Voice Training Machine

6.111 Final Project
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Introduction

American Idol is a trademark of FOX
Introduction
Problem

- Causes of singing off tune
  - Cannot hear ‘own’ voice
  - Shortness of breath
  - Faulty memory of tune due to background instrumentals

- Conventional solution
  - Practice with tune to commit to memory

Relies subjectively on singer’s distinction of pitch
New Solution

- Visual outputs quantifies degree the singer is off-key
- Audio outputs allow user to hear their voice with the synthesized note in real time
- Pause feature allows user to perfect singing note by note
Project Description: Notes

\[ f_{A4} = 440 \text{Hz} \]

\[ f_n = f_{A4} \cdot 2^{n/12} \]

\[ k = n \mod 12 \]
### AC97: A/D, D/A, 48kHz

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FFT Block Diagram
Synthesizer

- Explore different waveforms
- Possible filtering
- Avoid 3rd harmonic
Music Reading / Display
Memory
Memory – Play
Memory – Fast Forward
Memory – Pause
Display – Block Diagram
Display – Monitor

- Music
- Singer
- FFT
Conclusion

- We hope to achieve:
  - Less noise pollution
  - Provide authentic feedback to singer about his/her ability
  - Introduce a greater degree of objectivity in competitive singing