Vocal Clarity Sound Bar

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Abstract

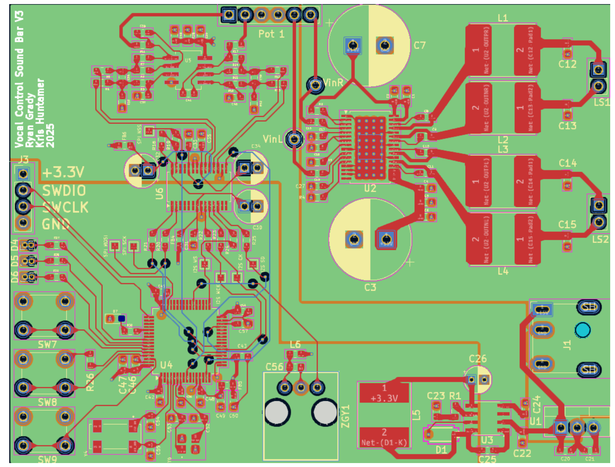
The Vocal Clarity Sound Bar (**VCSB**) is a specialized sound bar that is capable of enhancing the experience of watching movies without having to constantly change the volume. This consumer-level device will allow for a smoother experience while still providing high-fidelity audio.

Methods and Materials

Hardware:
- Oscilloscope
- Digital Multimeter
- DC Power Supply

Software:
- KiCad
- STM Cube IDE
- Logic 2/Logic Pro 8

VCSB was developed around an **STM32F446** which has a **SPDIFRx** peripheral. Once processed the digital audio was sent to an external audio codec, a **PCM3060**. After being converted to analog the audio is sent through a **TPA3116** Class D amplifier.

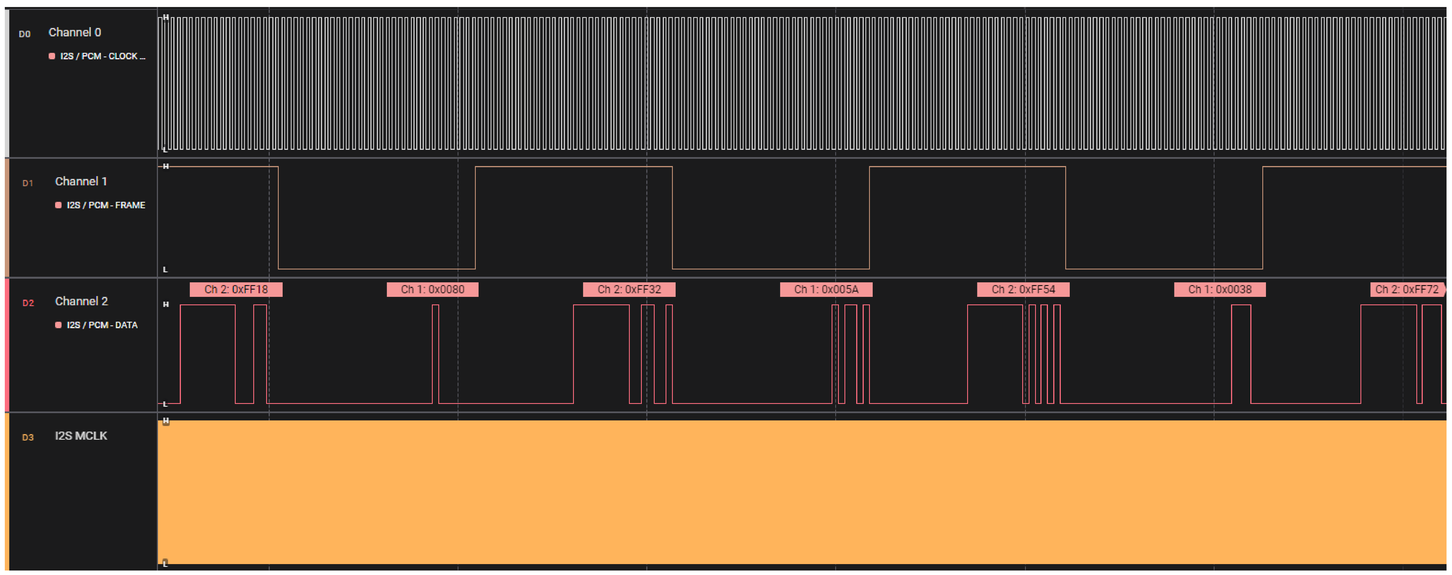


Challenges

- The use of a SPDIF peripheral made us unable to synchronize the clocks with the I2S clock for communication with the external audio codec due to limitations of the chosen silicon.

Results

The VCSB is outputting audio however, the audio has a lot of digital noise due to not being able to synchronize the SPDIF clock with the I2S peripheral.



Future Direction

In future renditions of this project, one of the first revisions would be to replace both the external audio codec and class D amplifier with a new amplifier IC that was recently released by Texas Instruments. This IC is an amplifier that has a built-in codec in it which would simplify our design and reduced the overall cost of our project. Additionally, most sound bars on the market have an external subwoofer which could be added to our device to enhance the listening experience.

Acknowledgements

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