Snail Gear

Building instructions

v3.1

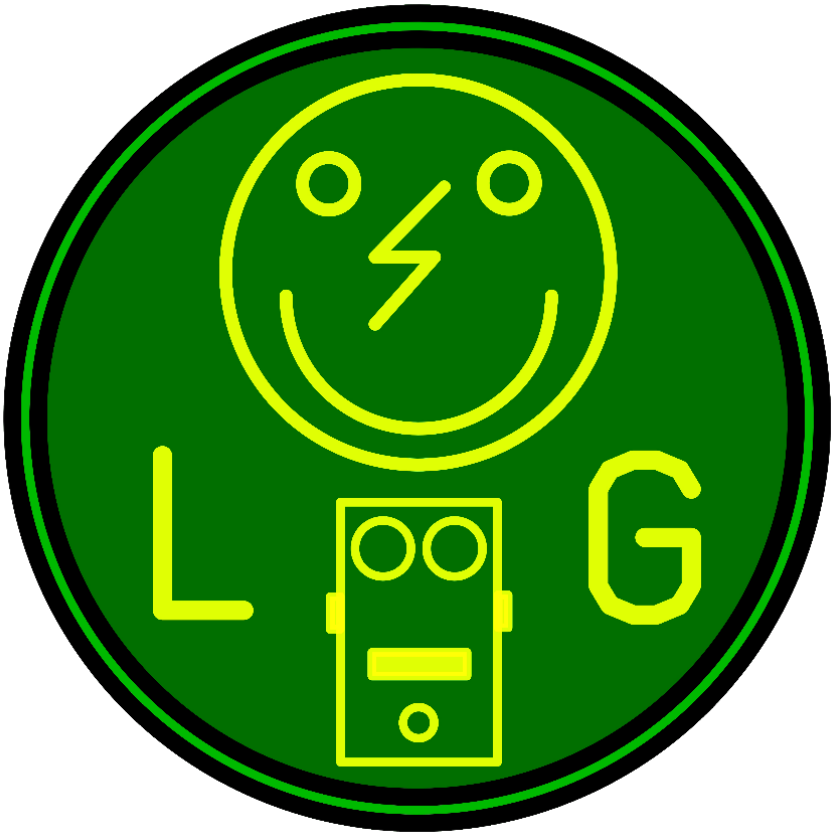


Table of contents

Read this entire manual thoroughly before you start to building the effect! Especially the Modification and Biasing part. Decide before building the effect which mods you want to try so that you do not need to desolder parts later.

