

FIREAXE

FX TYPE: Boost / OD

Based on the Boss® FA-1™

Enclosure Size: 1590B

"Softie" compatibility: Softie2&3

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Overview

The FA-1™ (FET amplifier) is an early '80's "pocket" effect by Boss. It had no bypass feature and was meant to work in tandem with MA-1 (a pocket amplifier) or clipped onto a guitar strap. While that's a very outdated format people have since rediscovered what a sweet little boost this unit is and that it can work very well in a modern pedalboard setup. Current prices on Reverb for the vintage units are in the \$300-400 range.

The **Fireaxe** reformats the circuit into pedal version. It also takes some liberties with the original design and adds a few new features. The Fireaxe uses a single dual op-amp instead of the two Hitachi HA12017 chips, and makes a few small adjustments to the circuit. It can also turn the FA-1 circuit into a low gain overdrive. This was done by adding a diode clipping feature and (master) volume output. And, it sounds really good as a low gain OD!

Controls

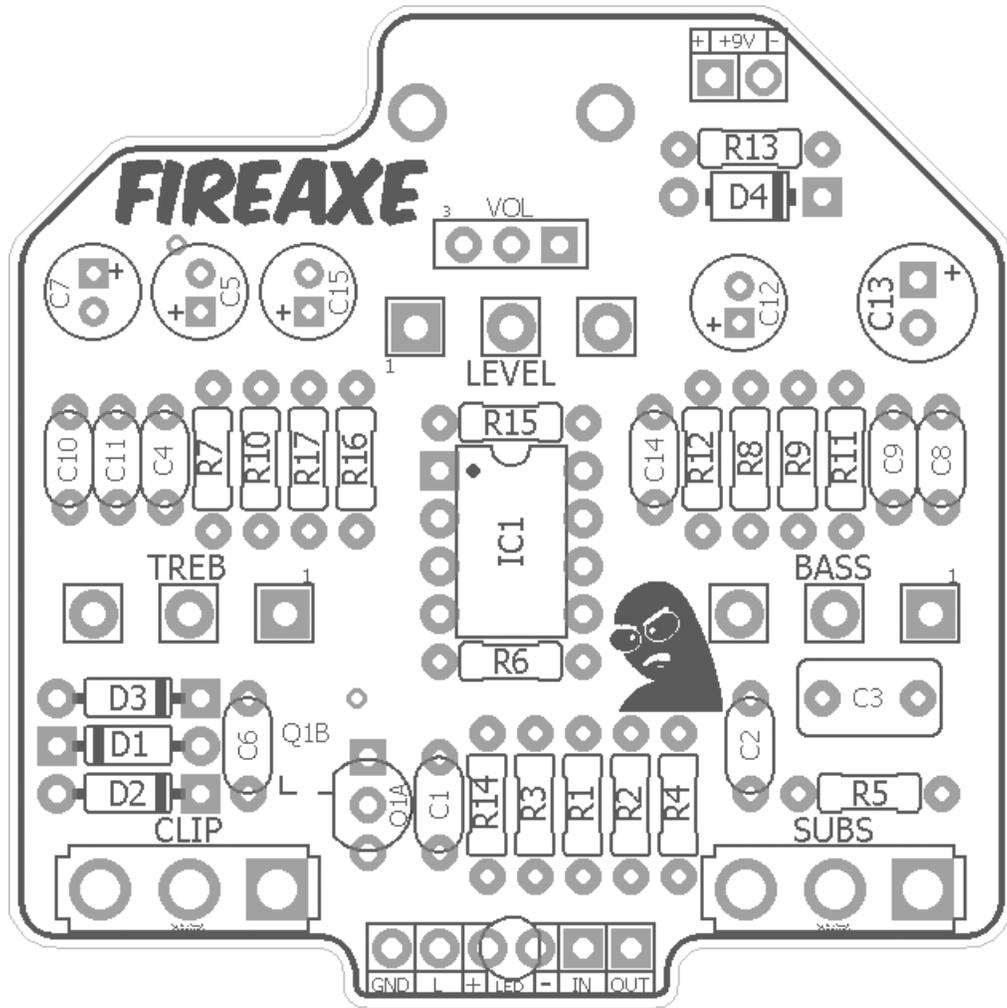
- **LEVEL** - Sets the clean output gain of the effect.
- **BASS, TREB** - Active Baxandall tone stack which cuts (CCW) or boosts (CW) bass and treble.
- **SUBS** - In the right position this switch increases the bass (about 10x) fed *into* the gain portion of the circuit. Use it for added low end or if you are using the Fireaxe for bass.
- **CLIP** - In the right position this switch adds asymmetrical clipping in the gain circuit to turn the Fireaxe into a low gain overdrive. The left position is stock FA-1.
- **VOL** - When the CLIP switch is active, use the volume control as you would with any overdrive. When the CLIP switch is off (left position) set the VOL control to max for stock FA-1 behavior.

