



VFE DRAGON

FX TYPE: Dynamic Overdrive

© 2018 [VFE](#) and [madbeanpedals](#)

From the VFE Website

Tubescreamer. Rat. Klon. OCD. Tim. KoT. What do all these beloved drive circuits have in common? They all cut bass before distortion, and cut treble after distortion. This basic recipe is the backbone of many of the dirt pedals you use. Enter the Dragon, a dynamic overdrive designed to give you ultimate power over the pre-gain bass cut (HPF) and post-gain treble cut (LPF). Precisely tighten or fatten up your low end, smooth out the top end or add sparkle. Go from a transparent tone to a focused mid boost to push through a dense band mix, or just use it to light your favorite drive on fire.

- True bypass with buffered bypass option via internal switch
- Massive amount of boost on tap to push any amp
- Internal trimpot to adjust the compression of the gain stage
- Cut filters can be 6dB or 12dB for more extreme EQ cuts

INPUT IMPEDANCE: 1.8M-ohm

CURRENT DRAW: ~15ma off, ~45ma on @ 9V, ~25ma off, ~55ma on @ 18V

Downloadable PDF docs:

Parts List* - <https://www.dropbox.com/s/grjn4avn7c4au1k/Parts%20Matrix.pdf> (includes links to purchase components)

Schematic - https://www.dropbox.com/s/8b3hssbhhslw7i1/dragon_schematic.png

PCB layout & mod sheet - <https://www.dropbox.com/s/f46wy0tqy42mqol/Dragon%20layout.pdf>

Link to buy pre-drilled 1590B2 enclosure from Pedal Parts Plus - <https://www.pedalpartsplus.com/ProductDetails.asp?ProductCode=1590B2VFE>

The drill template for the Hammond 1590B2 enclosure is quite precise. Because of this, we recommend getting a pre-drilled enclosure from the link above. Here is the link to a hand-drawn list of measurements - <https://www.dropbox.com/s/fyiq00oc-16qqzuk/10-Hole%201590B2.pdf>

Peter's How-To Guide for building the Pinball, Dragon and Standout:

<https://www.youtube.com/watch?v=Z5uwB45FI8>

Reverb demo of the Pinball, Dragon and Standout:

https://www.youtube.com/watch?v=QVI_Z43amII

Mike Herman's demo of the Dragon:

