

PROJECT NAME

18V VOLTAGE DOUBLER

DOCUMENT VERSION

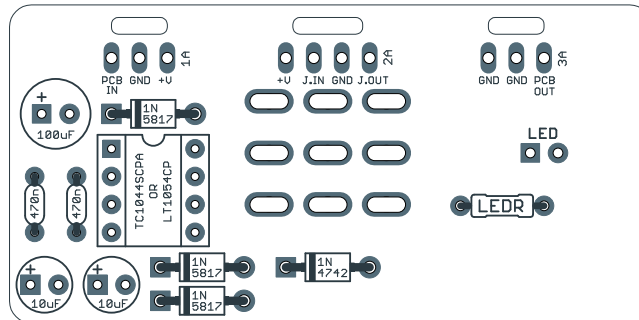
1.0.0 (2020-11-27)

BUILD DIFFICULTY

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PROJECT SUMMARY

A utility PCB allowing Aion FX projects to be powered by 18V using a standard 9V adapter.



Actual size is 2.3" x 1.14".

PROJECT OVERVIEW

The 18V Voltage Doubler / Bypass PCB is a direct substitute for the bypass boards that are included with Aion FX projects in the standard 125B format. It converts a standard 9V supply into 18V before passing it to the main circuit PCB.

The advantages of the higher supply voltage will vary with the circuit, but in general, most drive or boost circuits will get added headroom and clarity. Sometimes the clipping threshold will be raised for more transparent tone with less drive (perceived as gain).

It will work with most Aion FX projects, but there are a number of exceptions:

- It is not compatible with any of the large-format PCBs (Graviton, Tempest, etc.) because there is not enough space around the footswitch.
- It is not compatible with any project that has its own on-board charge pump or voltage inverter.
- It is not compatible with any project whose bypass PCB has functionality critical to the circuit (for example, the Cornish pedals' buffer/true bypass slide switch or the Luna's rate LED).
- It works best with circuits that use JFETs or op-amps. Transistor-based pedals, especially those designed prior to 1975, won't get as much benefit and may not bias properly without other changes.

In addition, the PCB takes up part of the space reserved for the battery, so you will no longer be able to use a battery with the effect.

Aion FX maintains a compatibility list of all the projects. If you don't see one on here, please get in touch and we'll add it.

[View project compatibility list](#) →

PARTS LIST

PART	QTY	TYPE	NOTES
TC1044SCPA	1	Charge pump, DIP-8	Can also use LT1054 (higher quality but more expensive).
1N4742A	1	Zener diode, 12V, DO-41	
1N5817	3	Schottky diode, DO-41	Can also substitute 1N4001, but the output voltage will be slightly lower.
470n (0.47uF)	2	MLCC capacitor, X7R	
10uF	2	Electrolytic capacitor, 5mm	
100uF	1	Electrolytic capacitor, 6.3mm	
LED R	1	Metal film resistor, 1/4W	LED current-limiting resistor. Recommended value is 4.7k.

INSTALLATION

The voltage doubler PCB is a drop-in replacement for the standard bypass PCB that comes attached to the 125B-format projects. Build it according to the parts list above (the values are printed directly on the PCB) and then follow the wiring diagram of the main project. The bypass PCB included with the project can be saved in case you want to change back to 9V in the future.

BUILD NOTES

There are a few important things to be aware of when using this PCB.

1. Not every Aion FX circuit has been tested at 18V.

We provide a [project compatibility list](#), but we have not tested every circuit. Most of the assessments were just made based on the characteristics of the circuit and the type of parts used.

