

Wave Painter is Eurorack conversion kit for Jye Tech WAVE2 oscilloscope



Build Guide

WAVE2 Is a cheap mini dual channel oscilloscope from JYE TECH.

You can find more info about the Wave2 at the Jye Tech website:

<https://jyetechnology.com/wave2-2-channel-portable-oscilloscope/>

Wave Painter:

The conversion kit lets you convert the WAVE2 into a Eurorack module.

The kit contains two parts:

- 14 Hp Panel
- Conversion Board

This is an easy DIY project, just follow this instruction guide.

There are several steps in the assembly process:

1. [WAVE2 Analog board assembling.](#)
2. [WAVE2 Main board assembling.](#)
3. [WAVE2 Calibration.](#)
4. [Conversion board assembling.](#)
5. [Putting all together with the panel.](#)

You will need those tools for the assembling process:

1. Soldering Iron and soldering wire
2. SMD tweezers
3. DMM - Multimeter
4. Cutter
5. Plier
6. Alligator clip wire
7. USB cable with micro USB type B connector
8. USB Power source (Computer with free USB socket or Power Bank or 5V phone charger) to test the scope.



BOM:

The updated part list is available at:

https://github.com/Shayshez/WavePainter/blob/master/WavePainter_BOM.xlsx

SMD Soldering:

The conversion board contains SMD parts, if this is your first SMD project don't worry, you'll find out it's easier than you think and It's just a matter of the right technique.

I recommend watching the tutorial in the link below from the wonderful EEVblog:

<https://www.youtube.com/watch?v=b9FC9fAlfQE>



Getting Started:

Before you start the assembly process please test WAVE2 main board:

1. Connect the USB Cable to the Micro-USB port on the Main Board and a USB power source.
2. Ensure your WAVE2 boots up correctly. When powered on, the LED will blink 3 times and the screen will turn on.

For more information please refer to the attached WAVE2 assembly guide (step 1).

GOOD LUCK!

STEP 1 – WAVE2 ANALOG BOARD ASSEMBLING:

Inside WAVE2 kit you will find the analog board (the smaller board) and a small zip lock bag with resistors, pin headers and BNC connectors.
you don't need the BNC connectors for this project, you can keep them for an other DIY project...

1. RESISTORS:

Solder 26 resistors in their places.

Use your multimeter to identify each resistor value (or use resistors color code)

Follow this list for resistors placement:

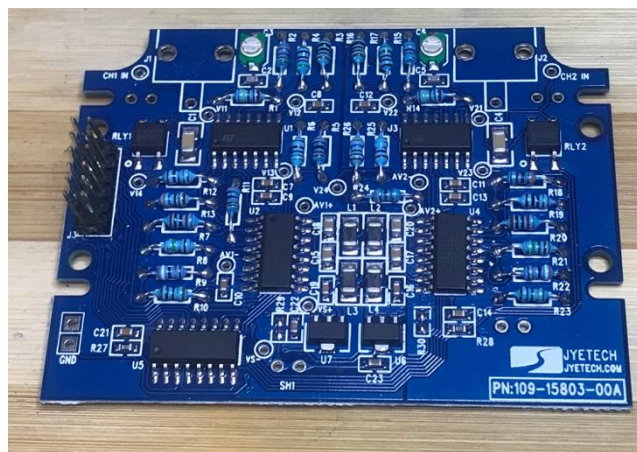
1MΩ	R1, R14
51KΩ	R2, R15
2KΩ	R3, R16
510Ω	R4, R17
3KΩ	R5, R11, R18, R24
1KΩ	R6, R12, R19, R25
820Ω	R7, R20
150Ω	R8, R21
39Ω	R9, R22
10Ω	R10, R23
360Ω	R13, R26

