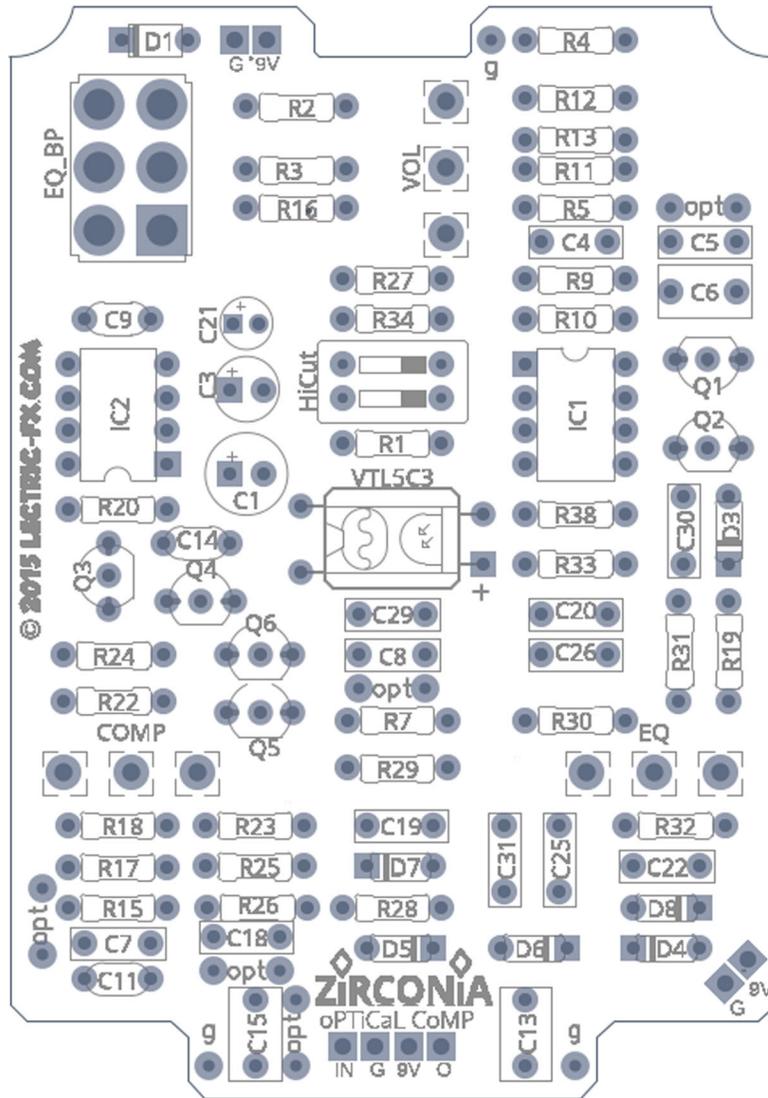


# ZiRCONiA <sup>V1.1</sup>

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Changes for V1.1: Pots and switch have been moved.

The ZiRCONiA is an optical compressor using a VTL5C3 vactrol (or similar) that includes a tilt style EQ, external EQ-bypass toggle, and internal Hi Cut switch.

The controls are:

**Volume-** Sets the output level.

**EQ-** This is a “tilt” style EQ that cuts bass as the treble is increased (CW) and conversely cuts treble as bass is increased (CCW).

**COMP-** Increases the amount of compression and sustain.

The Hi Cut dipswitch uses the bottom dip only. The top switch is floating. Also, please note the “+” symbol near the vactrol’s silkscreen, which indicates the position of the positive leg.