2. Watch the component voltage ratings.

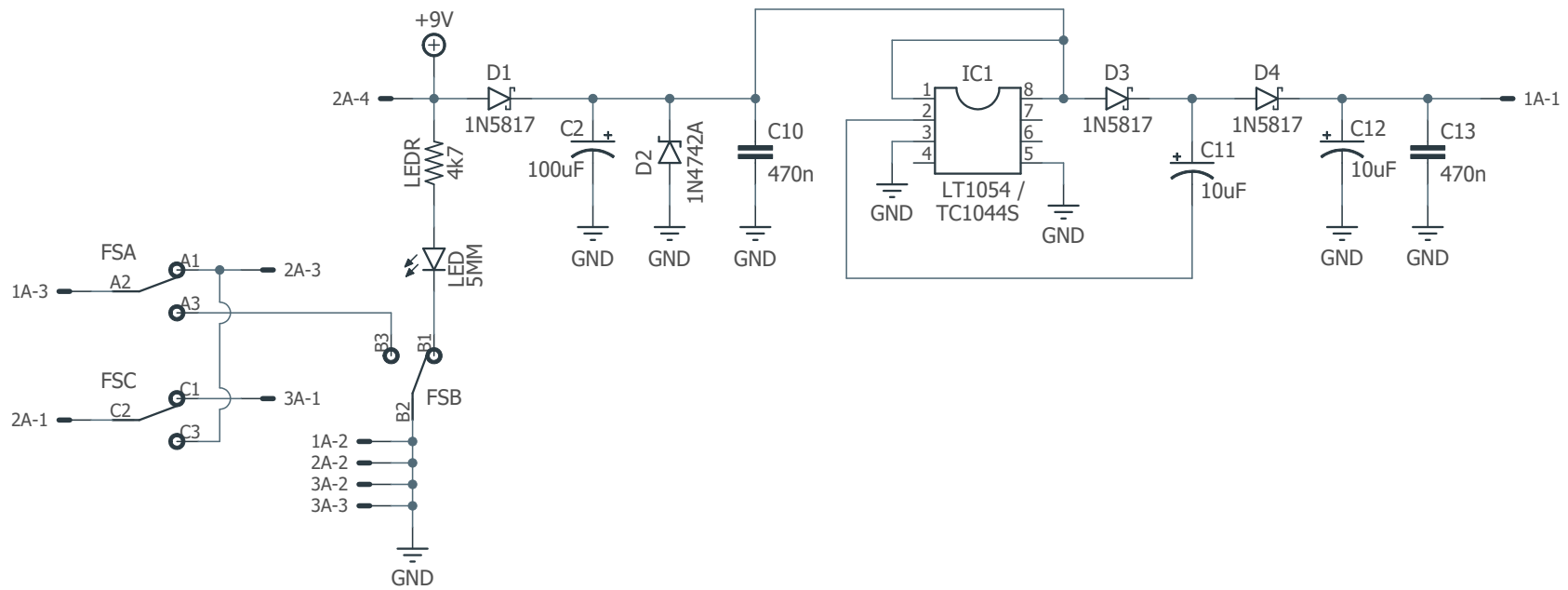
While it's recommended to always use capacitors 25V or higher for all of our projects even when running them at 9V, it bears repeating that you are responsible for making sure the components in your build are rated for the increased voltage.

3. Don't use a supply voltage higher than 9V.

This PCB is a voltage doubler, which means it will try to multiply whatever voltage is applied. If you accidentally plug in a 12V or 18V adapter, it will exceed the maximum ratings of the components and will likely cause something to burn out. So when using the doubler, it's a good idea to make sure the pedal is marked accordingly on the outside to indicate that it should only be powered by 9 volts.

Bottom line: use at your own risk!

SCHEMATIC



LICENSE & USAGE

No direct support is offered for these projects beyond the provided documentation. It's assumed that you have at least some experience building pedals before starting one of these. Replacements and refunds cannot be offered unless it can be shown that the circuit or documentation are in error.

All of these circuits have been tested in good faith in their base configurations. However, not all the modifications or variations have necessarily been tested. These are offered only as suggestions based on the experience and opinions of others.

Projects may be used for commercial endeavors in any quantity unless specifically noted. No attribution is necessary, though a link back is always greatly appreciated. The only usage restrictions are that **(1) you cannot resell the PCB as part of a kit without prior arrangement, and (2) you cannot "goop" the circuit, scratch off the screenprint, or otherwise obfuscate the circuit to disguise its source.** (In other words: you don't have to go out of your way to advertise the fact that you use these PCBs, but please don't go out of your way to hide it. The guitar effects industry needs more transparency, not less!)

DOCUMENT REVISIONS

1.0.0 (2020-11-27)

Initial release.