TB-FX Build Guide

TB-303 Inspired Effects Module

V1.1.1 October 2024

The TB-FX Eurorack module is an 8hp effects module that combines both a simple short period delay and gritty overdrive that both compliment the classic 303 tones from the rest of the TB series.

EFX1 – Delay

Starting with the delay, the module uses the classic chip used in many guitar pedals, the PT2399, which provides a digital delay on chip with an analog-esque tone. The chip allows delays from between 30ms and 340ms. At its lowest setting the delay provides an almost flanger like tone and depending on the BPM of your track, you can get one or two notes of delay in sync.

The module provides pot based controls of the dry/wet mix of the signal, the number of repeats and the overall delay time.

EFX2 – Overdrive

The second effect provided by the module is loosely based on the Roland blues drive circuit with some added gain control. The 303 again loves some overdrive / distortion – its used in almost all the classic tunes that have an instantly recognisable 303 sound.

Control of the overdrive consists of three pots, the drive amount, the tone of the drive and an overall level or gain control.

Combine the two effects by sending the output of one into the input of the other!

Add Some Noise

The module also includes two noise sources, a white and a pink noise derived from the fabled 2SC828 transistor, the one all the fuss was about in the 808 – the reality is any NPN with ECB can generate noise and the circuits taken from Roland's System 100 morph this into white and pink tones – control of the amount of noise is via a trimmer on the rear.

The TB-FX is available as a panel and pcb set, a panel and pcb set with partial kit and in limited numbers as a pre-built, tested and calibrated module.

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!!! Important Notes !!!

Note on electrolytics. I've tried to make it possible to use normal 11mm capacitors, so you will see a marking on the silkscreen showing where you can lay the capacitor on its side. The solid white line designates the side where the -ve stripe should end up. You can of course use <11mm high caps and stand them up, but if you are like me I have loads of 11mm normally.

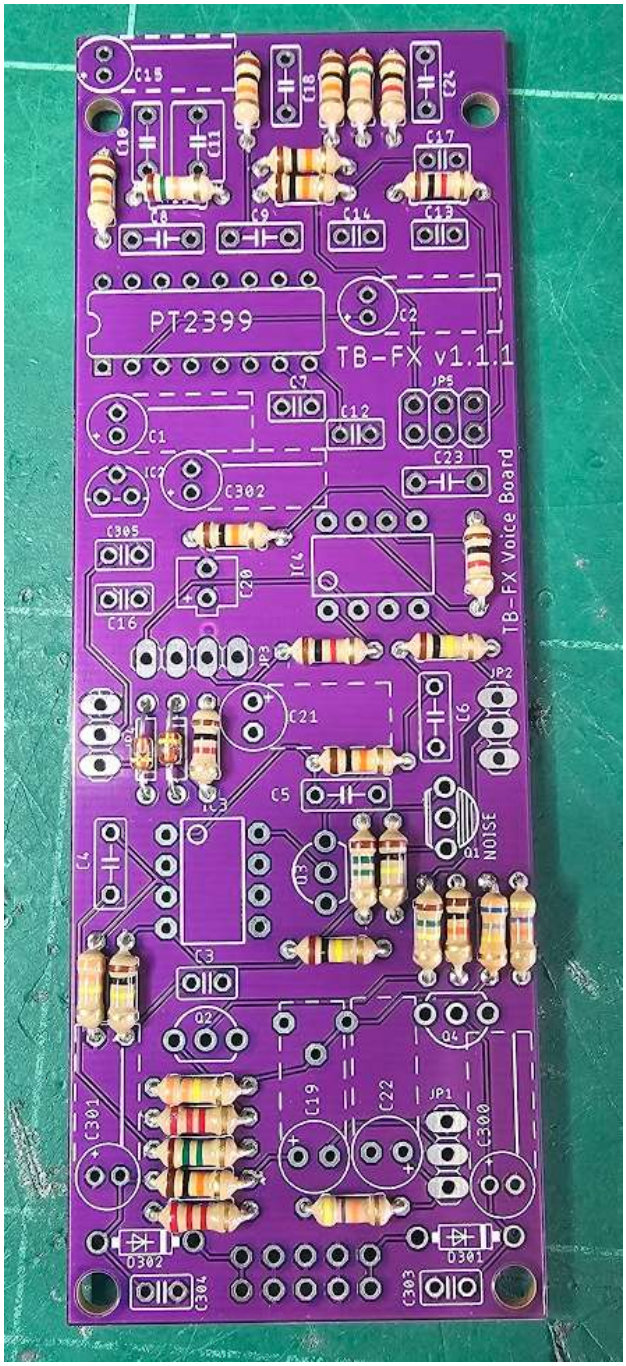
Enjoy!