2. PIN HEADER:

Solder 6X2 / 2.0mm Pin header to J3,

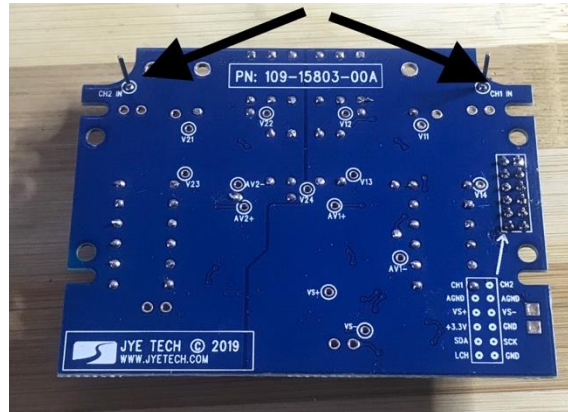
Pin headers should be soldered on the same side of the resistors,

Pay extra attention to solder it on the correct side of the board.



3. SIGNAL INPUTS:

Use 2 1X1 pin headers and solder them to the back of the board to “CH1 IN” and “CH2 IN” those headers will help you calibrate the unit soon.



STEP 2 – WAVE2 MAIN BOARD ASSEMBLING:

Inside WAVE2 kit you will find the main board (the bigger board),
You need to assemble:

1. ENCODER:

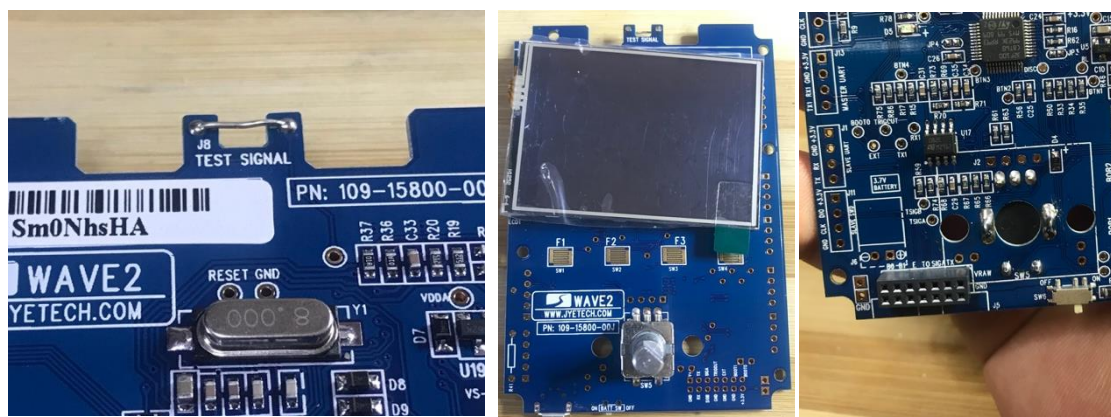
Please pay attention to use the exact part from the BOM.
Solder the encoder in place (SW5), you will probably need to straighten the encoder mounting pins to insert the encoder to the holes successfully, use plier for that.

2. TEST SIGNAL JUMPER:

Use one of the resistors legs left over from the previous step and solder a bridge between the 2 holes of J8 “TEST SIGNAL”

3. PIN HEADER:

Solder 2X7 / 2.0mm female header (J5)

