

## LAB 4

**Deadline: Nov. 27th, 2025**

1 Target:

Build a mp3 player on the development board and play the given audio files (music.mp3). Record sound as a .wav file using a microphone and play it back.

2 Demonstration:

2.1 Play provided .mp3 file with command. (40%)

2.2 Record sound and play it back. (20%)

2.3 Write a document about how you finish your work. (40%)

- Explain what command you enter and the **problems you encountered** and how you resolved them. (30%)
- Explain the signal processing procedure for playing an MP3 file. (10%)
- Provide references.

2.4 No source code for this lab.

2.5 Upload your document in PDF named <group\_id>\_lab4.pdf to E3. If naming rule is violated, **10** points will be deducted from the assignment.

2.6 Please submit your report before **December 4, 2025**.

3 Note:

3.1 We already have a soundcard driver(ALSA), but we **don't have any audio player** on our board.

3.2 “aplay” is a command-line sound player for ALSA.

3.3 “madplay” is a command-line MPEG audio decoder and player based on MAD library (libmad).

3.4 You should use the provided library files to build the mp3 player.

**3.5 apt-get command is not allowed in this lab**

4 Hints:

4.1 “aplay” can only play .wav

4.2 You can play your MP3 file through following command:

```
% madplay -o wav:-music.mp3 | aplay
```