AMPED

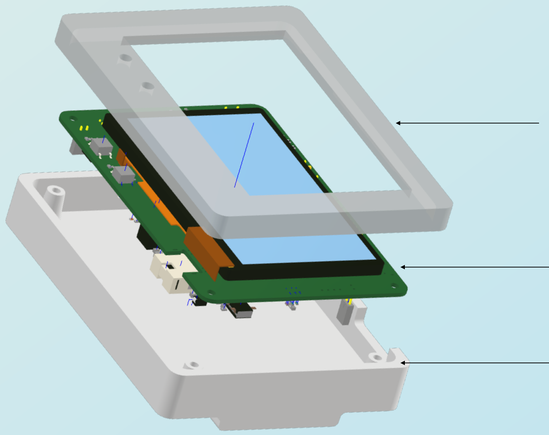
Keep it clamped and play with AMPED

Dylan Chan | Yuya Nemoto | Dang Nguyen | Andrea Ni

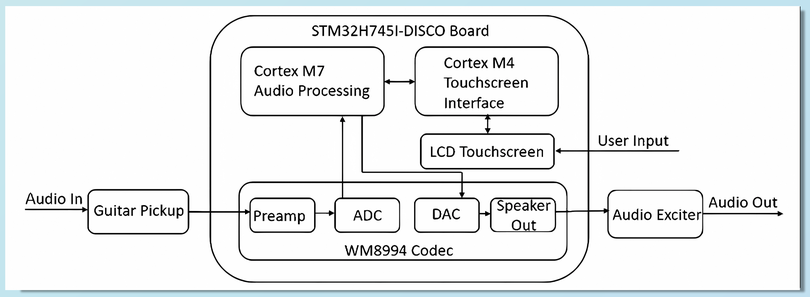
Background

Conventional guitar amplification and effects usually involves an amplifier and speaker setup with a separate effects pedalboard. For some musicians, hauling such a rig around may be impractical or out of their budget. AMPED aims to solve these issues by condensing such a setup into a two-piece package that fits in your pocket. It employs digital signal processing and the natural resonance of the guitar body to amplify and add effects to any acoustic guitar with a pickup. Just clamp AMPED to your guitar and let it take care of the rest!

Exploded View



Functional Flow Diagram



Final Design

- Audio signal from the guitar is outputted into the board
- STM board applies sound effects tremolo, reverb, delay to the signal
- LCD screen of the board has a guided user interface for users to adjust the sound effects and volume
- Signal with applied affects are amplified with the audio exciter placed on the guitar back

Key Components

STM Board with Casing

- Dual-core digital processing unit
- LCD touch screen for GUI
- Separate line in and out audio jacks

Audio Exciter

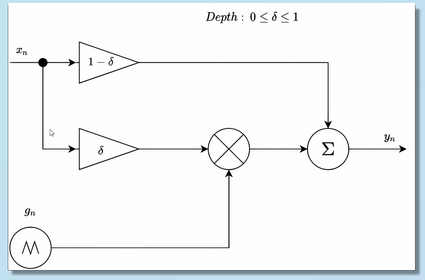
- Tripod feet structure serves as the mounting system on the guitar
- Vibrates to a rigid surface to create sound

Portable Battery

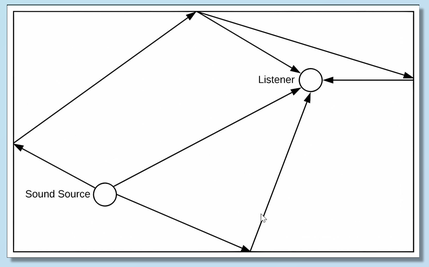
- Supplies power to the STM board
- Attached on the outside of the board housing

Tremolo

- Uses a low frequency sine wave to modify the amplitude of the input audio signal
- Adjustable parameters of this effect are rate and depth



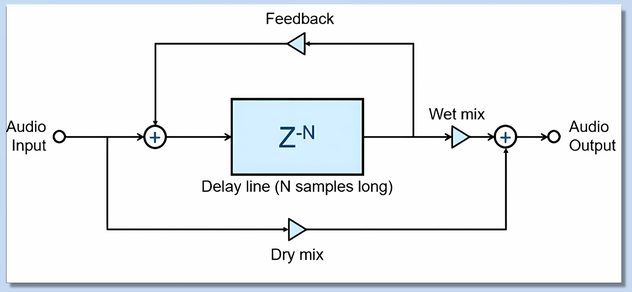
Reverb



- Emulates sound of being in a room or space
- Consists of multiple delayed and attenuated repetitions of the original audio signal

Delay

- Creates a series of delayed replicas of the original audio signal, like an echo
- Each delay is slightly quieter than the original sound



Acknowledgements:

The team would like to acknowledge and thank the project sponsors, mentors, and instructors for the help. Many thanks to UCSB URCA, Ilan Ben-Yaacov, Luke Theogarajan, Forrest Brewer, Chris Cheney, Samuel Fei, Layla Barthwal

UC SANTA BARBARA College of Engineering