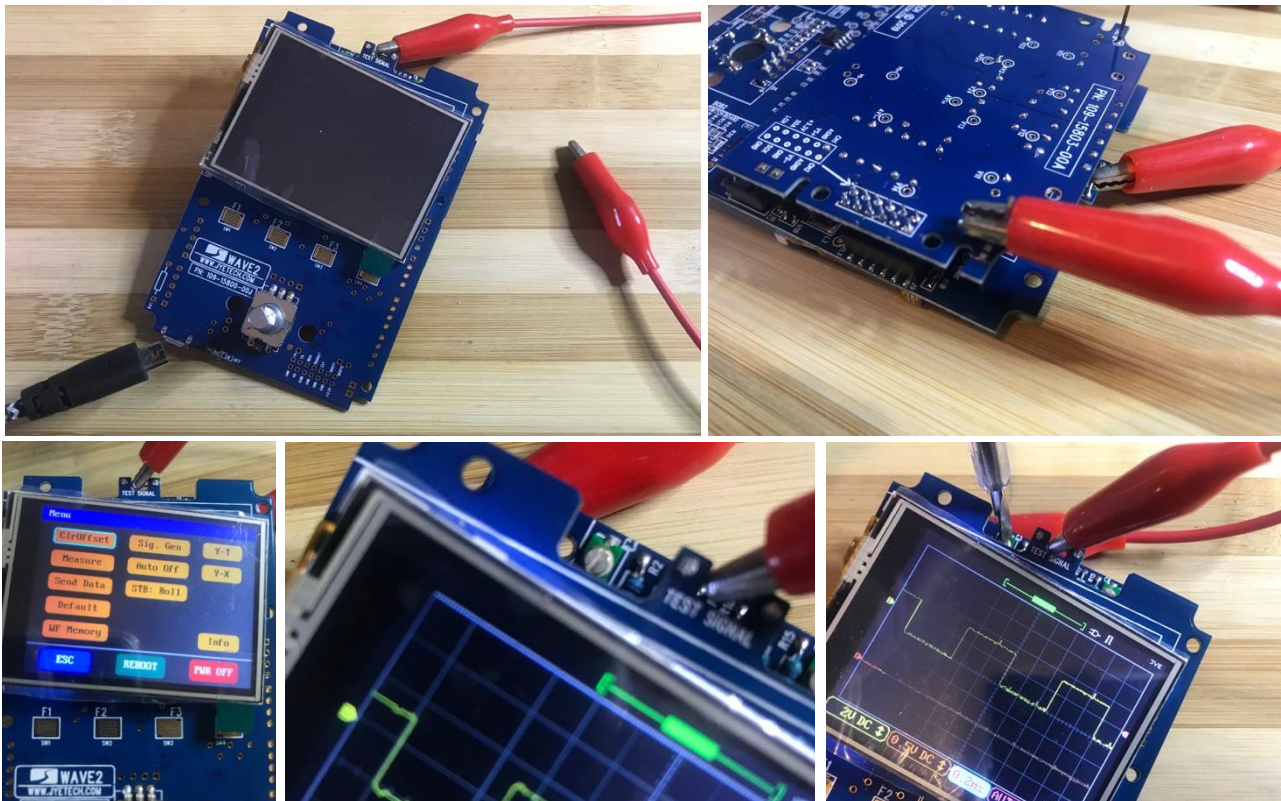


STEP 3 – WAVE2 CALIBRATION:

This is an excellent time to test WAVE2 analog board and calibrate it, for this step you will need alligator clip wire, USB cable and USB 5v power source (power bank, computer or cellphone charger).

1. Connect WAVE2 Main board and Analog board together.
2. Use alligator clip wire to connect between the main board “TEST SIGNAL” jumper to CH1 IN on the analog board (the pin header you soldered earlier).
3. Use USB cable to apply power to the main board, if everything is good the unit should boot up and you should see a square wave on channel 1.
4. Press the encoder once to get into the menu and a second time to choose “ClrOffset” (the first option).
5. Set input V/div to 2V (rotate the encoder).
6. Choose the 3rd option from the left at the bottom menu by pressing it on the touch screen and use the encoder to set Time/div to 0.2ms
7. If the square wave symmetry is not perfect use a screwdriver to adjust C3.
8. Connect the alligator clip to CH2 IN and repeat sections 4-7 for the second channel (to set channel 2 V/div press it on the touch screen and use C5 to adjust channel 2 symmetry).

*For further information please refer to step 6 on WAVE2 assembly guide.



