



TECHIN 512, SENSORS and CIRCUITS

Lab 1

DATE: Jan 7, 2020

Team:

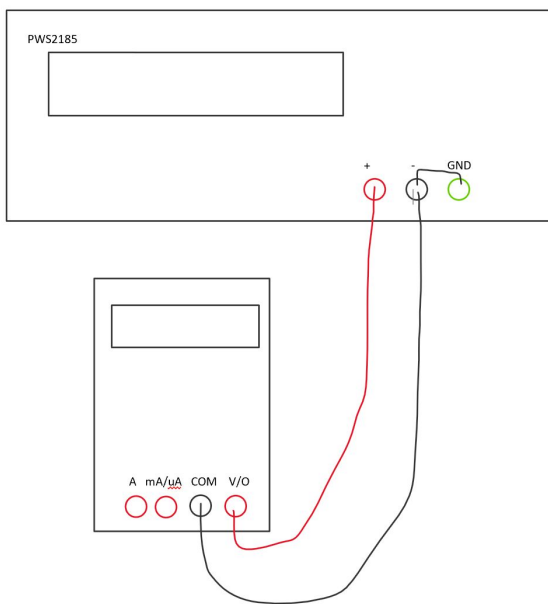
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INTRODUCTION

The purpose of this lab is to get familiar with the equipment that are going to be used in the course including DMM(digital multimeter), power supply, oscilloscope and signal generator. This also includes learning how to build simple circuits, setting up the devices and obtain measurements from the circuit using probes, resistors and wires.

