# MECH345

# MODERN INSTRUMENTATION AND EXPENRIMENTATION

# LAB REPORT #1


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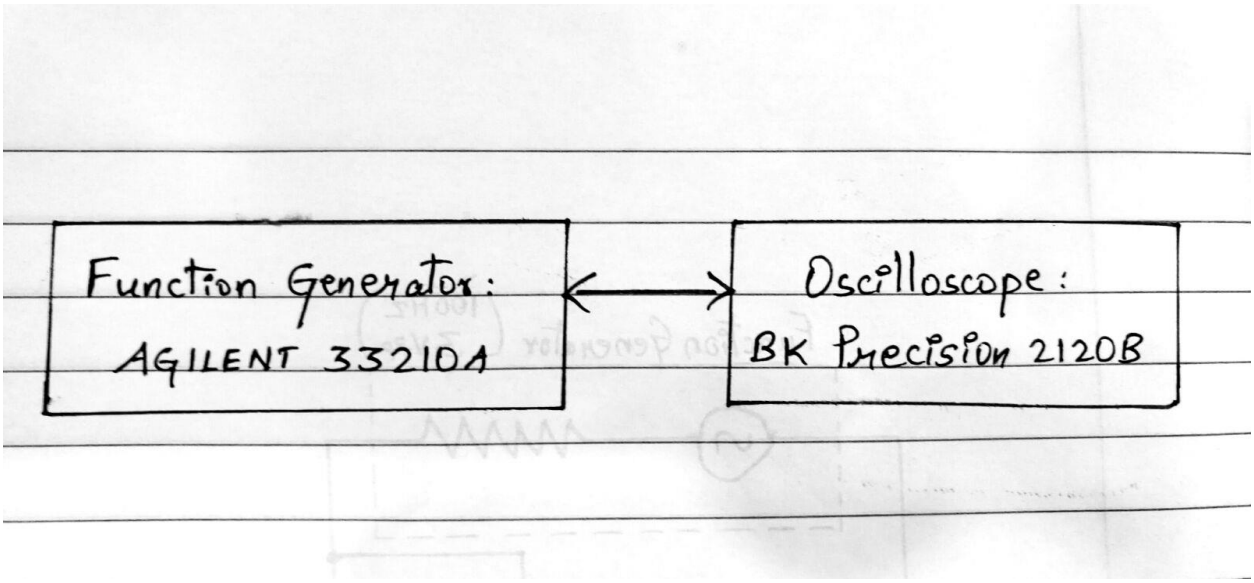
# TASK: 1

## A) Oscilloscope connected with Function Generator:

Purpose : To measure the voltage and frequency with the oscilloscope for different settings in function generator.

