

Principles of Embedded software: Final project proposal

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Audio recorder and playback device

Functionality: To create a device capable of capturing audio signals for short periods of time and playing it back using a speaker / piezoelectric disk element.

Backup plan: To playback sounds of musical notes as desired by the user for a specified amount of time

Tentative Hardware Components:

1. MCP4725 – 12-bit I2C DAC.
2. KY-037 - High sensitivity microphone sensor module (present in the 37in1 Sensor Module Kit).
3. frdm-kl25z development board.
4. On-board RGB LED – To show audio record/playback status.

Tentative Software technologies:

1. DMA / circular buffers - To store audio data.
2. DAC – To play audio using external transducers.
3. ADC – To capture audio from electret condenser microphone module.
4. PWM
5. I2C communication protocol
6. UART communication protocol
7. Command Processing

Testing methodology:

Device shall be tested by with a suit of manual and automated testcases.

References:

- <https://datasheetspdf.com/pdf-file/1402047/Joy-IT/KY-037/1>
- <https://www.microchip.com/en-us/product/mcp4725>
- <https://spivey.oriel.ox.ac.uk/dswiki/images-digisys/5/56/KL25-refman.pdf>