TYRANNY LIBERATOR

Seamless backup power. With or without solar.

Complete Plans, Instructions, Parts List & 3D Drawings

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Introduction:

DIY Power Wall is a home battery that stores energy so you can use it on demand and self-power your home to reduce your reliance on grid electricity. In the event of a grid outage. DIY Power Wall automatically provides backup power or easily integrates with solar to ensure your home is powered 24/7. With DIY Power Wall, you are assured of energy and clean energy lifestyle.

The benefits of The DIY Power Wall:

DIY Power Wall allows you to store 0.88 kWz of energy but you can scale it so you can store much power and use that energy to run your home during the night and back up your home in the event of a power outage. DIY Power Wall is compact, safe and includes a battery inverter, which provides easier integration.

Self-Powered Home

Use the DIY Power Wall to reduce reliance on the grid and run your home day and night.

Backup Power

Protect your home from a power outage with seamless and reliable backup power.

Energy Savings

Reduce your electric bill, if your utility offers a time-of-use rate plan.

Self-Power Your Home With The DIY Power Wall:

A self-powered home is one that runs off DIY Power Wall, which gives you the ability to own your energy and reduce your reliance on the grid. With DIY Power Wall you can use more of your excess energy and using it at night, which roughly doubles the amount of energy that directly powers your home.

Tools:

Angle Nose Plier	
Screwdriver	

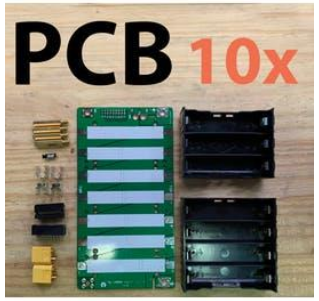
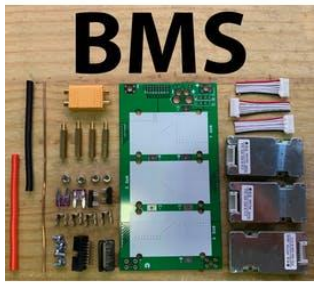
Bent Nose Plier	
Plier	
Soldering Station/Soldering Gun	

Digital Multimeter	
Rosin Core Solder	
Electric Screwdriver	

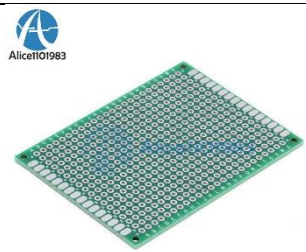
Screwdriver Bit and Ratchet Set	
Caliper	
Tweezer	

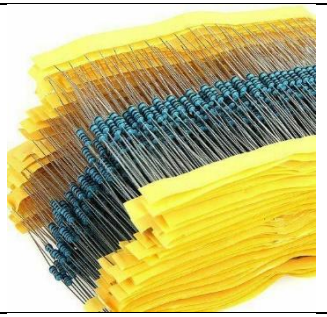
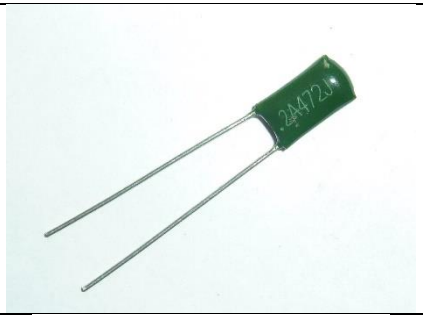
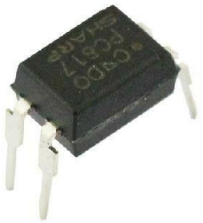
Drill	
Drill Bits	

Master List Of Materials:

Nr. Crt.	Description	Qty/Unit	Vendor	Images
1	Box Enclosure 800mm x 600mm x 260mm	1	eBay LINK	
2	Basic PCB Kit	20	Kit LINK	
3	BMS Module Complete Kit	1	Kit LINK	

4	Battery Capacity Voltage Checker Tester	1	eBay **LINK**	
5	AC 110V-220V TO DC 5V 12V 24V Switch Power Supply Driver Adapter LED Strip Light	1	eBay **LINK**	
6	1200W 20A DC Converter Boost Car Step-up Power Supply Module 8-60V to 12-83V	1	EBay **LINK**	
7	4 Four Channel Relay Module DC 5V + Optocoupler For Arduino PIC ARM AVR DSP	1	eBay **LINK**	

8	40PCS Dupont Wire Jumper Cable 2.54mm 1P-1P Male to Female 10CM/20CM/30CM (chose 10CM Female to Female)	1	eBay **LINK**	
9	WEMOS D1 ESP8266 WIFI Mini Pro 16M Connector IoT Board 2.4G SMA External Antenna	1	eBay **LINK**	
10	DC-DC / 3A adjustable buck module LM2596 regulated 24V to 12V 5V 3V	1	eBay **LINK**	
11	Double Side Prototype PCB Tinned Universal Breadboard 5x7 cm 50mmx70mm FR4	1	eBay **LINK**	

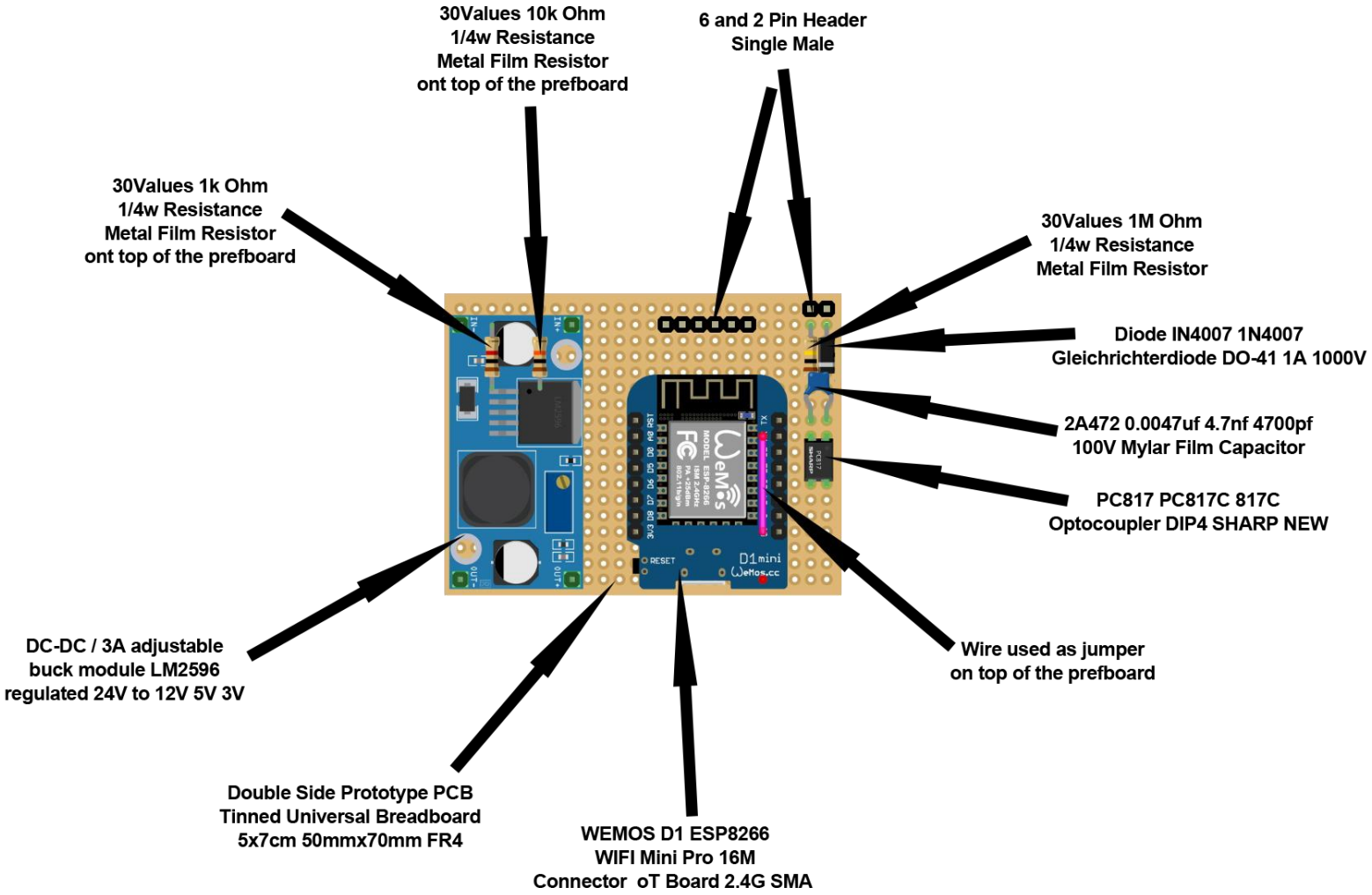
12	30Values 10-1M Ohm 1/4w Resistance 1% Metal Film Resistor Assortment Kit	1	eBay **LINK**	
13	Diode IN4007 1N4007 Gleichrichterdiode DO-41 1A 1000V	1	eBay **LINK**	
14	2A472 0.0047uf 4.7nf 4700pf 100V Mylar Film Capacitor	1	eBay **LINK**	
15	PC817 PC817C 817C Optocoupler DIP4 SHARP NEW	1	eBay **LINK**	

16	APC SC1500 TOWER POWER SUPPLY TOWER 1500VA 120V 865W	1	eBay **LINK**	
17	Lot of Battery Laptop	-	Search eBay Alibaba or Aliexpress	
18	16 Pin Flat IDC Cable Extension DuPont Wire&1.27mm Line Pitch Wires Connect	5	eBay **LINK**	
19	XT60 Male+ Female Bullet Connectors Plugs for RC Lipo Battery	10	eBay **LINK**	

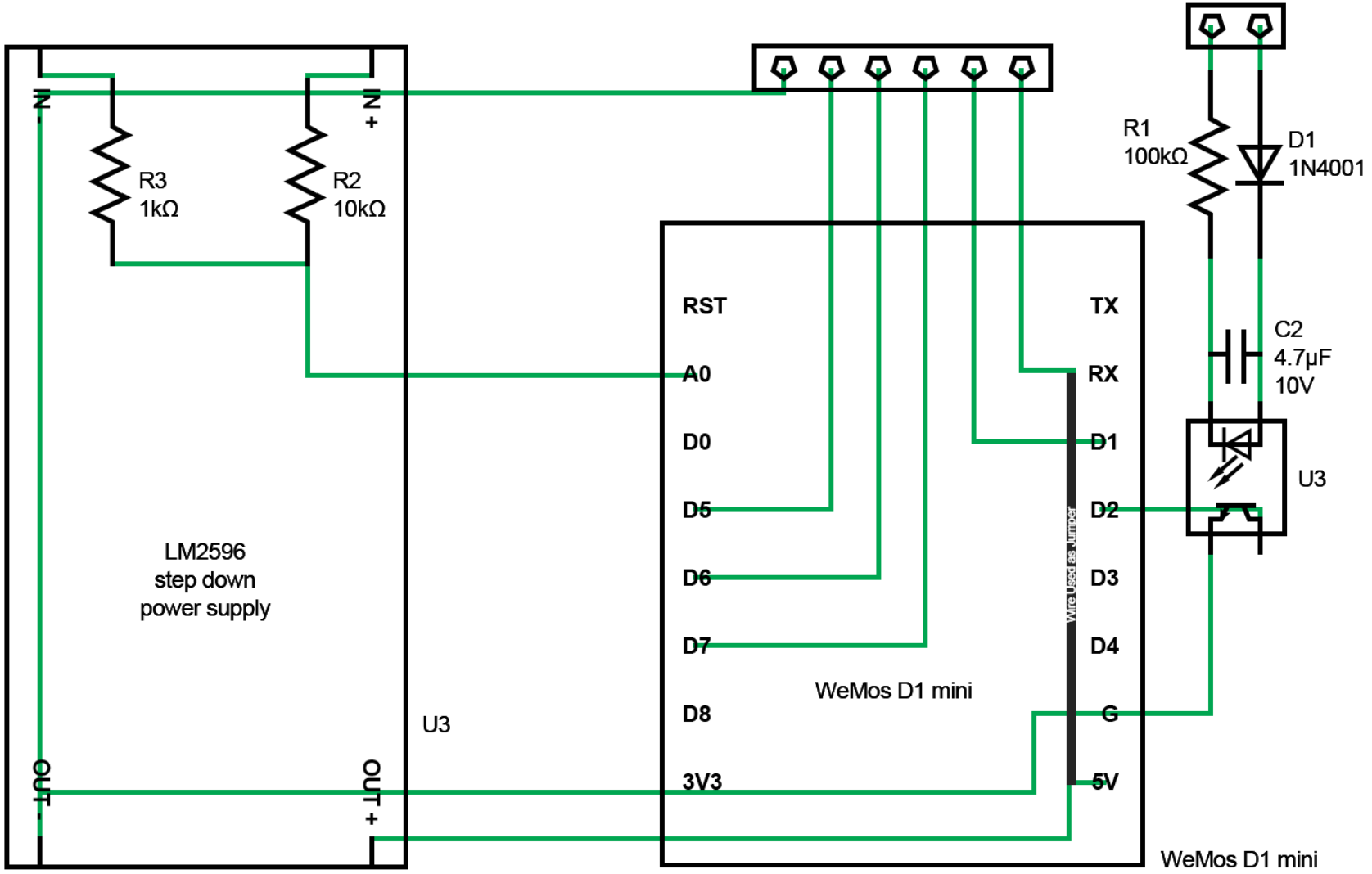
20	XT90 Female Male Banana Bullet Connector Plug For RC LiPo Battery Plug	1	eBay **LINK**	
21	Power Extension Cable Kettle Male to Female UPS Monitor, PC Lead C13 - C14	1	eBay **LINK**	
22	JST 2Pin Connector Male/Female Plug Cable 10cm Wire For Battery LED Lights	1	eBay **LINK**	

ESP Module Drawing and Diagram:

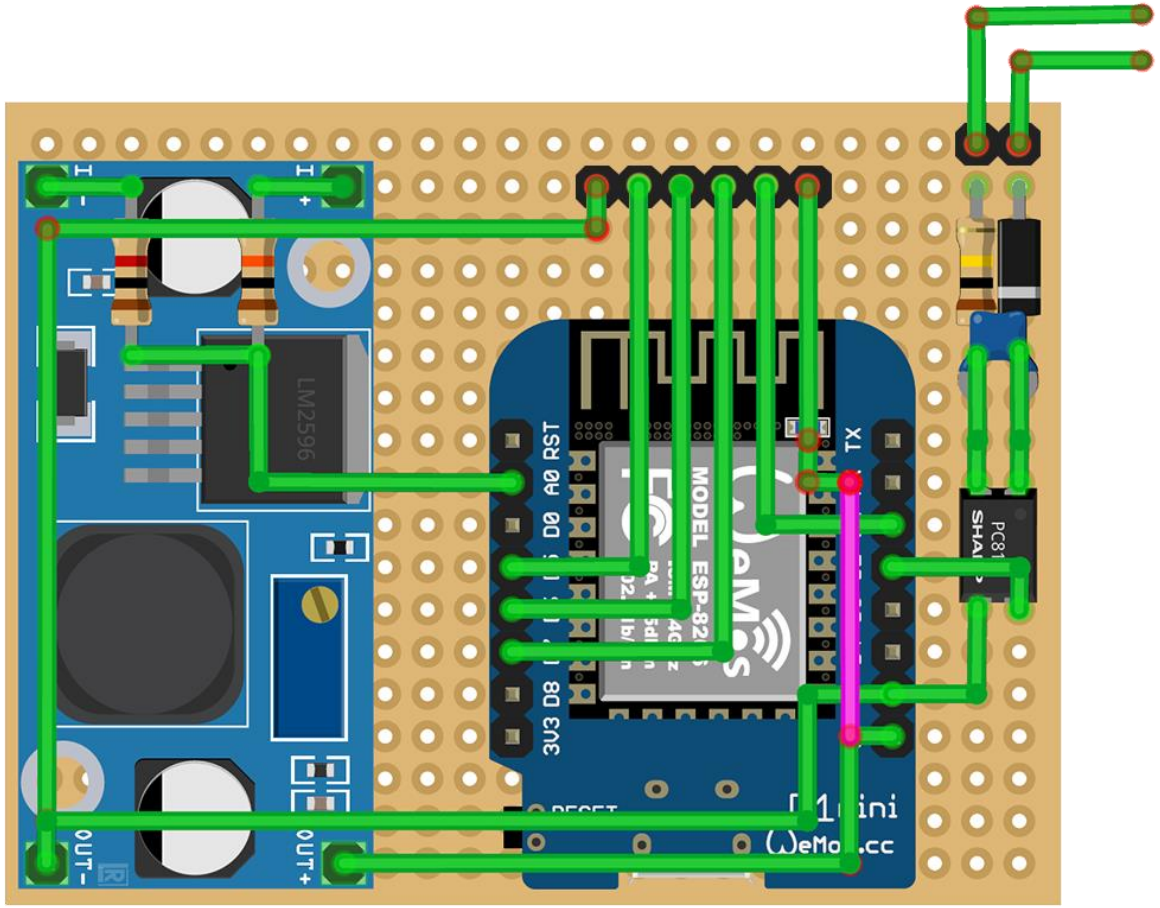
The position of the parts related to the Prefboard:



ESP module diagram:

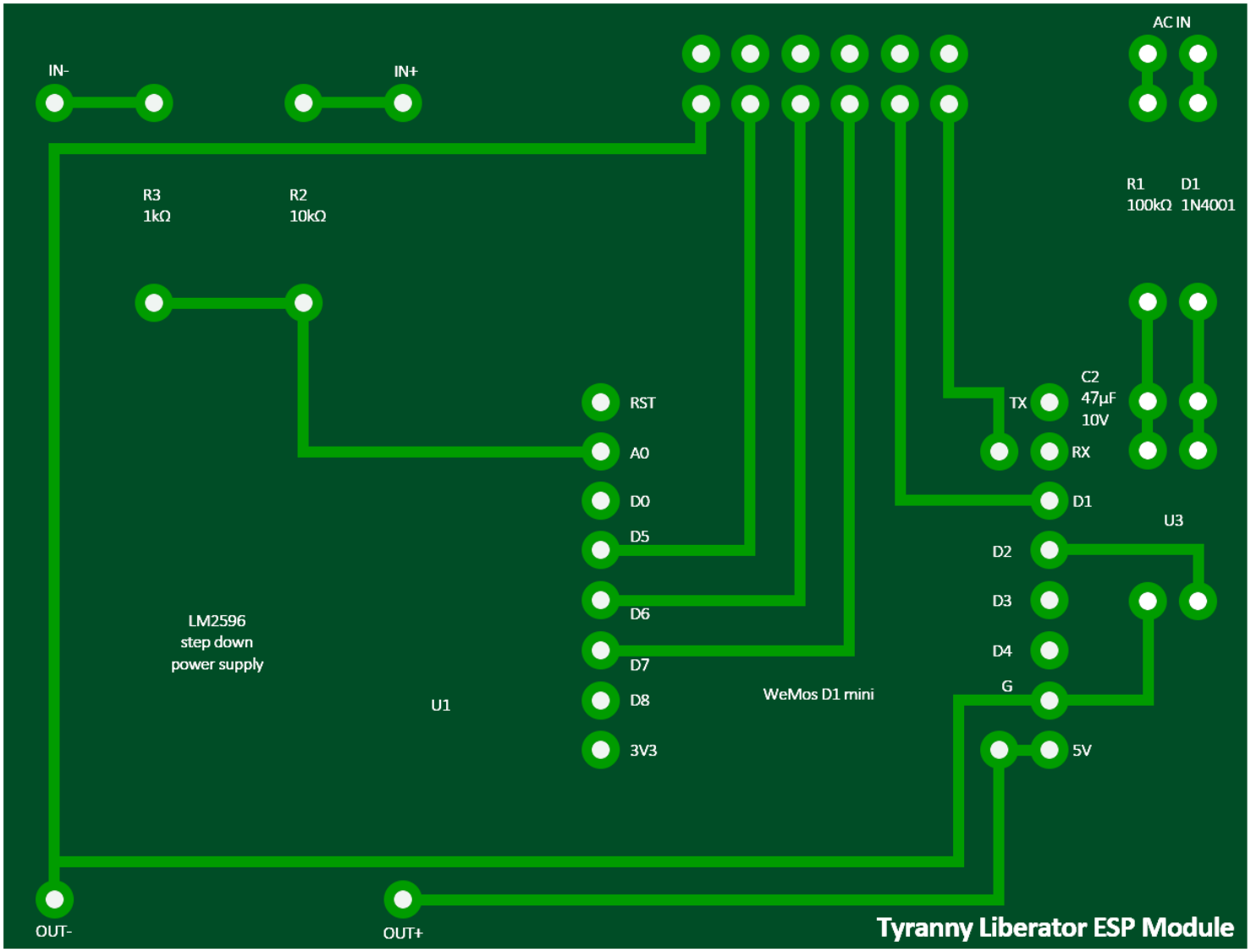


ESP module diagram with the pieces on perfboard:

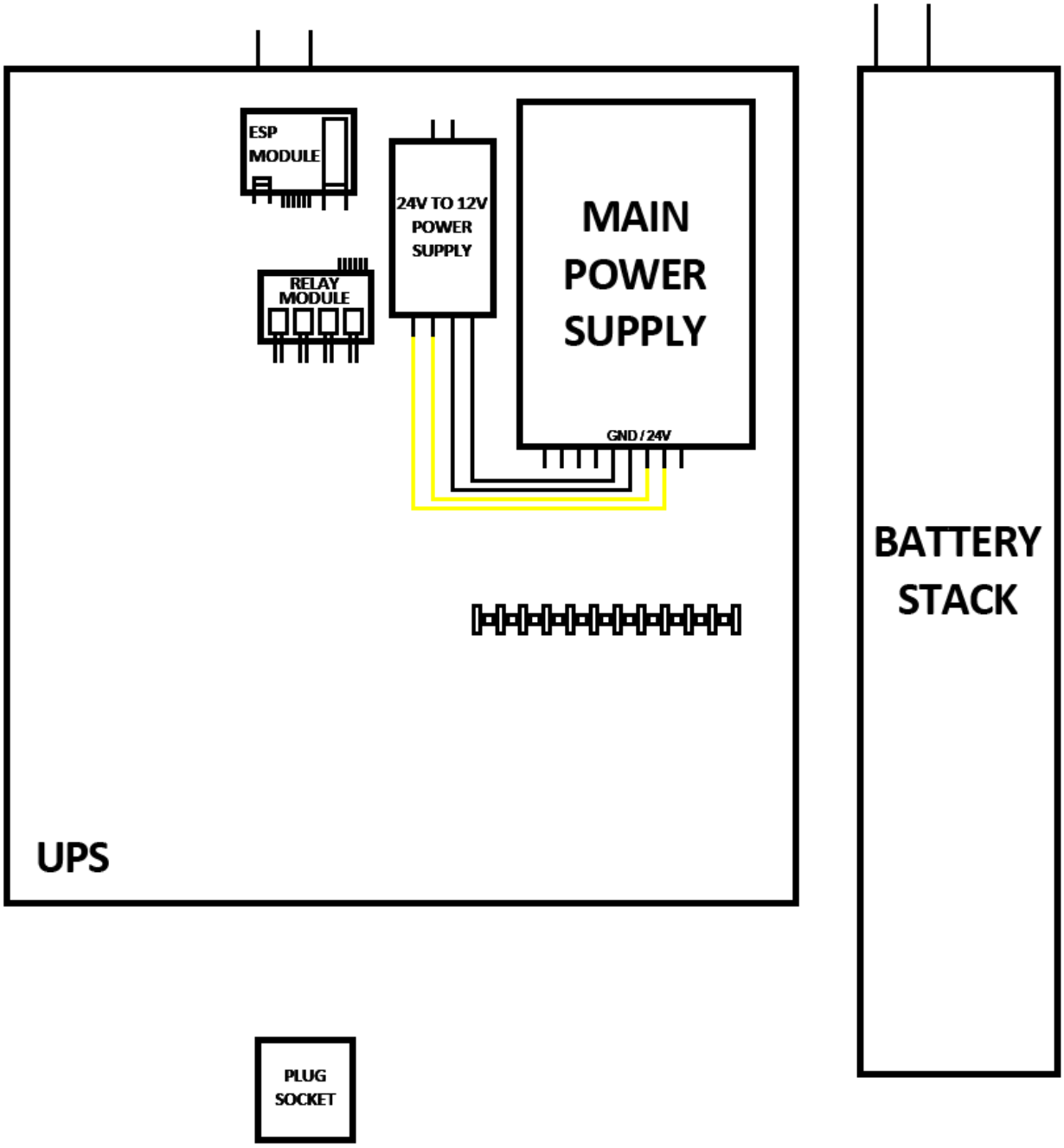


The R2 10kΩ and the R3 1kΩ are on the bottom of the perfboard. Also the wire jumper is under the WeMos D1 mini.

ESP Module PCB design:



Power Wall Cable Connections:



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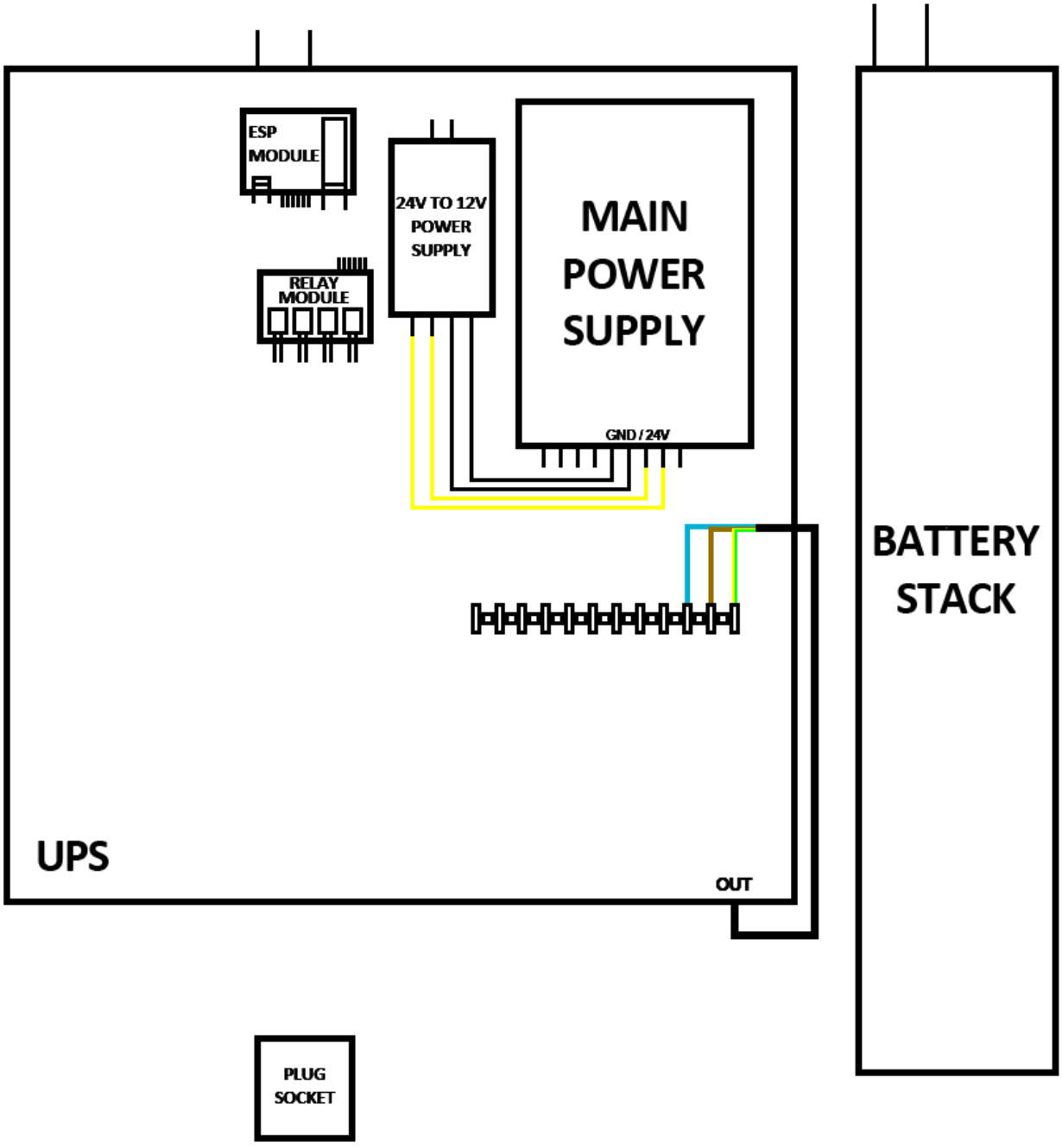
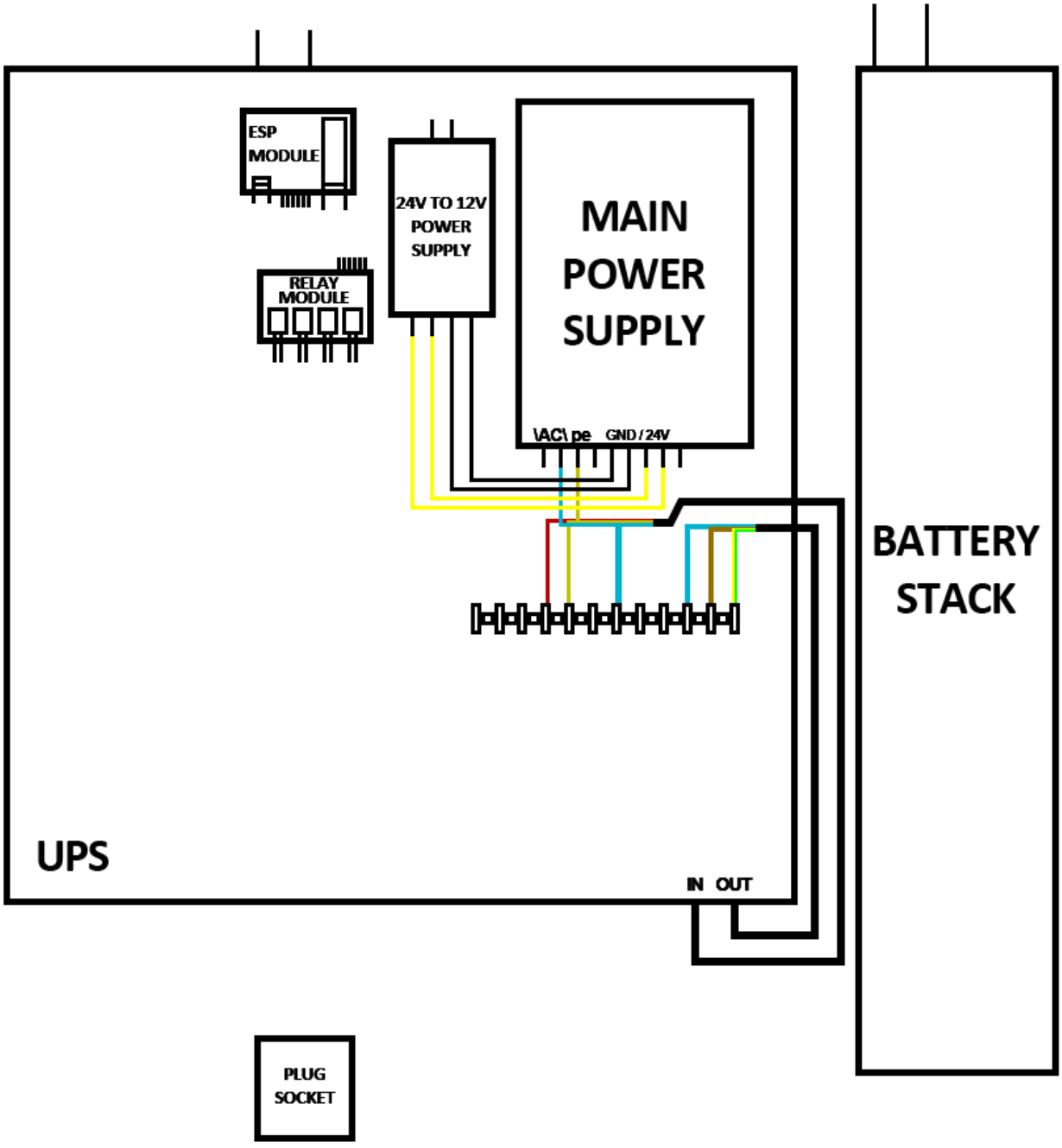