# ZiRCONiA Bill of Materials

## Part #'s/Values

|     |      |     |      |         |        |
|-----|------|-----|------|---------|--------|
| R1  | 100R | C1  | 100u | Q1      | 2N3904 |
| R2  | 10k  | C3  | 47u  | Q2      | 2N3904 |
| R3  | 10k  | C4  | 5n6  | Q3      | 2N3904 |
| R4  | 100R | C5  | 5n6  | Q4      | 2N3904 |
| R5  | 15k  | C6  | 330n | Q5      | 2N3904 |
| R7  | 22k  | C7  | 100n | Q6      | 2N3904 |
| R9  | 15k  | C8  | 100n | D1      | 1N4001 |
| R10 | 47k5 | C9  | 100p | D3      | 1N4148 |
| R11 | 47k5 | C11 | 100p | D4      | 1N4148 |
| R12 | 47k5 | C13 | 1u   | D5      | 1N4148 |
| R13 | 47k5 | C14 | 100p | D6      | 1N4148 |
| R15 | 1M   | C15 | 330n | D7      | 1N4148 |
| R16 | 475R | C18 | 100n | D8      | 1N4148 |
| R17 | 475k | C19 | 10n  | IC1     | LM358  |
| R18 | 475k | C20 | 10n  | IC2     | OP275  |
| R19 | 3k3  | C21 | 2u2  | VACTROL | VTL5C3 |
| R20 | 6k4  | C22 | 100n | HiCut   | DIP2   |
| R22 | 100R | C25 | 3n3  | SW2     | DPDT   |
| R23 | 475k | C26 | 15n  | VOL     | 100KA  |
| R24 | 22k  | C29 | 3n3  | COMP    | 100KB  |
| R25 | 100k | C30 | 100n | EQ      | 50KB   |
| R26 | 1k   | C31 | 100n |         |        |
| R27 | 3k3  |     |      |         |        |
| R28 | 475r |     |      |         |        |
| R29 | 220k |     |      |         |        |
| R30 | 475k |     |      |         |        |
| R31 | 100k |     |      |         |        |
| R32 | 220k |     |      |         |        |
| R33 | 100k |     |      |         |        |
| R34 | 475k |     |      |         |        |
| R38 | 10k  |     |      |         |        |

Some of the resistor values are a bit odd. feel free to sub the closest value without fear. Example- a 470R can be used in place of 475R.

## Cap/Resistor Totals

|   |      |   |        |
|---|------|---|--------|
| 3 | 100R | 3 | 100p   |
| 2 | 475R | 4 | 820p * |
| 1 | 1k   | 2 | 3n3    |
| 2 | 3k3  | 2 | 5n6    |
| 1 | 6k4  | 2 | 10n    |
| 4 | 10k  | 1 | 15n    |
| 3 | 15k  | 6 | 100n   |
| 2 | 22k  | 2 | 330n   |
| 5 | 47k5 | 1 | 1u     |
| 2 | 100k | 1 | 2u2    |
| 3 | 220k | 1 | 47u    |
| 4 | 475k | 1 | 100u   |
| 1 | 1M   |   |        |

\* Optional parallel caps for C6, C7, C8, C15, and C18. See explanation below.

There are 4 spaces on the pcb labeled "opt" These are where you would install the 4x 820p caps if you so wish. They aren't crucial to the sound, so we omitted them from the schematic.

The VTL5C3 is the recommended vactrol, but I used the MI1210CLF-R (smallbear item SKU: 2510M) with great results. It is possible an NSL-32, or even a home rolled vactrol could work, but I have not tested this.

