



VFE FOCUS

FX TYPE: Ultimate Mid Boost

From the VFE Website:

<http://vfepedals.com/focus.html>

Guitarists have long used tubescreamer-style overdrives as a clean mid boost by turning the gain down and cranking up the output. The FOCUS is the answer to the search for a better, more versatile mid boost pedal. Developed in collaboration with Adam "Nolly" Getgood from Periphery, the FOCUS employs variable bass and treble cut filters for control over top end grit and low frequency saturation, no matter how many strings your guitar has!

HOW THE Focus CAME TO BE

"My idea for the Focus came from many years of using various overdrive pedals to boost the front end of high-gain amps, taking advantage of the natural high- and low-end filtering those pedals have, which results in the unmistakably tightened and smoothed sound heard from countless rock and metal players both live and on recording. Pretty soon I realised that using this common overdrive EQ and combining it with a clean boost could accomplish the same result without the unnecessary clipping stage of an overdrive pedal. By making the filters adjustable, the player could completely fine tune the response of their guitar and amplifier without being stuck with the fixed filters of their usual boost pedal. I approached Peter at VFE and he understood what I was after straight away - the Focus was born very soon afterwards."

TIGHT: Sets the frequency roll off point of the variable bass cut. Turn counterclockwise to cut bass frequencies for a tighter bottom end. RANGE: 70Hz to 1.5kHz.

SMOOTH: Sets the frequency roll off point of the variable treble cut. Turn clockwise to cut treble frequencies for a smoother top end. RANGE: 320Hz to 7.2kHz.

LEVEL: Sets the gain of the output stage, up to 26dB of extra clean boost!

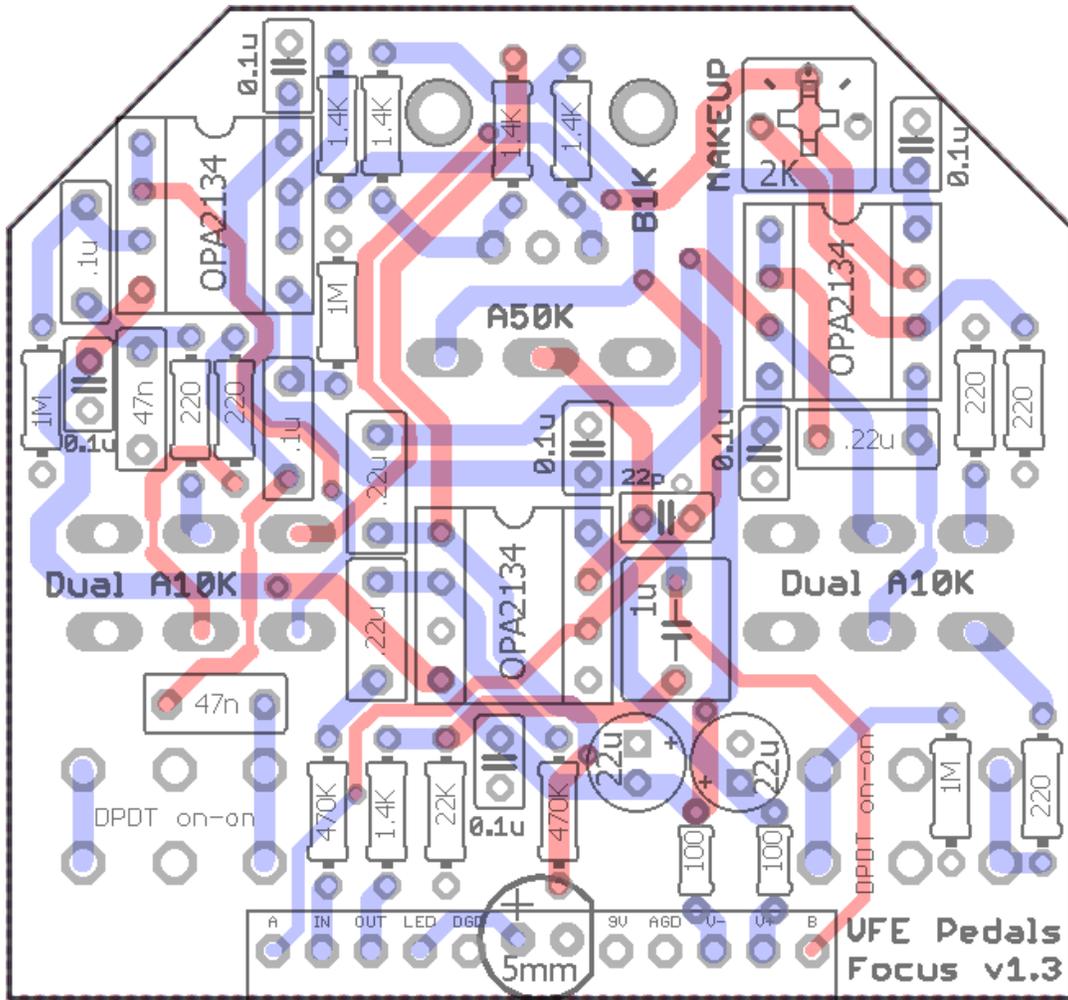
MIX: Blends between the dry signal (counterclockwise), and the EQ signal (clockwise). Use the blend to roll off the strength of the bass and treble cuts.

