# ProtorigJR24

FX Type: **BREADBUDDY**
Build Level: Beginner

Last Updated: August 18, 2024 1:09 PM


The *2024 version* of the **ProtorigJR** has no circuit changes. The 3PDT switch orientation has been corrected from the last version and a cut-out for wire strain relief has been added for the ground clip and audio probe.

## Overview

The ProtorigJR has the same functionality as the mbp Protorig, but has been stripped down to a smaller PCB footprint. Whereas the Protorig was limited to just two small and permanently fixed breadboards, the ProtorigJR can be expanded to include as many breadboards as you want. This makes it a powerful tool for breadboarding larger and more complex designs. Rather than repeating all the previous documentation here, I suggest you have a look at the Protorig pdf which goes into great detail on construction and use. Then, just adapt the JR version to your needs.

One extra switch was added to turn DC power on and off so you no longer have to disconnect your power supply when not in use or swapping in components in real time.

## Use

Building pedals is a lot of fun, but spending time and money on something that doesn't work correctly (or at all) is extremely frustrating. And, every pedal builder will experience that frustration at some point. If you are me, it's almost guaranteed.  That's why it is critical for every serious pedal maker to have the ability to quickly identify and diagnose problems to get to the fun part - making lovely noise.

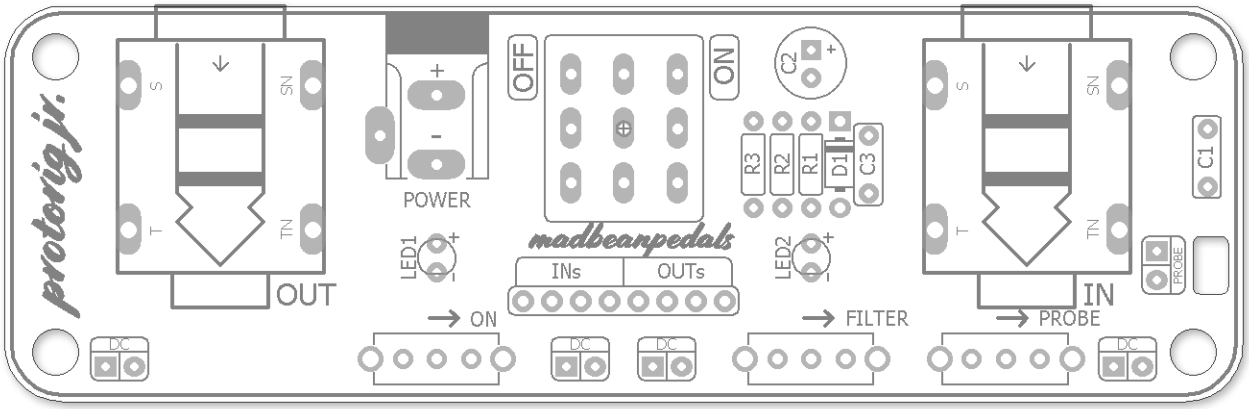
The ProtorigJR has the essentials tools to make the testing, debugging and prototyping easy. The other critical part is thinking and patience, of course! With this simple tool, you can:

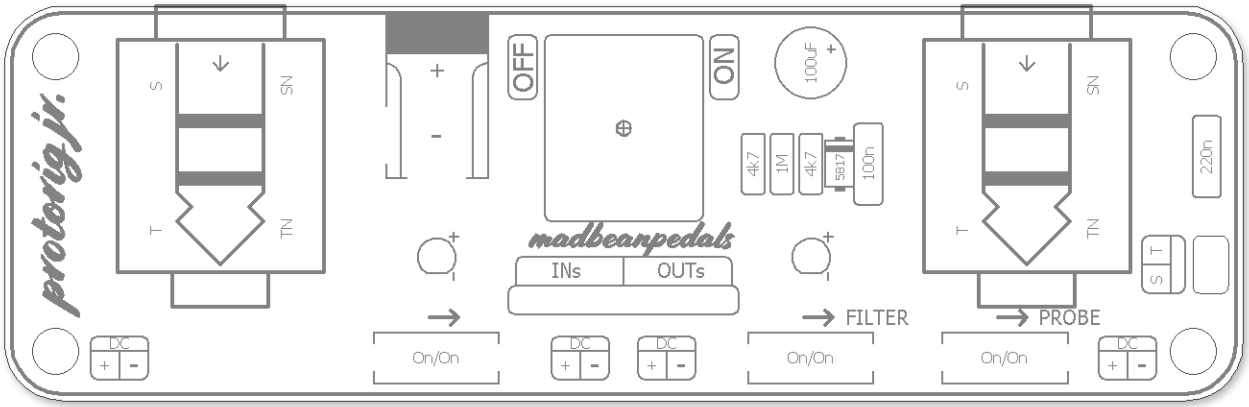
- Quickly breadboard circuit snippets and even a complete pedal circuit for testing, evaluation and experimentation.
- Test built PCBs for proper function *before* final pedal assembly.
- Debug problem areas in misbehaving builds.

