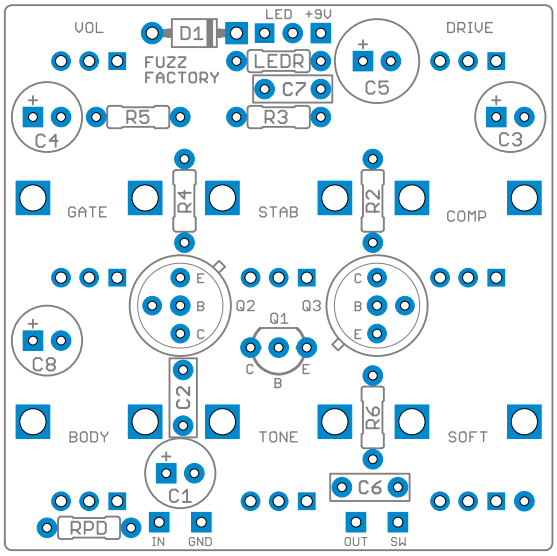
Flare

Fuzz Factory

Overview

Fuzz Factory Project Link



The Flare is a clone of the ZVEX Fuzz Factory, a really interesting little box that lets you create everything from a really thick but musical fuzz to some messed-up oscillations. The Fuzz Factory is essentially a classic Fuzz Face with a LPB-1 booster in front of it, but with the twist that it uses PNP transistors running on +9V rather than -9V like a standard Fuzz Face.

This is not a user-friendly pedal by any means—the knobs are very interactive, and there are a lot of settings that don't work, but if you start with some default knob settings you can get a good feel for what it's capable of.

The Fuzz Factory is notable for being custom-built directly into the guitars of Matthew Bellamy of Muse. He uses it for his main drive tone as well as for feedback & oscillation purposes.

Controls & Usage

- **Drive** controls the amount of fuzz, equivalent to an overdrive's gain control. This also turns into something of a feedback pitch control when the Stability is reduced.
- **Level** is the output level of the effect.
- **Comp** changes the attack. It is heavily affected by the Stability control.
- **Stability** reduces the +9V supply to change the bias of the whole circuit, changing the overall character of all of the knobs and throwing it into oscillation.
- **Gate** turns off the transistor when the signal is below the threshold. Useful for creating glitchy sounds.
- **Soft** reduces the gain of the first boost stage, which rounds out the fuzz a bit and gives it more of an overdrive character. **Note that this control cuts off the signal toward the top end of the range!**
- **Tone** is a classic SWTC (Stupidly Wonderful Tone Control) appended to the end of the circuit to allow the treble content to be tamed a bit.
- **Body** is an input capacitor blend that fades between a 100n and 10uF capacitor. This increases the bass and thickens up the effect.

Modifications

The three additional knobs can all be bypassed if you want to just build a classic Fuzz Factory.

- **Body** can be left off without using any jumpers; just include **C2** but not **C8**.
- **Soft** can be omitted by using a **220k** resistor across the outer two pads (the silkscreen is marked "220k RESISTOR" here)
- **Tone** can be bypassed by running a **jumper between pads 1 and 3**. Leave off **C6**.

Parts

Capacitors

C1	10uF electro
C2	100n
C3	10uF electro
C4	10uF electro
C5	47uF electro
C6	18n
C7	100n
C8	10uF electro

Resistors

R1	(omit) [1]
R2	10k
R3	47k
R4	470R
R5	5k1
R6	220k
LEDR	4k7
RPD	2M2

Semiconductors

Q1	2N3904
Q2-Q3	PNP (Ge or Si) [2]
D1	1N4002
LED	5mm LED

Potentiometers

Drive	10kB 9mm
Level	5kB 9mm
Comp	10kB 9mm
Stability	10kB 9mm
Gate	10kB 9mm
Soft	250kB 9mm [3]
Tone	10kB 9mm
Body	100kB 9mm

Build Notes

[1] **R1** is the **220k** resistor that would normally go from base to collector on Q1. If you want to omit the Soft control, put this resistor across the outer two lugs (it's marked "220k resistor" on the silkscreen).

[2] **You can use either germaniums or silicons here.** The original uses germaniums AC128s. You can buy Fuzz Factory sets on eBay (I recommend eBay seller elebcz from Slovakia) or you can buy a standard Fuzz Face set from either eBay or Small Bear Electronics. For silicons, use **2N3906** or comparable PNPs. This gives a very different character than germaniums. There are plenty of people who actually prefer this version.

