

RABBITHOLE2020

FX TYPE: Distortion

Based on the EHX® Big Muff™

Enclosure Size: 1590A

"Softie" compatibility: none

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Overview

The 2020 version of the RabbitHole is the exact same circuit as the previous version. The PCB has been re-designed to conform to the more recent style of 1590A layouts on mbp.

I've adopted the Ram's Head as the "default" BOM for this version, as it is very popular and a good representative of what the BM sounds like. However, there are many varieties you can build. In the zip file for this project I have included the old spreadsheet that has different BOMs for a few versions. Also, I highly suggest you check out the Kitrae Big Muff pages: not only for a complete history of the effect, but for additional possible BOMS.

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

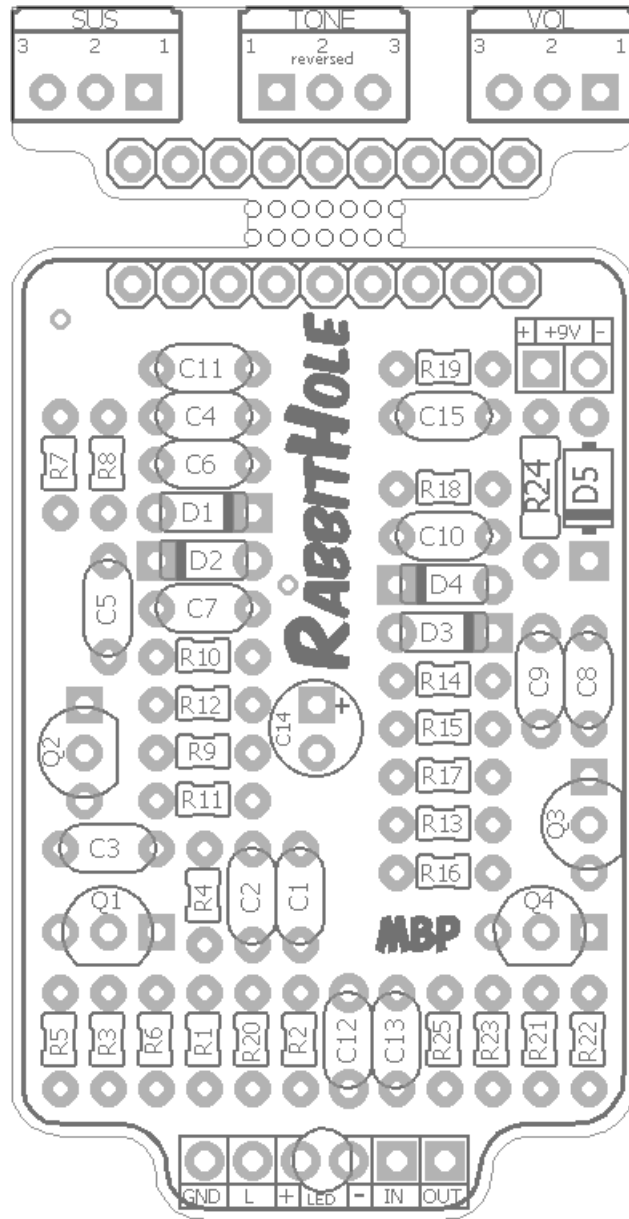
Controls

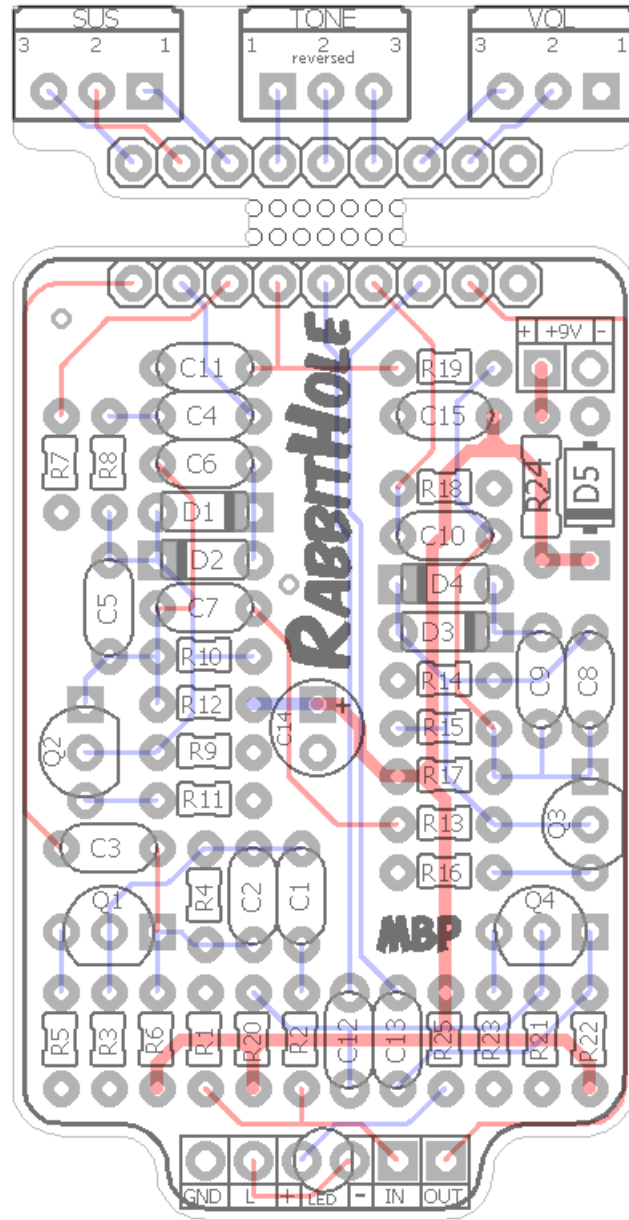
- **VOL** - Total Output.
- **SUS** - Total distortion.
- **TONE** - CCW - HP filter, CW - LP filter with a huge range in-between.

2.27 - Shopping List updated.

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Technical assistance for your build(s) is available via the [madbeanpedals forum](http://madbeanpedals.com/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.





Resistors		Caps		Diodes	