STEP 4 – CONVERSION BOARD ASSEMBLING:

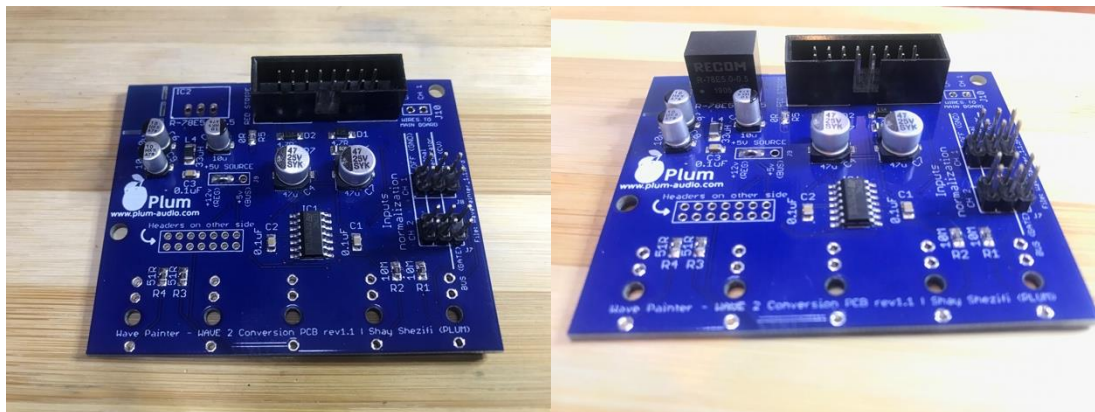
1. Solder all SMD parts in their places



2. Solder Power header, 2 2X3 headers to J7, J8 and 1X3 pin header to J9

*** Note about J9:**

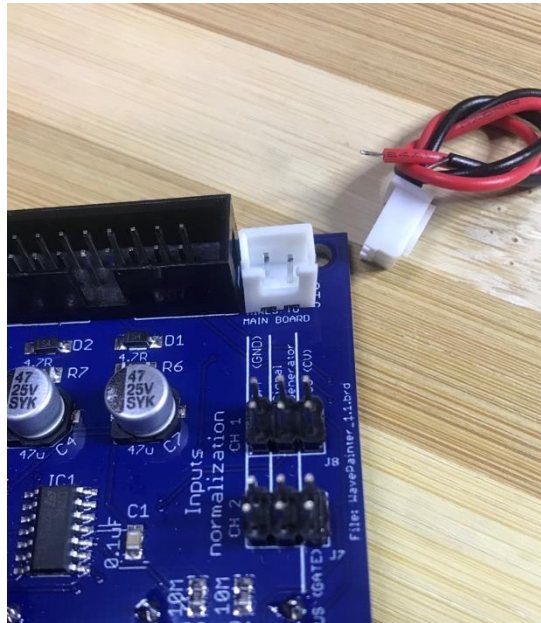
This header is there to choose 5v source needed to power up the scope, in most cases I'd recommend using power from the regulator to get a clean and filtered power, so if you want the regulator power you can bridge the 2 left holes and not using headers.



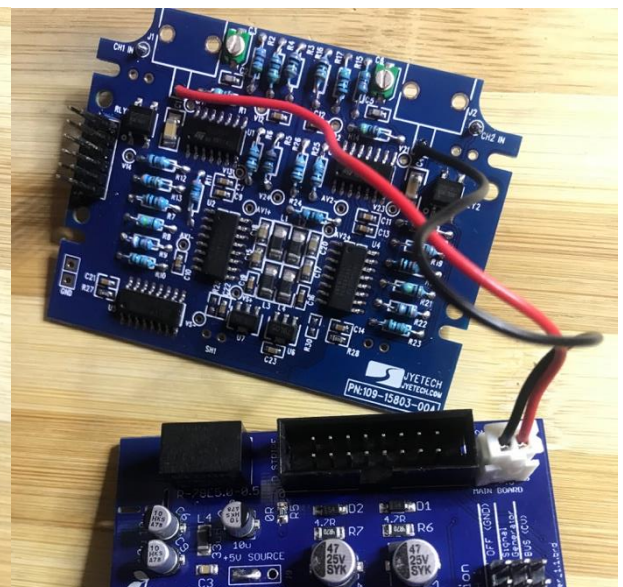
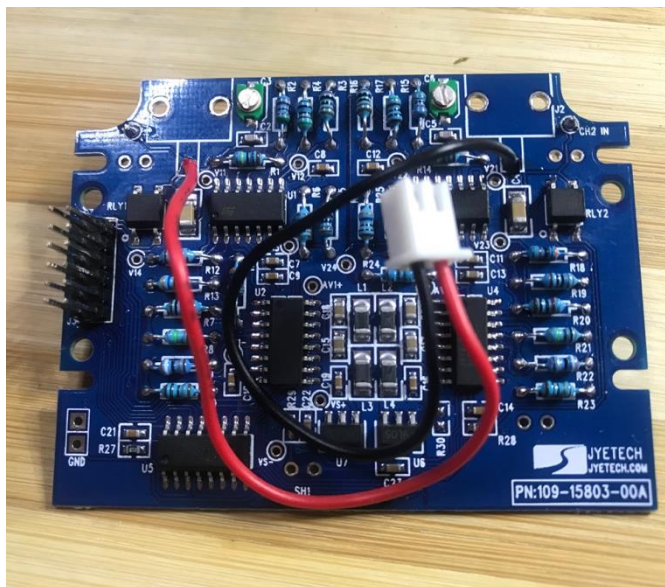
3. Solder the RECOM R-78E5.0-0.5 Regulator (IC2).
4. Flip the board and solder 5 Thonkiconn jacks.