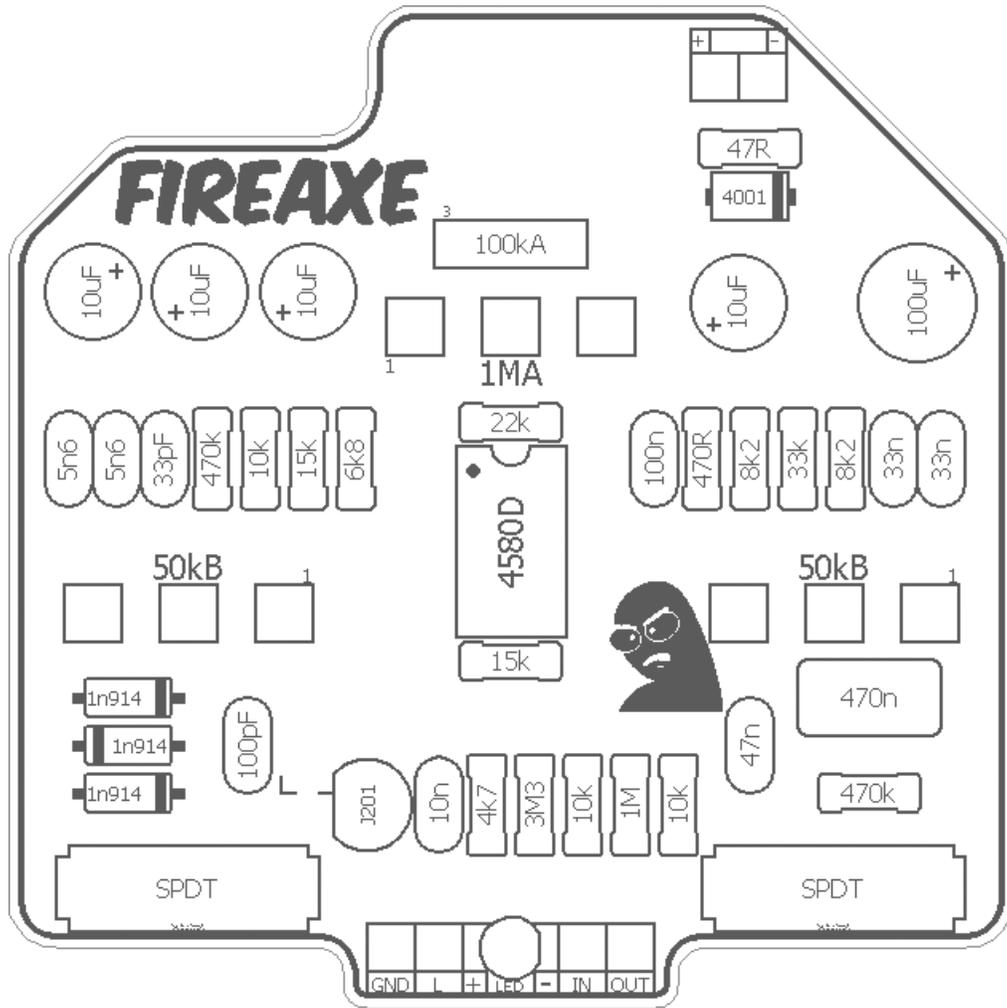
Good (short) article on the FA-1:

<https://catalinbread.com/blogs/kulas-cabinet/boss-fa-1-fet-amplifier>

Terms of Use: You are free to use purchased **Fireaxe** circuit boards for both DIY and small commercial operations. You may not offer **Fireaxe** 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). 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.