R1	1M	C1	100n	D1 - D4	1n914
R2	33k	C2	470pF	D5	1N4001
R3	100K	C3	100n	Transistors	
R4	470K	C4	100n	Q1 - Q4	Si
R5	100R	C5	470pF	Pots	
R6	12k	C6	100n	SUS	100kB
R7	560R	C7	100n	TONE	100kB
R8	8K2	C8	470pF	VOL	100kB
R9	100K	C9	100n		
R10	470K	C10	3n9		
R11	100R	C11	10n		
R12	12k	C12	100n		
R13	8K2	C13	100n		
R14	100K	C14	47uF		
R15	470K	C15	100n		
R16	100R				
R17	12k				
R18	33k				
R19	33k				
R20	470k				
R21	100K				
R22	12k				
R23	2K7				
R24	100R				
R25	4k7				

Value	QTY	Type	Rating
100R	1	Carbon / Metal Film	1/4W
100R	3	Carbon / Metal Film	1/8W
560R	1	Carbon / Metal Film	1/8W
2K7	1	Carbon / Metal Film	1/8W
4k7	1	Carbon / Metal Film	1/8W
8K2	2	Carbon / Metal Film	1/8W
12k	4	Carbon / Metal Film	1/8W
33k	3	Carbon / Metal Film	1/8W
100K	4	Carbon / Metal Film	1/8W
470k	4	Carbon / Metal Film	1/8W
1M	1	Carbon / Metal Film	1/8W
470pF	3	Ceramic / MLCC	16v. Min
3n9	1	Film	16v. Min
10n	1	Film	16v. Min
100n	9	Film	16v. Min
47uF	1	Low Profile Electrolytic	16v. Min
1n914	4		
1N4001	1		
Si	4	NPN - medium hFE	
100kB	3	PC Mount	9mm

2.27 - Updated shopping list to show (1) 100R at 1/4W and (3) 100R at 1/8W.

I've listed the transistors just as "Si" because there are many BJT that will work here. If you want the true "Rams Head" experience then I have linked two versions of the period correct transistors used on the next page. I'm not sure of the pinouts of the smallbear transistors.