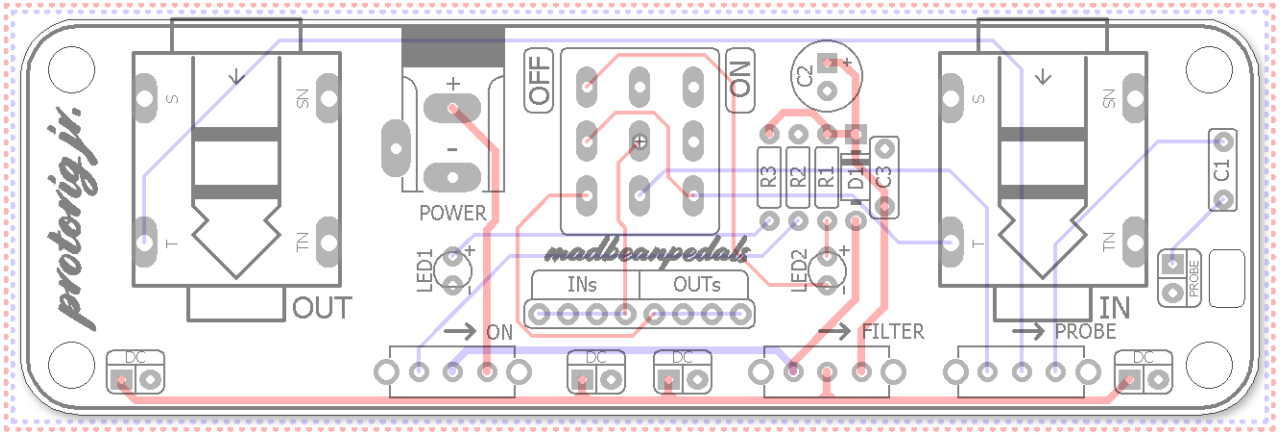
## Switches

- The **ON** switch powers the ProtorigJR from your DC supply. You can use 9-18v DC depending on the needed voltage for your testing.
- The **FILTER** switch has two modes. In the left position, no power decoupling is utilized. Use this mode when testing pre-built PCBs. In the right position a reverse polarity diode, 100uF and 100n cap are used for decoupling the supply. Use this mode when breadboarding circuit to emulate how a completed circuit board would be designed.
- The **PROBE** switch activates the audio probe. This sends audio from where the probe touches directly to the OUT jack.. Use the audio probe to trace audio signals through your circuit. The ground probe is used to attach to your multimeter to take voltage readings. It's active no matter where the Probe switch is set.

