

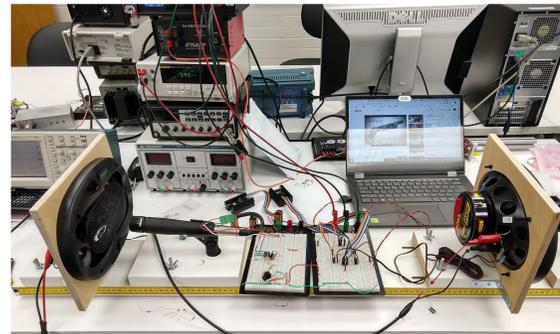
Making Loud Noises Quiet

Project

Guns are loud. Putting on ear protection takes time. Hunters need to listen for animals, so they can not wear ear protection constantly. Hunters have limited time to react when they see their target. They do not have time to put on ear protection. The Shot Silencer protects hunters' hearing by actively noise cancelling the sound of the gunshot.

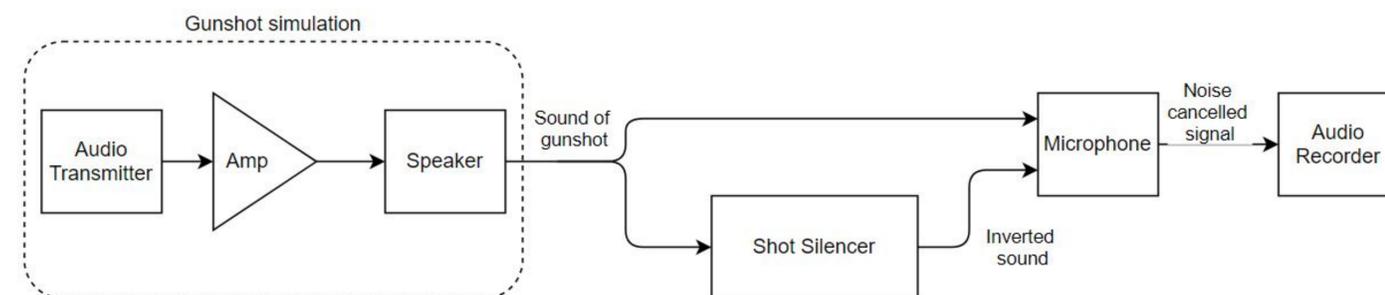
The Shot Silencer:

- Actively noise cancels
- Cancels 112 dBA sounds
- Cancels sounds at a distance
- Removes need to wear ear protection



System

Shot Silencer System Diagram



Methods

Digital vs Analog

- Digital adds complexities to timing
- Chose analog for active noise cancelling

Low Noise Amp

- Pull microphone signal out of noise

Inverting amp

- Invert signal for noise cancelling

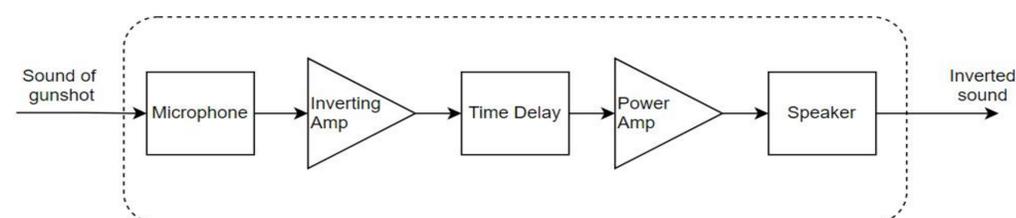
Frame

- Lock in position of mics and speakers
- Adjust distances to change timing

Power Amps

- Make signal strong enough to activate speaker

Shot Silencer Diagram



Conclusion

Results

- Shot Silencer reacts fast enough to cancel a gunshot
- Shot Silencer successfully inverts and plays back at 112 dBA

Future Steps

- Improve model of speaker placement to align sound waves
- Develop a method to adjust the timing of sound waves
- Develop a speaker and microphone that responds over 100 Hz - 20 kHz range
- Develop a speaker and microphone capable of handling the volume of a gunshot