# The Wumpus

Damon Vander Lind
Mark Tobenkin

October 31st, 2005

Team Wumpus will develop a sampling synthesizer keyboard. This keyboard will allow a user to record, edit, and playback a sound. The sythesizer will provide a set of filters, applied on playback, and two different playback modes. In the first of these modes a recorded sample will be mapped to a MIDI keyboard, and replayed with frequency shifts. The alternate playback mode will allow the user to listen to the sample on loop, and adjust various filter parameters. To aid in editing an external screen will be used to display a number of visualizations.

The system consists of four top-level modules: *control*, *keyboard*, *filtering*, and *display*. The *control* module maintains the timing between the *filtering* and *display* modules, and external devices. This modules also specifies the primary wiring of these modules. The current mode of the device (recoriding vs. various forms of playback) will be orchestrated by this module. Mark Tobenkin will develop the *keyboard* input module and the *display* modules as detailed below. Damon Vander Lind will develop the *control* and *filter* modules. Both authors intend to contribute to features in the *display* and *fitler* modules, once they have completed basic functionality.

The *display* module provides feeback to the user on a a heads up display. This feedback will include a waveform view of the original recording, and the filtered recording. Also, the synthesized output will be displayed as a VU-meter of a running fast fourier transform.

The *filter* module will operate in a manner similar to that of analog filters. At each new sample frame, data from the memory will be presented to the first in a series of filters. This filter will, a set number of sample frames later, present it's output to the next in the series of filters, and so on, in a pipeline. Internally, each filter will have a RAM cache associated with it allowing it to perform actions

involving time delays. The primary filters will consist of frequency (but not time) shift and echo. Following this other filters, including chorus, reverb will be added.

The *keyboard* module will provide an interface for the frequency shifted playback mode. This interface will allow any MIDI keyboard to be attached to the synthesizer. The keypresses on this keyboard will be mapped to different parameters in the frequency shift filter.