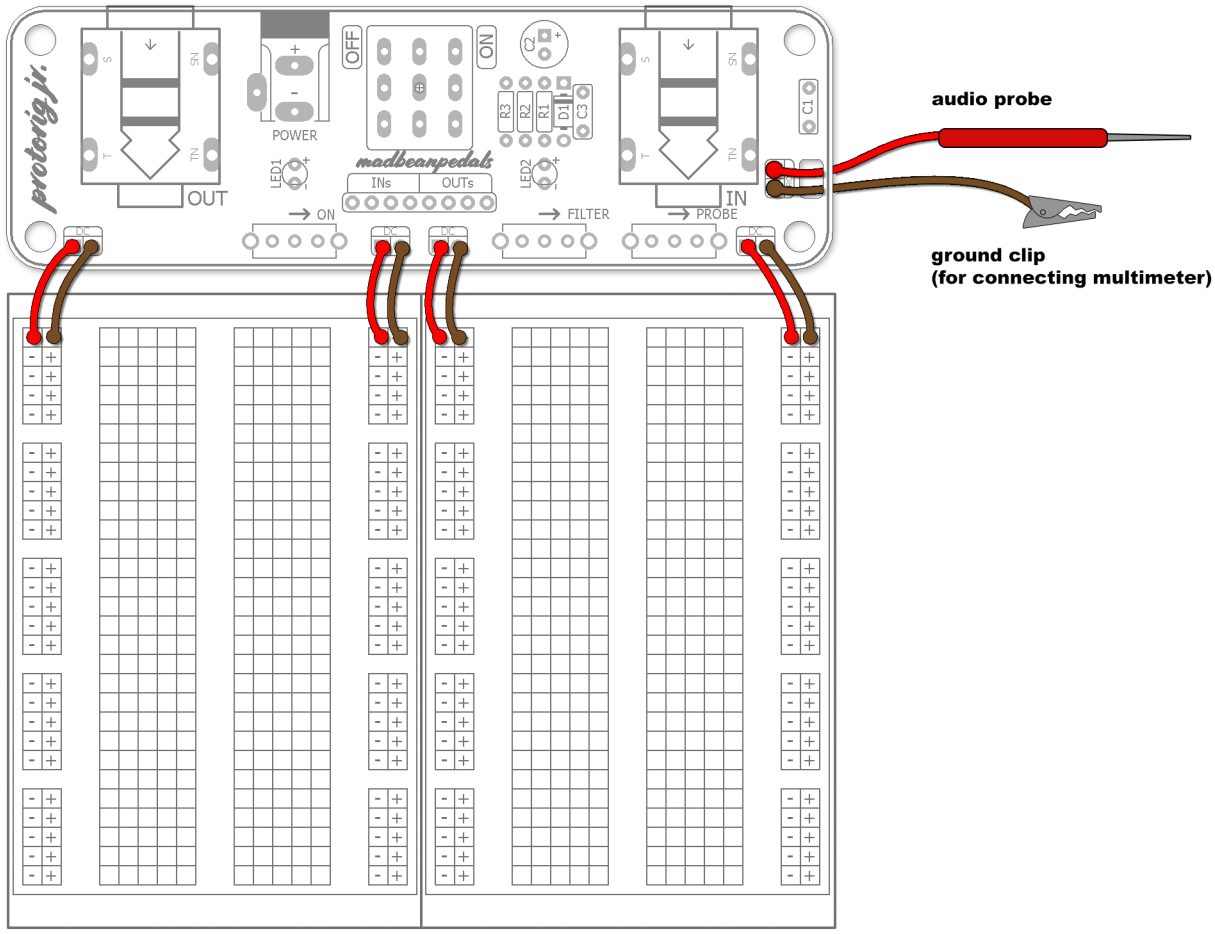
# PCB


protorig.jr.
S
SN
T
TN
OUT
POWER
OFF
ON
C2
R3
R2
R1
D1
C3
C1
LED1
LED2
madbeanpedals
INs
OUTs
PROBE
IN
ON
FILTER
PROBE
DC


protorig.jr.
S
SN
T
TN
OFF
ON
100uF
4k7
1M
4k7
5817
100n
220n
madbeanpedals
INs
OUTs
S T
FILTER
PROBE
On/On
On/On
On/On
DC


protorig.jr.
S
SN
T
TN
OUT
POWER
OFF
ON
C2
R3
R2
R1
D1
C3
C1
LED1
LED2
madbeanpedals
INs
OUTs
PROBE
IN
ON
FILTER
PROBE
DC

# Wiring




Note the “+” and “-” orientation of the breadboards.

TIP: Make your wires to the audio probe and ground clip longer than you think you need.

