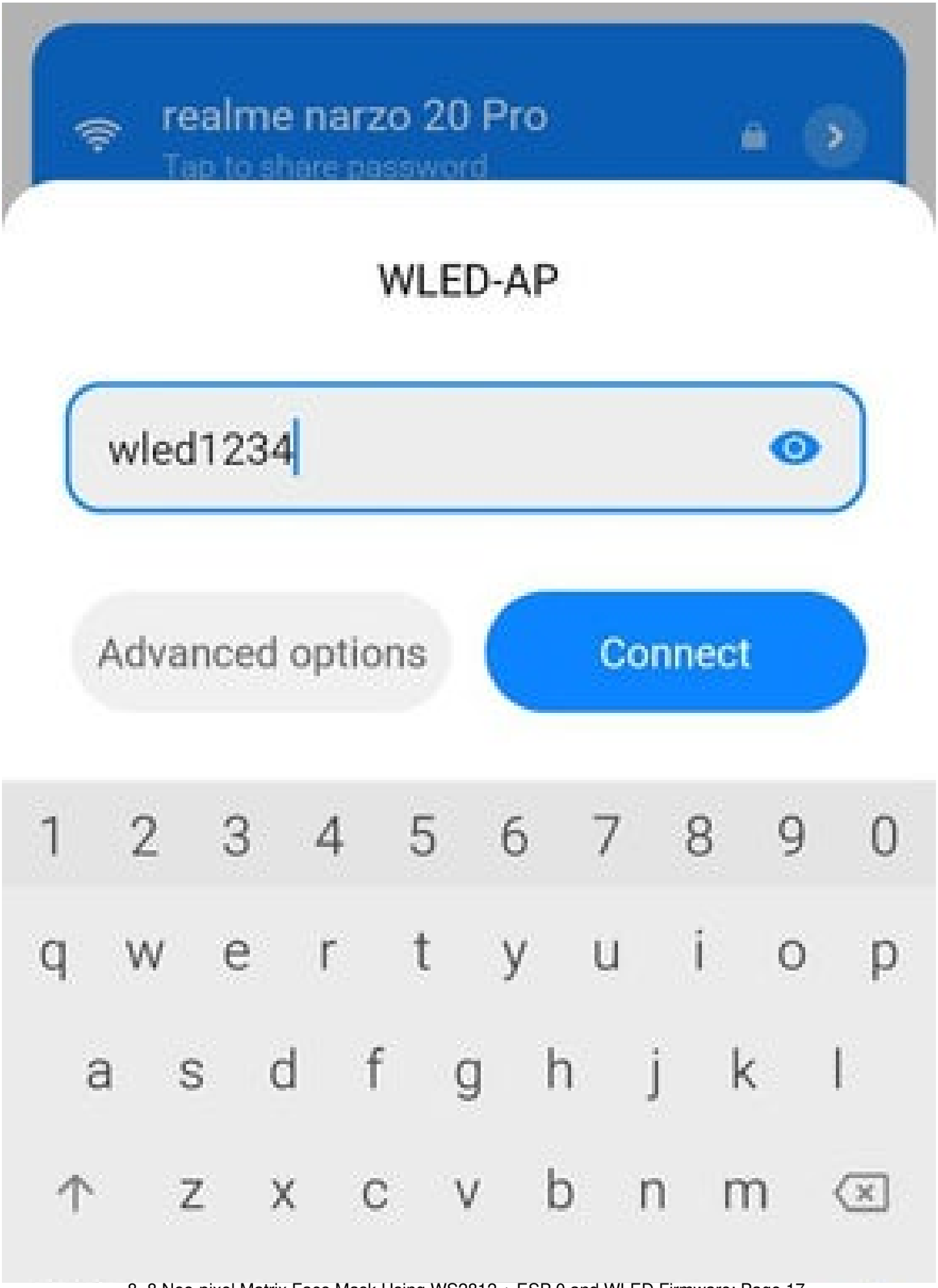
Step 4: Configuring

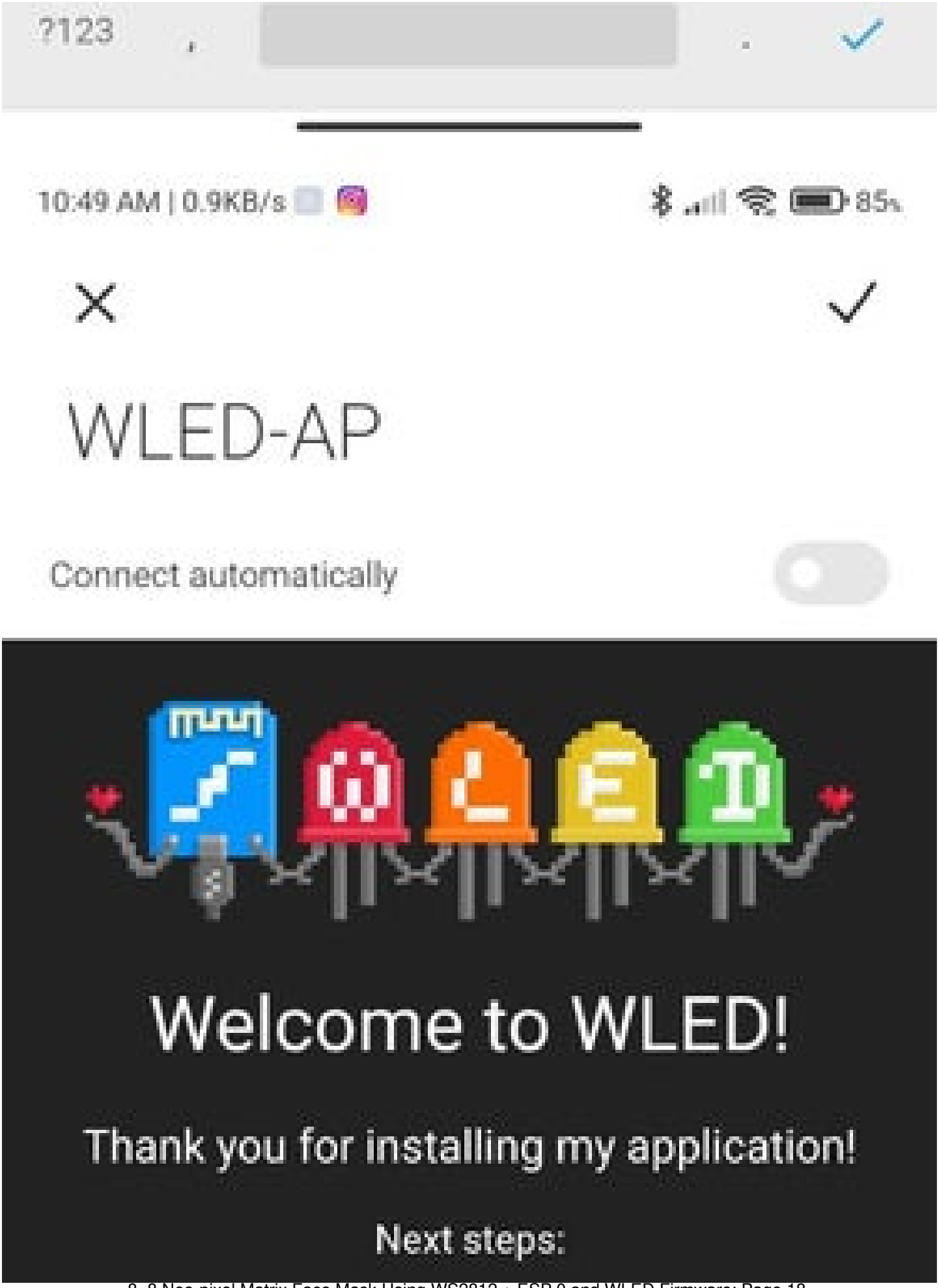
- Now only power up the esp-01 and keep the GPIO2 ==>LED Data In off.
- As shown in the above pictures you will see the Default Access point name of esp-01 As WLED-AP.