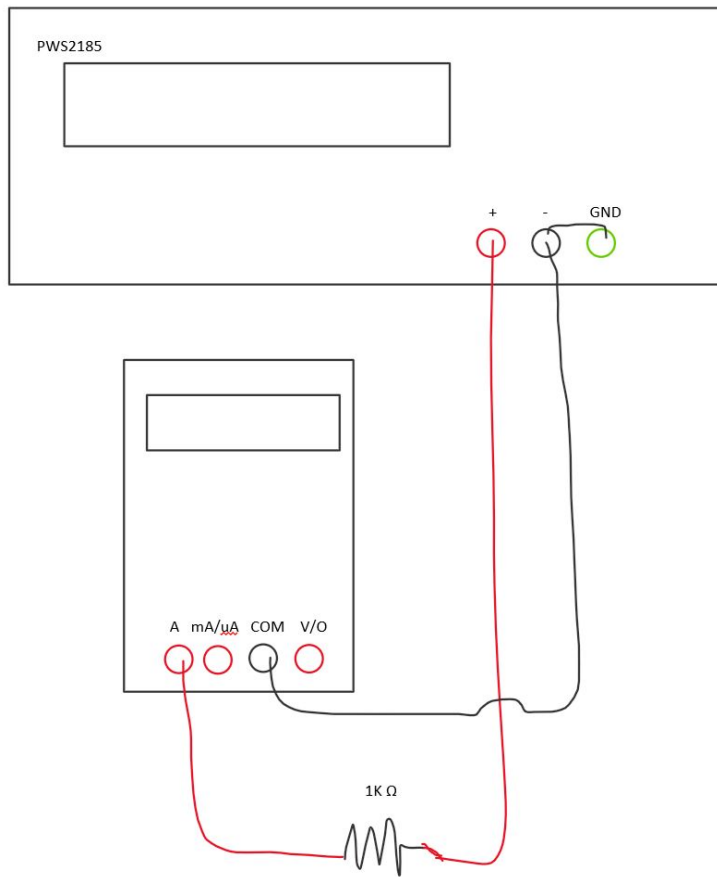
RESULTS

DC Voltage



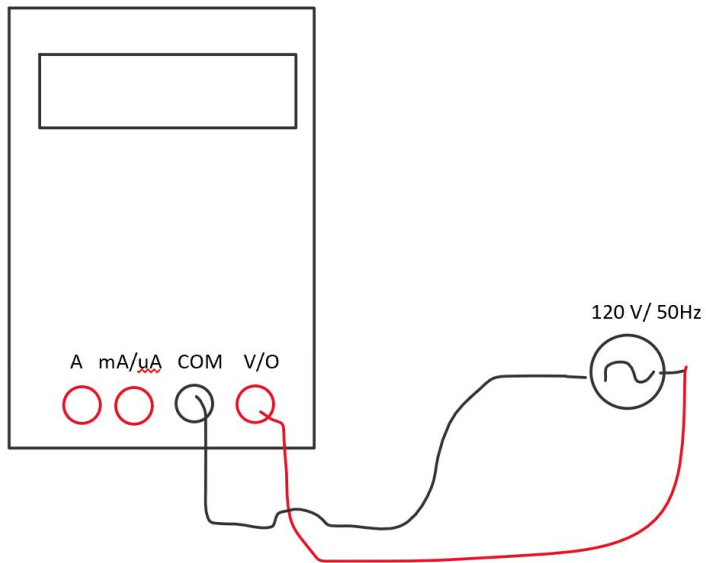
- Voltage read: **4.749V**

DC Current



- Current Measured with "A" **0.01 A**
- Current Measured with "mA" **10.18 mA**

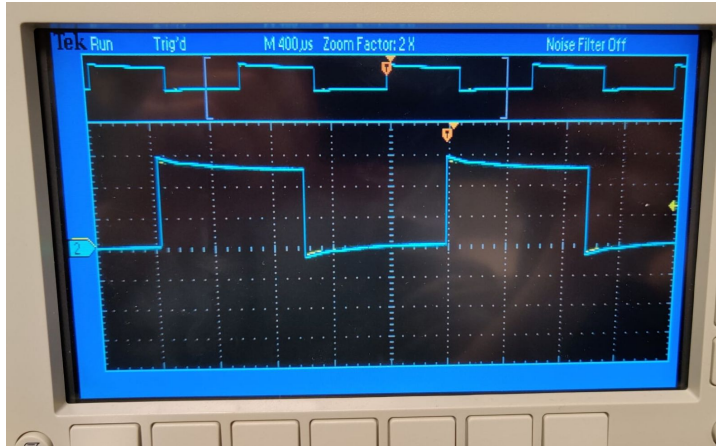
AC Voltage



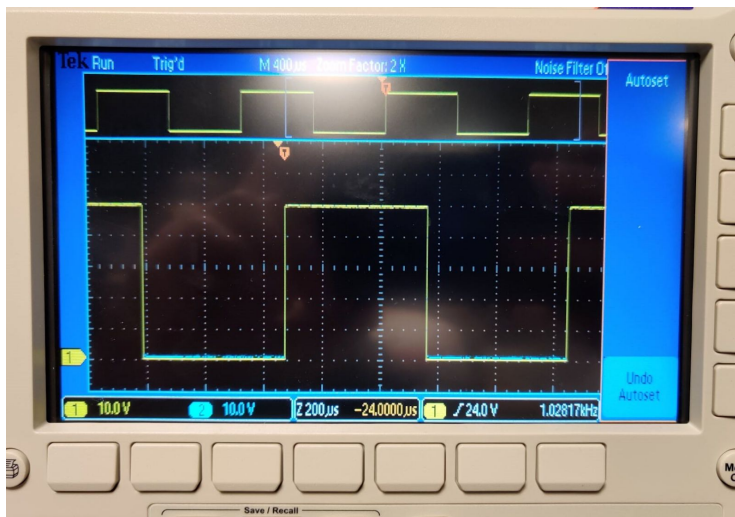
