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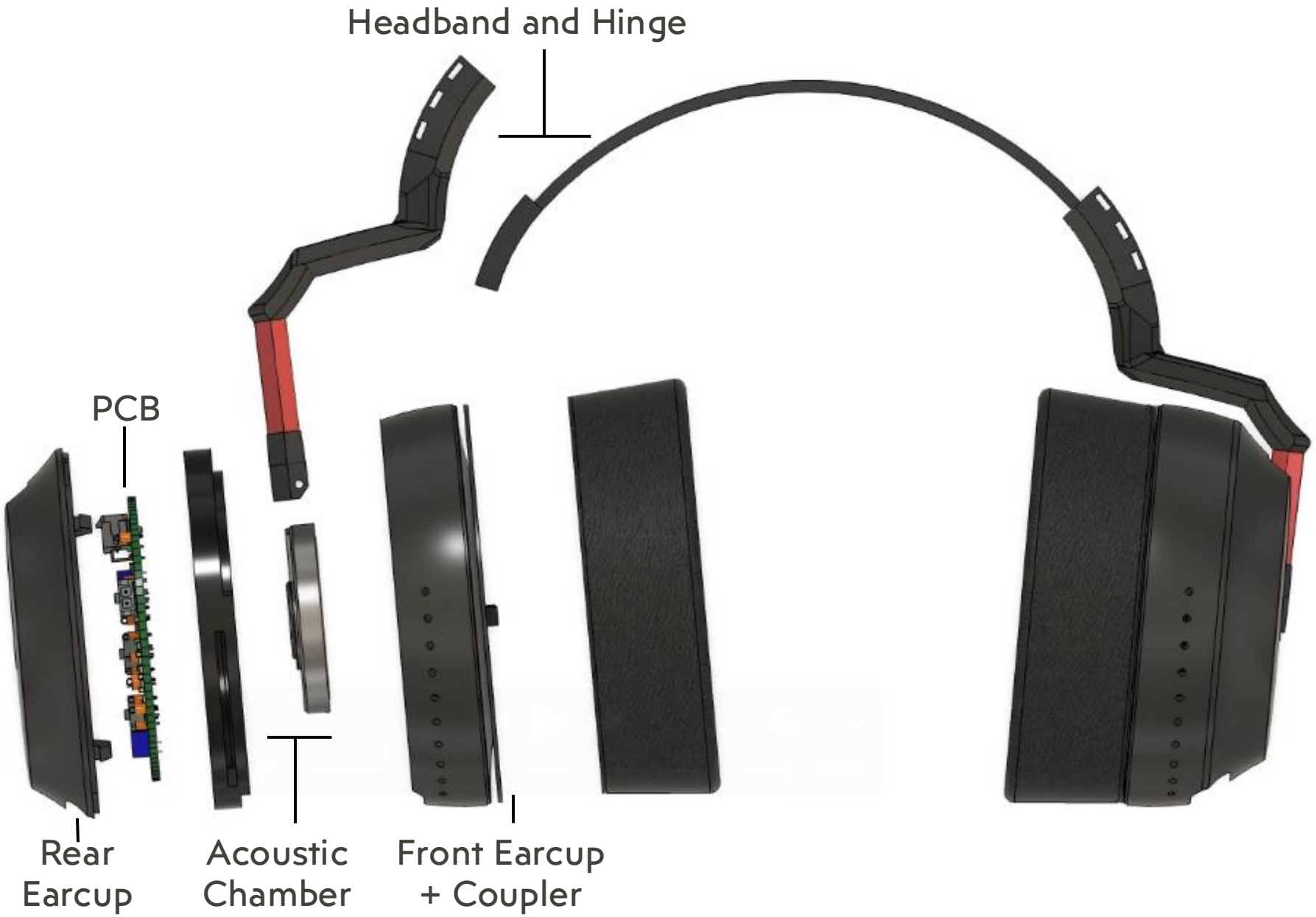
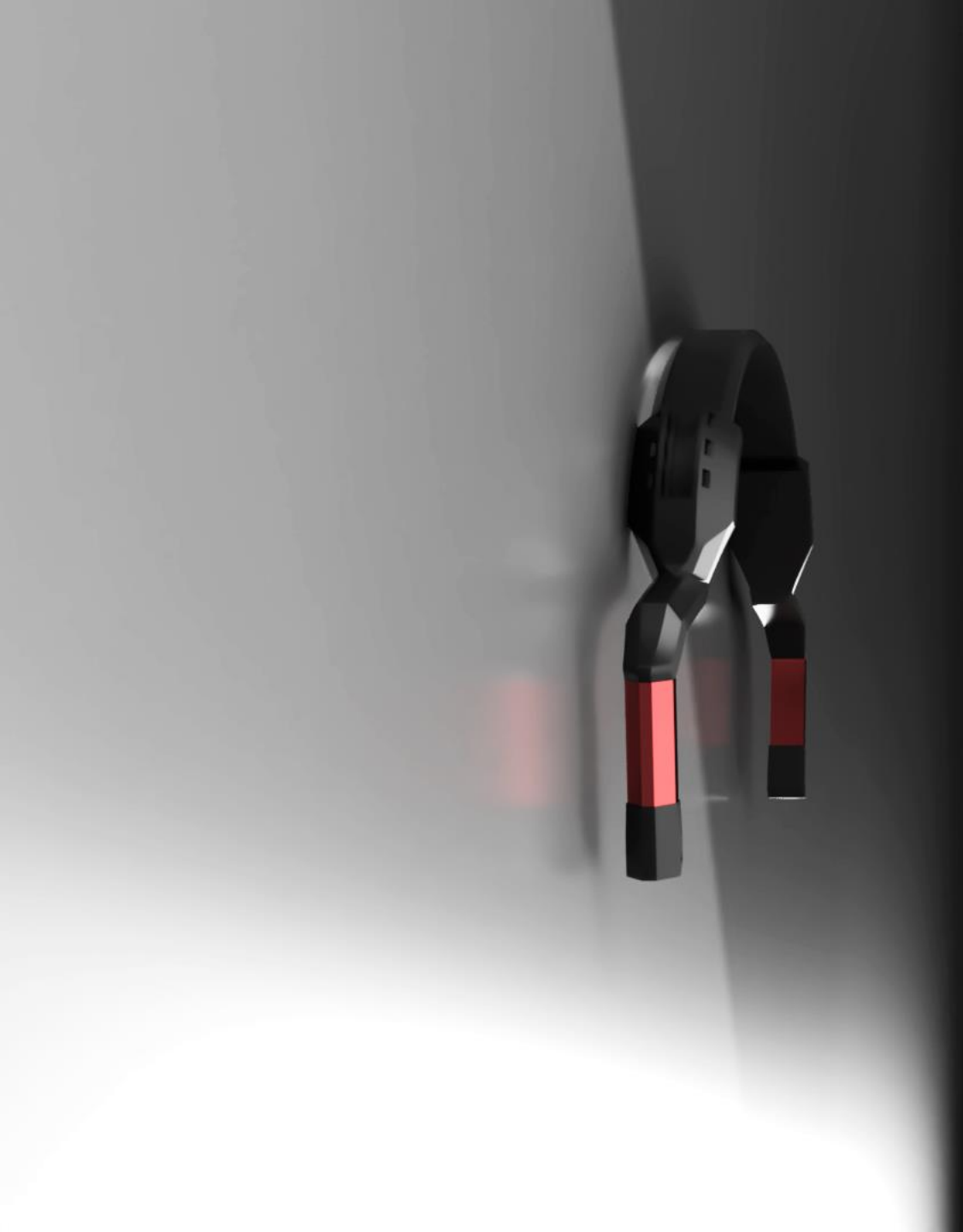

