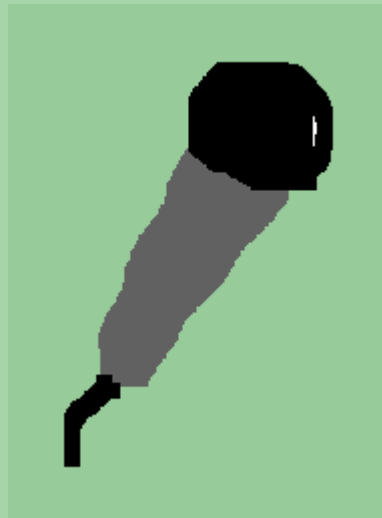


# Voice Training Machine

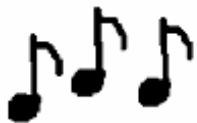


6.111 Final Project

By: Masood Qazi

Zhongying Zhou

# Introduction



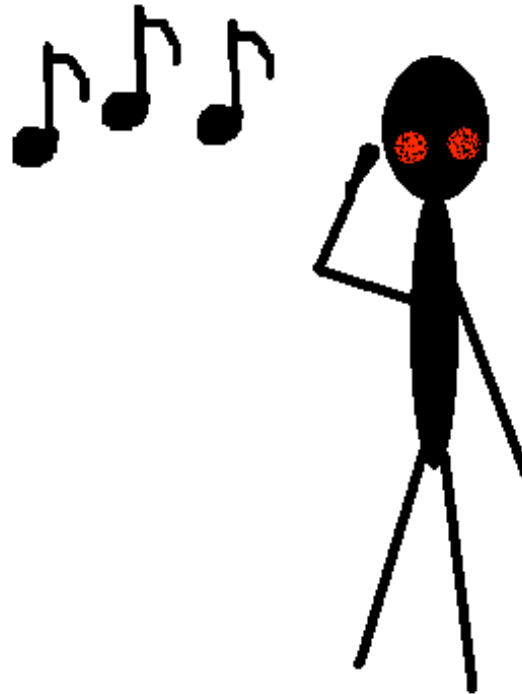
SHE BANGS ~

Worst singer EVER!



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

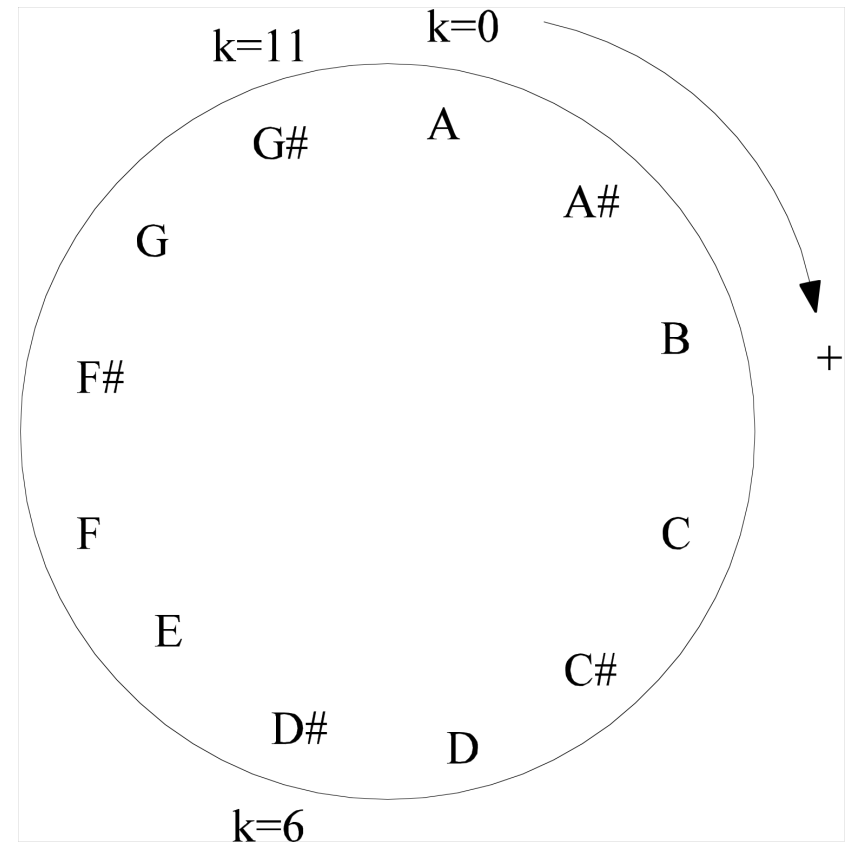
- Visual outputs quantifies degree the singer is off-key
- Audio outputs allow user to hear their voice with the synthesized note in real time
- Pause feature allows user to perfect singing note by note