ESP
MODULE
RELAY
MODULE
24V TO 12V
POWER
SUPPLY
MAIN
POWER
SUPPLY
GND / 24V
BATTERY
STACK
UPS
OUT
PLUG
SOCKET

Step 2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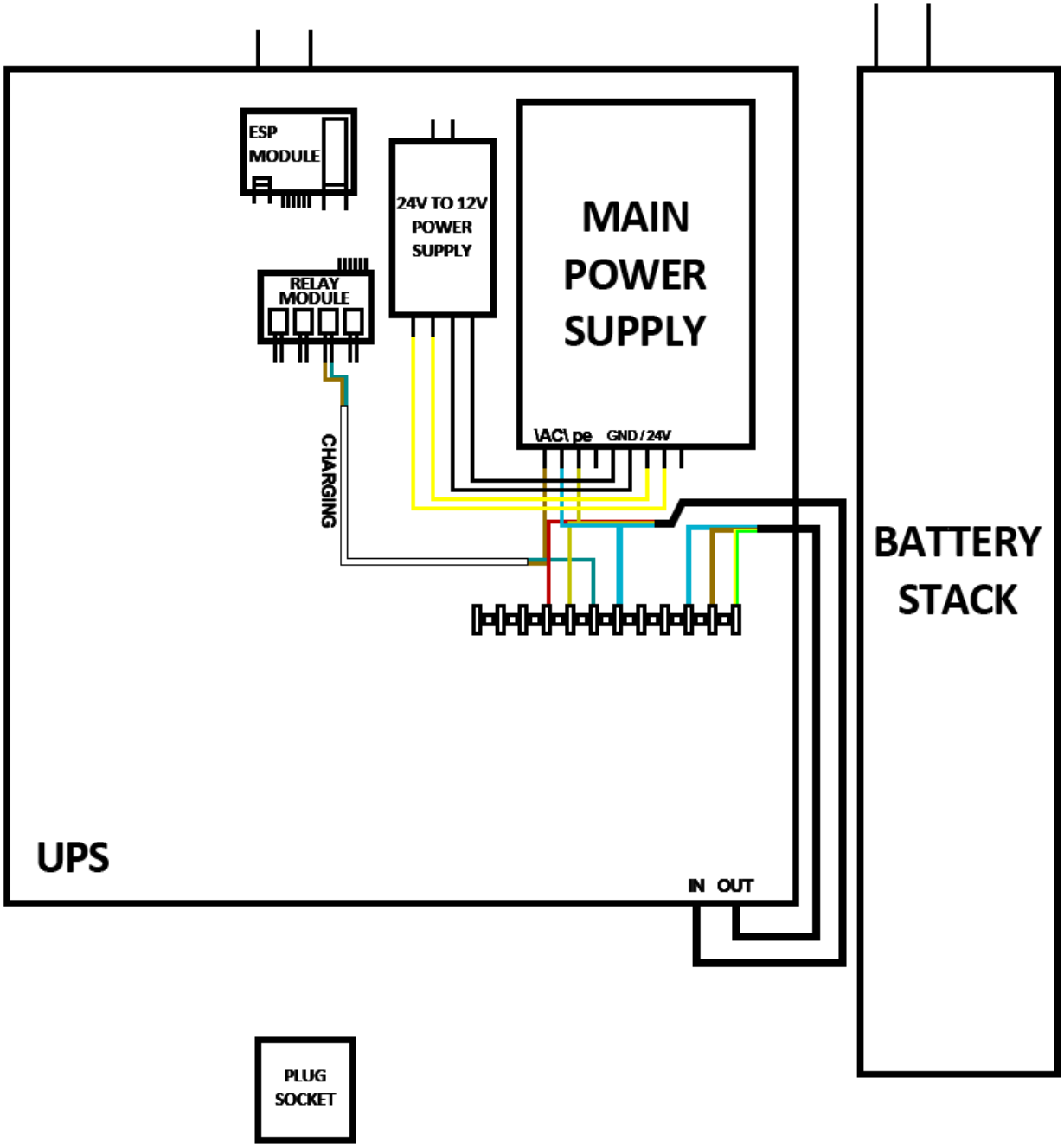
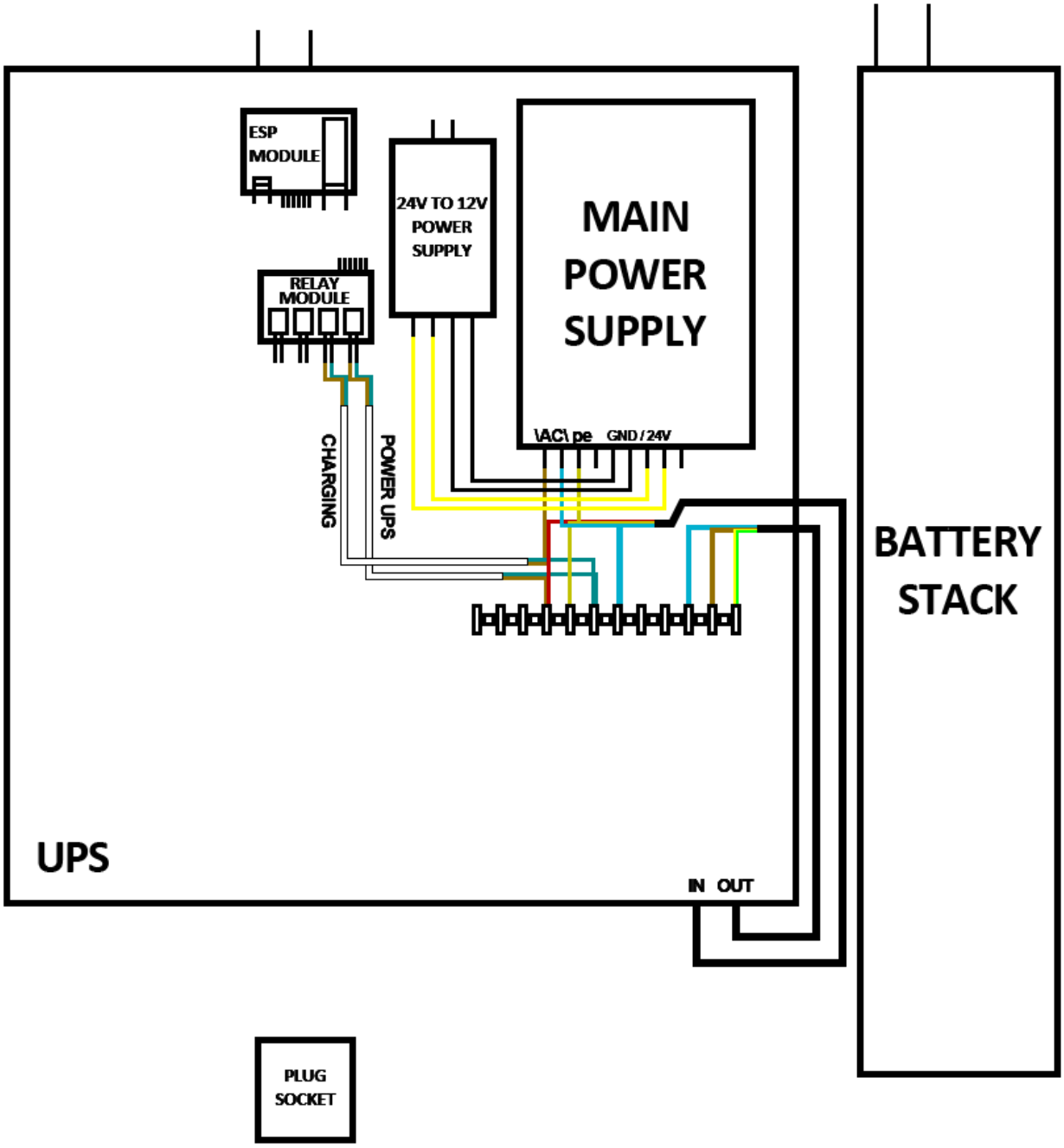
MODULE
RELAY
MODULE
24V TO 12V
POWER
SUPPLY
MAIN
POWER
SUPPLY
\AC\ pe
GND / 24V
BATTERY
STACK
UPS
IN
OUT
PLUG
SOCKET

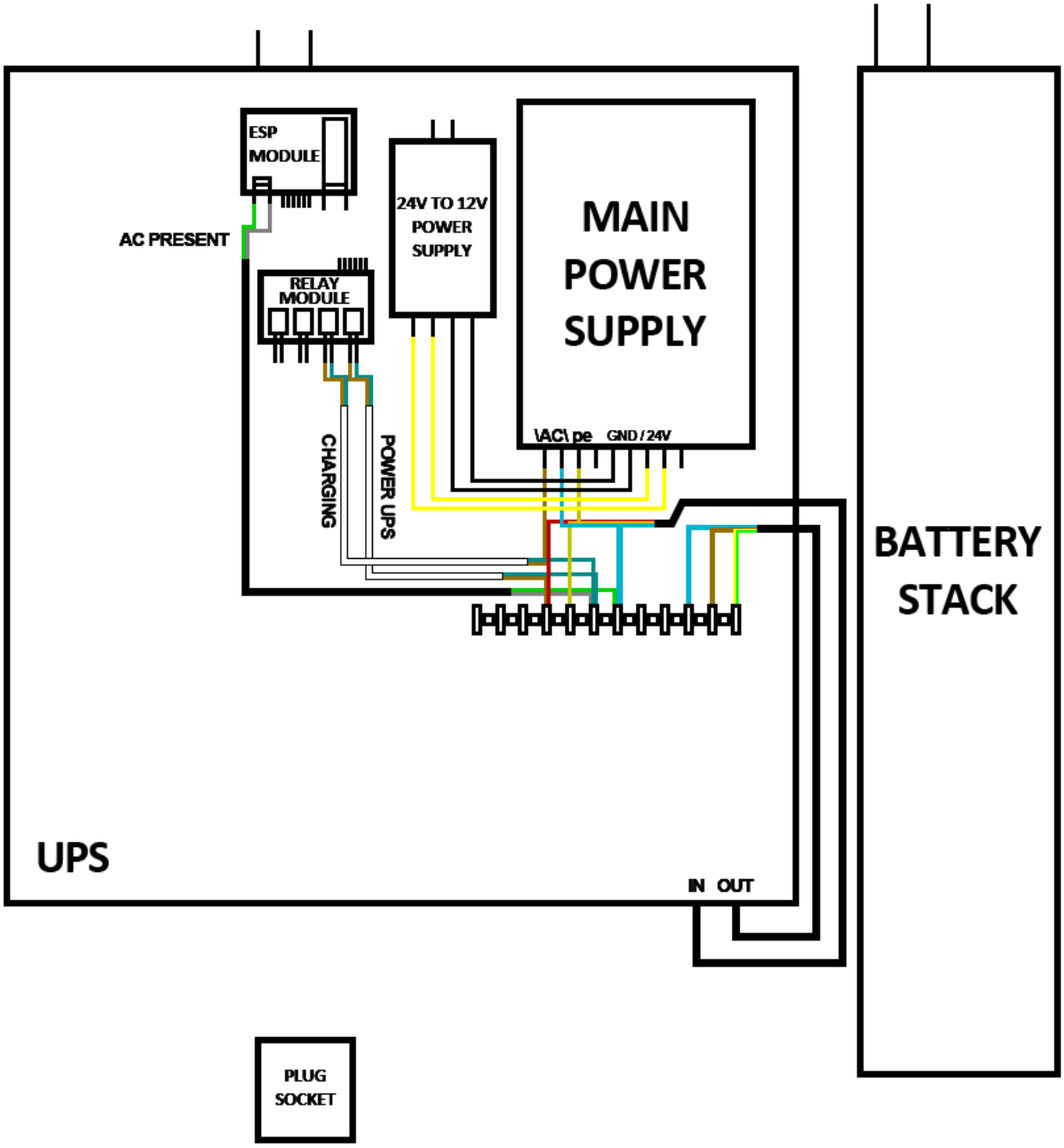
Step 3


ESP
MODULE
24V TO 12V
POWER
SUPPLY
MAIN
POWER
SUPPLY
RELAY
MODULE
CHARGING
\AC\ pe
GND / 24V
BATTERY
STACK
UPS
IN
OUT
PLUG
SOCKET

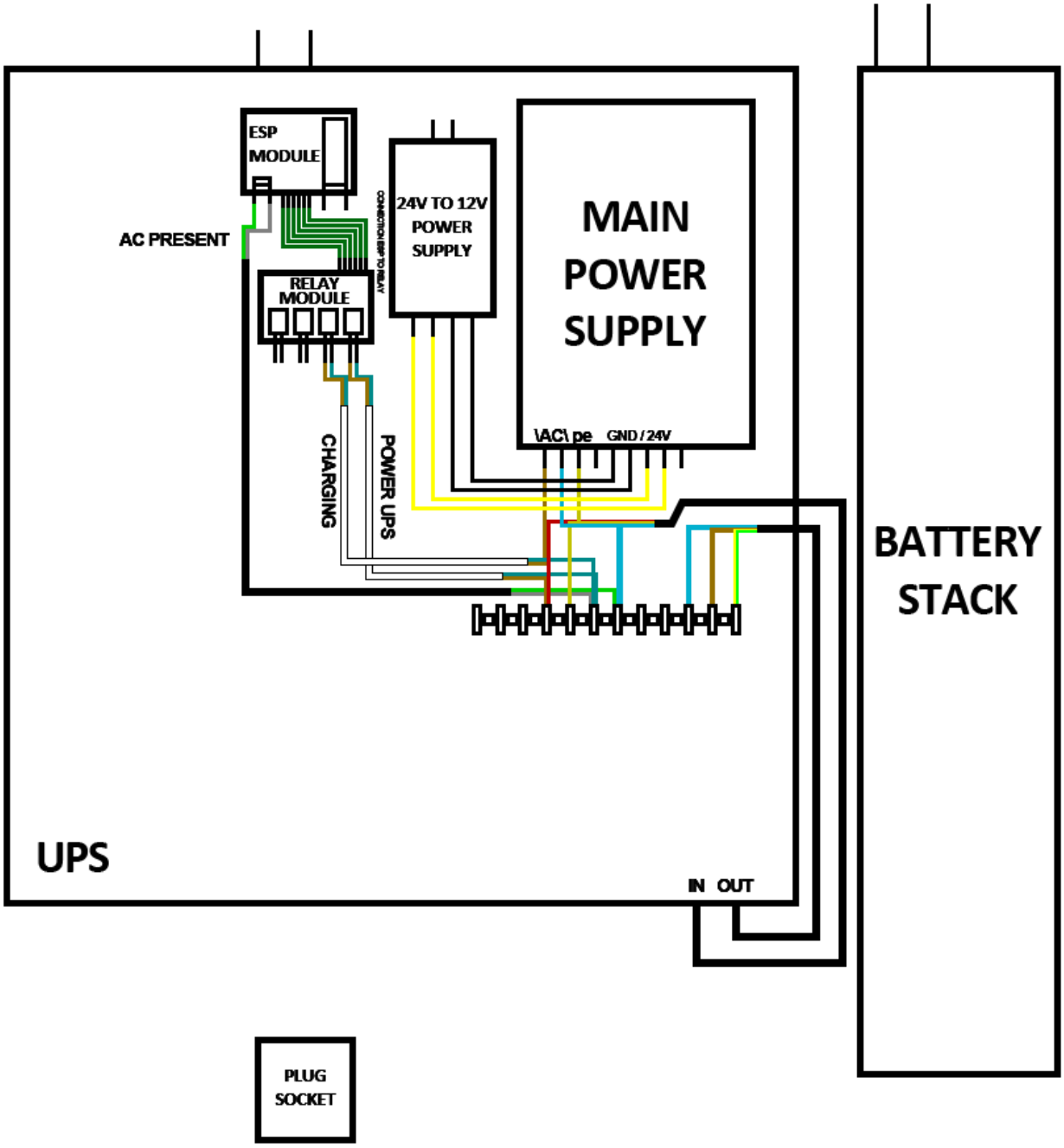
Step 4


ESP
MODULE
24V TO 12V
POWER
SUPPLY
MAIN
POWER
SUPPLY
RELAY
MODULE
CHARGING
POWER UPS
\AC\ pe
GND / 24V
BATTERY
STACK
UPS
IN
OUT
PLUG
SOCKET

Step 5


ESP
MODULE
AC PRESENT
RELAY
MODULE
24V TO 12V
POWER
SUPPLY
MAIN
POWER
SUPPLY
CHARGING
POWER UPS
\AC\ pe
GND / 24V
BATTERY
STACK
UPS
IN
OUT
PLUG
SOCKET

Step 6


ESP
MODULE
AC PRESENT
RELAY
MODULE
24V TO 12V
POWER
SUPPLY
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POWER
SUPPLY
CHARGING
POWER UPS
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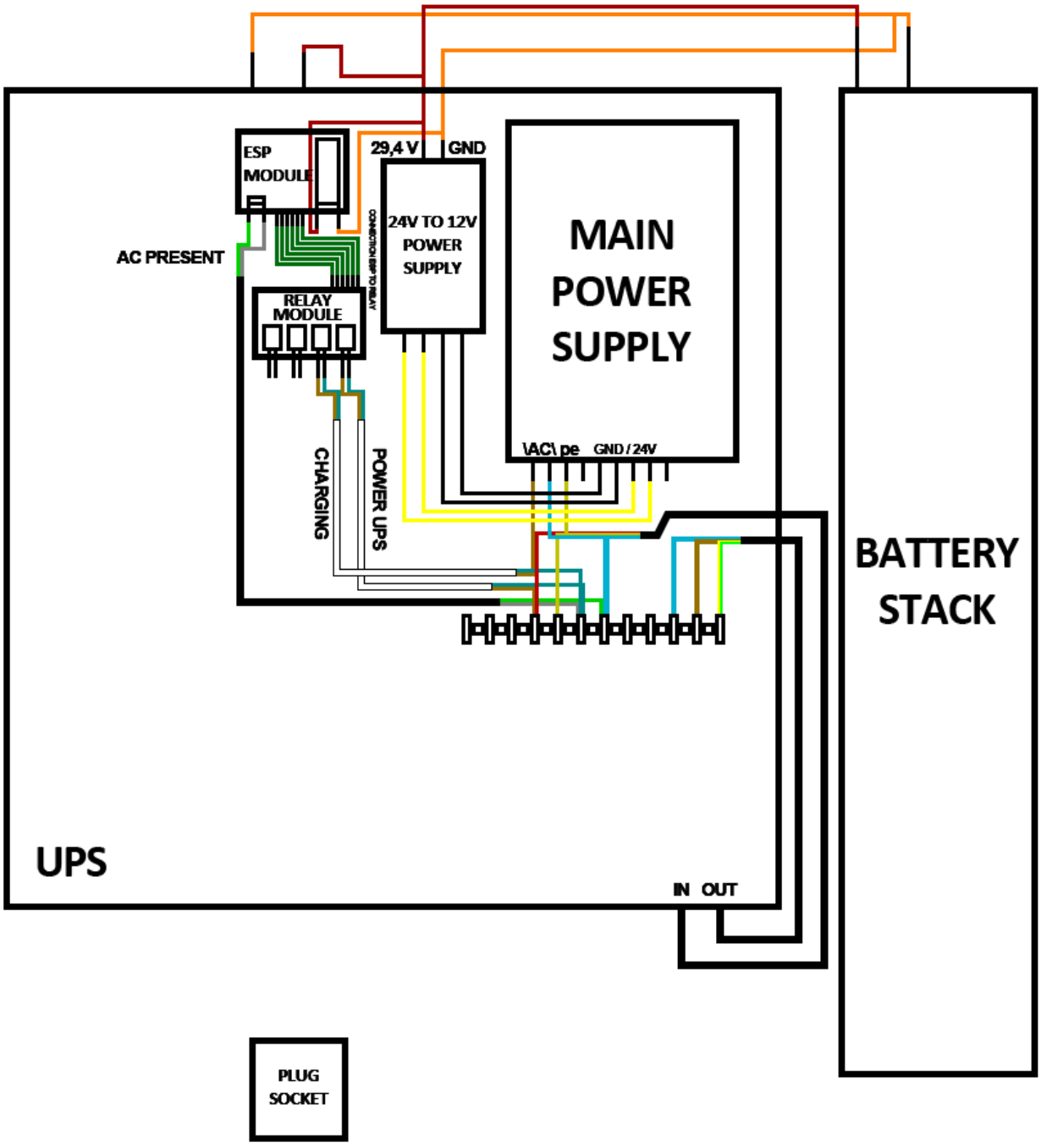
GND / 24V
BATTERY
STACK
UPS
IN
OUT
PLUG
SOCKET

Step 7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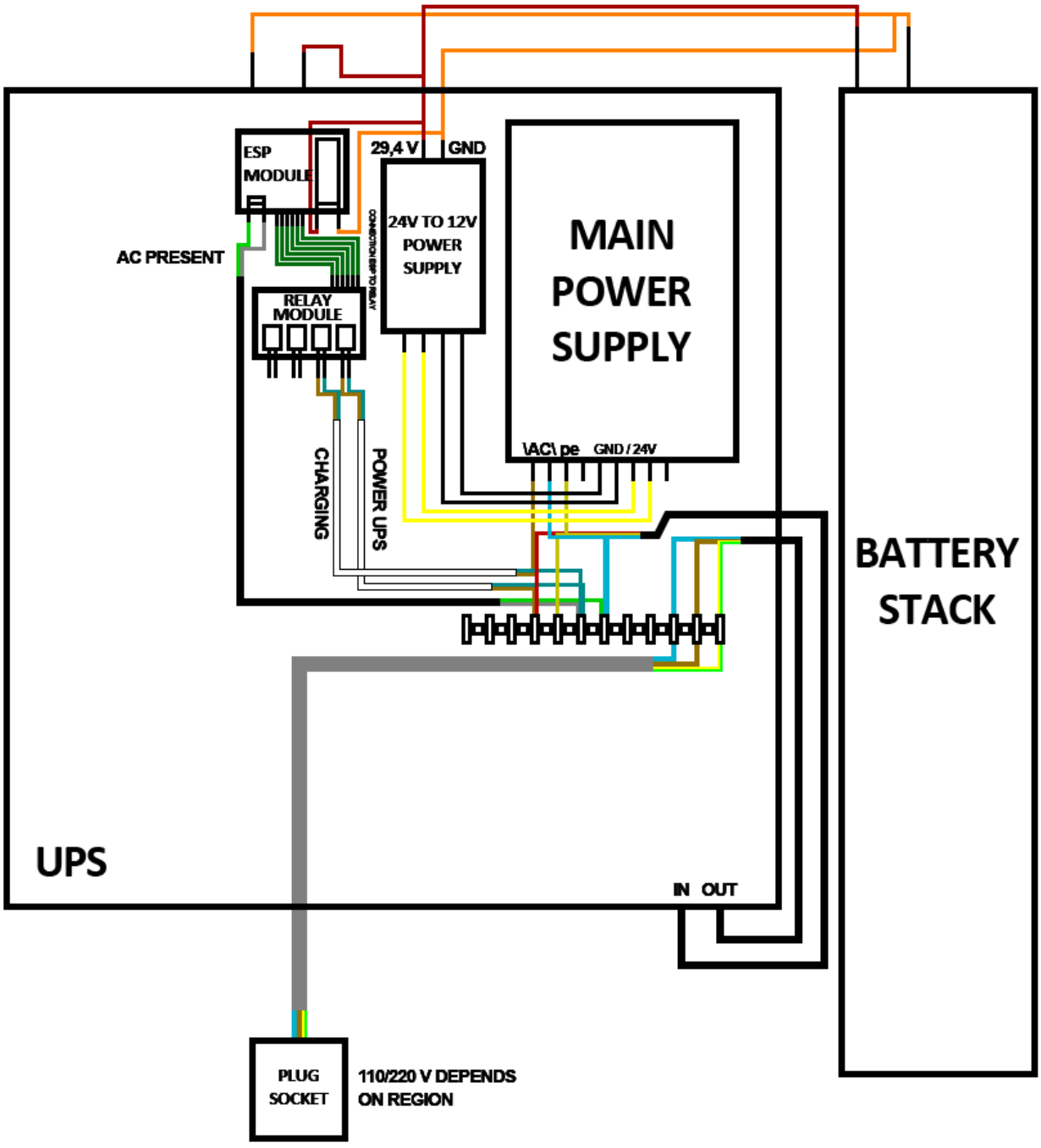
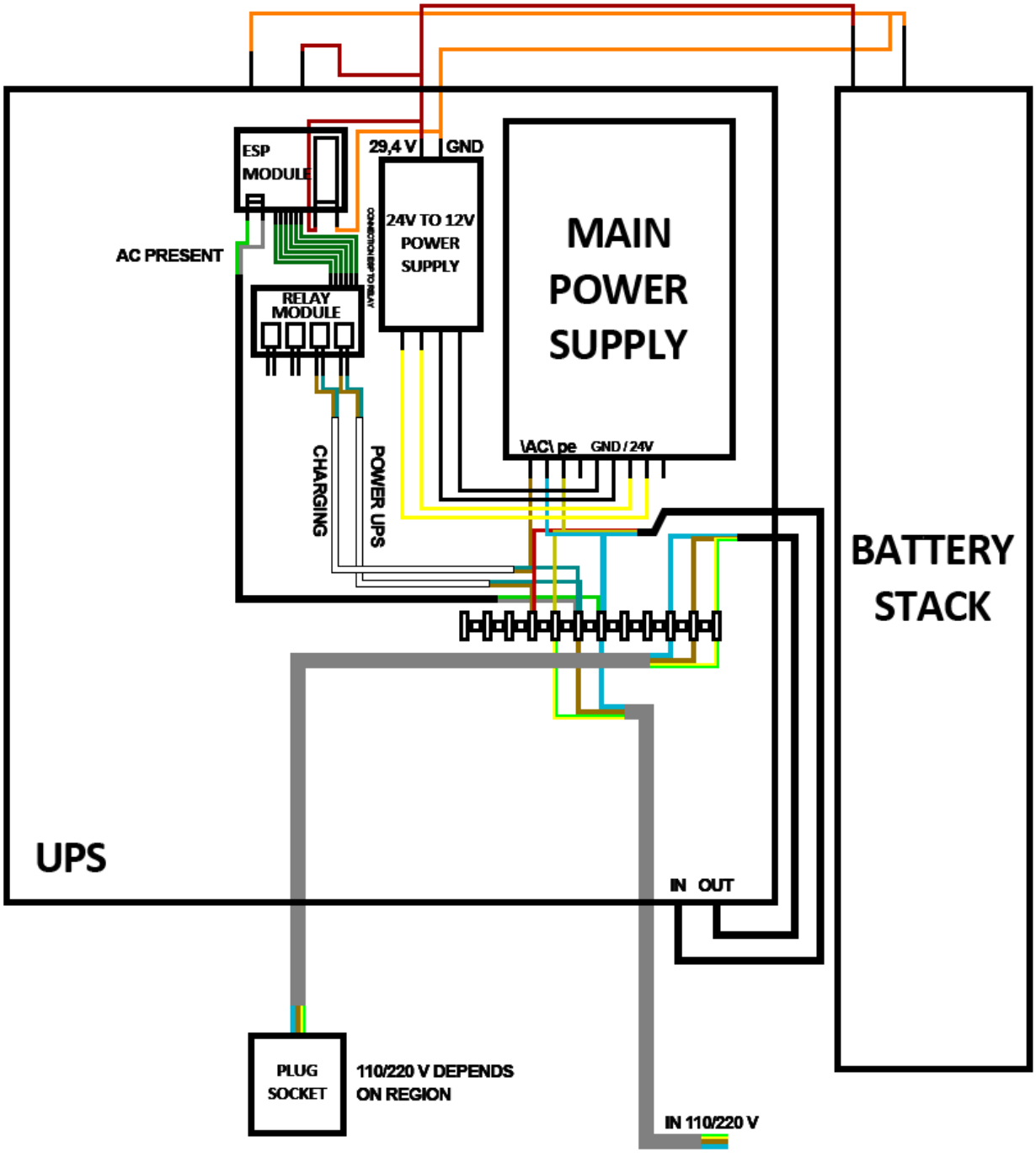
MODULE
29,4 V
GND
24V TO 12V
POWER
SUPPLY
MAIN
POWER
SUPPLY
AC PRESENT
RELAY
MODULE
CHARGING
POWER UPS
\AC\ pe
GND / 24V
BATTERY
STACK
UPS
IN
OUT
PLUG
SOCKET

Step 8


ESP
MODULE
29,4 V
GND
24V TO 12V
POWER
SUPPLY
MAIN
POWER
SUPPLY
AC PRESENT
RELAY
MODULE
CHARGING
POWER UPS
\AC\ pe
GND / 24V
BATTERY
STACK
UPS
IN
OUT
PLUG
SOCKET
110/220 V DEPENDS
ON REGION

Step 9


ESP
MODULE
29,4 V
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24V TO 12V
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SUPPLY
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SUPPLY
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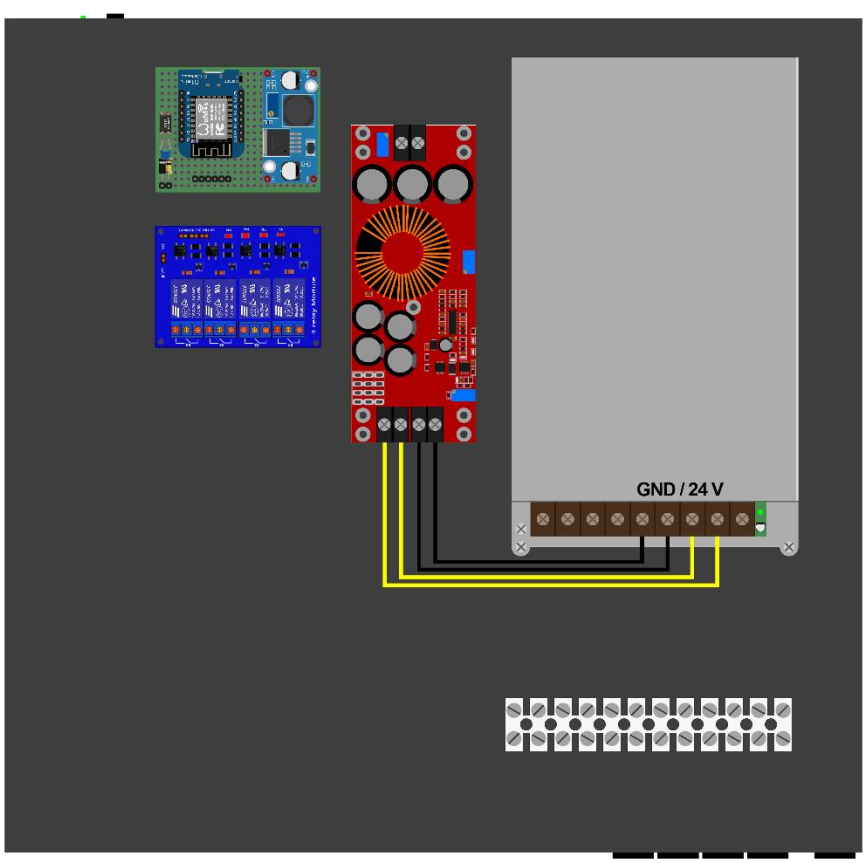
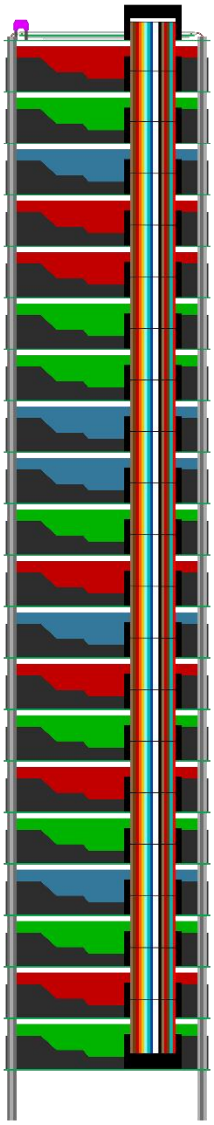
RELAY
MODULE
CHARGING
POWER UPS
\AC\ pe
GND / 24V
BATTERY
STACK
UPS
IN
OUT
PLUG
SOCKET
110/220 V DEPENDS
ON REGION
IN 110/220 V

Step 10

Cable Connections in Drawings





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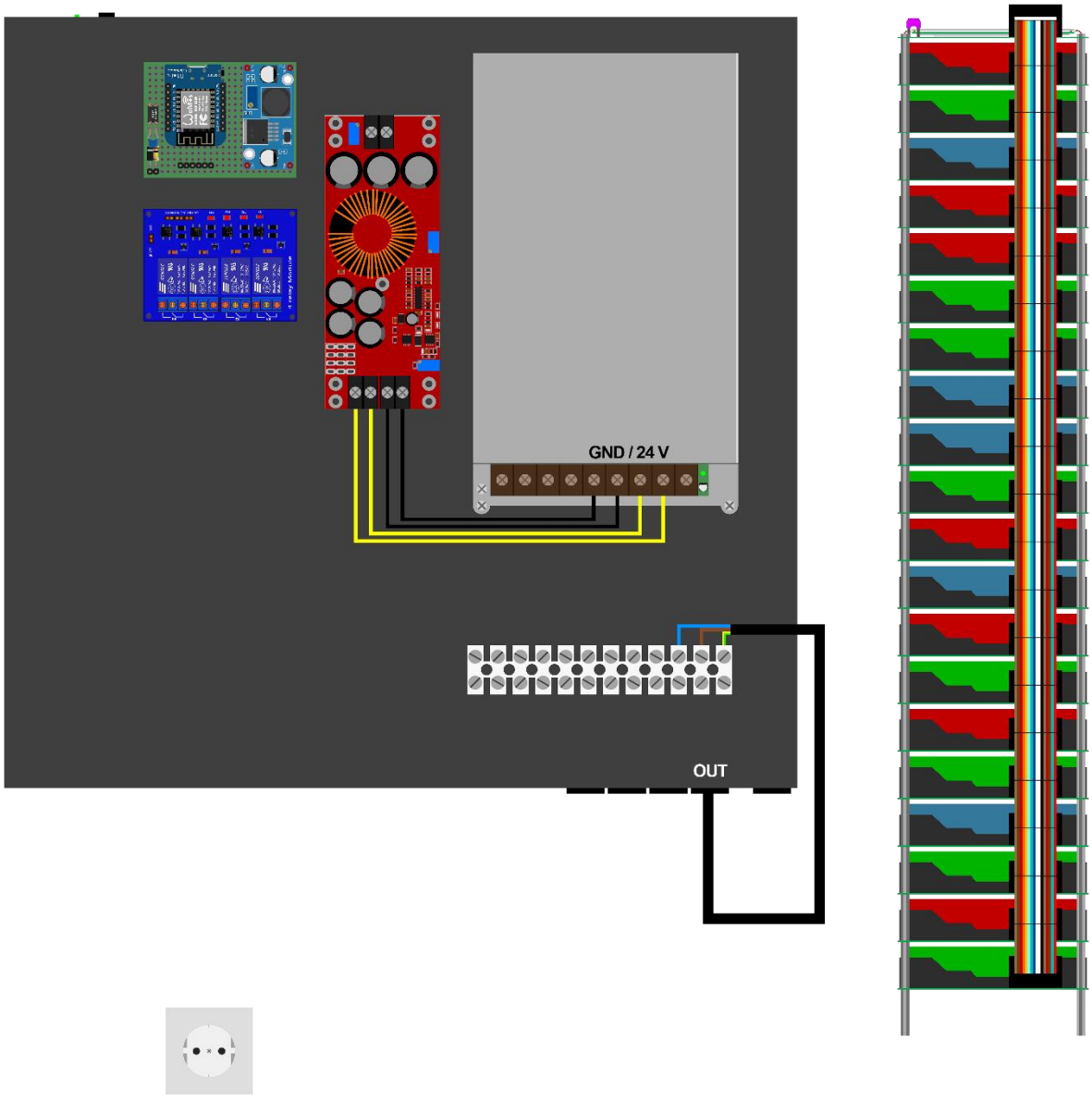

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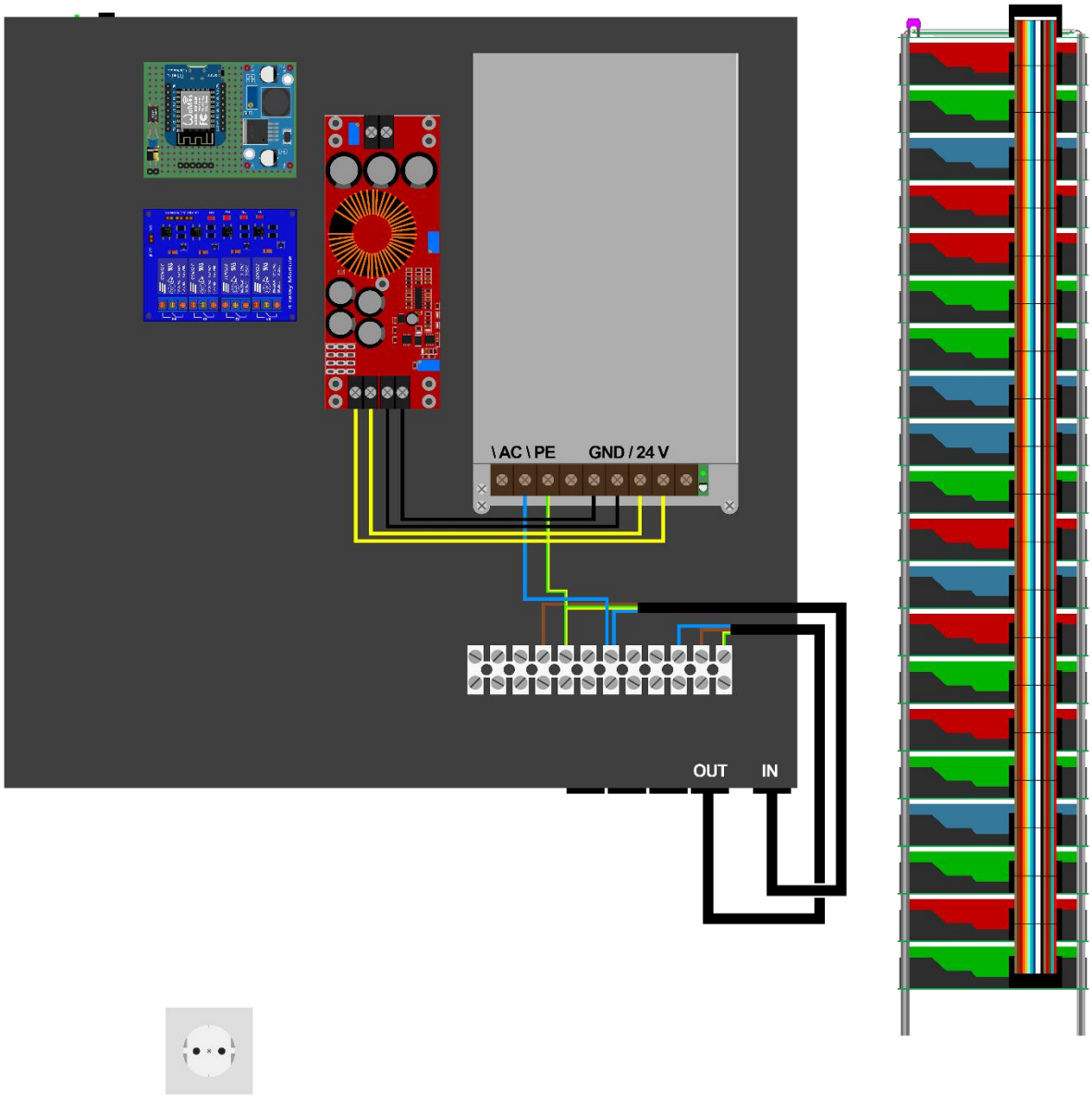