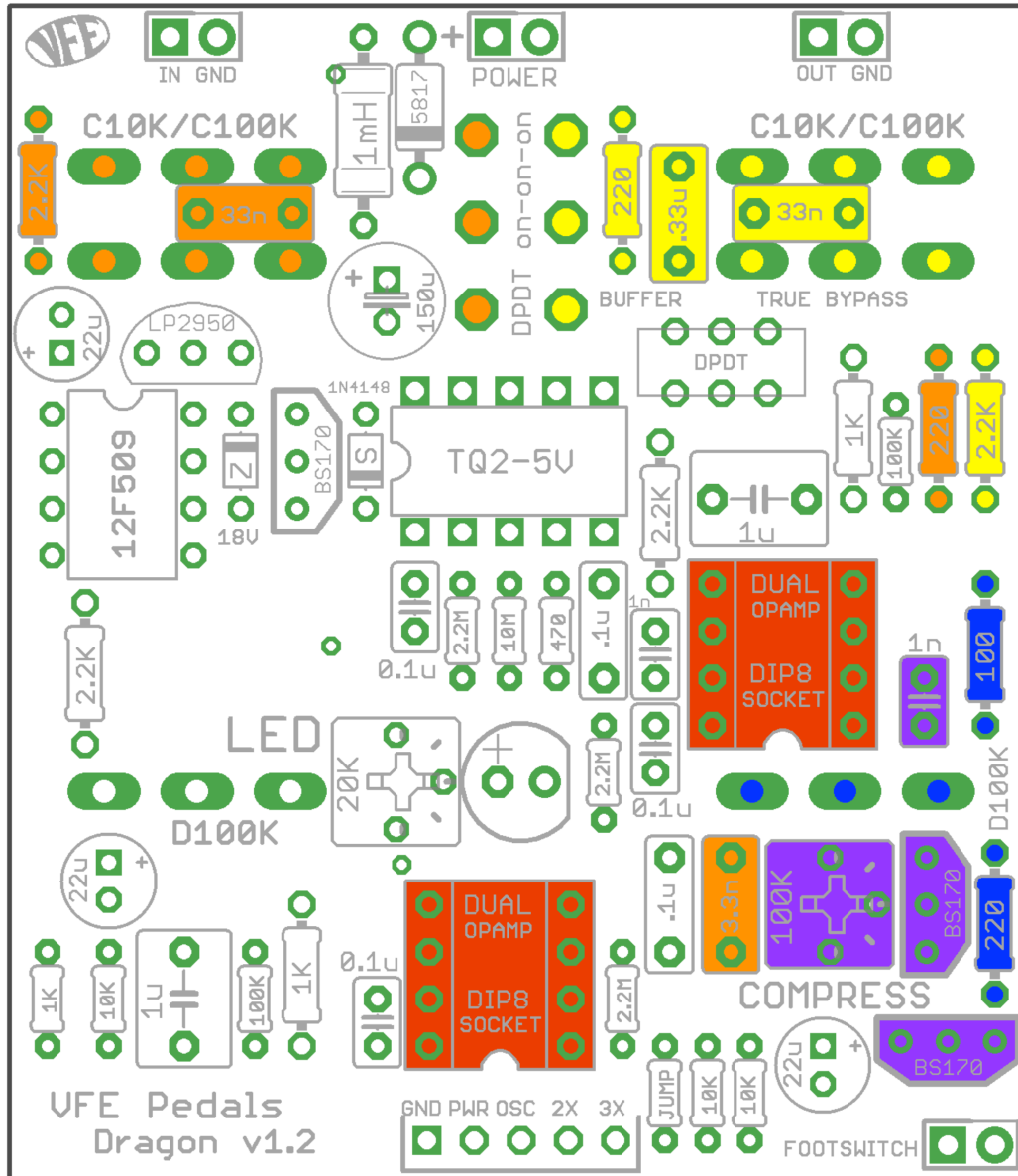
<https://www.youtube.com/watch?v=hRLU9xl7ixs>

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



Dragon PCB Layout

For optimal results, install components in the exact order listed.



- 1 x 12F509
- 1 x DPDT slide
- 1 x 1N4148
- 1 x 470 1/8W
- 1 x 1K 1/8W
- 3 x 10K 1/8W
- 2 x 100K 1/8W
- 3 x 2.2M 1/8W
- 1 x Jumper
- 1 x 10M 1/8W
- 1 x 20V Zener
- 1 x 100 1/4W
- 3 x 220 1/4W
- 2 x 1K 1/4W
- 4 x 2.2K 1/4W
- 3 x 0.1u yellow
- 1 x 1N5817
- 1 x 1mH
- 2 x OPA2134
- 1 x DPDT relay
- 1 x 20K 3362P
- 1 x 100K 3362P
- 2 x 1nF 2.5mm
- 1 x 3.3n red
- 2 x 33nF 5mm
- 2 x 0.1uF 5mm
- 1 x 0.33uF 5mm
- 2 x 1uF 5mm
- 1 x LP2950
- 3 x BS170
- 3 x 22uF
- 1 x 150uF

Red - JRC4580 op amp, but you can experiment with any dual op amp in DIP8 packaging

