

Checklist of Deliverables

- **Audio Processing Unit**

The APU handles the manipulation of an incoming audio stream via the RCA connectors and sends the processed stream to the headphone output of the labkit. It contains the AC97 control module as well as the FFT, gain curve applier, and IFFT blocks.

To test the module, a audio input of two sine waves superimposed on one another, operating at 100Hz and 200Hz, will be fed into the audio connector. Instead of using the gain curve RAM, a test module which just contains a notch filter to kill 100Hz frequencies will be used (this is controllable with a switch). The expected result is that only the 200Hz sine wave will remain.

- **Gain Curve RAM**

The Gain Curve RAM holds the set of gains that will be applied to each bin of the FFT. Space permitting, there are two identical gain curve RAMs so that one gain curve can be used by the APU while another is being built with one of the user interfaces.

To test the RAM, the same waveform fed into the labkit from the previous test will be used. Using the Incremental input method, a notch filter will be created to remove the 100Hz component.

- **UI1: Incremental Input Method**

The Incremental input method is module that creates a gain curve by allowing the user to add successive parabolas, triangles, or squares to an existing waveform (with the initial waveform being a flat gain curve). The user can select the frequency center, bandwidth, and peak gain of the curve and then implement it into the current curve.

In addition to have tested this method for the gain curve RAM, the following testing procedure will be used to prove the functionality of the input method. Music will be played and various gain curves will be applied. The gain curve display should be updated and the sound should be modified accordingly.

- **UI2: Mouse Input Method**

The Mouse input method uses a PS/2 mouse as a control device. By moving the mouse back and forth and up and down, the gain curve can be smoothly drawn once drawing mode has been enabled. After the user confirms the new gain curve, it will be used for the audio filter.

To test the module, a gain curve will be drawn with the mouse and music will be fed into the labkit for testing.

- **Gain Correction** [time permitting]

An automatic gain correction can be applied knowing the frequency response of a microphone. A microphone listens to the speaker output and gets the frequency response of the speaker. It then creates an appropriate gain curve to correct for deficiencies in the speaker's output.

To test this module, a microphone and several speakers would be used to see if it is possible to make music sound similar across many different qualities of speakers.