

## Frank Martino - Q2.4 Experimental Measurements and Personal Instrumentation

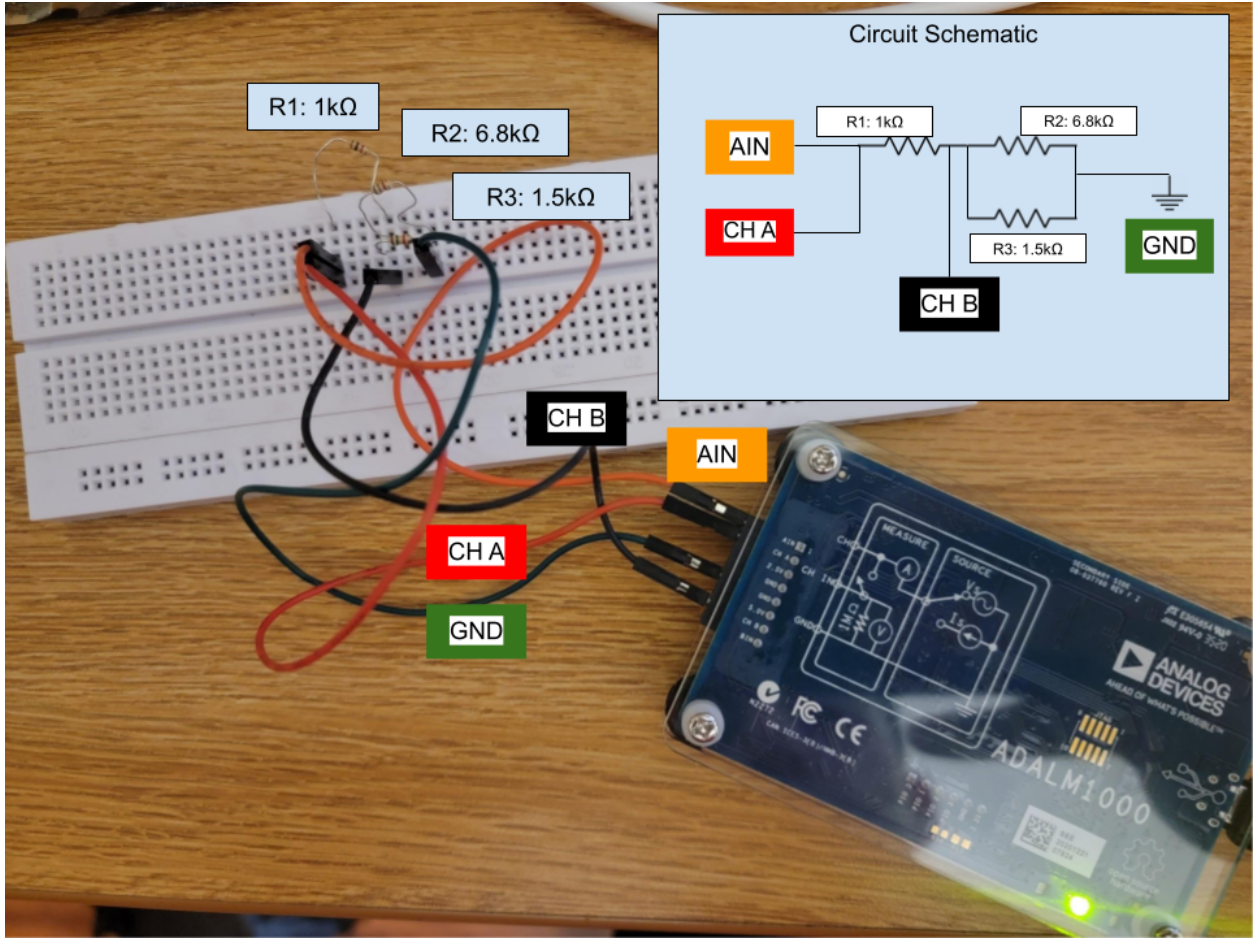
Prove your skill set using ONE of the following: M1K board, Analog Discovery Board, or M2K board.

### Q2.4 Measuring voltage across a resistor using a sinusoidal input source

I can build a resistive circuit and measure voltage across ONE resistor using a sinusoidal input source (Must be two or more resistors, hint: try to make a sinusoidal source with amplitude 0 to 5V centered at 2.5 V and another from -5 to +5V centered at 0 then document whether your board can accomplish both or only one of these).