Lower – Voice Board

Start with the board marked as the voice board.

1. Solder the 1S133 diodes. If you have 1N4148 these will work also.
2. Solder all the resistors.

   In the BOM, those marked in blue text are on the upper control board.



3. Solder the two 1N5817 diodes.
4. I like to add the IC sockets next, so if you are using them, place the single 16 pin DIP and 2x 8pin DIP sockets.
5. Next comes the capacitors, again my routine is usually;

    a. MLCC small ceramics and Tantalum
    b. Polyester/polypropylene yellow/greenies and the poly box ones

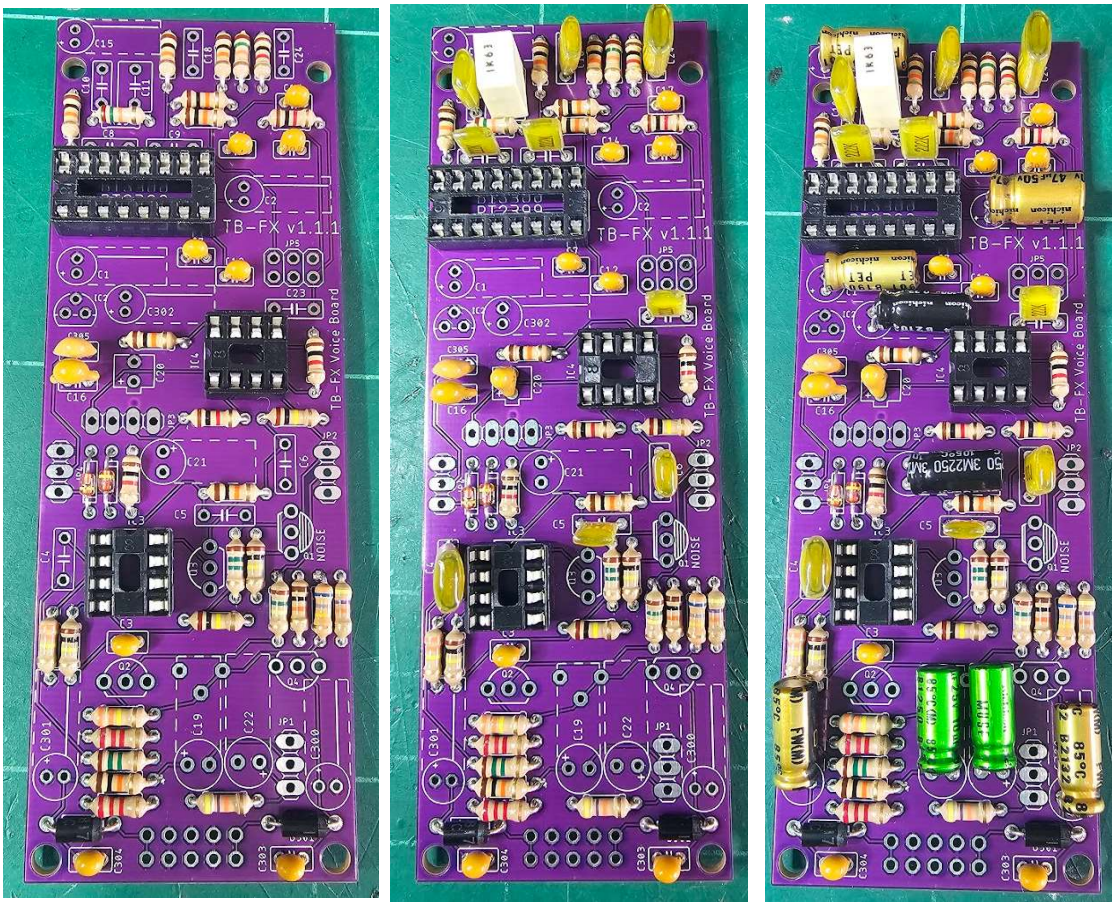
    The 33nF poly caps maybe quite tall and could cause problems with clearance for the upper board. If you have large ones, you can angle them so you can lean them over and reduce their height.