Resistors		Caps		Diodes	
R1	10k	C1	10n	D1 - D3	1n914
R2	1M	C2	47n	D4	1N4001
R3	3M3	C3	470n	Transistors	
R4	10k	C4	33pF	Q1	J201
R5	470k	C5	10uF	IC	
R6	15k	C6	100pF	IC1	4580DD
R7	470k	C7	10uF	Switches	
R8	8k2	C8	33n	SUBS	SPDT
R9	33k	C9	33n	CLIP	SPDT
R10	10k	C10	5n6	Pots	
R11	8k2	C11	5n6	VOL	100kA
R12	470R	C12	10uF	BASS	50kB
R13	47R	C13	100uF	TREB	50kB
R14	4k7	C14	100n	LEVEL	1MA
R15	22k	C15	10uF		
R16	6k8				
R17	15k				

Value	QTY	Type	Rating
47R	1	Metal / Carbon Film	1/4W
470R	1	Metal / Carbon Film	1/4W
4k7	1	Metal / Carbon Film	1/4W
6k8	1	Metal / Carbon Film	1/4W
8k2	2	Metal / Carbon Film	1/4W
10k	3	Metal / Carbon Film	1/4W
15k	2	Metal / Carbon Film	1/4W
22k	1	Metal / Carbon Film	1/4W
33k	1	Metal / Carbon Film	1/4W
470k	2	Metal / Carbon Film	1/4W
1M	1	Metal / Carbon Film	1/4W
3M3	1	Metal / Carbon Film	1/4W
33pF	1	Ceramic / MLCC	16v min.
100pF	1	Ceramic / MLCC	16v min.
5n6	2	Film	16v min.
10n	1	Film	16v min.
33n	2	Film	16v min.
47n	1	Film	16v min.
100n	1	Film	16v min.
470n	1	Film	16v min.
10uF	4	Electrolytic	16v min.
100uF	1	Electrolytic	16v min.
1n914	3		
1N4001	1		
J201	1	TH or SMD	
4580DD	1	or, similar dual op-amp	
SPDT	2	On/On, Solder Lug	
100kA	1	PCB Mount, Plastic Shaft	9mm
50kB	2	PCB Mount, Right Angle	16mm
1MA	1	PCB Mount, Right Angle	16mm

4580DD:

<https://www.mouser.com/ProductDetail/513-NJM4580DD>

(Currently out of stock with more expected May 2021. See Notes for sub suggestions. This is just my preferred op-amp but many others will work).

MMBFJ201:

<http://smallbear-electronics.mybigcommerce.com/fairchild-on-semi-jfet-mmbfj201/>

16mm pots (50k Ω , 1mA):

<http://smallbear-electronics.mybigcommerce.com/alpha-single-gang-16mm-right-angle-pc-mount/>

9mm Plastic Shaft pot:

<http://smallbear-electronics.mybigcommerce.com/alpha-single-gang-9mm-right-angle-pc-mount-w-knurled-plastic-shaft/>

On/On Toggle:

<http://smallbear-electronics.mybigcommerce.com/spdt-on-on-short-lever/>

Thinline DC Jack:

<http://smallbear-electronics.mybigcommerce.com/dc-power-jack-all-plastic-unswitched-2-1-mm/>

Enclosed Mono:

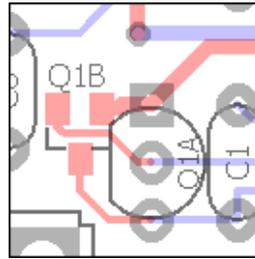
<http://smallbear-electronics.mybigcommerce.com/1-4-in-mono-enclosed-jack/>

<http://smallbear-electronics.mybigcommerce.com/1-4-in-mono-enclosed-switchcraft-111x/>