2N5133:

<http://smallbear-electronics.mybigcommerce.com/transistor-2n5133/>

SE4010 (Higher gain version of the 2N5133):

<http://smallbear-electronics.mybigcommerce.com/transistor-se4010-fairchild/>

Low profile Electrolytic caps:

<http://smallbear-electronics.mybigcommerce.com/electrolytic-radial-low-profile-16v-1-f-100-f/>

9mm PC Mount pots:

<http://smallbear-electronics.mybigcommerce.com/alpha-single-gang-9mm-pc-mount/>

Thinline DC Jack:

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

Enclosed Mono:

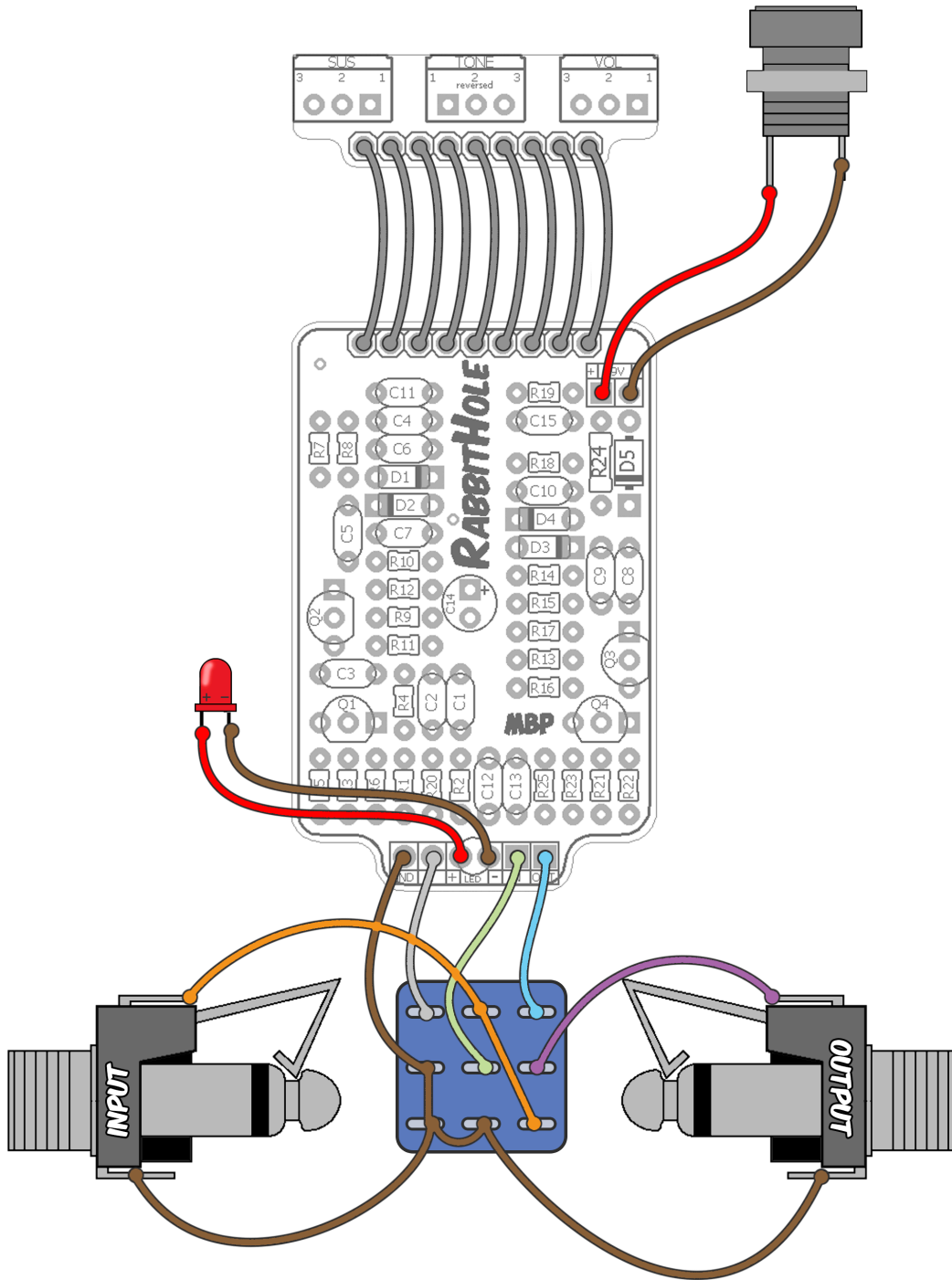
<http://smallbear-electronics.mybigcommerce.com/1-4-in-mono-enclosed-jack/>

