



Spasm Chasm – A Muff Mashup Circuit/PCB

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1 General Information

1.1 Quick Circuit Overview

The Spasm Chasm is a near-Muff¹ circuit that is fairly faithful to the original base circuit, but adds an additional pot to the tone section for added tonal flexibility. Otherwise, it's substantially similar to many other DIY Muff projects out there. However, it is important to note that this circuit is not a part-for-part clone of any current (or previous) production pedal commercially available.

1.2 Historical Context

The Big Muff is famous for its compressed, aggressive fuzzy distortion. So famous, in fact, that it has been cloned by boutique builders in excess of 175,000 times just in the past 18 months.² Rather than give a brief history of such a well-loved and storied product that has been the underpinning of the boutique pedal world for years now, we will instead link you to what is arguably the definitive history of the Big Muff Pi:

http://www.kitrae.net/music/music_big_muff.html

1.3 Usage of Project Materials

The circuit, name of the project, and the project PCB can all be used for any purpose. That includes commercialization though the sale of completed pedals, populated PCBs, kits of parts, reselling un-populated PCBs at a profit, or anything else you greedy would-be bourgeois pigs can dream up to make a quick buck.

¹ The name "Muff", "Big Muff", or any derivative thereof is the intellectual property of Electro-Harmonix and is used here only for comparative purposes. No affiliation with EHX is expressed or implied.

² We totally made that shit up. But seriously, it's almost embarrassing how often the Big Muff is cloned, repackaged, and resold for big bucks.