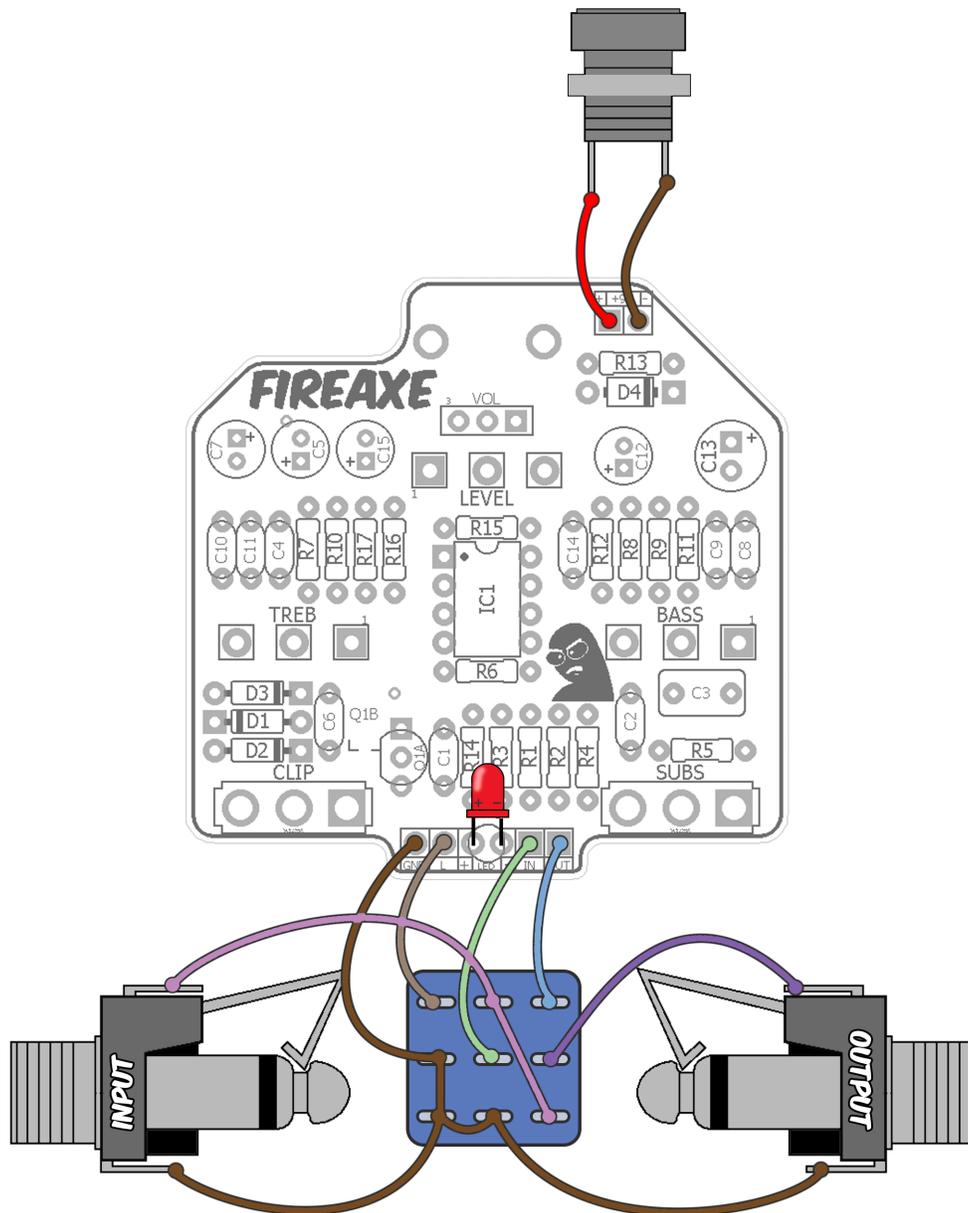
Lumberg Mono:

<http://smallbear-electronics.mybigcommerce.com/lumberg-1-4-compact-shrouded-mono-jack/>

- The Fireaxe allows for either through-hole or surface mount J201 (Q1A and Q1B, resp.) Just don't use both!