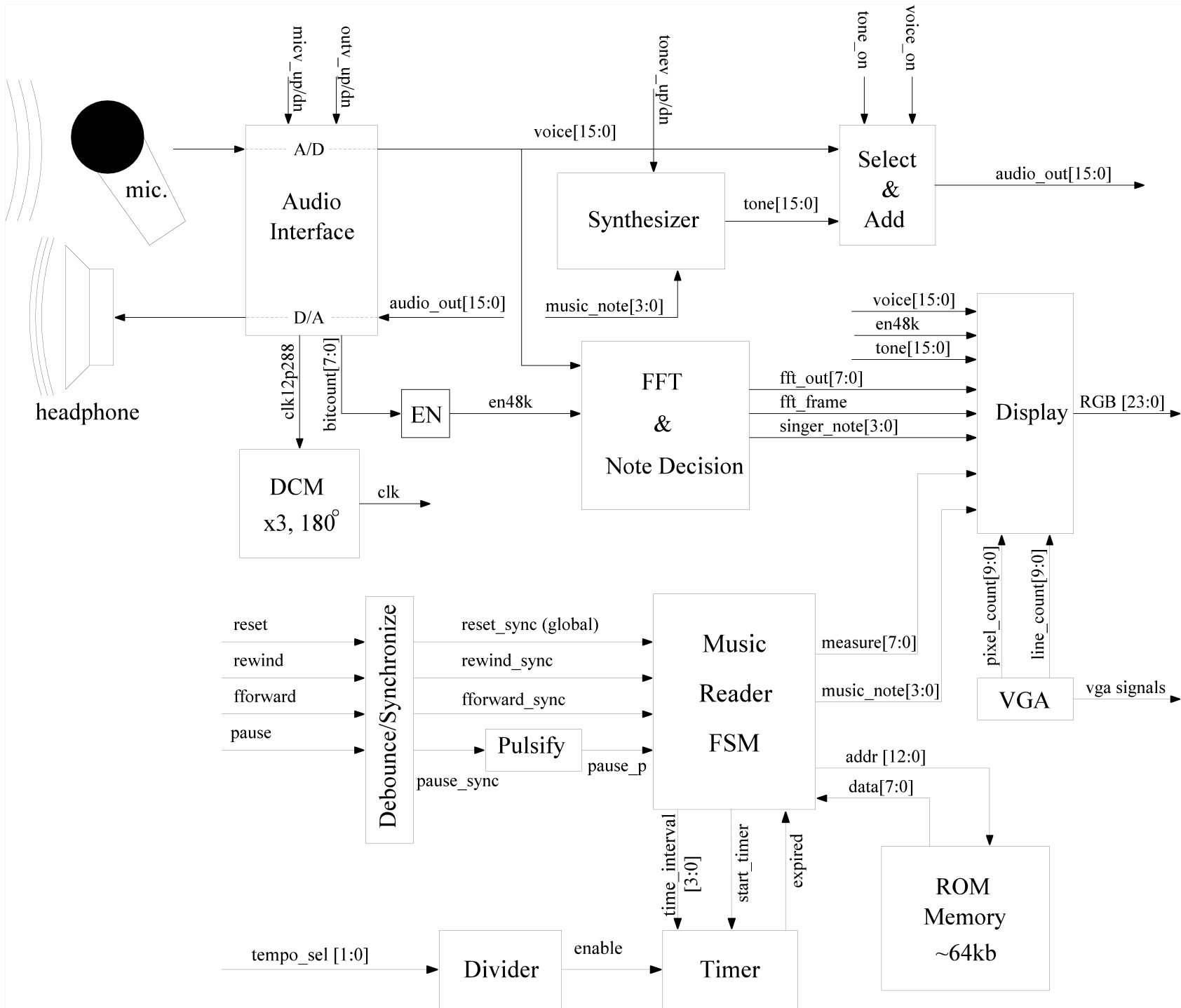
# Project Description: Notes

$$f_{A4} = 440\text{Hz}$$

