

# ROADRAGE2019

**FX TYPE:** BreadBuddy

Enclosure Size: multiple

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## Overview

The **RoadRage2019** is a utility that allows you to get one or more voltage supplies from a single 9v power supply. It is capable of delivering 15v (or 12v) regulated, 18v unregulated and -9v. It has a very small foot-print and will fit easily in a 1590B enclosure. There are several pedal building applications that can benefit from the use of a RoadRage PCB:

- Use a regular negative ground 9v power supply to produce a -9v *positive ground* supply for PNP fuzz or other positive ground circuits.
- Create a 15v or 18v supply for an overdrive. This can be useful in creating additional headroom or dynamics in some OD circuits.
- Use the RoadRage as a basis for creating a prototyping rig for circuit design and breadboarding.

## Limitations

Charge Pumps and Inverters are limited in the amount of current they can supply a circuit, and their efficiency decreases the more you “pump up” the voltage. When utilizing the LT1054, the RoadRage can supply around 100mA (total) of a pumped up or inverted voltage. This turns out to be sufficient for many analog circuit designs. The TC1044SCPA (the alternate charge pump recommended) is much less powerful with a max current of around 20mA. Again, even this limitation is sufficient enough for a many overdrive circuits (and probably *all* PNP fuzzes) The TC1044 has the advantage of being 1/3rd the price of the LT1054.

If you plan to use the RoadRage for several different projects it is a good idea to have both types of charge pumps so you can choose the appropriate device for your application. It’s about \$3 for the LT1054 and \$1 for the TC1044SCPA.

## Changes to the 2019 version

The 2019 version of the RoadRage is basically the same circuit as previous versions, with the exception of the default regulator being switched from a TO-220 style to a TO-92 one. The reason is the TO-92 style regulators are limited to 100mA which is the most the RoadRage can produce anyway. And, they are much smaller. The only other change is it’s a better PCB layout.

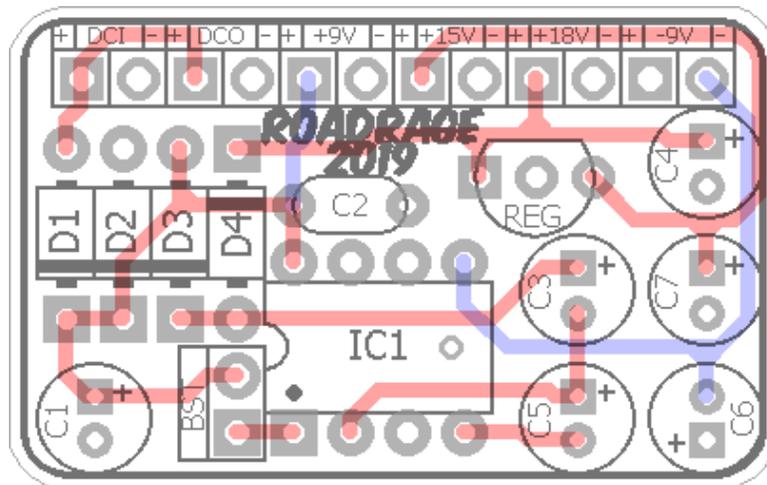
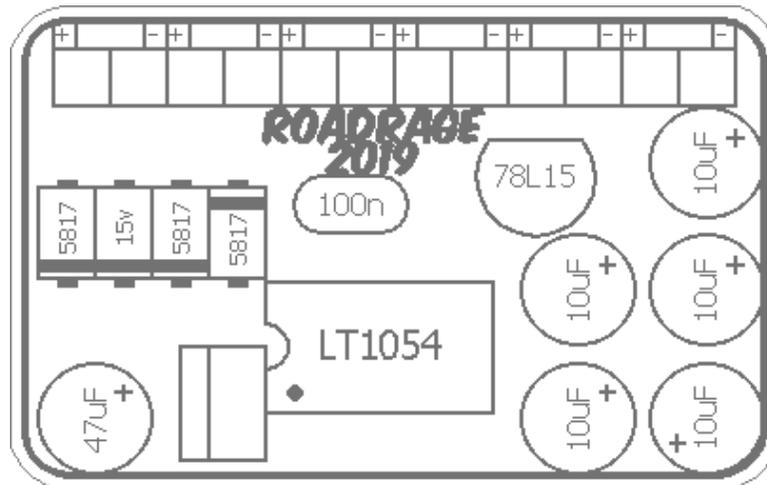
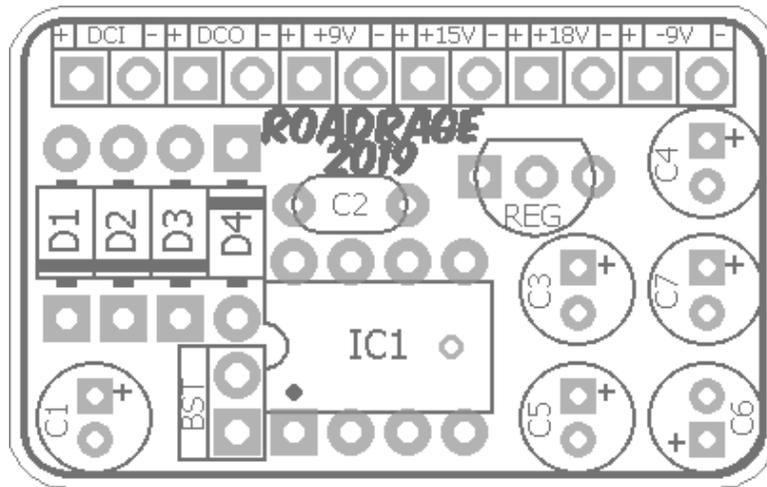
## Boost Switch