[3] **This control cuts out the sound in the last 10-15% of its range**, but it's useful up until that point, and you may be able to find some interesting sounds right on the edge. Since the Fuzz Factory is already plenty glitchy with a number of settings that don't work, one more of them didn't bother me too much.

Starting control settings

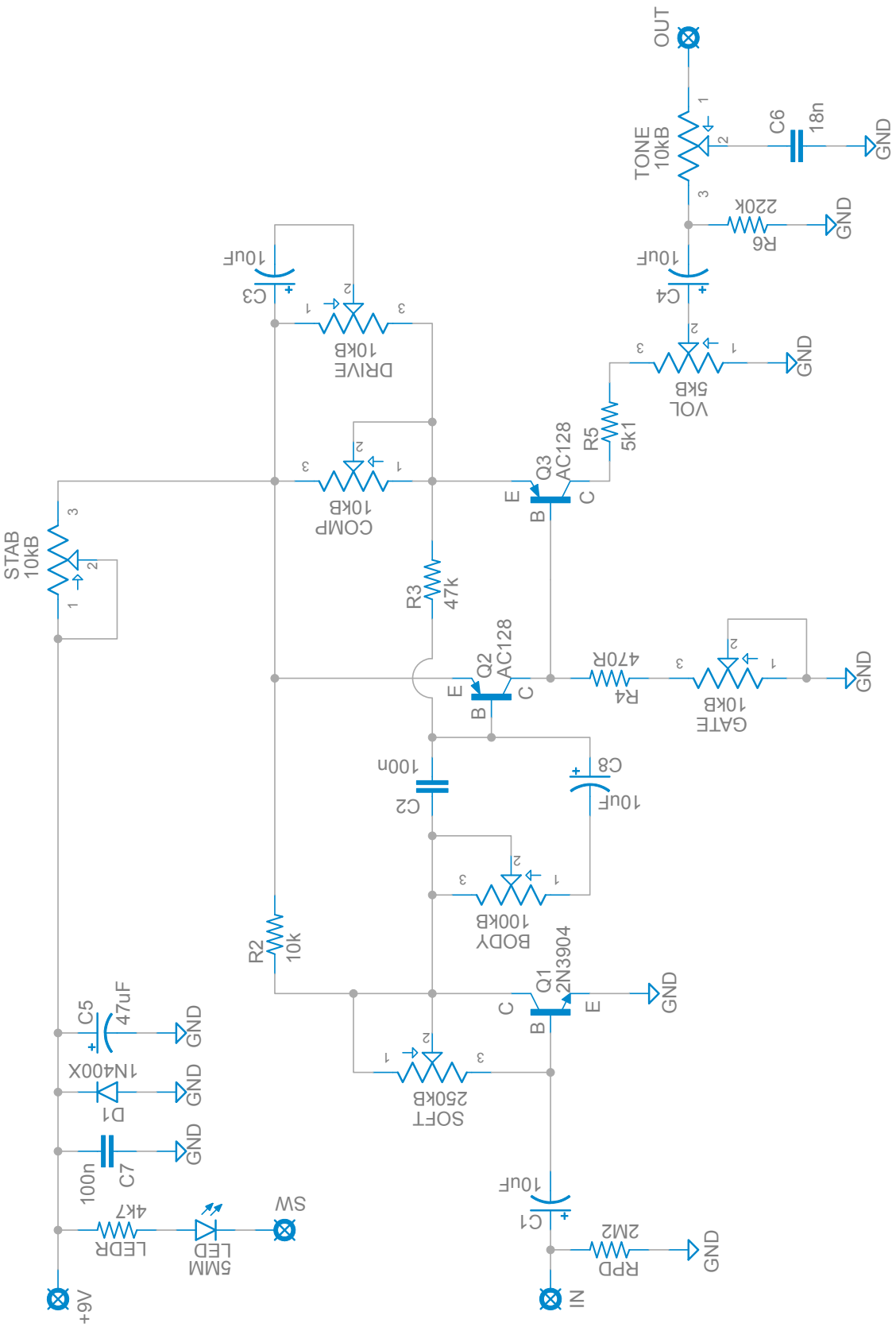
The Fuzz Factory is a very fun but very glitchy beast. If you fire it up for the first time with the knobs in random positions, you may be very disappointed in what you hear! Use these positions as a starting point. (1-10 scale)

Drive: 5		**Volume:** 3
Comp: 2	**Stability:** 10	**Gate:** 0
Soft: 0	**Tone:** 10	**Body:** 2

Additional Part Notes

- Capacitors are shown in nanofarads (n or nF) where appropriate. 1000n = 1uF. Many online suppliers do not use nanofarads, so you'll often have to look for 0.047uF instead of 47n, 0.0056uF instead of 5n6, etc.
- The PCB layout assumes the use of film capacitors with 5mm lead spacing for all values 1nF through 470nF. I prefer EPCOS box film or Panasonic ECQ-B/V-series.
- Pots are 9mm Alphas. These mount directly to the PCB. Unlike the 16mms, I recommend soldering all of these in place before dropping the PCB into the enclosure. Just make sure the drilling is accurate!

