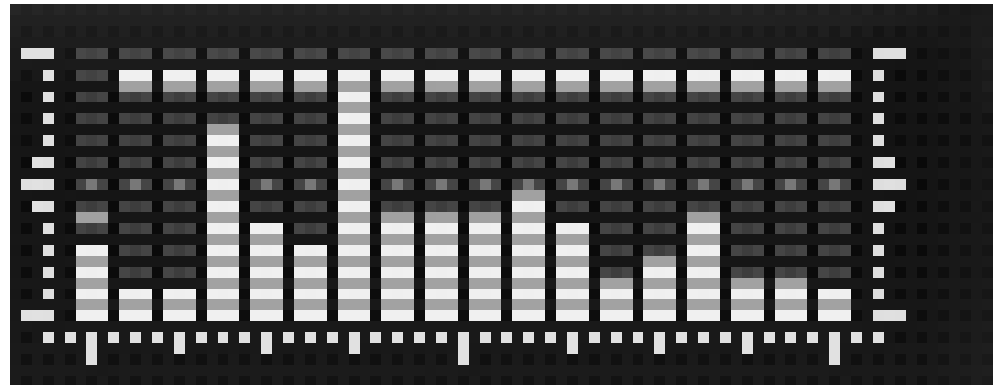

Real-Time Audio Visualization

6.111 Final Project

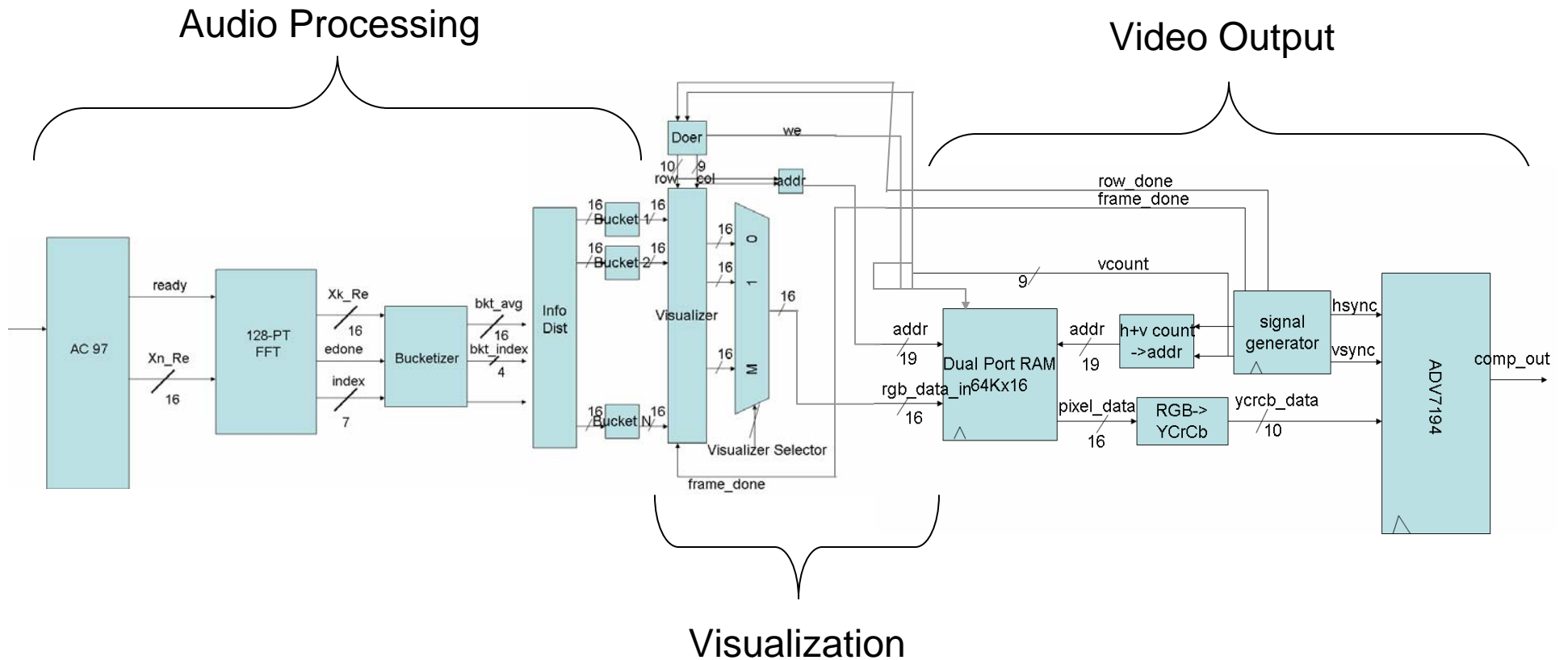
Bradley Edwards, Aston Motes, Stephen Oney