The BST pads are used to boost the internal frequency of charge pumps out of the audio range. These pads are left empty when using the LT1054. For the TC1044**SCPA**, MAX1044**CPA** or ICL7660**SCPA** the BST pads should be jumpered together.

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**Terms of Use:** You are free to use purchased **RoadRage2019** circuit boards for both DIY and small commercial operations. You may not offer **RoadRage2019** PCBs for resale or as part of a “kit” in a commercial fashion. Peer to peer re-sale is fine, though.

**Technical assistance** for your build(s) is available via the [madbeanpedals forum](http://madbeanpedals.com/forum). Please go there rather than emailing me for assistance on builds. This is because (1) I’m not always available to respond via email in a timely and continuous manner, and (2) posting technical problems and solutions in the forum creates a record from which other members may benefit.

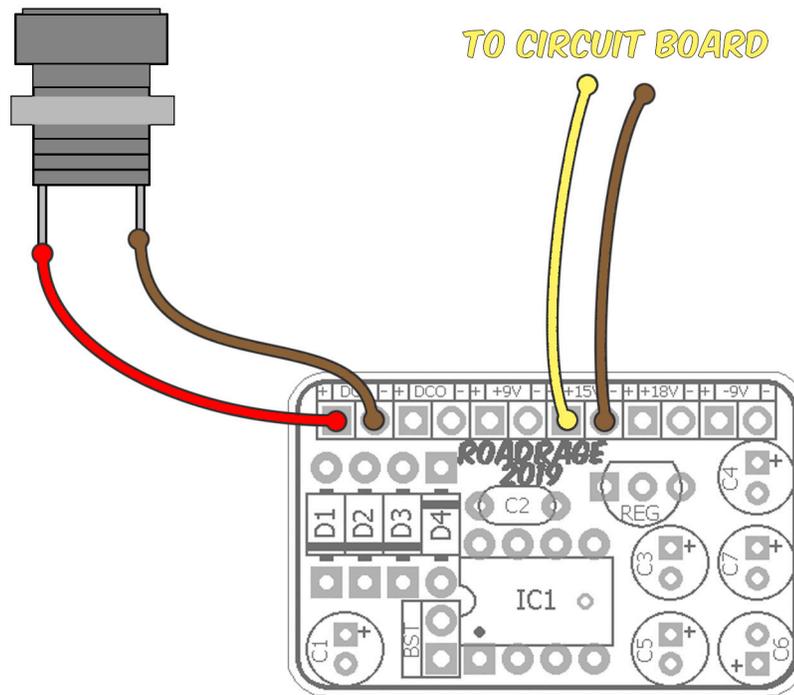


Name	Value	Value	QTY	Type	Rating
C1	47uF	100n	1	MLCC / Film	25v min
C2	100n	10uF	5	Electrolytic / Low Profile	25v min
