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ECE 6780-003

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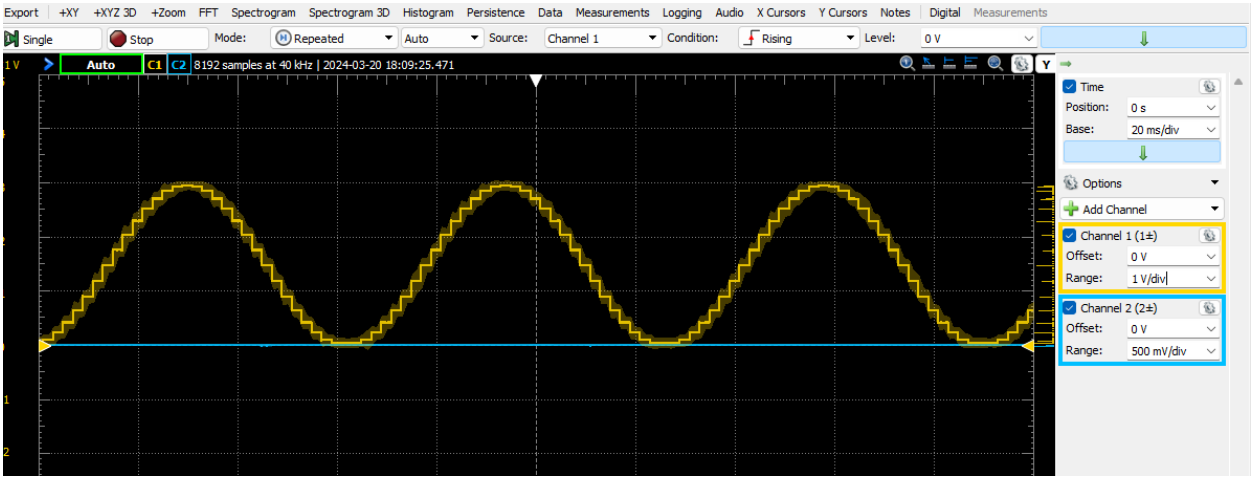
Post-lab 06 Questions

6.2 — Postlab 6. Please answer the following questions about the ADC and DAC and submit your source code.



I need to plug this into a crappy breadboard speaker to hear the lovely 8-bit audio.

1. Consider a system where the DAC is updated every 4us (250 kHz) with a value from a 200-element wave table containing a single cycle of a waveform. What would be the frequency of the output wave? $T = 200 \times 4\mu s = 800\mu s$

$f = \frac{1}{T} = \frac{1}{800\mu s} = 1250\ Hz$

2. Consider that the ADC in 12-bit mode divides the input voltage range (0-3V) into 4096 steps (where 0V is 0, and 3V is 4095).

• What is the voltage/measurement resolution (how much does the voltage change per bit) of the ADC? 12-Bit ADC $\Rightarrow 2^{12} = 4096$ TAPS

4096 STEPS $\longleftarrow$ 0V to +3V $\Rightarrow \frac{3V}{4096} \cong 732\mu V$ PER TAP

• What would be the ADC output value (nearest integer) if the input voltage was 1.75V?

$\frac{1.75V}{732\mu V} \cong$ TAP # 2390 OR 2391

IF WE DON'T APPROXIMATE $\Rightarrow$ CHANGES DEPENDING ON APPROXIMATION.

$\frac{1.75V}{732.422\mu V} \cong$ TAP # 2389