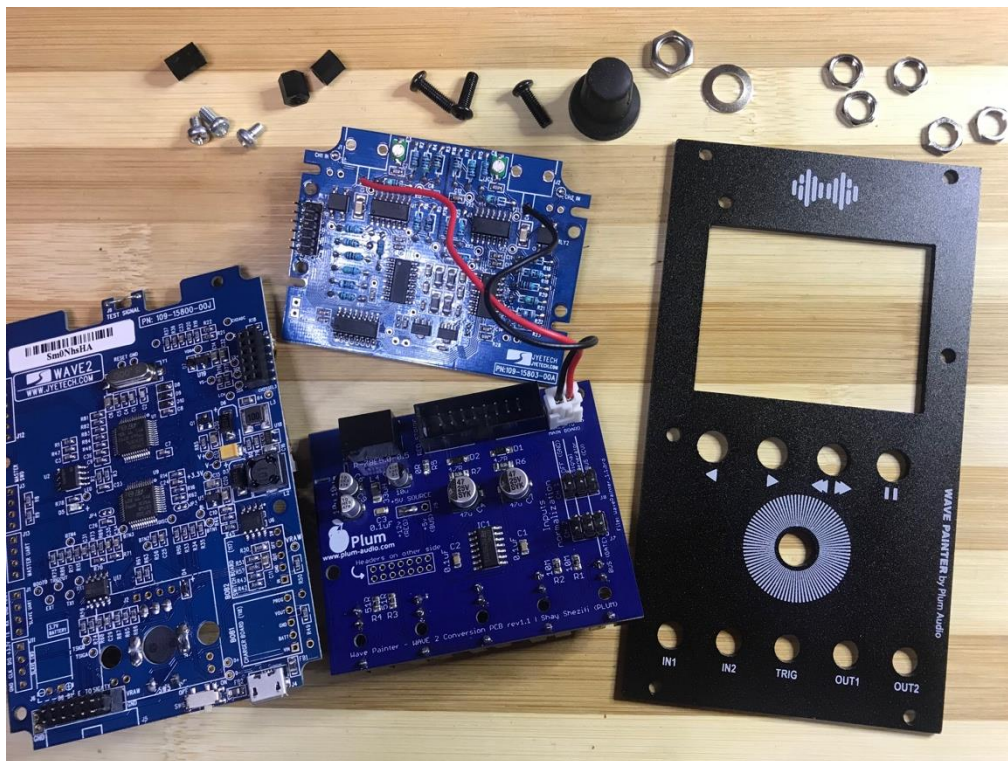
5. In WAVE2 kit you will find a small bag with a black & red wires and a small white connector, use plier to bend the white connector legs so you will be able to solder it vertically to J10, the cut out of the connector should face down.