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

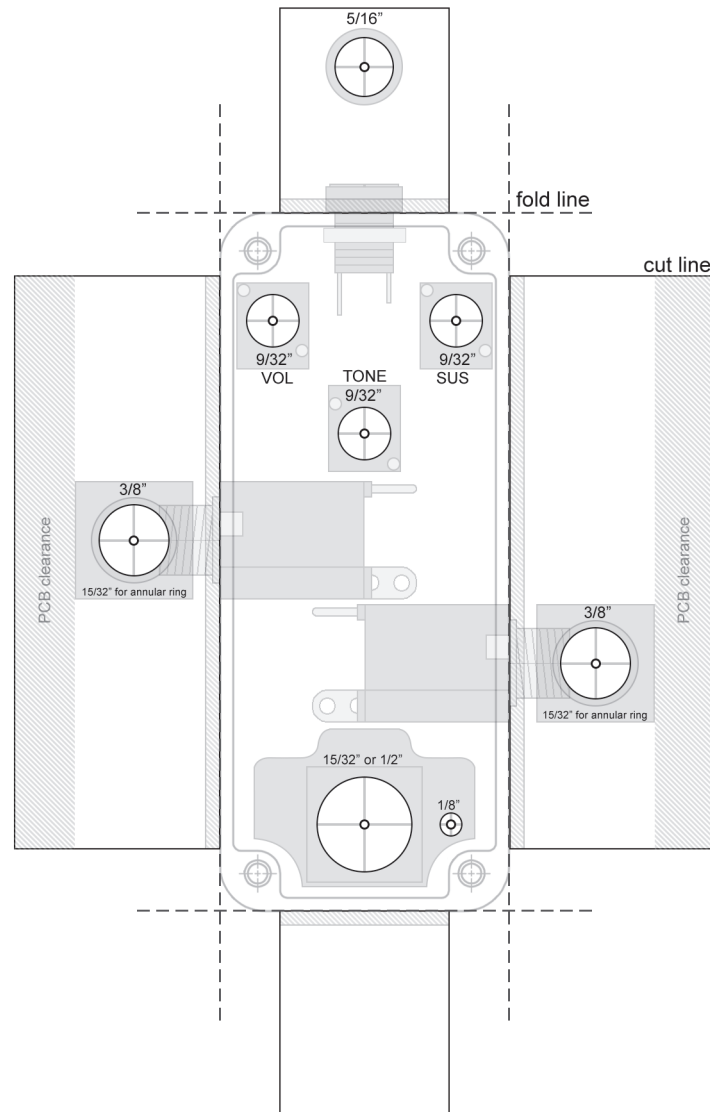
Lumberg Mono:

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

- There are many transistors you can use in the RabbitHole. Alternatives to the 2n5088 include BC549C, BC550, BC182L, 2n5089, and MPSA18, as well as many more. Using different transistors can create unique variations in tone. Be careful to use the correct pin-outs, however. Some transistors, such as the BC549C will need to be rotated 180° from the silk screen drawing on the PCB due to its reversed pin-out. Always check the appropriate datasheet for your transistor BEFORE soldering.
- There is a clipping mod list in the Mudbunny doc. You can certainly do any of those clipping mods here, if you like. There's just a lot less room if you want to get fancy with clipping switches, etc. This is a build where I think it's best to just keep it simple :)



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



- This template will work for either mono enclosed jacks or the “Lumberg” style.
- It uses the “Thinline” style DC Jack.
- It also shows the 3PDT02 bypass PCB but this is not required. If you are wiring straight to a 3PDT you can use the same LED location on the right side or choose a different spot.
- 03.19: Drill template updated (moved VOL and SUS pots slightly outward).