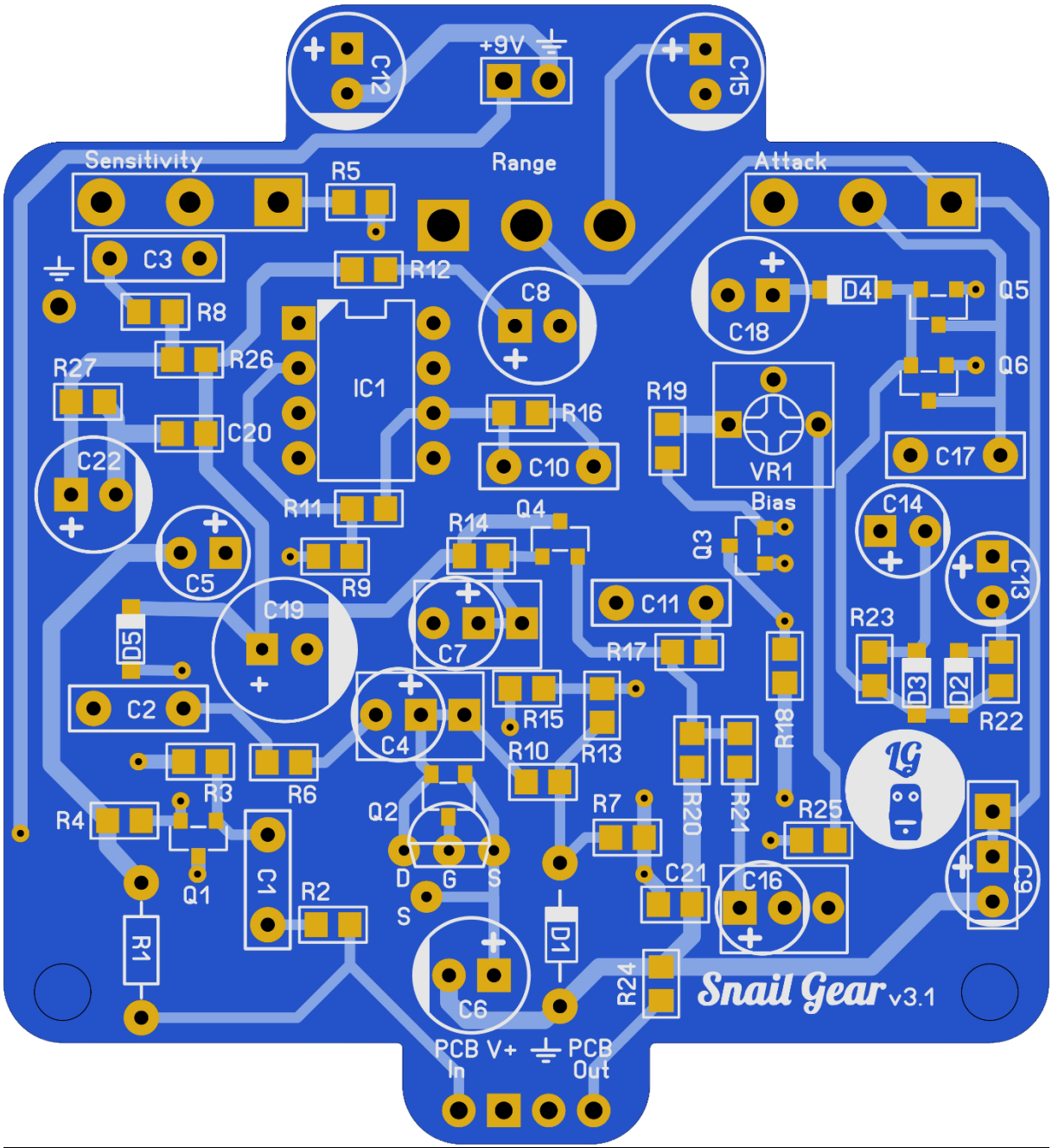
Last update: 05-07-2024

Components

Name	Value	Comment
C1	47n	SMF/MKT/FKP2
C2	22n	SMF/MKT/FKP2
C3	22n	SMF/MKT/FKP2
C4	1u	Electrolytic 25V+
C5	1u	Electrolytic 25V+
C6	47u	Electrolytic 25V+
C7	1u	Electrolytic 25V+
C8	10u	Electrolytic 25V+
C9	470n	Electrolytic 25V+
C10	1n	SMF/MKT/FKP2
C11	33n	SMF/MKT/FKP2
C12	2u2	Electrolytic 25V+
C13	1u	Electrolytic 25V+
C14	1u	Electrolytic 25V+
C15	10u	Electrolytic 25V+
C16	1u	Electrolytic 25V+
C17	47n	SMF/MKT/FKP2
C18	10u	Electrolytic 25V+
C19	100u	Electrolytic 25V+
C22	10u	Electrolytic 25V+
D1	1N5339	Zener 5.6V
IC1	LM741	Alternative TL071
P1	A100k	Sensitivity
P2	B20K	Attack
R1	2M2	Optional
SW1	SP3T	Range
VR1	B10k	
Jack In	Mono Jack	
Jack Out	Mono Jack	
DC	DC Jack	

A=Log, B=Lin, C=Rev. Log

PCB layout


+9V
C12
C15
Sensitivity
R5
Range
Attack
C3
R12
C8
C18
D4
Q5
Q6
R8
R27
R26
IC1
R16
R19
VR1
C20
C10
C17
C22
R11
Q4
R14
Bias
Q3
C14
C5
R9
C11
C13
C19
C7
R23
D5
R17
C2
D3
D2
R22
R15
R18
C4
R10
R13
R3
R6
R4
Q2
R7
R20
R21
R25
Q1
C1
R2
D
G
S
S
C21
C16
C9
R1
D1
C6
R24
Snail Gear v3.1
PCB V+ In
PCB Out

General building tips

Soldering this board can be very complicated for some people since the solder pads are very close together. Use a magnifying glass to make the job easier.