SLOPE: Toggles each band between a 1-pole and 2-pole cut filter. More poles = sharper frequency rolloff.

INTERNAL CONTROL: The internal MAKEUP trimpot sets the makeup gain of the dry signal path. This trimpot lets you set the relative volume of the EQ and dry signal paths, or you can use it to add even more clean boost to the dry signal path.

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

Trace Routing



Knob Layout



Shopping List

QTY	Value	Type	Rating	Spacing
2	100R	*see notes	1/4W	5mm
5	220R	Metal / Carbon Film	1/4W	7.5mm
5	1k43	Metal / Carbon Film	1/4W	7.5mm
1	22k	Metal / Carbon Film	1/4W	7.5mm
2	470k	Metal / Carbon Film	1/4W	7.5mm
3	1M	Metal / Carbon Film	1/4W	7.5mm
1	22pF	MLCC	25v min.	2.5mm
6	100n	MLCC	25v min.	2.5mm
2	47n	Film	25v min.	5mm
2	100n	Film	25v min.	5mm
3	220n	Film	25v min.	5mm
1	1uF	Film	25v min.	5mm
2	22uF	Electrolytic	25v min.	
3	OPA2134a	or, other Dual Op-Amp		
2	DPDT	On/On, Pin Mount		
1	2k	Bourns 3362p		
1	1kB	PCB Plastic Shaft	9mm	
1	50kA	PCB Right Angle	16mm	
2	10kA	PCB Dual Gang	16mm	

1) I suggest not using the two 100R resistors on the BOM and doing jumpers instead. Don't be like me: building this project blindly and sticking two 100R 1/8W resistors in there without thinking because they fit the space. 100R 1/8W resistors will drop your supply voltages like a tank in jello. At the roughly 60mA current draw on the Focus, you will end up with a whopping 2.2v drop across each resistor.

This could be improved by using higher wattage resistors there (like 1/4W) and lower values (like 10R or 22R) but ultimately, the circuit does not need the extra filtering or current limiting.

2) You can use 1k5 in place of the 1k43 resistors!

3) The OPA2134a is really expensive. You can try other, less expensive dual op-amps here. Anything that is rated for 18v operation. Suggestions: TL072 or JRC4580DD.

BOM Notes

22pF (2.5mm MLCC): <http://www.mouser.com/Search/ProductDetail.aspx?R=C315C220J5G5TAvirtualkey64600000virtualkey80-C315C220J5G>

100n (2.5mm MLCC): <http://www.mouser.com/Search/ProductDetail.aspx?R=C320C104K5R5TAvirtualkey64600000virtualkey80-C320C104K5R>

Bourns 3362p (2k): <https://www.mouser.com/ProductDetail/Bourns/3362P-1-202LF?qs=s-GAEpiMZZMvygUB3GLcD7sb71EWCGEDbMej%2fZaROi94%3d>

OPA2134a: <http://www.mouser.com/Search/ProductDetail.aspx?R=OPA2134PAvirtualkey-59500000virtualkey595-OPA2134PA>

<http://www.smallbear-electronics.mybigcommerce.com/ic-opa2604ap/>

DPDT On/On (Pin Mount): <http://www.smallbear-electronics.mybigcommerce.com/dpdt-on-on-short-lever-pc-mount/>

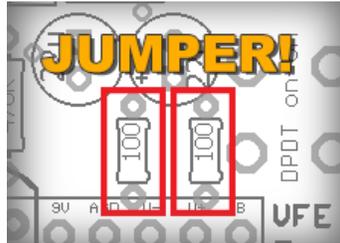
9mm Plastic Shaft (1kB): <http://smallbear-electronics.mybigcommerce.com/alpha-single-gang-9mm-right-angle-pc-mount-w-knurled-plastic-shaft/>

16mm PCB Mount (50kA): <http://smallbear-electronics.mybigcommerce.com/alpha-single-gang-16mm-right-angle-pc-mount/>