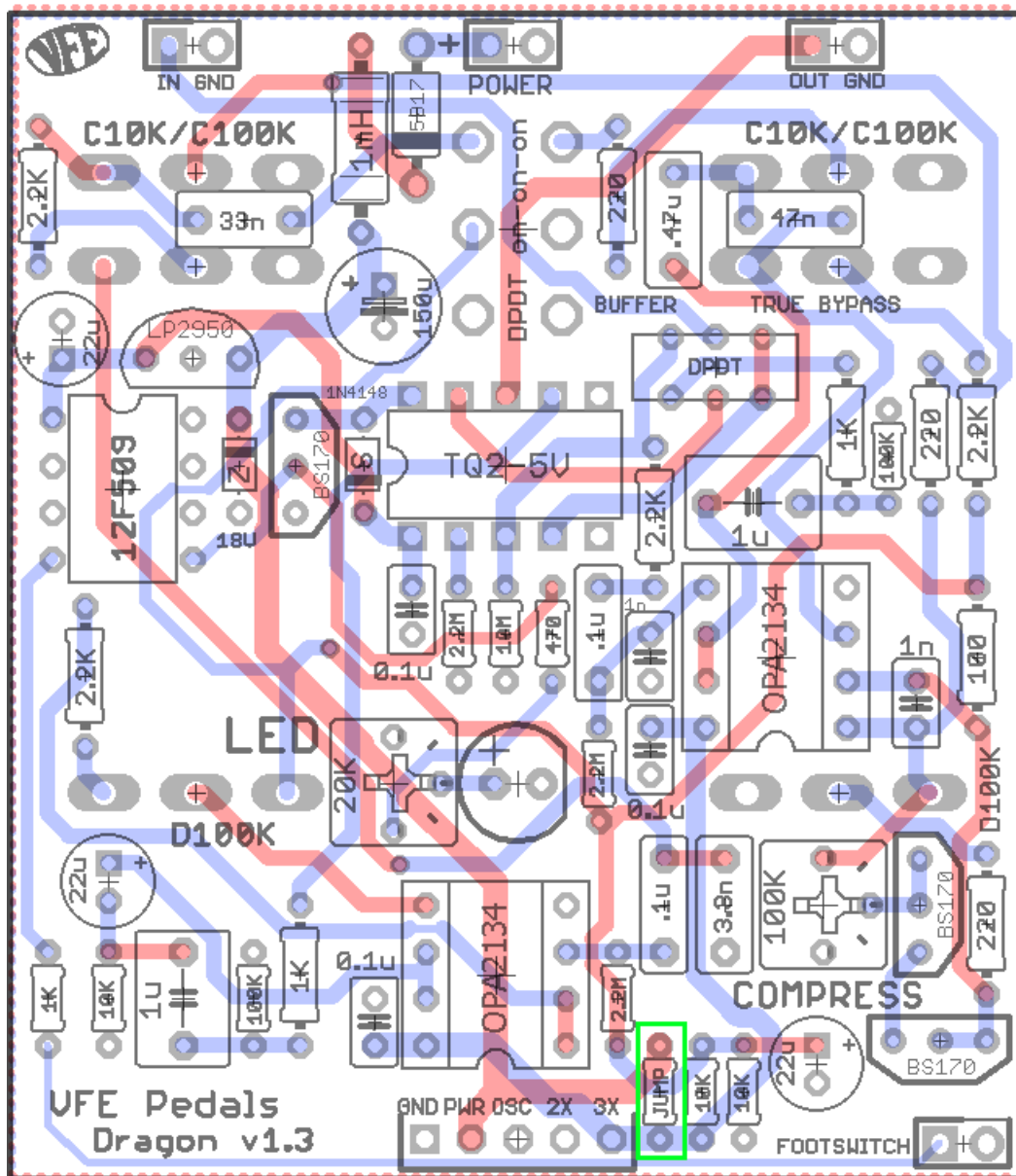
Orange - These components set the frequency range of the LPF

Yellow - These components set the frequency range of the HPF

Blue - These components set the gain range

Purple - These components affect the compression & harmonic character of the distortion

Dimensions: 2.17" W x 2.49" H



Note: solder a jumper in the green box labeled "jump".