Start by soldering the diodes and resistor. **R1** is an optional Pull down resistor to prevent a pop when switching the effect on. Feel free to leave it out.

Note: Do not blow on your solder in an attempt to cool it down. That will possibly result in a bad join that might corrode!

Next, solder the IC sockets then the VR1 and the foil capacitors. Lastly solder the electrolyte capacitors.

Place the IC (and transistors) and you are almost ready to rock.

Besides the components mentioned in the table on the page 3, you will need a footswitch, LED and a **Hammond 125B** case (or similar) in your favorite color.

PS you can experiment with the values of **C12** and **C15** to get even more swell. For example use a 4.7uF in **C12** and 22uF in **C15**. Find your own best matches.

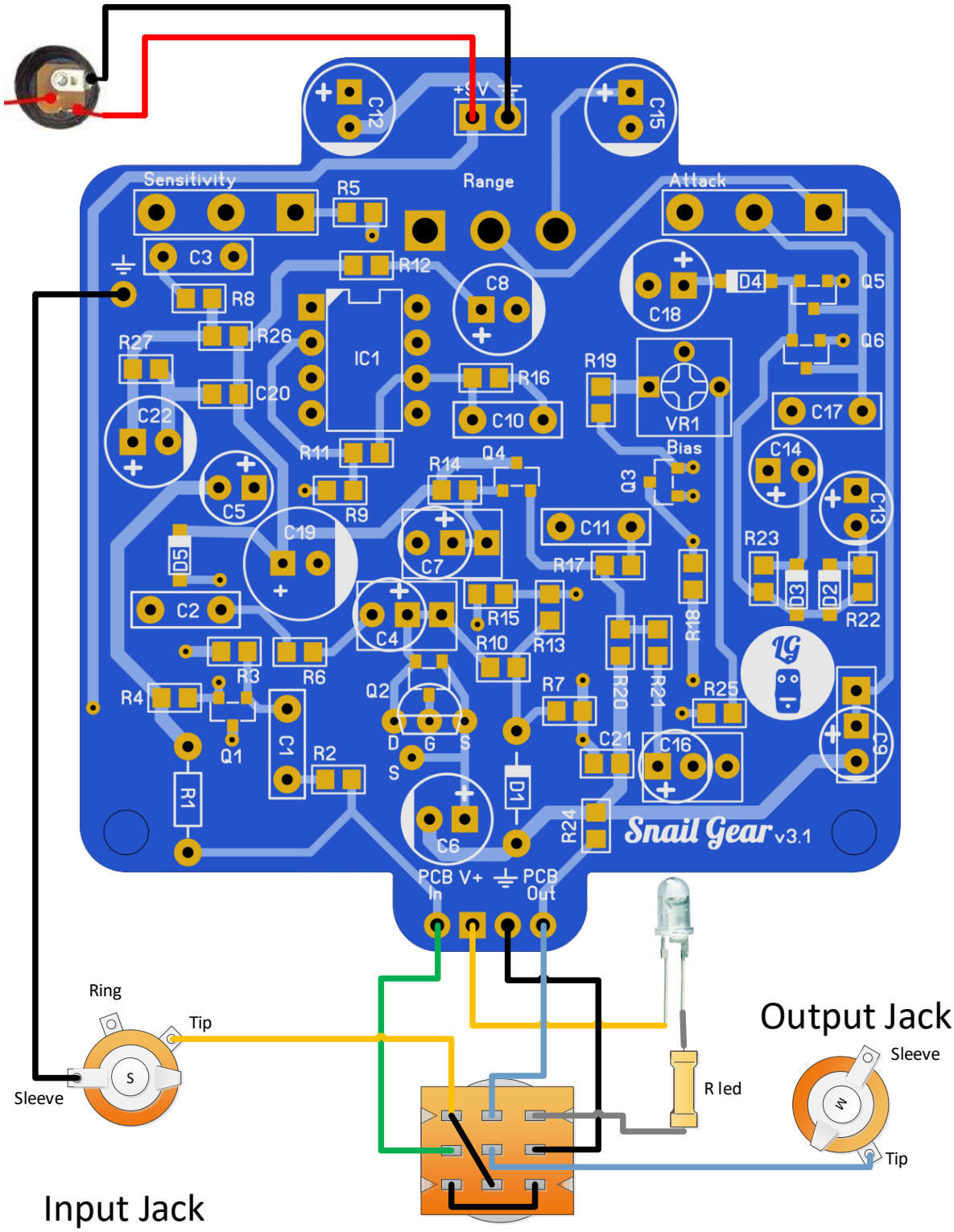
Biasing

The most important part of this build is the biasing. If your effect is inaudible at low attack settings then it is not biased correctly. Biasing can be done by ear, but can be difficult, so take your time.

1. Turn **Attack** to 0 (=fully counterclockwise) and **Sensitivity** to 5 (=halfway/12 o'clock) and **VR1** to 10 (=fully clockwise)
2. Turn the **VR1** until you hear the effect swell correct and without volume loss.

NB the Sensitivity pot is used to adapt the effect to the amount of input the effect gets (like an input boost). If you use a booster/fuzz in front of the effect, you will need to lower the Sensitivity to get the optimal result.

Off board wiring



The LEDs requires a resistor (R led in the diagram) depending on the type of LED you are using. To be safe use a 3k3 or 4k7 resistor.