    For the PolyBox 1uF, make sure its 10mm or less, and ensure its flush with the PCB

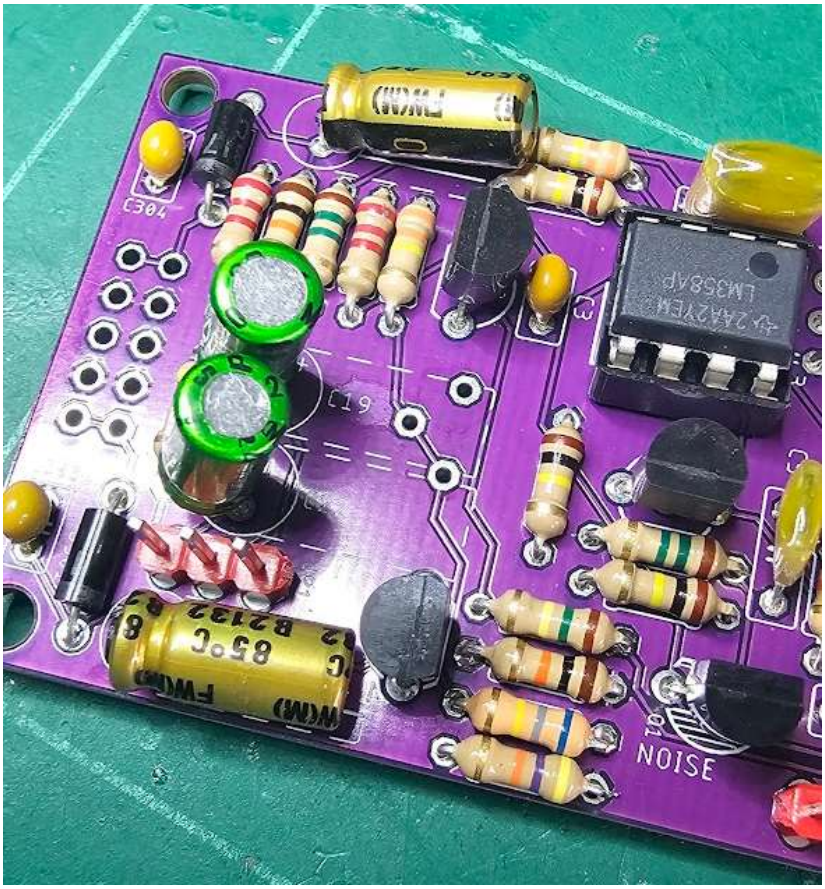
    c. Finally, the electrolytics.

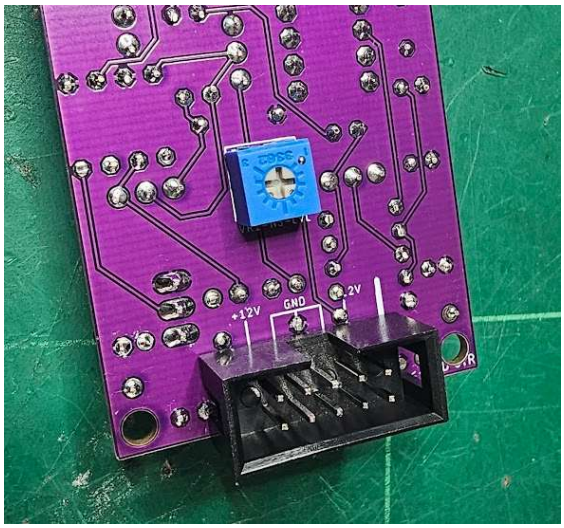
    Due to the stacking of the boards and the normal 11mm clearance between them, you cannot stand up the electrolytics if the are standard 11mm themselves. If you have low profile electrolytics, all good, but otherwise insert the caps and bend them over to sit parallel to the board in the space marked in the silkscreen.

    The solid white line marks the side where the -ve marking should end up.



