

VFE_MINIMU

FX TYPE: Filter

Enclosure Size: 1590B, 125B

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Overview

[From the VFE website:](#)

The MINI MU is derived from the classic Mutron III envelope filter (aka autowah), and has all the same great fat and funky filter sweeps inside a much smaller box. A few extras have been added, namely an active clean gain stage and an “in between” position on the range switch. With the included charge pump, the MINI MU runs on +/-9V like the original without needing a special power supply or two batteries.

HOW THE MINI MU CAME TO BE

I started tweaking with the Mini Mu after continual requests for an autowah, most frequently one based on the original Mutron III pedal. The original design was a straight-up clone with a volume control added. Countless tweaks followed, all of which were attempts to smooth out the filter’s response, add headroom, and increase versatility - each tweak came from either user responses or my own personal testing.

The Mini Mu is great at adding quack & funk to your tone. However, don’t look here if you want slow filter sweeps. The Mini Mu utilizes optocouplers with a faster reaction time, which was key aspect of the custom units used in the original circuit.

Controls

LEVEL: We added a clean boost to the end of the circuit, giving you full control over the volume, from off to to 20dB of gain.

GAIN: Sets the pre-gain before the filter. This also affects the sensitivity and range of the filter sweep. We modified this section to provide the most clean headroom possible.

PEAK: Adds feedback, giving the filter more bite and resonance to the autowah’s sweep.

DRIVE: Sets the direction of the filter sweep. Up = starts low and goes higher, Down = starts high and goes lower.

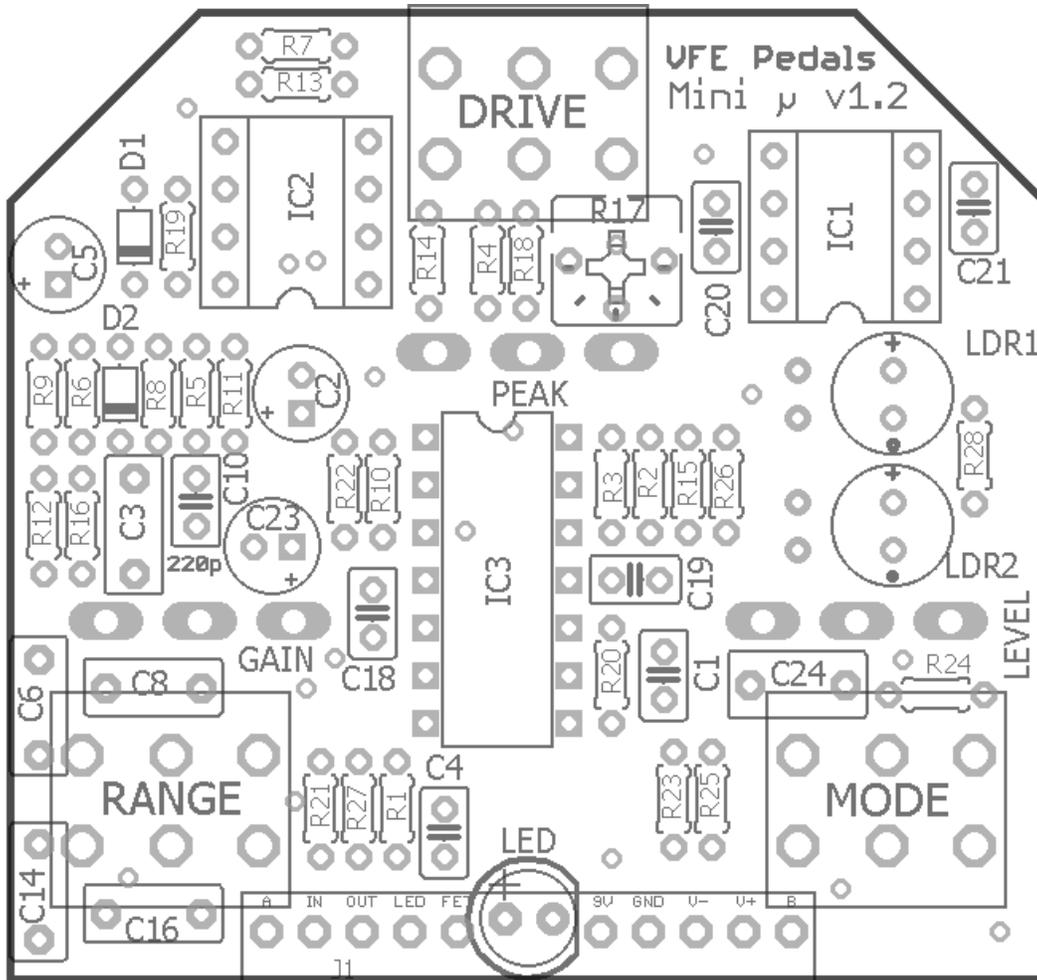
MODE: Sets the type of filter. HP = high pass (brightest), BP = band pass, LP = low pass (fattest).