Schematic


OUT
TONE 10kB
C6 18n
GND
R6 220k
C4 10uF
VOL 5kB
R5 5k1
Q3 AC128
C3 10uF
DRIVE 10kB
COMP 10kB
STAB 10kB
R3 47k
Q2 AC128
R4 470R
GATE 10kB
C2 100n
C8 10uF
BODY 100kB
R2 10k
Q1 2N3904
SOFT 250kB
C5 47uF
1N400X
D1
100n C7
4K7
LEDR
5MM LED
SW
+9V
C1 10uF
2M2 RPD
IN

General Build Instructions

These are general guidelines and explanations for all Aion Electronics DIY projects, so be aware that not everything described below may apply to this particular project.

Build Order

When putting together the PCB, it's recommended that you do not yet solder any of the enclosure-mounted control components (pots and switches) to the board. Instead, follow this build order:

1. Attach the **audio jacks**, **DC jack** and **footswitch** to the enclosure.
2. Firmly attach the **pots** and **switches** to the enclosure, taking care that they are aligned and straight.
3. Push the **LED**[1] into the hole in the enclosure with the leads sticking straight up, ensuring that the flat side is oriented according to the silkscreen on the PCB.
4. Fit the **PCB** onto all the control components, including the leads of the LED. If it doesn't fit, or if you need to bend things more than you think you should, double-check the alignment of the pots and switches.
5. Once you feel good about everything, **solder them from the top**[2] as the last step before wiring. This way there is no stress on the solder joints from slight misalignments that do not fit the drilled holes. You can still take it out easily if the build needs to be debugged, but now the PCB is "custom-fit" to that particular enclosure.
6. Wire everything according to the wiring diagram on the last page.

[1] **For the LED**: You can use a bezel if you'd like, but generally it's easier just to drill the proper size of hole and push the LED through so it fits snugly. If you solder it directly to the PCB, it'll stay put even if the hole is slightly too big. Make absolutely sure the LED is oriented correctly (the flat side matches the silk screen) before soldering, as it'll be a pain to fix later! After it's soldered, clip off the excess length of the leads.

[2] **Note on soldering the toggle switch(es):** It will require a good amount of solder to fill the pads. Try to be as quick as possible to avoid melting the lugs, and be prepared to feed a lot of solder as soon as the solder starts to melt. I recommend waiting 20-30 seconds between soldering each lug to give it time to cool down.