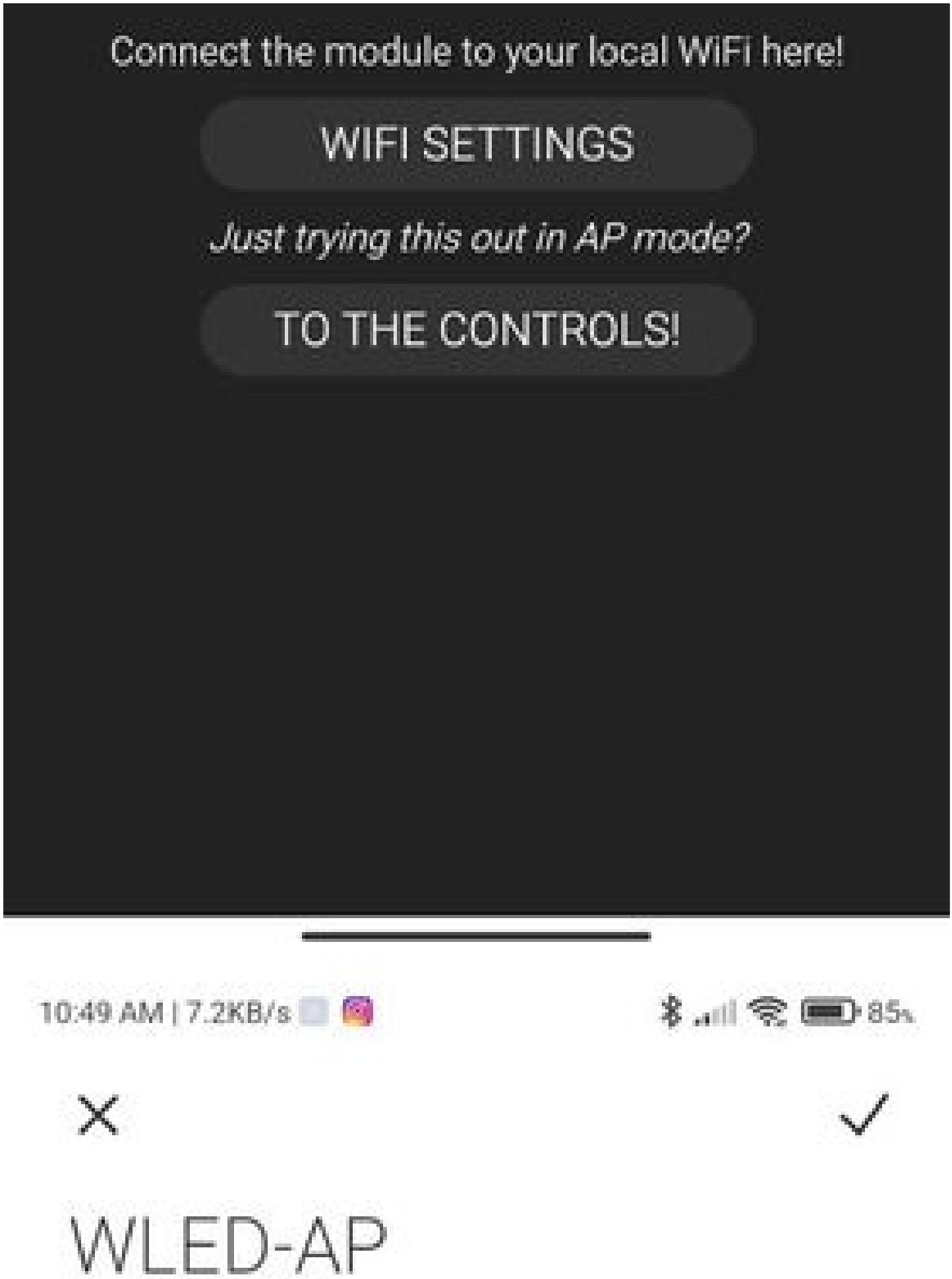
- Its default password will be **wled1234.**
- We can change the Access Point name and password as per our requirement.
- The HTML page will open up automatically and by using this page we can set up the number of LEDs.
- Now choose the color and effect.
- After choosing the color we can turn on the data pin switch (if we turn on both the switches then the access point will not be visible) .