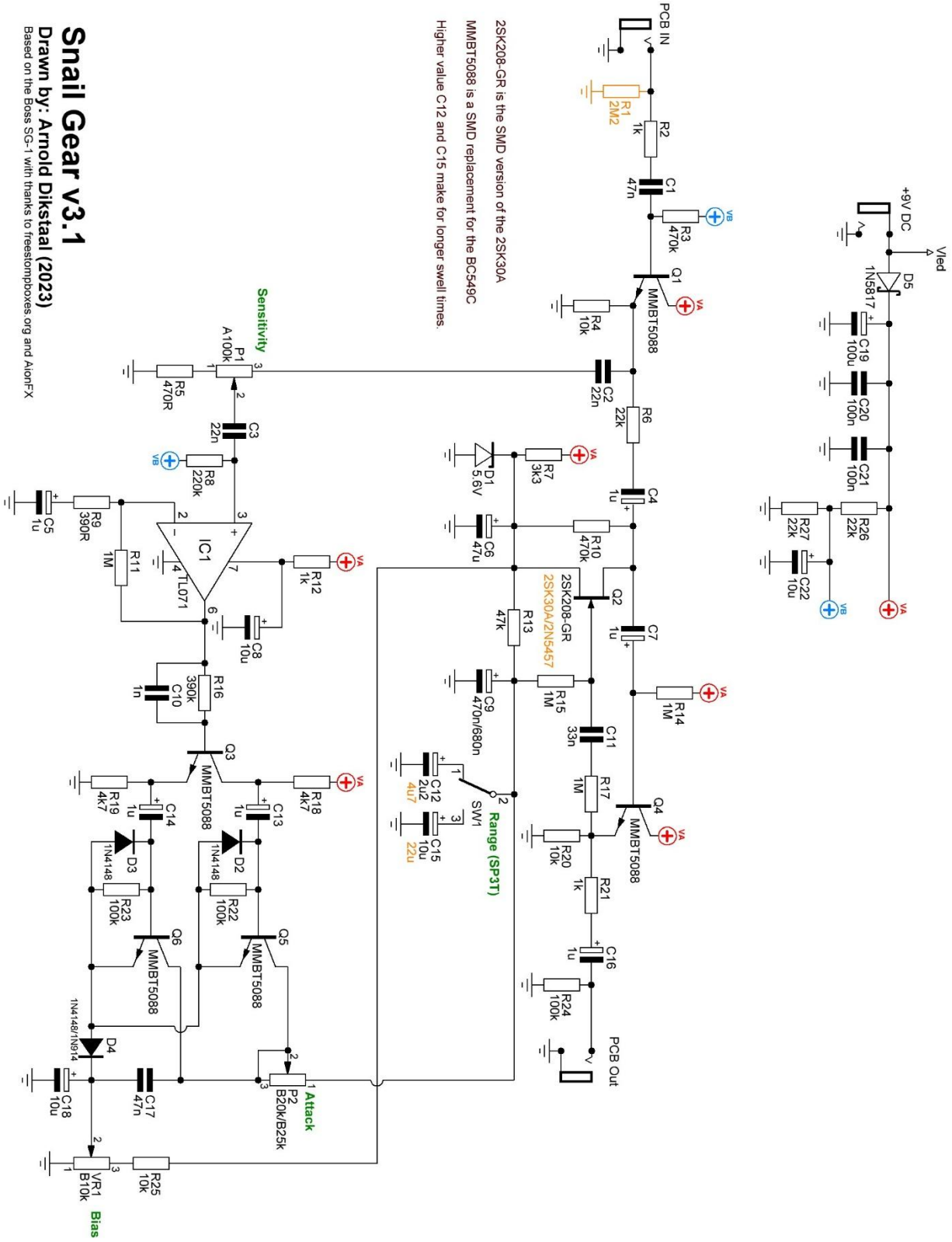
Troubleshooting

All PCB's have been 100% factory e-tested and out of every batch I receive I build a effect to double check, so there should not be a connection problem on the PCB itself.

The board is not working (at all), what now?

- Check if your 9V is plugged in correctly (and/or soldered correctly on the board).
- Check that you oriented the capacitors, IC's ,transistors and diodes the right way. SMF, MKT capacitors and resistors do not need to be oriented.
- Check if you used the correct values of the components. For resistors you can look here: http://www.diyaudioandvideo.com/Electronics/Color/
- Double and triple check your soldering! A loose or cold solder can be really bad for your board.
- Replace the IC's and transistors, one might be defective. Before doing that first unplug the 9V and wait 5 seconds.
- Check that you have good/high grade components. A lot of Chinese sourced parts are fakes (especially high end opamps, vintage diodes and transistors) so be careful that you source your parts from reliable suppliers.

