

Optional Modifications: Grandson of Zerobeat kit by Chuck Olson, WB9KZY, Jackson Harbor Press

- 1) The junction of R13 and R14 which set the pseudo ground level for the op-amp is not bypassed to ground. A .1 uF capacitor (or larger, value not critical) can be soldered from this junction point to ground. While it can't hurt to do this mod, I doubt it will make much difference.
- 2) If a horizontal orientation of the LED array is desired, the builder can purchase a 20 pin right angle DIP socket – be aware that these sockets are fairly expensive, roughly 6 times the price of a normal DIP socket. I haven't tried this myself so no recommendations as to which one to buy.
- 3) An alternative to trying to cut a rectangular hole in the case for the LED & LED array is to use an enclosure with a clear or translucent plastic top. See the prototype picture on the Grandson of Zerobeat web page for an example made from an anti-static semiconductor sample box.
- 4) The 1n400x series diode on the +12V power input has saved many a 5V regulator for me. However, it does drop considerable voltage, roughly 0.7 Volt – not a problem at a nominal 12 Volts (up to 13.8 volts) but more of a problem if the kit is being used with a battery. One help is to substitute a Schottky diode such as the 1n5817, 1n5818 or 1n5819. These will save roughly ½ Volt. Another idea is to use a p-channel MOSFET as a polarity reversal protector: connect the drain to +Vin, connect the source to the Grandson of Zerobeat and connect the gate to ground (a series resistor can be used). Depending on the MOSFET used, this results in virtually no voltage drop.
- 5) The TL062 opamp is a favorite of mine, inexpensive and low-power. However there are many better opamps on the market now which are pin compatible and which may offer the builder lower noise or lower power consumption or rail-to-rail performance. Another mod which is easy due to the socketing of the op-amp but which probably won't make much difference.
- 6) Some builders may find the detector LED problematic – the builder is free to substitute a brighter and / or round LED. Another idea is to get rid of the separate detector LED by using the leftmost array LED (D1) instead. Remove (or do not install) R17, the 180 ohm (Brown-gray-brown-gold) resistor. Then install R9, the 150 ohm (Brown-green-brown-gold) resistor diagonally to the cathode of D1.
- 7) Alternately to mod 6, since there are two green LEDs (D5 and D6) the builder could elect to use one of them as the detector LED, however this probably would be confusing. It would also be possible to do mod 6 but then continue the diagonal shift of the resistors, substituting D2 for D1, D3 for D2, D4 for D3 and finally D5 for D4. But this might also be confusing, the builder would just have to remember that the right green LED indicates zerobeat.
- 8) One mod which I have done is to use a panel mounted pot for R10, the level set trimpot. This is handy for setting the level when conditions get either noisier or quieter than the last listening session. Either a 100k ohm linear pot can be used or if the builder wants more spread (since the setting is usually fairly close to the center of the pot range), a smaller value pot can be used with two fixed value resistors on each “side” of the pot, the three values to total 100k ohms.

Please feel free to email with any questions, comments, suggestions or problems to:

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