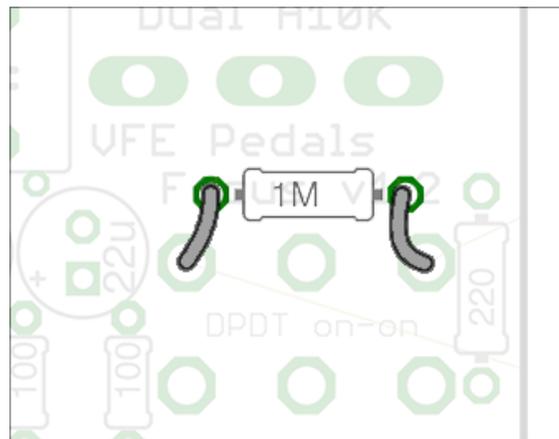
16mm Dual-Gang (10kA): <http://www.smallbear-electronics.mybigcommerce.com/alpha-dual-gang-16mm-pc-mount/>

Build Notes

As recommended on pg.4, jumper the two spots for the 100R resistors like so:



Version 1.1 of the Focus (the board that ships with this project) requires a 1M resistor soldered across the two outside pins of the right-side DPDT. This was added to prevent a small switch pop. Ver. 1.3 (the one shown on the Trace layout on pg.2) has this resistor on the PCB.



PS: Insofar as I can tell, there is not real difference in v1.1, 1.2, or 1.3 of the PCB other than this 1M resistor. He may have done small tweaks on the trace routing or values but the values listed in the BOM are for the last version, which is 1.3.

Voltages

All voltages on the ICs should read about 0v DC except pins 8 and 4.