Headband and Hinge
PCB
Rear Earcup
Acoustic Chamber
Front Earcup + Coupler



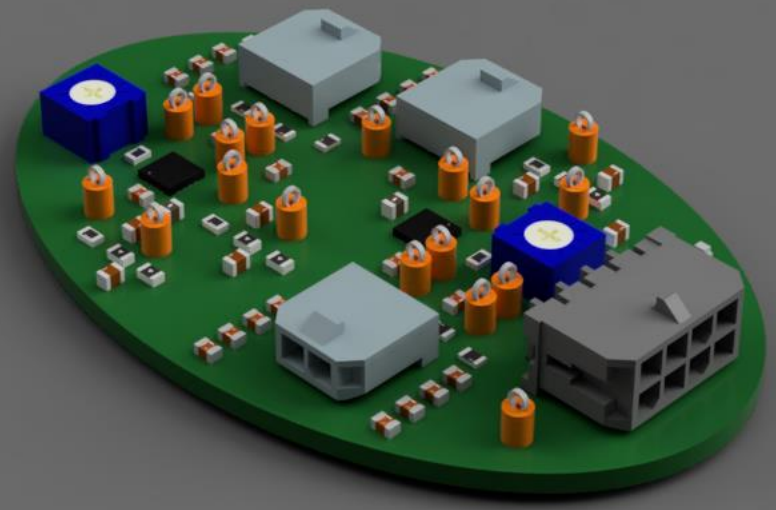
- Ergonomically designed around average human head shape
- Made from flexible, “Durable” resin print for comfort, longevity, and prototyping ease
- Adjustable slider mechanism for comfortable fit across multiple head sizes

- Large earcup ensures comfortable use for extended usage sessions
- PU leather material to maximize passive isolation while maintaining breathability

- Inspired by Bose QuietComfort and Sony XM series for superior isolation
- Primary housing for electronics; optimized spatial efficiency
- Ensures durable housing for all componentry while aiding with passive noise isolation

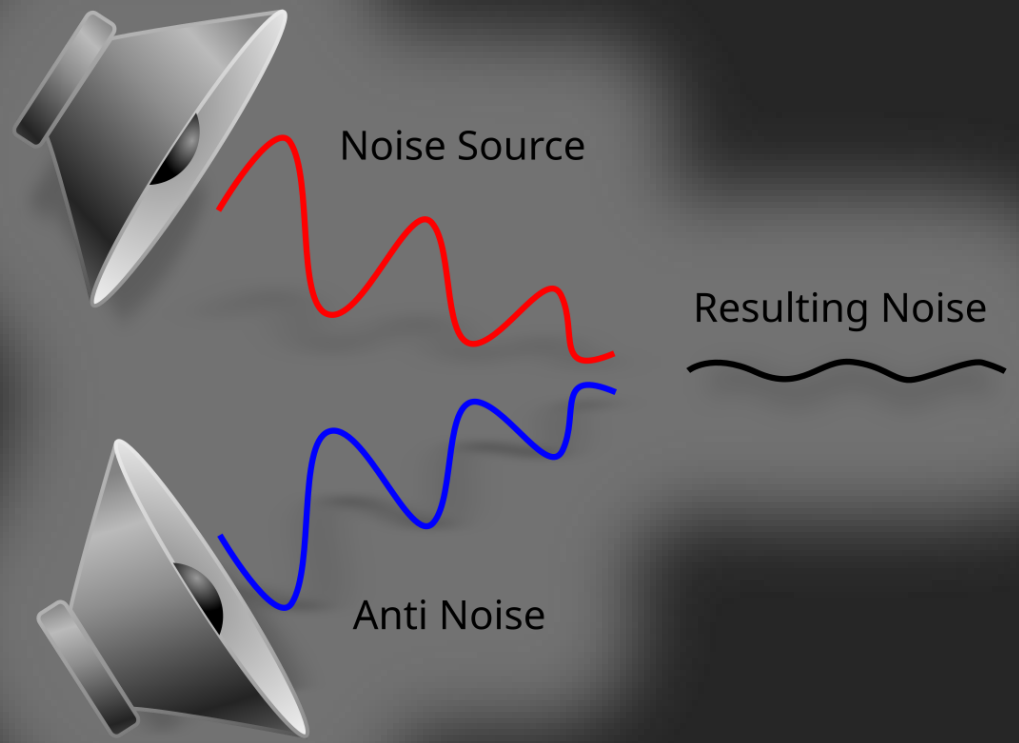
- Isolated acoustic volume (~50 cm^3) behind 50mm dynamic driver
- Enhances bass response and reduces distortion through controlled air volume
- Paired with two 6mm electret microphones for accurate sound capture
- Minimizes external acoustic interference