RANGE: Sets the overall frequency range of the filter sweep.

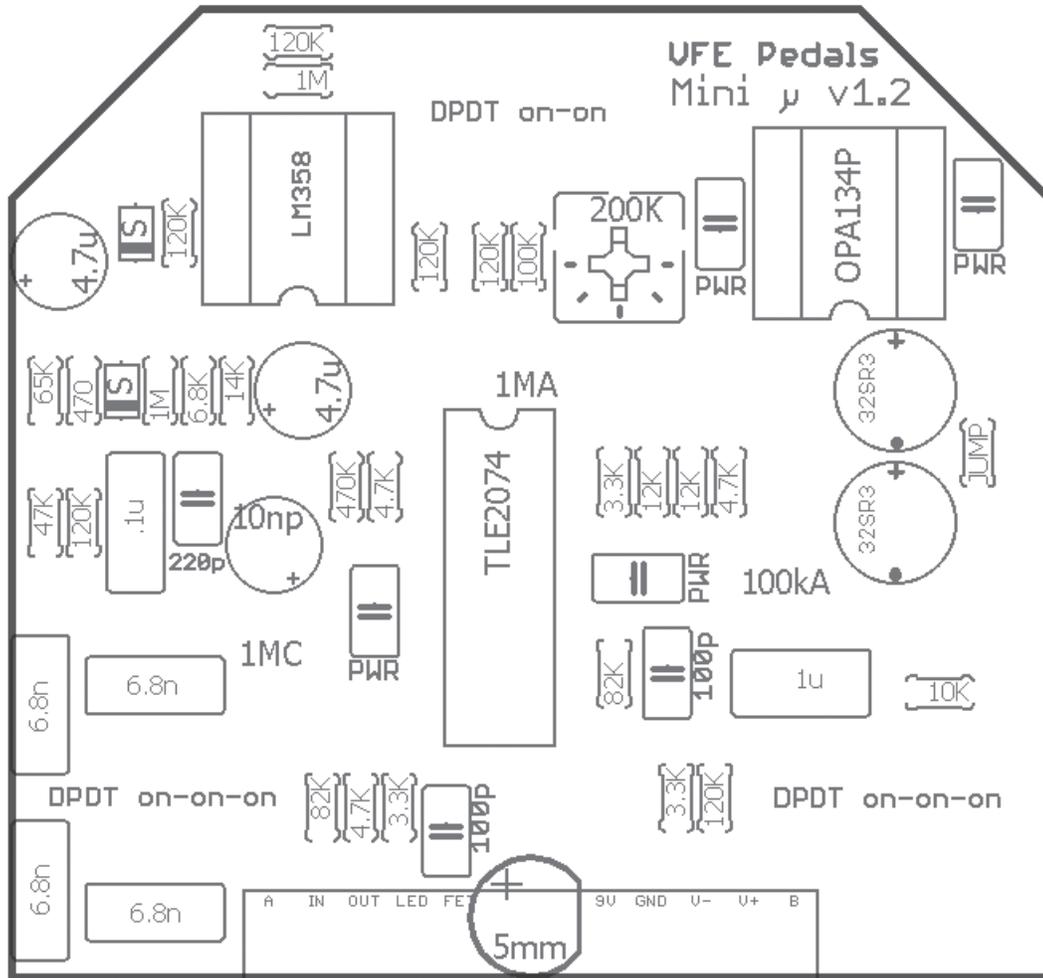
INTERNAL CONTROL: The internal trimpot on the main board tunes the sensitivity of the optocouplers. Use this control to add sensitivity or tune the filters frequency response.