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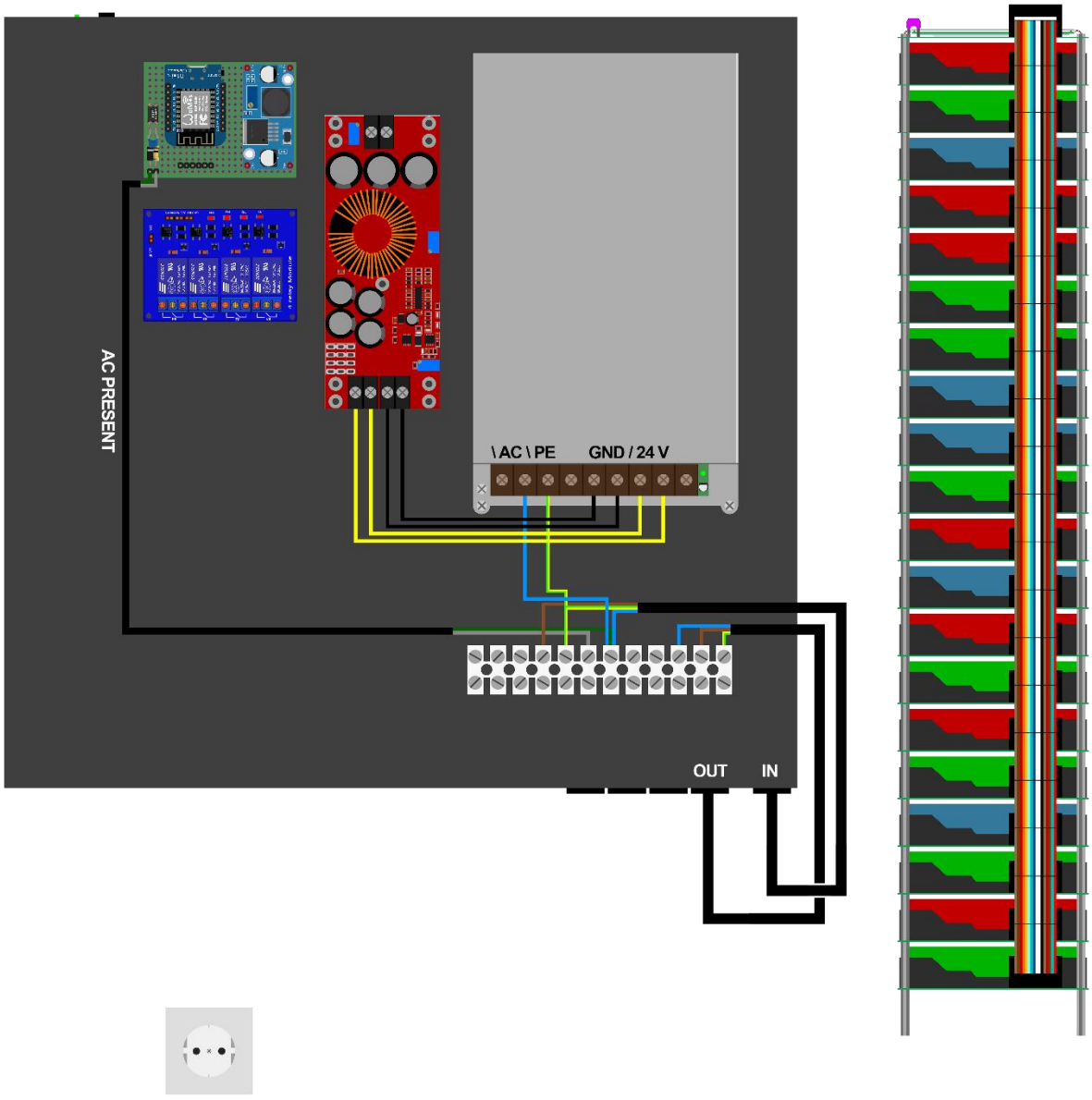

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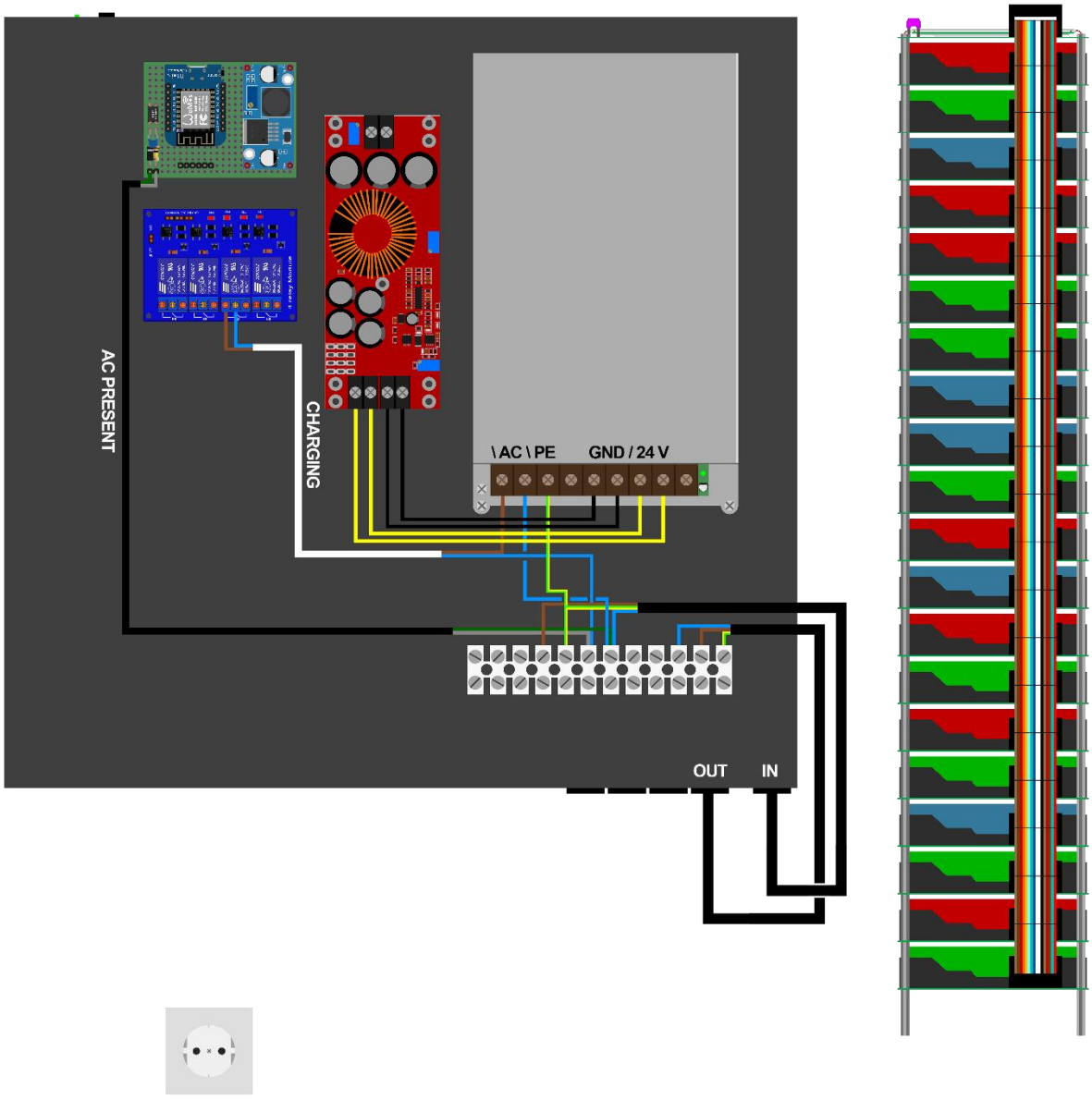

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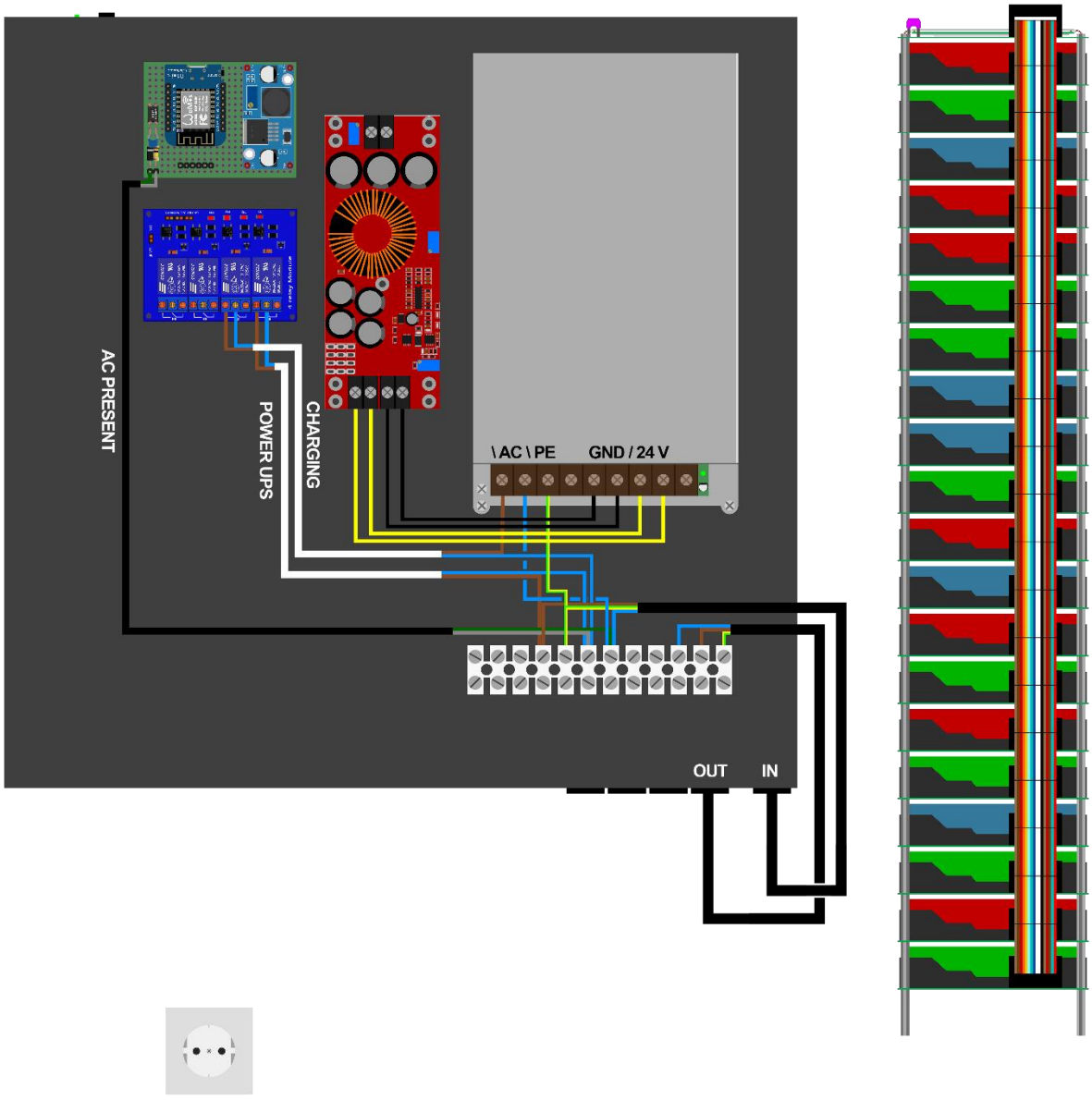

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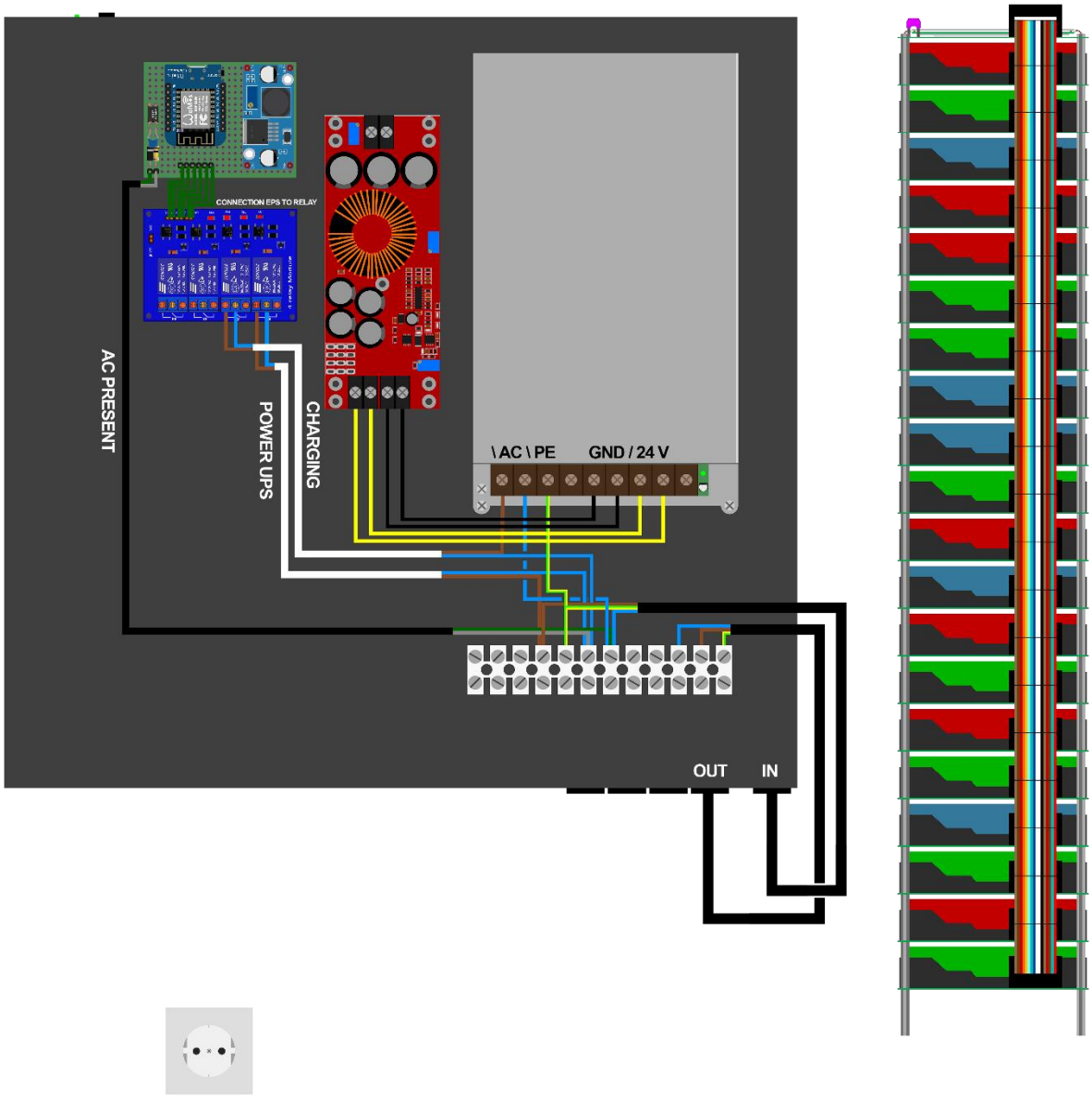
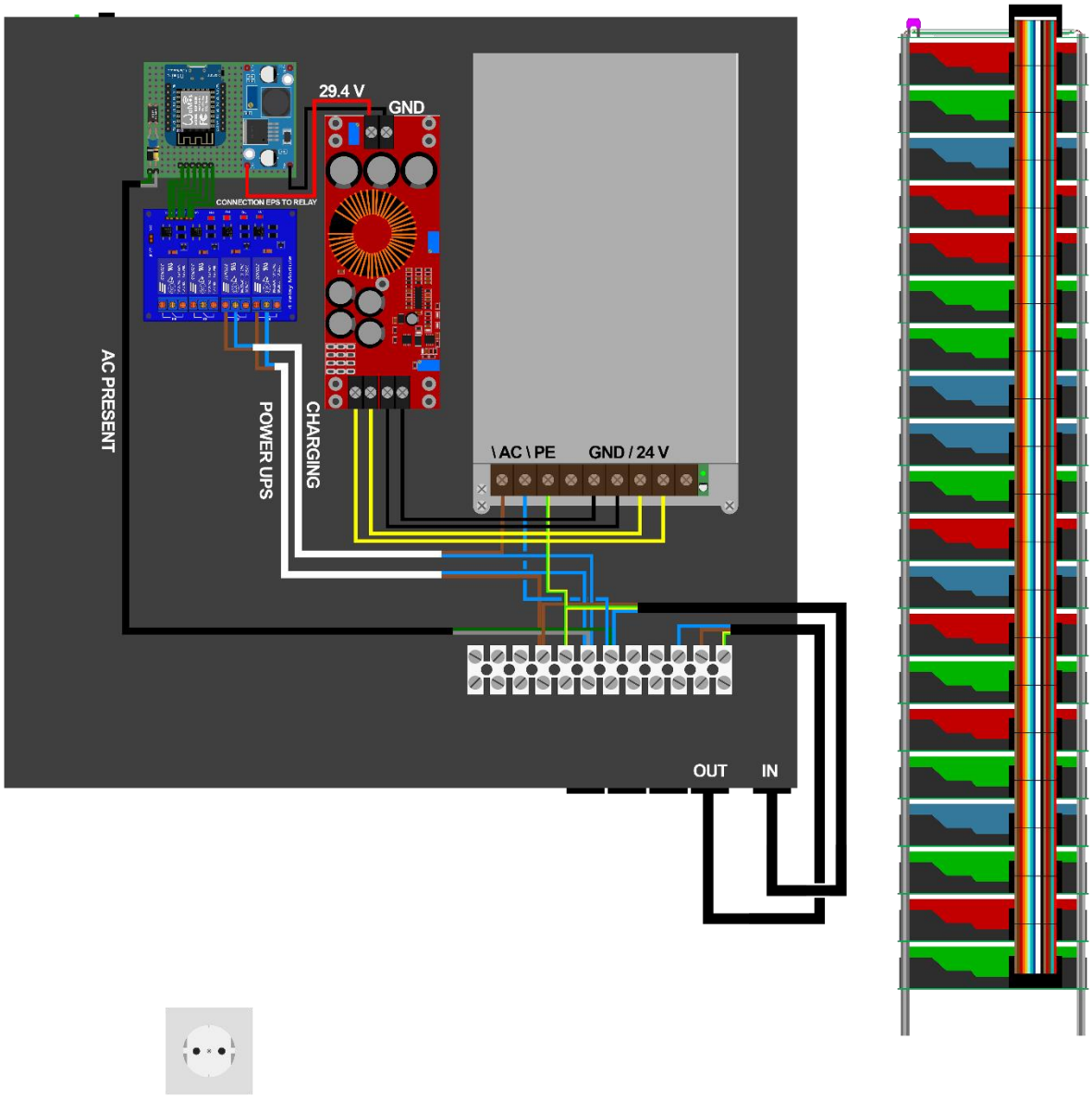
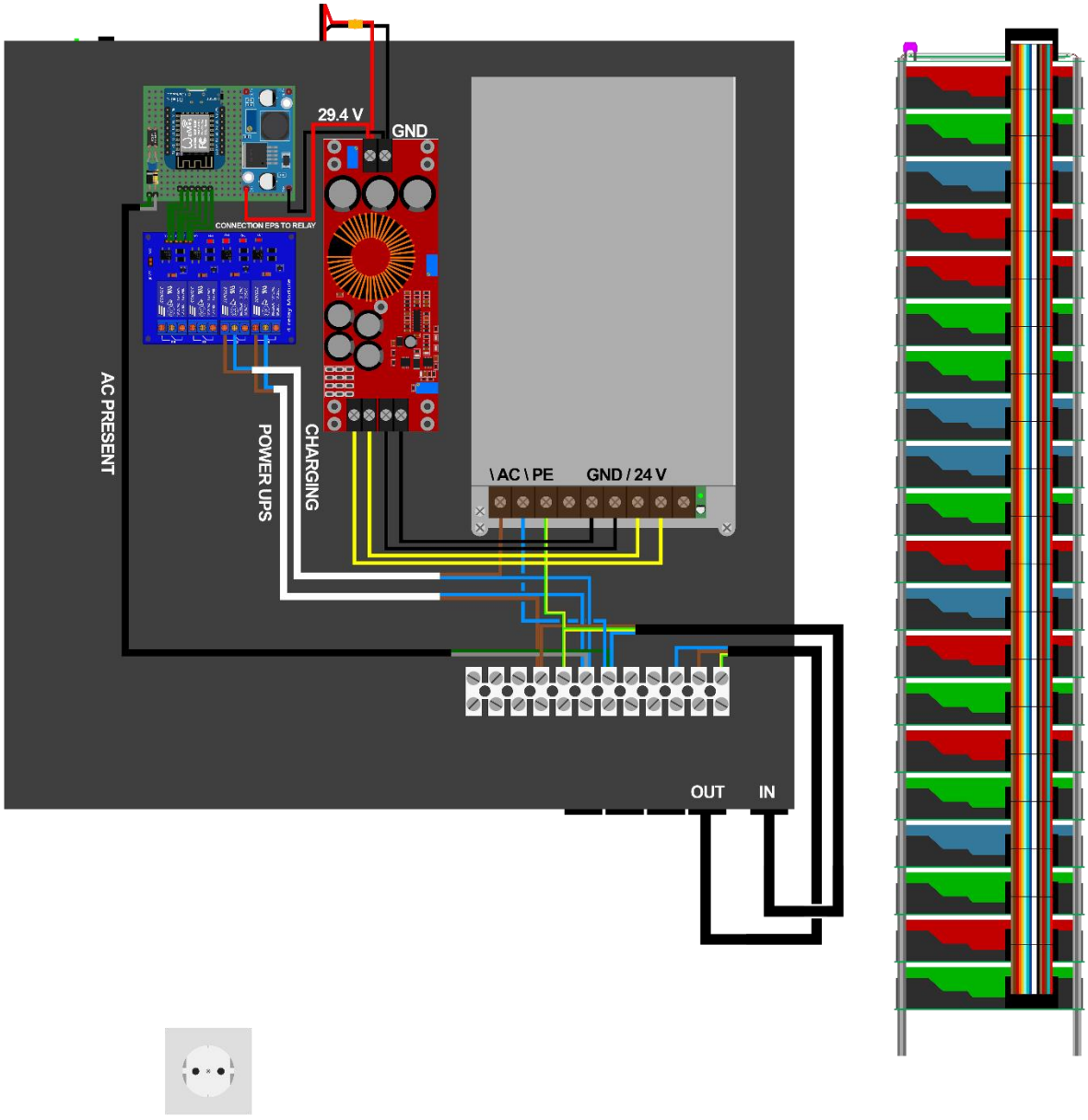

CONNECTION EPS TO RELAY
AC PRESENT
POWER UPS
CHARGING
\ AC \ PE
GND / 24 V
OUT
IN

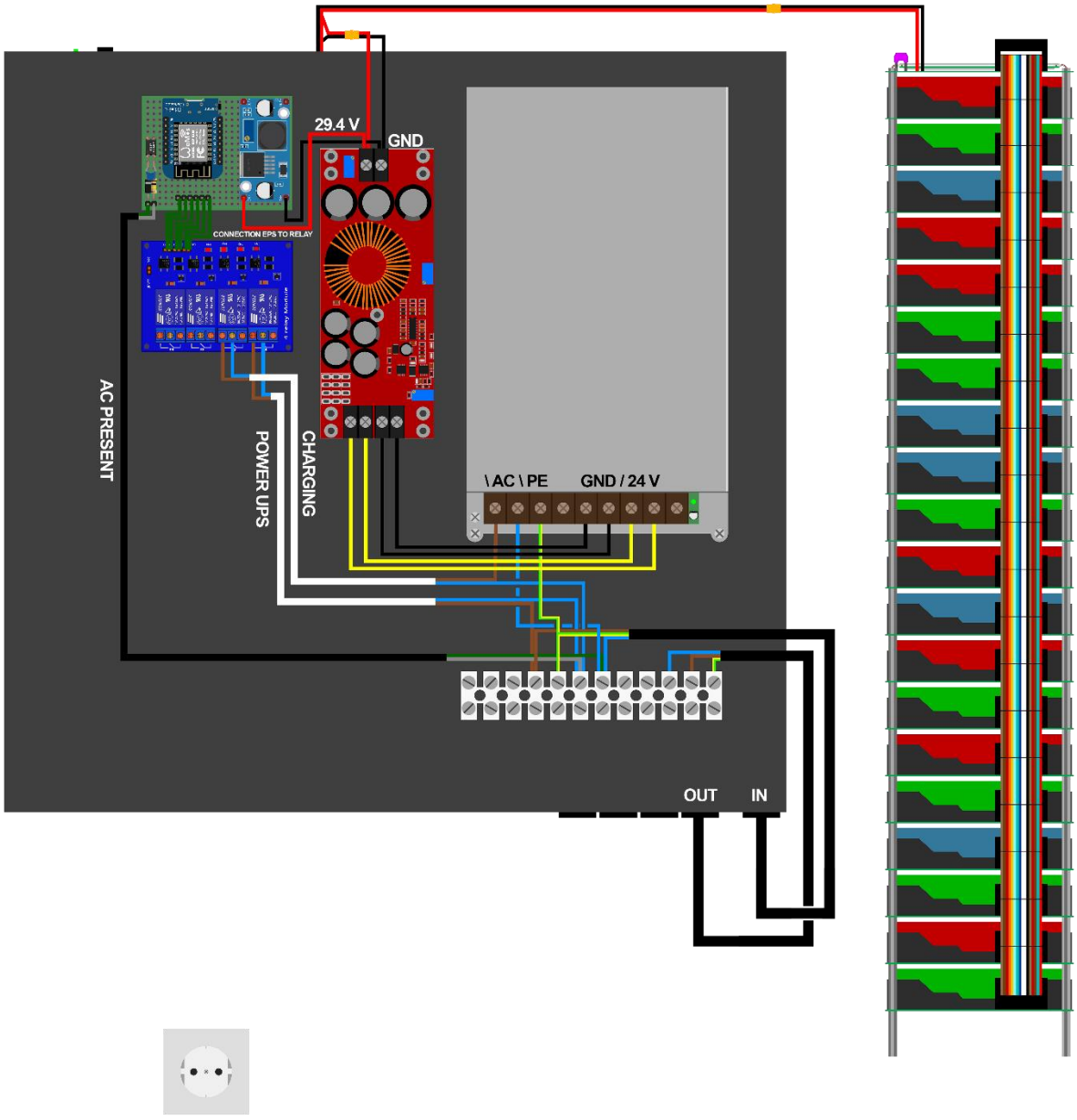
Step 7


29.4 V
GND
CONNECTION EPS TO RELAY
AC PRESENT
POWER UPS
CHARGING
\ AC \ PE
GND / 24 V
OUT
IN

Step 8


29.4 V
GND
CONNECTION EPS TO RELAY
AC PRESENT
POWER UPS
CHARGING
\ AC \ PE
GND / 24 V
OUT
IN

Step 9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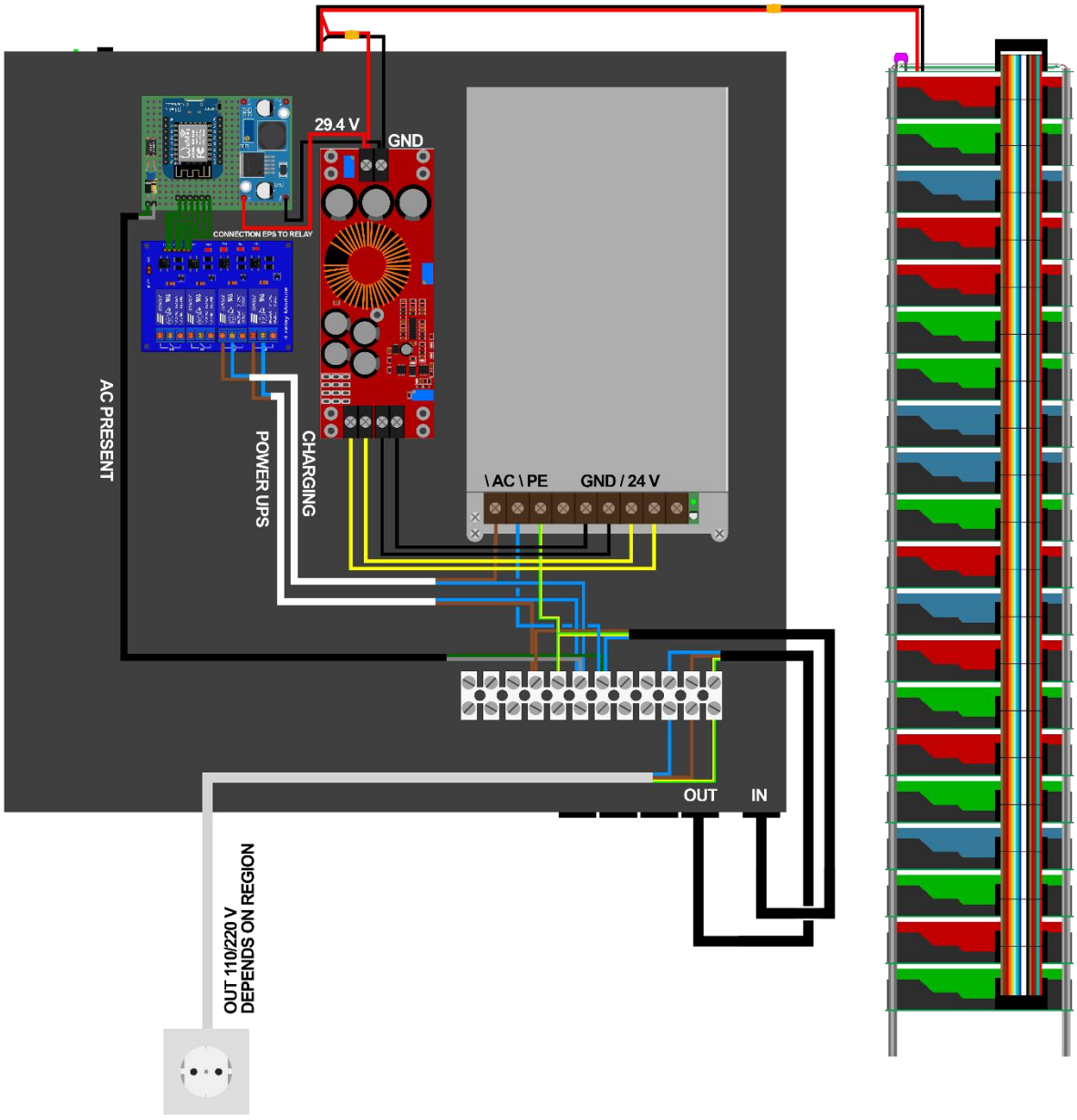
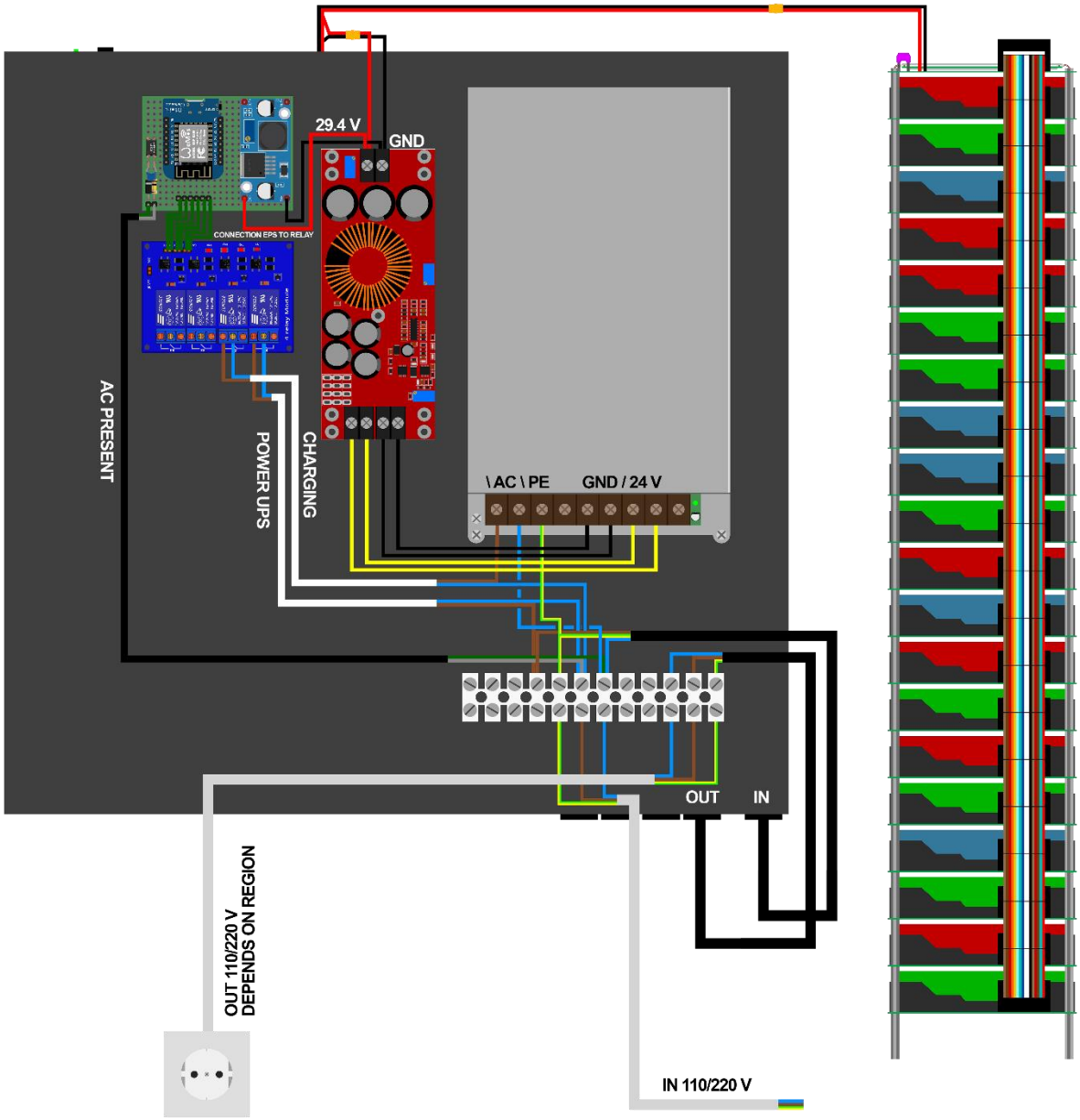
GND
CONNECTION EPS TO RELAY
AC PRESENT
POWER UPS
CHARGING
\ AC \ PE
GND / 24 V
OUT
IN

Step 10


29.4 V
GND
CONNECTION EPS TO RELAY
AC PRESENT
POWER UPS
CHARGING
\ AC \ PE
GND / 24 V
OUT
IN
OUT 110/220 V
DEPENDS ON REGION

Step 11


29.4 V
GND
CONNECTION EPS TO RELAY
AC PRESENT
POWER UPS
CHARGING
\ AC \ PE
GND / 24 V
OUT
IN
OUT 110/220 V
DEPENDS ON REGION
IN 110/220 V

Step 12

Sorting The Cells:

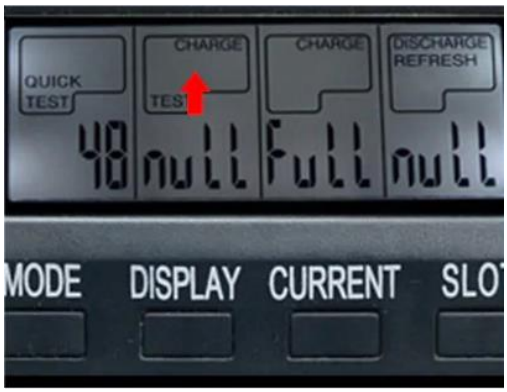
We have used 2 methods to sort the cells. Use the method you think suits for you.