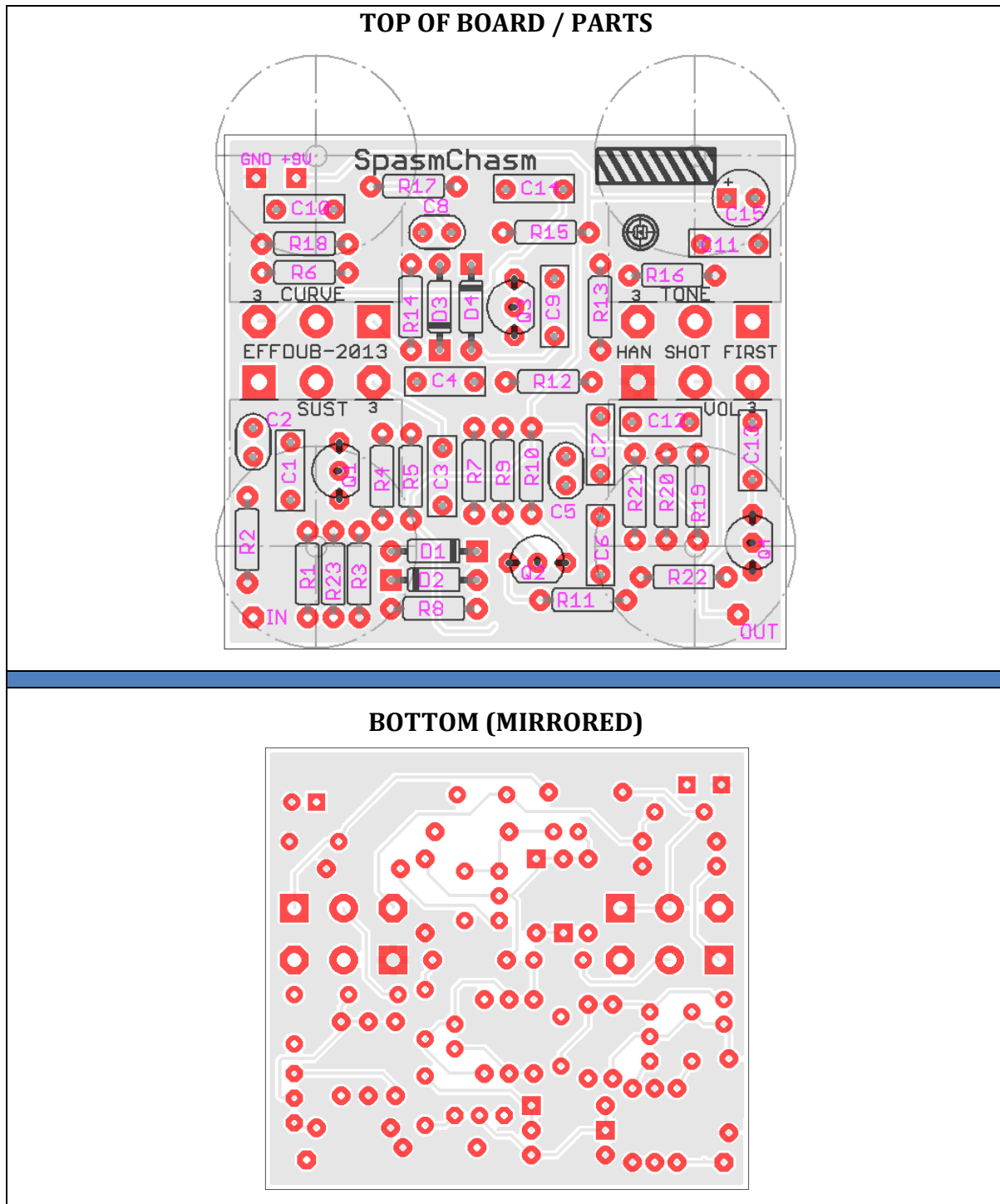


-- An EFFDUB AUDIO / CPFX MKE joint --

**SPASM
CHASM**

2 Project Information

2.1 PCB Layout





2.2 Bill of Materials

The following BOM is for the stock circuit. Alternative parts lists are in section 4 below.

Name	Value		Name	Value
R1	33K		C1	68n
R2	100K		C2	470p
R3	100R		C3	68n
R4	470K		C4	100n
R5	10K		C5	470p
R6	1K		C6	100n
R7	10K		C7	100n
R8	56K		C8	470p
R9	470K		C9	100n
R10	10K		C10	10n
R11	220R		C11	6n8
R12	10K		C12	100n
R13	100K		C13	100n
R14	470K		C14	33n
R15	22K		C15	47u
R16	390R			
R17	18K			
R18	33K		Name	Value
R19	470K		D1	1N914
R20	100K		D2	1N914
R21	10K		D3	1N914
R22	2K		D4	1N914
R23	1M		Q1	2N5089
Sustain	A100K		Q2	2N5089
Tone	B50K		Q3	2N5089
Curve	B100K		Q4	2N5088
Volume	A100K			

A more detailed BOM is attached, which includes part numbers, package sizes, and ordering information:



Spasm - BOM.xlsx



2.2.1 BOM Notes

- All resistors are ¼-watt
- Pots are 16mm PCB-mount, right-angle type. But any pot can be used if not board mounting the hardware.
- Caps < 1n are ceramic disc (or multi-layer ceramic) with 2.5mm pitch.
- Caps < 1u but >1n are box/film type with 5mm pitch.
- R23 can be omitted. It is a pulldown resistor that was not included on most original Muff versions.

