# YODA Blog Example

Comments: this is a basic blog, sufficient for the need but you might want to write up something a bit more detailed with better illustrations and block diagrams, to maximize your mark (besides having some reusable text that you can utilize in your further milestones, like the status update and final report).

MP3 Player

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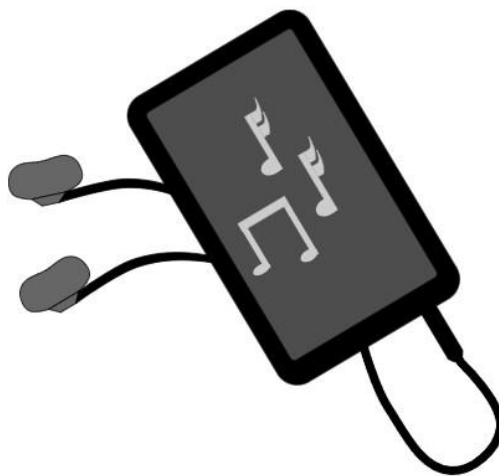
conceptual illustration of system

Project Description

The problem of focus for this project is development and prototyping a stand-alone MP3 player. It needs to play at least one MP3 track which is stored as a file on an SD card.

Proposed Solution

The MP3 player will be prototyped on Nexys4 board, simulating the SD Card in BRAM. The device will be able to play only the most basic MP3 format [1] with 8bit sampling. The system operates by the user copying an MP3 file onto the (simulated) SD-card from a PC (done by representing the MP3 file as an initialization of an array variable in Verilog). The simulated SD-card will have a file allocation table and multiple MP3 files stored in it, if time provides but the basic version will simply have one MP3 file without filename in the memory. The system will immediately on start up start playing the MP3 file. Details on the MP3 format and decoding techniques will be based around methods recommended by Hong et al. [2].

Prototype Specification

- The SD-card will be simulated using BRAM on the FPGA.

- There will be only one MP3 file in memory (if time permits a FAT and multiple files will be simulated in the memory, for which the next and previous buttons will be able to change tracks).
- If only one MP3 file is in memory than the next and previous buttons both just restart playing the same single file in memory.
- There is no display. The only output is the stereo sound, which is implemented by means of noise-shaped pulse-width modulation and a simple 1st order analog filter.
- User input consists of 3 buttons and 8 slide switches. The slide switches represent an 8-bit word used to set the output volume. The button functions are:
  - Previous file
  - Next file
  - Pause / Play

Criteria for acceptable solution

- Starts up
- Can play a sound (e.g. test tone)
- Can pause/play sound (i.e. these buttons work)
- The previous/next buttons work
- Able to interpret the MP3 data
- Can decode and play back the MP3 data (e.g. PWM output)

Bibliography

[1] MP3 File Format Specification, available from http://mpgedit.org/mpgedit/mpeg_format/MP3Format.html

[2] Hong, Sekyoung, Dalsoo Kim, and Minkyu Song. "A low power full accuracy MPEG1 audio layer III (MP3) decoder with on-chip data converters." *IEEE Transactions on Consumer Electronics* 46.3 (2000): 903-906.

comments/suggestions:

Note that you may want to use a site such as imgur.com to store your for free images, from which you can obtain a URL to the image that you can insert into the blogpost. You can probably also use Google Drive or Dropbox in the same way (creating a shared link).