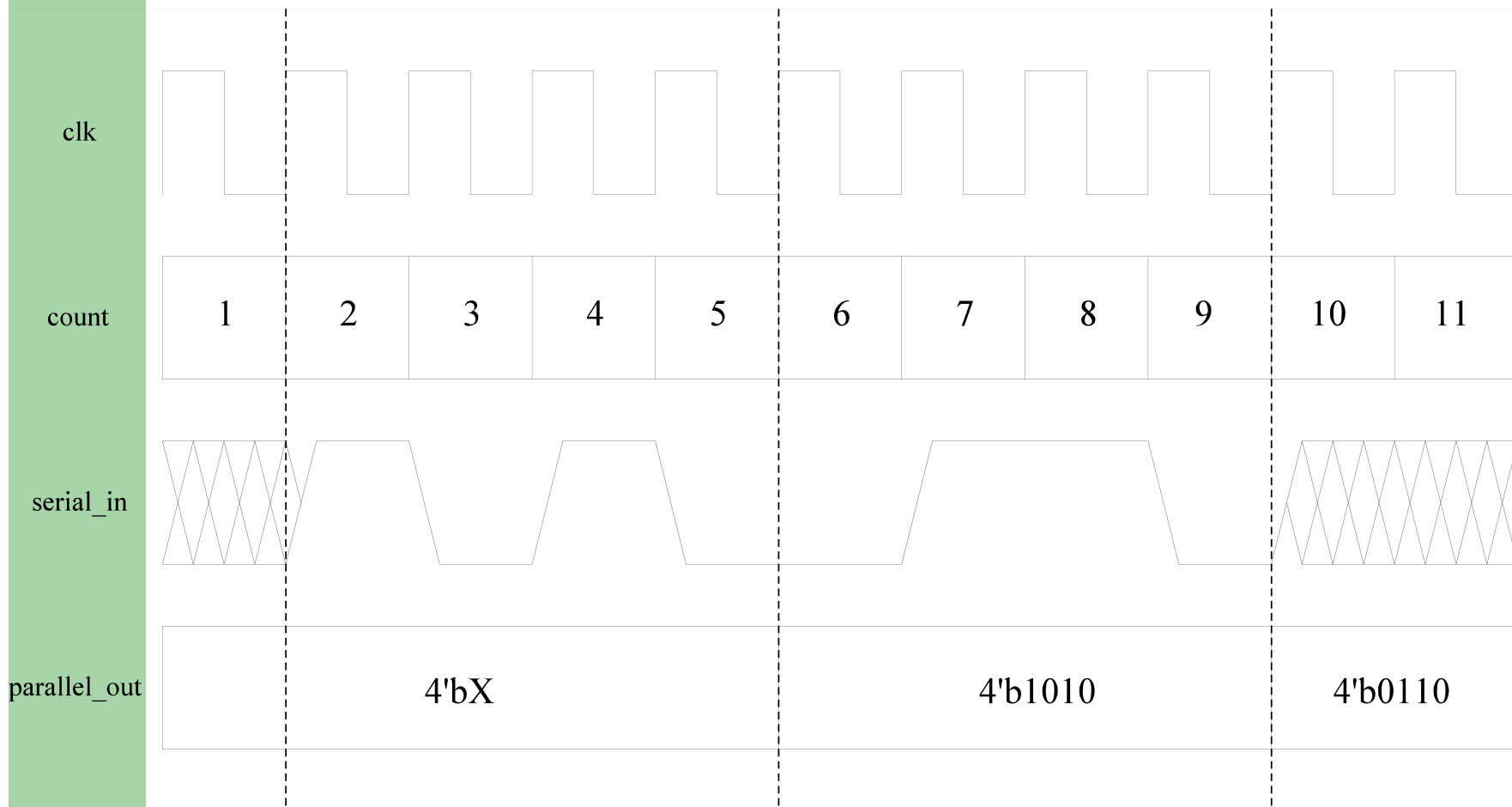
$$f_n = f_{A4} \cdot 2^{n/12}$$

$$k = n \bmod 12$$



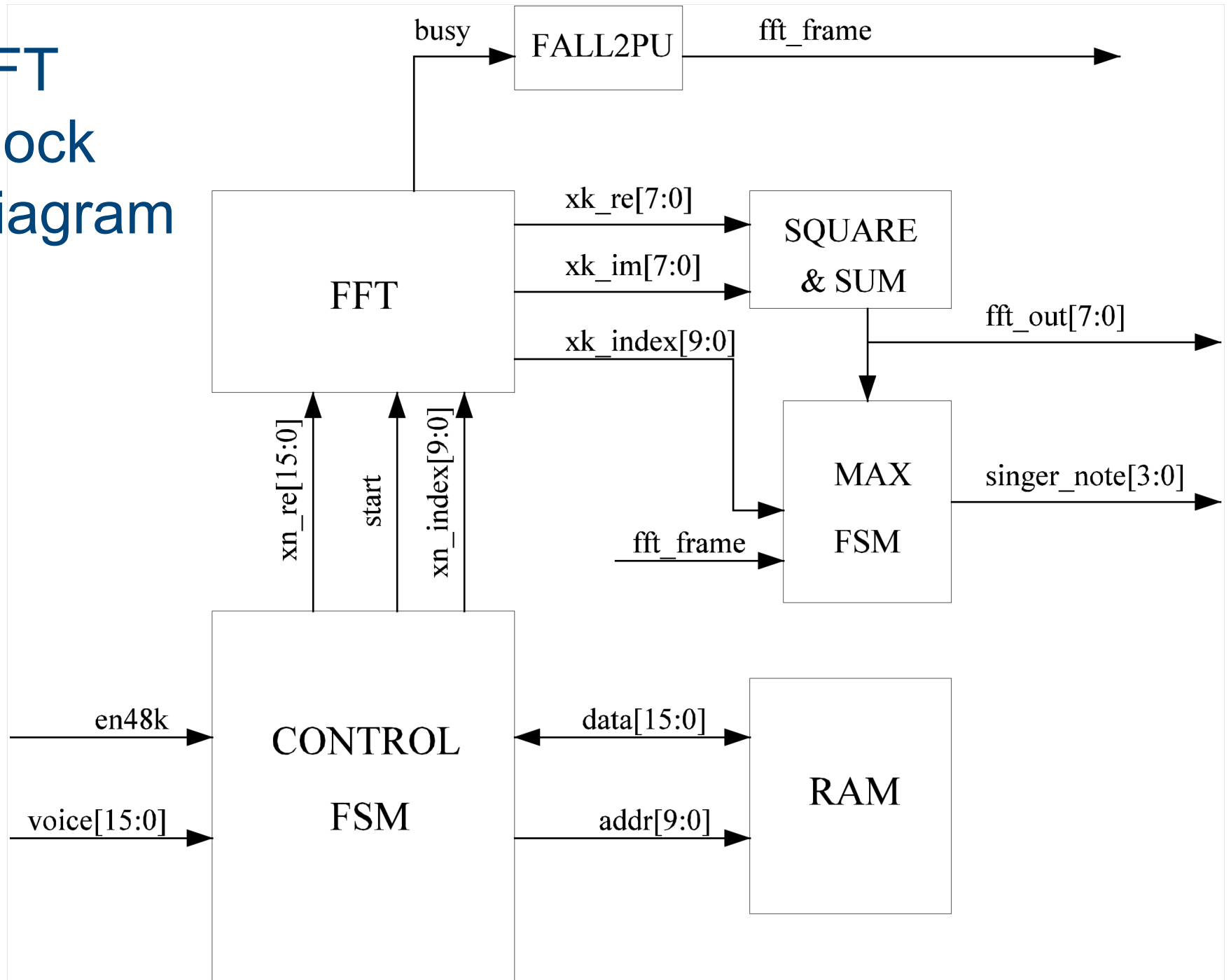


