

# Programmable Music Visualizer Checklist

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## 1 Audio Preprocessing

The audio preprocessing stage will take input from the AC97 microphone input and make it available to the effects generators via sample memory. This will be demonstrated by the "waveform" effects generator. If time permits, the preprocessor will also perform beat detection and FFT and make this data available to the visualizer. These features will be demonstrated by appropriate visualizations.

## 2 CPU

1. Show register file with parameter outputs in simulation.
2. Show instruction memory fetch working in hardware.
3. Show control logic and timing in simulation.
4. Demonstrate register operations through an ALU.

## 3 Effects Box

The effects box will perform the following things:

1. Generate coordinates via the pixel FSM.
2. Have a configurable transform box. This will implement at least the rotate transform and the modulo transform. These will be demonstrated visually.
3. Implement at least two effects generators, including a waveform generator and a fetch from the previous frame memory. These will be demonstrated visually.

4. Have a configurable blend stage. This will be demonstrated visually.

If time allows, the effects module will also implement a configurable convolution stage, more generators, and more translate types.

## **4 Display**

1. Show reliable ZBT read and write operation, with test code or video output.
2. Show VGA video output, accounting for pipelining delay, with test code or from ram.
3. Show oldframe memory access interleaving module, in simulation or video output.
4. Show newframe interleaving and pipelining module, in simulation or video output.
5. Demonstrate video being updated through double-buffer switching.