Introduction

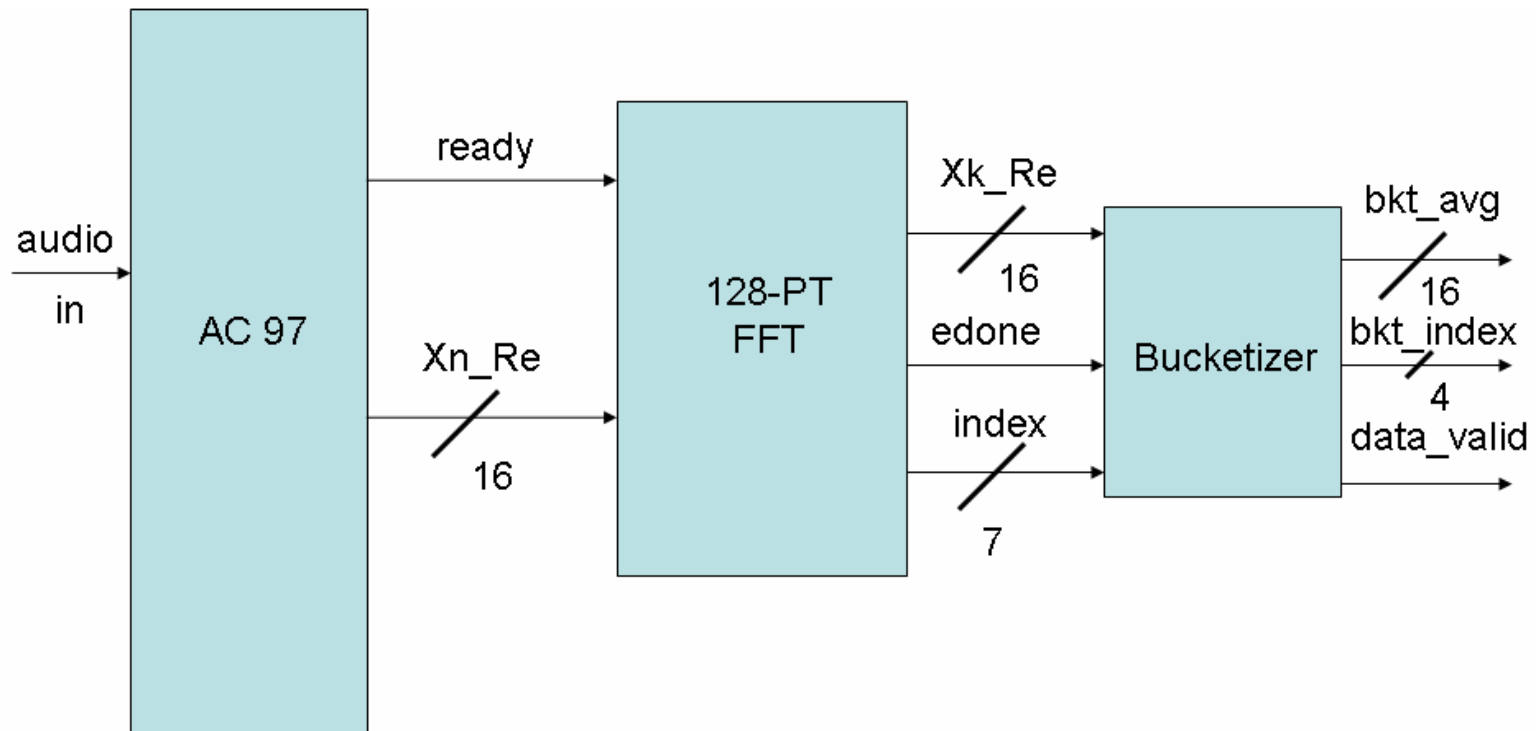
- Music visualizer
- Input: 3.5 MM Headphone Jack with audio
- Output: RCA A/V Cables with a visualization that corresponds to the input in real time on a standard television screen