Shopping List

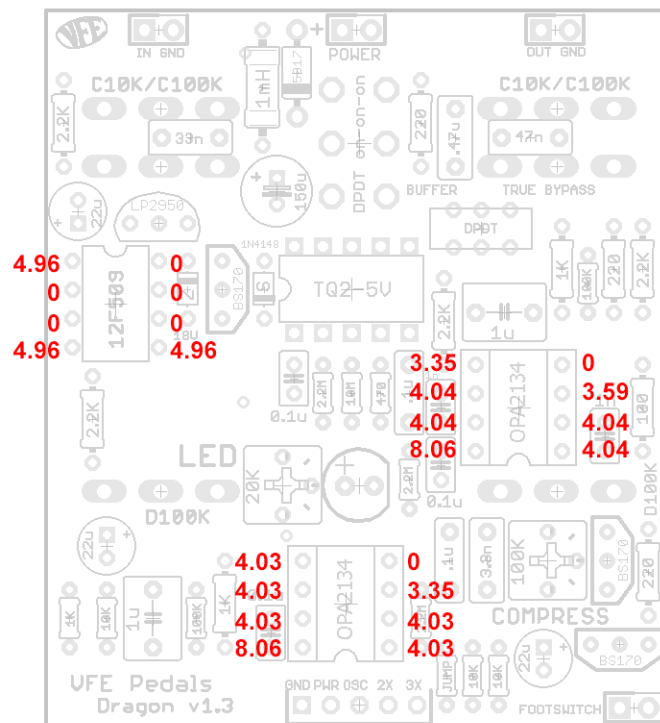
| Shopping List | | | | | | |
|-----------------------------------|-------------|----------------------|--------|---|------------------------|--|
| QTY | Value | Type | Rating | Primary Source | | Alternate Source |
| 1 | 100R | Metal / Carbon Film | 1/4W | Mouser | Mouser | |
| 3 | 220R | Metal / Carbon Film | 1/4W | | | |
| 2 | 1k | Metal / Carbon Film | 1/4W | | | |
| 4 | 2k2 | Metal / Carbon Film | 1/4W | | | |
| 1 | 470R | Metal / Carbon Film | 1/8W | | | |
| 1 | 1k | Metal / Carbon Film | 1/8W | | | |
| 3 | 10k | Metal / Carbon Film | 1/8W | | | |
| 2 | 100k | Metal / Carbon Film | 1/8W | | | |
| 3 | 2M2 | Metal / Carbon Film | 1/8W | | | |
| 1 | 10M | Metal / Carbon Film | 1/8W | | | |
| Caps | | | | | | |
| 3 | 100n | MLCC | 2.5mm | Mouser | | |
| 2 | 1n | Film | | Mouser | | Smallbear |
| 1 | 3n3 | Film | 5mm | Mouser | | Smallbear |
| 2 | 33n | Film | 5mm | Mouser | | Smallbear |
| 2 | 100n | Film | 5mm | Mouser | | Smallbear |
| 1 | 330n | Film | 5mm | Mouser | | Smallbear |
| 2 | 1uF | Film | 5mm | Mouser | | Smallbear |
| 3 | 22uF | Electrolytic | 2.5mm | Mouser | | |
| 1 | 150uF | Electrolytic | 2.5mm | Mouser | | |
| Diodes | | | | | | |
| 1 | 1N4148 | or, 1n914 | | Mouser | | Smallbear |
| 1 | 1N5817 | | | Mouser | | Smallbear |
| 1 | 20v | Zener | | Mouser | | |
| 1 | LED | *your choice color | 3mm | Smallbear | | |
| Transistors / Regulators | | | | | | |
| 1 | LP2950 | | 5v | Mouser | | |
| 3 | BS170 | | | Mouser | | Smallbear |
| Inductors | | | | | | |
| 1 | 1mH | Inductor | | Mouser | | |
| Switches | | | | | | |
| 1 | DPDT | Non-Latching Relay | | Mouser | | |
| 1 | DPDT | Slide | | Mouser | | |
| 1 | DPDT | On/On/On | | Smallbear | | |
| Op-Amps | | | | | | |
| 2 | OPA2134 | | | Mouser | | |
| Pots | | | | | | |
| 1 | 20k | Bourns 3362p | | Mouser | | |
| 1 | 100k | Bourns 3362p | | Mouser | | |
| 2 | 100kA | PCB Right Angle | 16mm | Smallbear | | |
| Hardware | | | | | | |
| 2 | Jacks | Mono | | Smallbear | | LoveMySwitches |
| 1 | Jacks | DC | | Smallbear | | LoveMySwitches |
| 1 | Foot-Switch | Momentary | | LoveMySwitches | | Smallbear |
| 1 | Enclosure | 1590B2 | | PedalPartsPlus - PreDrilled | | PedalPartsPlus - Undrilled |
| 4 | Knobs | *your choice | | Smallbear | | LoveMySwitches |
| Included w/ Purchase | | | | | | |
| 2 | C10k/C100k | Custon PCB Dual-Gang | 16mm | | | |
| 1 | 12F509 | Micro_Controller | DIP8 | | | |
| red indicates see important notes | | | | | | |