- Voltage read: **119.9V**

Oscilloscope – Probe Setup

1. Before probe calibration

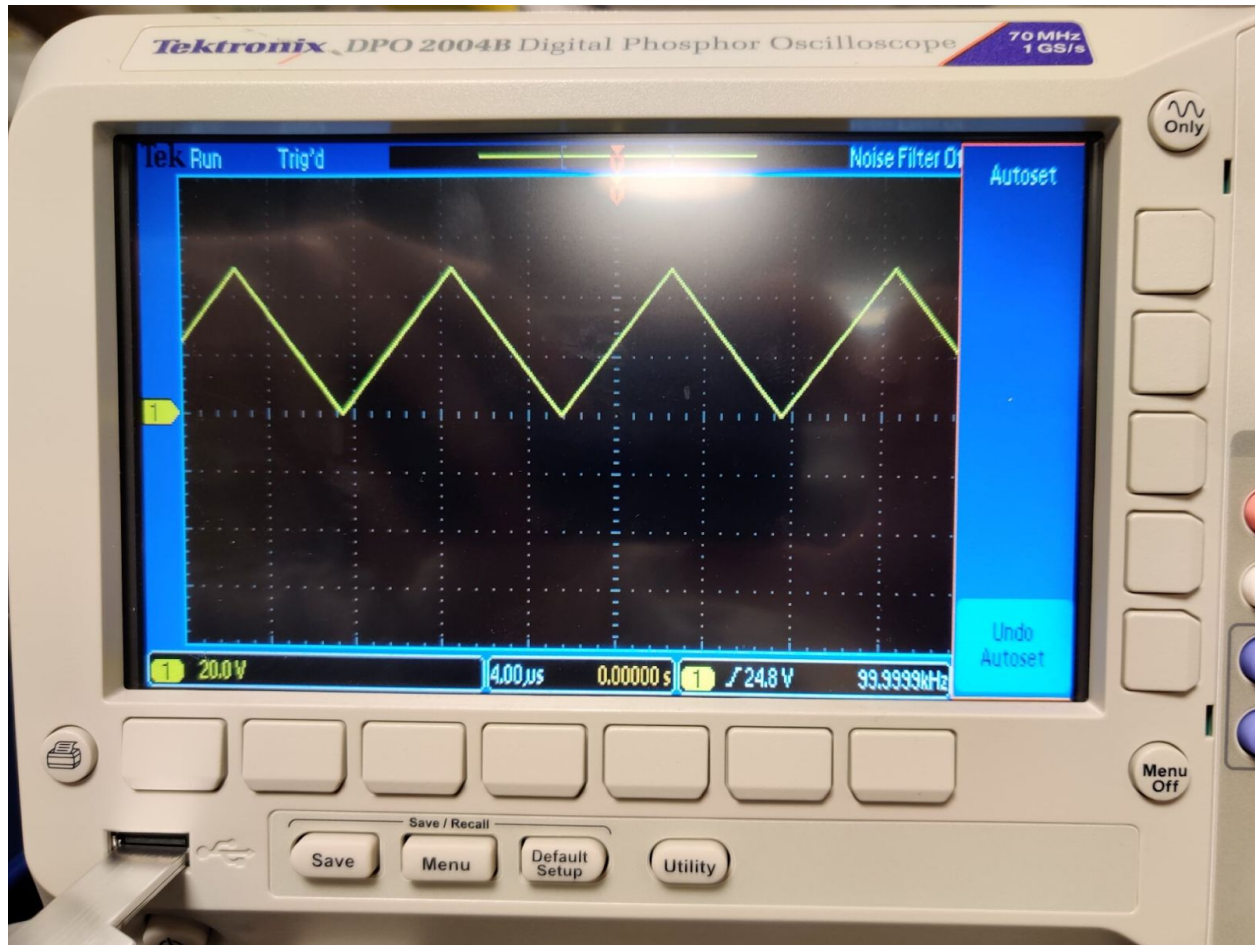


2. After probe calibration



Signal Generator & Oscilloscope / Visualize a Signal

4 us Window



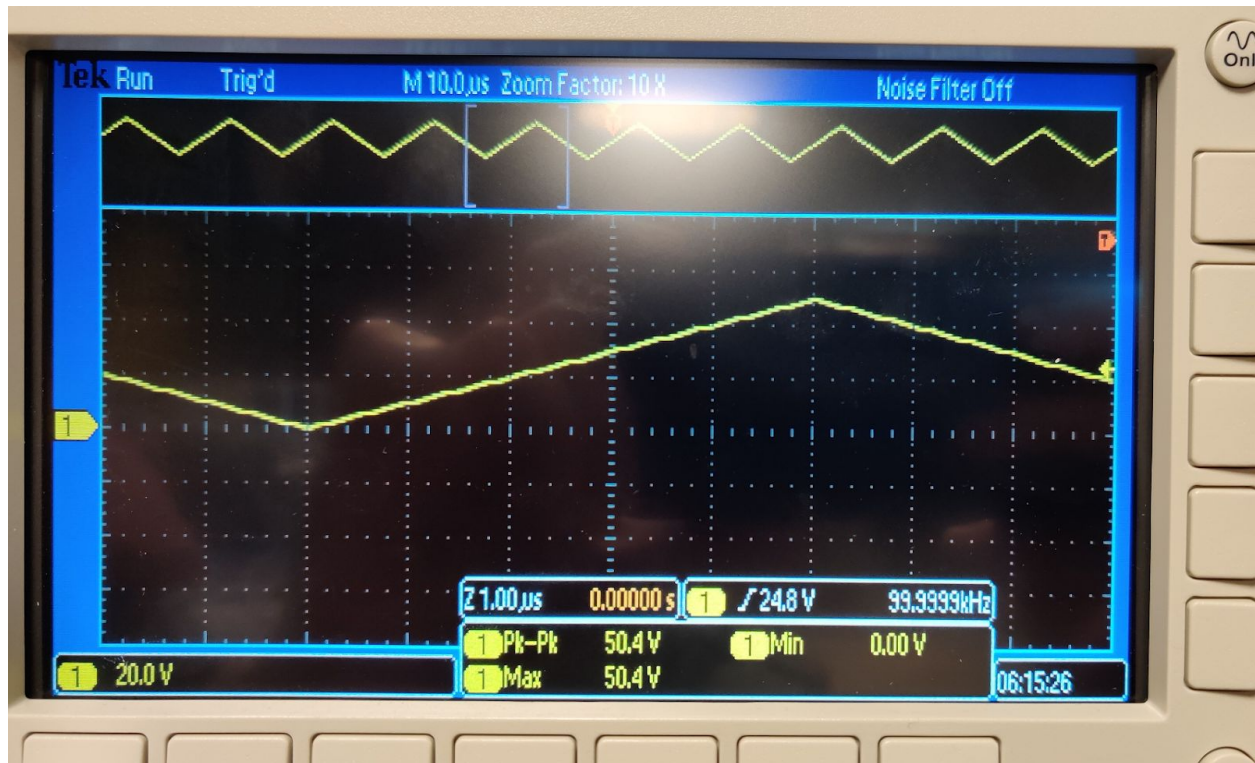
Count the number of positive peaks on the screen, and explain why you get the number you get

- 4 peaks
- Since the frequency is at 100kHz, the period of one cycle is 10 us, one grid represent 4 us, and there are 8x10 grid on the screen. Peak to peak takes 2.5 grids so there are 4 peaks on the screen

Read and record the Peak-to-peak amplitude and minimum voltage.