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

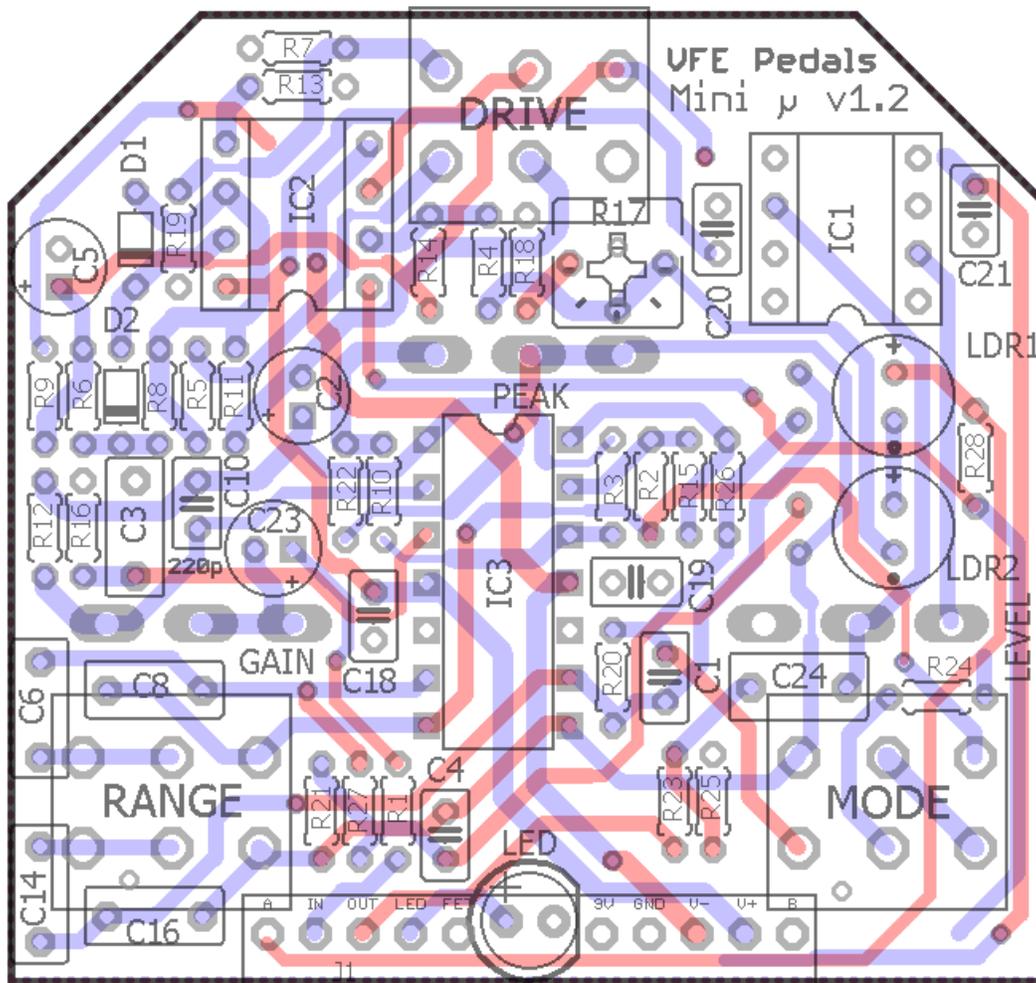
Technical assistance for your build(s) is available via the [madbeanpedals forum](#). Please go there rather than emailing me for assistance on [builds](#). This is because (1) I’m not always available to respond via email in a timely and continuous manner, and (2) posting technical problems and solutions in the forum creates a record from which other members may benefit.



6.10 update: Some component labels were transposed to the wrong parts. This is the corrected version.



The "PWR" caps are the 100n 2.5mm.



REMINDER: PETER RUTTER / VFE DOES NOT PROVIDE SUPPORT FOR THESE PROJECTS. PLEASE DO NOT CONTACT HIM FOR QUESTIONS OR TECHNICAL SUPPORT. VISIT THE VFE SECTION OF THE MADBEANPEDALS FORUM FOR QUESTIONS AND ANSWERS!

Resistors		Caps		Diodes	
R1	3k3	C1	100pF	D1	1n914
R2	12k	C2	4u7	D2	1n914
R3	3k3	C3	100n	ICs	
R4	120k	C4	100pF	IC1	OPA134
R5	6k8	C5	4u7	IC2	LM358
R6	470R	C6	6n8	IC3	TLE2074
R7	120k	C8	6n8	Optical	
R8	1M	C10	220pF	OPTO1	NSL32-R3
R9	65k	C14	6n8	OPTO2	NSL32-R3
R10	4k7	C16	6n8	Switches	
R11	14k	C18	100n	DRIVE	On/On
R12	47k	C19	100n	MODE	On/On/On
R13	1M	C20	100n	RANGE	On/On/On
R14	120k	C21	100n	Trimmer	
R15	12k	C23	10uF BP	T1	200k
R16	120k	C24	1uF	Pots	
R18	100k			LEVEL	100kA
R19	120k			PEAK	1MA
R20	82k			GAIN	1MC
R21	82k				
R22	470k				
R23	3k3				
R24	10k				
R25	120k				
R26	4k7				
R27	4k7				