2.2.2 Parts Substitutions

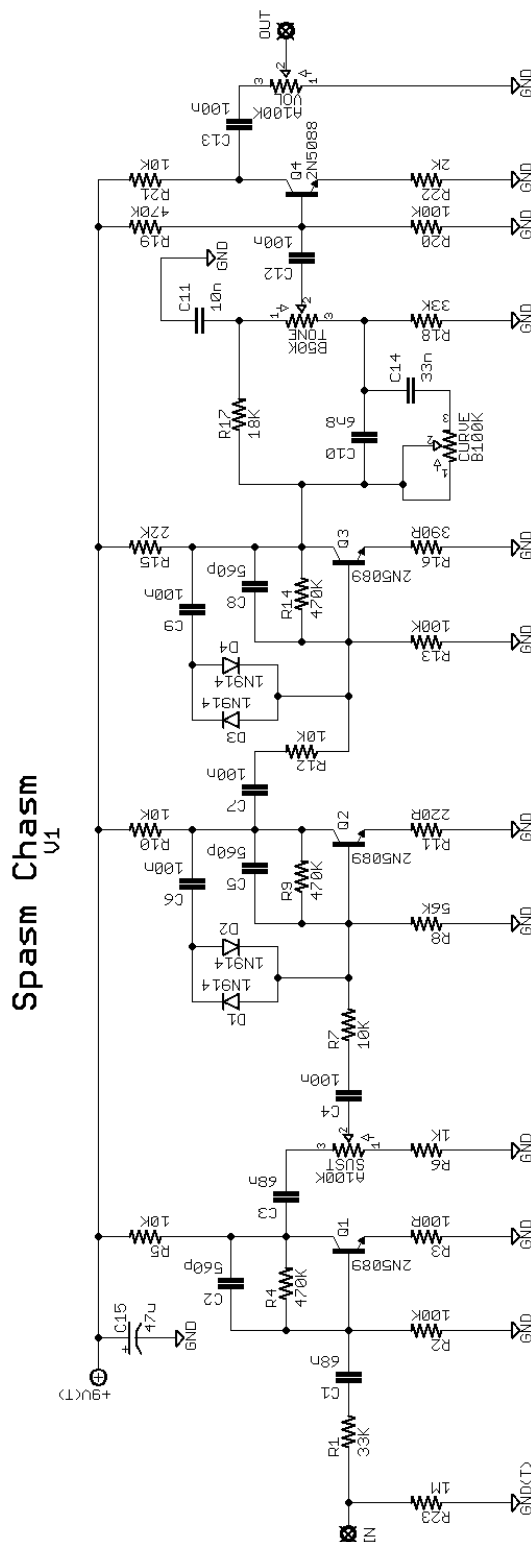
- D1-D4 can be just about any diode type. The higher the forward voltage drop, the less compression/clipping will result. Try LEDs for a less compressed sound. Or omit one or both sets for a fuzzy aggressive tone with more dynamics.
- Q1-Q4 can be a variety of part numbers. The most common subs: 2N5088, MPSA18. The rule of thumb is to go for gain (hFE) of between 400 – 800. The board is laid out for C-B-E transistors in a TO-92 package.
- C15 can be any value from 47µF – 220µF.



=- An EFFDUB AUDIO / CPFX MKE joint =-

SPASM
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2.3 Schematic





3 Mod Ideas

3.1 Input Gain

Add a DPDT switch to toggle the series input resistor (R1). Higher values generally lower the overall gain of the circuit. Or, replace R1 with a B50K pot for variable control.

3.2 Clipper Mods

- Use a DPDT switch to toggle between clipping diode types in either or both of the clipping stages (D1 and D2 for Q2, D3 and D4 for Q3). Use a center-off DPDT to also add the option of a diode lift.
- Use LEDs for a more open, less compressed level of clipping. Water-clear LEDs are more open, diffused LEDs less so. Try germanium diodes (or schottky diodes, such as BAT-41) to squeeze the signal even harder and really clamp down for maximum sustain. Mix and match!
- Adjust the feedback/clipping caps to smooth out or scuff up the clipping. The caps in question are: C6 and C9. Larger values smooth out the nature of the clipping. Or go crazy and add a switch to toggle between smooth and aggressive.

3.3 Stage Bias

Adjust the emitter resistors of Q1-Q3 to vary the bias and resulting gain. The emitter resistors are: R3, R11, R16. Lowering these resistor values will increase gain. For max gain, replace any or all of the resistors with a jumper. They are already fairly low, so jumpering them or going for lower gain with higher values are the best bets.



4 Alternative Parts Lists

4.1 My Oinker

Name	Value		Name	Value
R1	33K		C1	10u
R2	100K		C2	200p
R3	120R		C3	220n
R4	470K		C4	220n
R5	18K		C5	470p
R6	820R		C6	1u
R7	2K7		C7	220n
R8	56K		C8	560p
R9	470K		C9	1u
R10	10K		C10	4n7
R11	100R		C11	5n6
R12	8K2		C12	100n
R13	100K		C13	100n
R14	470K		C14	5n6
R15	18K		C15	100u
R16	200R			
R17	33K			
R18	33K		Name	Value
R19	390K		D1	1N914
R20	100K		D2	1N914
R21	10K		D3	1N914
R22	2K7		D4	1N914
R23	--		Q1	BC184
Sustain	A100K		Q2	BC183
Tone	B100K		Q3	BC184
Curve	--		Q4	BC184
Volume	A100K		S1	SPST

Notes

- This is substantially similar to a Skreddy³ Pig Mine.
- Wire S1 to the pads 3 and 2 where the Curve pot would be in a stock build.
- Add a 1n cap to lugs 3 and 2 of the Sustain pot; add a 200p cap to lugs 3 and 1 of Volume pot.
- Q1-Q4 pin outs do not match the silkscreen on the PCB. Orientate them opposite of the indication on the PCB. Or just use 2N5088/2N5089 and don't worry about it.

