Beavis Audio Research
FKR Mark II Project
Build Documentation
Revision 1.12 – 16 April 2007

Overview

The FKR is a clone of the ProCo Rat pedal. It adds the following mods:

1. Clipping diodes switchable between stock 1N914 pair, 1N914/1N34A asymmetrical pair, red LEDs and MOSFETs
2. Addition of an overdrive clipping arrangement with options for LEDs or MOSFETS
3. Replacement of the 560 ohm resistor with a 1k pot for the Lube mod. And additional switch switches between the stock 560 ohm value and the pot.

This document provides the basic information on how to build your own FKR Mark II.

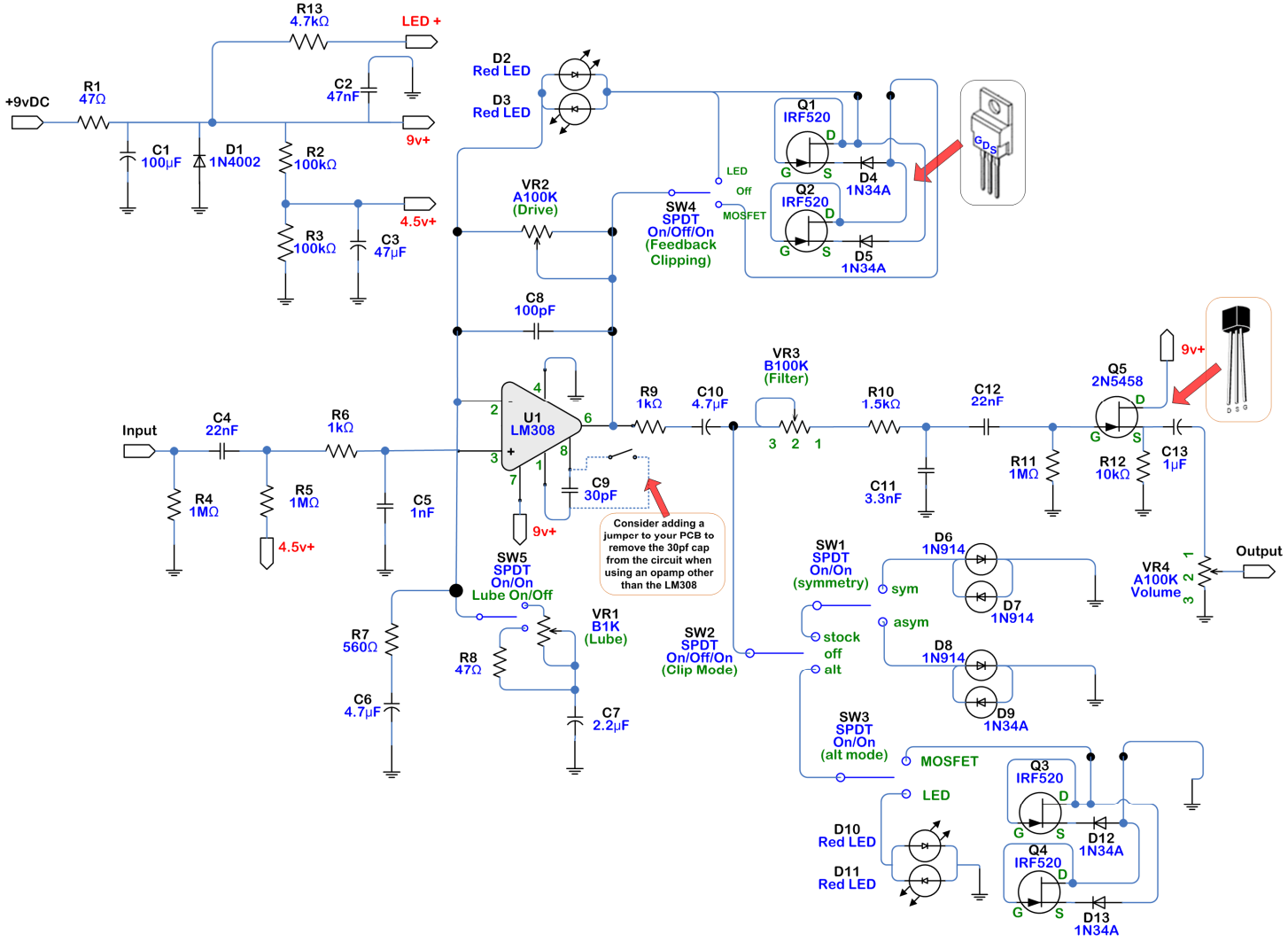
The name FKR stands for Four Knob Rat. How it is pronounced is completely up to you. ☺

Special Thanks To

Mr. Ruetz for the lube mod, Jack Orman for his great Rat eBook, and the helpful people at DIYStompboxes.com for the great ideas and feedback.

