

# COMS 4840 - Project Proposal

## Mostly Asians Singing Horribly (M.A.S.H.)

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We plan on implementing a basic karaoke machine. While we would like to stream video with music playing and the lyrics on screen, our initial step will be towards implementing the audio synchronized with on-screen lyrics. Our implementation will be broken into the following modules.

- **Sound**

The audio will probably be stored in WAV or MP3 formats. The MP3 format is more involved to decode, so we will start with the WAV format and work our way towards decoding and playing MP3. In order to complete the audio processing unit, we need to interface with the AK4565 20bit stereo codec. We need to create a codec driver in VHDL to interface with various components in the design. The codec driver module will need to handle important signals such as 20bit parallel I/O signals and controls signals that needs to synchronize with the processing of data flow. Data will be accessed and processed from the onboard SDRAM where a circular buffer will be implemented so that the oldest data in memory can be continuous overwritten with new data.

- **Data Storage**

We are going to use Compact Flash (CF) to store and retrieve our data. Compact Flash use 16 bits for data, 12 bits for address, and an 8-bit interface for the purpose of control. The XSB board provides three different kinds of software interfaces to access the CF card. We will use memory mode and write a C program to control it.

The file system on the flash cards is FAT16. It is composed of a MBR which describes the partitioning scheme. The beginning of a partition has a root directory which allows via pointers to locate any subdirectory or file. its uncertain whether there would be a significant performance penalty for dynamically selecting tracks and this would have to be worked out during the project.

- **Video Display**

Full motion video would probably too ambitious, but as a secondary goal, we would like to use the compact flash to store a bunch of images to be used in a slide show to accompany the karaoke. However, this will probalby also prove difficult to implement, so we will leave these as secondary goals if we are successful implementing basic audio playback with synchronized displayed lyrics. Displaying lyrics should be self-evident upon successful completion of Lab 4. Additionally, we need to highlight the word the user is supposed to be singing.

- **Lyrics/Audio Synchronization**

We plan on examining existing karaoke video disc specifications and other A/V-text synchronization standards. One particular format that seems interesting is KAR which is a karaoke lyrics and MIDI file format. While we don't to use MIDI, the KAR format should give us some pointers on how to synchronize the audio and lyrics.

- **GUI**

Assuming the successful completion of the above components, we may build a graphical user interface to allow the user to select individual karaoke songs.