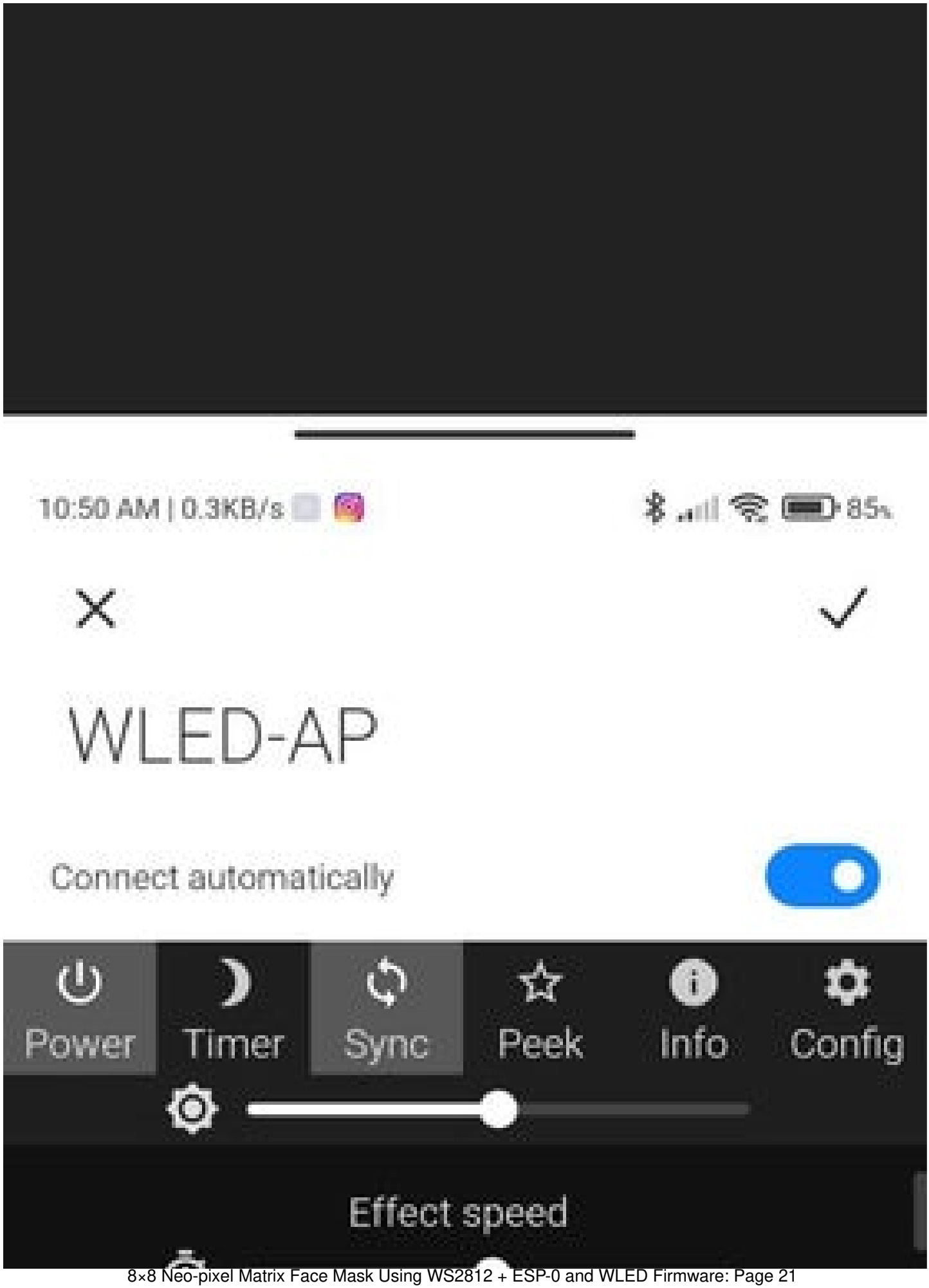


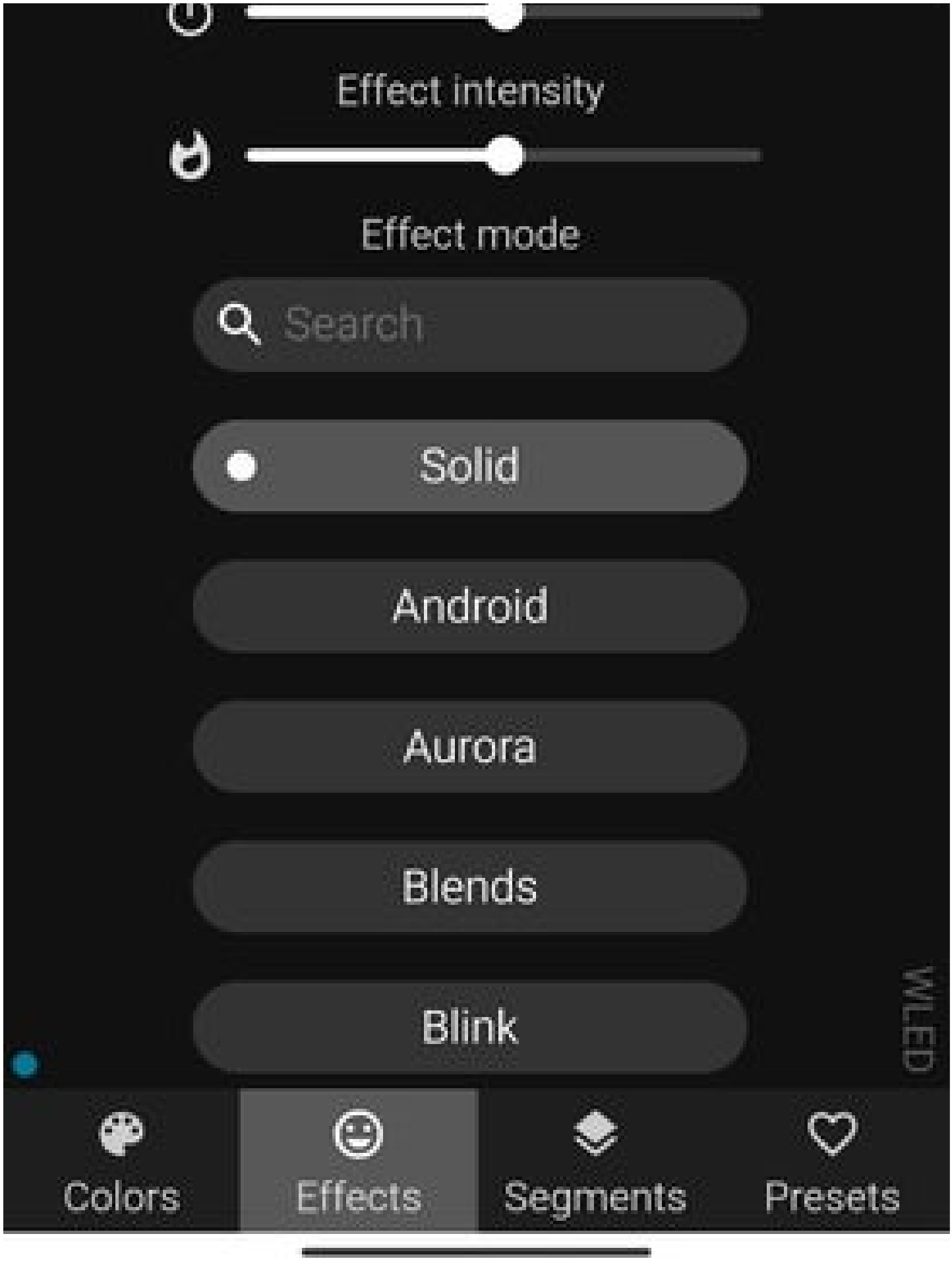

realme narzo 20 Pro
Tap to share password
WLED-AP
wled1234
Advanced options
Connect
1 2 3 4 5 6 7 8 9 0
q w e r t y u i o p
a s d f g h j k l
z x c v b n m