Use Policy

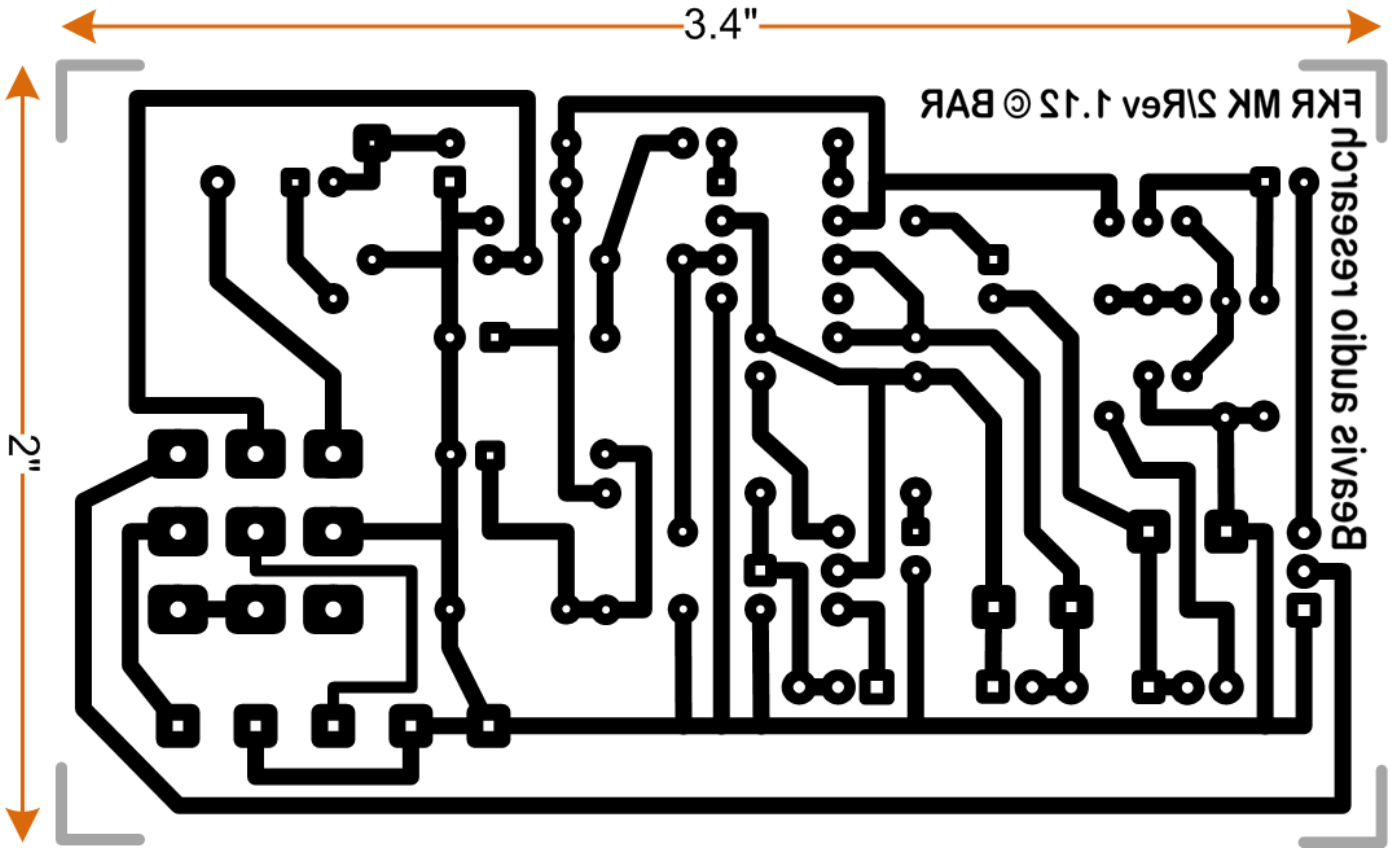
Schematic


R13
4.7kΩ
LED +
+9vDC
R1
47Ω
C2
47nF
9v+
C1
100µF
D1
1N4002
R2
100kΩ
4.5v+
R3
100kΩ
C3
47µF
D2
Red LED
D3
Red LED
Q1
IRF520
D4
1N34A
Q2
IRF520
D5
1N34A
LED
Off
MOSFET
SW4
SPDT
On/Off/On
(Feedback
Clipping)
VR2
A100K
(Drive)
C8
100pF
U1
LM308
VR3
B100K
(Filter)
R9
1kΩ
C10
4.7µF
R10
1.5kΩ
C12
22nF
Q5
2N5458
9v+
Input
C4
22nF
R6
1kΩ
R4
1MΩ
R5
1MΩ
4.5v+
C5
1nF
C9
30pF
9v+
Consider adding a
jumper to your PCB to
remove the 30pf cap
from the circuit when
using an opamp other
than the LM308
C11
3.3nF
R11
1MΩ
R12
10kΩ
C13
1µF
SW5
SPDT
On/On
Lube On/Off
VR1
B1K
(Lube)
R7
560Ω
R8
47Ω
C6
4.7µF
C7
2.2µF
SW2
SPDT
On/Off/On
(Clip Mode)
SW1
SPDT
On/On
(symmetry)
sym
asym
stock
off
alt
D6
1N914
D7
1N914
D8
1N914
D9
1N34A
VR4