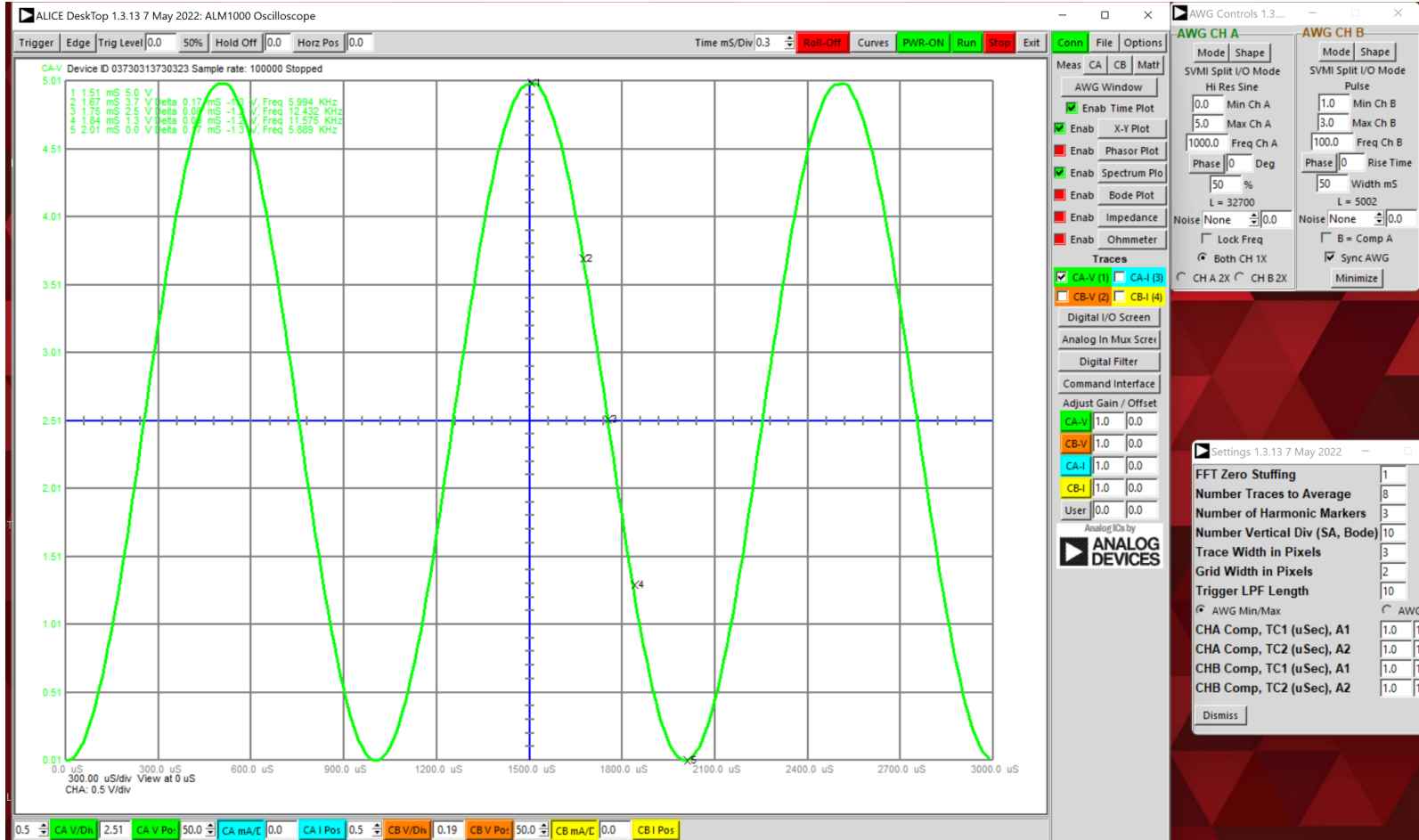
I was able to use the board with a  $1\text{k}\Omega$  resistor set in series with two parallel resistors,  $6.8\text{k}\Omega$  and  $1.5\text{k}\Omega$ . Then, I connected the pins from the ADALM1000 to the breadboard in the same way as mentioned in Q2.2 which has been copied below for convenience. This is so that I can measure the voltage across one resistor which will be the  $1\text{k}\Omega$  resistor. I then opened the ALICE desktop where I was able to set the minimum voltage to 0.0 volts and the maximum voltage to 5.0 volts where the axis goes through 2.5 volts. However, when trying to set the minimum voltage to -5.0 volts, I was not able to because the program did not recognize negative values. Therefore, my board was not able to accomplish both of these tasks.

Part of Q2.2: Once I finished this, I connected the AIN lead and A channel to the first pin on the  $1\text{k}\Omega$  resistor. Then, I connected the ground pin to the joint where all of the resistors connect to. Finally, I connected the Channel B pin to the end of the circuit, as labeled below.