- Central hub for power distribution and signal routing
- Compact, space-efficient design placed strategically behind acoustic chamber
- Preserves audio integrity and internal layout efficiency



- Power output to headphone driver
- Power receiver from electret microphones
- Variable resistance potentiometers for fine tuning signal response
- Modular connectivity for ease of prototyping

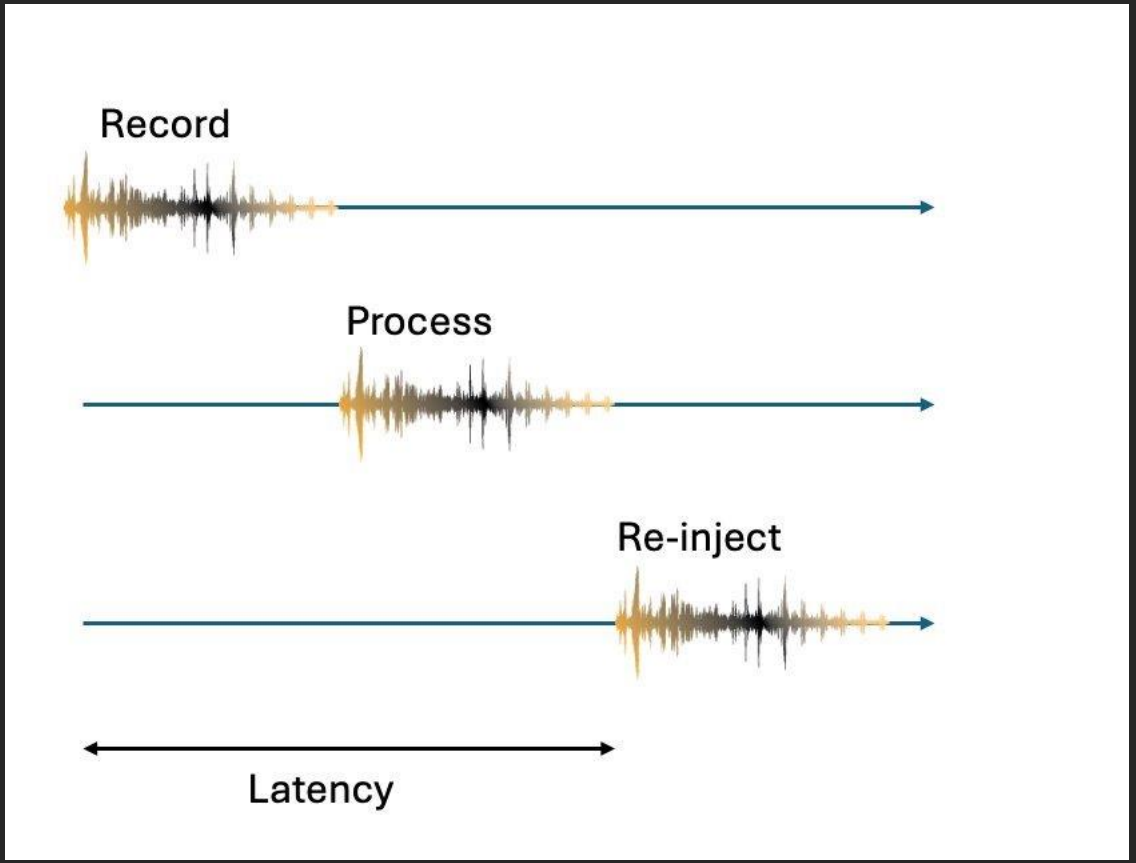
How Does Noise Cancelling Work?



