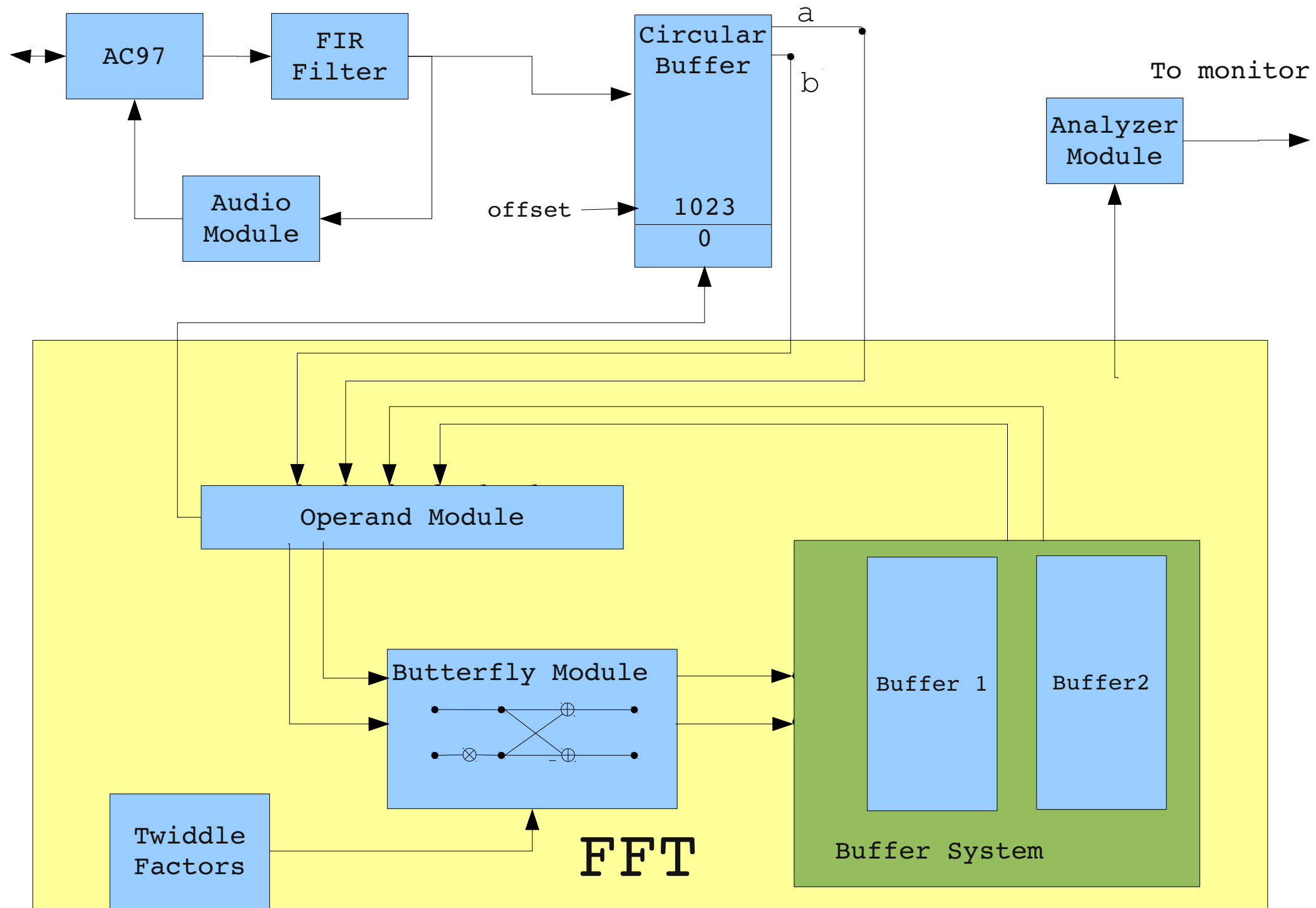


# FFT and Filters for Audio

- System which takes 8kHz samples and returns:
  - Filtered audio
    - Using an FIR Filter
  - Spectrum Analyzer Output
    - Using a FFT