# B.O.M.

| B.O.M. | |
|---|---|
| **Resistors** | |
| R1 | 4k7 |
| R2 | 1M |
| R3 | 4k7 |
| **Caps** | |
| C1 | 220n |
| C2 | 100uF |
| C3 | 100n |
| **Diodes** | |
| D1 | 1n5817 |
| LED1 | 5mm |
| LED2 | 5mm |
| **Header** | |
| HDR_1 | 8PIN |
| **Jacks** | |
| POWER | 2.1mm TRS |
| IN | 1/4” TS |
| OUT | 1/4” TS |
| **Switches** | |
| F/UF | SPDT |
| ON | SPDT |
| PRB | SPDT |
| BYP | 3PDT |
| **Misc** | |
| PROBE1 | Probe |
| PROBE2 | Clip |

| ShoppingList | | | |
|---|---|---|---|
| Values | Qty | Type | Rating |
| 4k7 | 2 | Metal Film | 1/4W |
| 1M | 1 | Metal Film | 1/4W |
| 100n | 1 | Film | 25v min. |
| 220n | 1 | Film | 25v min. |
| 100uF | 1 | Electrolytic | 25v min. |
| 1n5817 | 1 | | |
| LED | 2 | 5mm, diffused, any color | |
| Header | 1 | SIL female pin | 2.54mm |
| Audio Jacks | 2 | TS | 1/4” |
| Power Jack | 1 | TRS | 2.1mm |
| SPDT | 3 | Slide | |
| 3PDT | 1 | Toggle, PCB or Pin Mounted | |
| Clip | 1 | *see link | |
| Probe | 1 | *see link | |

# Shopping List

**Resistors:**
https://www.taydaelectronics.com/resistors/1-4w-metal-film-resistors.html

**100n cap:**
https://www.taydaelectronics.com/capacitors/polyester-film-box-type-capacitors/0-22uf-100v-5-jfj-polyester-film-box-type-capacitor.html

**220n cap:**
https://www.taydaelectronics.com/capacitors/polyester-film-box-type-capacitors/0-22uf-100v-5-jfj-polyester-film-box-type-capacitor.html

**100uF Electrolytic:**
https://www.taydaelectronics.com/capacitors/electrolytic-capacitors/100uf-25v-105c-jrb-radial-electrolytic-capacitor-6x11mm.html

**1n5817:**
https://www.taydaelectronics.com/1n5817-diode-schottky-1a-20v.html

**LEDs (2):**
https://www.taydaelectronics.com/leds/round-leds/5mm-leds.html

For connecting from the IN/OUT pads to the breadboards, you can use SIL sockets or female pin headers.
4 pin 2.54mm SIL Sockets: https://www.taydaelectronics.com/connectors-sockets/sockets/sip-sockets/4-pin-dip-sip-ic-sockets-adaptor-solder-type-single-row.html
4 pin 2.54mm Pin Header: https://www.taydaelectronics.com/connectors-sockets/pin-headers/4-pin-2-54-mm-single-row-female-pin-header.html

**Mono jacks (2):**
https://www.taydaelectronics.com/hardware/6-35mm-1-4-plugs-jacks/6-35mm-1-4-stereo-insulated-switched-socket-jack-pcb-mono.html

**2.1mm DC Jack:**
https://www.taydaelectronics.com/dc-power-jack-2-1mm-barrel-type-pcb-mount.html

**3PDT Toggle:**
https://www.taydaelectronics.com/electromechanical/switches-key-pad/toggle-switch/mini-toggle-switch-1m-series-3pdt-on-on-short-handle.html