(x-axis and y-axis stretched to allow for easier reading, and line thickness increased to 3 pixels on the graph presented below)

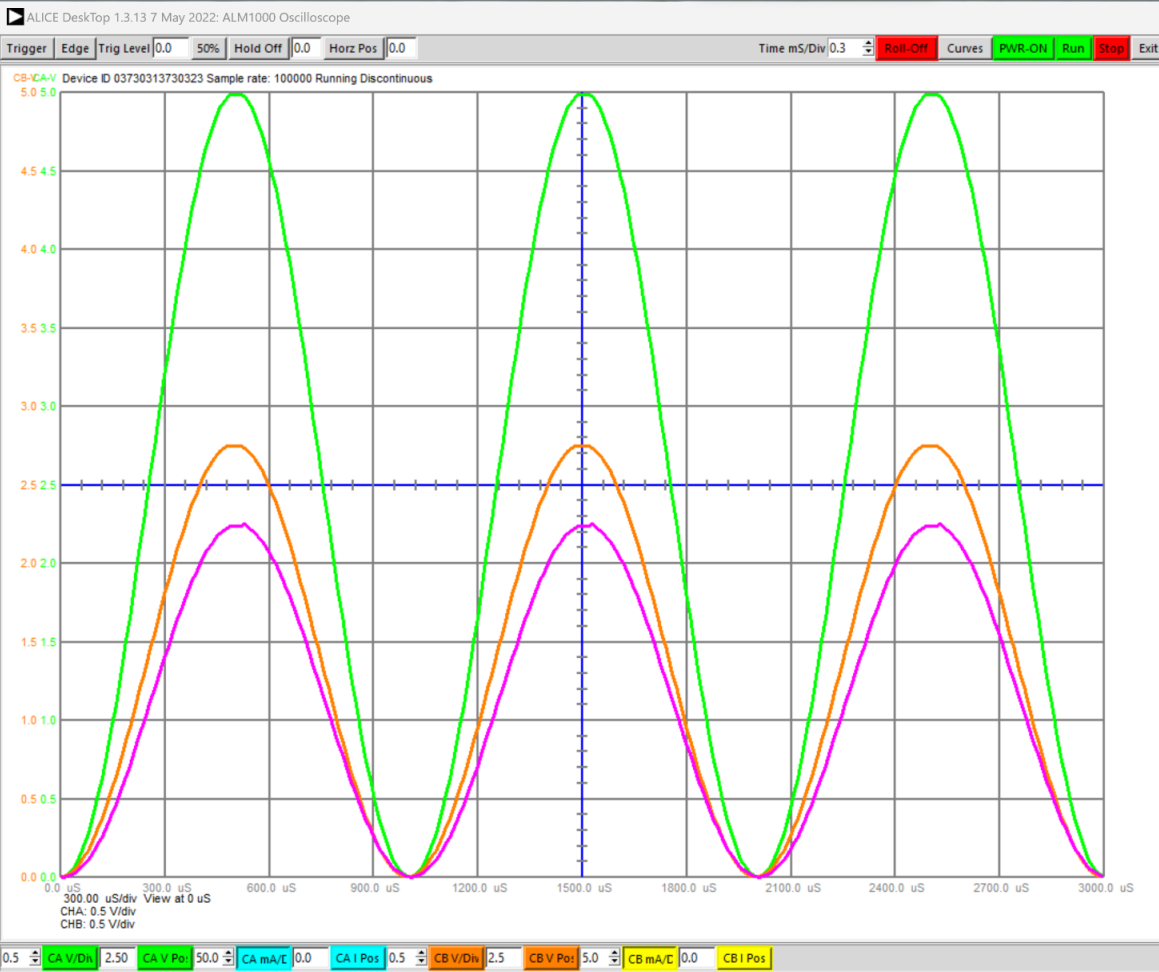
Source voltage:



**Green** = source voltage ranges from 0 to 5 volts

**Orange** = voltage after r1 or 1kΩ resistor which ranges from about 0 to 2.75 volts

**Purple** = source voltage minus voltage after the resistor, or the voltage consumed by R1(1kΩ) resistor; this ranges from 0 to 2.25 volts



AWG Controls 1.3.13...

AWG CH A Mode Shape SVMI Split I/O Mode Other Shape DC Min Ch A 0.0 Max Ch A 5.0 Freq Ch A 1000 Phase 0 Deg L = 0 Noise None -1.3

AWG CH B Mode Shape SVMI Split I/O Mode Other Shape DC Min Ch B 1.0 Max Ch B 3.0 Freq Ch B 1.0 Phase 0 Deg L = 0 Noise None -1.3

Math Formula 1.3.13 7 May...  
Formula  $V_{BuffA}[t] + V_{BuffB}[t]$   
Units V Check  
Axis V-A Apply

Built-in Exp  
none  
CAV+CBV  
CAV-CBV  
CBV-CAV  
CAI-CBI  
CBI-CAI  
CAV\*CAI  
CBV\*CBI  
CAV/CAI  
CBV/CBI  
CBV/CAV  
CBI/CAI  
Formula

Settings 1.3.13 7 May 2022  
FFT Zero Stuffing 1  
Number Traces to Average 8  
Number of Harmonic Markers 3  
Number Vertical Div (SA, Bode) 10  
Trace Width in Pixels 3  
Grid Width in Pixels 2  
Trigger LPF Length 10  
AWG Min/Max  
CHA Comp, TC1 (uSec), A1 1.0 1.0  
CHA Comp, TC2 (uSec), A2 1.0 1.0  
CHB Comp, TC1 (uSec), A1 1.0 1.0  
CHB Comp, TC2 (uSec), A2 1.0 1.0