- Min volt: 0V
- Peak-to-peak amplitude: 50.0V

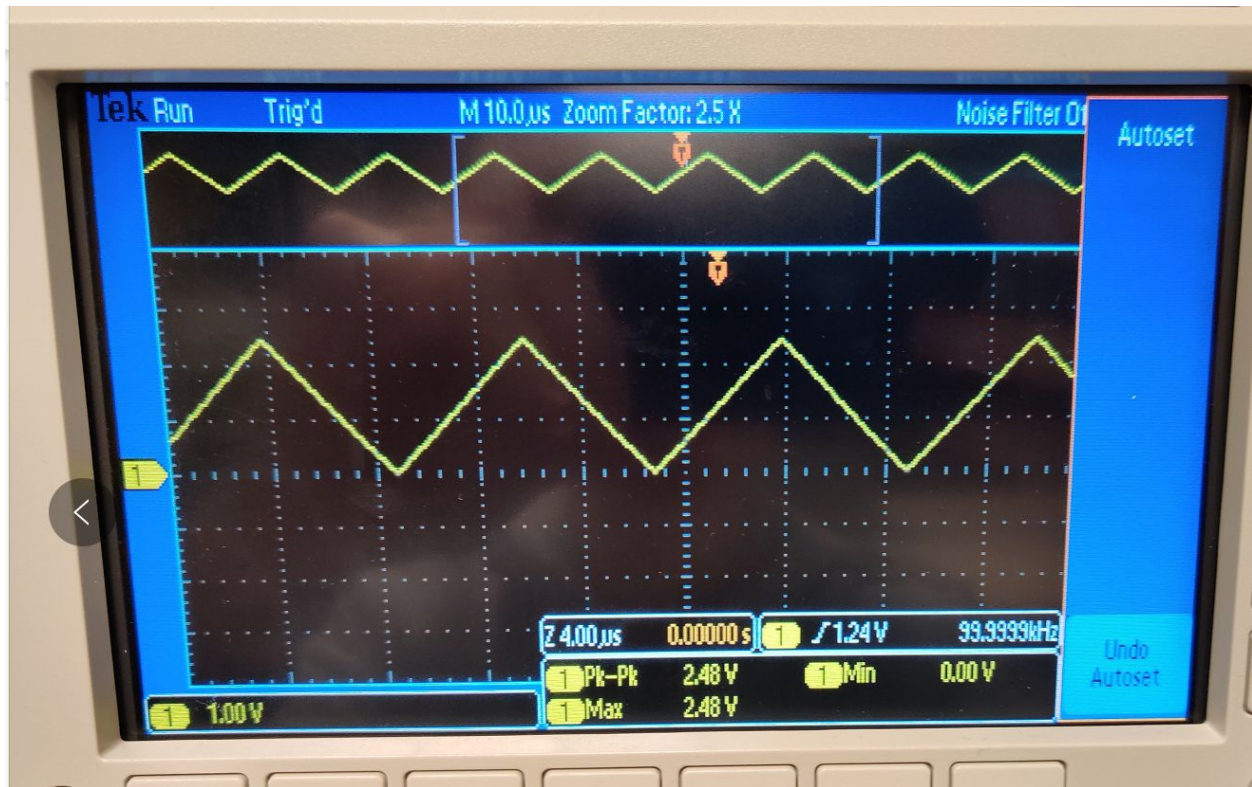
1 μ S window



Count the number of positive peaks on the screen, and explain why you get the number you get

- 1 peaks
- Since the frequency is at 100kHz, the period of one cycle is 10 μ s, one grid represent 1 μ s, and there are 8x10 grid on the screen. Peak to peak takes 5 grids so there is only one peak on the screen

50 Ohm resistor



Read and record the Peak-to-peak amplitude and minimum voltage.