6. Now we can add the transistors and VR IC
7. Add the ICs, the 2 op amps and the PT2399 delay chip.
8. Add the Euro 10pin header and the 3pin trimmer **on the reverse side of the board. Take care and move the two 10uF BP electrolytics away from the PCB so you can solder the pins of the trimmer.**



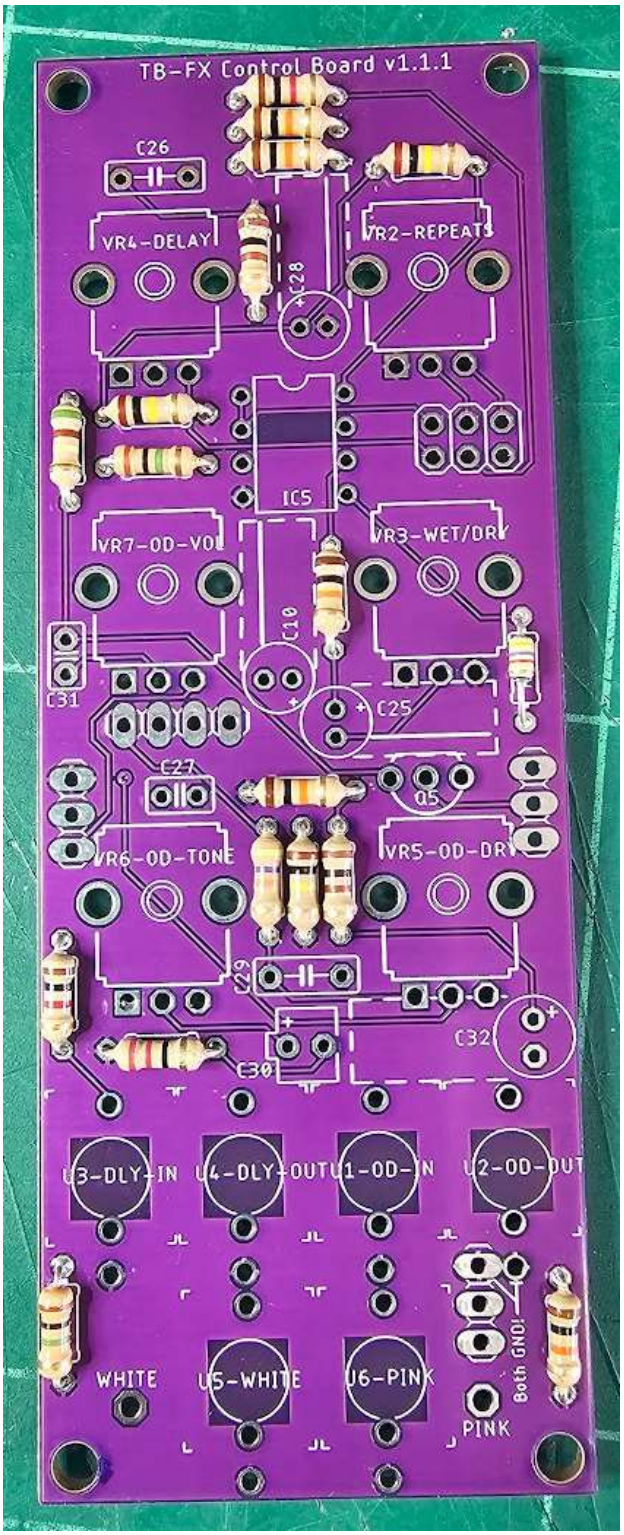