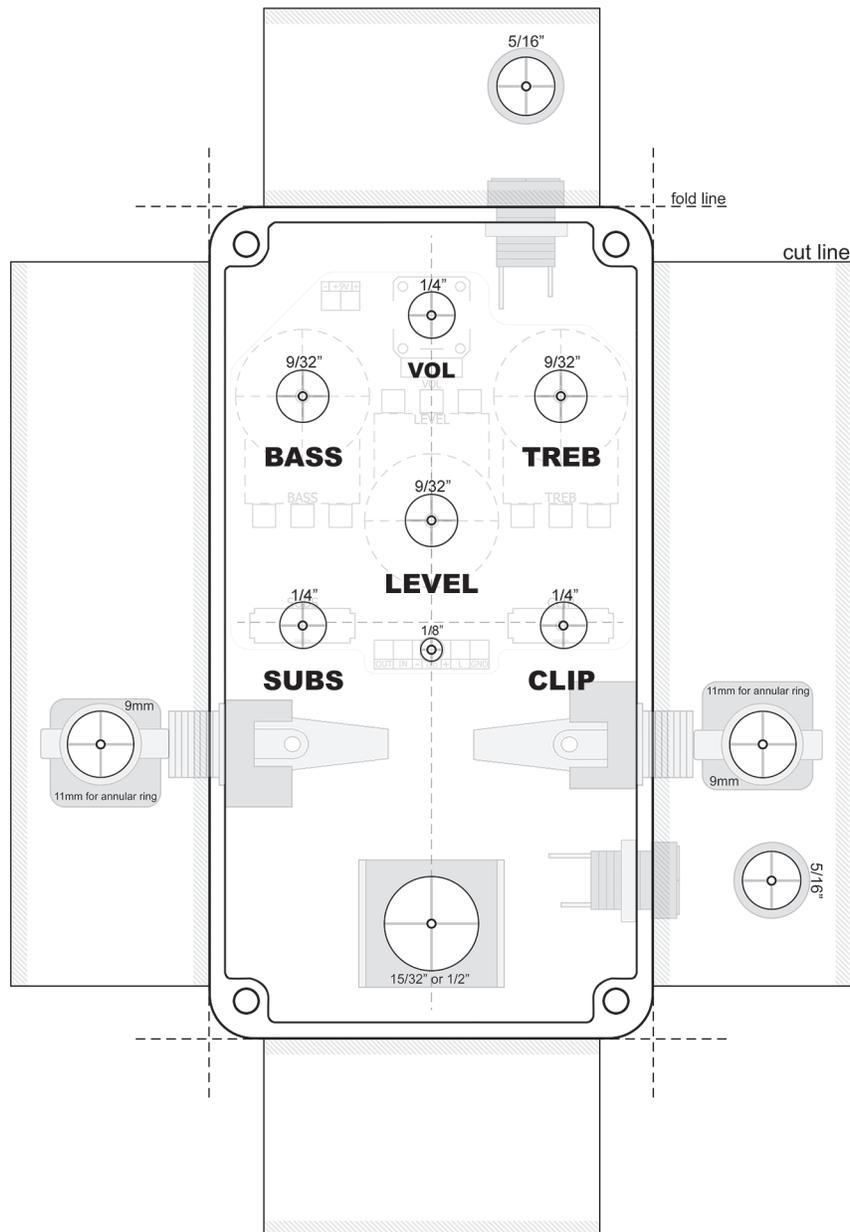


- Smallbear appears to be out of through-hole J201 (maybe forever?) If you are not comfortable with surface mount soldering, I suggest subbing any similar through-hole JFET you can find (being mindful of the pinout). A 2n5457 or MPF102 would be fine as subs for the J201 in this circuit.
- You can use any decent dual op-amp. I happened to like the 4580DD in my build so that's what I suggested. Other ones to try: 4558, TL072, LM1458, OPA2134a, etc.
- I was happy with 1n914 for clipping diodes but you can certainly try others.



The bypass LED can be soldered directly to the PCB.

Note: Drill Guides are approximate and may require tweaking depending on the types of jacks, switches and pots you use.



- This drill diagram shows two locations for the DC jack, depending on if you prefer top or side mounted. Just be sure you only drill one of them!
- You can use open metal frame jacks, if you like.
- The Fireaxe will accommodate the Softie 2 or 3 (for soft touch switching). You will need to make adjustments to the bypass switch and LED locations if you use either.

IC1 4580DD

1	4.51
2	4.53
3	4.53
4	0
5	4.53
6	4.53
7	4.53
8	9.19

Q1 J201

D	9.16
S	2.39
G	3.17

- 9.42vDC One Spot
- Current Draw ~ 5mA