"RPD" and "LEDR" resistors

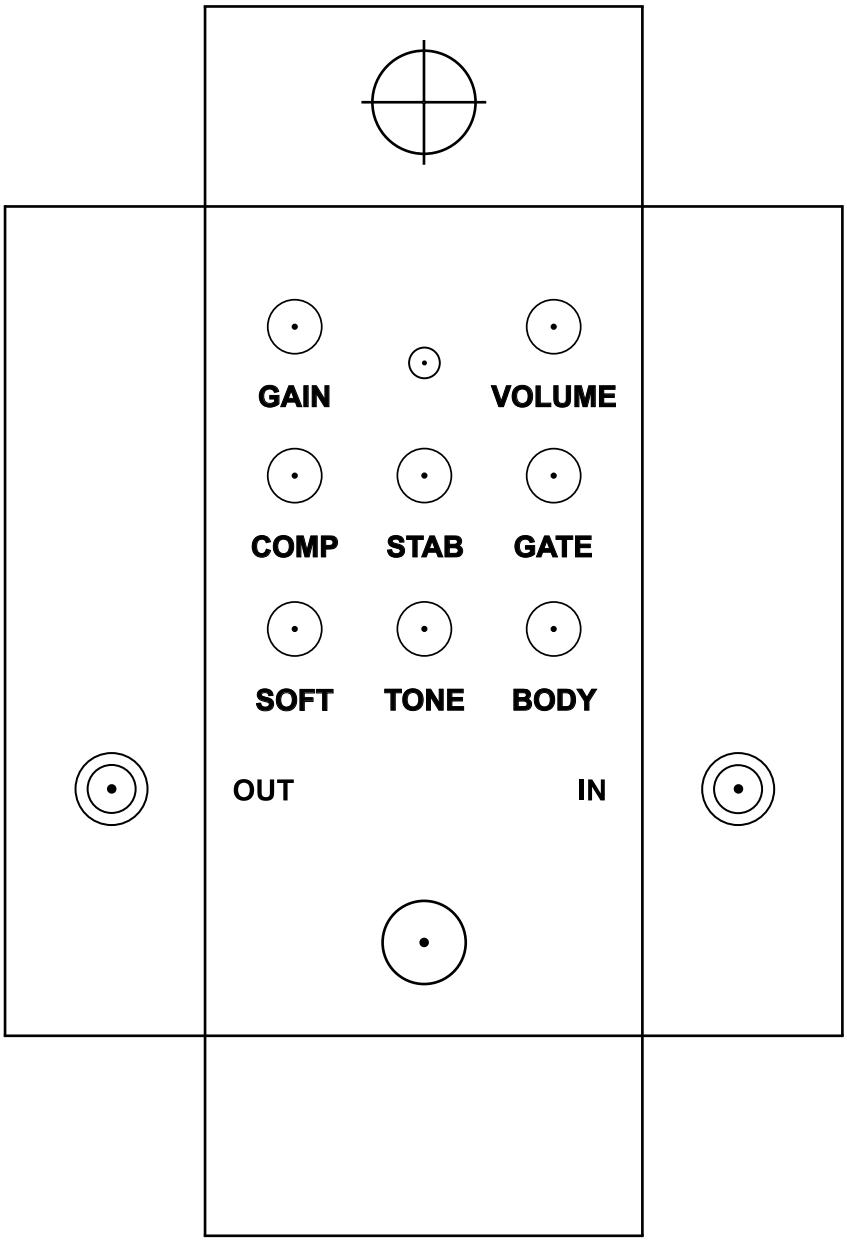
The resistors marked "RPD" and "LEDR" are generally not original to the circuit and can be adjusted to preference. "RPD" is the pulldown resistor to help tame true-bypass popping, while "LEDR" controls the brightness of the LED. I generally use 2.2M for the pulldown resistor and 4.7k for the LED resistor.

Sockets

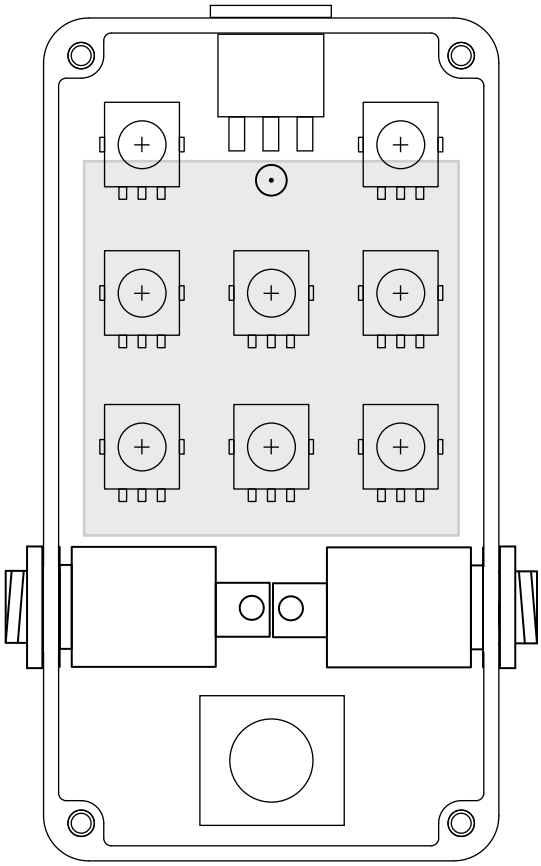
Since double-sided boards can be very frustrating to desolder, especially components with more than 2 leads, it is recommended to use sockets for all transistors and ICs. It may save you a lot of headaches later on.

Drilling & Placement

Print this page and have an adult cut out the drilling template below for you. Tape it to the enclosure to secure it while drilling. Note that the holes are shown slightly smaller than they need to be, so drill out the holes as shown and then step up until they are the correct size for the components.