C3	10uF	47uF	1	Electrolytic / Low Profile	25v min
C4	10uF	1N5817	3		
C5	10uF	15v	1	Zener diode	
C6	10uF	78L15	1	TO-92 casing	
C7	10uF	LT1054	1	*see notes	
D1	1N5817				
D2	15v Zener				
D3	1N5817				
D4	1N5817				
REG	78L15				
IC1	LT1054				

Here is a Mouser project that contains all the parts needed for the Road Rage:  
<https://www.mouser.com/ProjectManager/ProjectDetail.aspx?AccessID=33f4e30e17>

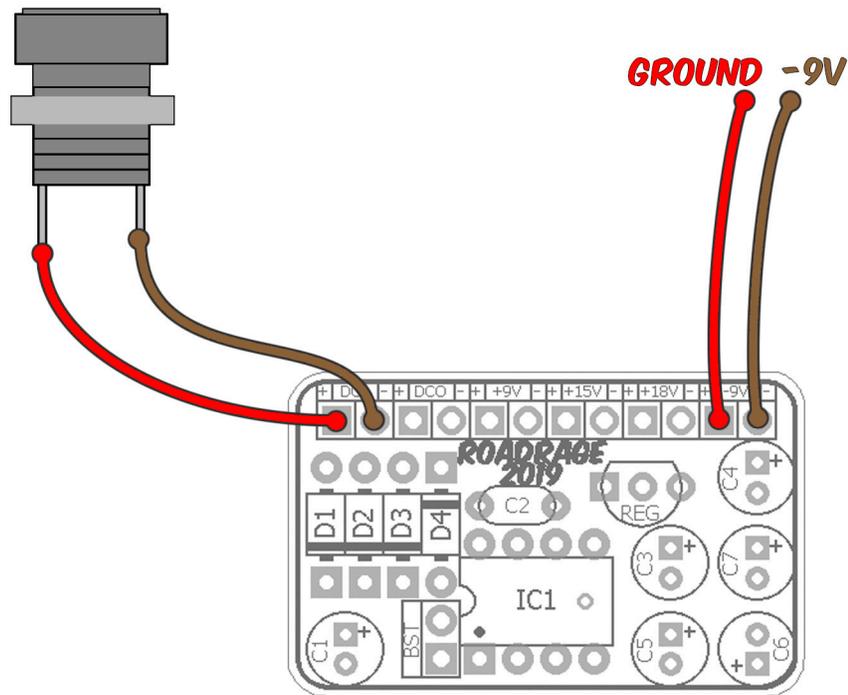
This has everything listed above as well as the alternate parts: 12v Zener diode, 78L12 regulator and TC1044SCPA charge pump (the last three items). Just be sure to delete the items you don't need from the cart when ordering! The 12v Zener is used of a 15v with the TC1044 because that is the maximum voltage input rating for that device.

If you are sourcing the parts yourself, I strongly recommend *against* buying the charge pump from Tayda Electronics. There have been several instances of builders getting fake/bum/non-functional devices from them. Stick to reliable sources like Mouser, Digi-Key and smallbear (or any of the overseas vendors familiar to pedal builders).