9. Now time to move to the Control Board.

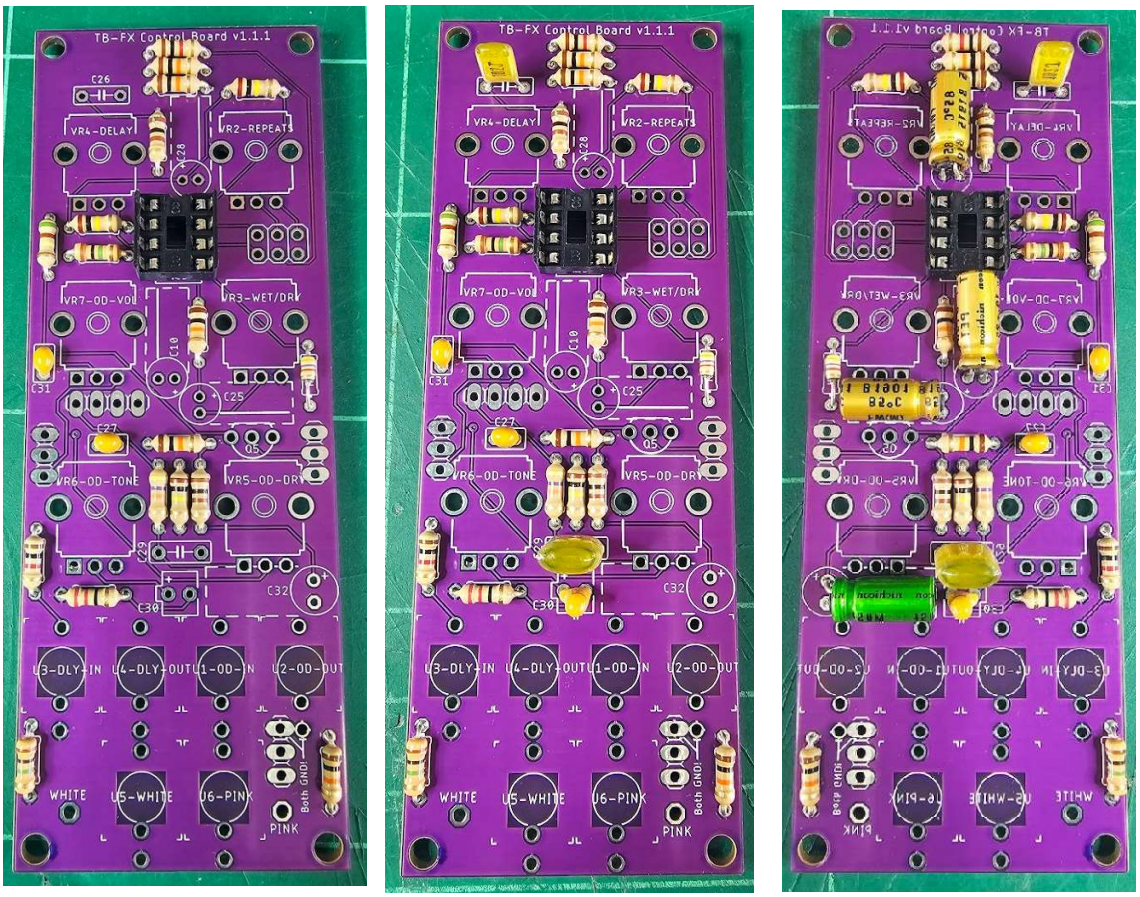
Upper - Control Board

Basically we are going to follow the same process as before :

1. Populate and solder all the resistors.



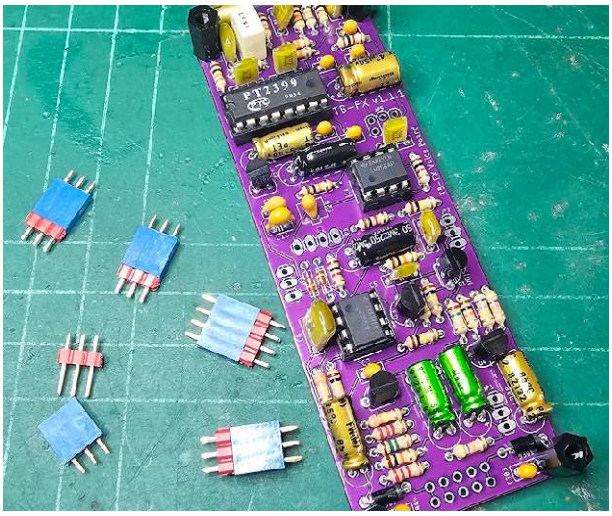
2. Add the IC socket, MLCC, Tantalum, Polyester and Electrolytics.