**SPDT Slide Switch (3):**
https://www.taydaelectronics.com/slide-switch-1p2t-through-hole-0-5a-50vdc.html

**Alligator clip:**
https://www.taydaelectronics.com/black-alligator-clip-crocodile-35mm.html

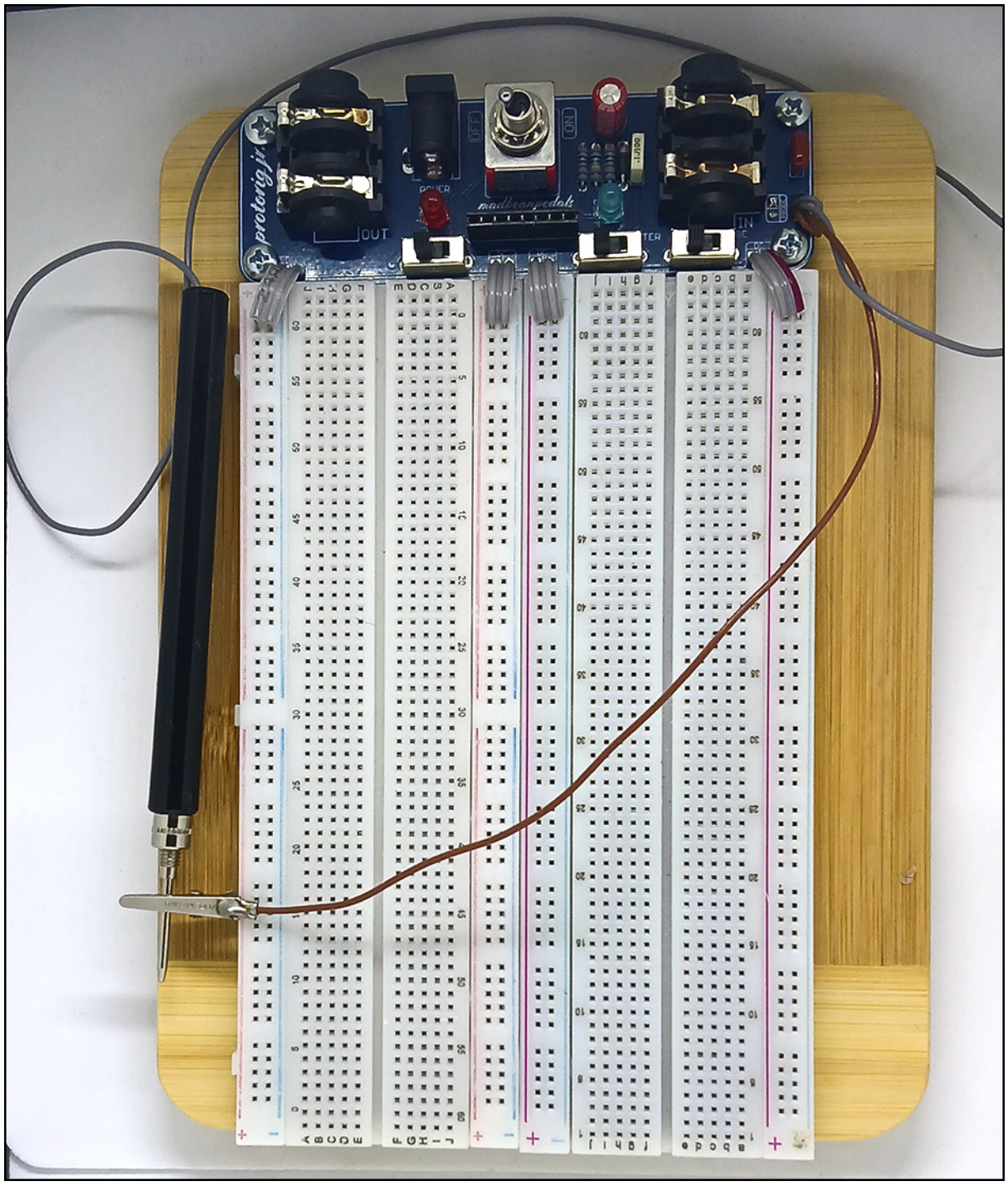
**Philmore Test Probe:**
https://smallbear-electronics.mybigcommerce.com/test-probes/
https://www.ebay.com/itm/232638424136

**Check the mbp ProtoRig documentation for more info on how to use this Philmore probe as an audio probe:**

You can use a cheap multimeter/test probe and simply strip the connector end to solder it to the ProtorigJR PCB. So long as the probe tip is insulated (IOW, has a plastic covering) it will work fine as an audio probe.

Ex:
https://www.tritekelectronics.com/electronic-test-equipment/clips-leads-probes/test-leads/philmore-sa15-test-lead-kit
https://www.tritekelectronics.com/electronic-test-equipment/test-leads/test-leads-philmore-473
https://www.tritekelectronics.com/electronic-test-equipment/test-leads/philmore-467-test-leads

