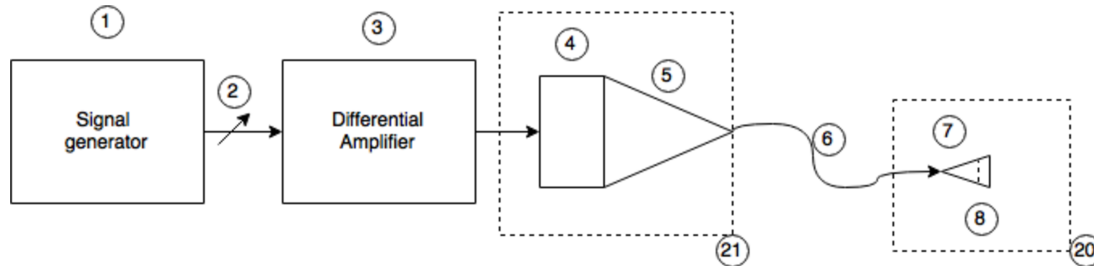


Supplemental Document1: Detailed Mechanism of the NIOD



1. Signal generator used to generate a sine wave from 20 to 65Hz with amplitude from 0 to 100%
2. Calibration
3. Differential amplifier
4. Electric to acoustic converter
5. Sound wave reduction flute
6. Logarithmic sound wave flute to reduce the diameter of the vibration chamber from 4" to 1" allowing a small tube to be connected.
7. Flexible tube
8. This tube was selected with care to optimize the wave transmission and minimize as much as possible the attenuations that could reduce the output at the adapter side. The tube is very thin and light, but is assembled on a stronger spiral material on its outer layer to minimize the obstacles inside the tube and augment its resistance to manipulations.
9. Acoustic amplification chamber
10. Logarithmic sound wave flute to increase the internal diameter from 1" to 2". This part allows the more space for the air exchange that is needed to create the vibration of the membrane
11. Vibration membrane
12. A thin membrane made of silicon that vibrates to the original frequency output by the transducer. The membrane is allowed to move freely without touching the skin since it is recessed on the adapter.
13. Adapter converting a pressure wave into a vibration (motion and sound)
14. Transducer transforming the electrical signal into an acoustic signal
15. The combination of #20 & #21 is air-tight to optimize the sound and vibration by minimizing losses and attenuations