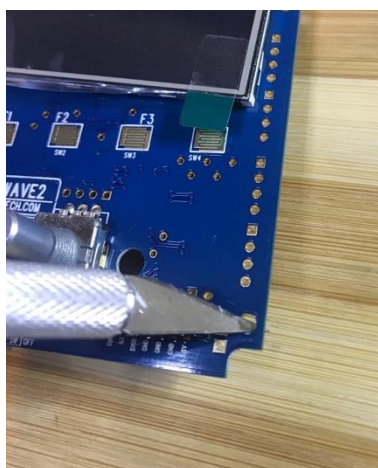
6. Solder the Black/Red wires to the bottom holes of the BNC connectors footprints (J1, J2) on WAVE2 analog board. Red wire to CH1, Black wire to CH2.



STEP 5 – PUTTING ALL TOGETHER:



1. Use a sharp knife to expand (a little bit) the bottom right mounting hole of the main board, attach there the 5mm standoff with 4mm screw.



2. Put the rubber buttons in their place on the panel, hold the panel in your hand and place the main board on the panel.



3. Use the 3 black screws (M3 / 10mm) to fix the main board to the panel, don't tighten the screws so you can adjust screen position and pull out the protective sheet.



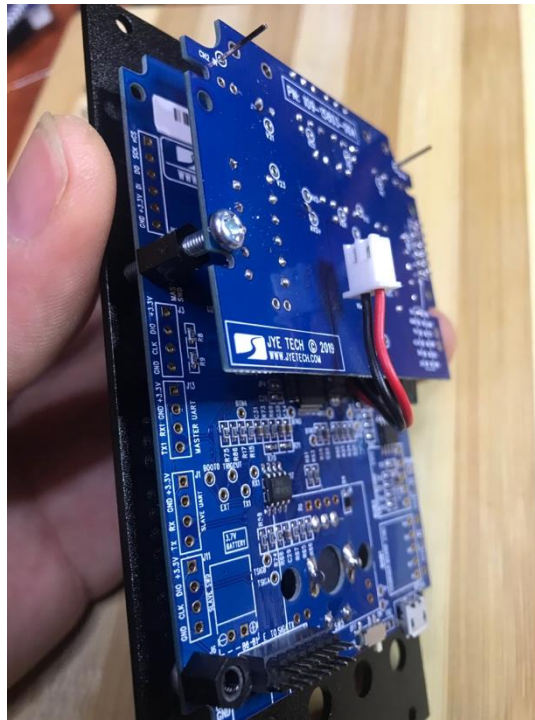
4. Put washer on the encoder shaft and tighten the nut.



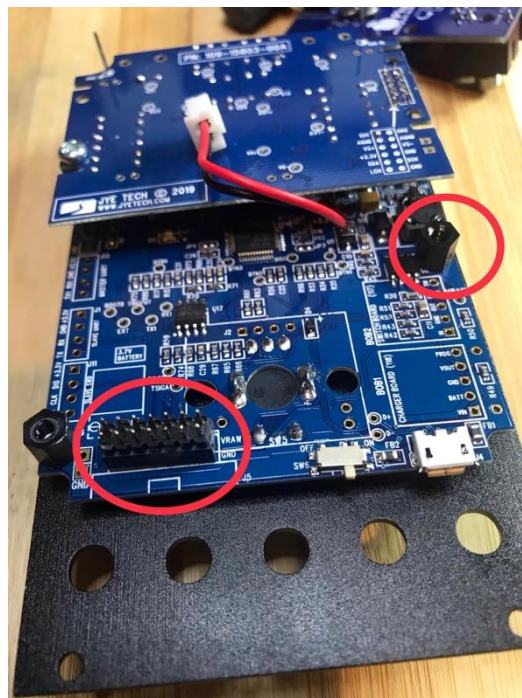
5. Attach the 8mm standoff on the top of the black screw