Using the Opus Charger:

Easy-to-read LCD with backlight display makes it show more clearly in the dark.

Refresh mode can show you batteries capacity, letting you know real magnitude.

Quick test mode to test to test the battery impedance



There are also charge/discharge modes

When the display is flashing it is possible to select mode and current.

Using the SLOT button it is possible to reselect a slot and change parameters for it, also when the charger is working.

When putting multiple batteries in the charger at the same time, it is possible to select mode and current simultaneous for all of them.

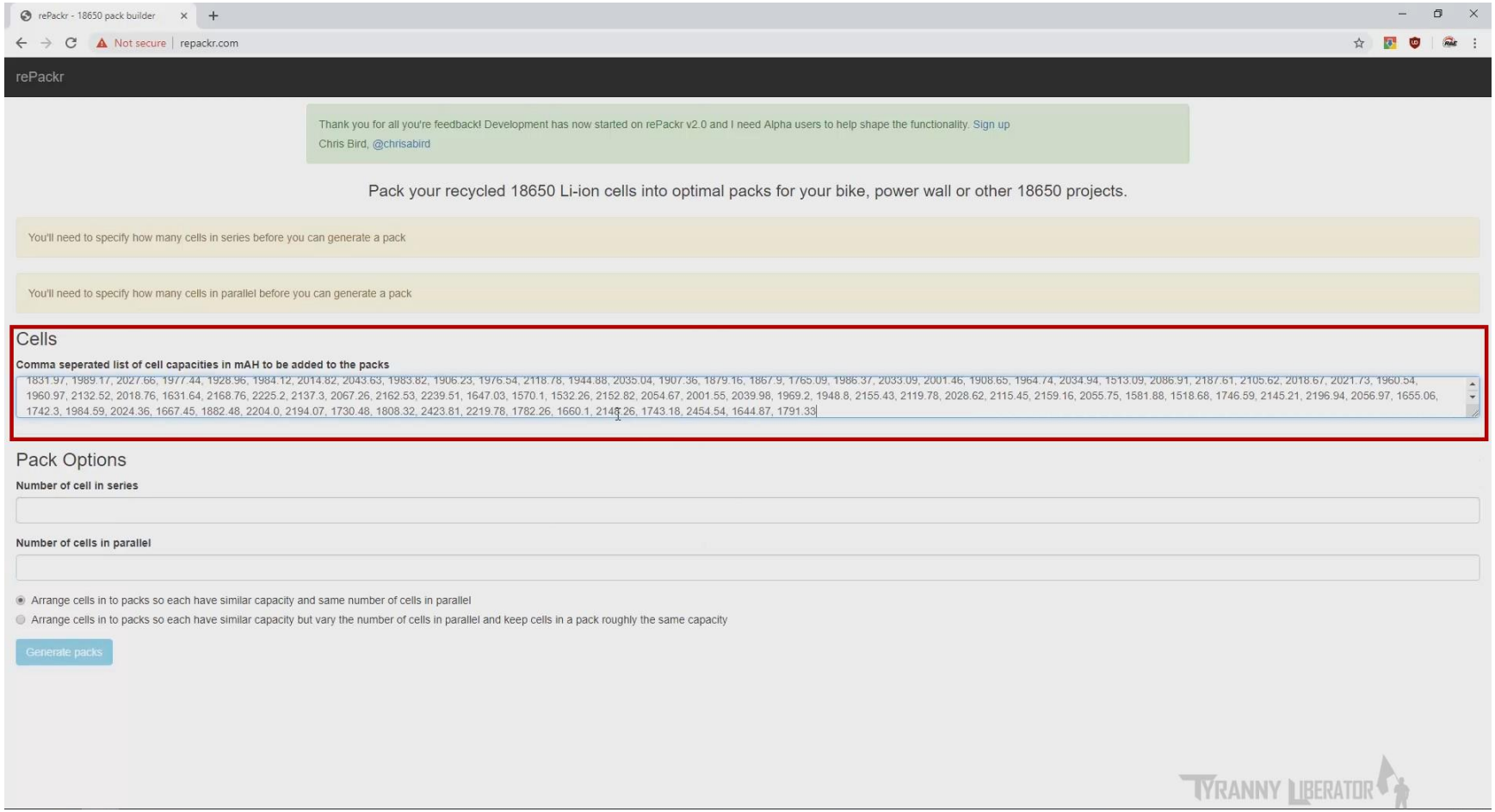
When charging or discharging it is possible to use the DISPLAY button to select between V, mA, and mAh.

The DISPLAY button can also be used when the charge/discharge is finished, but the charger will change back to FULL display rather quickly.

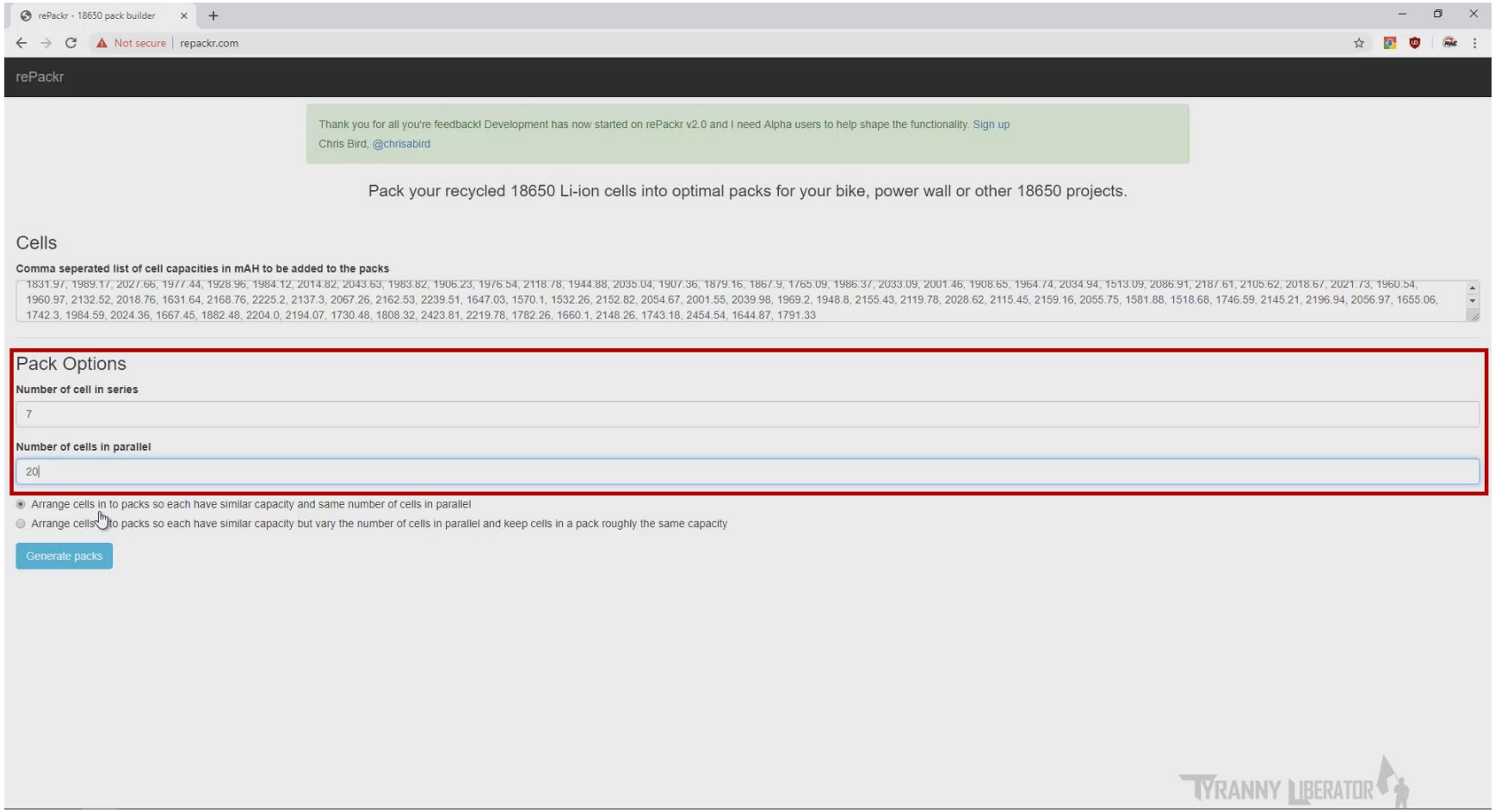
I use an excel spreadsheet to write the values of each cell to use later with an online calculator called repackr.com .

Type in the address bar of your browser repack.com

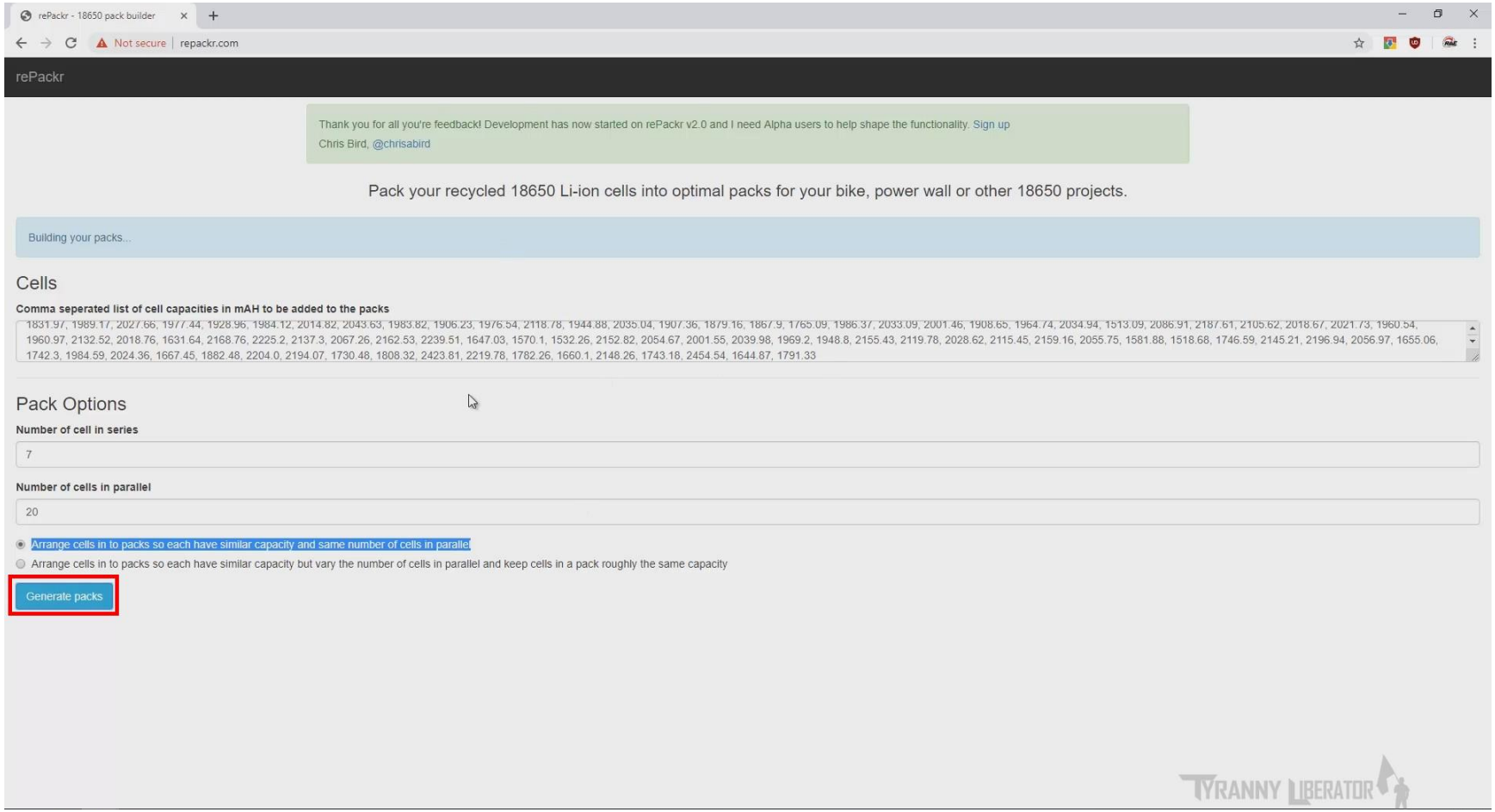
After this insert the excel spreadsheet in the cells section on the page.



I am building a pack with 7 cells in series and 20 in parallel.

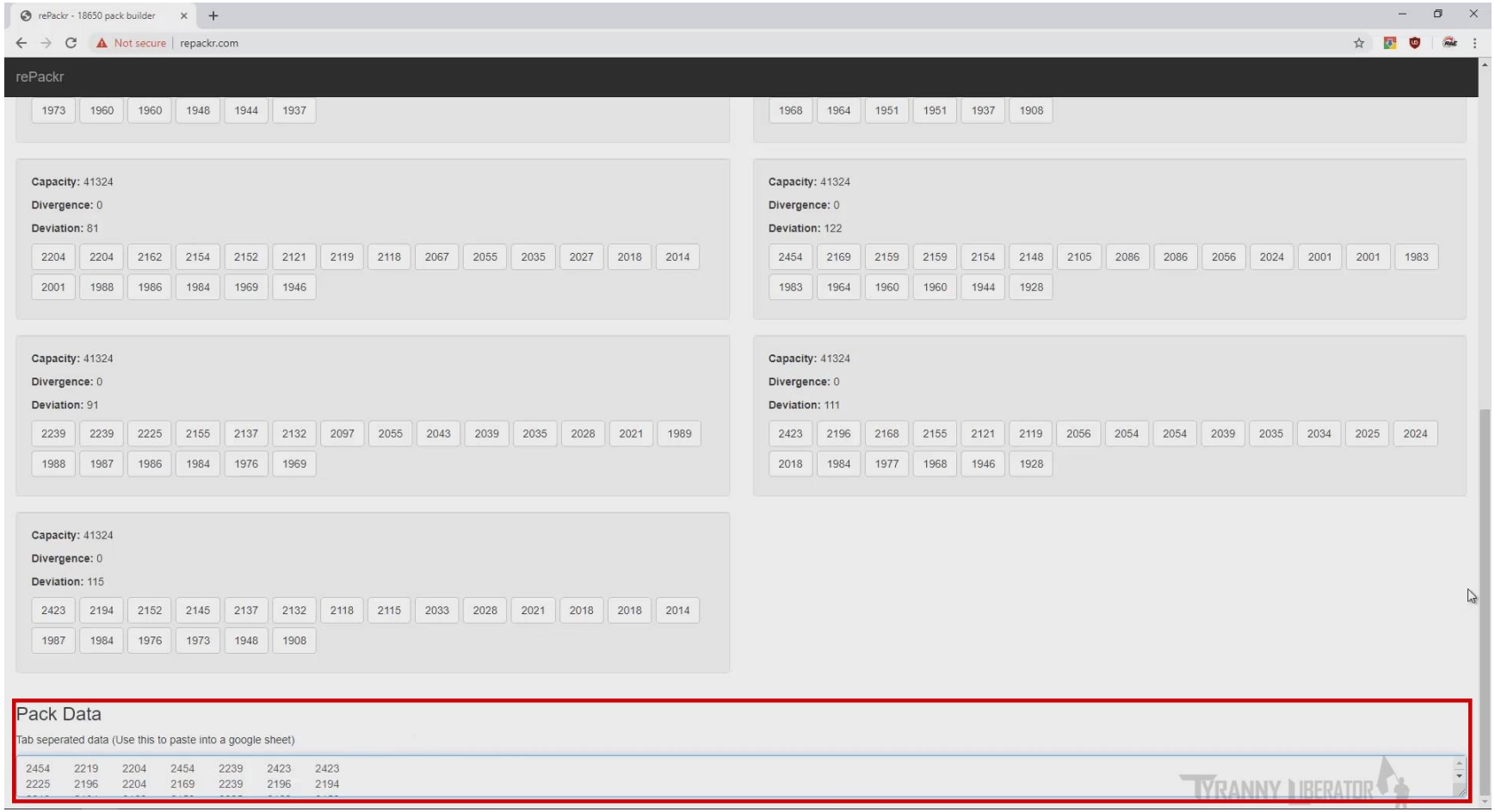


Before clicking on generate packs make sure you check the arrange cell in to packs so each have similar capacity and same number of cells in parallel.



After hitting “Generate Packs” it will calculate the modules which must be created.

I Copy and print the bottom values and arrange the cells as specified for each pack.



Using the Cell Doctor Charger

After I've done the first pack using the 4-cell tester from Opus, I realized that a better solution must be found to speed up the process considerably in order to make this project worthwhile.

Together with my friend Alex, we developed a 16-cell tester that's charging and discharging 2 times faster, giving you the ability to process 8 times more cells compared with a regular tester. We call it The Cell Doctor.

The best part is that's connected to a computer and has its own database to store the cell values and allows you to print labels automatically for each cell, this removes the tedious work you had to do with the regular testing device.

Once the database has all the values from the tested cells, you can generate the packs from the calculator page inside the cell doctor software.

The testing process can be started by holding the button until "Start MCap" is displayed on the LCD, this stands for "Measure Capacity".

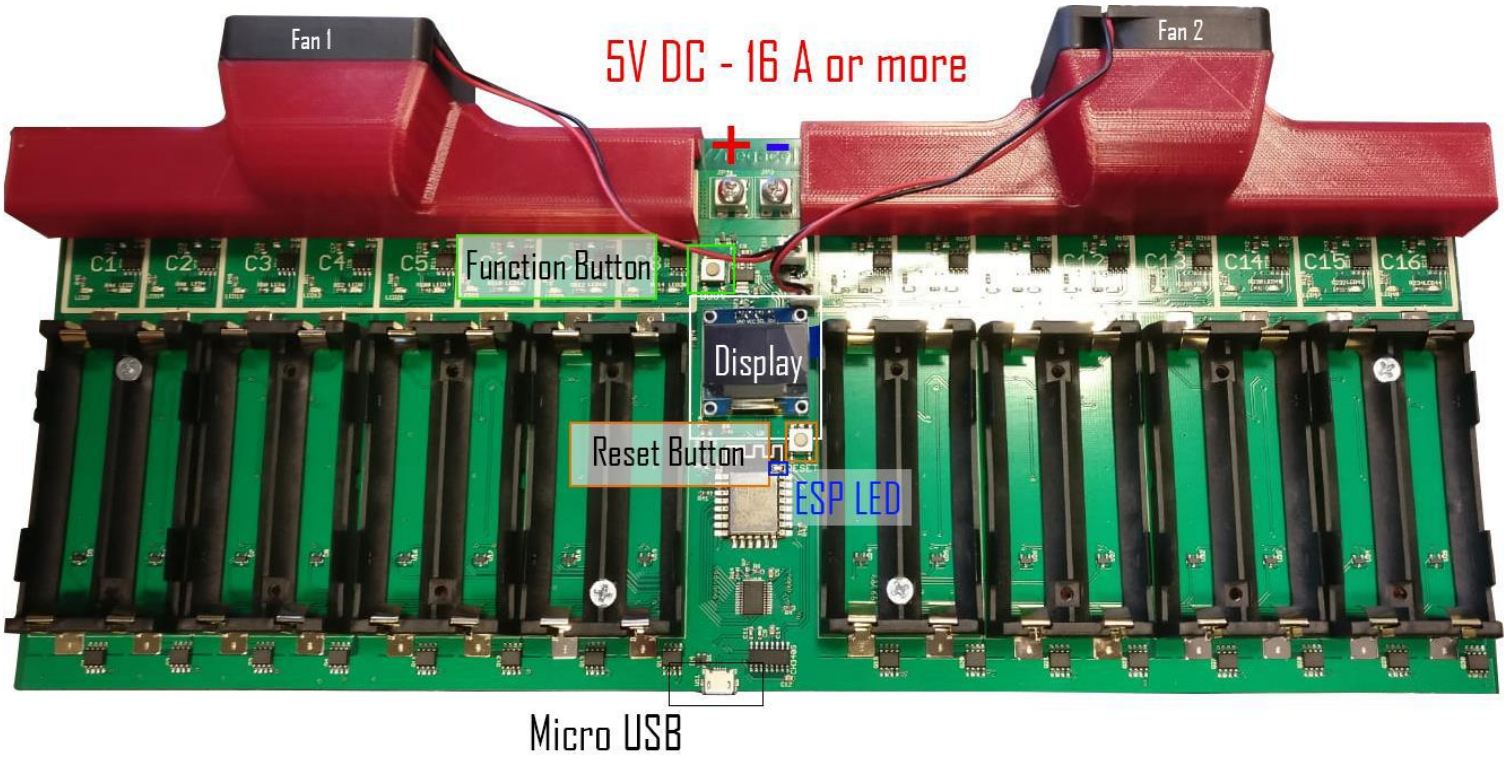
The cells will charge then automatically begin discharging, measuring the capacity in the process.

Setting up the Hardware:

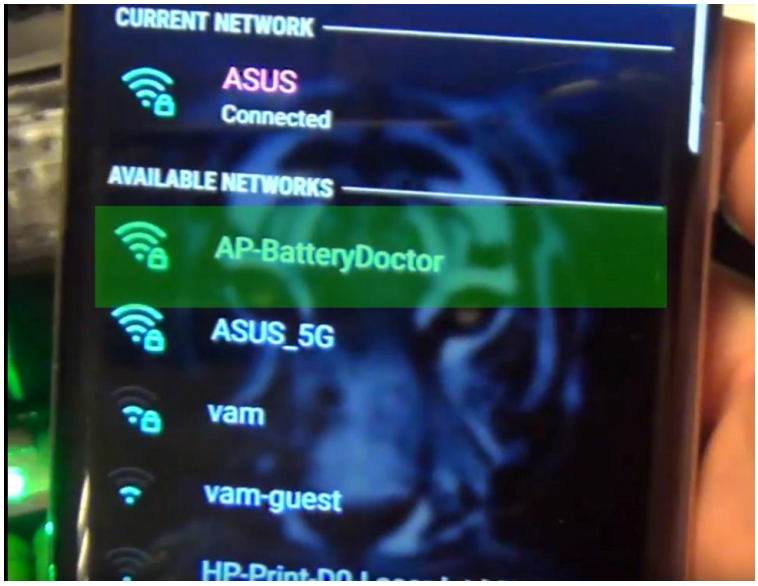
I will give you a detailed overview on how to connect and how to use this board. I have also made some video guides and I will link them at the end of this file.

1. Connecting the board to Power. To power up the board, you must use 5V DC capable of 16 amps or more. Each cell is charging with max 1 amp/h.

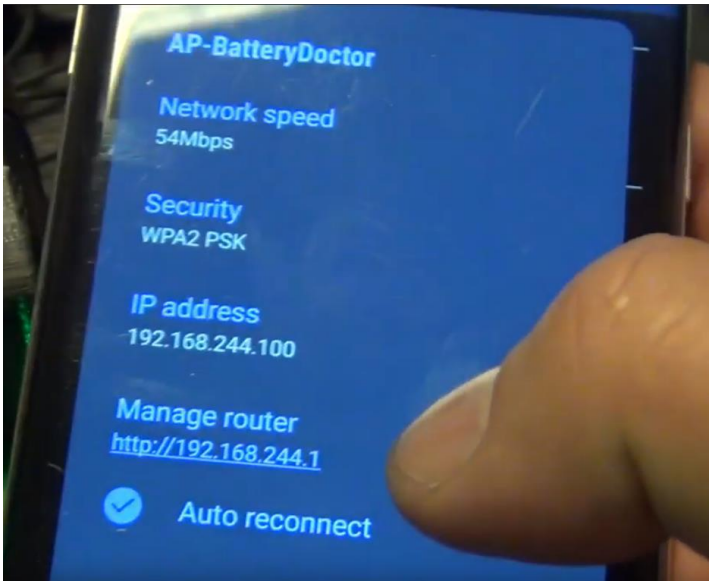
Caution: Do not reverse polarity or add a higher voltage than 6V to the input. The circuit is not protected for reversed polarity because of the high amperage required, we will try to find a solution in the future to avoid failure at polarity reversing.



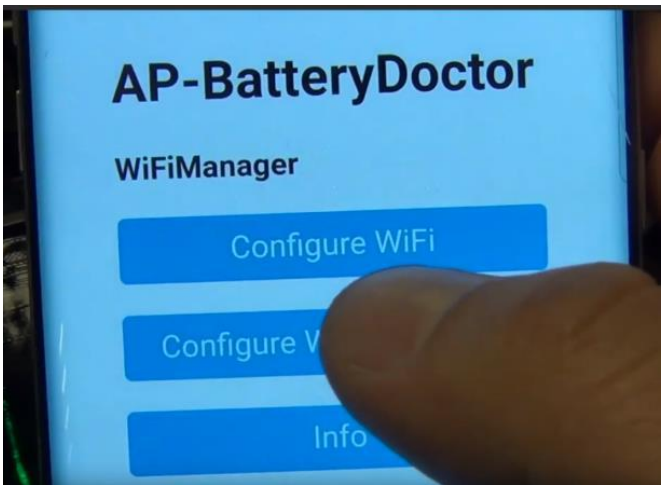
2. After board is being powered up, the ESP LED will light up. The display will stay black for 1 minute, during this time the ESP awaits for Wireless configuration.

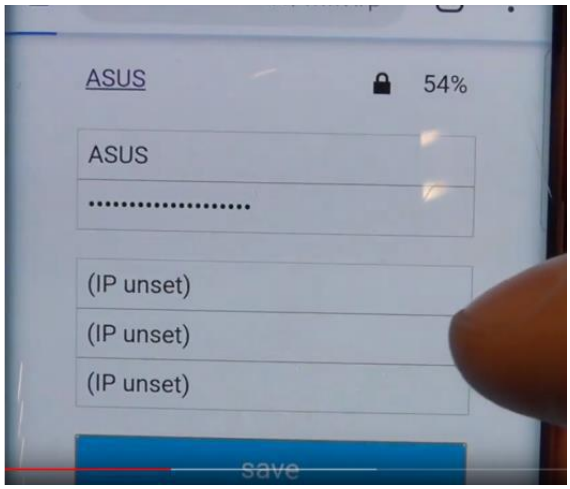


3. After connecting to the wireless Access Point, you click on the IP address to manage router.



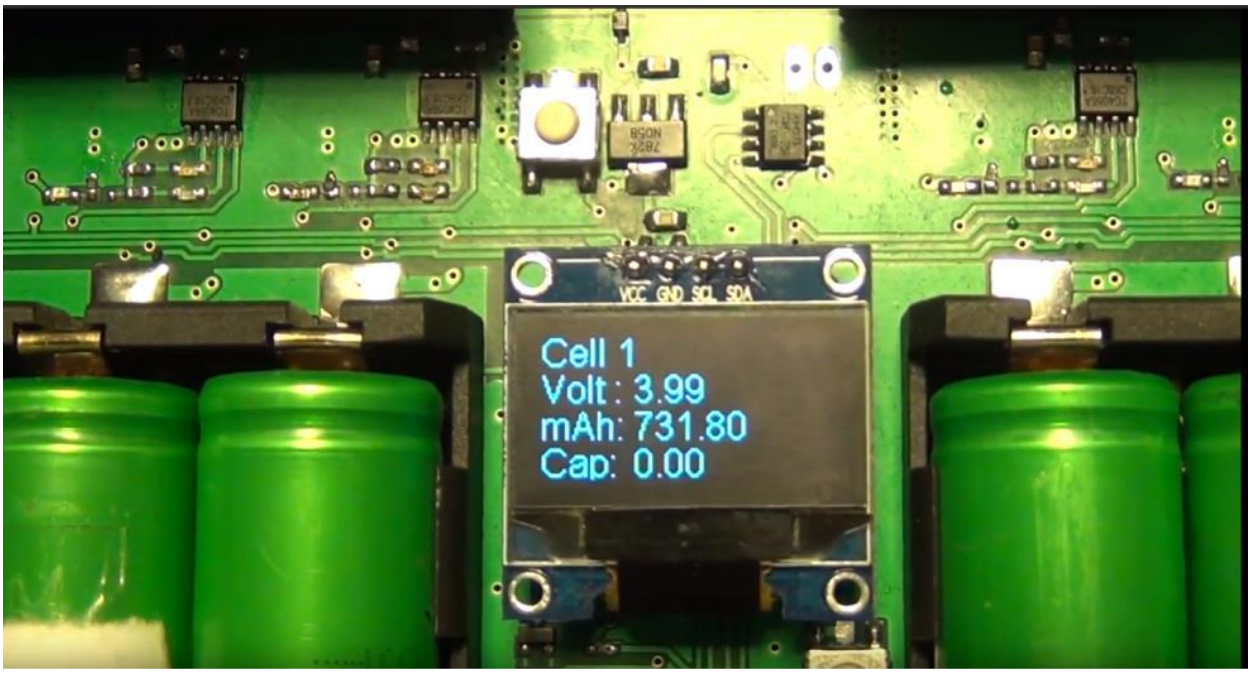
4. Click on “Configure WiFi” and add the username and password of your router and click the save button:





TIP: You can connect to your main router or you could use a separate router which is not connected to internet and make an internal network to be used just with The Cell Doctor.
TIP: If you leave it unconfigured after 1 minute of powering it up, the cell doctor board remains set as an access point and you can connect with your laptop and send commands through software, default password is: 1234567890

5. After the configuration has been saved, the board will reset and display should look like:

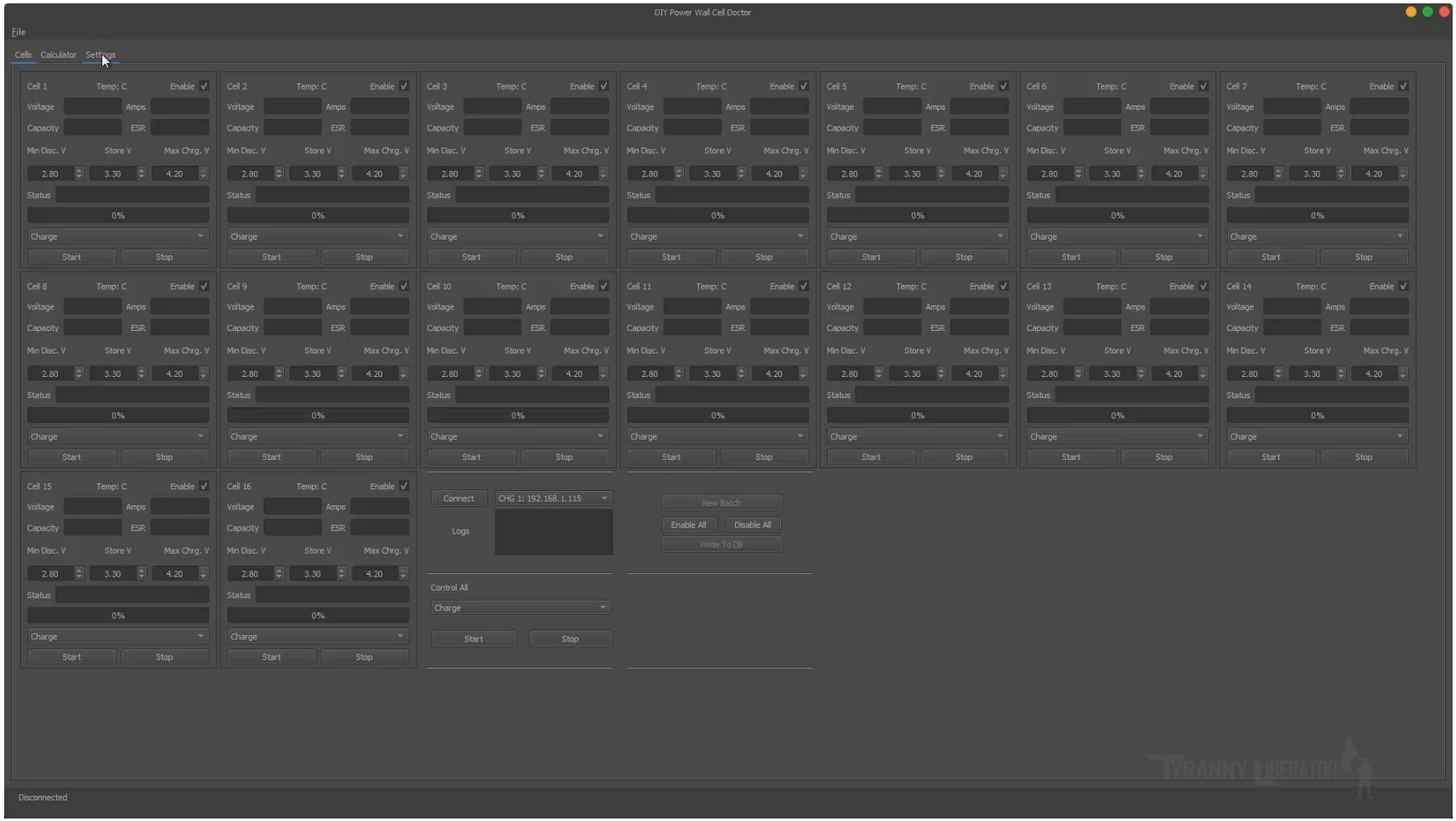


6. The function button can have the following options:

- Short press, less than 100 milli seconds (Click and release) will cycle through cells, displaying information for each cell at a time
- Press and hold will cycle through the following options:

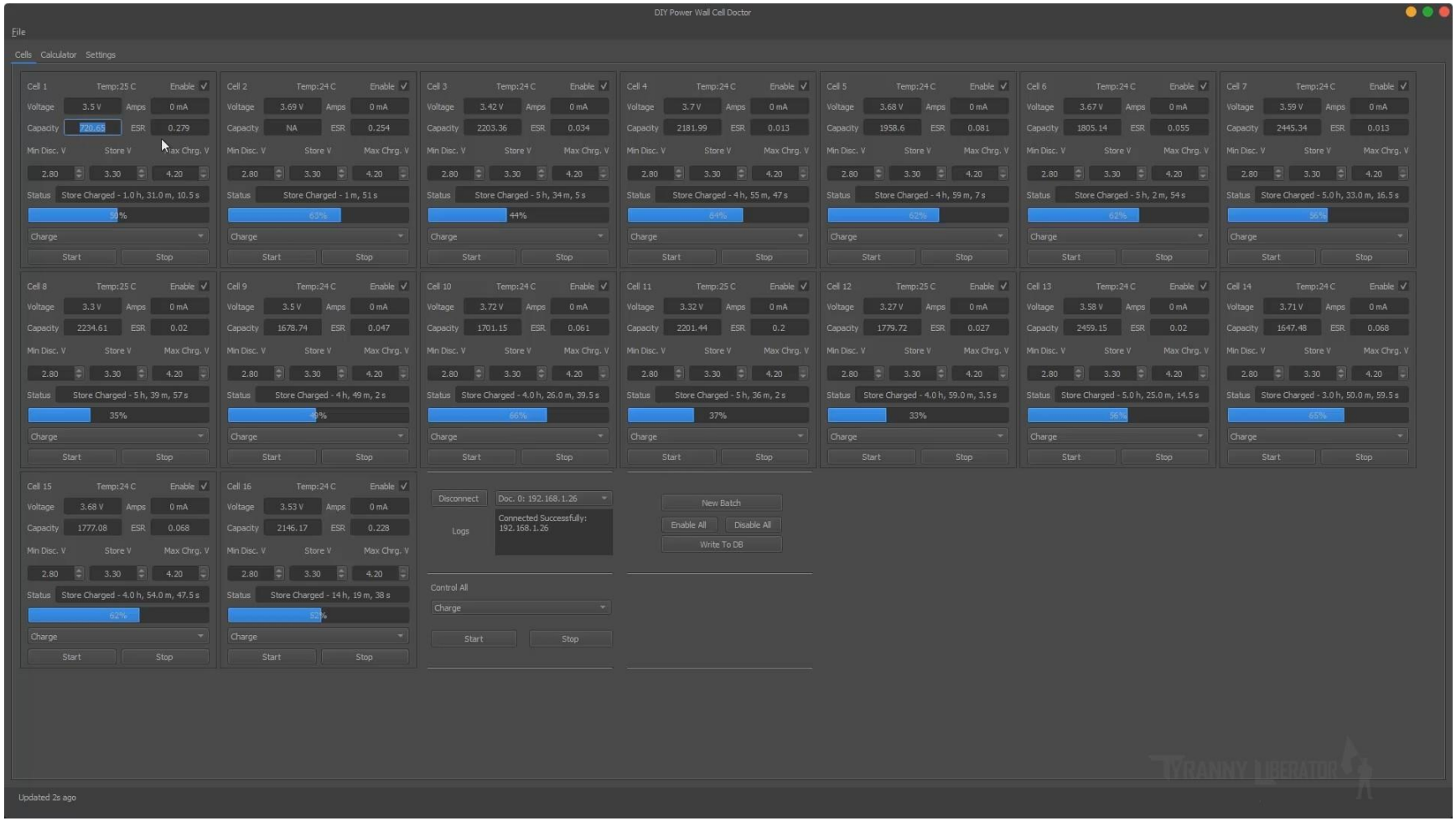
  - Start MCap – This will start the process of measuring capacity with the following characteristics: - If cell voltage is lower than 4.1 V it will charge it until reaching 4.2 V **(that is default voltage on the board, but it can be configured if charger is controlled from the provided software)** - If cell voltage is above 4.1 V it will enter the discharge cycle **(each cell is independently controlled, one could be charging and another one could be discharging, depending on their state at insertion)** - After discharge cycle, the MCap option will charge the cells back to 3.3 V for default **(can be adjusted when using the PC software)**
  - Stop MCap – This will stop the capacity measurement **(charge or discharge will be stopped)**
  - Show IP - This is helpful to get the device IP if you want to connect to it with the PC software. The PC software has a scanning feature which will discover all the cell doctors on the same network with your computer, but depending on how your network is set, that feature might not work so you can add the IP manually
  - Self Testing – This option will run a test on the charger to see if all the cells are detected and if the charge / discharge works. There's data output if you connect to the USB and open a serial terminal such as termite. There's data displayed on the LCD as well if test passed or not.
    Note: The cells should be removed and 5V DC present at the main terminals for the test to run properly.
  - Factory Reset – This option will put the device to run self-test first time the charger is powered up. **(it might do other functionality in the future)**

This is the desktop software which connects to The Cell Doctor.