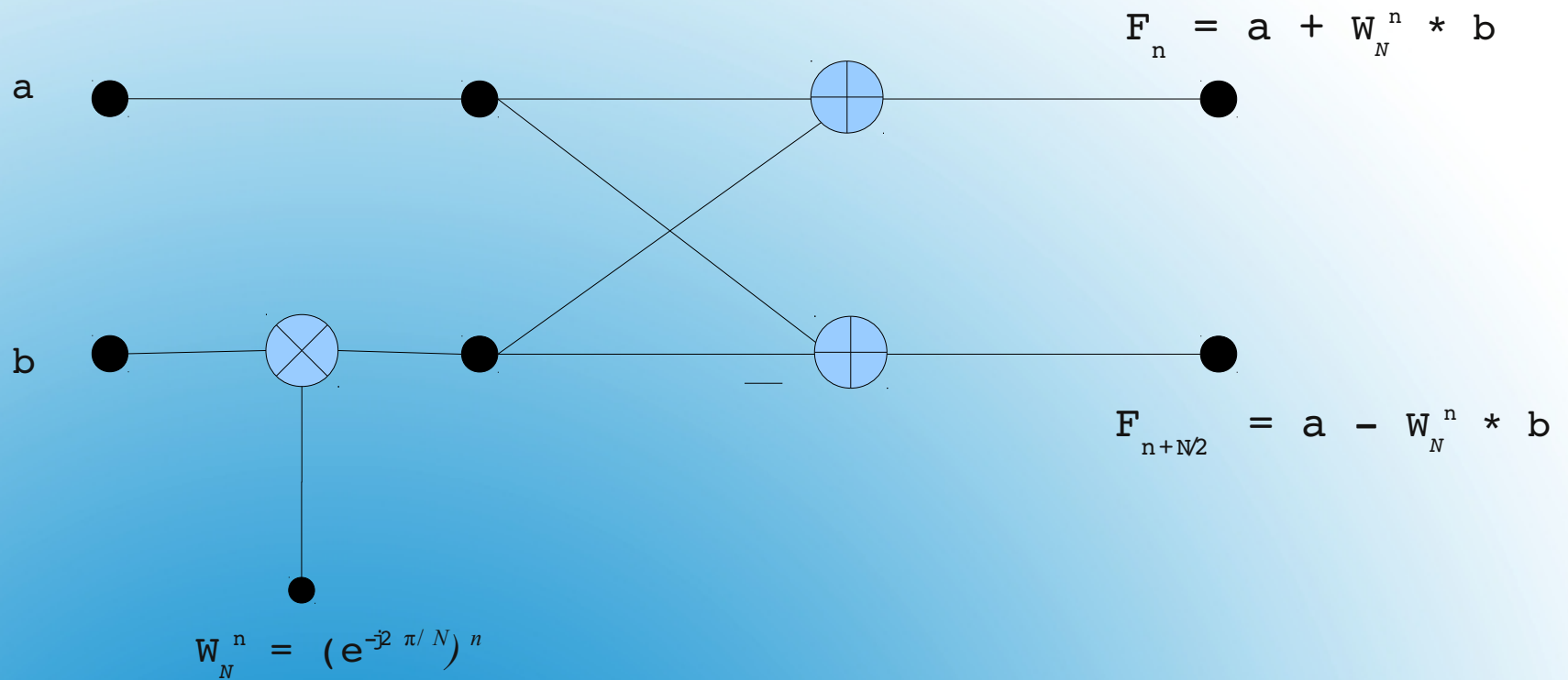
# Overview



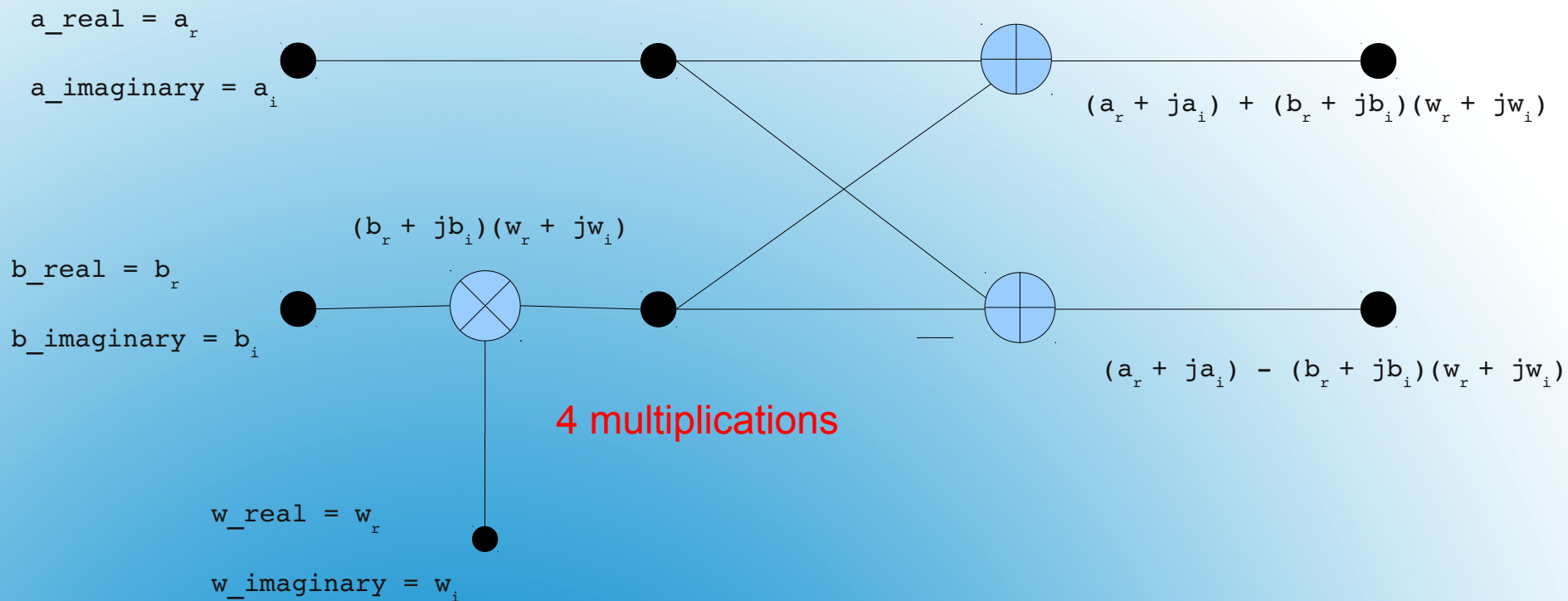
- Circular Buffer stores the newest input in the 1023 offset
- The two buffer system allows for two reads and two writes to take place in a smaller number of cycles
- All memory will hold a 32 bit complex number