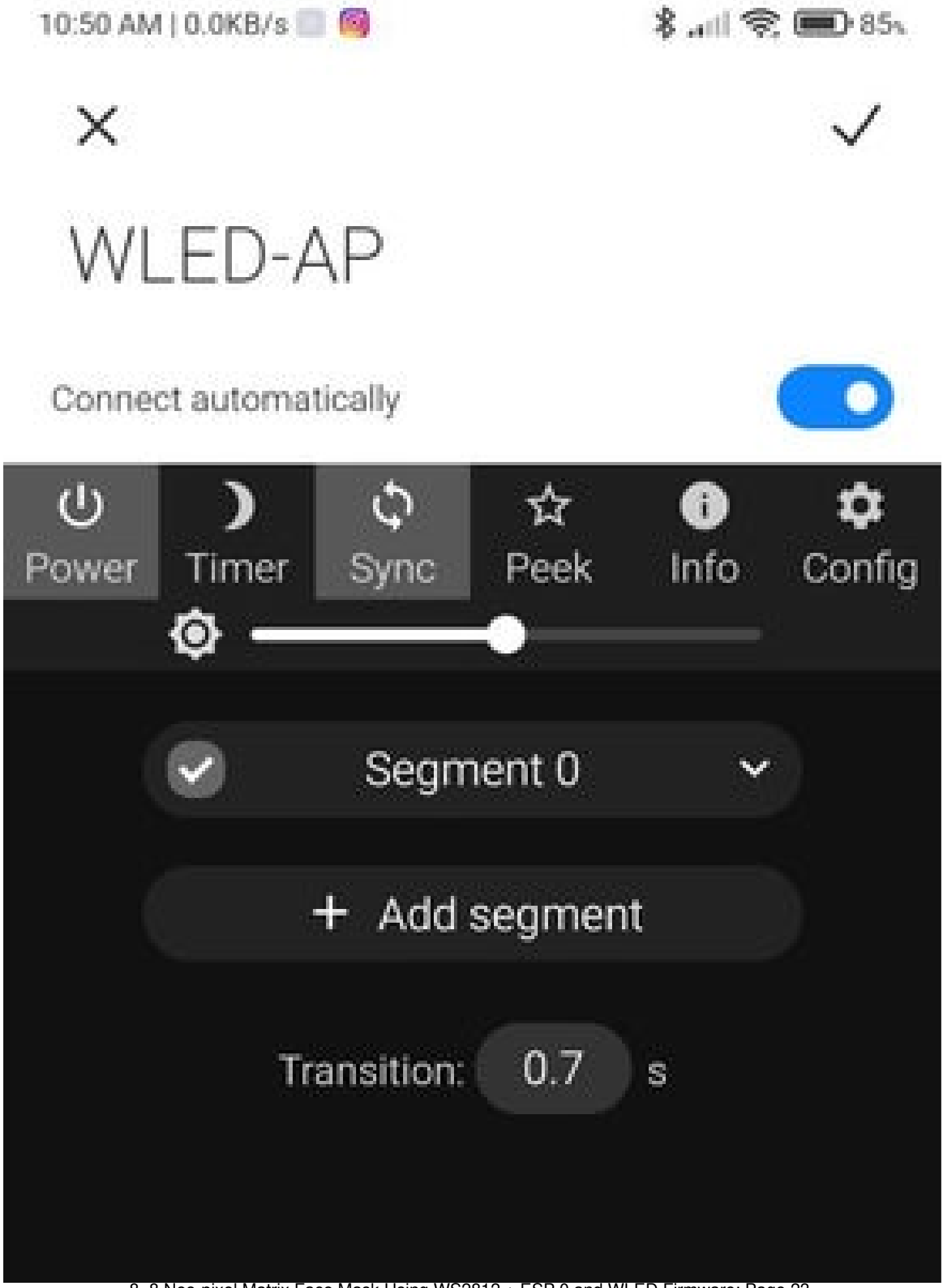

7123
10:49 AM | 0.9KB/s
WLED-AP
Connect automatically
Welcome to WLED!
Thank you for installing my application!
Next steps:

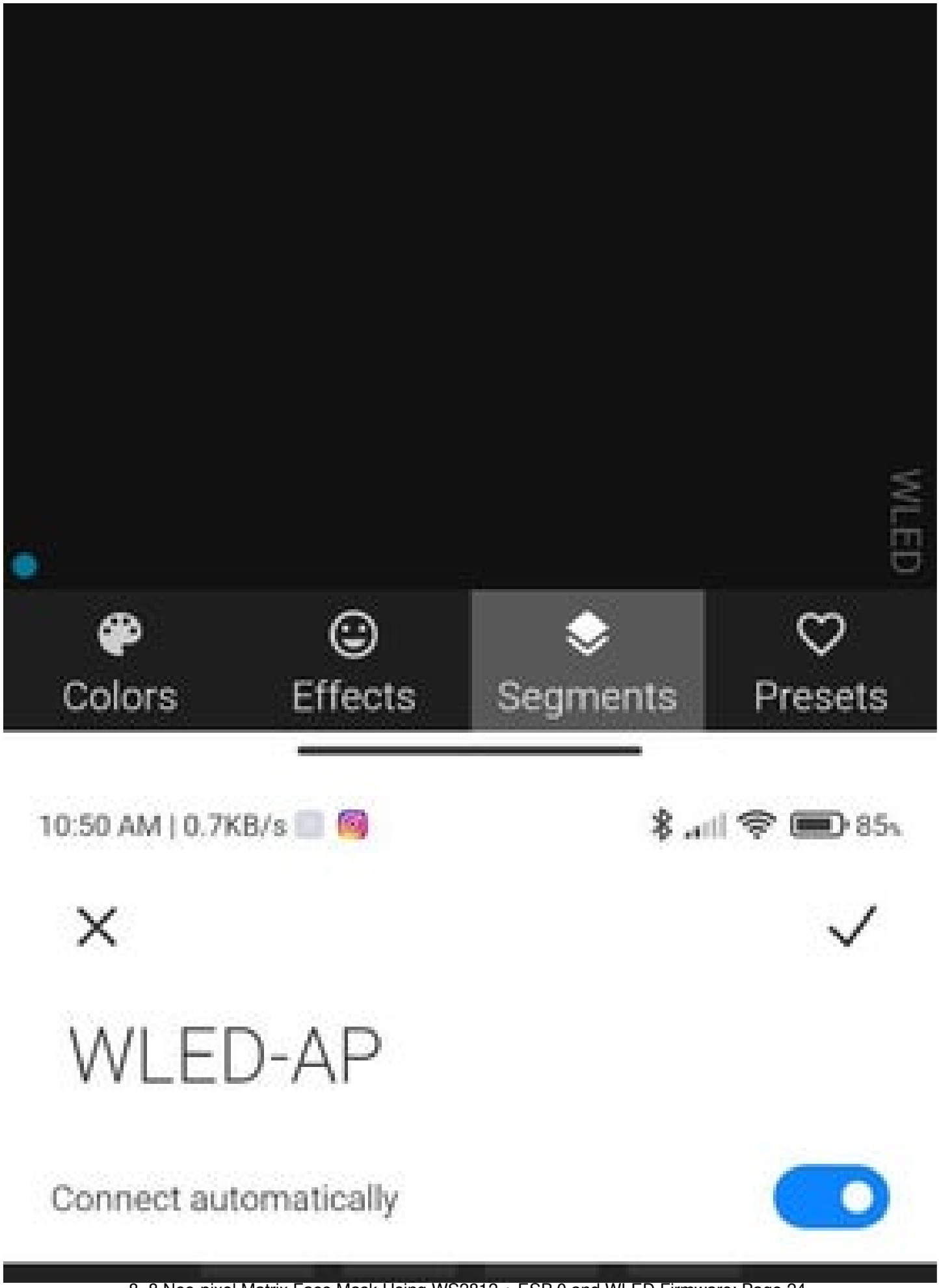

Connect the module to your local WiFi here!
WIFI SETTINGS
Just trying this out in AP mode?
TO THE CONTROLS!
10:49 AM | 7.2KB/s
85%
WLED-AP


Connect automatically
Welcome to WLED!
Thank you for installing my application!
Next steps:
Connect the module to your local WiFi here!
WIFI SETTINGS
Just trying this out in AP mode?
TO THE CONTROLS!