- Min volt: 0V
- Peak-to-peak amplitude: 2.48V

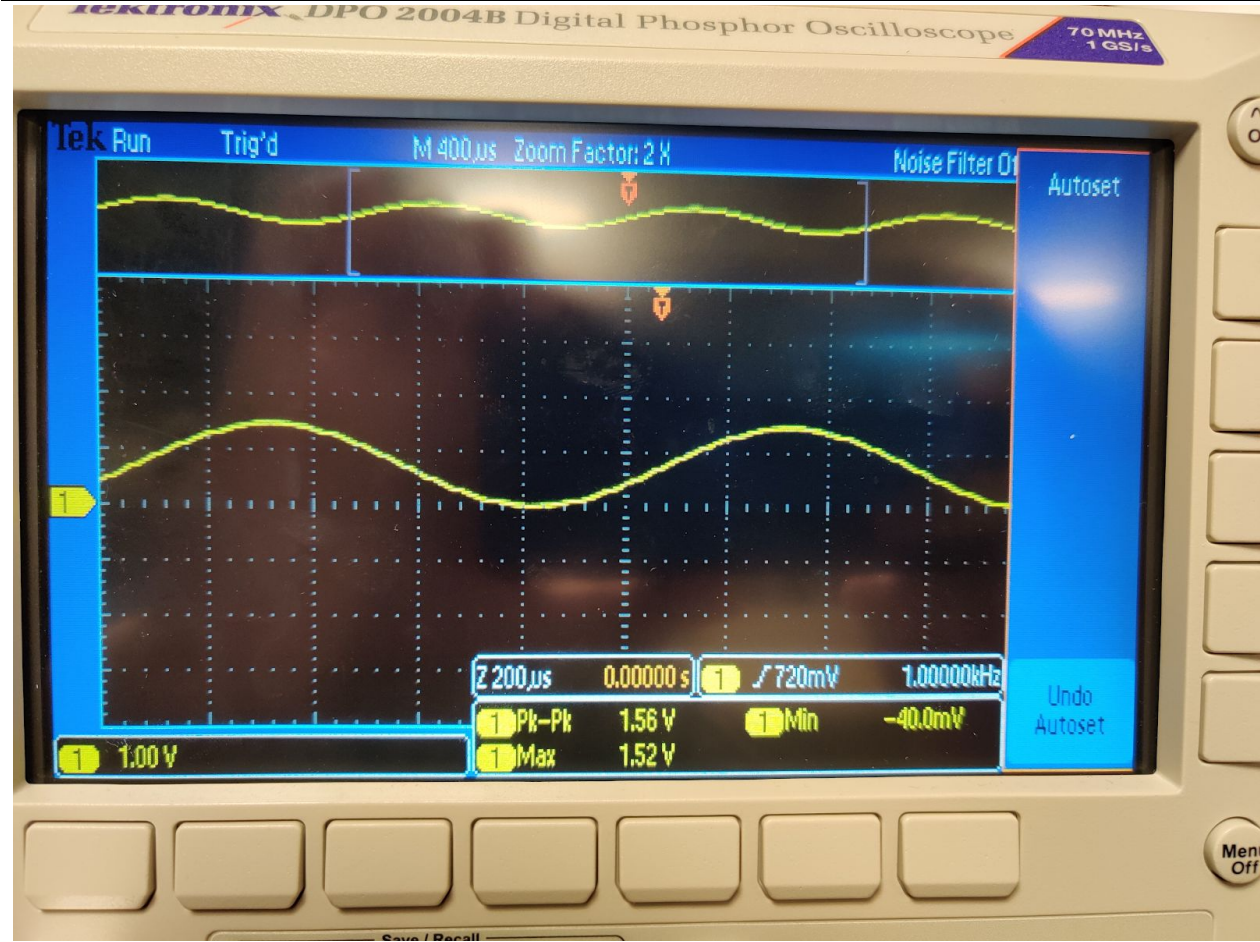
Signal Generator / Waveforms

	Shape	Frequency	V PtoP	Vmin