Value	QTY	Type	Rating	Spacing
470R	1	Metal / Carbon Film	1/8W	
3k3	3	Metal / Carbon Film	1/8W	
4k7	3	Metal / Carbon Film	1/8W	
6k8	1	Metal / Carbon Film	1/8W	
10k	1	Metal / Carbon Film	1/8W	
12k	2	Metal / Carbon Film	1/8W	
14k	1	Metal / Carbon Film	1/8W	
47k	1	Metal / Carbon Film	1/8W	
65k	1	Metal / Carbon Film	1/8W	
82k	2	Metal / Carbon Film	1/8W	
100k	1	Metal / Carbon Film	1/8W	
120k	6	Metal / Carbon Film	1/8W	
470k	1	Metal / Carbon Film	1/8W	
1M	2	Metal / Carbon Film	1/8W	
100pF	2	MLCC	25v min.	2.5mm
220pF	1	MLCC	25v min.	2.5mm
100n	5	MLCC	25v min.	2.5mm
6n8	4	Film	25v min.	5mm
100n	1	Film	25v min.	5mm
1uF	1	Film	25v min.	5mm
4u7	2	Electrolytic	25v min.	5mm
10uF BP	1	Bi-Polar	25v min.	5mm
1n914	2			
OPA134	1			
LM358	1			
TLE2074	1			
NSL32-R3	2			
On/On	1	Pin Mount		
On/On/On	2	Pin Mount		
200k	1	Bourns 3362p		
100kA	1	PCB Right Angle	16mm	
1MA	1	PCB Right Angle	16mm	
1MC	1	PCB Right Angle	16mm	

100pF MLCC (2.5mm):

<https://www.mouser.com/ProductDetail/80-C320C101J5G>

220pF MLCC (2.5mm):

<https://www.mouser.com/ProductDetail/80-C320C221J2G>

100n MLCC (2.5mm):

<https://www.mouser.com/ProductDetail/80-C320C104K5R>

10uF BP:

<https://www.mouser.com/ProductDetail/667-ECE-A1EN100U>

OPA134:

<https://www.mouser.com/ProductDetail/595-OPA134PA>

LM358:

<https://www.mouser.com/ProductDetail/926-LM358N-NOPB>
<http://smallbear-electronics.mybigcommerce.com/ic-lm358/>

TLE2074:

<https://www.mouser.com/ProductDetail/595-TLE2074CN>

NSL32-R3:

<http://www.smallbear-electronics.mybigcommerce.com/photocoupler-silonex-nsl-32sr3/>

DPDT (On/On):

<http://smallbear-electronics.mybigcommerce.com/dpdt-on-on-short-lever-pc-mount/>

DPDT (On/On/On):

<http://smallbear-electronics.mybigcommerce.com/toggle-switch-dpdt-on-on-on-short-lever/>

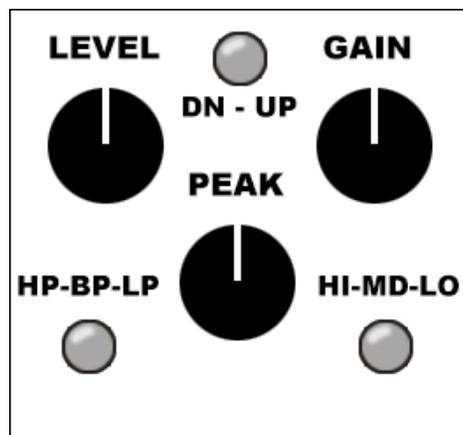
Bourns 3362p (200k):

<https://www.mouser.com/ProductDetail/652-3362P-1-204LF>

16mm Pots (100kA, 1MA, 1MC):