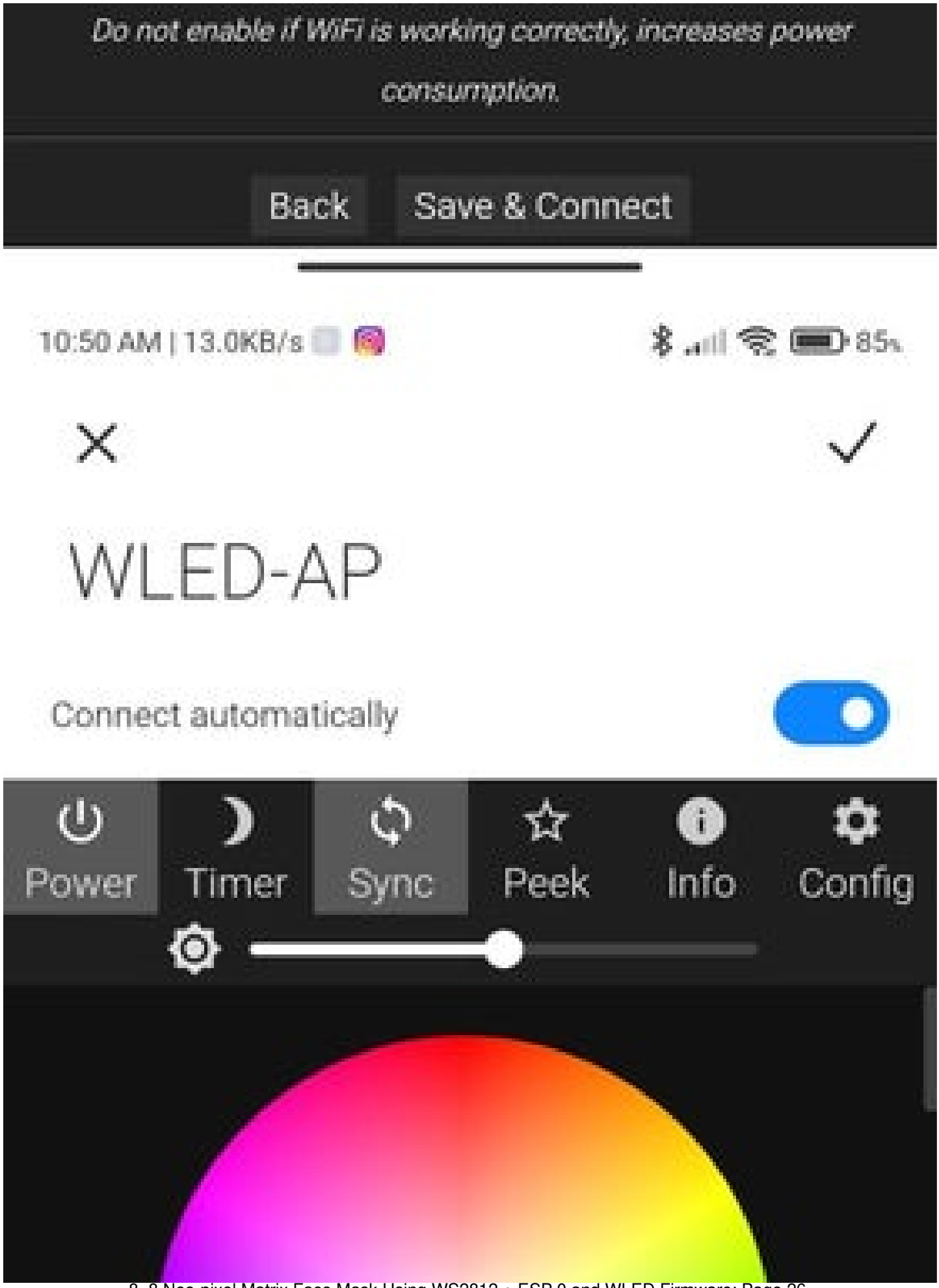

10:50 AM | 0.3KB/s
85%
WLED-AP
Connect automatically
Power
Timer
Sync
Peek
Info
Config
Effect speed


Effect intensity
Effect mode
Search
Solid
Android
Aurora
Blends
Blink
WLED
Colors
Effects
Segments
Presets


10:50 AM | 0.0KB/s
WLED-AP
Connect automatically
Power
Timer
Sync
Peek
Info
Config
Segment 0
+ Add segment
Transition:
0.7
s


WLED
Colors
Effects
Segments
Presets
10:50 AM | 0.7KB/s
85%
WLED-AP
Connect automatically


Static gateway:
0 . 0 . 0 . 0
Static subnet mask:
255 . 255 . 255 . 0
mDNS address (leave empty for no mDNS):
http:// wled-0076a3 .local
Client IP: Not connected
Configure Access Point
AP SSID (leave empty for no AP):
WLED-AP
Hide AP name:
AP password (leave empty for open):
••••••••
Access Point WiFi channel: 1
AP opens: No connection after boot
AP IP: 4.3.2.1
Experimental
Disable WiFi sleep:
Can help with connectivity issues.


Do not enable if WiFi is working correctly, increases power consumption.
Back
Save & Connect
10:50 AM | 13.0KB/s
85%
WLED-AP
Connect automatically
Power
Timer
Sync
Peek
Info
Config

Step 5: Finalizing

- We have successfully built our LED face mask.
- Charge the battery at a healthy capacity use the battery charging module indicator light (ona full charge

it will turn blue)

- Now put the Neo-pixel LED matrix in the pocket section of the mask.
- Now we can glow in the dark.