W1	Square	1.0 Mhz	0.50 V	-0.25V



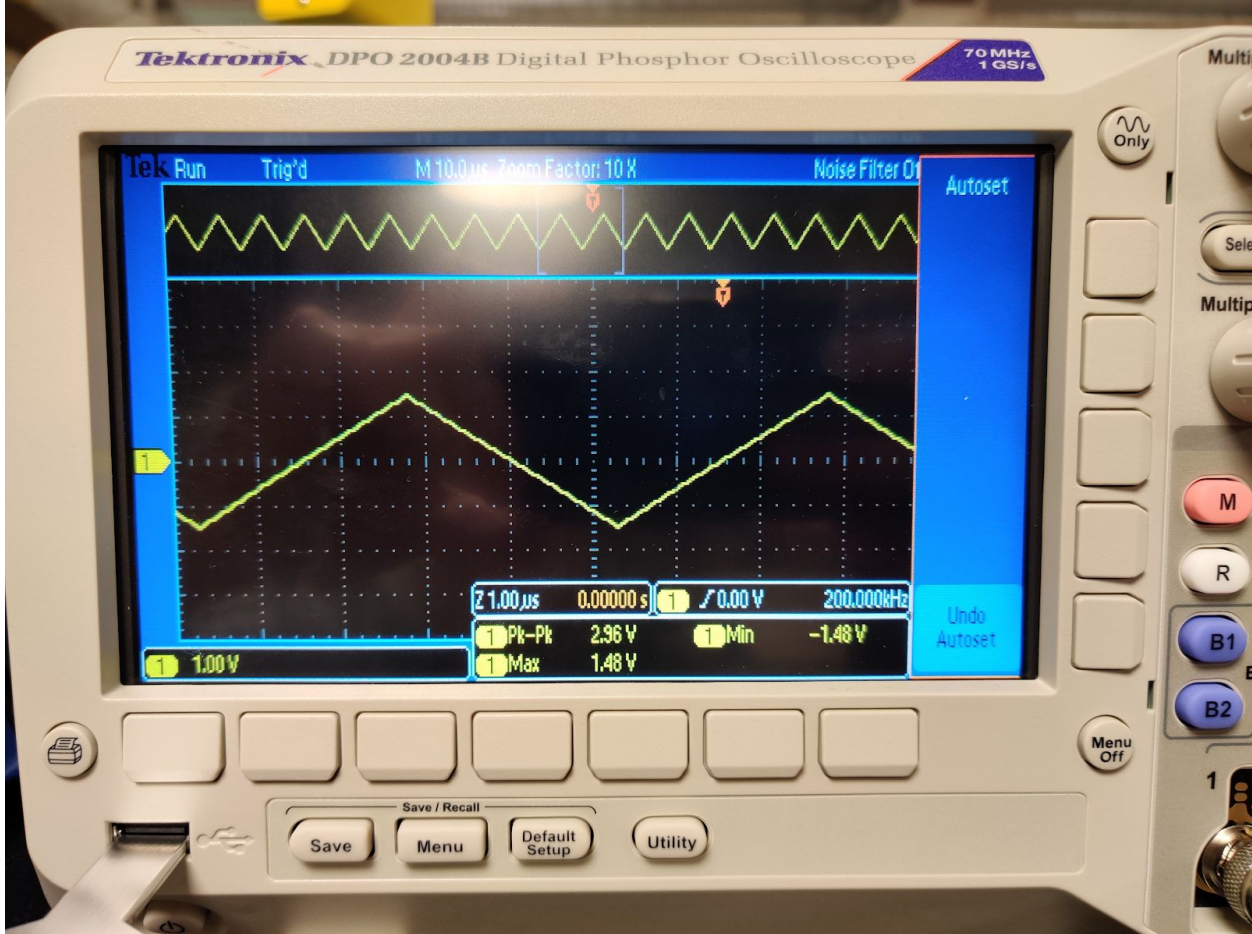
- horizontal scale: 200ns
- vertical scale: 100 mV
- trigger mode: Default