Schematic


Snail Gear v3.1
Drawn by: Arnold Dikstaal (2023)
Based on the Boss SG-1 with thanks to freestompboxes.org and AionFX
2SK208-GR is the SMD version of the 2SK30A
MMBT5088 is a SMD replacement for the BC549C
Higher value C12 and C15 make for longer swell times.
PCB IN
PCB Out
+9V DC
Vled
D5
1N5817
R1 2M2
R2 1k
C1 47n
R3 470k
Q1
MMBT5088
R4 10k
C2 22n
R6 22k
C4 1u
D1 5.6V
R7 3k3
C6 47u
R10 470k
Q2
2SK208-GR
2SK30A/2N5457
R13 47k
C9 470n/680n
R15 1M
C11 33n
R17 1M
Q4
MMBT5088
R20 10k
R21 1k
C16 1u
R24 100k
C19 100u
C20 100n
C21 100n
R26 22k
R27 22k
C22 10u
Sensitivity
P1 A100k
R5 470R
C3 22n
R8 220k
C5 1u
R9 390R
R11 1M
IC1
TL071
R12 1k
C8 10u
R16 390k
C10 1n
Q3
MMBT5088
R19 4k7
R18 4k7
C14 1u
C13 1u
D3 1N4148
D2 1N4148
R23 100k
R22 100k
Q6
MMBT5088
Q5
MMBT5088
D4 1N4148/1N914
C18 10u
C17 47n
P2 B20k/B25k
Attack
VR1 B10k
Bias
R25 10k
C12 2u2 4u7
C15 10u 22u
SW1
Range (SP3T)
R14 1M
VA
VB