BOM Notes

- You should be able to use an LM78L05 in place of the LP2950.
- The relay for the Dragon, Pinball and Standout is the non-latching version of the same relay used in the other VFE projects. Be sure to use the included Mouser link to get the right part!
- Peter uses enclosed mono jacks on his builds, but I recommend using the Lumberg style linked. The reason is the pre-drilled enclosures from PPP do not seem to take this into account, and enclosed jacks will not fit.
- Peter also uses an expensive momentary switch that has a soft click (the smallbear link). I used the much cheaper ones from LoveMyswitches and had no problem with them.
- The 100kD is a custom pot which is not available for the Dragon. It's simply a 100kA with 10% tolerance instead of 20%. Use a 100kA instead. I actually used a 50kA in my build as this had more than enough boost function for me.
- PedalPartsPlus does offer pre-drilled 1590B2 boxes for these projects. They are a bit more expensive but worth it, IMO. They are bang on for the pots/switches layout he uses on these boards. Just remember to use the Lumberg mono jacks. Also, the hole for the LED on the PPP enclosures is overdrilled. A 3mm will fall through so you'll need to solder it in place so it sits correctly. You can use a 5mm, but the hole is actually too small to fit through! A small inconvenience, but not a big deal.

Pre-made cart for all the Mouser items listed in the Primary Source column:
<https://www.mouser.com/ProjectManager/ProjectDetail.aspx?AccessID=c8f81d472c>

