

Frank Martino - Proof of Skills Day 2

Q2 Experimental Measurements and Personal Instrumentation

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

Each of the **Experimental Measurements and Personal Instrumentation** Objectives above should reflect the following goals:

- ✓ 1. I can use consistent **color-coding of wires when I build circuits on my breadboard** to aid in troubleshooting.
- ✓ 2. I can “zoom in” to an oscilloscope output by **changing the time scale (x-axis)** to show important parameters (for example, a sinusoid with 25 cycles would be easier to see if only 3-5 cycles were shown instead!) when needed
- ✓ 3. I can “zoom in” to an oscilloscope output by **changing the voltage scale (y-axis)** to show important parameters (for example, a sinusoid with 500mV amplitude would be difficult to see with 5V/div...) when needed
- ✓ 4. I can **change the THICKNESS** of my trace lines for easy viewing.
- ✓ 5. I **can change the background color of my oscilloscope output to white** and paste in an external document for easy viewing.
- ✓ 6. I **can label the measurement output clearly** with the circuit schematic component names

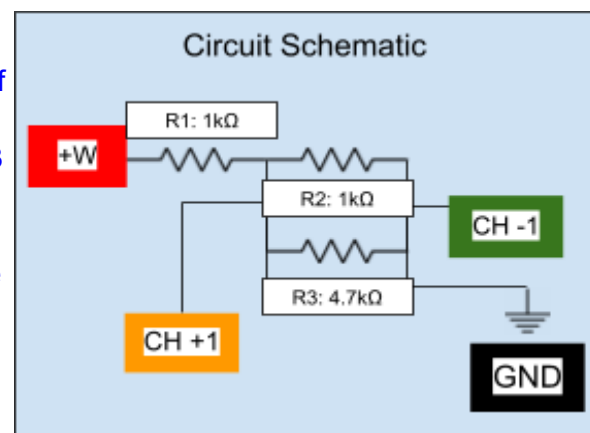
Q2.5 Build Use Cursor Function

I can use my cursor function to show specific voltage and time points.

To prove my skills in using the cursor function in Scopy, I created a sinusoidal wave and built a resistive circuit used from day 2.4 (described below). I measure the voltage across one of the resistors. I purposely used a sinusoidal function that had an amplitude and offset that is hard to read on a graph, 5.3 volts and .4 volts. This makes the cursor function much more useful as you do not need to guess any values, because they read out a specific point and state the values of the voltage and time and the desired locations. Scopy only allows two cursors at a time that have a horizontal and vertical axis. I set up the cursors to show a point on the rise of one of the cycles and the minimum value of the function. Unfortunately, Scopy does not allow the user to change the color or line thickness, despite being the same thickness and color as the rest of the grid. This makes it easy for the viewer to lose track of where the cursors actually are. To fix this, I added a green and purple line over the two cursors to make viewing it much easier.

Day 2.4 Circuit:

I made a circuit with a 1kΩ resistor in series with a parallel set of two resistors 1.5kΩ and 4.7kΩ (shown in the diagram to the right). I then supplied a sinusoidal wave with an amplitude of 5.3 volts with an offset of 0.4, a frequency of 5KHz, and no phase shift. I then measured the voltage of the R2. Using the ADALM2000, I used the waveform channel, which is the voltage in, and the ground channel at the very end of the circuit. I then placed channels +1 and -1 on either side of R2 in order to read it.



Constant Waveform Buffer Math

Sine

<input type="button" value="+"/>	Amplitude	<input type="text" value="5.3"/>	<input type="button" value="+"/>	Offset	<input type="text" value="400"/>
<input type="button" value="-"/>	Volts p-p		<input type="button" value="-"/>	mVolts	
<input type="button" value="+"/>	Frequency	<input type="text" value="5"/>	<input type="button" value="+"/>	Phase	<input type="text" value="0"/>
<input type="button" value="-"/>	kHz		<input type="button" value="-"/>	deg	