A100K
Volume
Output
SW3
SPDT
On/On
(alt mode)
MOSFET
LED
D10
Red LED
D11
Red LED
Q3
IRF520
D12
1N34A
Q4
IRF520
D13
1N34A

Main Board PCB

The PCB design for the FKR has been optimized for low build time given that it is being sold as a commercial pedal. The Mark II design incorporates two separate boards, one for the main circuit, and a clipboard PCB that has the clipping diodes and the diode switches. The clipboard is standalone to allow its use in other pedal designs.

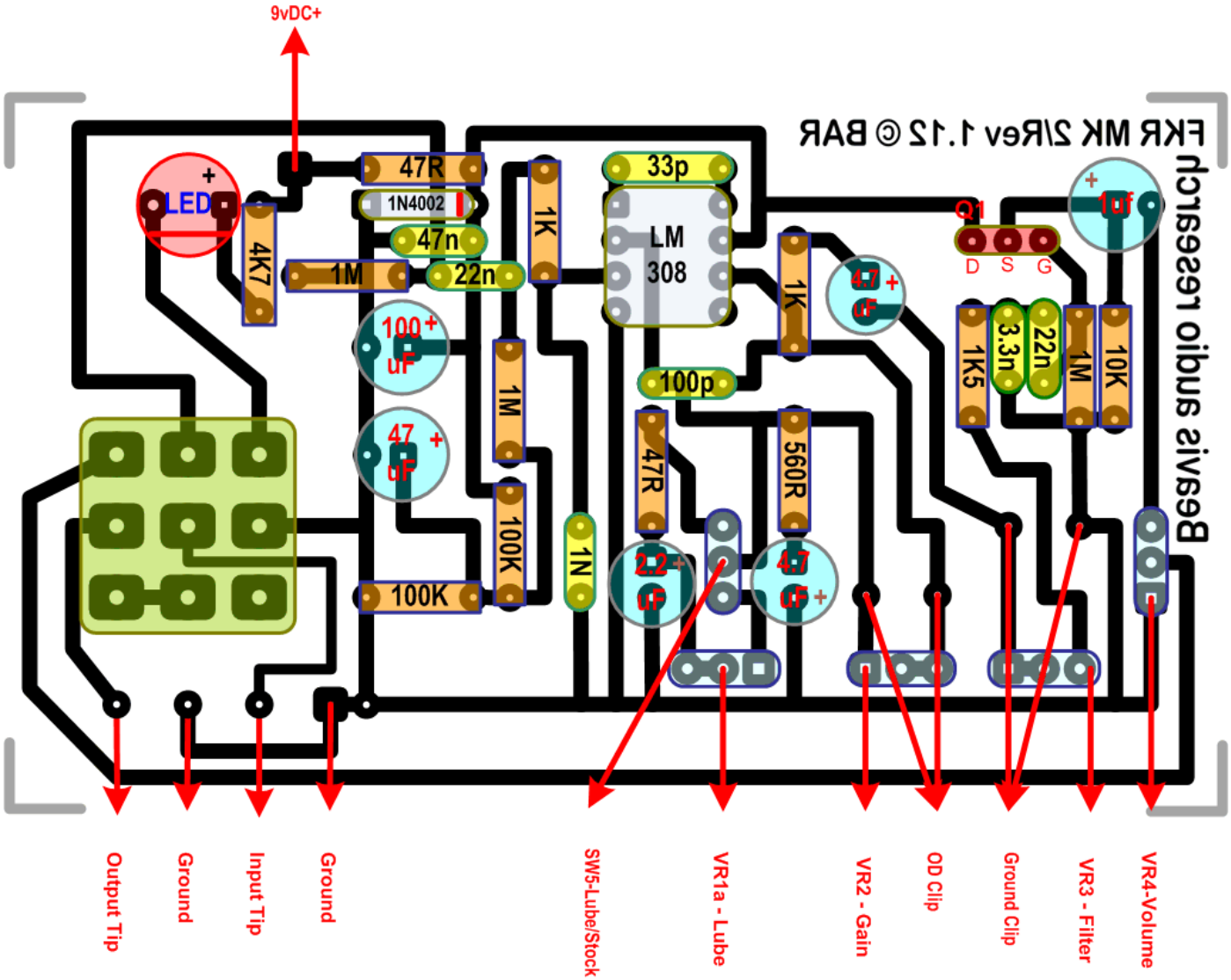
The idea of mounting switches on the PCB directly is typically frowned upon for durability reasons. However it should be noted that the FKR Mark II design has the switches as the only point of contact with the enclosure. The jacks and pots are still enclosure mounted.