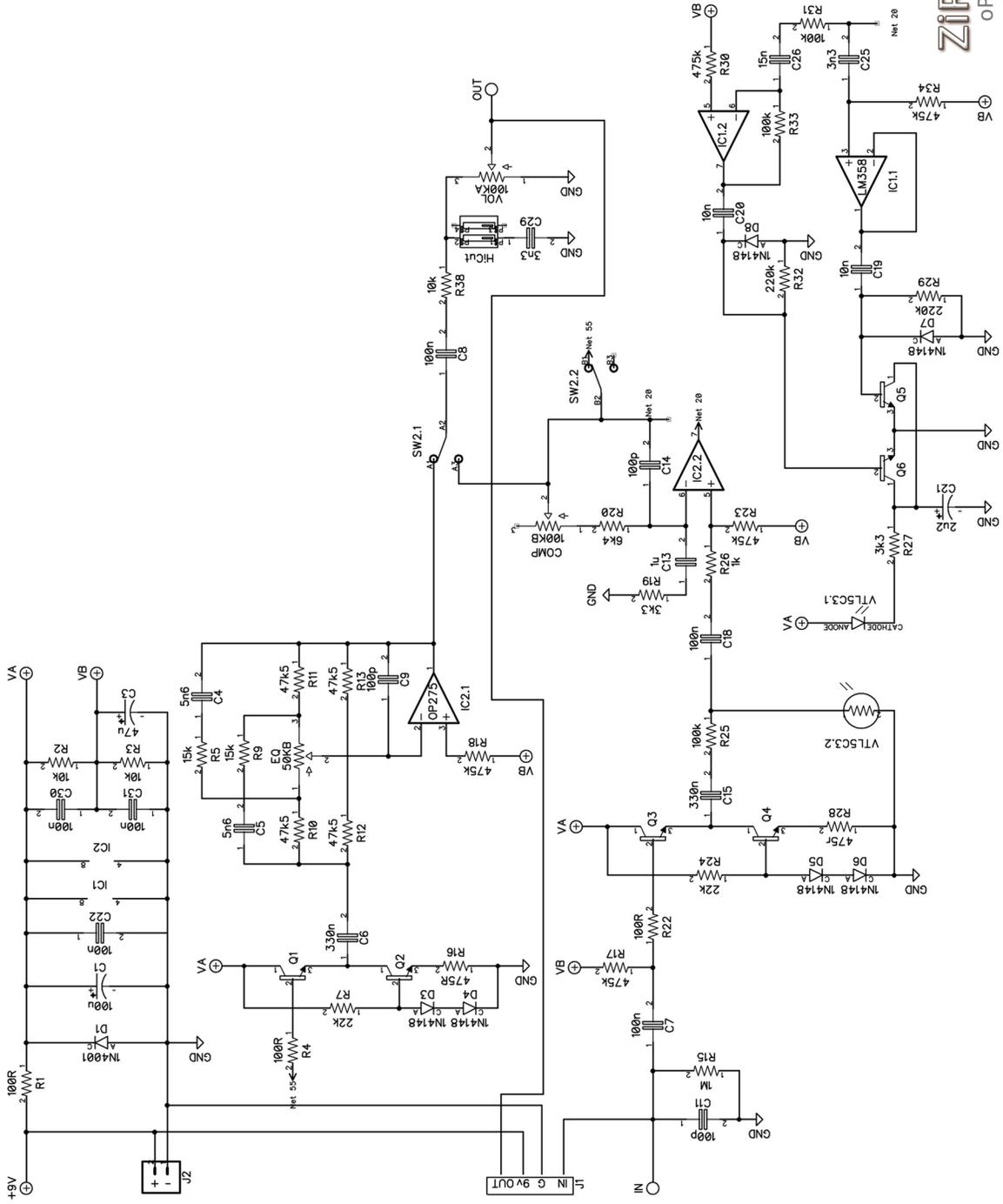
## Bill of Materials (BASS version)

|     |      |     |        |         |        |
|-----|------|-----|--------|---------|--------|
| R1  | 100R | C1  | 100u   | Q1      | MPSA18 |
| R2  | 10k5 | C3  | 47u    | Q2      | 2N5088 |
| R3  | 10k5 | C4  | 4n7 *  | Q3      | 2N3904 |
| R4  | 100R | C5  | 4n7 *  | Q4      | 2N3904 |
| R5  | 15k  | C6  | 4U7    | Q5      | 2N3904 |
| R7  | 22k  | C7  | 100n   | Q6      | 2N3904 |
| R9  | 15k  | C8  | 4U7    | Vactrol | VTL5C3 |
| R10 | 47k5 | C9  | 100p   | IC1     | LM358  |
| R11 | 47k5 | C11 | 100p   | IC2     | OP275  |
| R12 | 47k5 | C13 | 2u2    | SW2     | DPDT   |
| R13 | 47k5 | C14 | 100p   | HiCut   | DIP2   |
| R15 | 1M   | C15 | 4u7    | VOL     | 100KA  |
| R16 | 475R | C18 | 100n   | COMP    | 100KB  |
| R17 | 475k | C19 | 10n    | EQ      | 50KB   |
| R18 | 470k | C20 | 10n    |         |        |
| R19 | 4k7  | C21 | 2u2    |         |        |
| R20 | 6k8  | C22 | 100n   |         |        |
| R22 | 100R | C25 | 3n3    |         |        |
| R23 | 470k | C26 | 15n    |         |        |
| R24 | 22k  | C29 | 3n3    |         |        |
| R25 | 100k | C30 | 100n   |         |        |
| R26 | 1k   | C31 | 100n   |         |        |
| R27 | 3k3  | D1  | 1N4001 |         |        |
| R28 | 470r | D3  | 1N4148 |         |        |
| R29 | 220k | D4  | 1N4148 |         |        |
| R30 | 470k | D5  | 1N4148 |         |        |
| R31 | 100k | D6  | 1N4148 |         |        |
| R32 | 220k | D7  | 1N4148 |         |        |
| R33 | 150k | D8  | 1N4148 |         |        |
| R34 | 470k |     |        |         |        |
| R38 | 10k  |     |        |         |        |

The bass version is run at 18v, presumably for more headroom. A madbeanpedals Road Rage or 3PRR would be ideal to use for this, running the 18v out of the RR to the 9v in on the ZiRCONiA pcb. Whether you use a Road Rage or a 3PRR, we recommend using LT1054 just to be safe, since the VTL5C3 draws 20mA on its own.