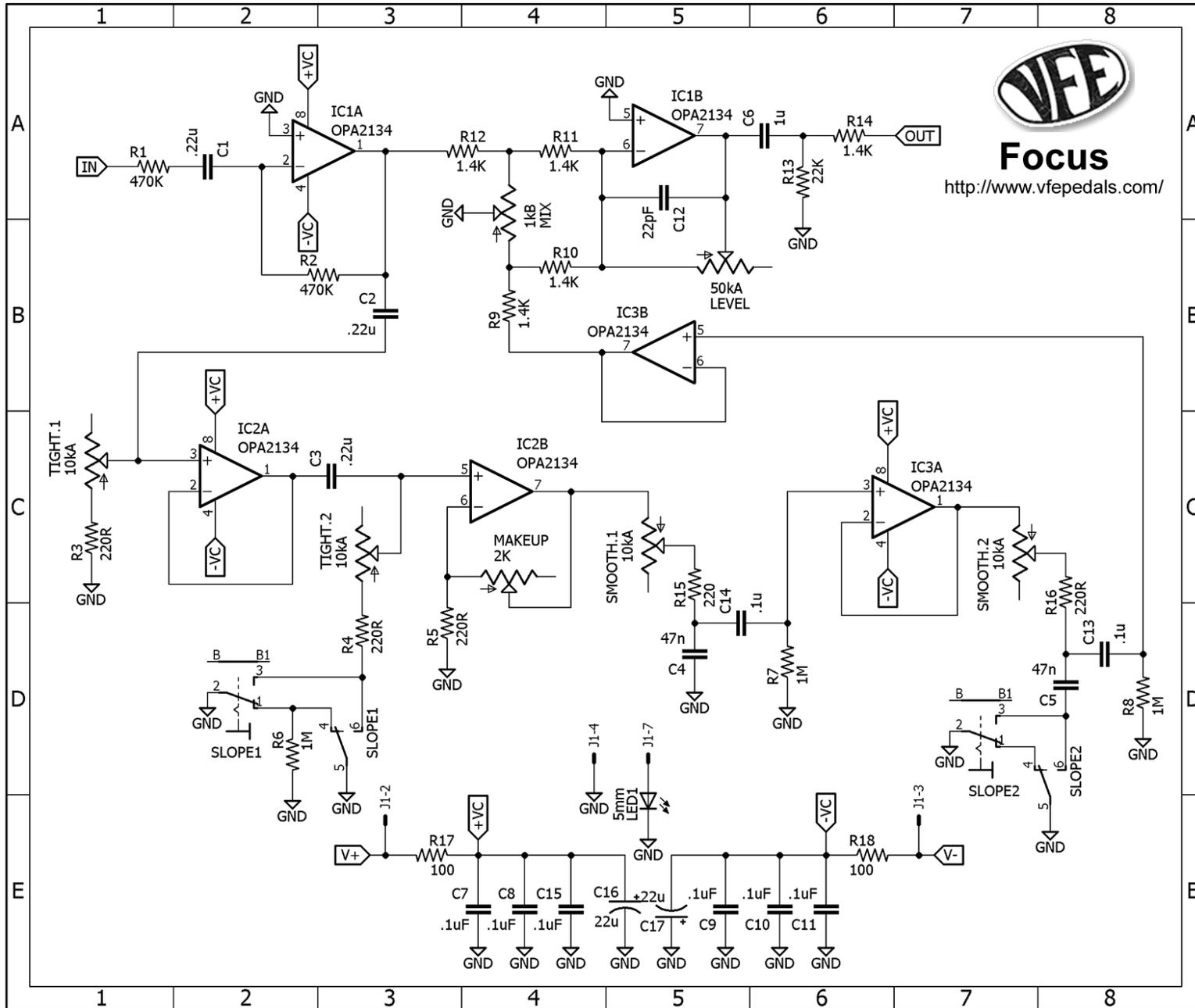
Pin8 (all): +7.86v

Pin4 (all): -6.8v

This is with the two 100Rs jumpered and using a One Spot with 9.42 nominal.

Current Draw: About 57mA

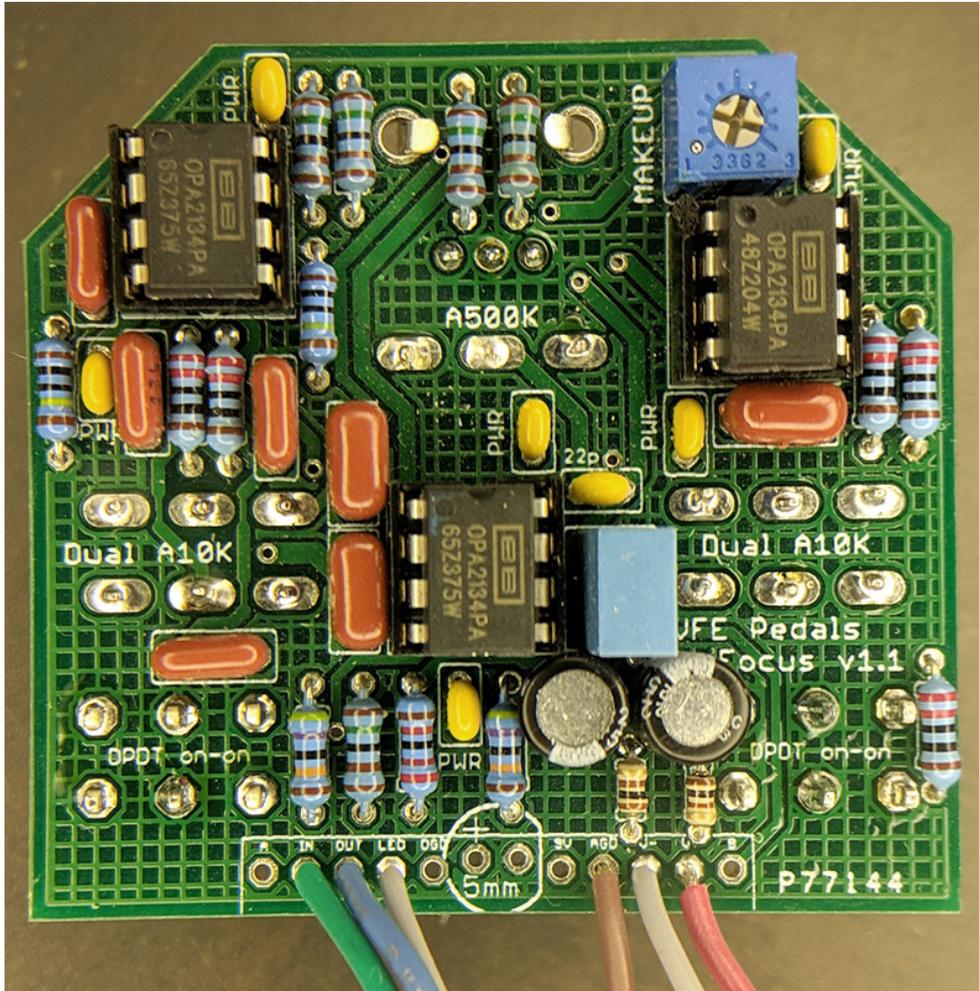
Schematic



Focus

<http://www.vfepedals.com/>

Build



This pic was taken before adding the 1M jumper across the DPDT (right under the “Focus v1.1” text). Also, the 100R resistors are on the PCB because I elected to short them on the bottom rather than remove them (to lessen the chance of damaging it).