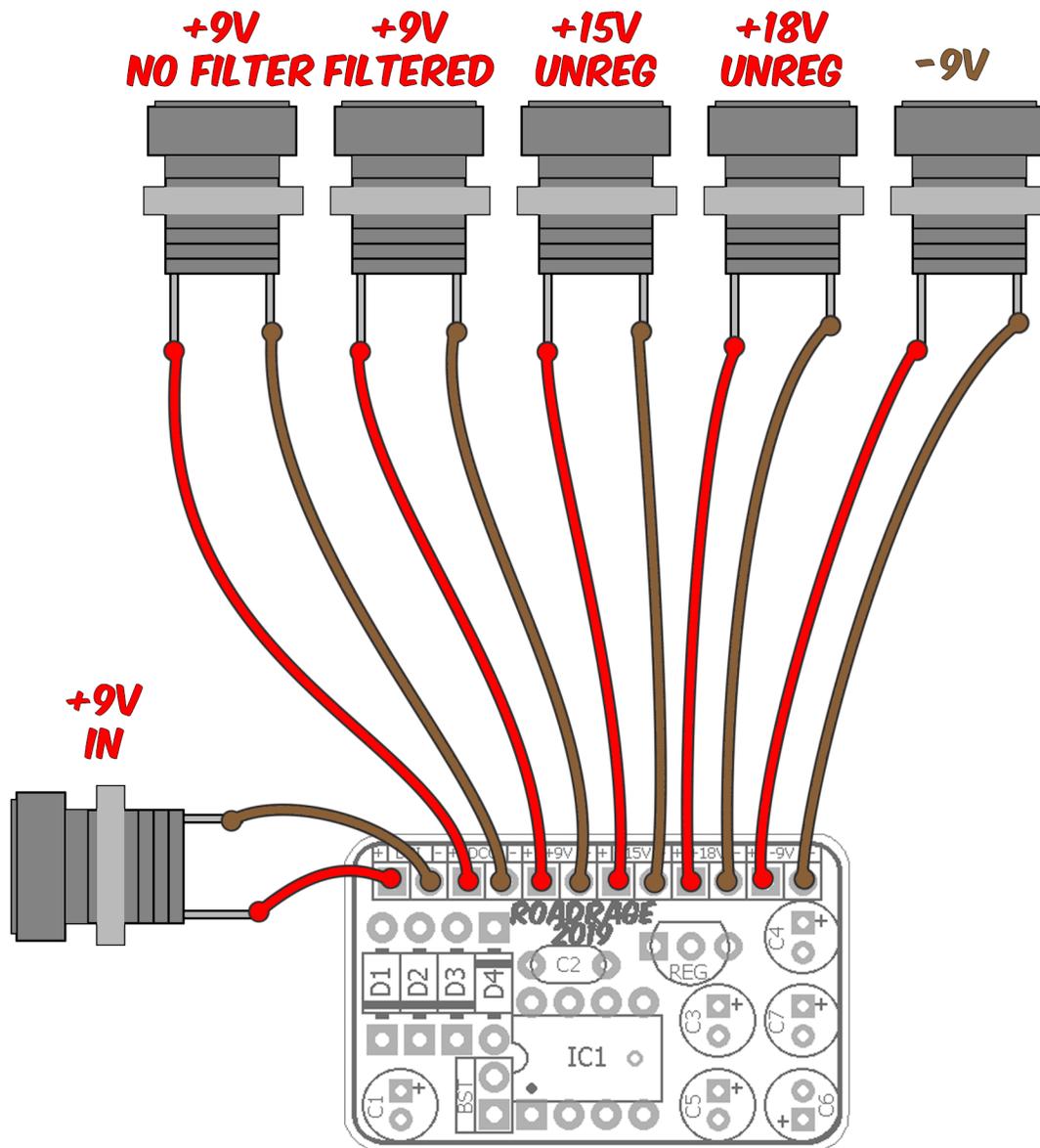


For +15v (regulated) or +18v (unregulated) omit C5 and C6. You can put a jumper between the + and - pads of C6 to ground pin5 of the charge pump. This is not required, but it is good practice when you are not using the inverter pin.

Wire from either the +15v or +18v pads as needed.