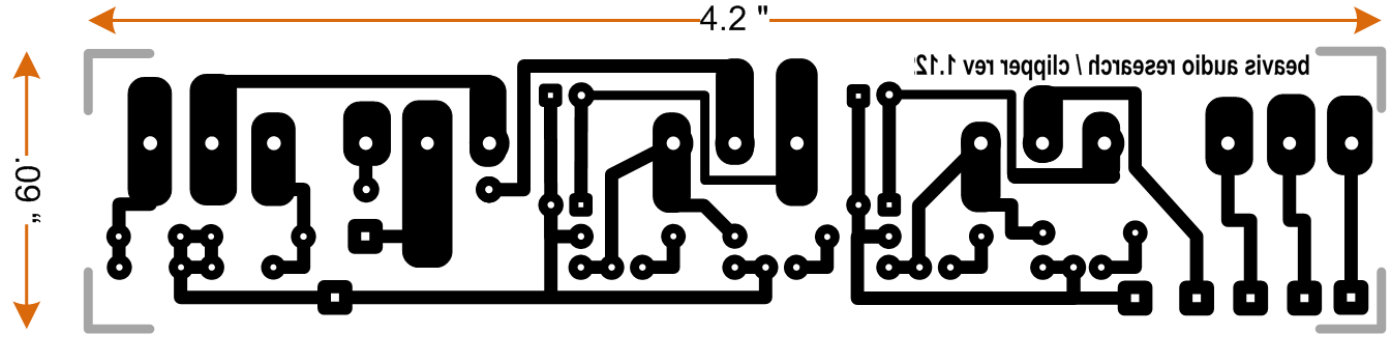
To get the size right, print the PCB out on paper first. Take a 8-pin DIP chip and line it up with the holes for U1 as shown in the parts layout below. Resize the image and reprint until you get the IC pins to line up exactly. Use the 3PDT switch as another reference point. Once everything lines up *exactly* you should have the right size.

Main Board Parts Layout

The following graphic shows the parts layout. Note that the 3PDT switch and the LED are mounted on the board.



