



Sushi Box FX – High Voltage Daughter Board

The High-Voltage Daughter Board is designed to deliver reliable high voltage to your tube projects. It takes a typical 9-12V DC input and steps it up to voltages tubes like to see, adjustable from about 30V to around 450V. There is also a 6V regulator to deliver low voltage for tube heaters.

DISCLAIMER AND WARNING

This circuit contains high voltages that can exceed 200V and is EXTREMELY DANGEROUS. Sushi Box FX is not responsible for any damage or injury caused by improper use or assembly. I encourage you to use the utmost care when building, testing, and using this pedal. If high voltages make you uncomfortable, DO NOT BUILD THIS. Just don't. This is not a beginner project and should not be treated as such. It was designed to be as easy as possible to assemble and make it work, but **you have to be careful.**

Recommended Build Instructions

This will go similar to most pedal builds; I recommend starting with smaller components and working your way up to the larger components. I recommend assembling in the following order:

1. Resistors
2. Diodes
3. IC socket
4. Ceramic capacitors
5. Film capacitors
6. Electrolytic capacitors
7. Inductor
8. BJT transistor
9. Power MOSFET

Bill of Materials

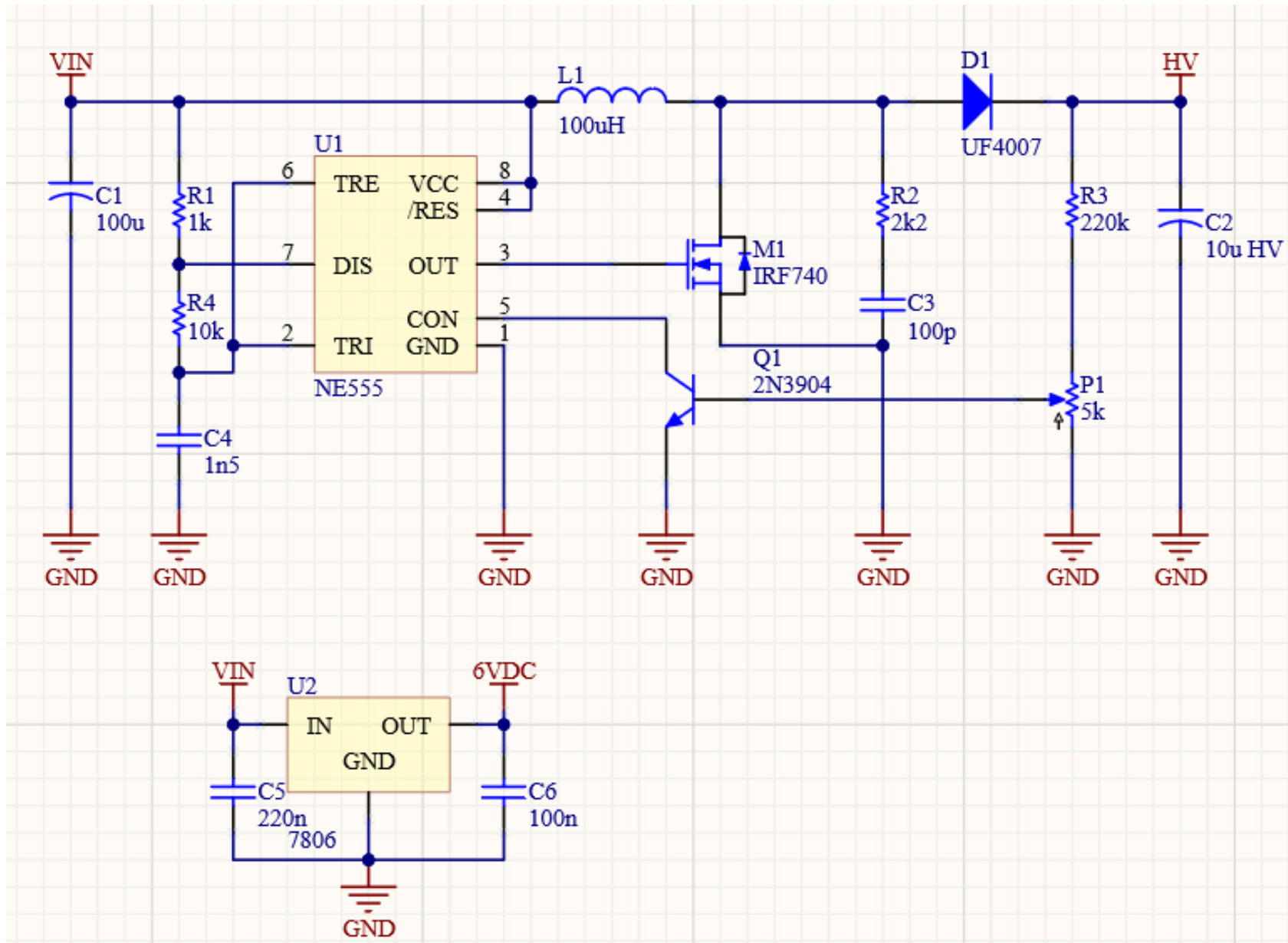
The links below are recommendations and suitable replacements can be used as needed. These are non-affiliated links: I get no compensation of any kind if these links are used.