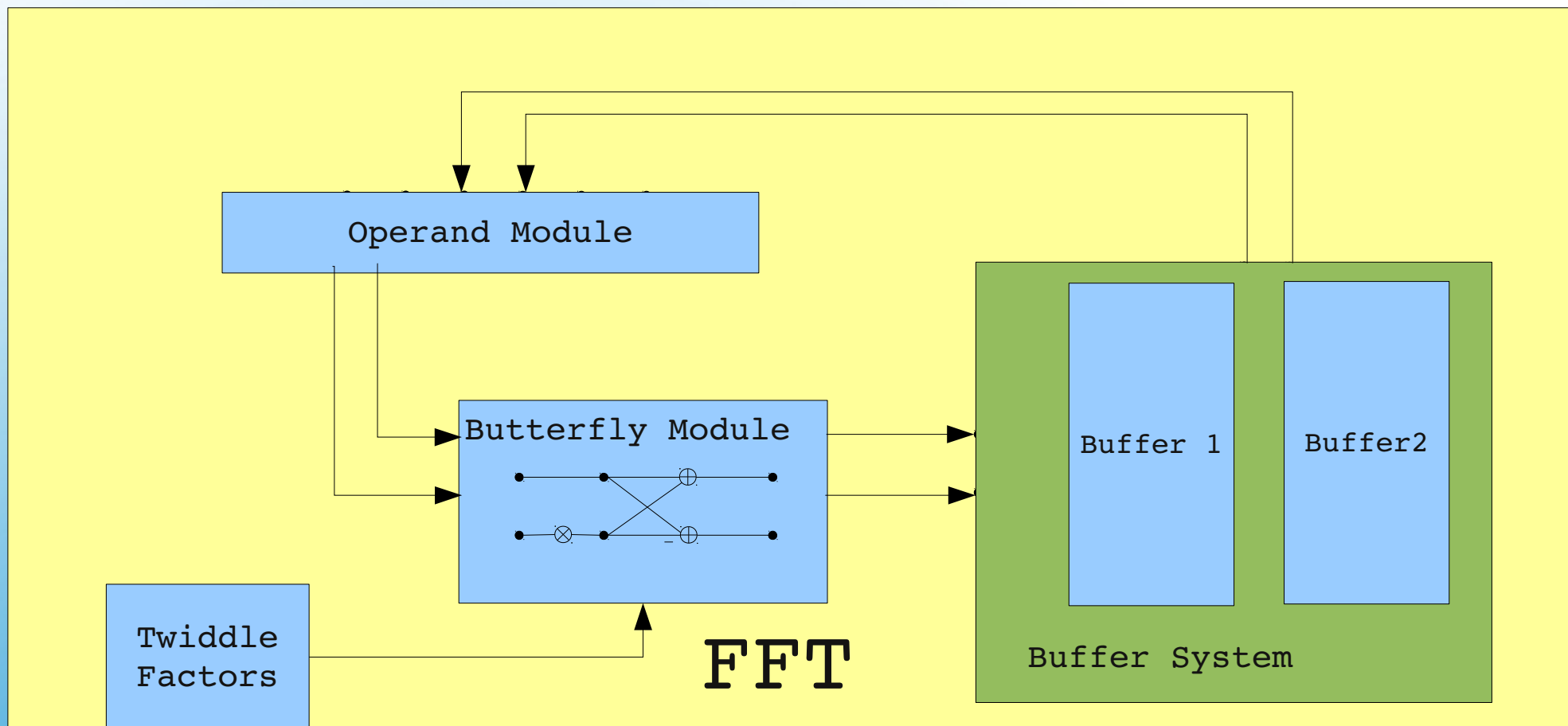
# Buffer System



# Basic Butterfly



# Complex Multiplication in Butterfly



**10 Levels \* 512 different inputs = 5120 cycles of Butterfly Module for one full FFT**

- Nov. 22 – Completed Testing for Butterfly Implementation in Python
- Nov. 24 – First Implementation of Butterfly in Verilog
- Dec. 1 – Completed FFT Module
- Dec. 3 – Visual Output Implementation Complete
- Dec. 5 – FIR Filters implemented

## Timeline