Clipboard PCB



Clipboard Parts Layout

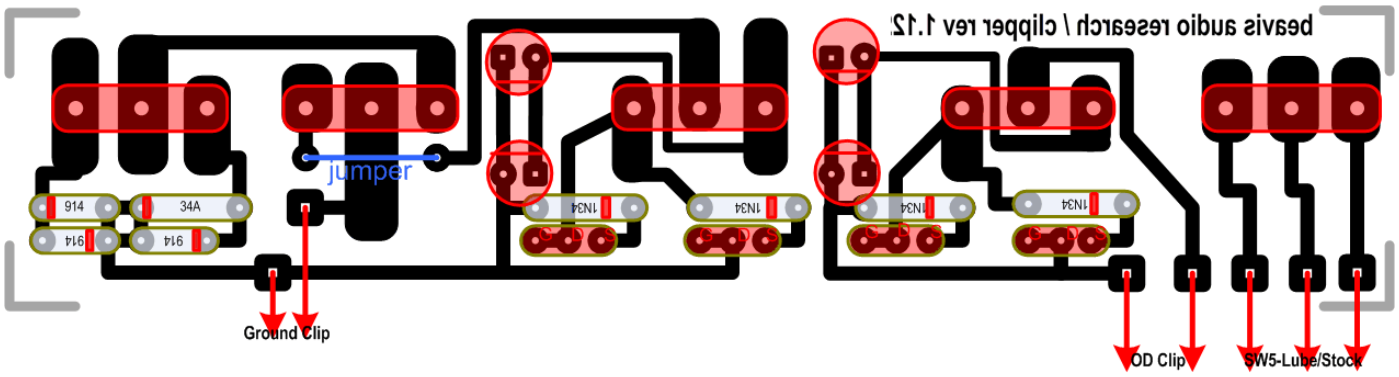
SW1-Symmetry
SPDT
On/On

SW2 -ClipMode
SPDT
On/Off/On

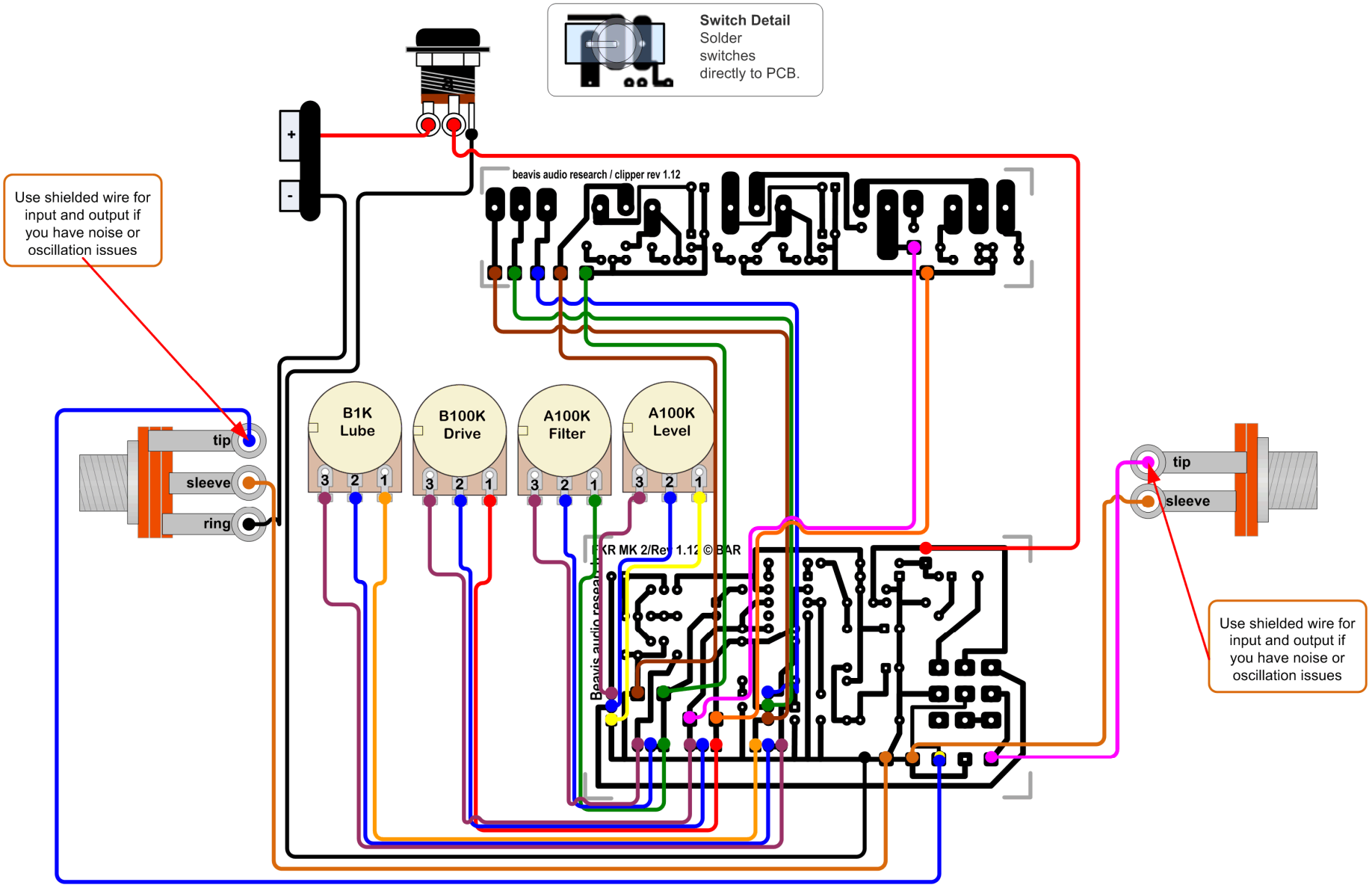