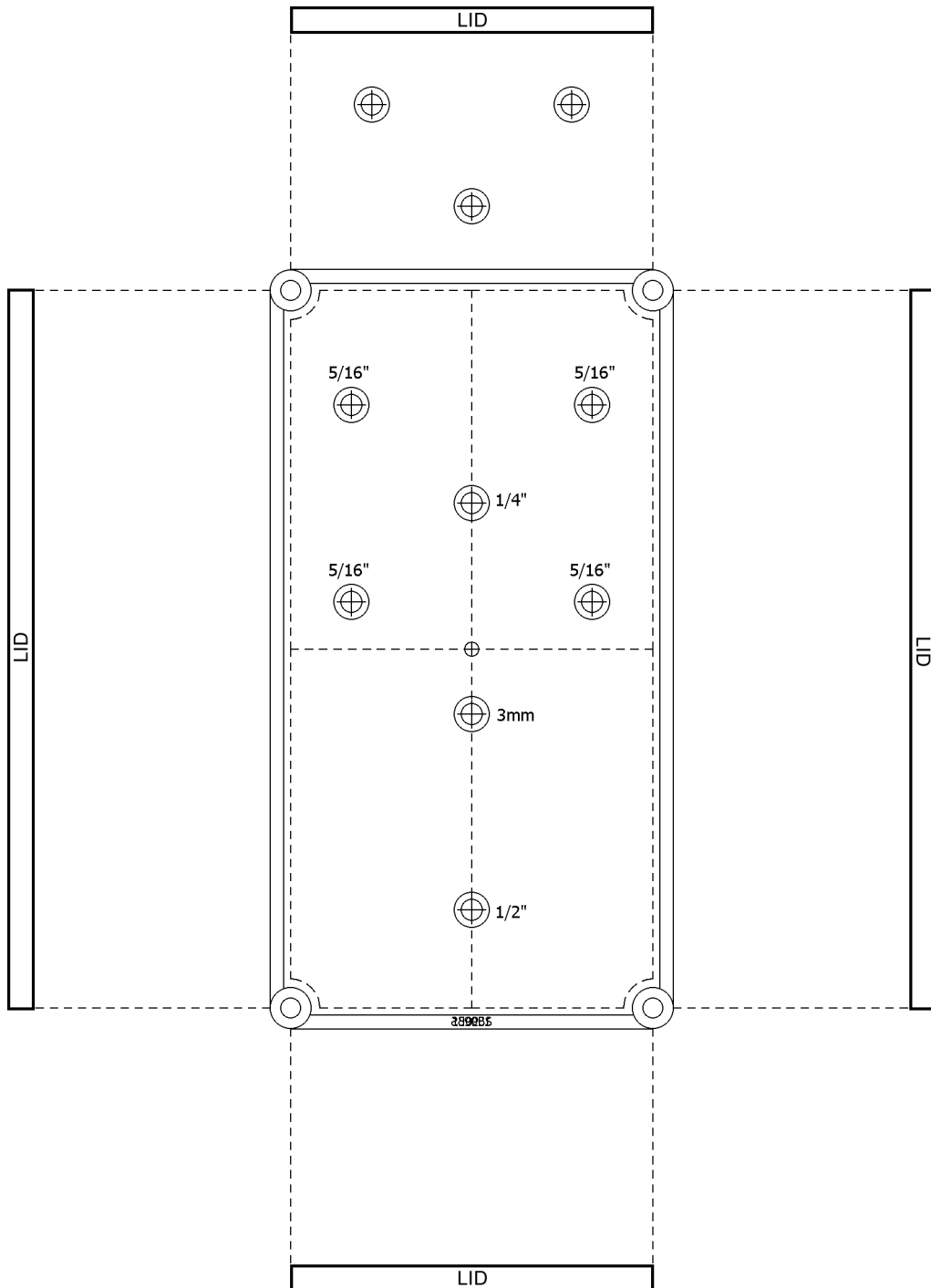
Voltages



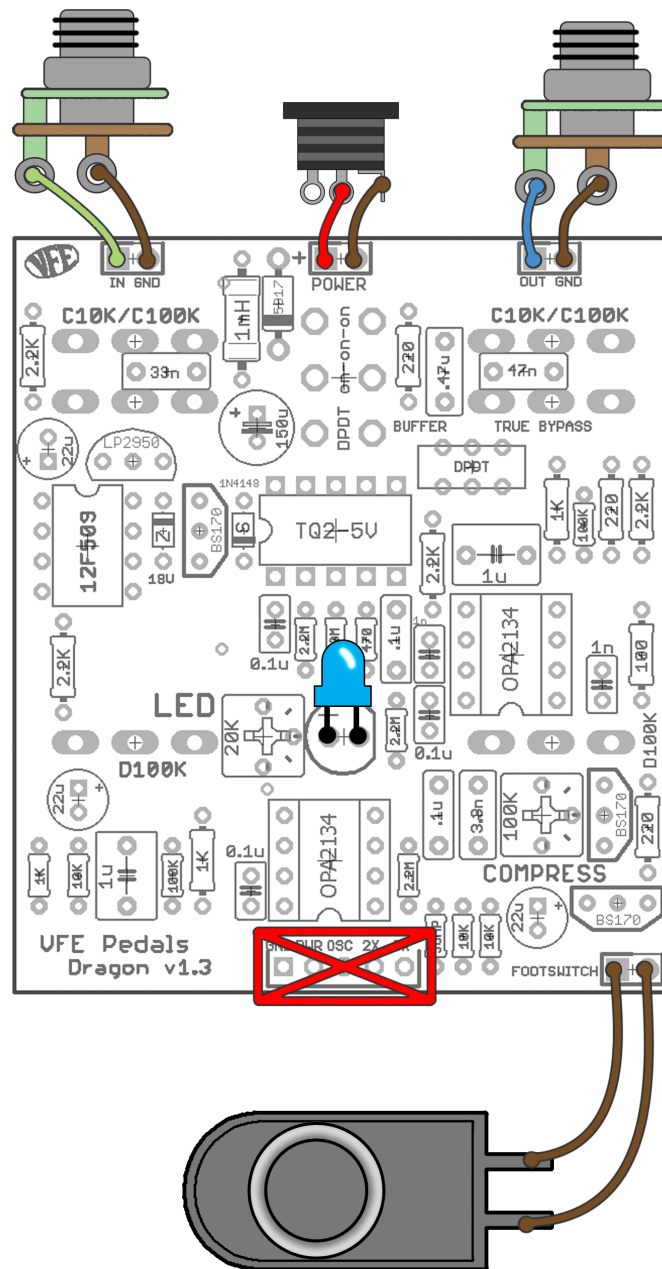
9.42vDC One Spot. Voltages taken from "pedal on" state.