Q1	Si
C	4.12
B	0.64
E	42mV

Q3	Si
C	4.12
B	0.64
E	42mV

Q2	Si
C	4.12
B	0.64
E	42mV

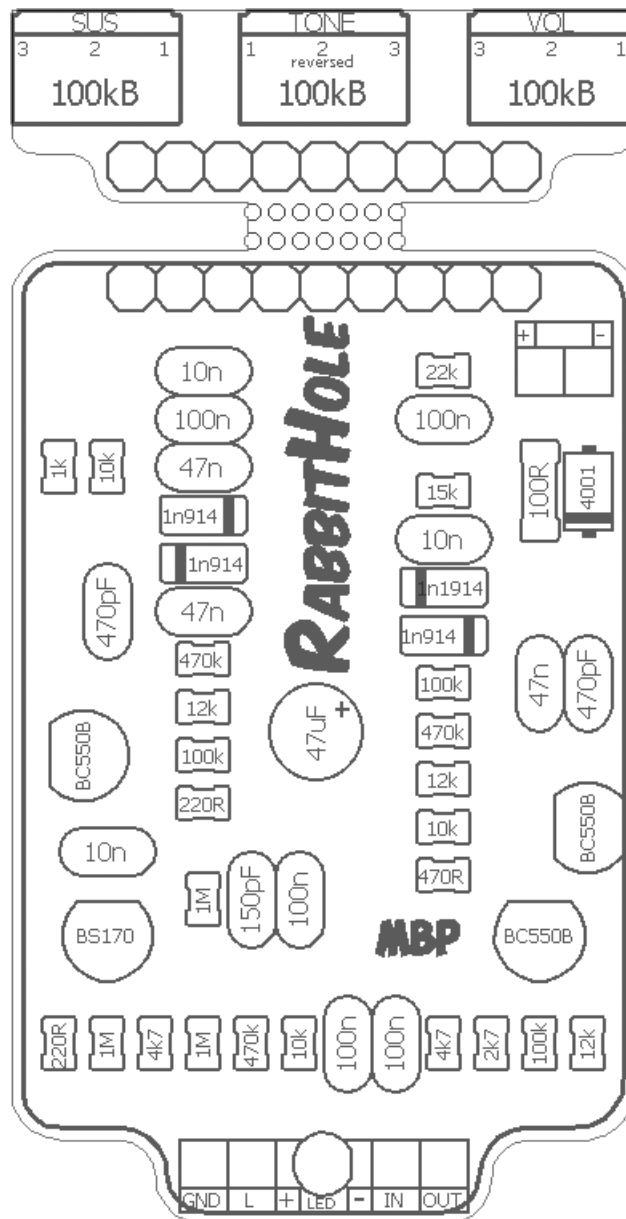
Q4	Si
C	4.96
B	1.55
E	0.96

- 9.42vDC One Spot
- Current Draw: ~ 2mA

If you are up for something different I've come up with an alternate build for the RabbitHole. Call this the BeanMuff. Or, maybe the SproutMuffin. Whatever.