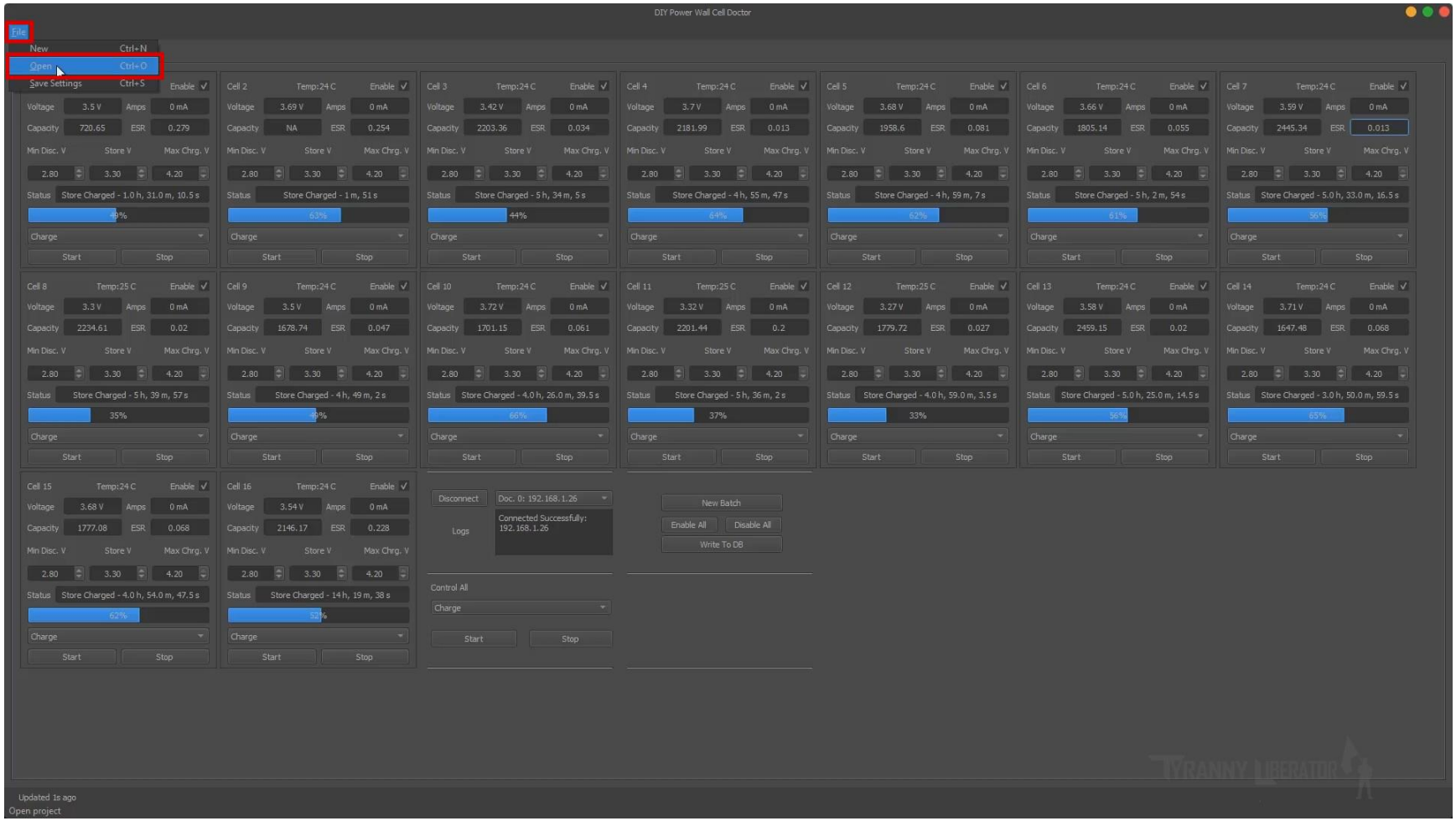


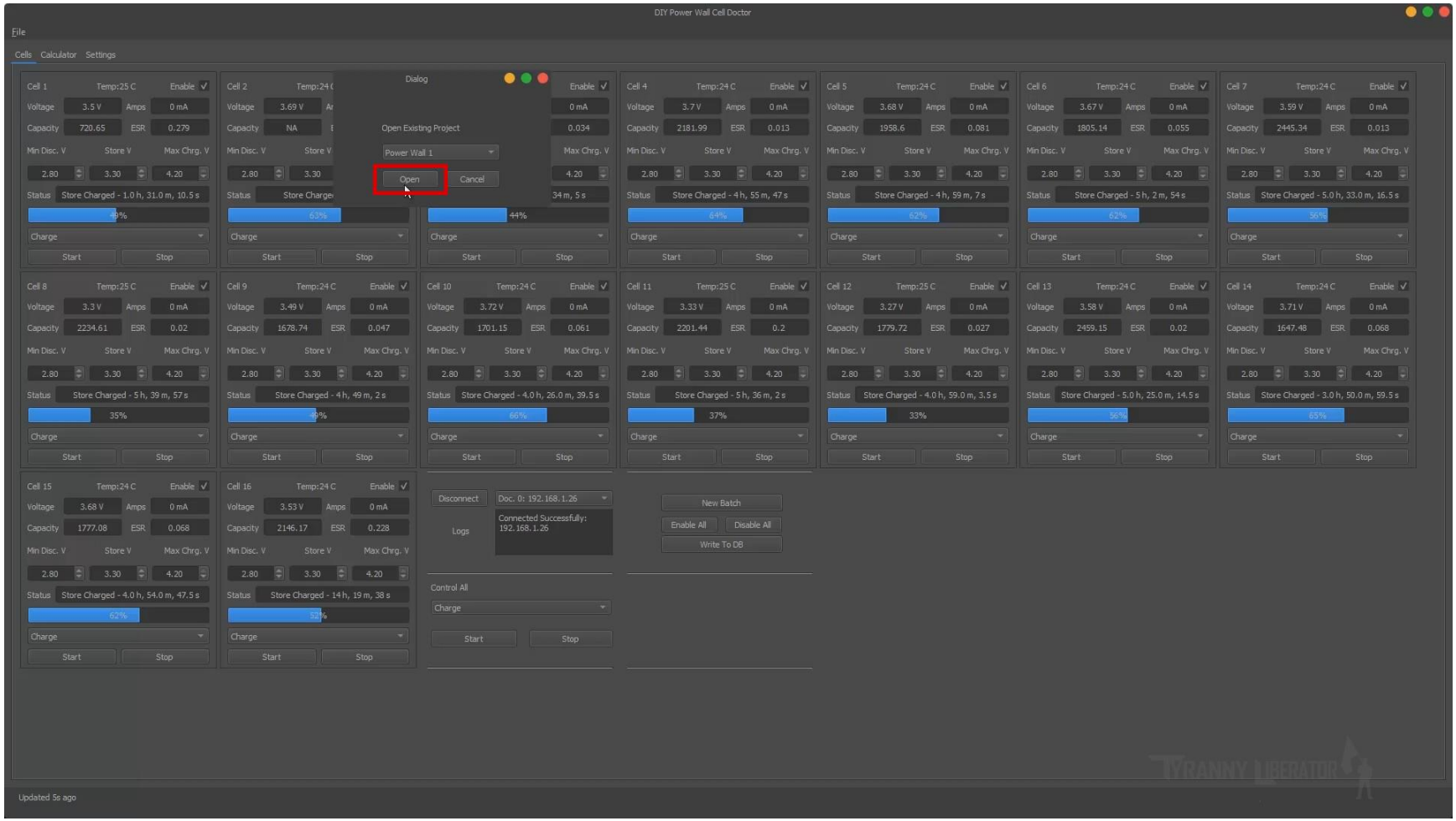
First select the settings tab and after that click on scan for cell doctors.

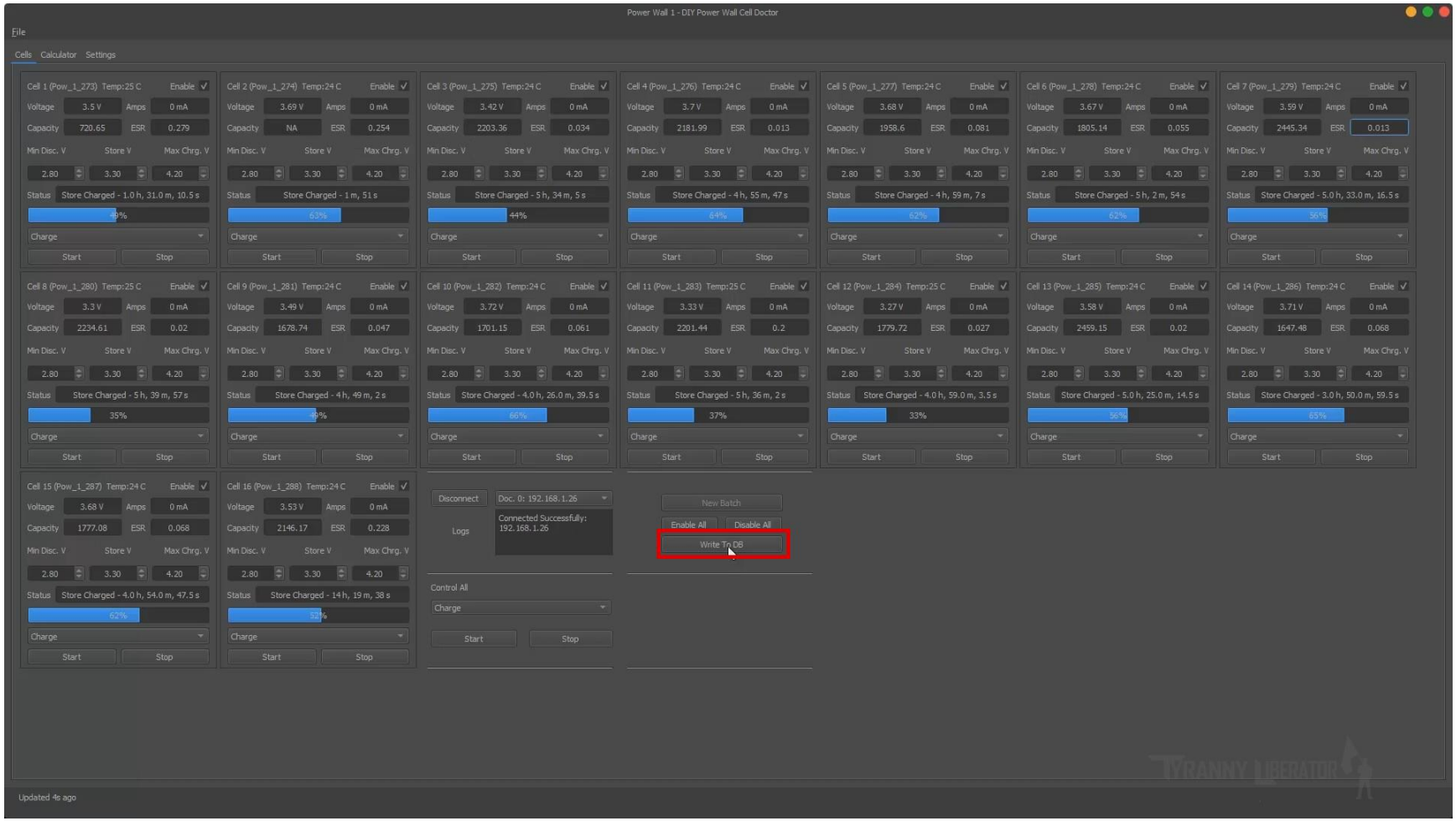
I scan the network to find my device and now I can read values and send commands to the charger.

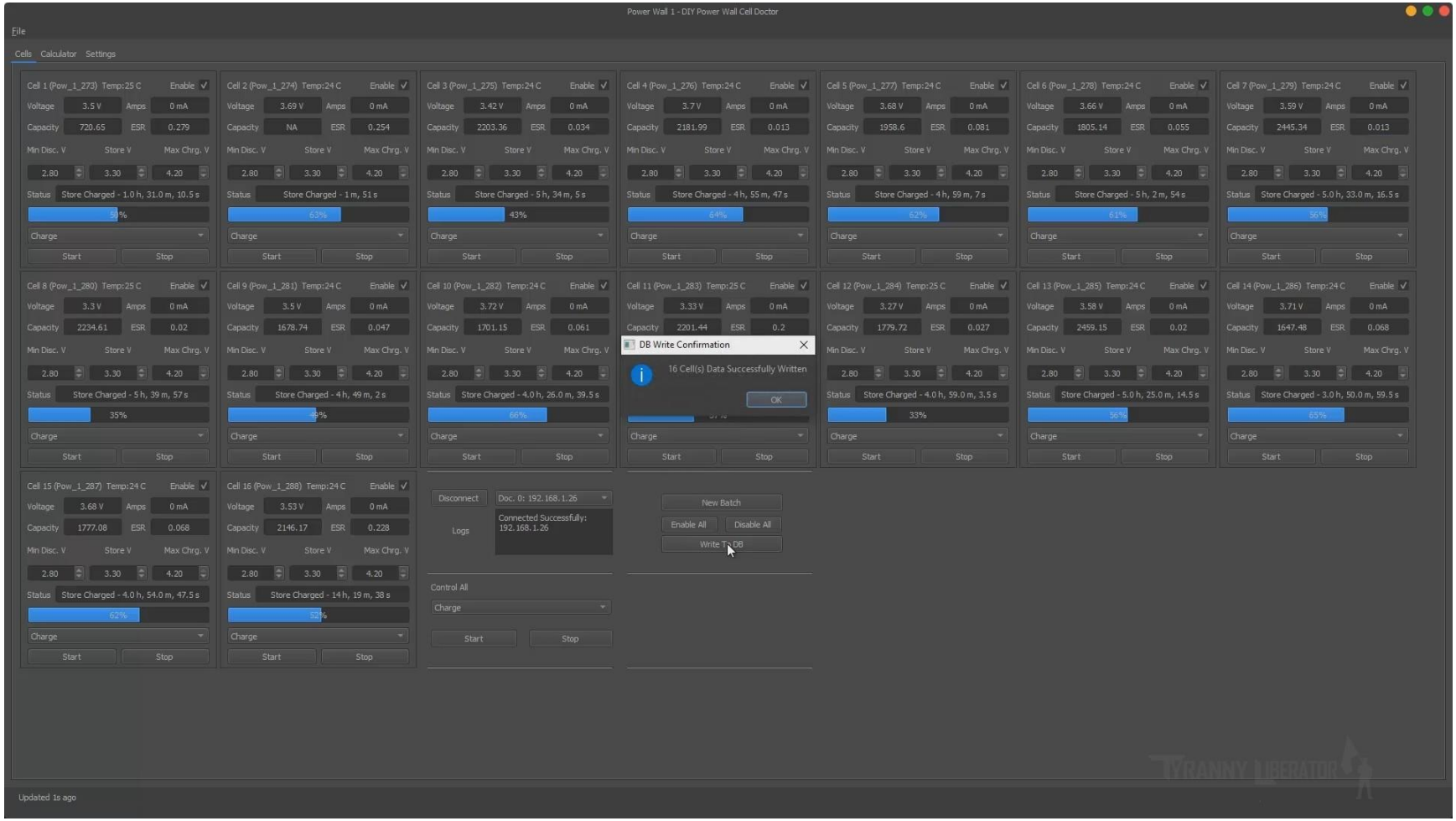


I open an existing project then I write the data inside the database.



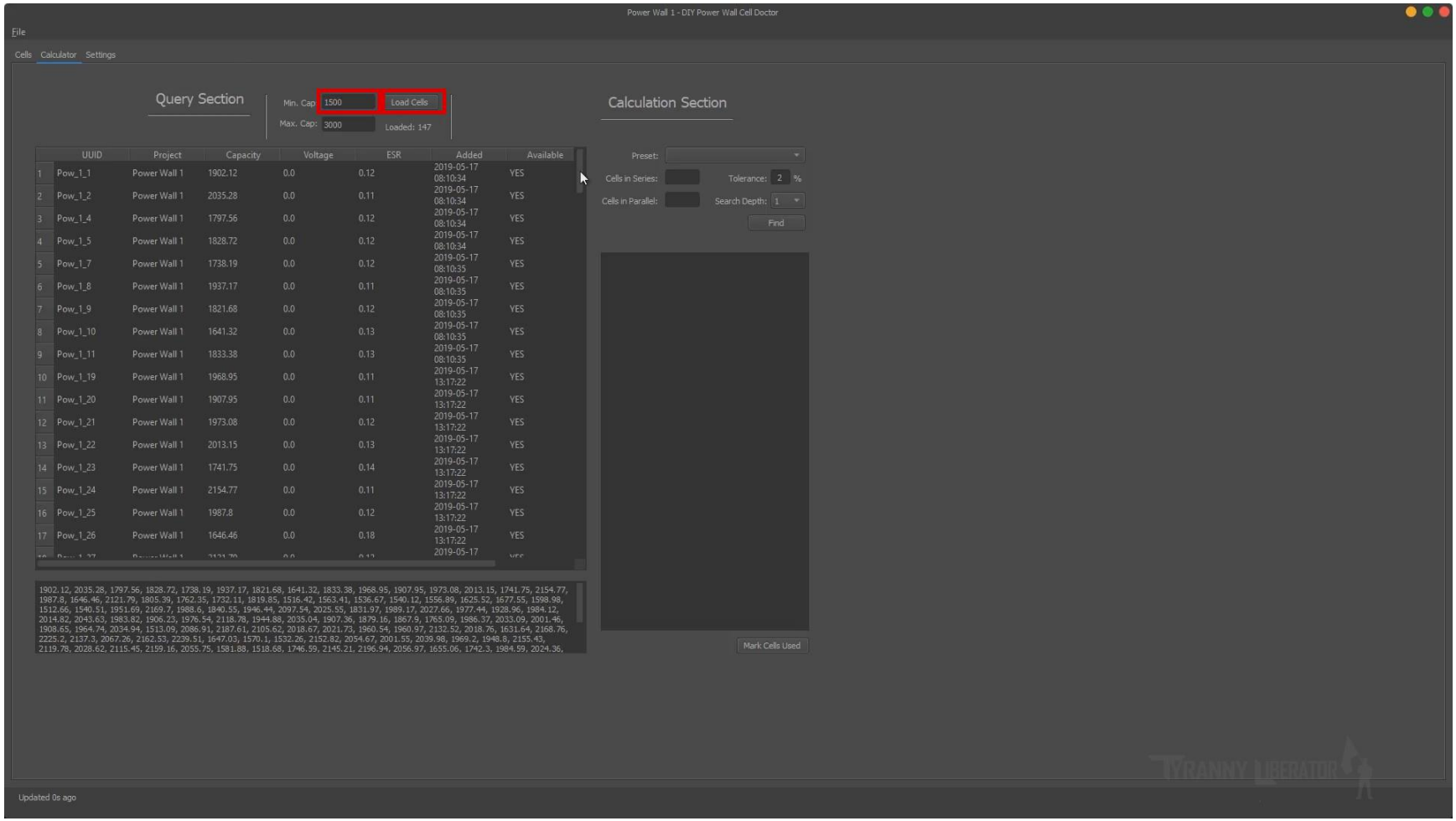

DIY Power Wall Cell Doctor
File
Cells
Calculator
Settings
Dialog
Open Existing Project
Power Wall 1
Open
Cancel
Disconnect
Doc. 0: 192.168.1.26
Logs
Connected Successfully: 192.168.1.26
New Batch
Enable All
Disable All
Write To DB
Control All
Charge
Start
Stop
Updated 5s ago

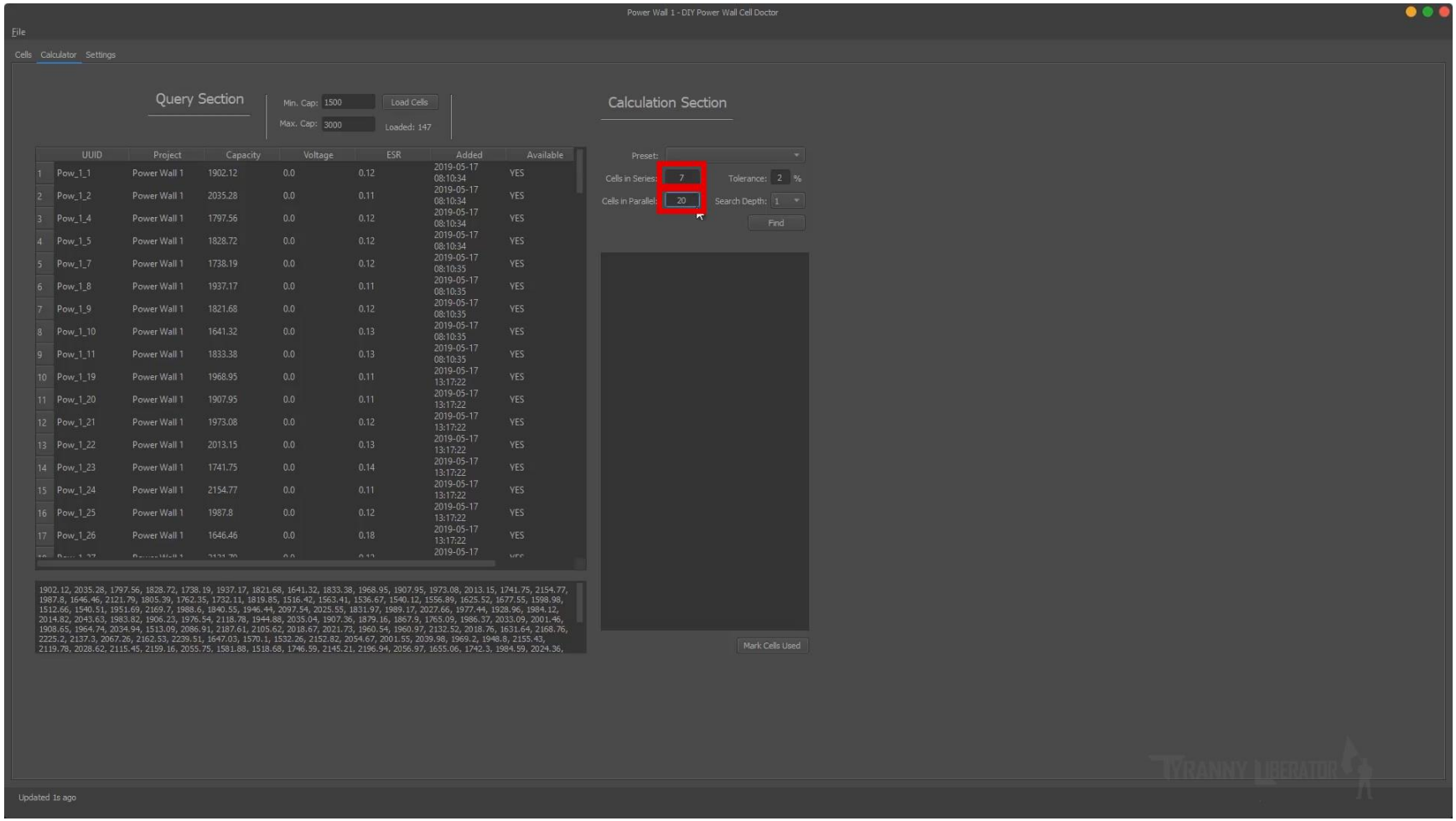

Power Wall 1 - DIY Power Wall Cell Doctor
File
Cells
Calculator
Settings
Cell 1 (Pow_1_273) Temp:25 C
Enable
Voltage 3.5 V
Amps 0 mA
Capacity 720.65
ESR 0.279
Min Disc. V
Store V
Max Chrg. V
2.80
3.30
4.20
Status Store Charged - 1.0 h, 31.0 m, 10.5 s
49%
Charge
Start
Stop
Cell 2 (Pow_1_274) Temp:24 C
Enable
Voltage 3.69 V
Amps 0 mA
Capacity NA
ESR 0.254
Min Disc. V
Store V
Max Chrg. V
2.80
3.30
4.20
Status Store Charged - 1 m, 51 s
63%
Charge
Start
Stop
Cell 3 (Pow_1_275) Temp:24 C
Enable
Voltage 3.42 V
Amps 0 mA
Capacity 2203.36
ESR 0.034
Min Disc. V
Store V
Max Chrg. V
2.80
3.30
4.20
Status Store Charged - 5 h, 34 m, 5 s
44%
Charge
Start
Stop
Cell 4 (Pow_1_276) Temp:24 C
Enable
Voltage 3.7 V
Amps 0 mA
Capacity 2181.99
ESR 0.013
Min Disc. V
Store V
Max Chrg. V
2.80
3.30
4.20
Status Store Charged - 4 h, 55 m, 47 s
64%
Charge
Start
Stop
Cell 5 (Pow_1_277) Temp:24 C
Enable
Voltage 3.68 V
Amps 0 mA
Capacity 1958.6
ESR 0.081
Min Disc. V
Store V
Max Chrg. V
2.80
3.30
4.20
Status Store Charged - 4 h, 59 m, 7 s
62%
Charge
Start
Stop
Cell 6 (Pow_1_278) Temp:24 C
Enable
Voltage 3.67 V
Amps 0 mA
Capacity 1805.14
ESR 0.055
Min Disc. V
Store V
Max Chrg. V
2.80
3.30
4.20
Status Store Charged - 5 h, 2 m, 54 s
62%
Charge
Start
Stop
Cell 7 (Pow_1_279) Temp:24 C
Enable
Voltage 3.59 V
Amps 0 mA
Capacity 2445.34
ESR 0.013
Min Disc. V
Store V
Max Chrg. V
2.80
3.30
4.20
Status Store Charged - 5.0 h, 33.0 m, 16.5 s
56%
Charge
Start
Stop
Cell 8 (Pow_1_280) Temp:25 C
Enable
Voltage 3.3 V
Amps 0 mA
Capacity 2234.61
ESR 0.02
Min Disc. V
Store V
Max Chrg. V
2.80
3.30
4.20
Status Store Charged - 5 h, 39 m, 57 s
35%
Charge
Start
Stop
Cell 9 (Pow_1_281) Temp:24 C
Enable
Voltage 3.49 V
Amps 0 mA
Capacity 1678.74
ESR 0.047
Min Disc. V
Store V
Max Chrg. V
2.80
3.30
4.20
Status Store Charged - 4 h, 49 m, 2 s
49%
Charge
Start
Stop
Cell 10 (Pow_1_282) Temp:24 C
Enable
Voltage 3.72 V
Amps 0 mA
Capacity 1701.15
ESR 0.061
Min Disc. V
Store V
Max Chrg. V
2.80
3.30
4.20
Status Store Charged - 4.0 h, 26.0 m, 39.5 s
66%
Charge
Start
Stop
Cell 11 (Pow_1_283) Temp:25 C
Enable
Voltage 3.33 V
Amps 0 mA
Capacity 2201.44
ESR 0.2
Min Disc. V
Store V
Max Chrg. V
2.80
3.30
4.20
Status Store Charged - 5 h, 36 m, 2 s
37%
Charge
Start
Stop
Cell 12 (Pow_1_284) Temp:25 C
Enable
Voltage 3.27 V
Amps 0 mA
Capacity 1779.72
ESR 0.027
Min Disc. V
Store V
Max Chrg. V
2.80
3.30
4.20
Status Store Charged - 4.0 h, 59.0 m, 3.5 s
33%
Charge
Start
Stop
Cell 13 (Pow_1_285) Temp:24 C
Enable
Voltage 3.58 V
Amps 0 mA
Capacity 2459.15
ESR 0.02
Min Disc. V
Store V
Max Chrg. V
2.80
3.30
4.20
Status Store Charged - 5.0 h, 25.0 m, 14.5 s
56%
Charge
Start
Stop
Cell 14 (Pow_1_286) Temp:24 C
Enable
Voltage 3.71 V
Amps 0 mA
Capacity 1647.48
ESR 0.068
Min Disc. V
Store V
Max Chrg. V
2.80
3.30
4.20
Status Store Charged - 3.0 h, 50.0 m, 59.5 s
65%
Charge
Start
Stop
Cell 15 (Pow_1_287) Temp:24 C
Enable
Voltage 3.68 V
Amps 0 mA
Capacity 1777.08
ESR 0.068
Min Disc. V
Store V
Max Chrg. V
2.80
3.30
4.20
Status Store Charged - 4.0 h, 54.0 m, 47.5 s
62%
Charge
Start
Stop
Cell 16 (Pow_1_288) Temp:24 C
Enable
Voltage 3.53 V
Amps 0 mA
Capacity 2146.17
ESR 0.228
Min Disc. V
Store V
Max Chrg. V
2.80
3.30
4.20
Status Store Charged - 14 h, 19 m, 38 s
72%
Charge
Start
Stop
Disconnect
Doc. 0: 192.168.1.26
Logs
Connected Successfully: 192.168.1.26
Control All
Charge
Start
Stop
New Batch
Enable All
Disable All
Write To DB
Updated 4s ago



I went through all the cells to find which ones are good and what capacity they have, then I moved to the next step, which is arranging the cells in modules.

Now I open the calculator and load all the cells above 1500 milliamps hour and choose the pack I want to create, 7 cells in series and 20 in parallel.