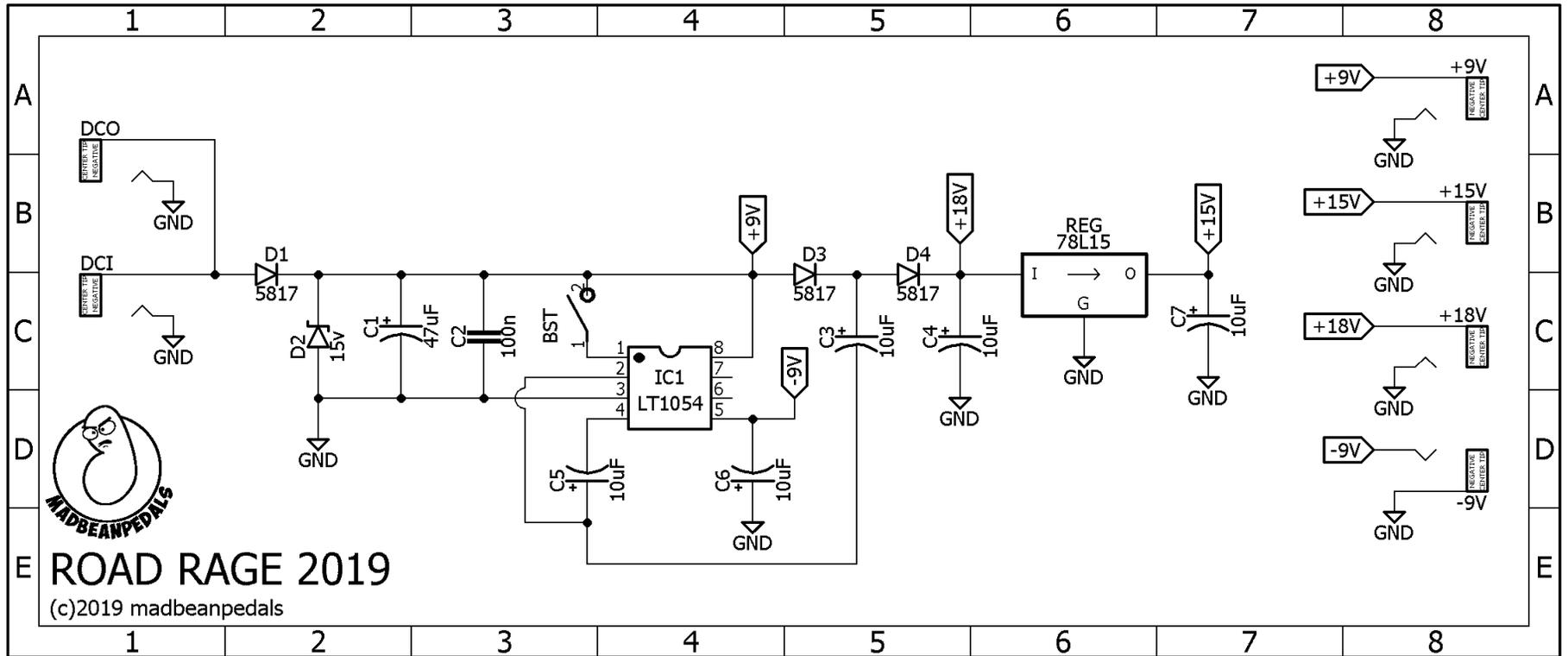
For -9v operation only you can omit D3, D4, C3, C4, C7 and the regulator. Here the red wire is ground and the brown wire is -9v.