Hammond 1590B
(bottom/inside view)



Parts Used

- Switchcraft 111X enclosed jacks
- Kobiconn-style DC jack with internal nut

Standard Wiring Diagram

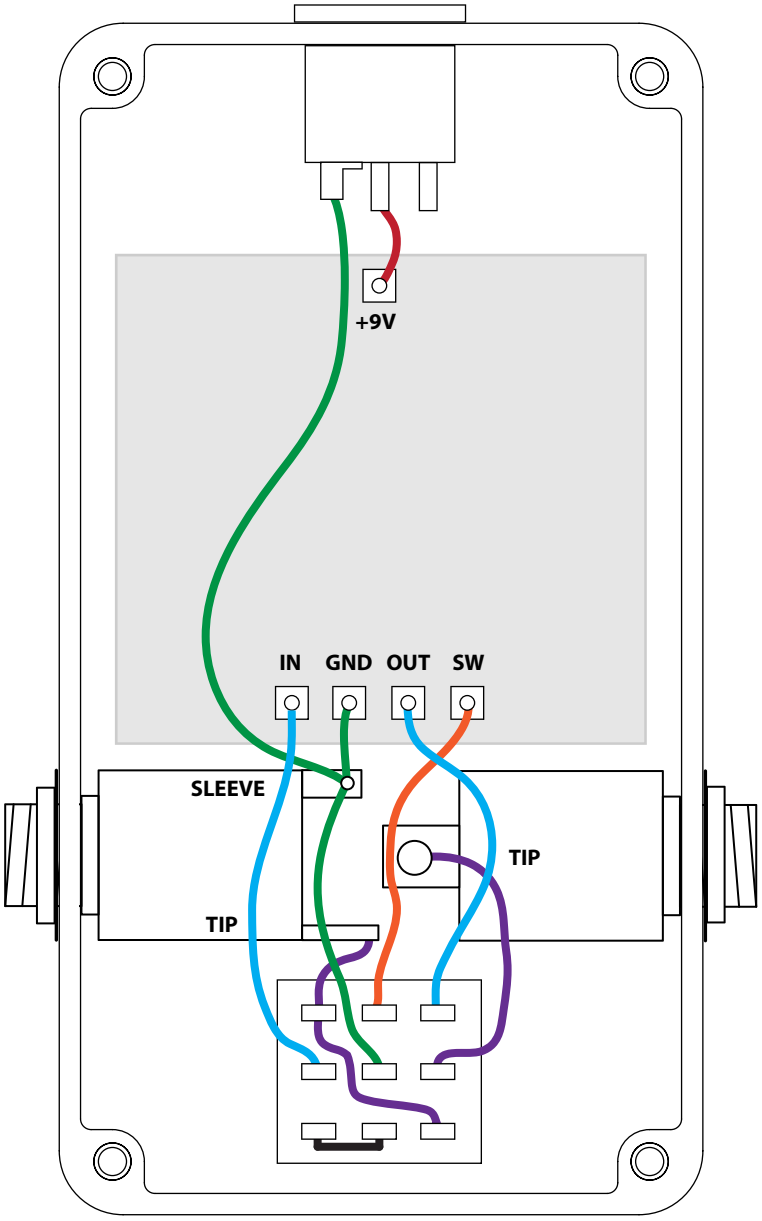
This diagram shows standard true-bypass wiring with a 3PDT switch. When the switch is off, the input of the circuit is grounded and the input jack is connected directly to the output jack.

The **SW** pad is the cathode connection for the LED. This will connect to ground to turn it on when the switch is on. Usage of the on-board LED connection is not required if you have specific placement needs for your enclosure, but's incredibly convenient.

The wiring diagram also makes use of **star grounding** principles where all of the grounds connect to a single ground point (in this case the sleeve of the input jack). This is best practice to avoid added noise caused by improper grounding. The sleeve of the output jack is unconnected.

If using a painted or powdercoated enclosure, **make sure both jacks have solid contact with bare aluminum** for grounding purposes. You may need to sand off some of the paint or powdercoat on the inside in order to make this happen.

Make sure to double-check the markings of the pads on the PCB for your particular project – they are not always in the order shown here!



License / Usage

No direct support is offered for these PCBs beyond the provided documentation. It is assumed that you have at least some experience building pedals before starting one of these. Replacements and refunds will not be offered unless it can be shown that the circuit or documentation are in error. I have in good faith tested all of these circuits. However, I have not necessarily tested every listed modification or variation. These are offered only as suggestions based on the experience and opinions of others.

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