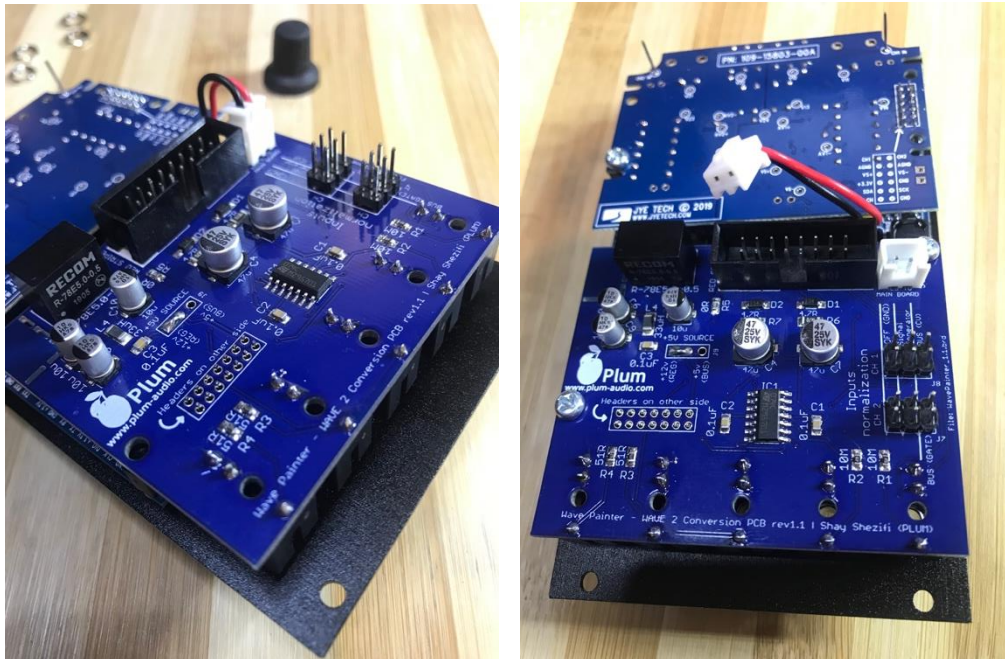
6. Connect the analog board to the main board and tight the screw to the standoff (if you need to expand the hole, use sharp knife)



7. Connect the male 2X7 2.0mm pin headers to the female header and attach the 5mm standoff to the right black screw



8. Attach the conversion board in place and tighten the two M3 x 4mm screws to the standoffs.



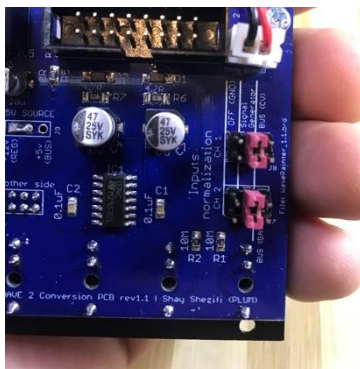
9. Tighten the jack nuts



10. Solder Pin headers on the back of the conversion board



11. Attach the knob



Input normalization Jumpers Positions:

On the back of the module, use 2 jumper covers to set which signal will pass through the scope to the outputs when no jack is plugged in (one jumper cover for each channel).

Left: GND, the 0v of your system, used to easily calibrate offset of the scope. this is the default settings if you want the scope outs to stay in silence when nothing is plugged in.

Middle: Internal signal generator of WAVE2, you can set the internal signal generator to common waveforms in any frequency, ide like to use this settings as reference tone to tune other oscillators in my system or even as additional fixed modulation source.

Right: CV/GATE rails of your bus board, I did this to easily connect the outputs from my upcoming mixer module (Baker, see picture ->) without the needed to patch Wave Painter, but you can use this method to "listen" to those rails, it is very easy to connect modules to those rails with jumper wires inside your case (check first if there's no module in your case that already uses those rails).



You're done!

Check your new Wave Painter and read WAVE2 manual to understand how to operate it.

If you have problems, questions or if you found mistakes in this document visit [PlumAudio DIY First Aid](#) group at Facebook to get help or to contact me.

With Love,

Shay Shezifi,
Plum Audio