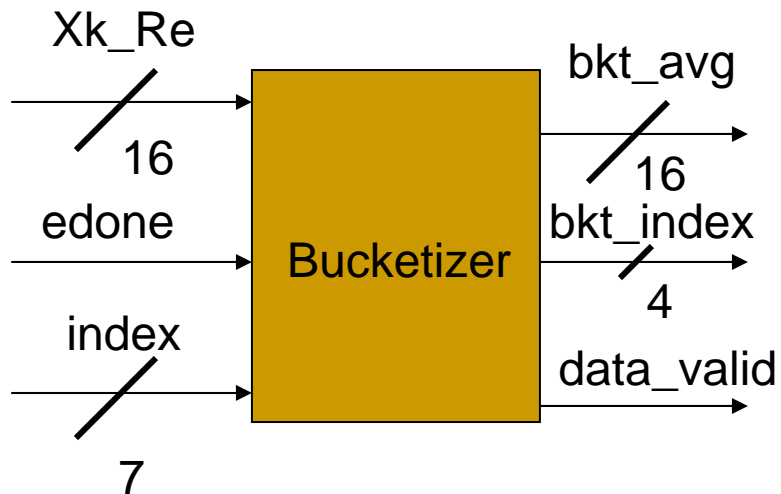
System Overview



Audio Frontend



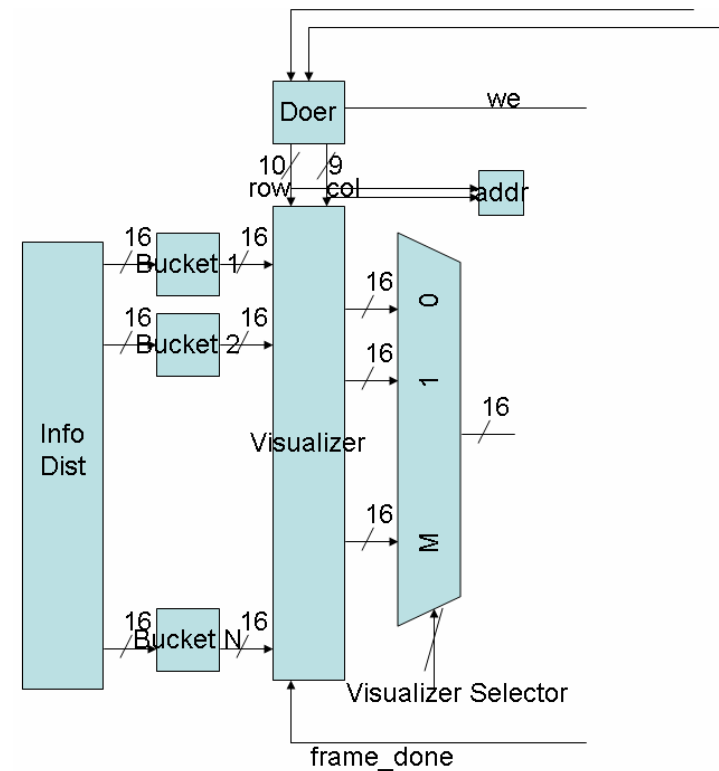
Audio Aggregation



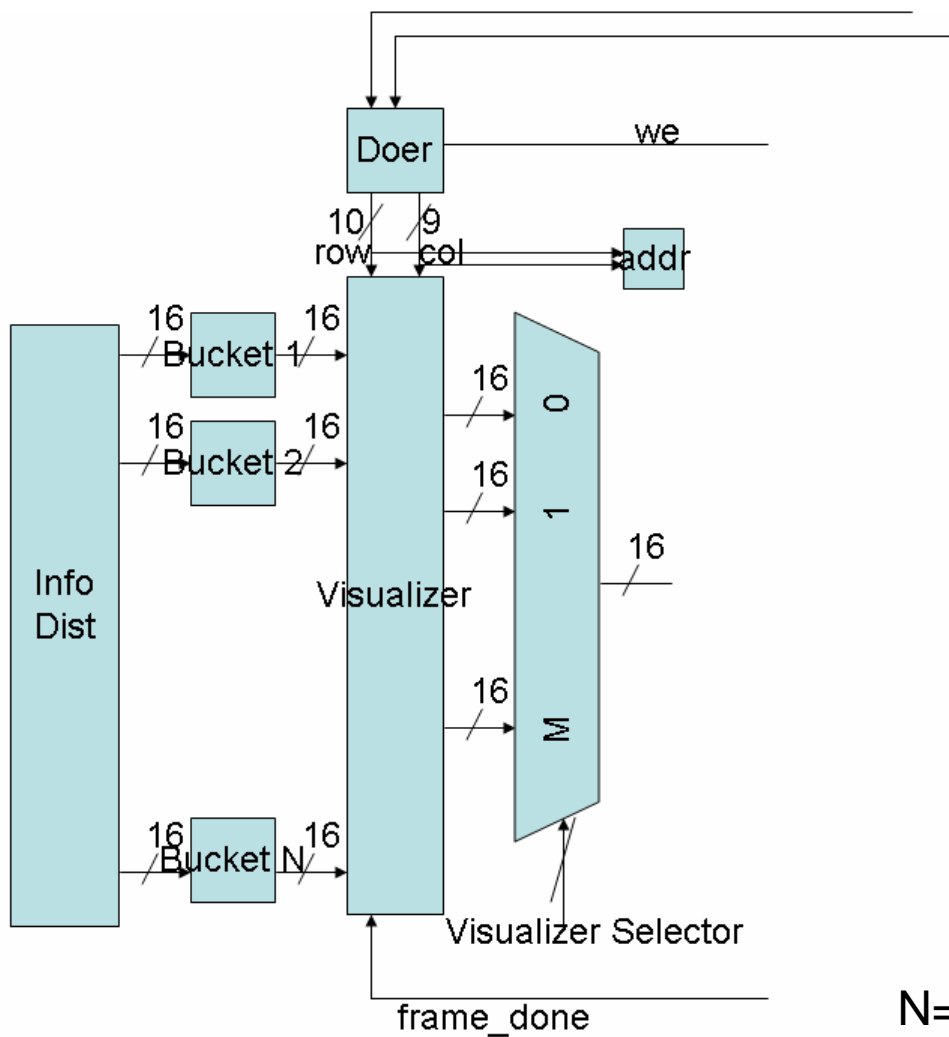
~ Frequency Bucket Range	Indices from Bucketizer
0 – 60 Hz	127 – 126
60 – 170 Hz	125 – 124
170 – 310 Hz	123 – 122
310 – 600 Hz	121 – 118
600 – 1kHz	117 – 112
1kHz - 3kHz	111 – 97
3 kHz – 6kHz	96 – 72
6kHz – 12kHz	71 – 36
12kHz – 14kHz	35 – 21
14kHz – 16kHz	20 – 9
> 16kHz	8 – 0