³ The brand name "Skreddy" and product name "Pig Mine" are the intellectual property of Skreddy Pedals. No affiliation is expressed or implied.



4.2 PT-109

Name	Value		Name	Value
R1	33K		C1	68n
R2	100K		C2	560p
R3	200R		C3	68n
R4	470K		C4	100n
R5	10K		C5	560p
R6	820R		C6	100n
R7	10K		C7	100n
R8	56K		C8	560p
R9	470K		C9	100n
R10	10K		C10	6n8
R11	200R		C11	10n
R12	10K		C12	330n
R13	100K		C13	100n
R14	470K		C14	6n8
R15	10K		C15	100u
R16	200R			
R17	18K			
R18	33K		Name	Value
R19	470K		D1	1N914
R20	100K		D2	1N914
R21	10K		D3	1N914
R22	2K7		D4	1N914
R23	--		Q1	BC550
Sustain	A100K		Q2	BC550
Tone	B100K		Q3	BC550
Curve	--		Q4	BC550
Volume	A100K		S1	SPST

Notes

- This is substantially similar to a Skreddy⁴ P19.
- Wire S1 to the pads 3 and 2 where the Curve pot would be in a stock build.
- Add a 2n cap to lugs 3 and 2 of the Sustain pot; add a 560p cap to lugs 3 and 1 of Volume pot.
- Q1-Q4 pin outs may or may not match the silkscreen on the PCB. Check the datasheet of the manufacturer of the BC550 that you purchase. Or just use 2N5088/2N5089 and don't worry about it.

⁴ The brand name "Skreddy" and product name "P19" are the intellectual property of Skreddy Pedals. No affiliation is expressed or implied.



4.3 Triangle

Name	Value		Name	Value
R1	33K		C1	100n
R2	82K		C2	560p
R3	100R		C3	100n
R4	390K		C4	100n
R5	22K		C5	560p
R6	jumper		C6	50n
R7	8K2		C7	100n
R8	82K		C8	560p
R9	390K		C9	50n
R10	12K		C10	4n
R11	100R		C11	10n
R12	8K2		C12	100n
R13	82K		C13	100n
R14	470K		C14	--
R15	22K		C15	100u
R16	100R			
R17	39K			
R18	39K		Name	Value
R19	390K		D1	1N914
R20	100K		D2	1N914
R21	10K		D3	1N914
R22	2K7		D4	1N914
R23	--		Q1	2N5088
Sustain	A100K		Q2	2N5088
Tone	B100K		Q3	2N5088
Curve	--		Q4	2N5088
Volume	A100K			

Notes

- Q1-Q4 original parts are unobtainable. Sub in 2N5088/2N5089.



4.4 Ram's Head

Name	Value		Name	Value
R1	39K		C1	10u
R2	47K		C2	560p
R3	120R		C3	100n
R4	470K		C4	100n
R5	10K		C5	560p
R6	1K		C6	100n
R7	10K		C7	100n
R8	100K		C8	560p
R9	470K		C9	1u
R10	10K		C10	4n
R11	150R		C11	10n
R12	10K		C12	100n
R13	100K		C13	1u
R14	470K		C14	--
R15	15K		C15	100u
R16	150R			
R17	39K			
R18	22K		Name	Value
R19	430K		D1	1N914
R20	100K		D2	1N914
R21	15K		D3	1N914
R22	3K3		D4	1N914
R23	--		Q1	2N5088
Sustain	A100K		Q2	2N5088
Tone	B100K		Q3	2N5088
Curve	--		Q4	2N5088
Volume	A100K			

Notes

- Q1-Q4 original parts are unobtainable. Sub in 2N5088/2N5089.



4.5 Violet Ram's Head

Name	Value		Name	Value
R1	39K		C1	100n
R2	100K		C2	470p
R3	100R		C3	100n
R4	470K		C4	100n
R5	15K		C5	470p
R6	1K		C6	100n
R7	8K2		C7	100n
R8	100K		C8	470p
R9	470K		C9	1u
R10	10K		C10	4n
R11	100R		C11	10n
R12	8K2		C12	100n
R13	100K		C13	100n
R14	470K		C14	--
R15	15K		C15	100u
R16	100R			
R17	39K			
R18	39K		Name	Value
R19	390K		D1	1N914
R20	100K		D2	1N914
R21	10K		D3	1N914
R22	2K7		D4	1N914
R23	--		Q1	2N5088
Sustain	A100K		Q2	2N5088
Tone	B100K		Q3	2N5088
Curve	--		Q4	2N5088
Volume	A100K			

Notes

- Q1-Q4 original parts are unobtainable. Sub in 2N5088/2N5089.