# AC97: A/D, D/A, 48kHz

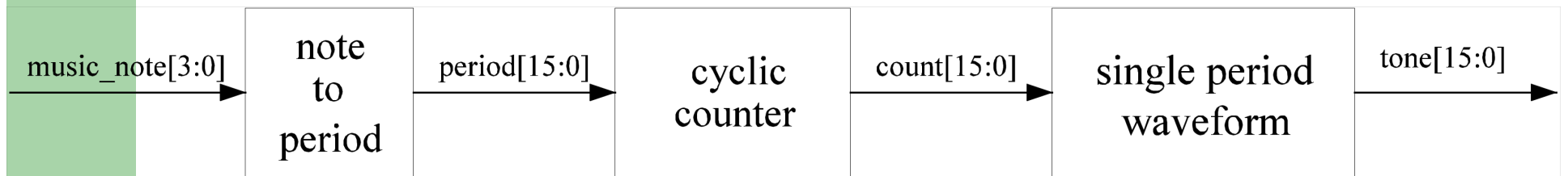




# FFT Block Diagram

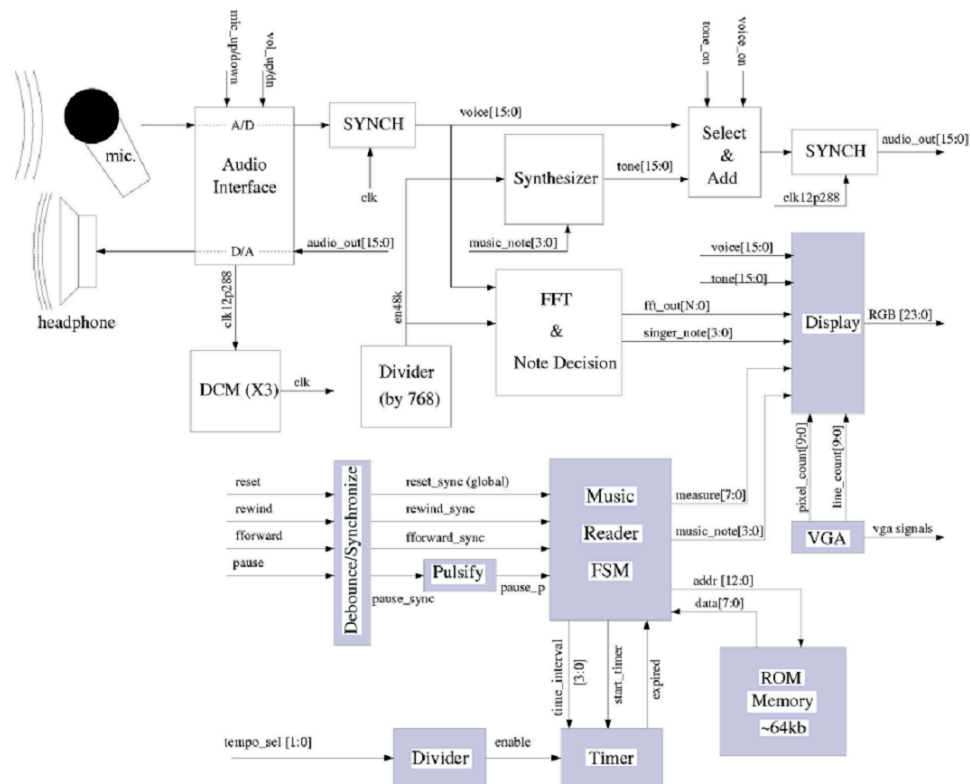


# Synthesizer



- Explore different waveforms
- Possible filtering
- Avoid 3<sup>rd</sup> harmonic