Visualization

- Multiple possible visualizations
 - All contained within visualizer
- The system has 11 buckets
- The “Info Dist” module decides the bucket in which we should place the data from the audio frontend
- The “Doer” module informs the visualizer of where it needs to write next



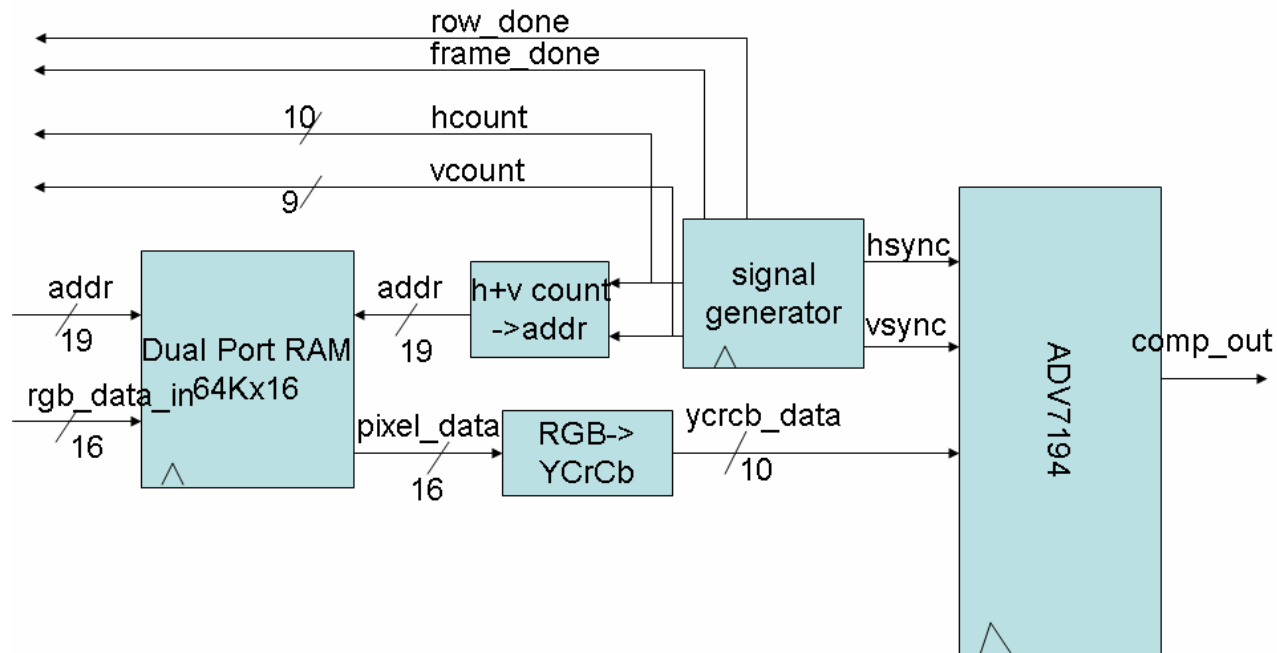
Visualization



N=10

~ Frequency Bucket Range	Bucket Index (binary)
0 – 60 Hz	0b0000
60 – 170 Hz	0b0001
170 – 310 Hz	0b0010
310 – 600 Hz	0b0011
600 – 1kHz	0b0100
1kHz - 3kHz	0b0110
3 kHz – 6kHz	0b0101
6kHz – 12kHz	0b0111
12kHz – 14kHz	0b1000
14kHz – 16kHz	0b1001
> 16kHz	0b1010

Video Output



- NTSC Composite Video Output
- Signal Generator drives ADV7194
- Visualization subsystem receives row and frame timing signals