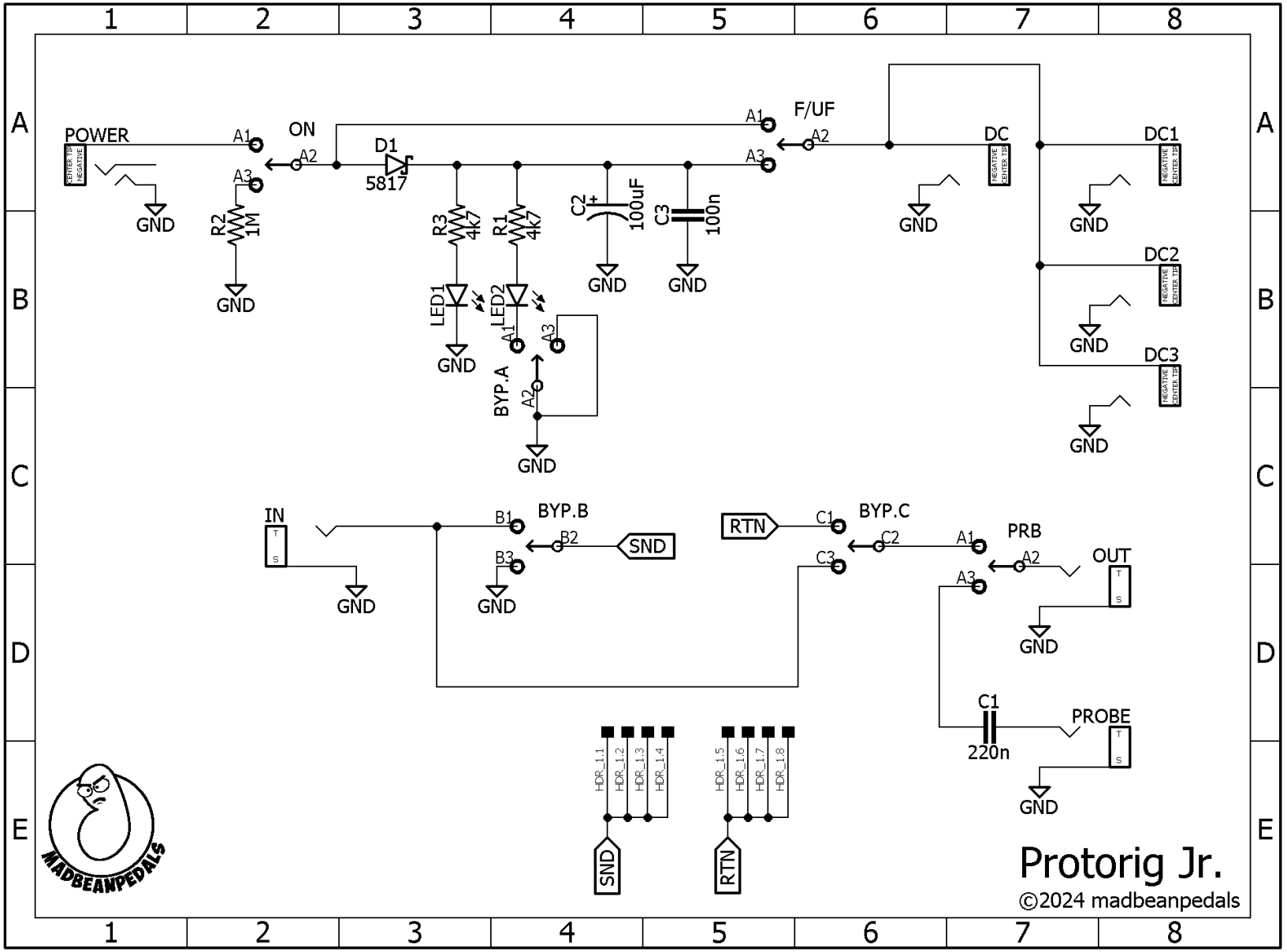
# Build Pic




I used a cheap cutting board from Amazon to mount everything. For the PCB, I used #4 sheet metal screws to secure it to the cutting board. I also used stick-on rubber feet in the corners on the bottom.

Cutting boards:
https://www.amazon.com/dp/B01DF3DGAE?psc=1&ref=ppx_yo2ov_dt_b_product_details
Cabinet Bumpers:
https://www.amazon.com/gp/product/B001WAK6DS/ref=ox_sc_act_title_1?smid=ATVPDKIKX0DER&psc=1

# Schematic


POWER
ON
D1
5817
F/UF
DC
DC1
DC2
DC3
R2
1M
R3
4k7
R1
4k7
C2
100uF
C3
100n
LED1
LED2
BYP.A
BYP.B
BYP.C
IN
SND
RTN
PRB
OUT
C1
220n
PROBE
GND
HDR_1.1
HDR_1.2
HDR_1.3
HDR_1.4
HDR_1.5
HDR_1.6
HDR_1.7
HDR_1.8
Protorig Jr.
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