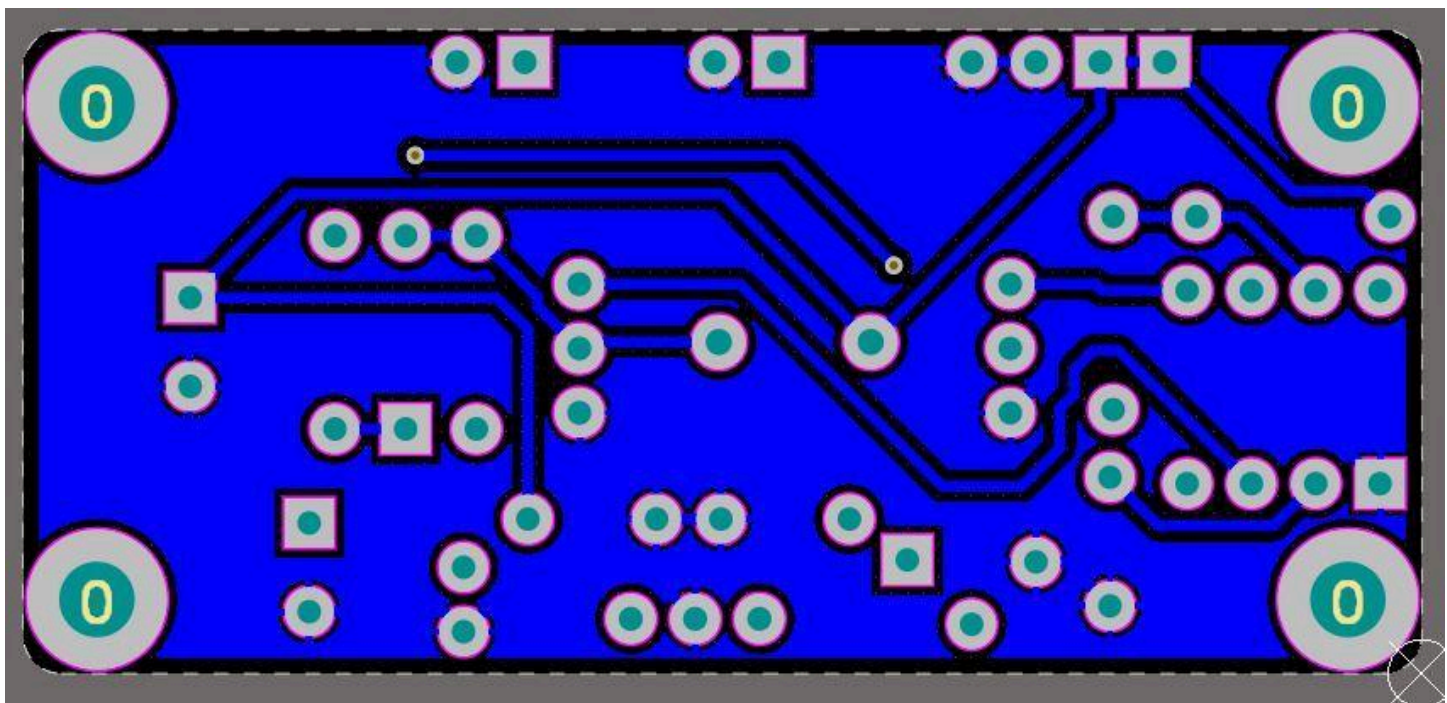
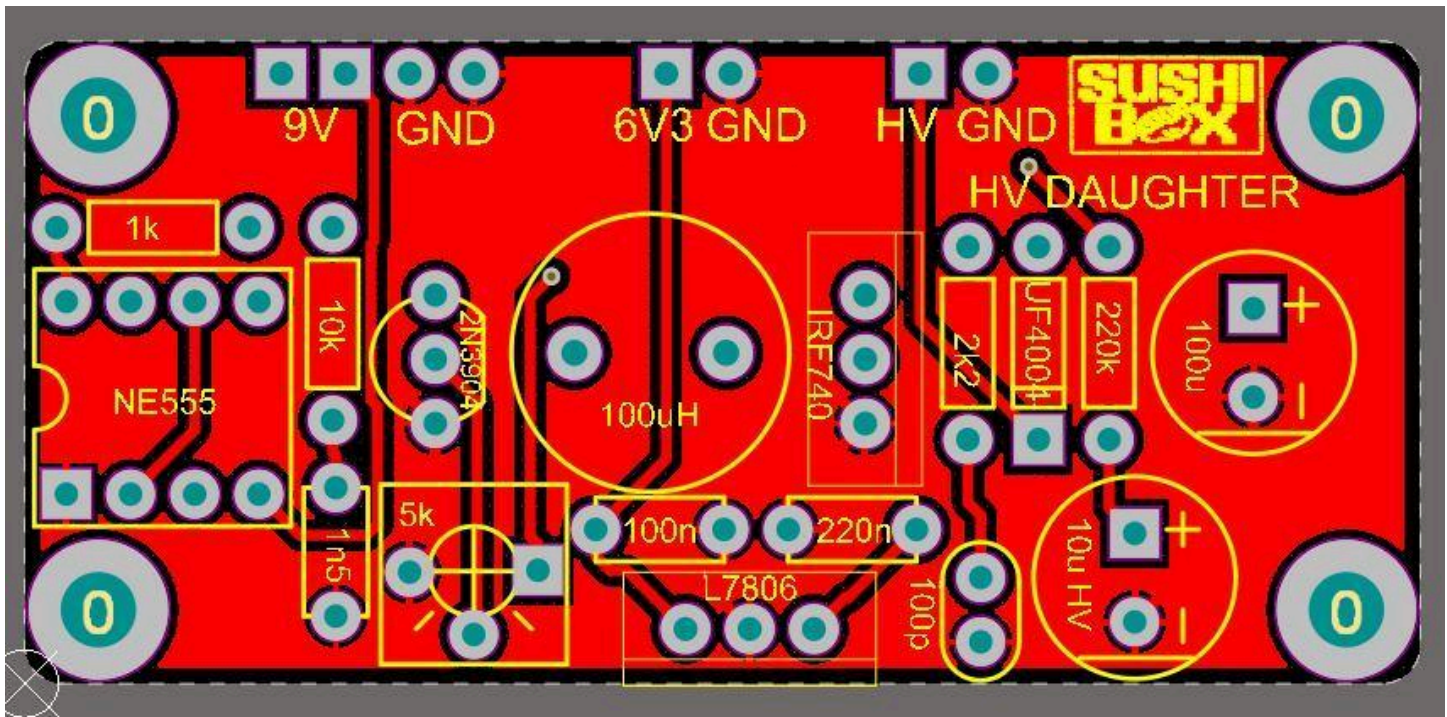
Value	Rating/Package	Designator	Quantity	Link
10u	Set for desired output voltage	C1	1	Tayda Link
100u	Set for desired input voltage	C2	1	Tayda Link
100p	50V	C3	1	Tayda Link
1n5	50V	C4	1	Tayda Link
220n	50V	C5	1	Tayda Link
100n	50V	C6	1	Tayda Link
UF4007	Rectifier	D1	1	Tayda Link
100uH	Inductor	L1	1	Tayda Link
IRF740	TO-220	M1	1	Tayda Link
2N3904	TO-92	Q1	1	Tayda Link
2k2	1/4W	R2	1	Tayda Link
220k	1/4W	R3	1	Tayda Link
1k	1/4W	R1	1	Tayda Link
10k	1/4W	R4	1	Tayda Link
5k	trimpot	P1	1	Tayda Link
NE555	DIP-8	U1	1	Tayda Link
8-pin DIP socket		U1 (optional)	1	Tayda Link
L7806 regulator	TO-220	U2	1	Tayda Link



Schematic



Board Layout





Usage Instructions

The board is designed for two main uses: breadboarding and full build implementation.

Breadboard:

The input and output pads are spaced such that you can solder in 2.54mm header pins and the board will sit in a standard breadboard. If you plan to use the board this way I recommend assembling everything and placing it in the breadboard before connecting power and calibrating the high voltage. This is particularly handy on breadboard if you have a multimeter with thin probes that can fit into the breadboard connections so you can keep one hand away from the circuit when adjusting. Stick the positive probe into the HV output, negative probe into ground, then keep one hand away while your other hand holds the screwdriver to adjust the trimpot to the desired voltage.

Full Build:

The board is designed to be mounted inside an enclosure with M3 standoffs and hardware. Where to mount it is up to you and depends on a lot of aspects of the project. I still recommend mounting the board in such a way that it isn't going to move around while setting the high voltage for safety reasons. I will always recommend minimizing the hands-on time with the circuit while it is energized.