# Music Reading / Display

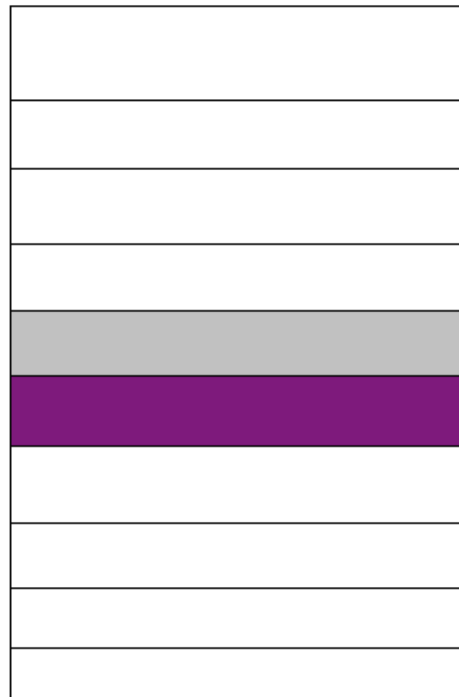




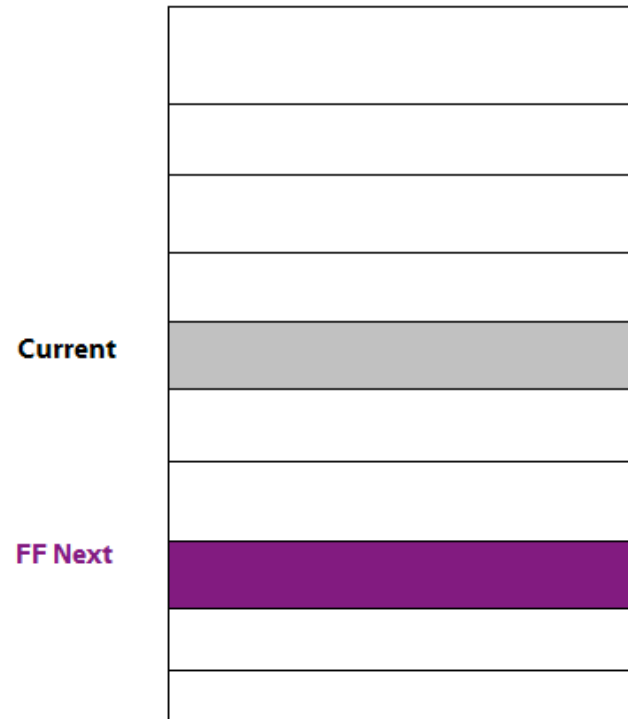
# Memory – Play

**Current**

**Next**

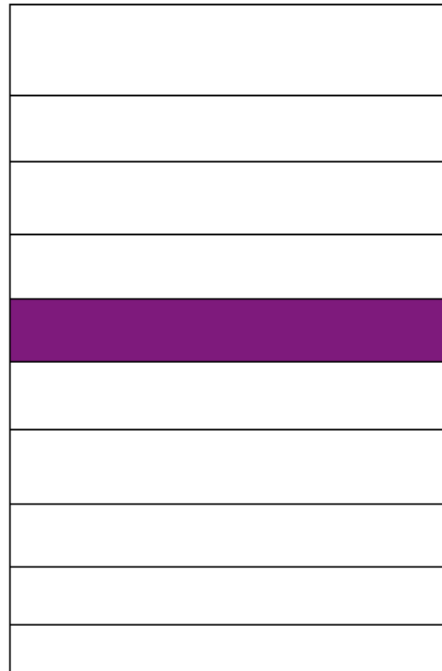