SW3–Alt Mode
SPDT
On/On

SW4-Overdrive
SPDT
On/Off/On

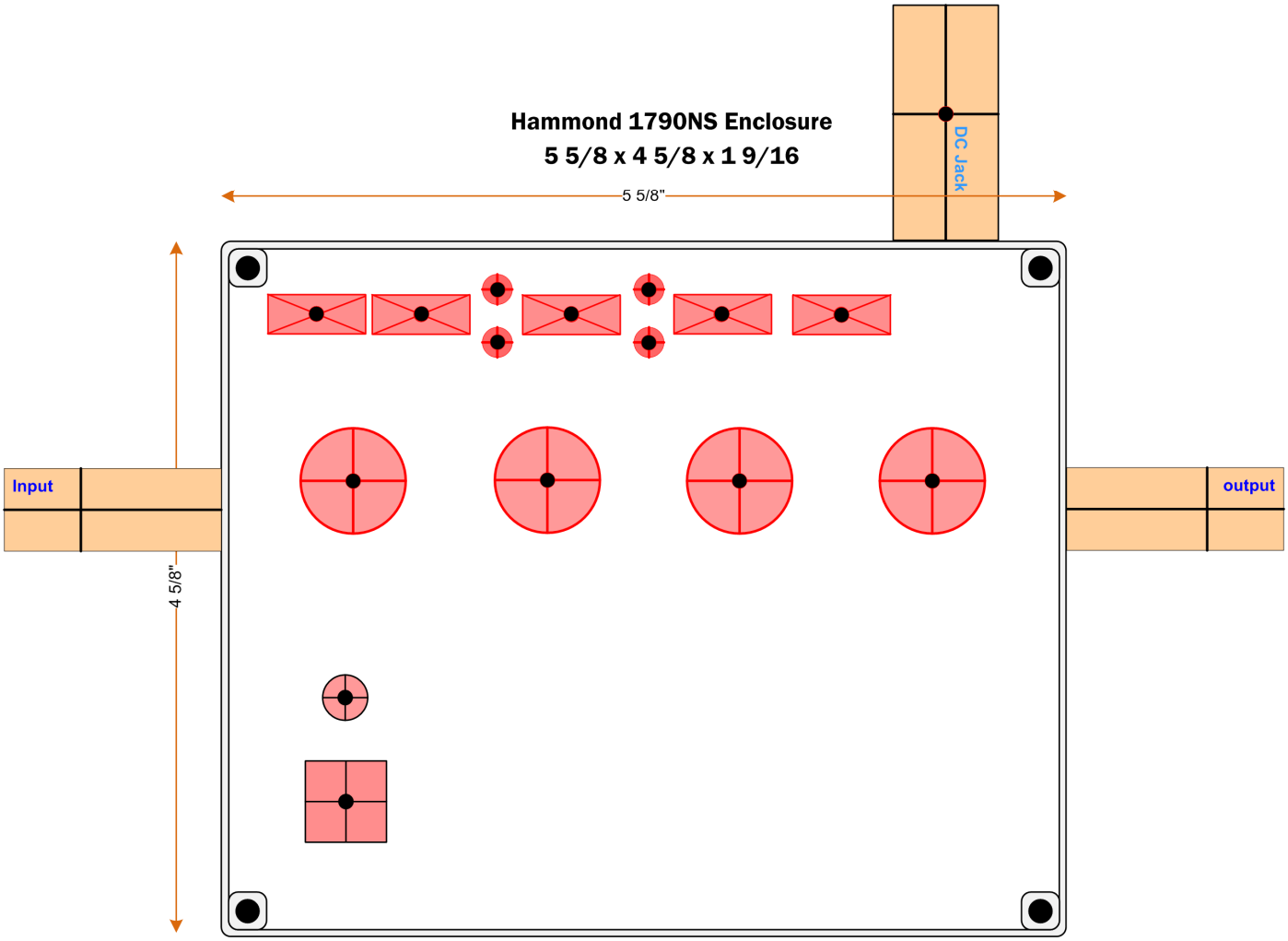
SW5-LubeMode
SPDT
On/Off



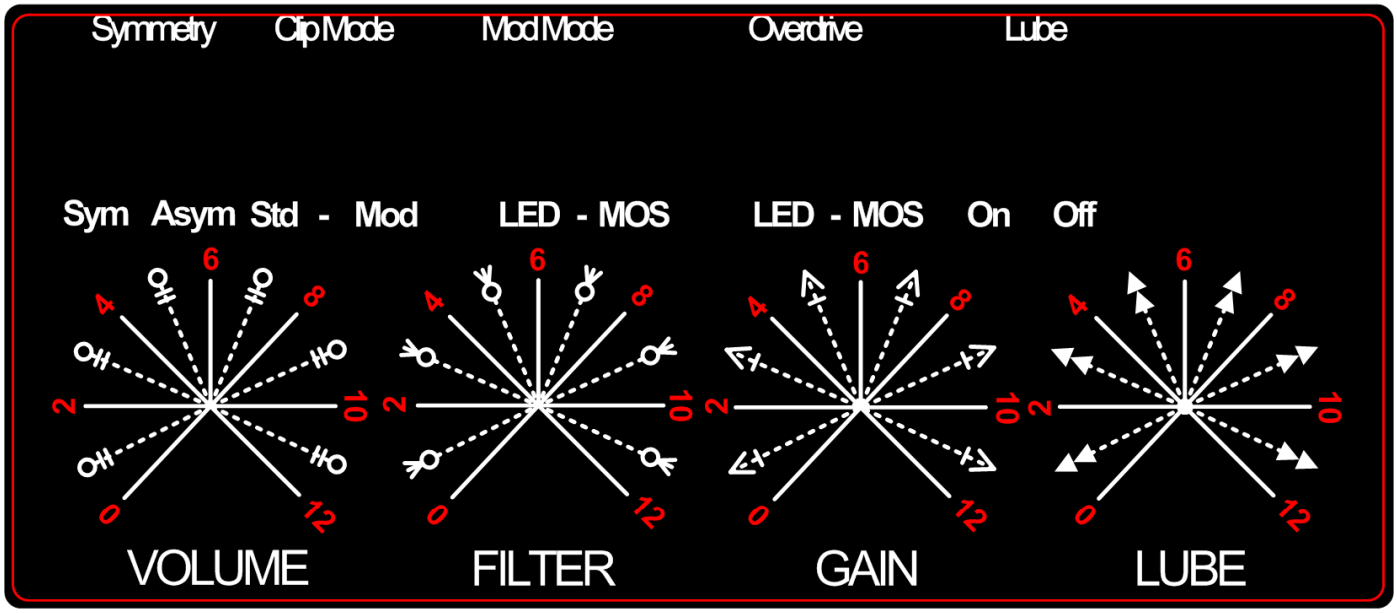
Wiring Diagram



Drilling Template – Top View



Box Art


Symmetry
Clip Mode
Mod Mode
Overdrive
Lube
Sym
Asym
Std - Mod
LED - MOS
LED - MOS
On
Off
VOLUME
FILTER
GAIN
LUBE