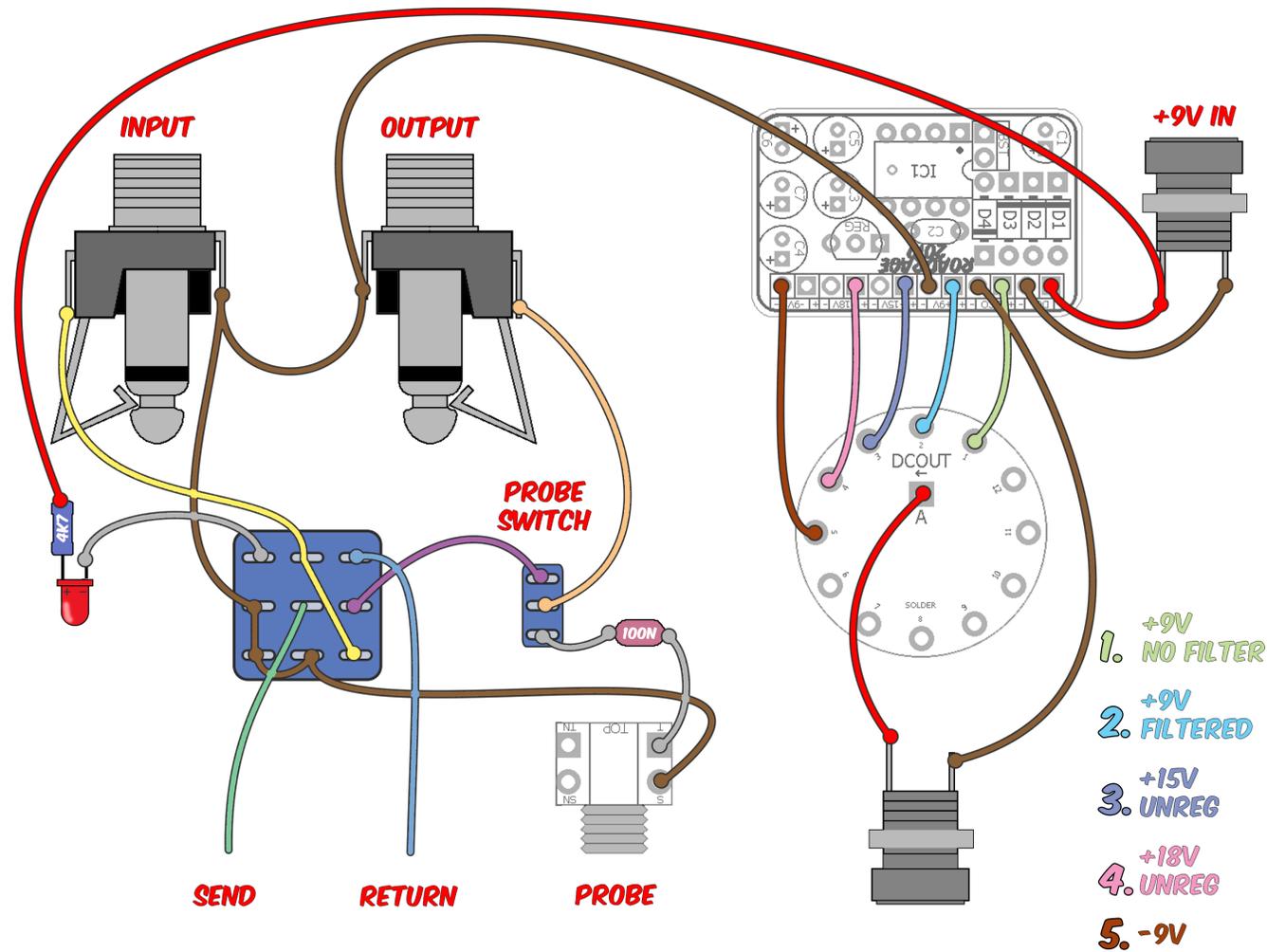


Another use for the RoadRage is as a power supply for breadboarding. This gives you the additional option of +9v unfiltered or +9v filtered (IOW, with power decoupling). There are some cases where one is better than the other.

If you are testing a built circuit that already has power decoupling on it, use the 9v *unfiltered* output. If you are breadboarding, you can use the 9v *filtered* output so you don't have to place an extra cap to ground on the 9v supply.

