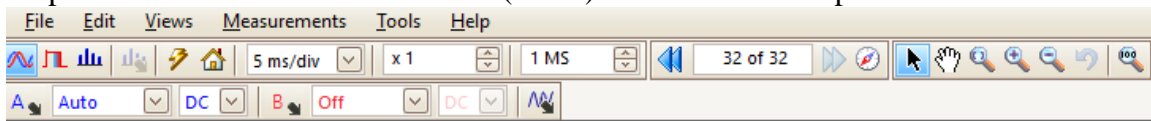


## Instructions for Using the Picoscope Digital Oscilloscope and Waveform Generator

The following are quick instructions to get started using the picoscopes. For full instructions, see the full manual (*Picoscope 6 Training Manual*, available on the course website <http://course.knox.edu/physics242>).

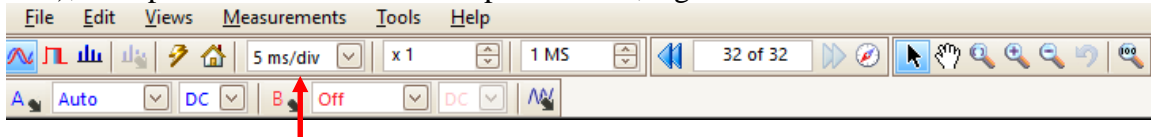
**1. Starting Up** Connect your picoscope to the USB drive, and start the program Picoscope 6 on your computer. Connect a cable from picoscope input A (or B) to the voltage you want to measure. The program will display a graph of voltage (on the y-axis) vs. time (on the x-axis).

**2. Changing axis scales** To rescale the voltage axis, choose a selection from the dropdown menu on the left side of the (lower) menu bar at the top of the screen.

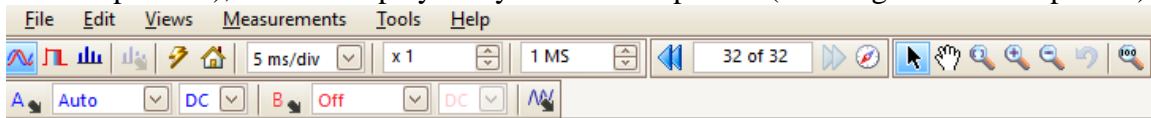



Use AUTO to let the picoscope automatically select the scale. You can set different scales for inputs A and B if desired.

To rescale the time axis, select a value from the dropdown menu (middle menu bar, left side); the options are in units of time per division, e.g. 5 ms/div.



You can also set the coupling mode: DC displays the full input waveform (both DC and AC components), but AC displays only the AC component (omitting the DC component).



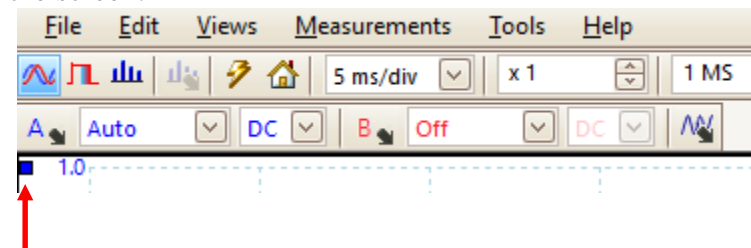
**3. Using the Waveform Generator** The connector marked AWG is the output of a built-in arbitrary waveform generator. To use it, click the icon that looks like a triangle wave . In the pop-up menu that appears, click the checkbox Signal On to turn on the waveform generator. You can select the waveform type (sine wave, square wave, etc.) and can enter the frequency. When you are done, close the pop-up menu—the waveform generator will continue to produce the waveform unless you reopen the menu and make changes.

**4. Measuring Amplitude and Period** The most common measurements you'll want to make are the amplitude and period of a waveform. Select "Measurements" from the

menu bar, then “Add Measurement.” In the pop-up menu that appears, you can select the input channel and what you want to measure. Peak-to-peak means the vertical distance (volts) between peaks (twice the amplitude of the waveform). Frequency is the horizontal distance (seconds) of one cycle of the waveform. The measurement results are displayed at the bottom of the graph. The results will automatically update as the oscilloscope acquires new data, so if you want the measured numbers to remain stable, temporarily stop acquiring new data by clicking the icon in the lower left corner which toggles between “Running” and “Stopped.”

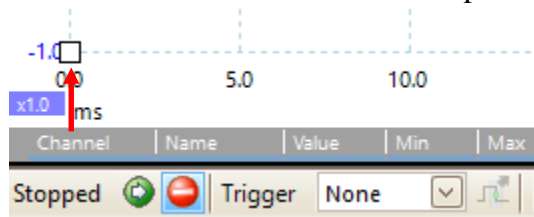


**5. Other Measurements** You can measure the vertical or horizontal distance between any features on the waveform you like by using the mouse to position reference lines on the screen. For example, to measure a vertical distance (volts), click and drag the voltage marker onto your plot. The voltage marker is a small solid blue box at the upper left of the screen.

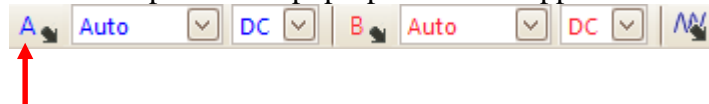


When you have dragged a reference line onto your plot, a measurement box will appear at the top of the plot, indicating the voltage at that reference line. When you have dragged two reference lines onto the plot, the measurement box will also display the voltage difference between your lines.

You can measure time periods (horizontal distances) in a similar way, using the white time marker at the lower left of the plot.



**6. Lowpass Filtering** To suppress (average out) noise at high frequencies, use the low-pass filter option. Click on the ‘scope channel (A or B), and enter the cut-off frequency of the low-pass in the pop-up menu that appears.



**7. Printing Out** Just stop the data collection (see 4 above), select the File menu, then Print. You can print to a pdf file to be included later in your lab report.