SS

- PCB Layout / Design
- Analog Circuit Design
- Digital
- Embedded Systems
- DAQs

Meeting with Lusher Questions: **QUESTIONS DUE 9/3 MIDNIGHT**

Sorted List by Category:

1. System Design & Architecture
   a. Can we buy a DAC or do we have to make our own? - Can buy (2 DACs)
   b. What kinds of microcontrollers can we use? Is there anything we can't use the microcontroller to do, like store the memory of the signal? ESP32
   c. Power constraints: sourcing, limited to pwr sources
   d. What protections are necessary for the power supply subsystem?
   e. What will be the exact purposes for the output ~~filters~~? signals, or just for display
   f. Local or Cloud Memory? local

2. Specifications & Performance
   a. ~~Design specs?~~
   b. What should the resolution of the output signal be? 16 Bit
   c. What is the maximum output frequency and useful signal bandwidth per channel?
   d. ~~What is the Frequency range?~~ 1 MHz / 100 kHz
   e. What is maximum amplitude?
   f. What is the required DC accuracy?
   g. How many values per arbitrary waveform period? changes
   h. What output voltage ranges do we need? 10V
   i. What load impedances must we support? 50 ohm
   j. Do we want both AC-coupled and DC-coupled outputs, or only one? (allow selectable AC coupling?)

3. User Interface & Display
   a. Do we need a display on the waveform generator? - Our choice
   b. Does any data need to be displayed on the phone app that needs to be communicated back from the waveform generator?

4. Power & Portability
   a. Portability constraints? Should this device be a table-top machine or a handheld device? No, table top is fine
   b. Battery Life constraints? Wireless capabilities
   c. Main input: 12V Wall adapter (AC/DC Power Supply), Battery (Li-ion/Polymer), or Hybrid? Either or
   d. Do we need isolated power rails for analog and digital sections, or is careful grounding enough?
   e. ~~Is thermal management (heatsinks, airflow) a concern for the DC/DC converters or LDOs?~~
   f. What are the required voltage rails for each subsystem (FPGA, MCU, memory, DAC) 2 DACs, 1 SRAM,
   g. What are the maximum current draws for each rail under worst-case load?

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h. What noise level is acceptable on the analog rails?
i. ~~Main input: 12V Wall adapter (AC/DC Power Supply), Battery (Li-ion/Polymer), or Hybrid?~~

5. Functionality & Use Cases
   a. What is the primary intended application for the AWG? Should the signal be tested against different \[loads/environments]? drive 50 ohm load,
   b. Should we have preset waveforms (square, triangle, sin, etc)? yes, adjustable

output to oscilascope

Meeting W/ Lusher

Demo Date: Dec. 2nd

WEB 24HE | Pactic.com cases

Office Hours: Wed/Thurs 2-3:30, FEDC, Zoom

- Max freq: 1 MHz (Boundary Max.) can (1 million samples per sec)

- "Sampling Therom"
  - Nyquiss (?) Sample x2 rate to know signal @ 500K
    - Below, you get aliasing

100 KHz Signal freq max

2 DAC,

Output Voltage: ±5V

Calculate waveform on DAC

- Sampling Rate . . . vs . . .

- Nice Enclosure → display, leds
  - Doesn't need on board interface
  - prefers app
  - "drawable waveform"
  - B & C Jacks
  - Compatable

x2 DAC = 16 Bit
- parrallel board

Basic SRAM

* FPGA
- index counter
- RAM
- load mem
- playback
- vs config

5 Min Demo

- control Clks speed

-

16 Bit Range for ±5V

sin, sinc, ~~triangle~~ trap,

- invert

-

Driving 50 ohm load

ESP32

Additional Features