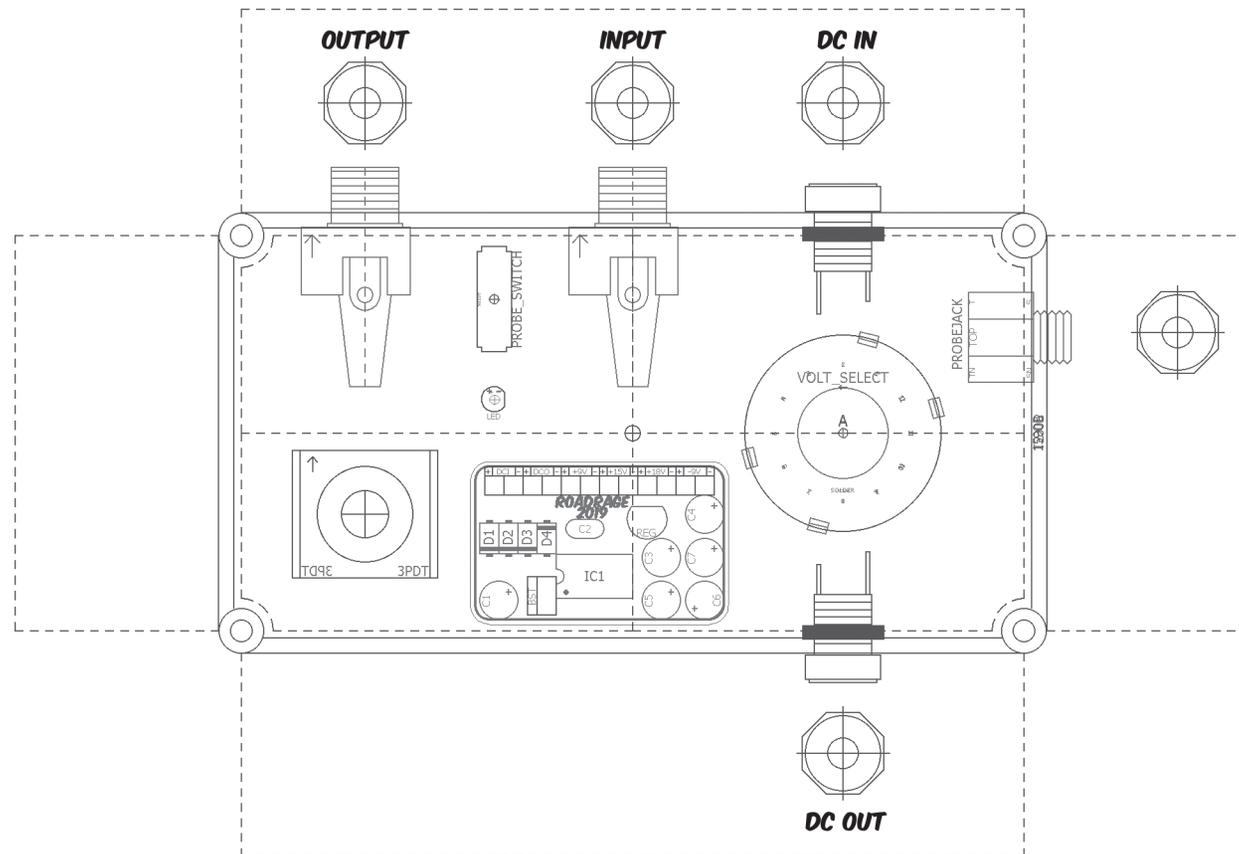
In this illustration I've shown how you could wire each output to a jack if you were to put the RoadRage in an enclosure (with input/output jacks and a 3PDT for example) to build a complete prototyping rig. Or, you could just use wires if you only want to hook up the RoadRage on your breadboard when you need it.





Here's a way to create a very useful prototyping/breadboard/testing rig. I've been using a variation of this for about 10 years and it works great. You can fit all of this in a 1590B and just hook it up to a breadboard (or 2 or 3 together). The Send and Return wires go to the breadboard for the input/output of your circuit. The 1P12T (set for 5 steps) selects between different voltage outputs. The Probe Switch selects between effect output or audio probe output. The Probe jack uses the tip to connect to any point of your circuit you want to audio probe. The Probe sleeve gets wired to an alligator clip which you can attach to the ground probe of your multimeter (to use when you are checking voltages with your DMM).

It takes maybe a half-hour to put together and makes building and testing incredibly efficient. Dooo eeeettt!



One point of caution: with the -9v option on the rotary switch it's possible to be careless and send -9v to a +9v build or circuit on your breadboard. If you want extra insurance, wire the -9v output to another DC jack and just plug that in when you need it.