# Memory – Fast Forward



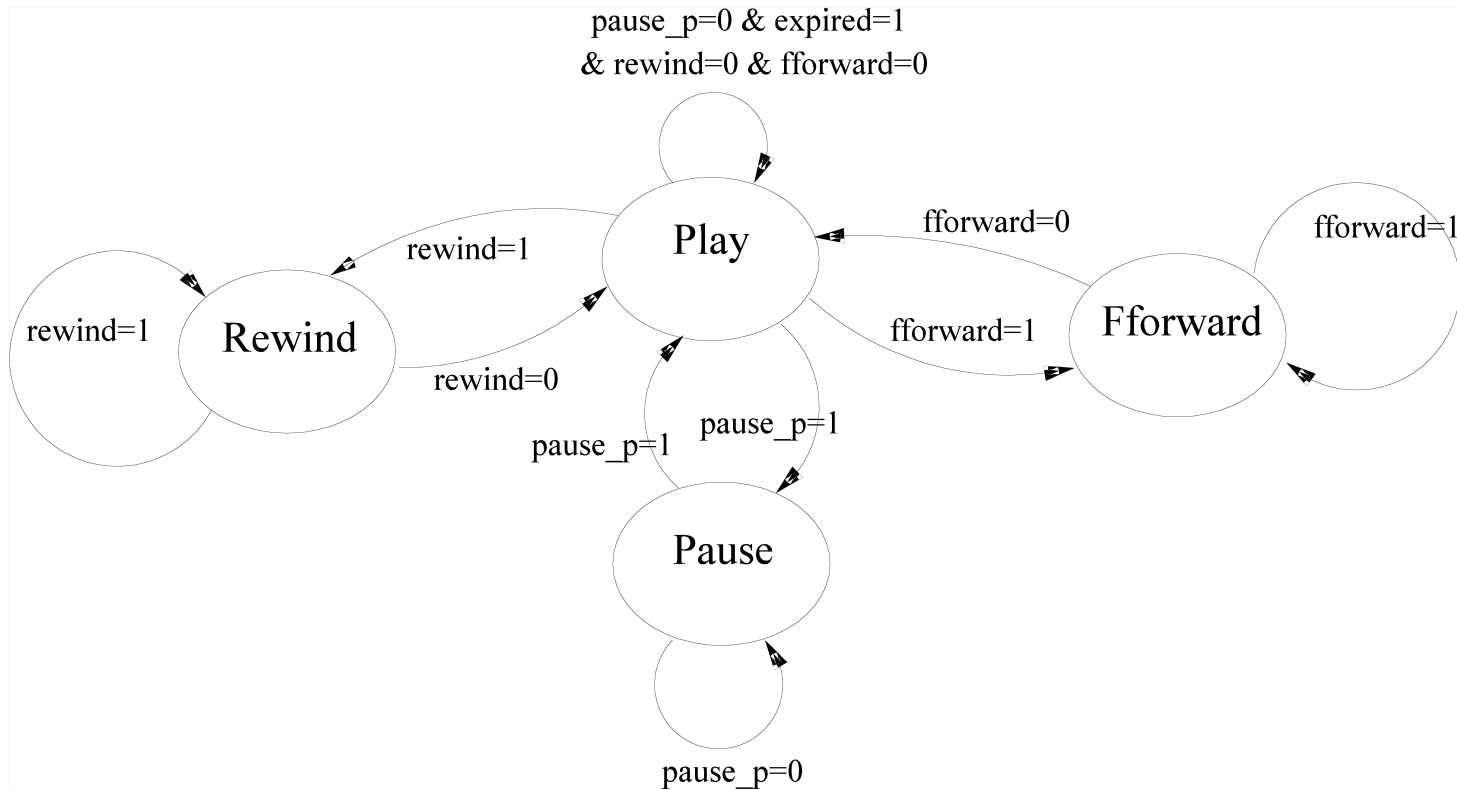
# Memory – Pause

Current



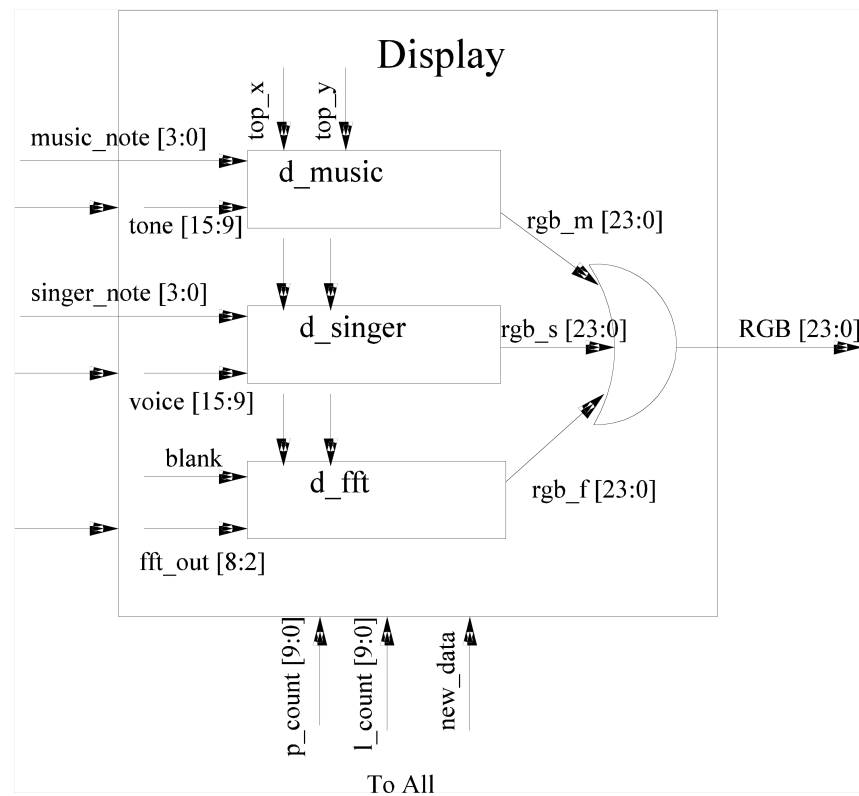
Pause Next