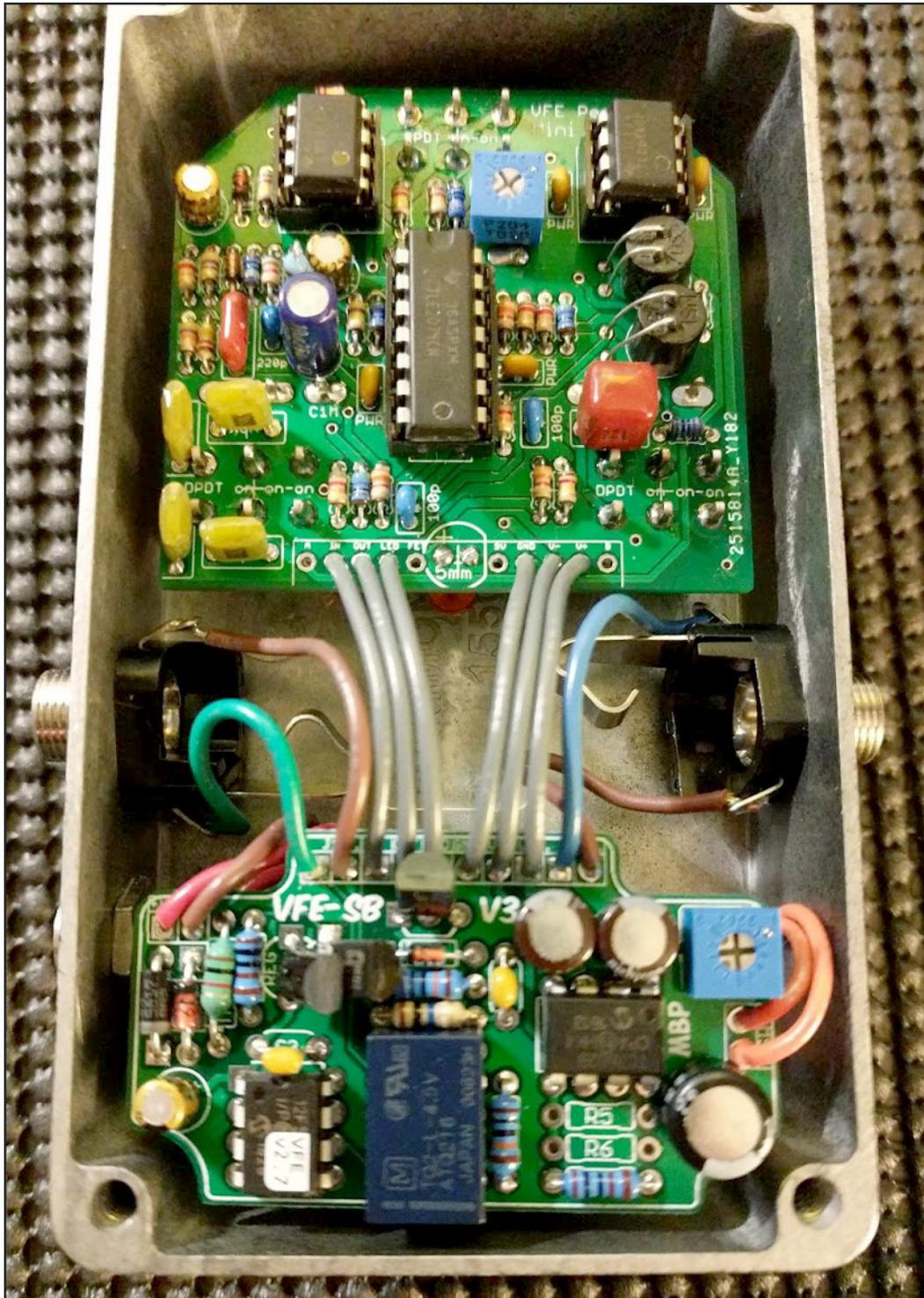
<http://smallbear-electronics.mybigcommerce.com/alpha-single-gang-16mm-right-angle-pc-mount/>

- Wiring and drill diagrams are located in the [Switching Doc.](#)
- The hardest thing about this build is soldering the switches in place. They are surrounded by parts. Go slow and be careful not to accidentally burn up any of those caps when soldering the switches.
- Due to an error in manufacturing, the component “origins” appear on the silk screen layer (little crosses over each component). This makes the PCB values hard to read. Just print up the values image on page 3 to use as a guide when populating.
- ***Make sure you install the opto devices the correct way.*** Each one has a cream dot which indicates the cathode of the internal LED. The silkscreen image on pg.2 shows you where the dot goes.
- The trimpot is set strictly to taste. I landed about 2/3rd up on mine.



IC1	OPA134	IC3	TLE2074
1	-8.4	1	0
2	0	2	0
3	0	3	0
4	-8.44	4	8.77
5	-8.4	5	0
6	~0	6	0
7	8.78	7	0
8	ignore	8	0
IC2	LM358	9	0
1	7.57	10	0
2	2.24	11	-8.44
3	4.35	12	0
4	-8.44	13	0
5	27mV	14	0
6	30mV		
7	362mV		
8	8.77		

Current Draw: ~18mA
 DC Supply: 9.42v One Spot
 Setup: All knobs and switches in their middle positions (Drive knob set to Down).



I did not have any OPA134 ICs so I used a plain old TL061 as a sub.