\* These 2 caps decide the center frequency of the EQ control. They can be socketed for experimentation. The 4n7 values listed will give a center freq of 1060Hz, while a pair of 18n or 22n caps will be closer to 250Hz.

1 2 3 4 5 6 7 8

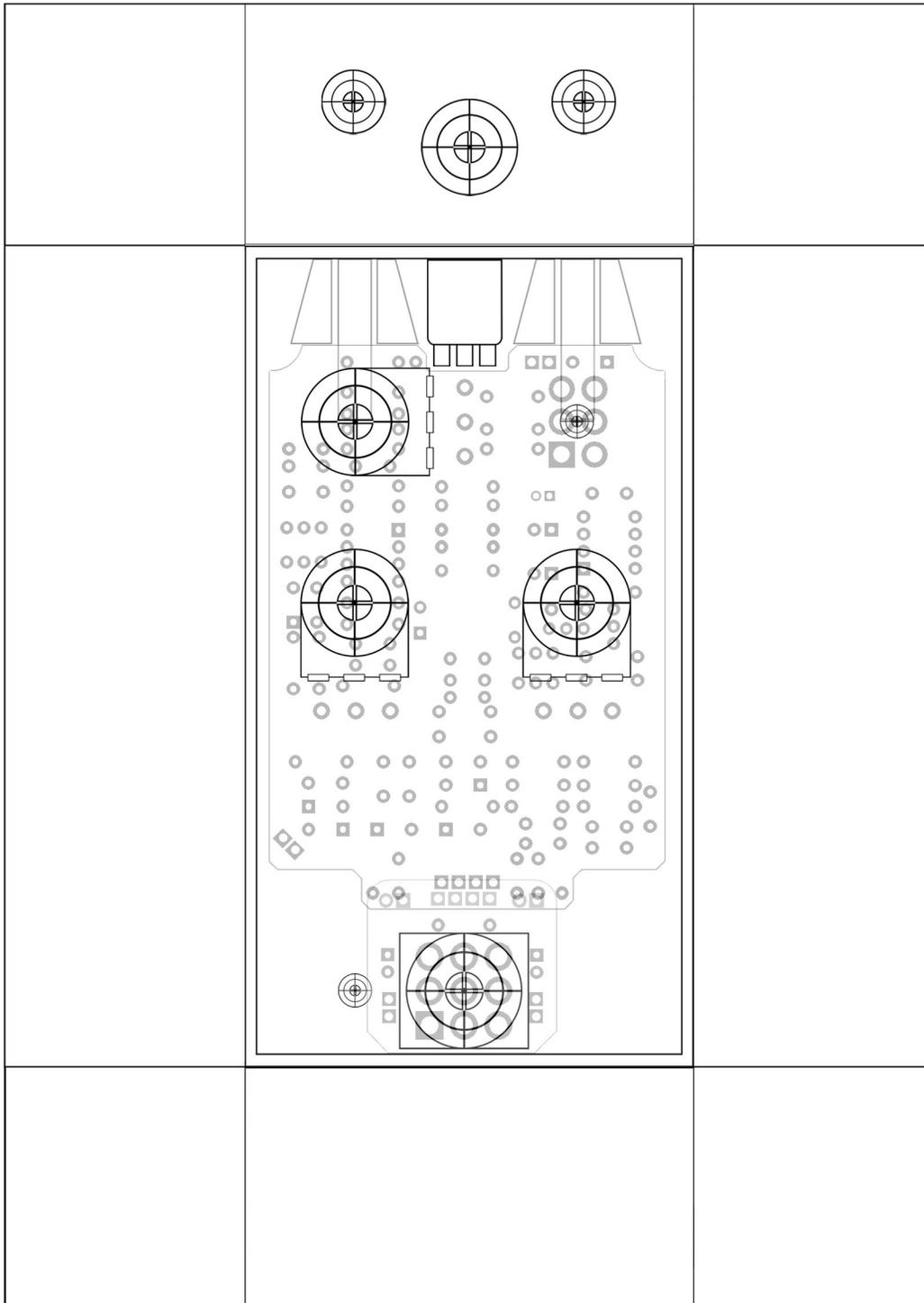


**ZIRCONIA**  
OPTICAL COMP  
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1 2 3 4 5 6 7 8

# Drill Guide Suggestion (Top Mount)

125b- Untested!



When using top mount jacks with the 3pdt pcb you may need to install D1, C13 and C15 on the backside.