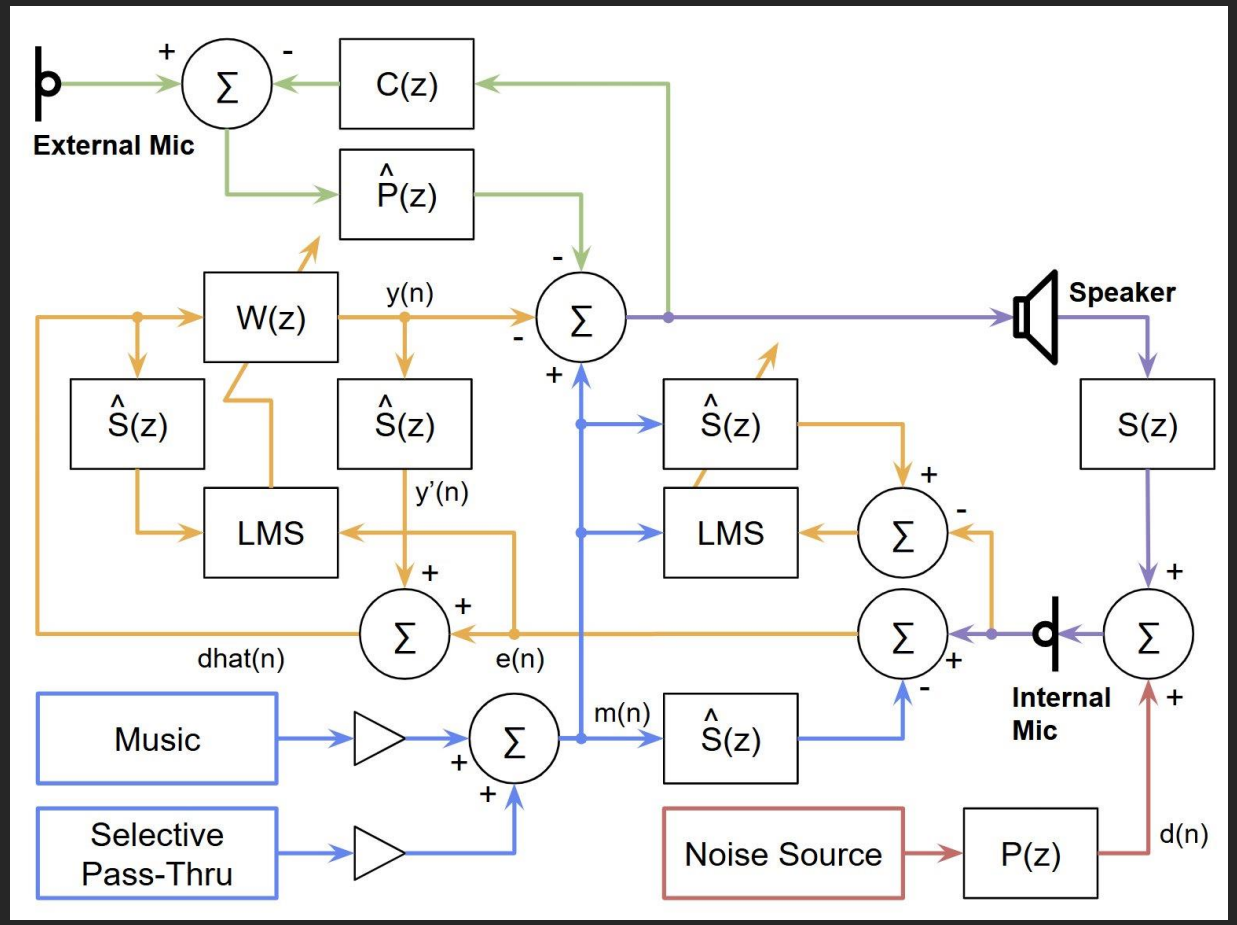
- Destructive interference/superposition to cancel unwanted noise
- Feed-forward and Feed-back techniques to maximize performance

External Processing: ML Overview

- Audio input segmented into short, 10ms intervals.
- The decoder, guided by user-defined preference (such as voice, birds, or instruments), generates an adaptive filtering mask.
- Mask isolates desired sounds from ambient noise and reconstructs the filtered audio output.



DSP/Aux Board: Architecture and Result



- 22μs ANC latency
- Suitable for real-time, high-fidelity audio applications
- Augmented hearing, smart headphones, assistive listening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