1590B2 Drill Guide

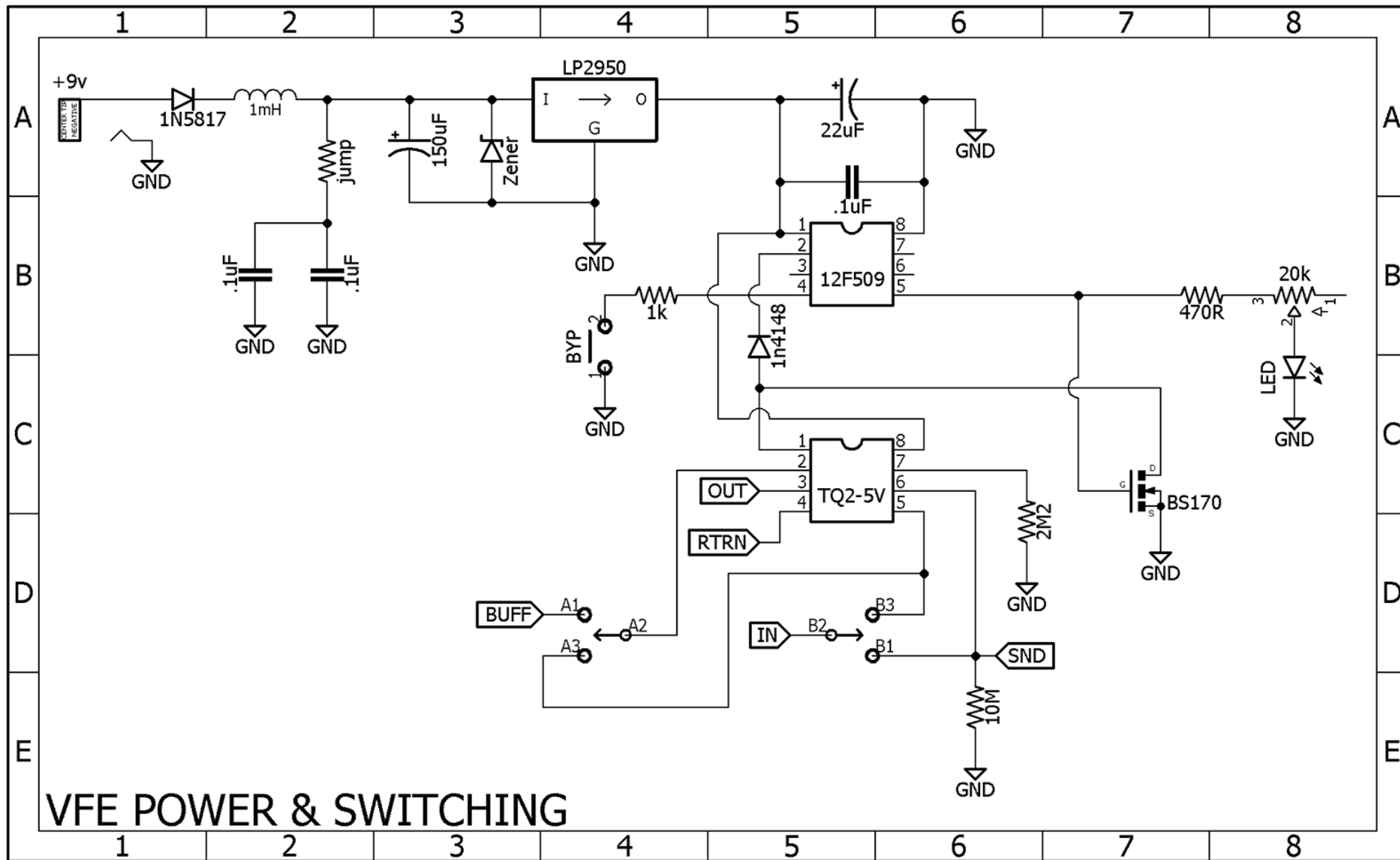
5.3" W x 7.34" H



Wiring

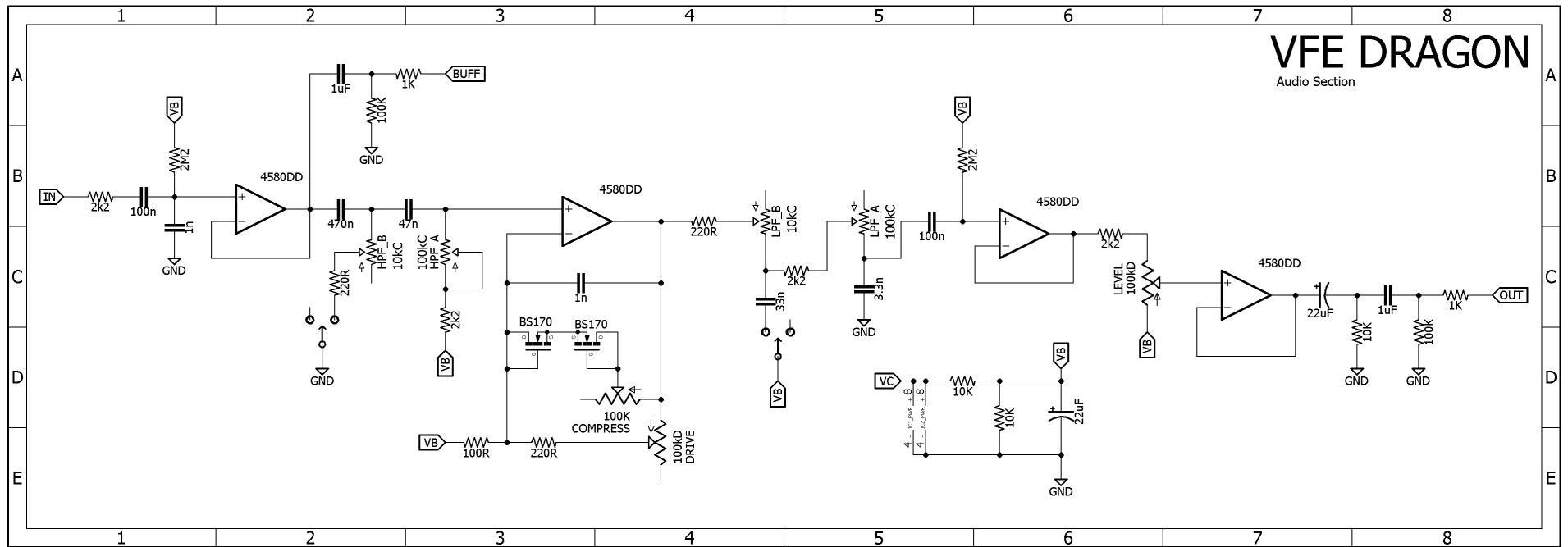


All the pads in the red "x" area should be left unconnected.



Power and Switching are the same for the Pinball, Dragon and Standout.

Schematic



Build