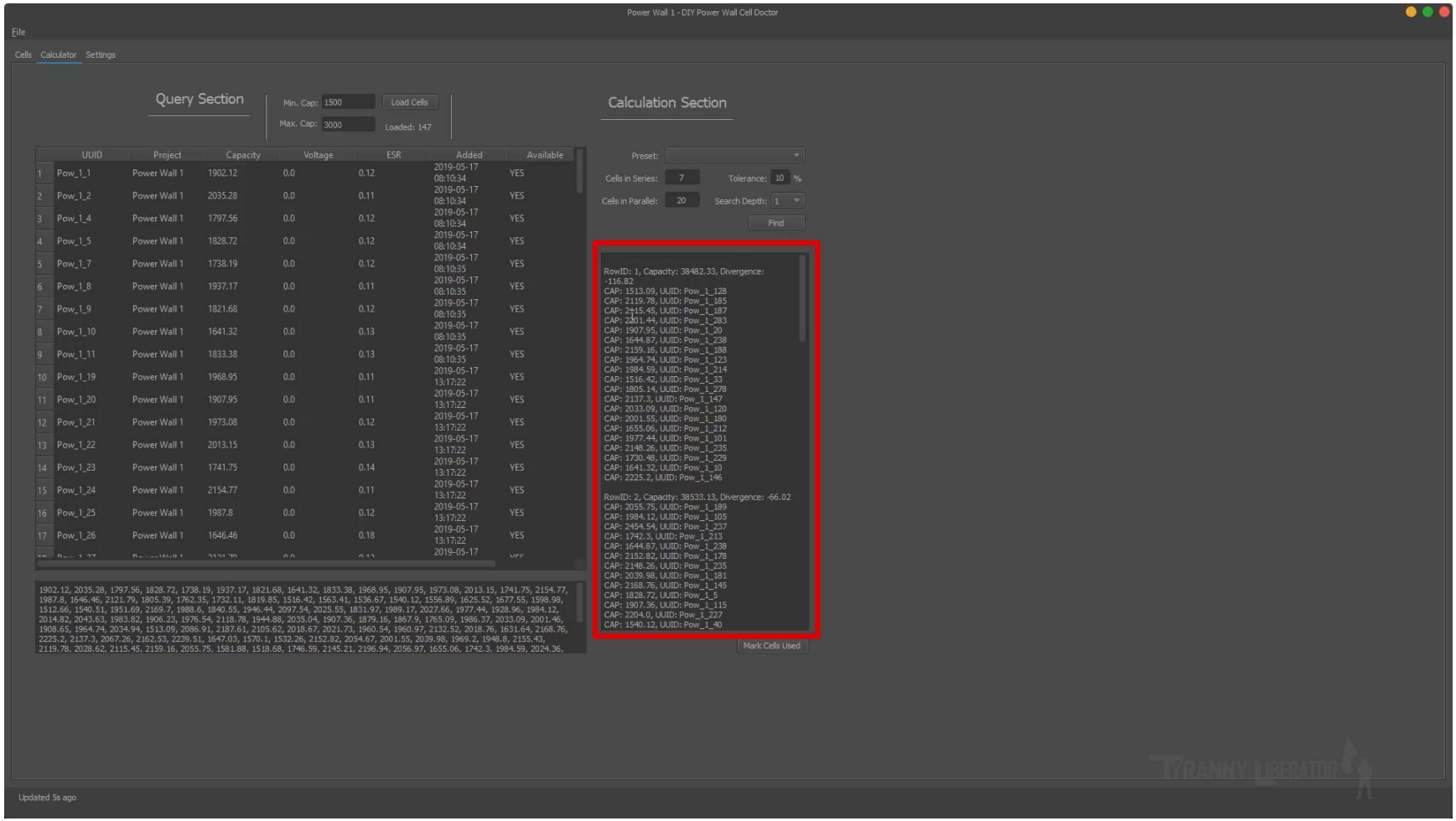


	UUID	Project	Capacity	Voltage	ESR	Added	Available
1	Pow_1_1	Power Wall 1	1902.12	0.0	0.12	2019-05-17 08:10:34	YES
2	Pow_1_2	Power Wall 1	2035.28	0.0	0.11	2019-05-17 08:10:34	YES
3	Pow_1_4	Power Wall 1	1797.56	0.0	0.12	2019-05-17 08:10:34	YES
4	Pow_1_5	Power Wall 1	1828.72	0.0	0.12	2019-05-17 08:10:34	YES
5	Pow_1_7	Power Wall 1	1738.19	0.0	0.12	2019-05-17 08:10:35	YES
6	Pow_1_8	Power Wall 1	1937.17	0.0	0.11	2019-05-17 08:10:35	YES
7	Pow_1_9	Power Wall 1	1821.68	0.0	0.12	2019-05-17 08:10:35	YES
8	Pow_1_10	Power Wall 1	1641.32	0.0	0.13	2019-05-17 08:10:35	YES
9	Pow_1_11	Power Wall 1	1833.38	0.0	0.13	2019-05-17 08:10:35	YES
10	Pow_1_19	Power Wall 1	1968.95	0.0	0.11	2019-05-17 13:17:22	YES
11	Pow_1_20	Power Wall 1	1907.95	0.0	0.11	2019-05-17 13:17:22	YES
12	Pow_1_21	Power Wall 1	1973.08	0.0	0.12	2019-05-17 13:17:22	YES
13	Pow_1_22	Power Wall 1	2013.15	0.0	0.13	2019-05-17 13:17:22	YES
14	Pow_1_23	Power Wall 1	1741.75	0.0	0.14	2019-05-17 13:17:22	YES
15	Pow_1_24	Power Wall 1	2154.77	0.0	0.11	2019-05-17 13:17:22	YES
16	Pow_1_25	Power Wall 1	1987.8	0.0	0.12	2019-05-17 13:17:22	YES
17	Pow_1_26	Power Wall 1	1646.46	0.0	0.18	2019-05-17 13:17:22	YES
						2019-05-17	

1902.12, 2035.28, 1797.56, 1828.72, 1738.19, 1937.17, 1821.68, 1641.32, 1833.38, 1968.95, 1907.95, 1973.08, 2013.15, 1741.75, 2154.77, 1987.8, 1646.46, 2121.79, 1805.39, 1762.35, 1732.11, 1819.85, 1516.42, 1563.41, 1536.67, 1540.12, 1556.89, 1625.52, 1677.55, 1598.98, 1512.66, 1540.51, 1951.69, 2169.7, 1988.6, 1840.55, 1946.44, 2097.54, 2025.55, 1831.97, 1989.17, 2027.66, 1977.44, 1928.96, 1984.12, 2014.82, 2043.63, 1983.82, 1906.23, 1976.54, 2118.78, 1944.88, 2035.04, 1907.36, 1879.16, 1867.9, 1765.09, 1986.37, 2033.09, 2001.46, 1908.65, 1964.74, 2034.94, 1513.09, 2086.91, 2187.61, 2105.62, 2018.67, 2021.73, 1960.54, 1960.97, 2132.52, 2018.76, 1631.64, 2168.76, 2225.2, 2137.3, 2067.26, 2162.53, 2239.51, 1647.03, 1570.1, 1532.26, 2152.82, 2054.67, 2001.55, 2039.98, 1969.2, 1948.8, 2155.43, 2119.78, 2028.62, 2115.45, 2159.16, 2055.75, 1581.88, 1518.68, 1746.59, 2145.21, 2196.94, 2056.97, 1655.06, 1742.3, 1984.59, 2024.36,

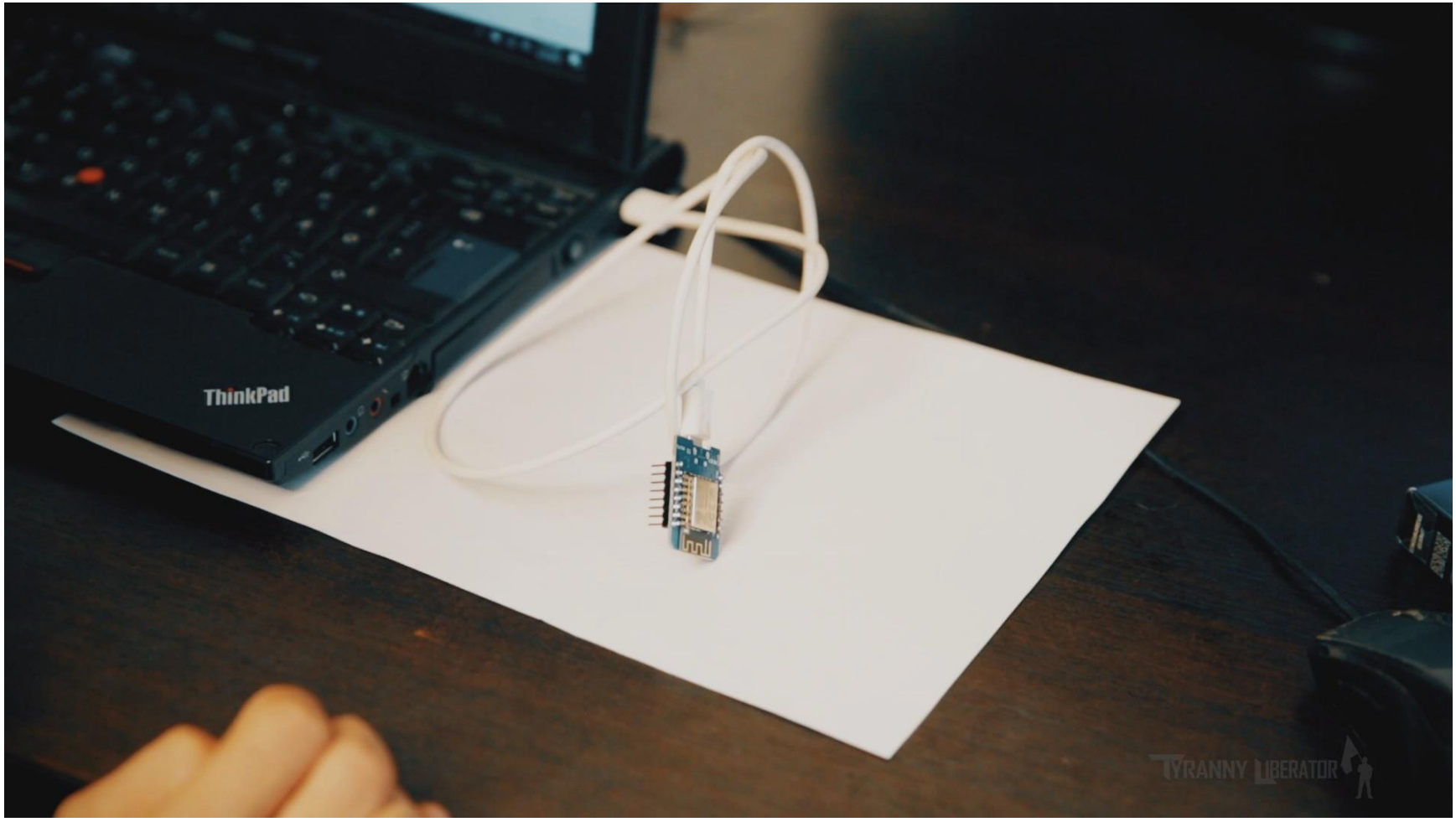
I used 1 paper sheet for 20 cells and found the corresponding cells.

This allows making 20 modules of 7 cells each connected in parallel.



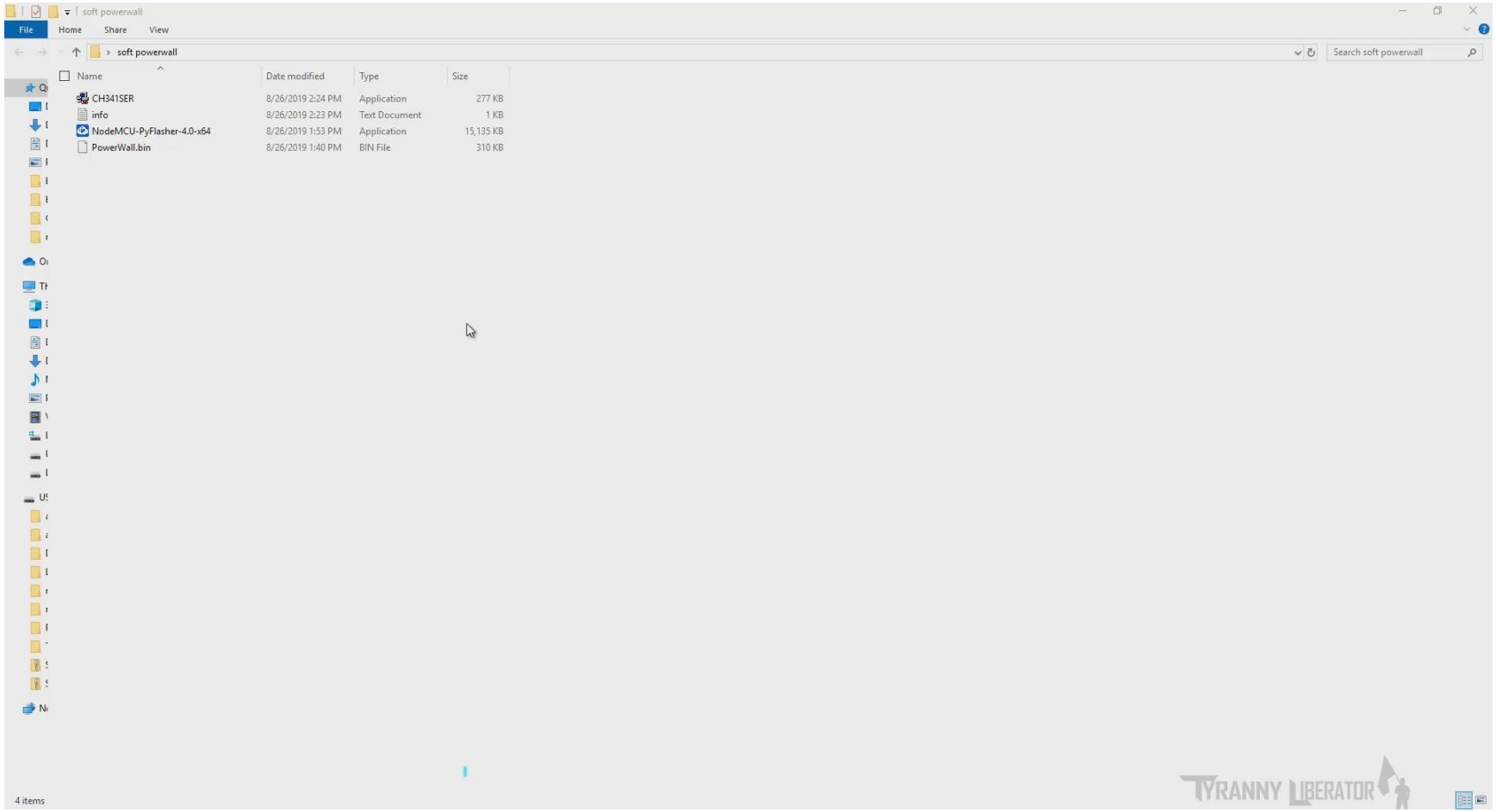
Setting-up the ESP:

To do that, connect the device to your computer with a micro USB cable, download the file called “ESP_Firmware.zip” on the download page and unzip it.

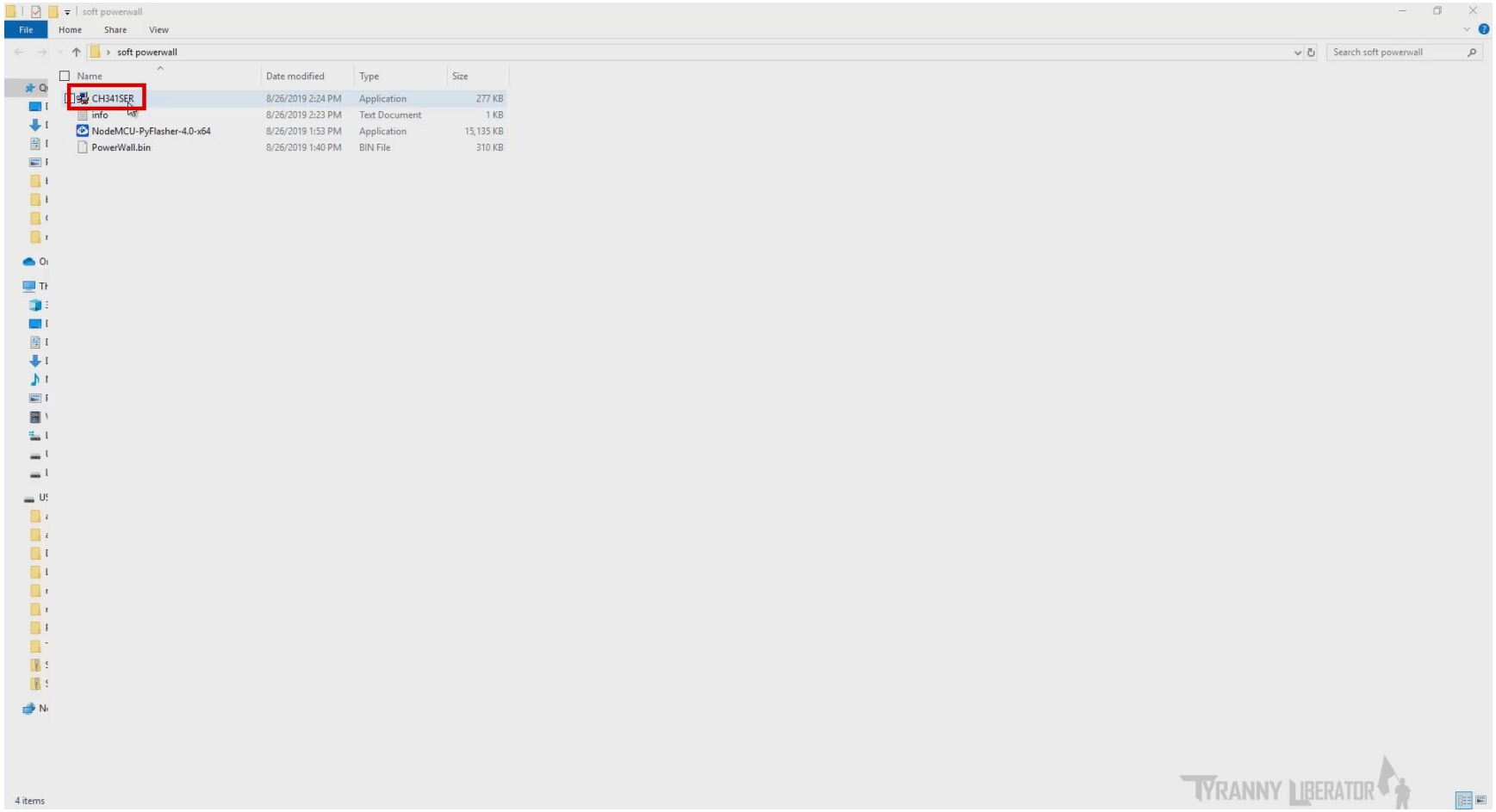


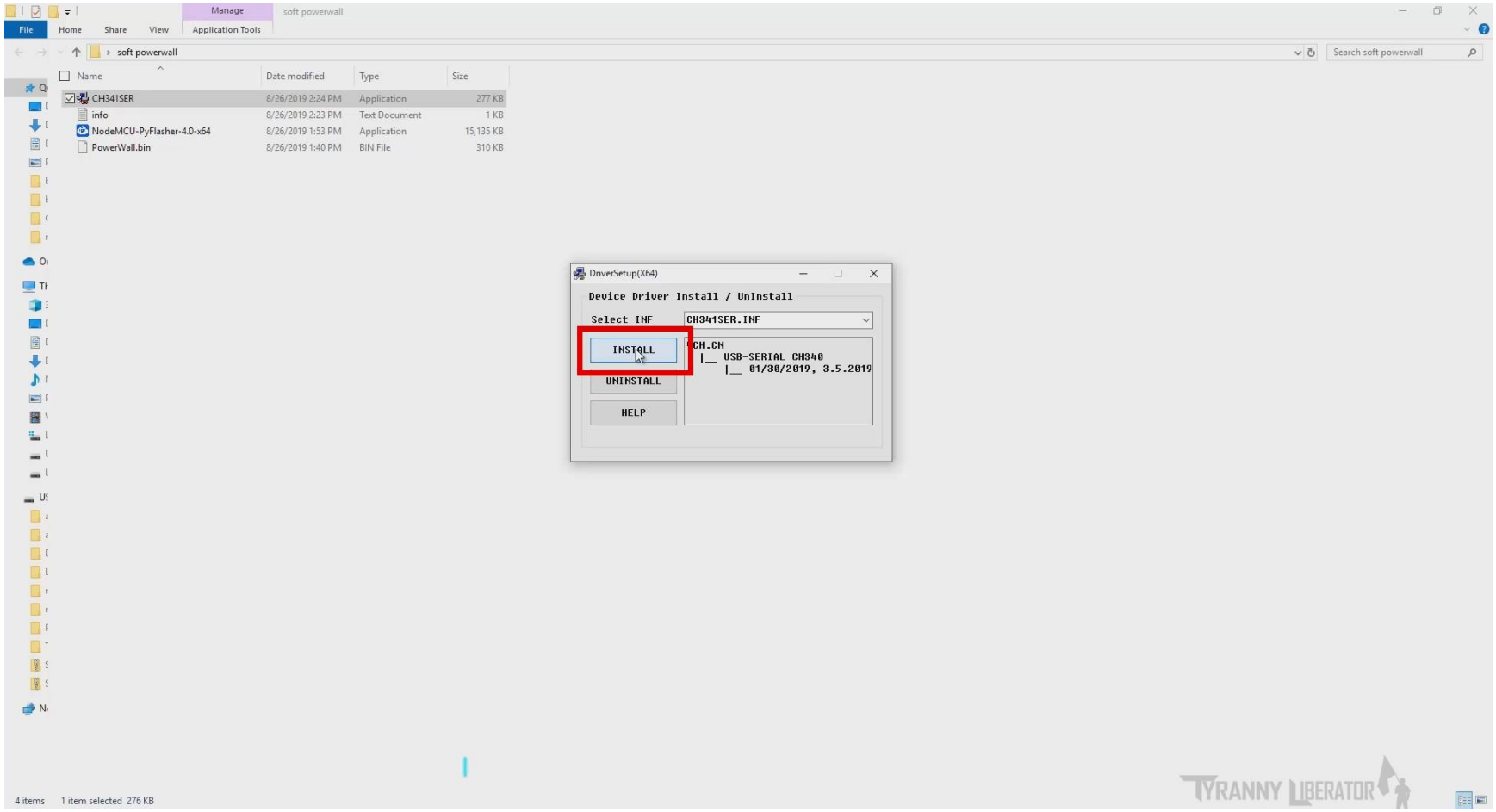
Flashing the firmware:

Inside you will see the files displayed in this video.

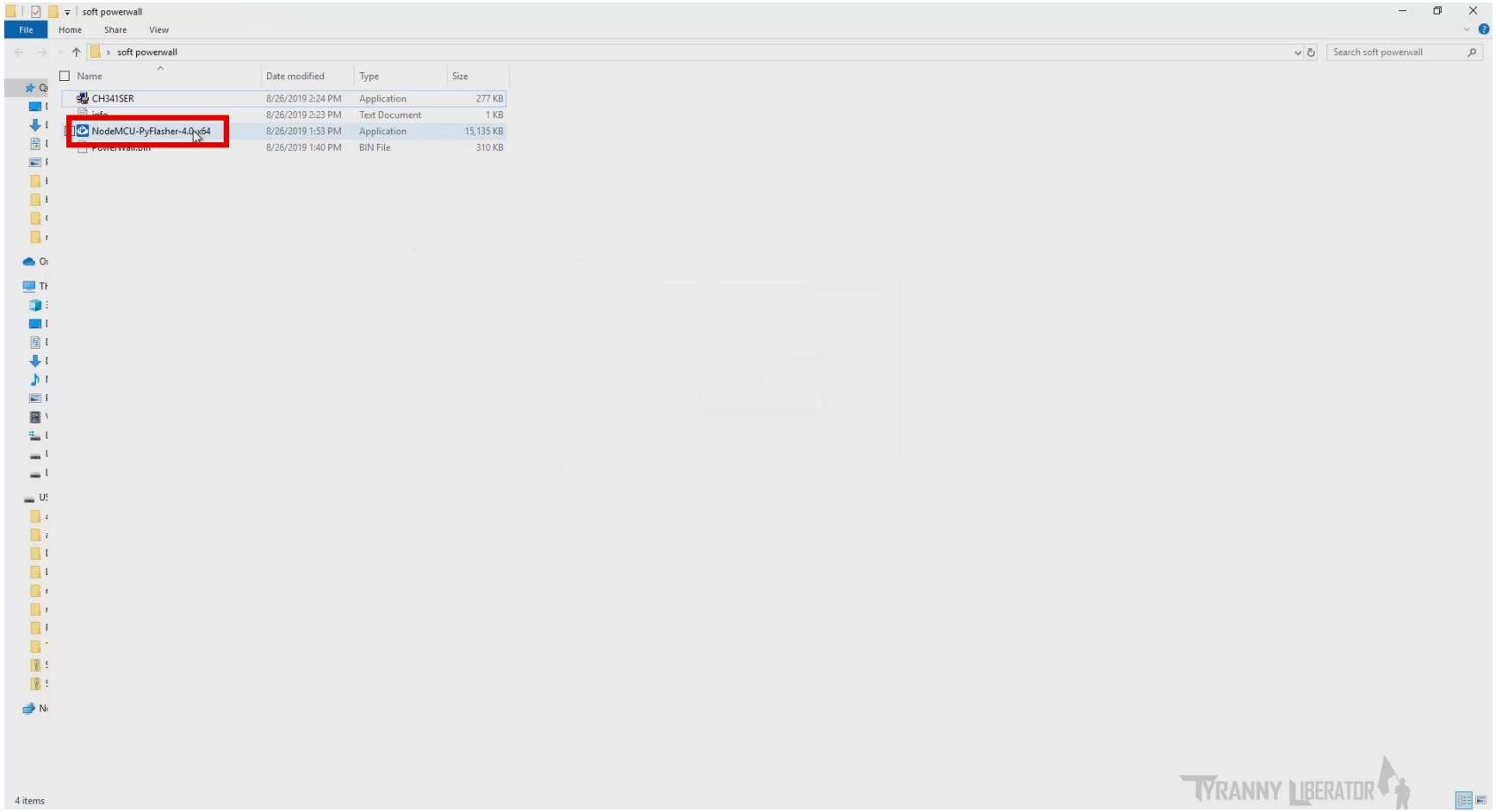


This process can be done on a windows machine. In order to connect to the ESP, you must have this driver installed, double click on CH341SER file and follow the installation steps.

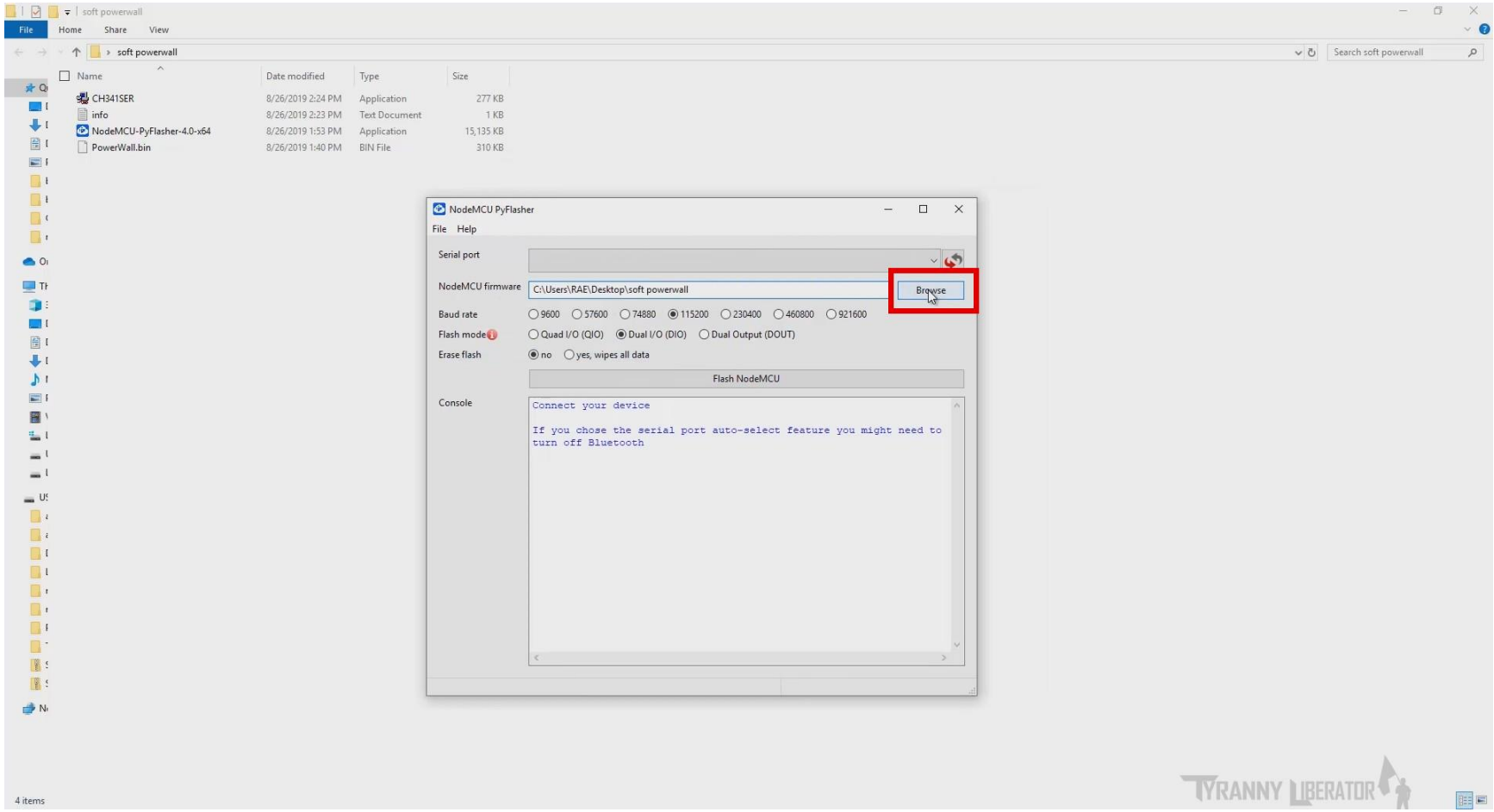


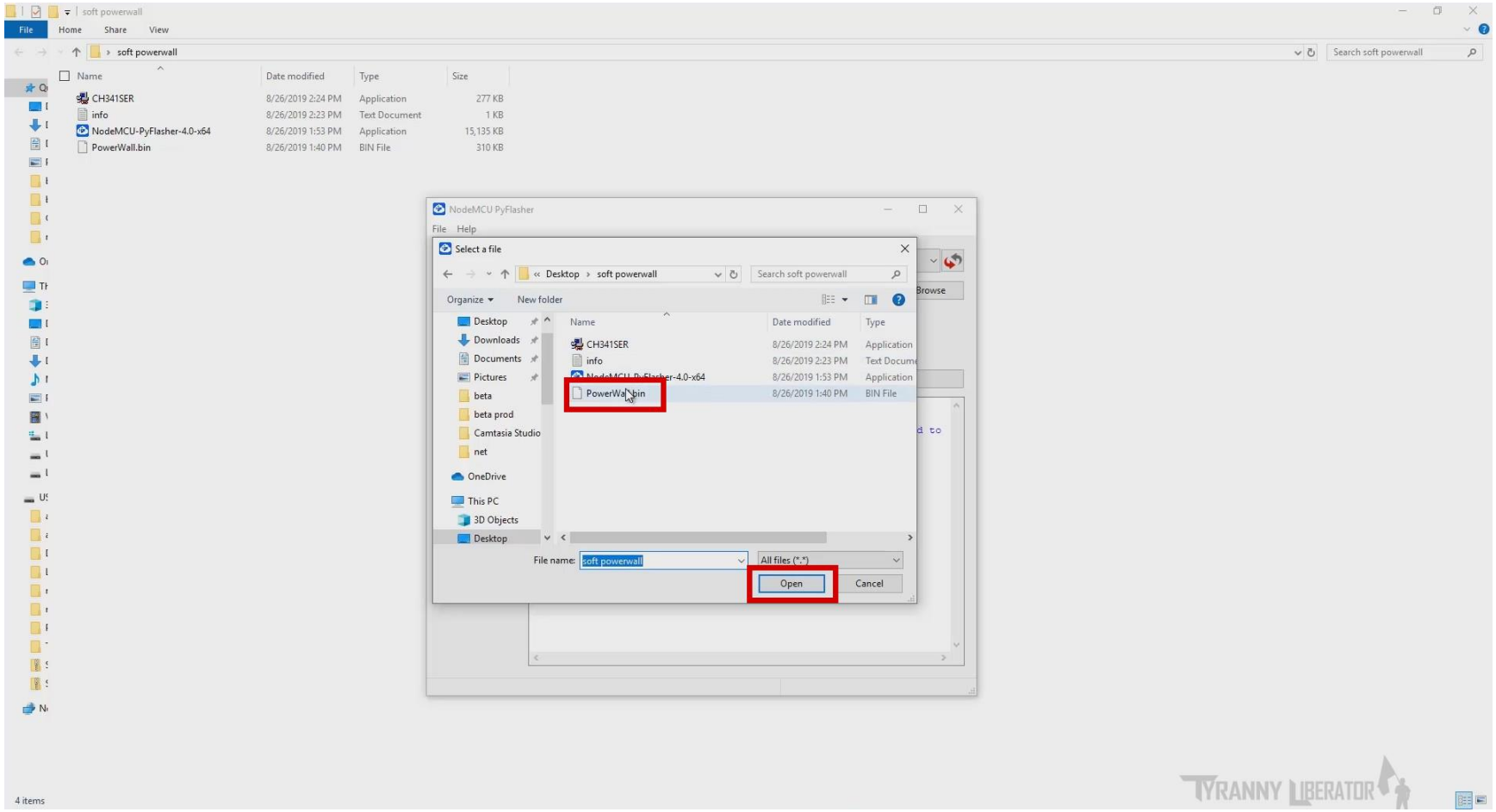

soft powerwall
File
Home
Share
View
Manage
Application Tools
soft powerwall
Search soft powerwall
Name
Date modified
Type
Size
CH341SER
8/26/2019 2:24 PM
Application
277 KB
info
8/26/2019 2:23 PM
Text Document
1 KB
NodeMCU-PyFlasher-4.0-x64
8/26/2019 1:53 PM
Application
15,135 KB
PowerWall.bin
8/26/2019 1:40 PM
BIN File
310 KB
DriverSetup(X64)
Device Driver Install / UnInstall
Select INF
CH341SER.INF
INSTALL
UNINSTALL
HELP
CH.CN
|__ USB-SERIAL CH340
|__ 01/30/2019, 3.5.2019
4 items
1 item selected 276 KB
TYRANNY LIBERATOR

After the driver is installed, double click on “NodeMCU-PyFlasher-4.0-x64” to launch the application that’s going to write the code to the ESP.

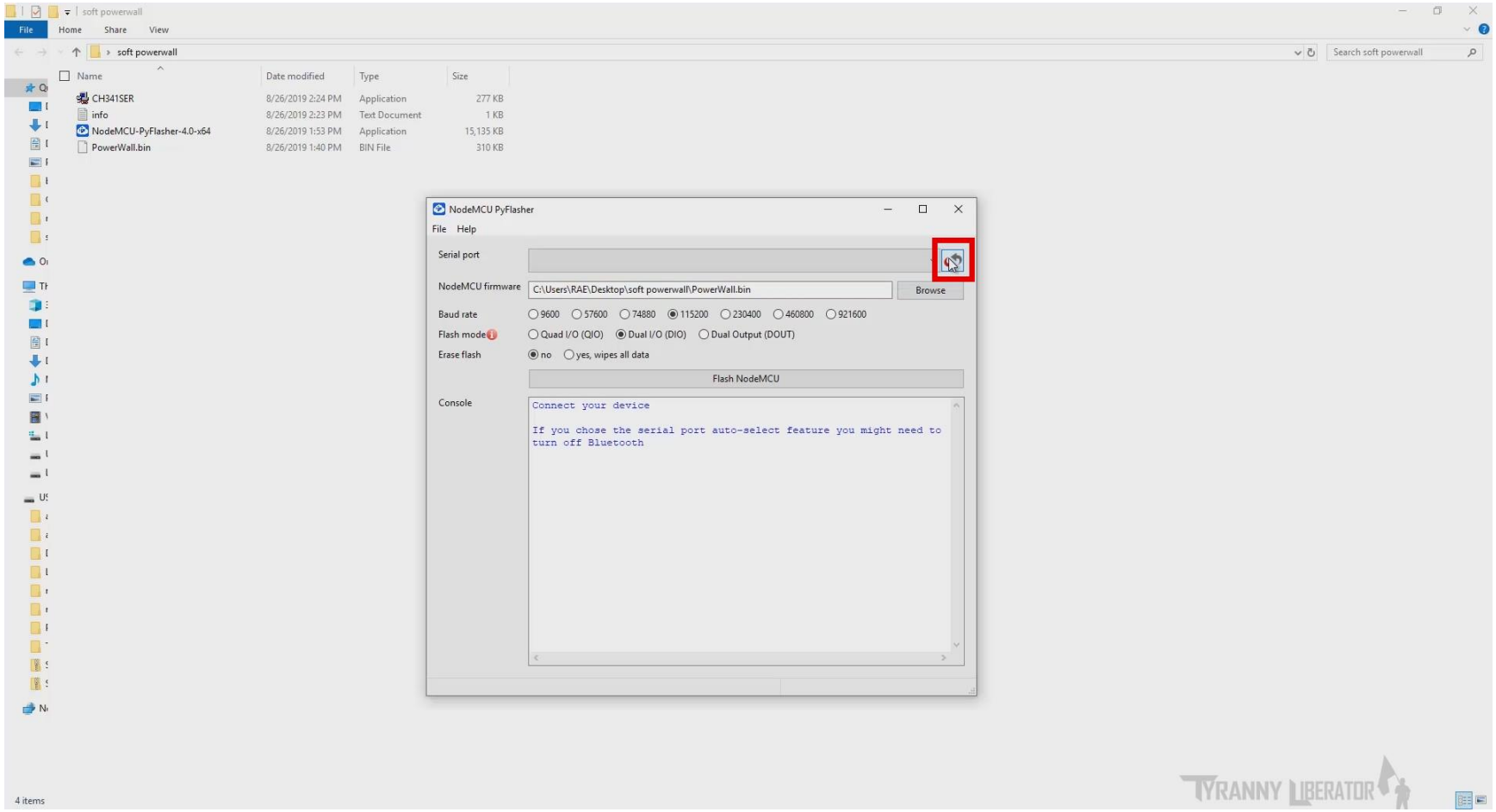


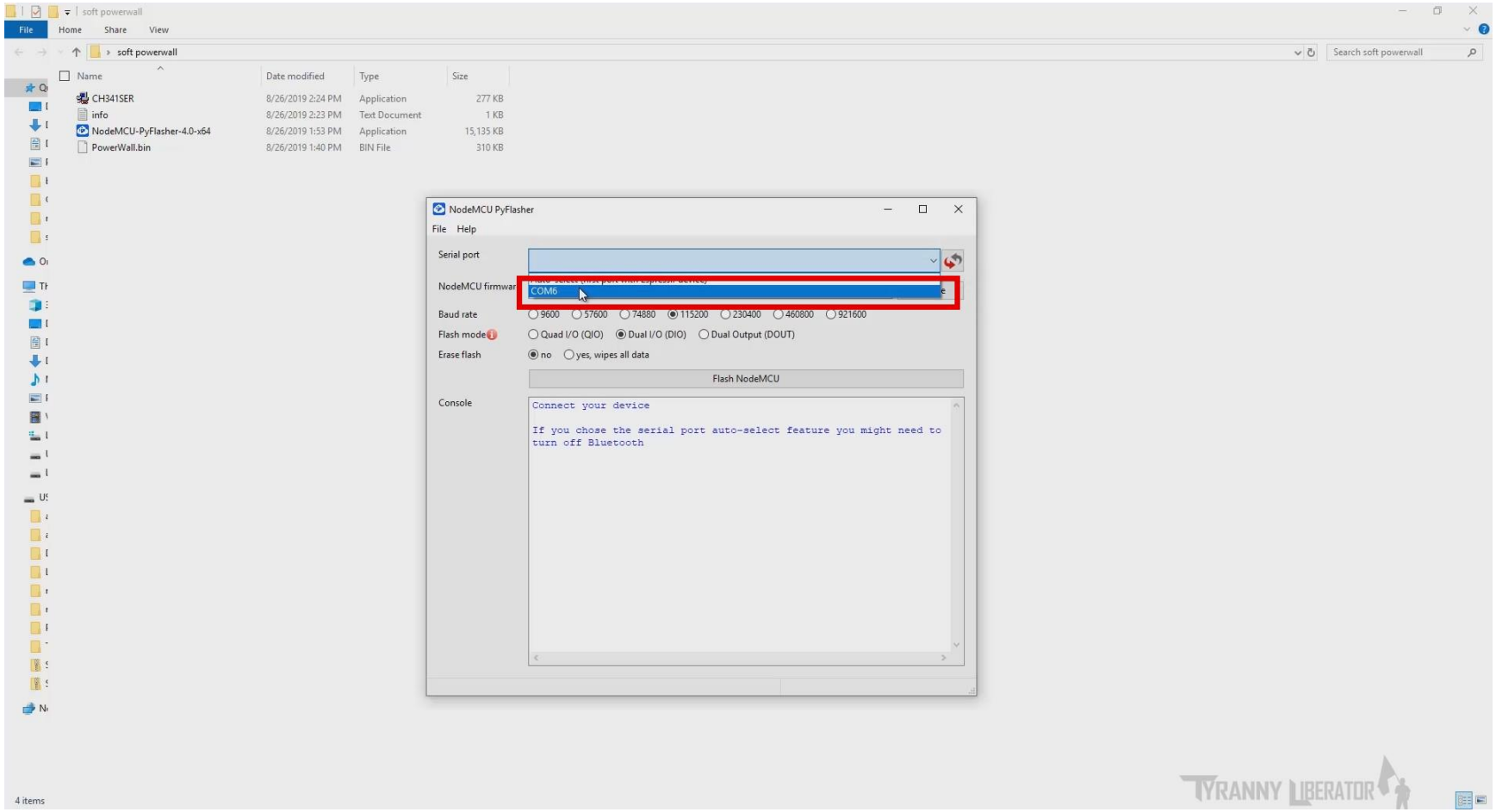
After the window opens, click on browse and navigate to the folder location where you have the file called Powerwall.bin .




soft powerwall
File
Home
Share
View
soft powerwall
Search soft powerwall
Name
Date modified
Type
Size
CH341SER
8/26/2019 2:24 PM
Application
277 KB
info
8/26/2019 2:23 PM
Text Document
1 KB
NodeMCU-PyFlasher-4.0-x64
8/26/2019 1:53 PM
Application
15,135 KB
PowerWall.bin
8/26/2019 1:40 PM
BIN File
310 KB
NodeMCU PyFlasher
File
Help
Select a file
Desktop
soft powerwall
Search soft powerwall
Organize
New folder
Desktop
Downloads
Documents
Pictures
beta
beta prod
Camtasia Studio
net
OneDrive
This PC
3D Objects
Desktop
Name
Date modified
Type
CH341SER
8/26/2019 2:24 PM
Application
info
8/26/2019 2:23 PM
Text Docume
NodeMCU-PyFlasher-4.0-x64
8/26/2019 1:53 PM
Application
PowerWall.bin
8/26/2019 1:40 PM
BIN File
File name:
soft powerwall
All files (*.*)
Open
Cancel
Browse
4 items
TYRANNY LIBERATOR

If no device is connected, click on the refresh button then select the COM port that's available for communication with the ESP device.