# Music Reader

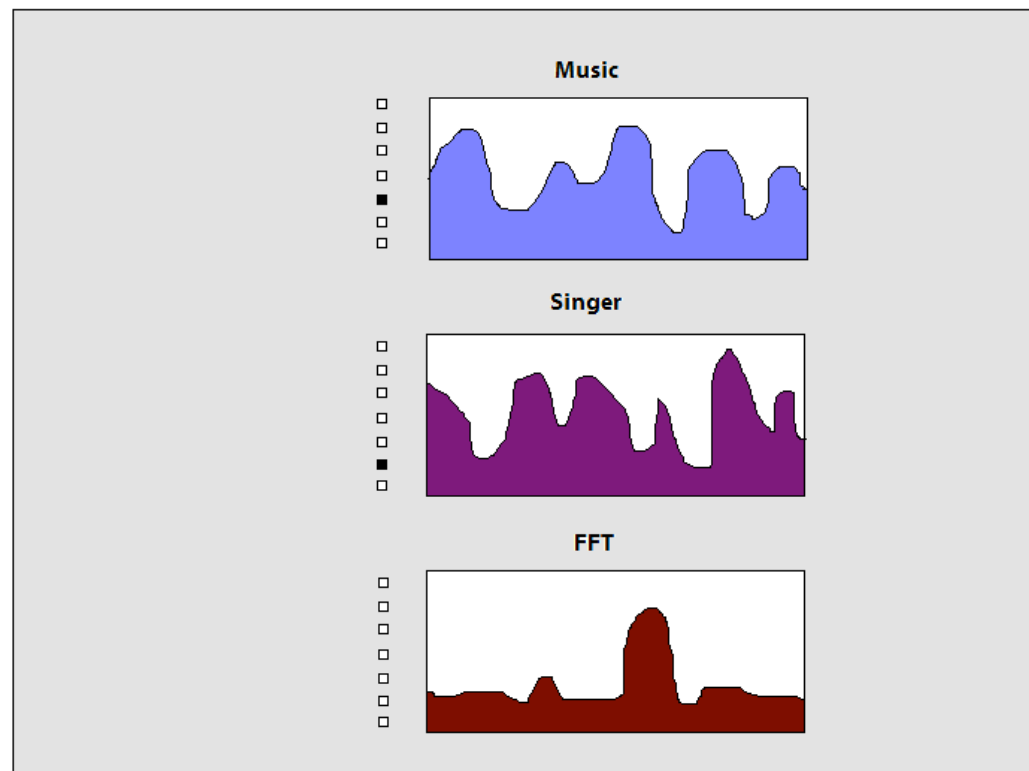




# Display – Block Diagram



# Display – Monitor



# 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