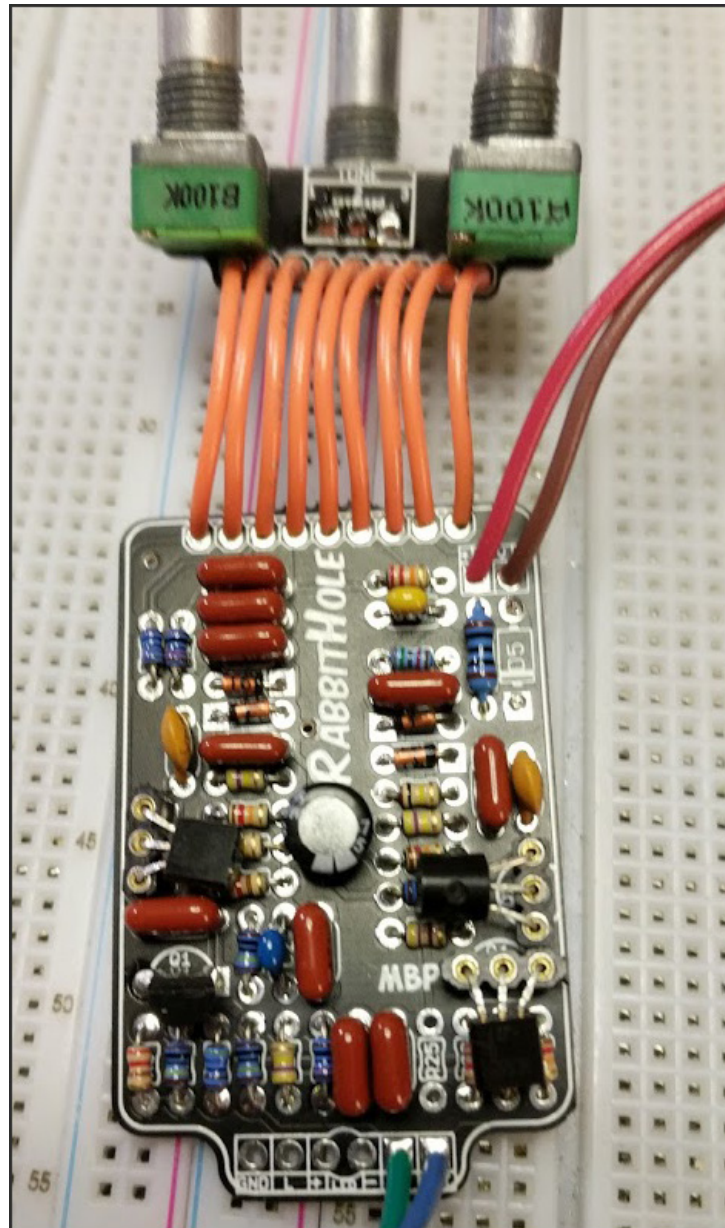
This is based partially on the old mbp GreaseGun which later became the Function F(x) Third Rail. The difference here is the GG had only one clipping section. The input section has been replaced with a BS170 for a different flavor. The tone section has been dialed for a flatter response when the knob is set to the middle position. It is also tweaked for less low end. I pretty much made it up as I was putting it together and I think it sounds very cool. Not quite a Muff, but not not-a-Muff.

All four transistors are the opposite pinouts from what is shown on the PCB, so you will need to flip them around. The image below shows how they should be oriented.



BeanMuff					
Resistors		Caps		Diodes	
R1	1M	C1	100n	D1 - D4	1n914
R2	10k	C2	150pF	D5	IN4001
R3	1M	C3	10n	Transistors	
R4	1M	C4	100n	Q1	BS170
R5	220R	C5	470pF	Q2 - Q4	BC550B
R6	4k7	C6	47n	Pots	
R7	1k	C7	47n	SUS	100kB
R8	10k	C8	470pF	TONE	100kB
R9	100k	C9	47n	VOL	100kB
R10	470k	C10	10n		
R11	220R	C11	10n		
R12	12k	C12	100n		
R13	10k	C13	100n		
R14	100k	C14	47uF		
R15	470k	C15	100n		
R16	470R				
R17	12k				
R18	15k				
R19	22k				
R20	470k				
R21	100k				
R22	12k				
R23	2k7				
R24	100R				
R25	4k7				

BeanMuff Shopping List			
Value	QTY	Type	Rating
100R	1	Carbon / Metal Film	1/4W
220R	2	Carbon / Metal Film	1/8W
470R	1	Carbon / Metal Film	1/8W
1k	1	Carbon / Metal Film	1/8W
2k7	1	Carbon / Metal Film	1/8W
4k7	2	Carbon / Metal Film	1/8W
10k	3	Carbon / Metal Film	1/8W
12k	3	Carbon / Metal Film	1/8W
15k	1	Carbon / Metal Film	1/8W
22k	1	Carbon / Metal Film	1/8W
100k	3	Carbon / Metal Film	1/8W
470k	3	Carbon / Metal Film	1/8W
1M	3	Carbon / Metal Film	1/8W
150pF	1	Ceramic / MLCC	16v min.
470pF	2	Ceramic / MLCC	16v min.
10n	3	Film	16v min.
47n	3	Film	16v min.
100n	5	Film	16v min.
47uF	1	Electrolytic	16v min.
1n914	4		
IN4001	1		
BS170	1		
BC550B	3		
100kB	3	PC Mount	9mm



Couple notes on the BeanMuff build here.

You'll notice D5 is missing. It's because I put the damn thing in the wrong way! Took the pic before replacing it.

I used 100kA pot for the Vol. This is more of a personal preference for me. All Muffs have plenty enough output that there's no reason to use a linear taper instead of audio.