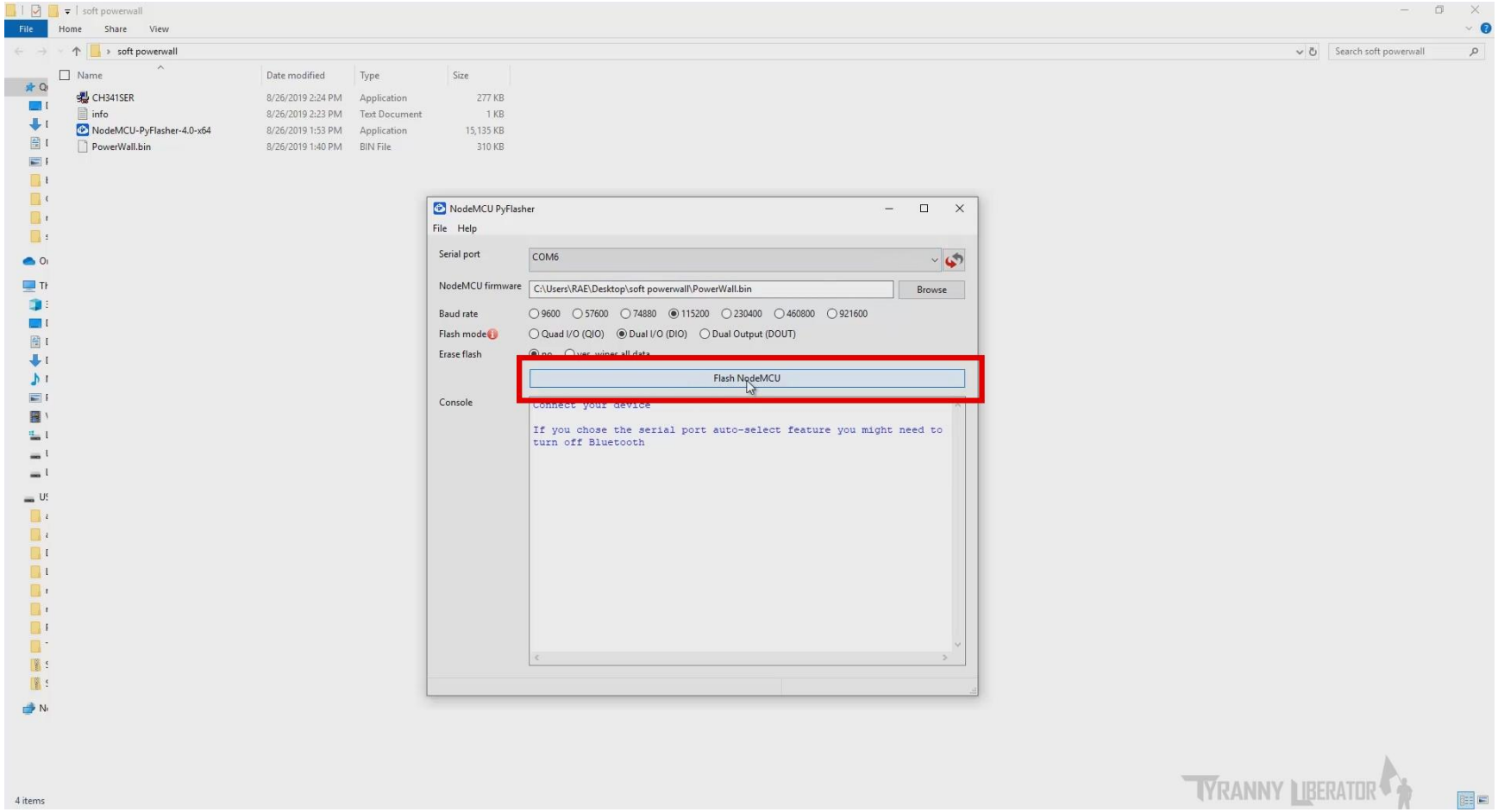


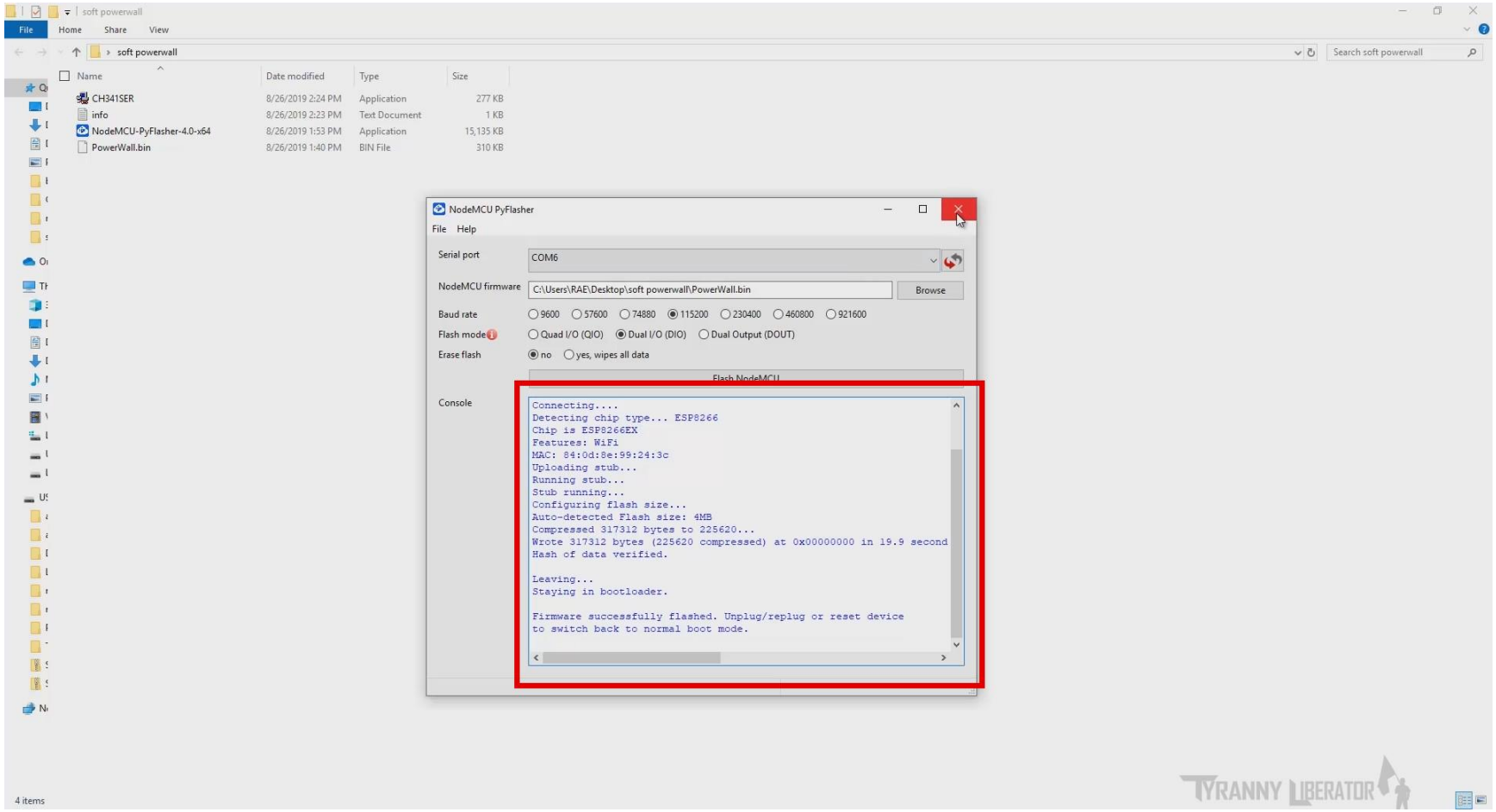

soft powerwall
File
Home
Share
View
soft powerwall
Search soft powerwall
Name
Date modified
Type
Size
CH341SER
8/26/2019 2:24 PM
Application
277 KB
info
8/26/2019 2:23 PM
Text Document
1 KB
NodeMCU-PyFlasher-4.0-x64
8/26/2019 1:53 PM
Application
15,135 KB
PowerWall.bin
8/26/2019 1:40 PM
BIN File
310 KB
4 items
NodeMCU PyFlasher
File
Help
Serial port
NodeMCU firmwar
COM6
Baud rate
9600
57600
74880
115200
230400
460800
921600
Flash mode
Quad I/O (QIO)
Dual I/O (DIO)
Dual Output (DOUT)
Erase flash
no
yes, wipes all data
Flash NodeMCU
Console
Connect your device
If you chose the serial port auto-select feature you might need to turn off Bluetooth
TYRANNY LIBERATOR

Once everything is set, click on the button called “Flash NodeMCU”.

The code is now written on the device.

You can unplug and plug the usb cable so the device is reset. After a few seconds, you should be able to login to the device.




soft powerwall
File
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soft powerwall
Search soft powerwall
Name
Date modified
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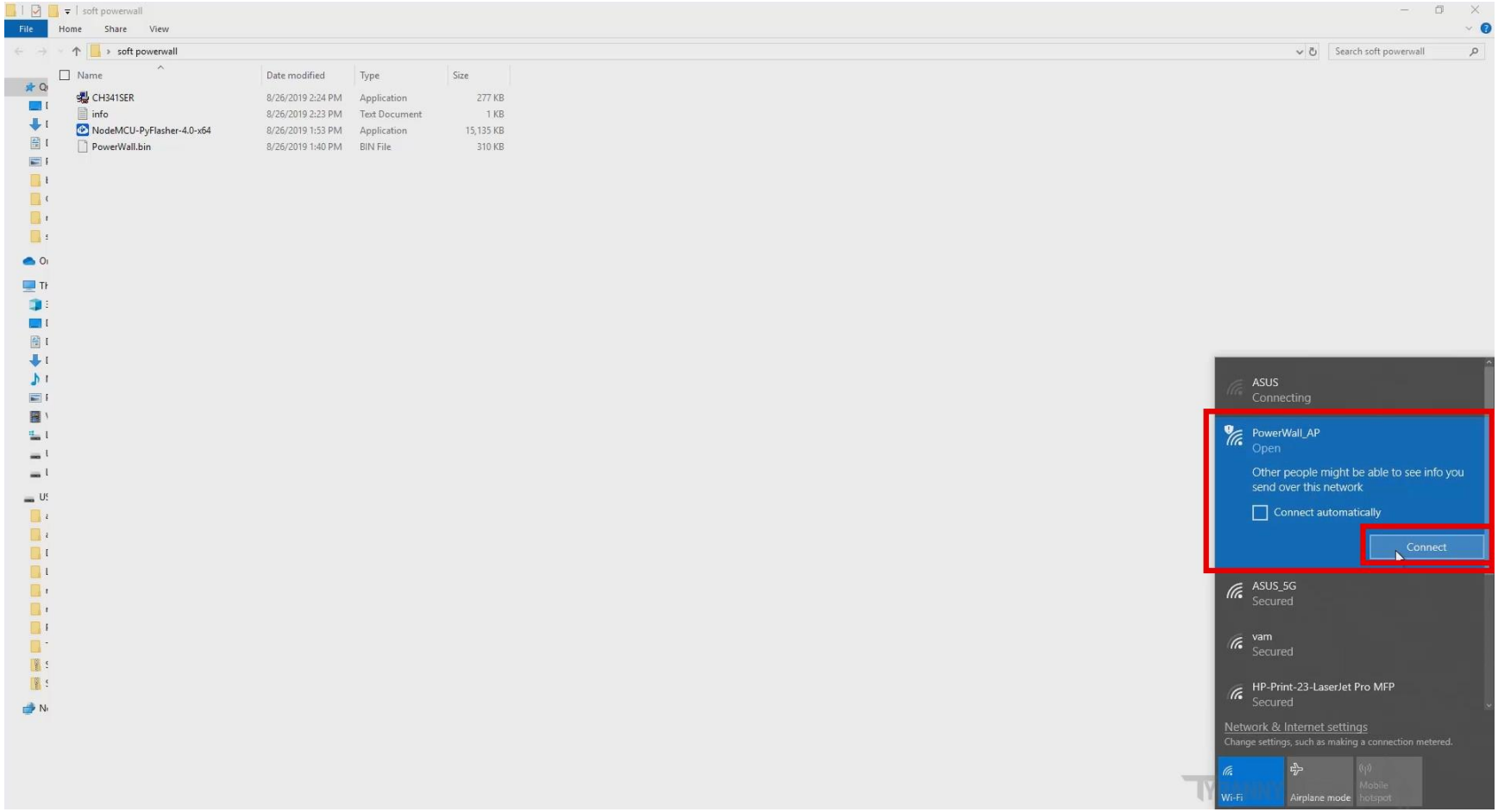
BIN File
310 KB
NodeMCU PyFlasher
File
Help
Serial port
COM6
NodeMCU firmware
C:\Users\RAE\Desktop\soft powerwall\PowerWall.bin
Browse
Baud rate
9600
57600
74880
115200
230400
460800
921600
Flash mode
Quad I/O (QIO)
Dual I/O (DIO)
Dual Output (DOUT)
Erase flash
no
yes, wipes all data
Flash NodeMCU
Console
Connecting....
Detecting chip type... ESP8266
Chip is ESP8266EX
Features: WiFi
MAC: 84:0d:8e:99:24:3c
Uploading stub...
Running stub...
Stub running...
Configuring flash size...
Auto-detected Flash size: 4MB
Compressed 317312 bytes to 225620...
Wrote 317312 bytes (225620 compressed) at 0x00000000 in 19.9 second
Hash of data verified.
Leaving...
Staying in bootloader.
Firmware successfully flashed. Unplug/replug or reset device
to switch back to normal boot mode.
4 items
TYRANNY LIBERATOR

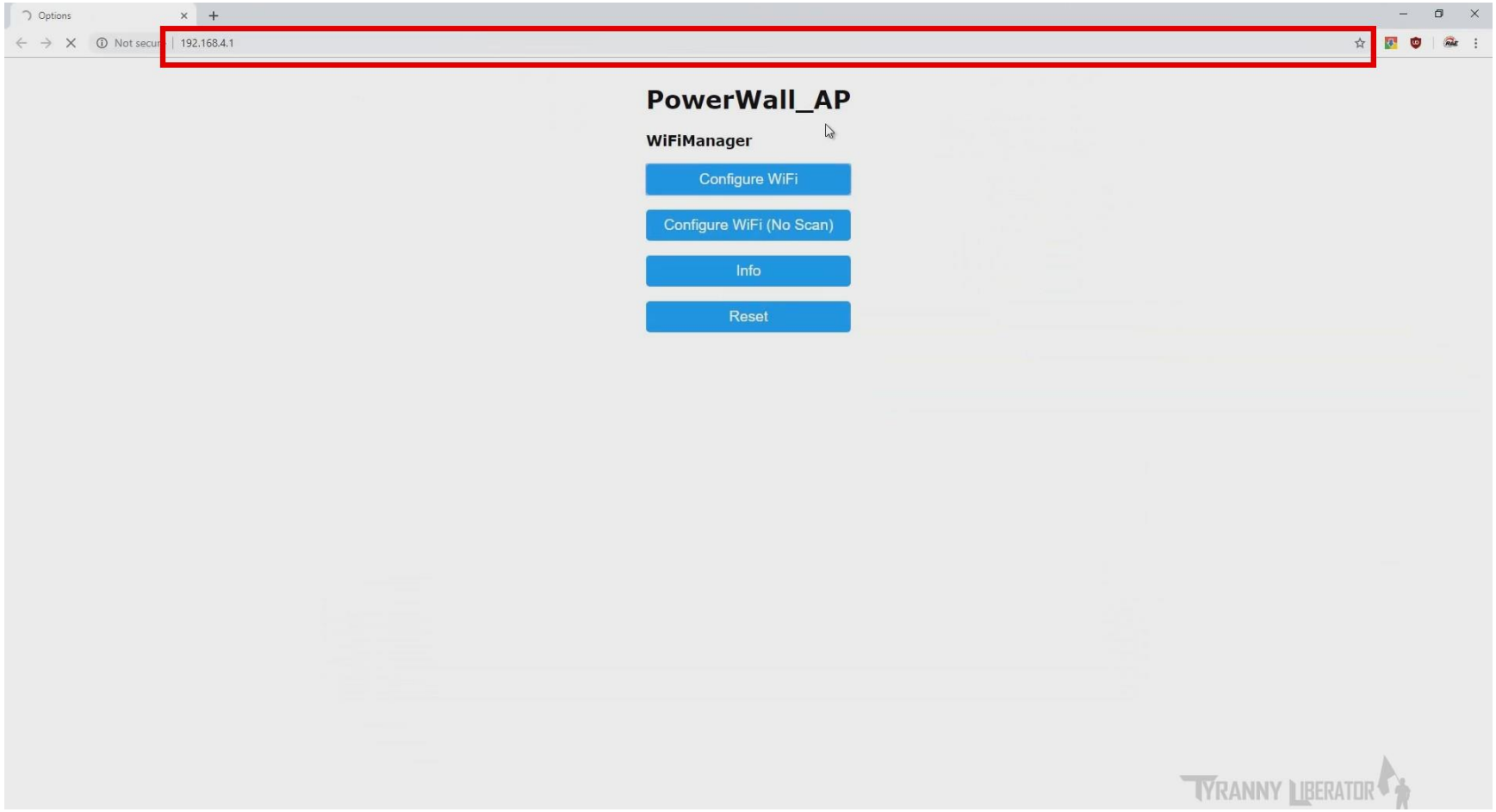
WiFi set-up:

In order to access the device in your network, you must connect to it and set the WiFi credentials from your router.

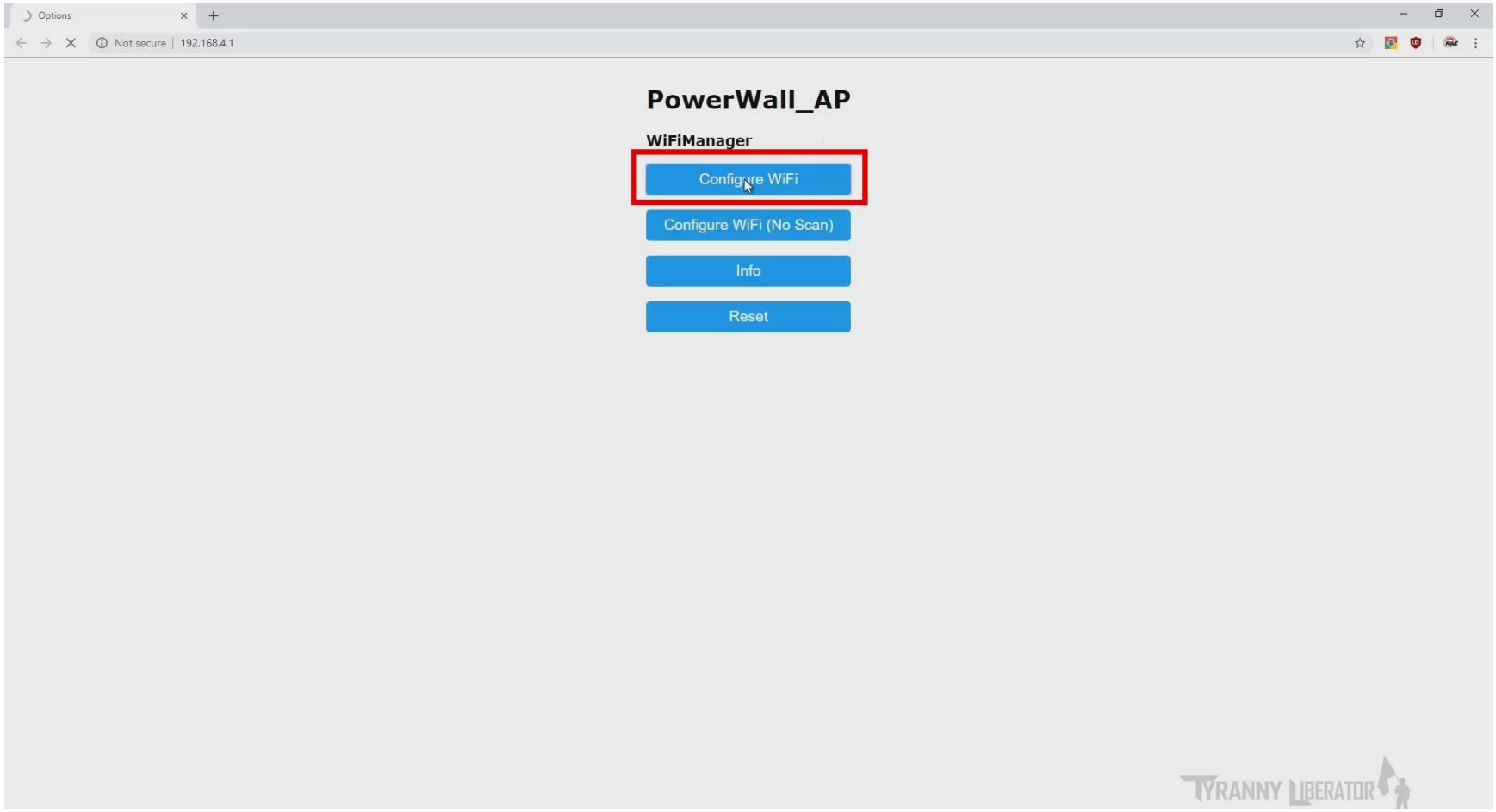
You can perform this step on a phone or laptop with wireless access.

Go to WiFi Connections and look for PowerWall_AP and choose to connect to it. Usually you will get redirected to a configuration page after it's connected. If that's not happening, open an internet browser and type this address: http://192.168.4.1 .

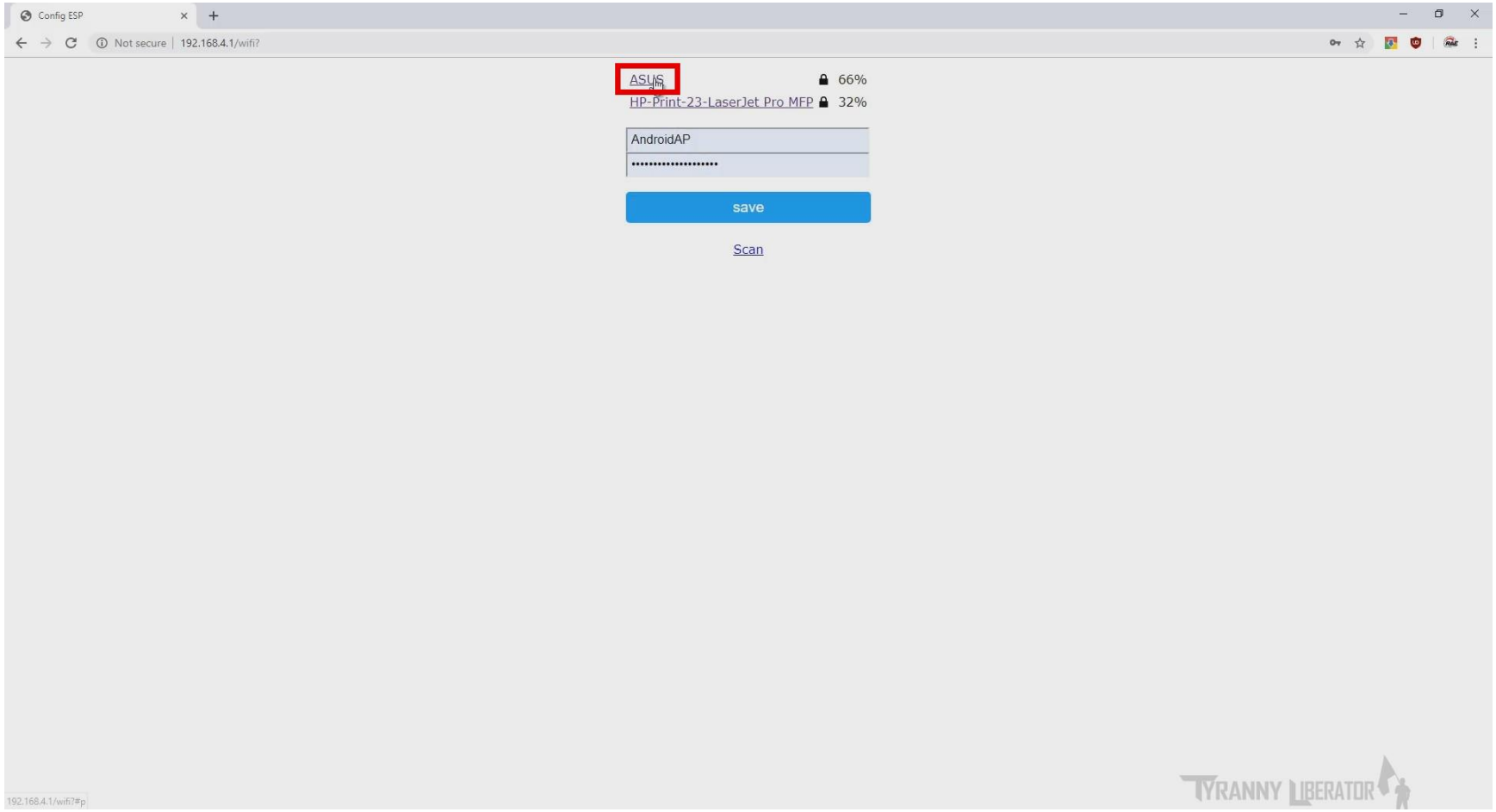



Options
Not secur
192.168.4.1
PowerWall_AP
WiFiManager
Configure WiFi
Configure WiFi (No Scan)
Info
Reset
TYRANNY LIBERATOR

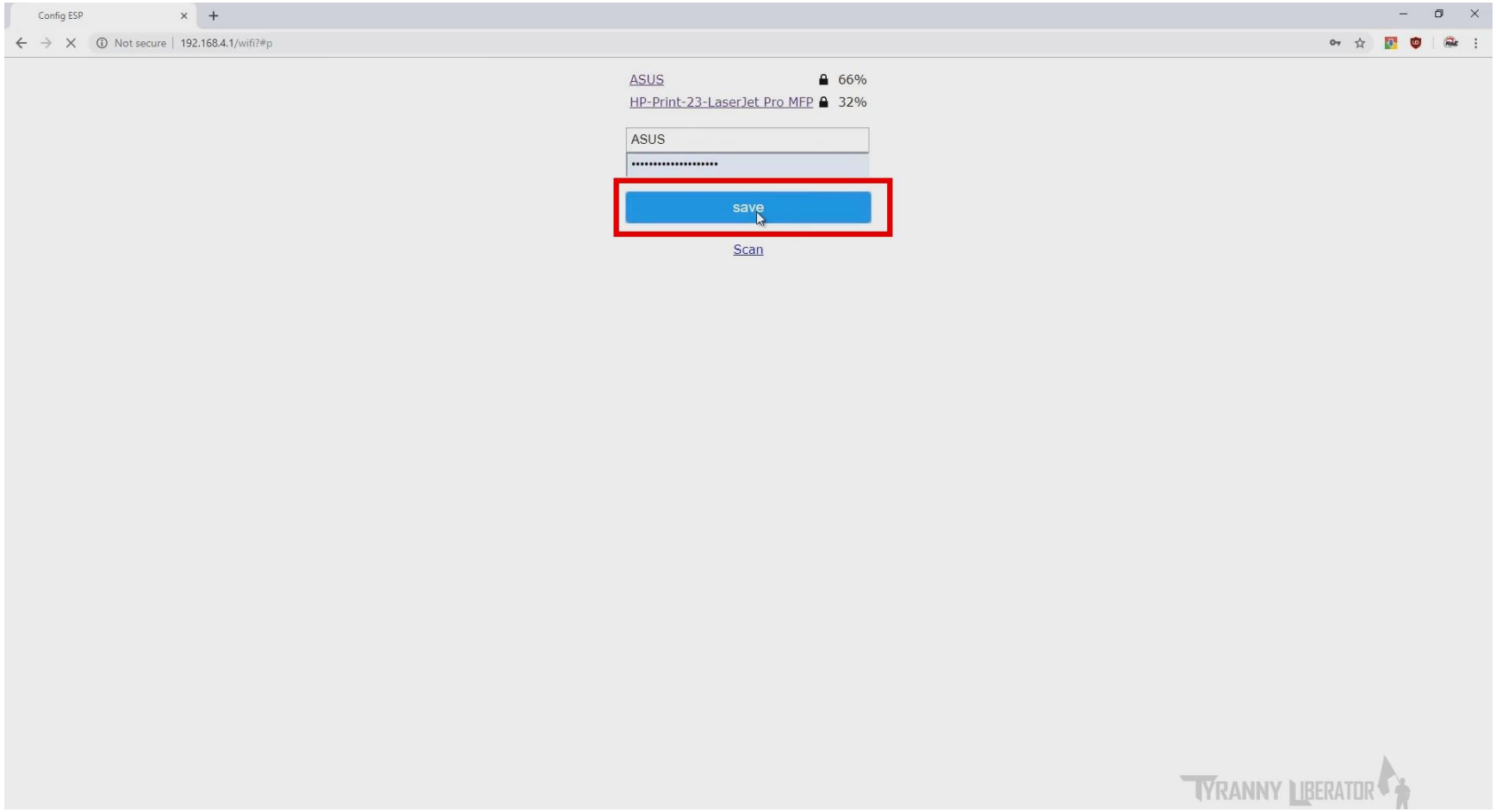
On the configuration page choose the “Configure WiFi” option.



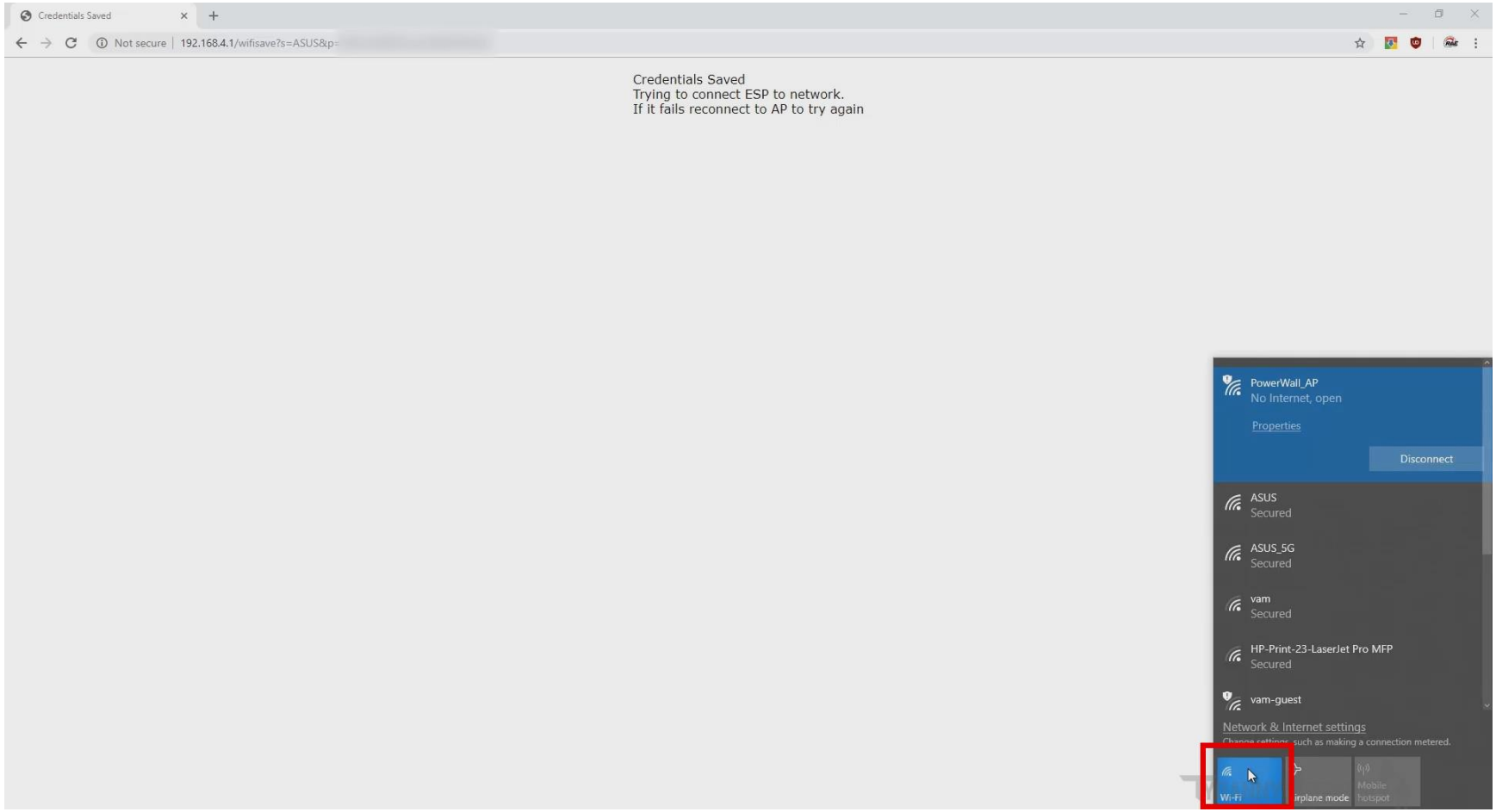
On that page, you will see the available routers to connect to. Choose the System ID of your router by clicking on it, then input your wireless password. Mine is named ASUS.