4.6 Civil War

Name	Value		Name	Value
R1	39K		C1	100n
R2	100K		C2	430p
R3	390R		C3	100n
R4	470K		C4	100n
R5	12K		C5	430p
R6	1K		C6	47n
R7	10K		C7	100n
R8	100K		C8	430p
R9	470K		C9	47n
R10	12K		C10	3n9
R11	390R		C11	10n
R12	10K		C12	100n
R13	100K		C13	100n
R14	470K		C14	--
R15	12K		C15	100u
R16	390R			
R17	22K			
R18	20K		Name	Value
R19	470K		D1	1N914
R20	100K		D2	1N914
R21	10K		D3	1N914
R22	2K7		D4	1N914
R23	--		Q1	2N5088
Sustain	A100K		Q2	2N5088
Tone	B100K		Q3	2N5088
Curve	--		Q4	2N5088
Volume	A100K			



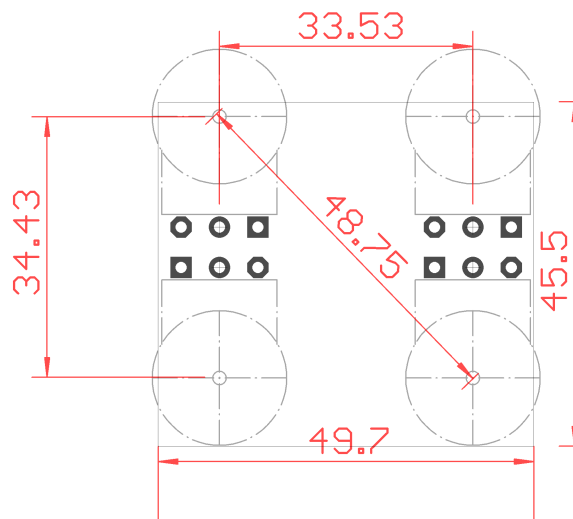
4.7 Green Russian

Name	Value		Name	Value
R1	39K		C1	100n
R2	100K		C2	430p
R3	390R		C3	100n
R4	470K		C4	100n
R5	12K		C5	430p
R6	1K		C6	47n
R7	10K		C7	100n
R8	100K		C8	430p
R9	470K		C9	47n
R10	12K		C10	3n9
R11	390R		C11	10n
R12	10K		C12	100n
R13	100K		C13	100n
R14	470K		C14	--
R15	12K		C15	100u
R16	390R			
R17	22K			
R18	20K		Name	Value
R19	470K		D1	1N914
R20	100K		D2	1N914
R21	10K		D3	1N914
R22	2K7		D4	1N914
R23	--		Q1	2N5088
Sustain	A100K		Q2	2N5088
Tone	B100K		Q3	2N5088
Curve	--		Q4	2N5088
Volume	A100K			

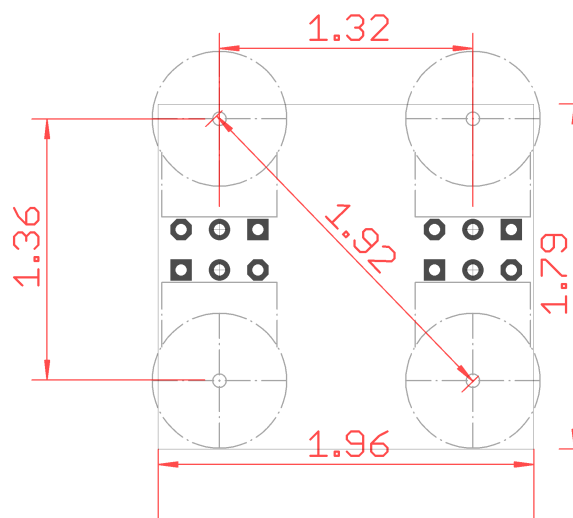


5 Drill Plan / Dimensions

Metric (MM)



Muriken! (Inches)



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