	Shape	Frequency	V PtoP	Vmin
W2	Sine	1000 Hz	1.5V	0.0V



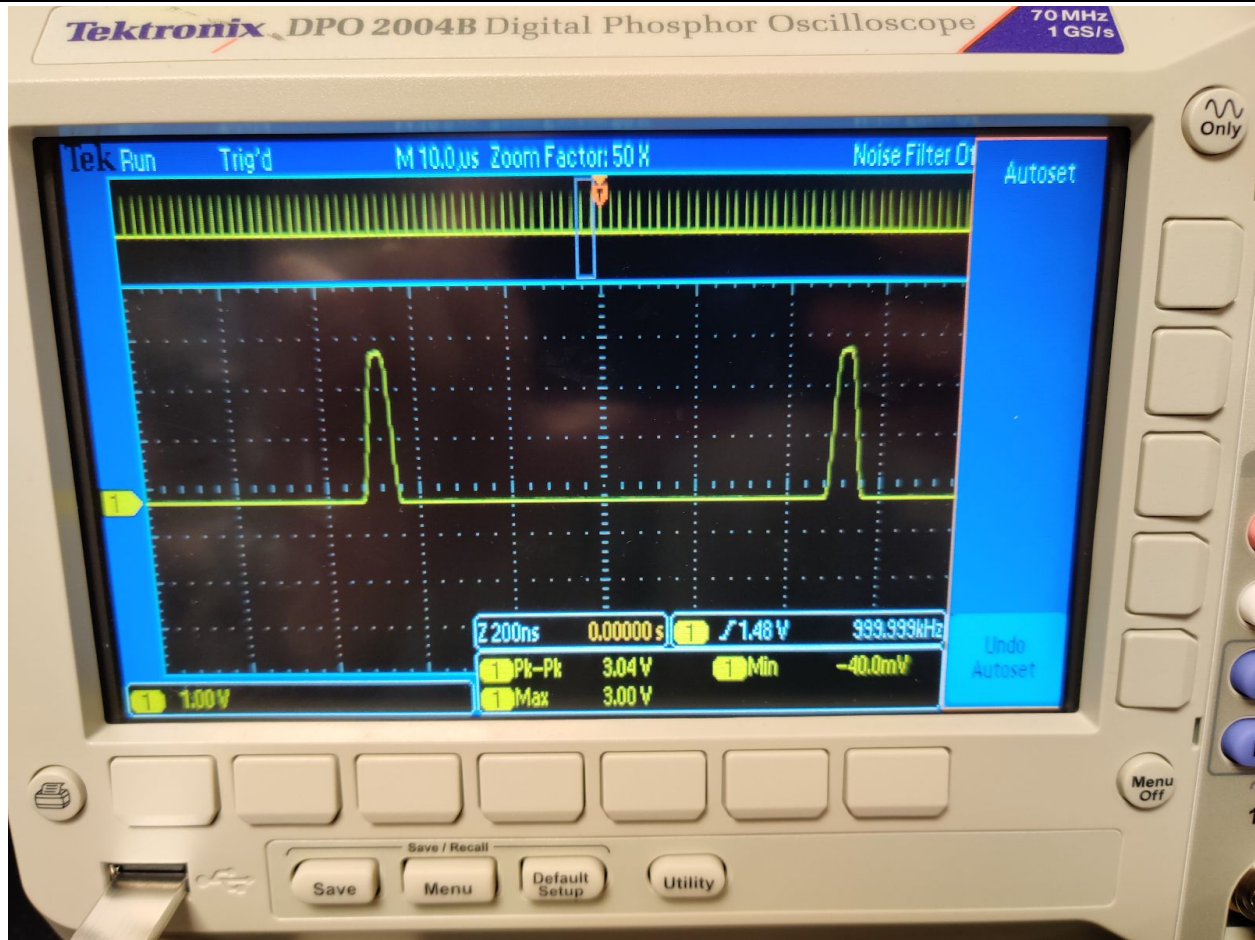
- horizontal scale: 200 us
- vertical scale: 1.0 V
- trigger mode: Default

	Shape		Frequency	V PtoP	Vmin
W3	Ramp	50/50	200 khz	3.0V	-1.5V



- horizontal scale: 1.0us
- vertical scale: 1.0 V
- trigger mode: Default

	Shape	Frequency	V PtoP	Vmin
W4	Pulse: 5% on 95% off	1 Mhz	3.0V	0.0V



- horizontal scale: 200 ns
- vertical scale: 1.0 V
- trigger mode: Default

Discussion and Conclusions

- The negative output of the power supply should be grounded
- The DMM should have parallel connection with the tested circuit when on Voltage mode but on series connection mode with the tested circuit on current mode
- The DMM should be switched to the right Voltage mode (A, mA, μ A) depending on the magnitude
- The Oscilloscope probe should be calibrated with probe calibration connection points before use
- “Autoset” button can find the right setting for viewing the signal most of the time but usually need minor pan/zoom adjustment for the best result
- The default setting of Oscilloscope assumes the resistance of the circuit is 50 Ohm, you need to change the setting to make it work on other circumstances
- The graph on Oscilloscope from different input source can be panned and zoomed individually
- Press the “measure” button to get stats about the current graph.
- The zoom scale and the scale of the x axis can be found at the top of the screen
- Change the frequency, magnitude and waveform on the signal generator to generate different signals.