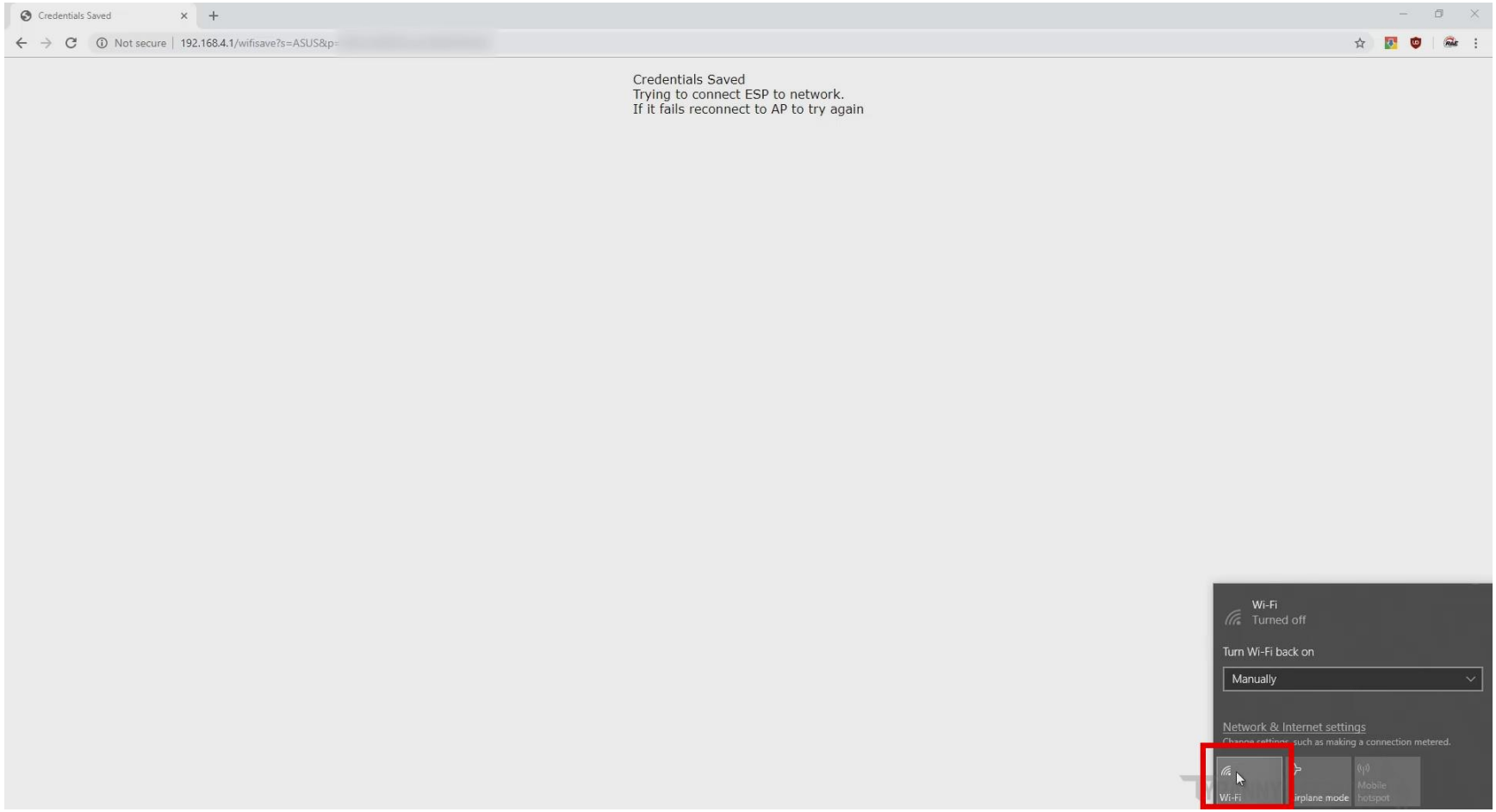


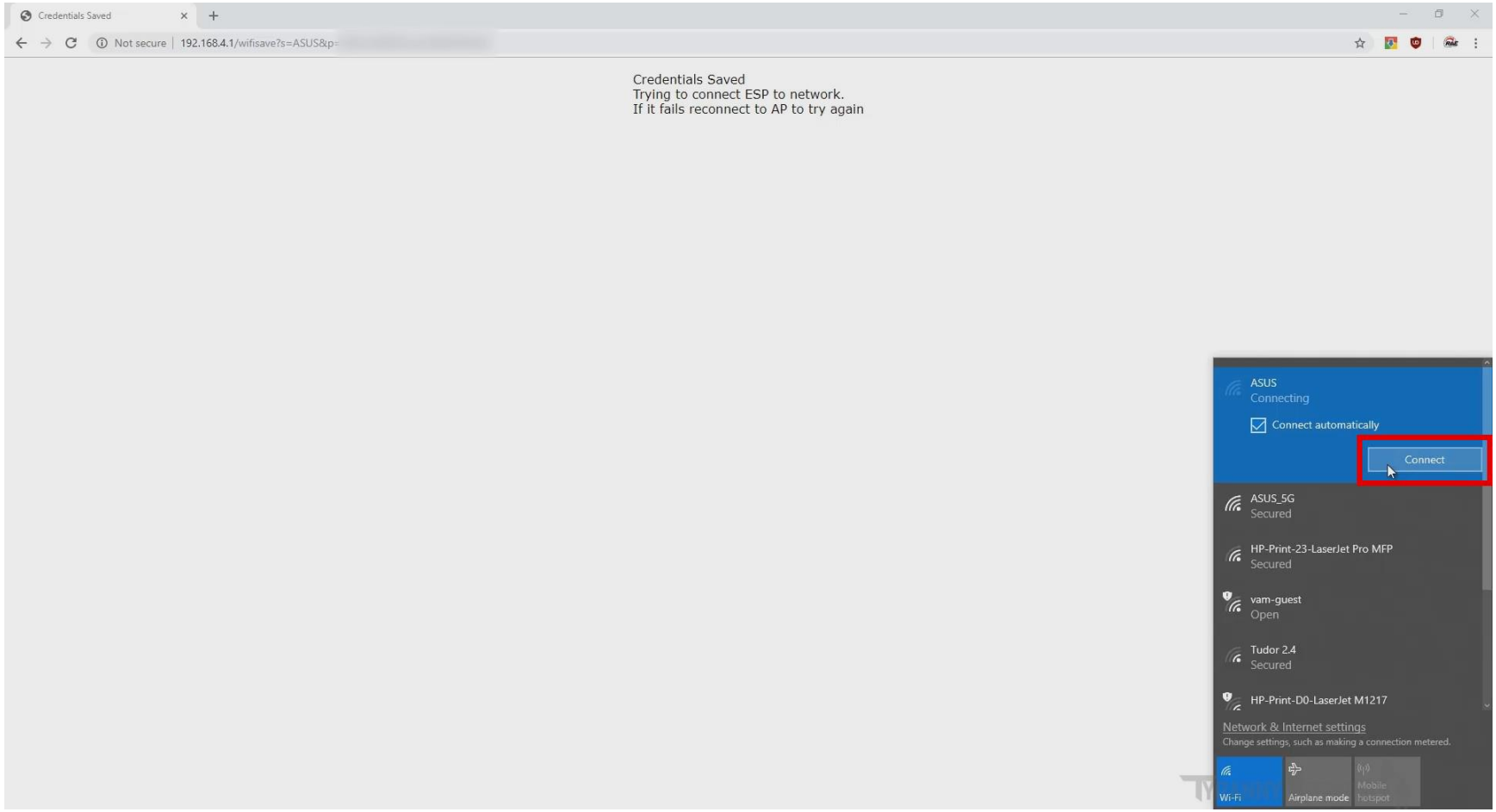
Click Save and the device will reboot and connect to your local network so you can access it from a phone or computer easily.

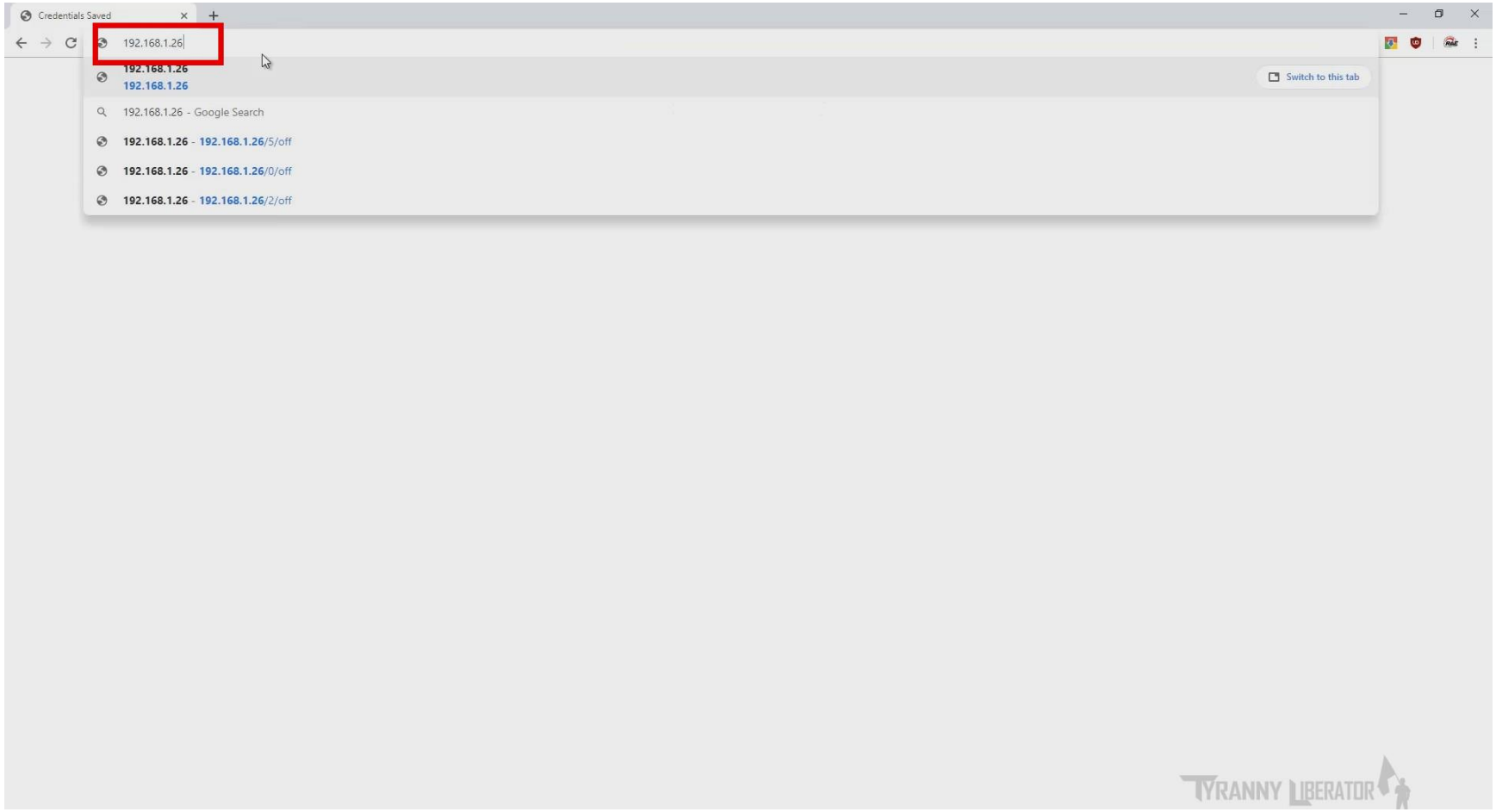


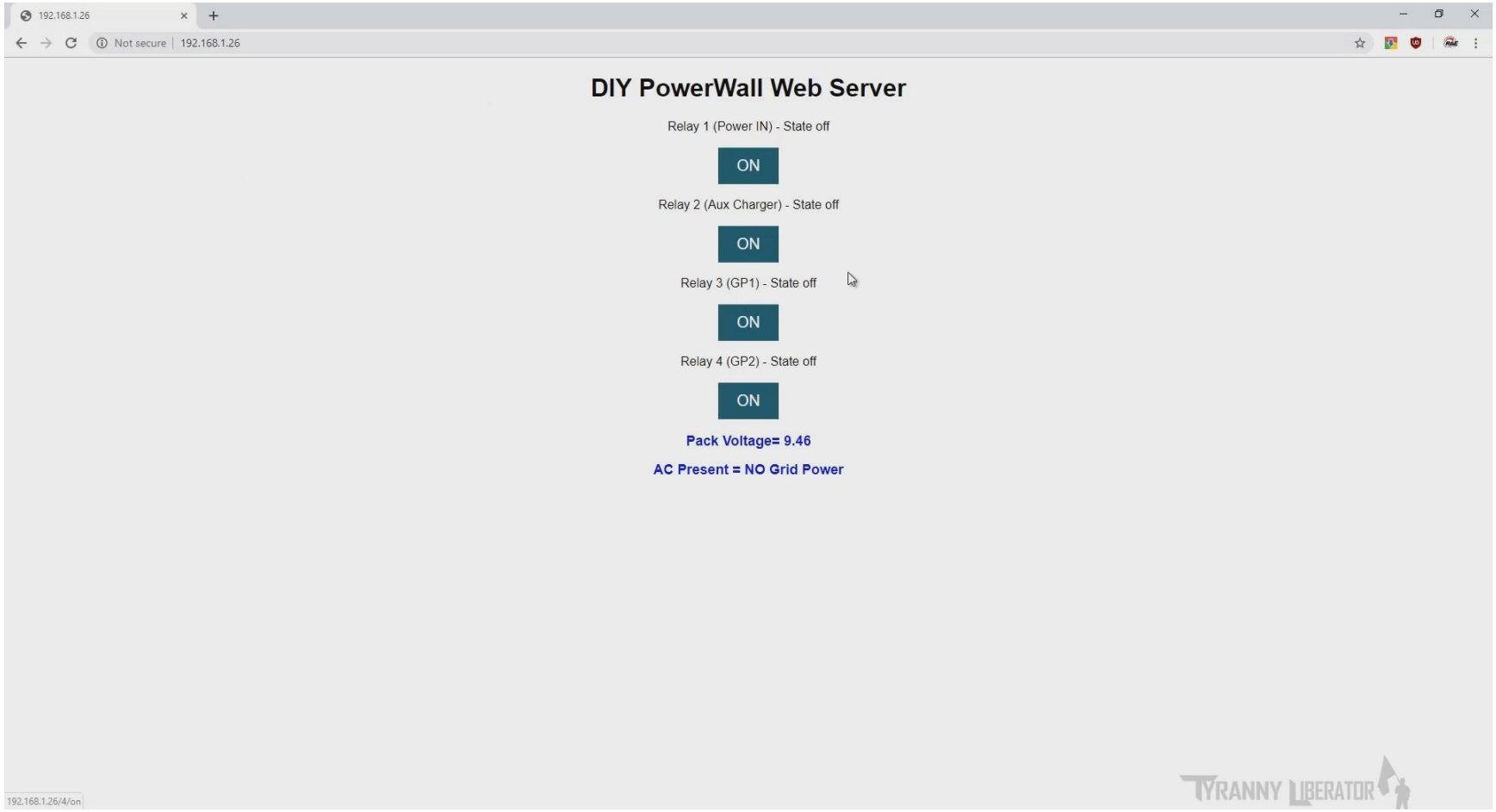
Turn WiFi off and on, connect to your main network and now you can access the IP which has been assigned automatically by your router to get the options for the powerwall.




Credentials Saved
Not secure | 192.168.4.1/wifisave?s=ASUS&p=
Credentials Saved
Trying to connect ESP to network.
If it fails reconnect to AP to try again
Wi-Fi
Turned off
Turn Wi-Fi back on
Manually
Network & Internet settings
Wi-Fi
Mobile hotspot

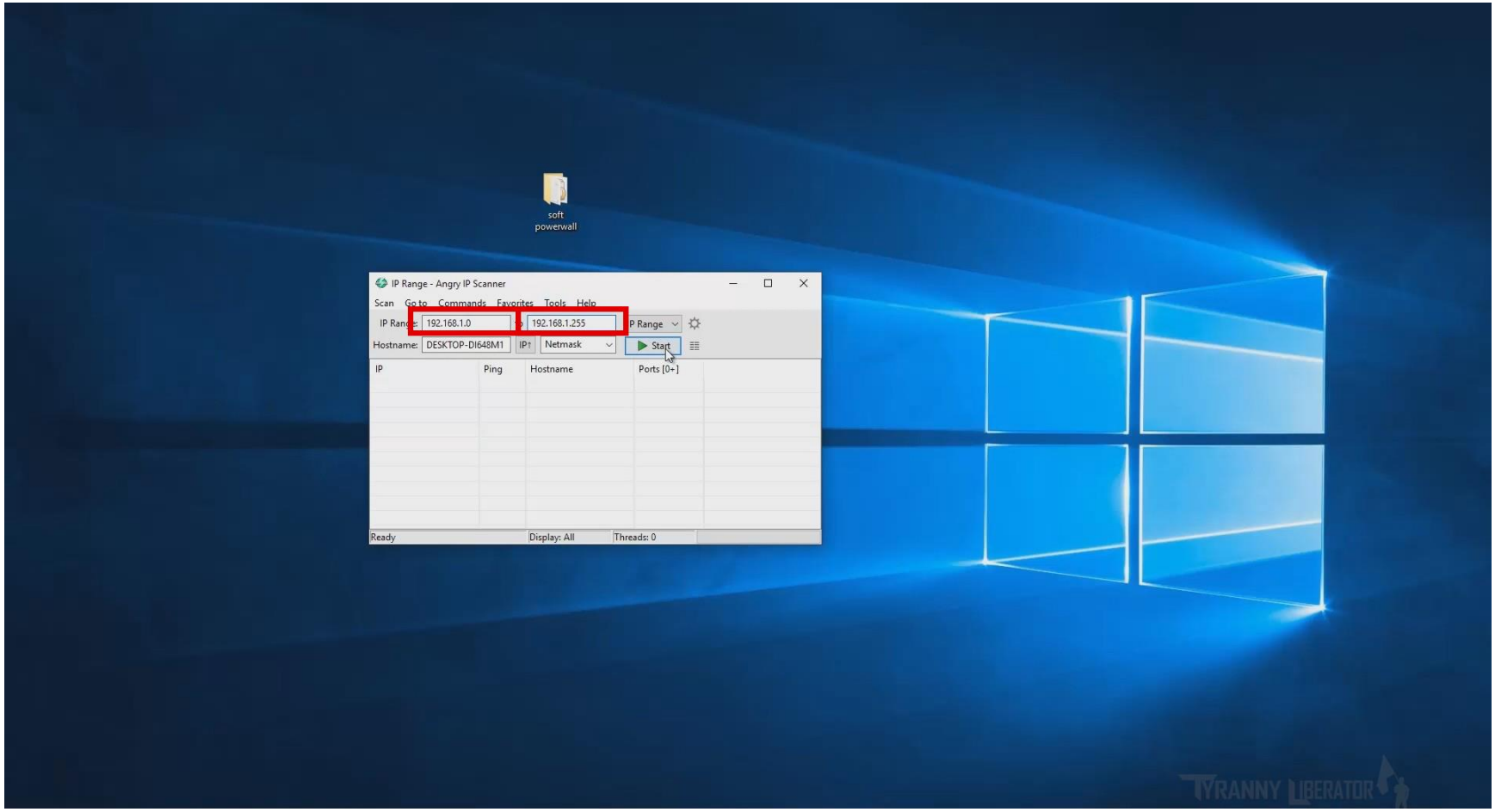

Credentials Saved
Not secure | 192.168.4.1/wifisave?s=ASUS&p=
Credentials Saved
Trying to connect ESP to network.
If it fails reconnect to AP to try again
ASUS
Connecting
Connect automatically
Connect
ASUS_5G
Secured
HP-Print-23-LaserJet Pro MFP
Secured
vam-guest
Open
Tudor 2.4
Secured
HP-Print-D0-LaserJet M1217
Network & Internet settings
Change settings, such as making a connection metered.
Wi-Fi
Airplane mode
Mobile hotspot

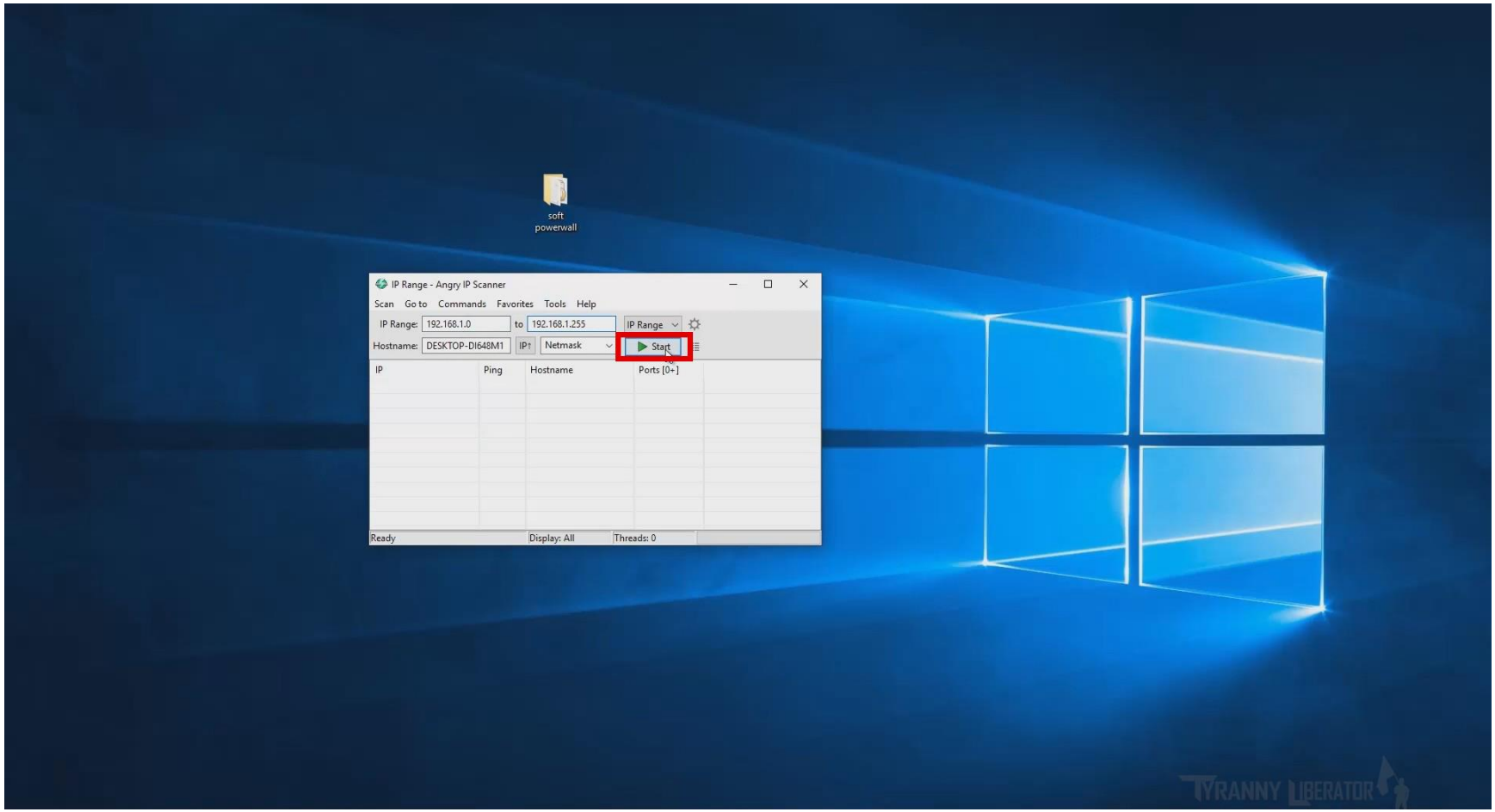

Credentials Saved
192.168.1.26
192.168.1.26
192.168.1.26
Switch to this tab
192.168.1.26 - Google Search
192.168.1.26 - 192.168.1.26/5/off
192.168.1.26 - 192.168.1.26/0/off
192.168.1.26 - 192.168.1.26/2/off
TYRANNY LIBERATOR

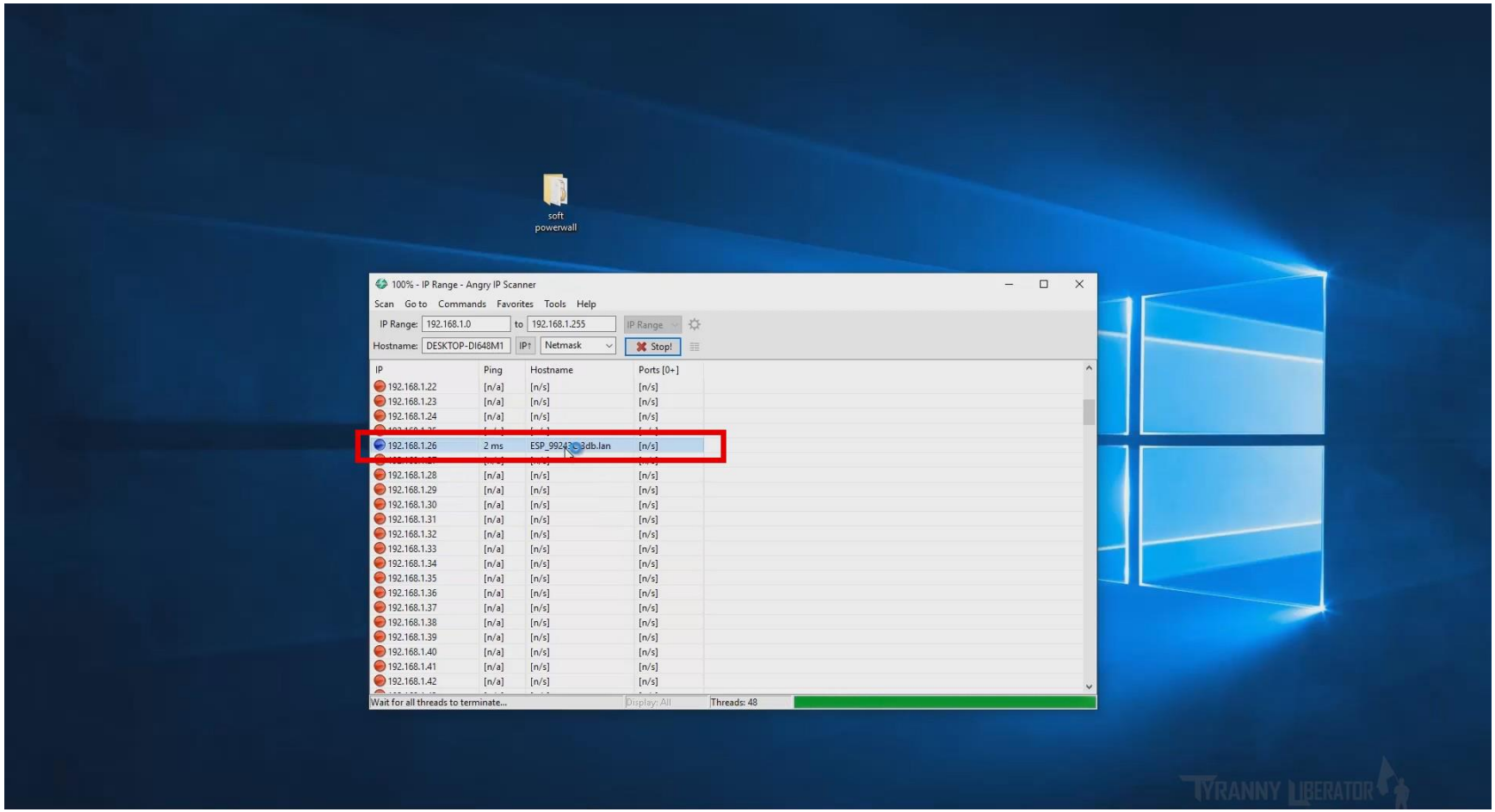

192.168.1.26
Not secure | 192.168.1.26
DIY PowerWall Web Server
Relay 1 (Power IN) - State off
ON
Relay 2 (Aux Charger) - State off
ON
Relay 3 (GP1) - State off
ON
Relay 4 (GP2) - State off
ON
Pack Voltage= 9.46
AC Present = NO Grid Power
192.168.1.26/4/on
TYRANNY LIBERATOR

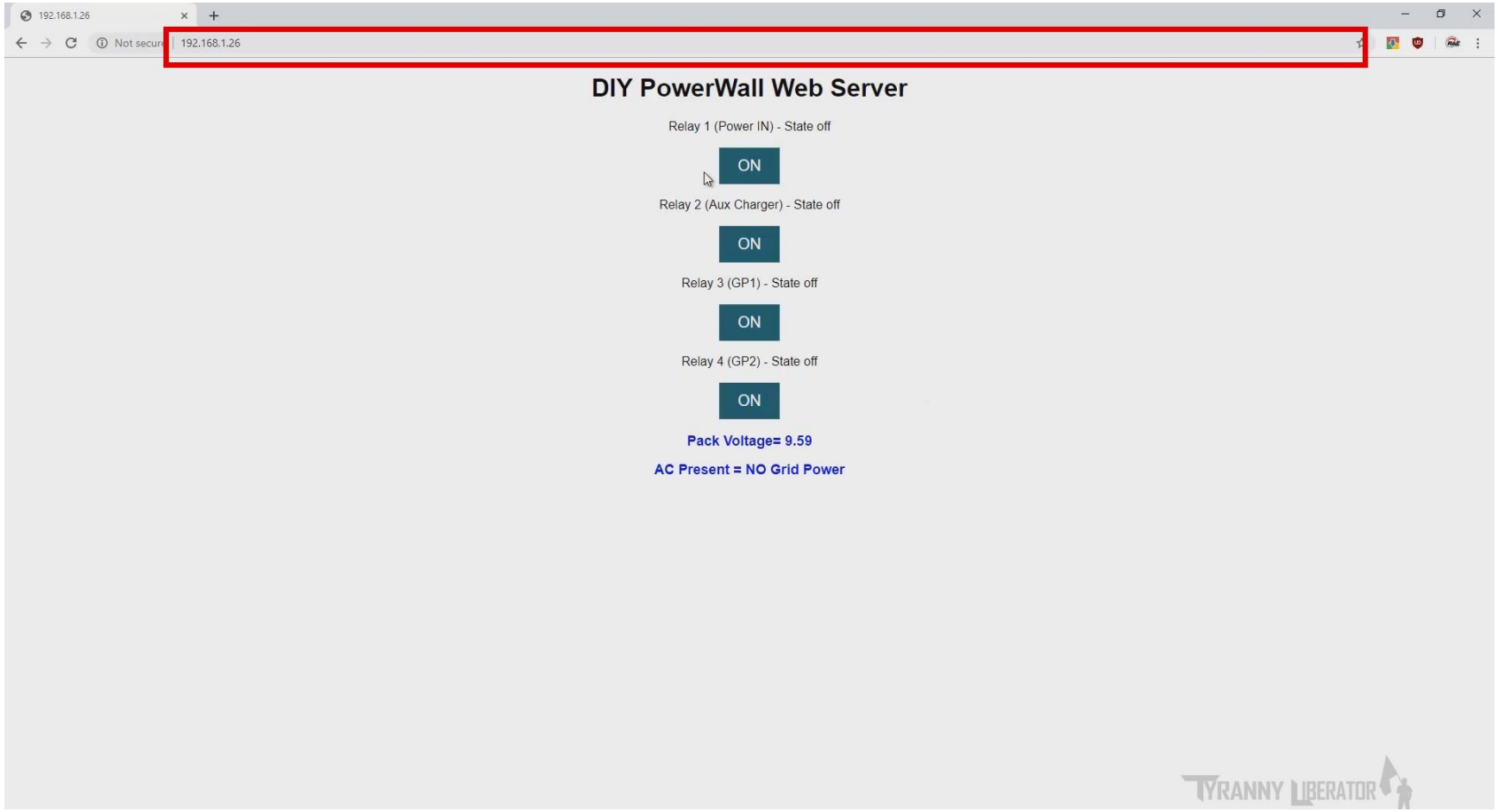
Scan for IP:

To get the IP address you can either connect to your router or check IP's of all connected devices, or you use a network scanning software that's going to list all the devices from your network.




soft
powerwall
IP Range - Angry IP Scanner
Scan Go to Commands Favorites Tools Help
IP Range: 192.168.1.0 to 192.168.1.255 IP Range
Hostname: DESKTOP-DI648M1 IP↑ Netmask Start
IP Ping Hostname Ports [0+]
Ready Display: All Threads: 0
TYRANNY LIBERATOR


soft
powerwall
100% - IP Range - Angry IP Scanner
Scan Go to Commands Favorites Tools Help
IP Range: 192.168.1.0 to 192.168.1.255 IP Range
Hostname: DESKTOP-DI648M1 IP↑ Netmask Stop!
IP Ping Hostname Ports [0+]
192.168.1.22 [n/a] [n/s] [n/s]
192.168.1.23 [n/a] [n/s] [n/s]
192.168.1.24 [n/a] [n/s] [n/s]
192.168.1.26 2 ms ESP_99243C3db.lan [n/s]
192.168.1.28 [n/a] [n/s] [n/s]
192.168.1.29 [n/a] [n/s] [n/s]
192.168.1.30 [n/a] [n/s] [n/s]
192.168.1.31 [n/a] [n/s] [n/s]
192.168.1.32 [n/a] [n/s] [n/s]
192.168.1.33 [n/a] [n/s] [n/s]
192.168.1.34 [n/a] [n/s] [n/s]
192.168.1.35 [n/a] [n/s] [n/s]
192.168.1.36 [n/a] [n/s] [n/s]
192.168.1.37 [n/a] [n/s] [n/s]
192.168.1.38 [n/a] [n/s] [n/s]
192.168.1.39 [n/a] [n/s] [n/s]
192.168.1.40 [n/a] [n/s] [n/s]
192.168.1.41 [n/a] [n/s] [n/s]
192.168.1.42 [n/a] [n/s] [n/s]
Wait for all threads to terminate...
Display: All
Threads: 48
TYRANNY LIBERATOR



I know that it might look overwhelming for some users, but if you pay attention and follow the video step-by-step, you should not have any problems setting this up. The nice thing is that you set it once and forget about it.

Once the brain of the unit is programmed, I place it inside the circuit that I built.