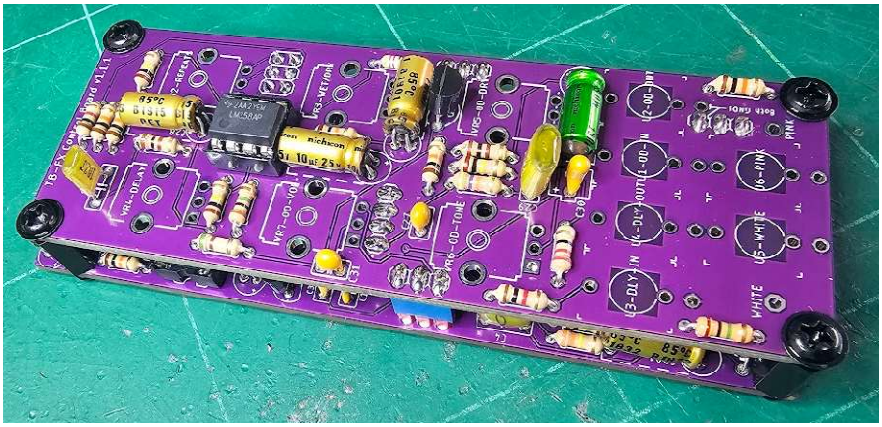


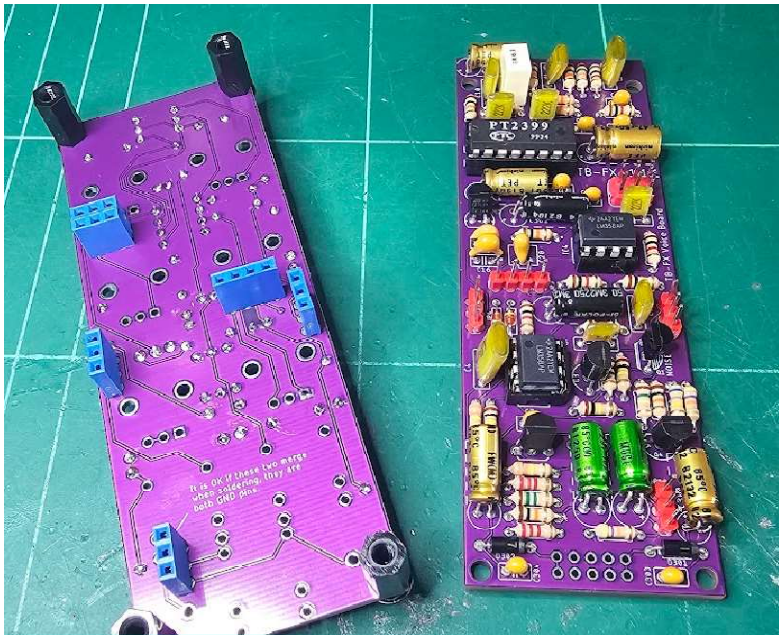
3. Add the IC and now we can prepare the headers to join the two boards. Use your usual technique for this but I find the following makes it easy.

    a. Screw the four 11mm standoffs to the voice board. The standoff should be on the same side as the components, so screw from the underside.
    b. Cut / prepare both the male and female connectors and join them together.
    c. Place all 5 (JP1 to JP5) into the voice board sticking up the same way as the standoffs. **Don't solder yet.**
    d. Bring the control board to the stack and place it carefully so the standoffs line up with the holes and most importantly so that all the connector pins go through the corresponding holes in the control board.
    e. Screw the control board to the standoffs and you should now have a nice, neat sandwich and you can simple solder all the connector pins from the top and bottom.
    f. Unscrew one of the boards from the standoffs and carefully pull apart the connectors. Perfectly lined up every time!

    (NB: I usually leave the standoffs attached to the upper board, so unscrew the bottom board. This is because I am lazy and if they are already attached to the upper board, you can fit the panel later and not have to worry about access to the screw holes!)


PT2399
TB-FX v1.1


TB-FX Low Noise v1.1
LM358P
Nichicon
WHITE


PT2399
TB-FX v1.1
It is OK if these two wires stop soldering, don't affect both GND pins.

3. Finally add the pots and jack sockets and use the panel to line then up correctly before soldering.

Calibration of Noise Level

The trimmer on the rear can be tuned to your desired noise output. Listen to the pink/white noise outputs and trim to your desired amount and tone.


TB-FX
TB-303 Inspired
EFX
DELAY
REPEATS
DRY
TONE
DRIVE
TB-FX Voice Board

Appendix A – PCB Layout