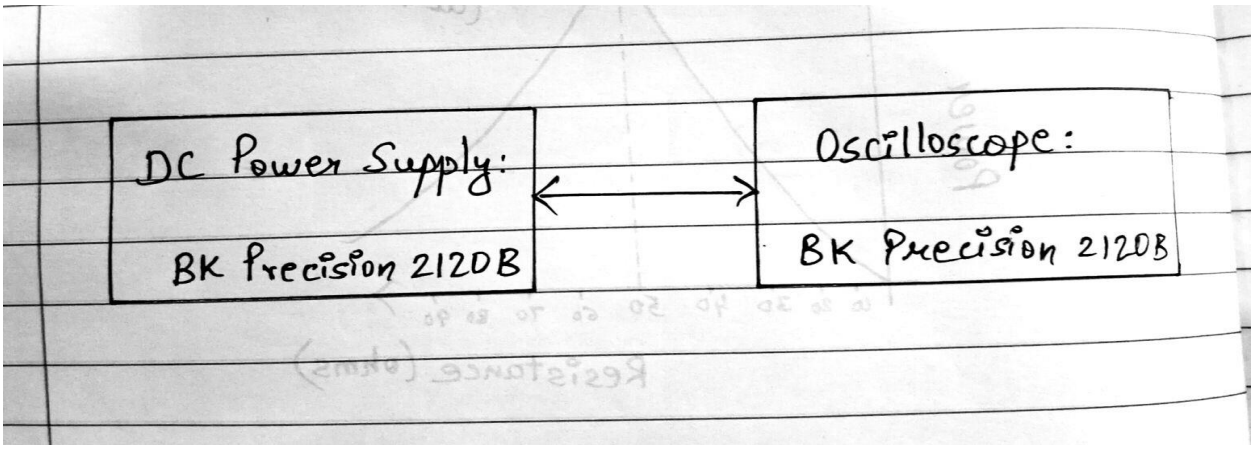


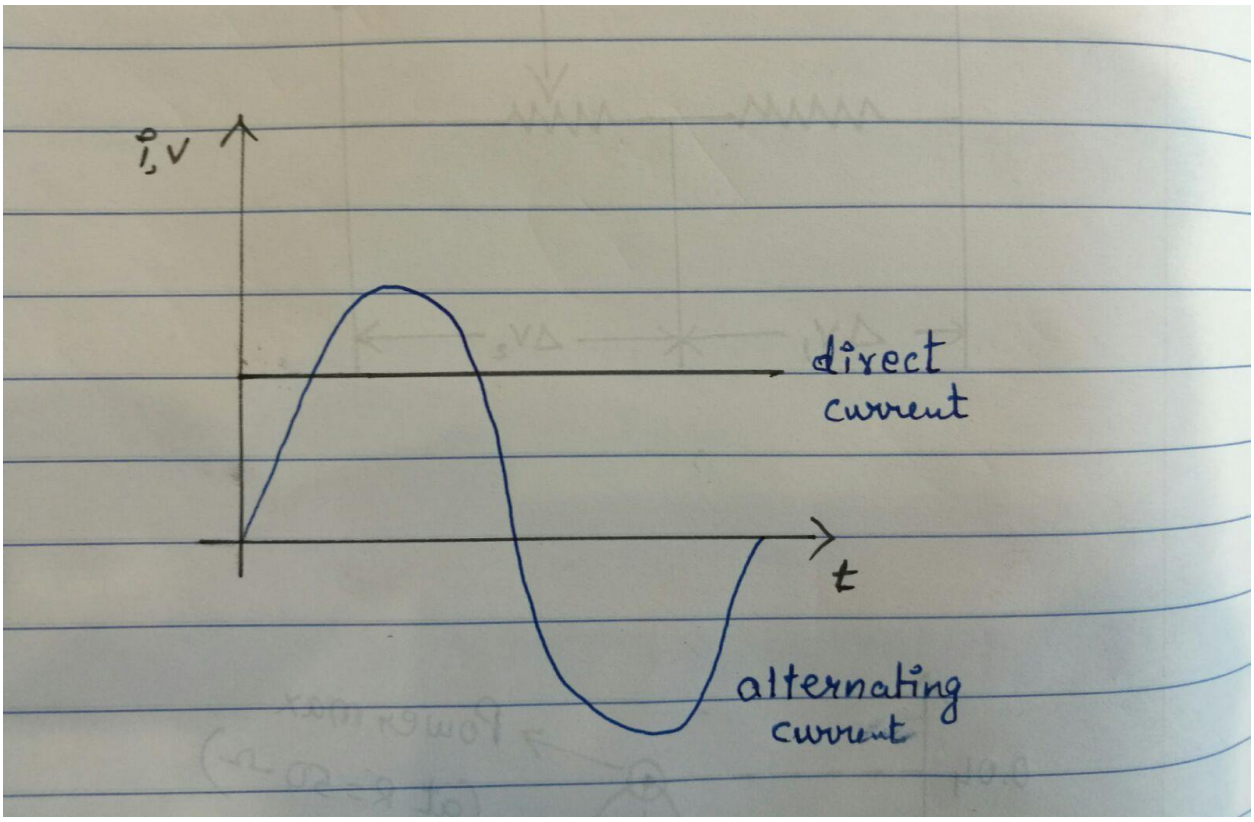

| Frequency (Function Generator) | Amplitude (Function Generator) | Voltage (Oscilloscope) (volt/div) |
|---|---|---|
| 500 Hz | 1 (Vpp) | 2.2 V |
| 1000 Hz | 1 (Vpp) | 2.2 V |
| 1500 Hz | 1 (Vpp) | 2.2 V |

Result: We can see that for different values of frequency in the function generator, we are getting the same value of voltage in the oscilloscope.

## B) Oscilloscope connected with DC power supply:

For different values in the function genrator, the DC power supply shows the same value (straight line) of voltage in the oscilloscope.

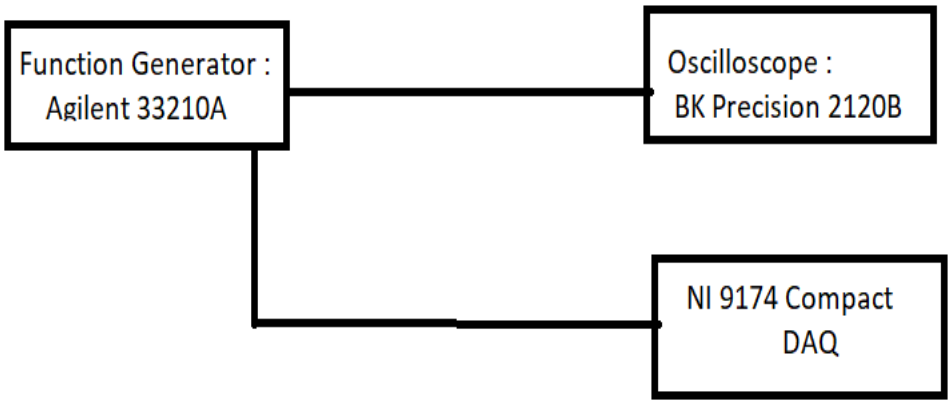


# TASK 2:

## AC Signal Measurement

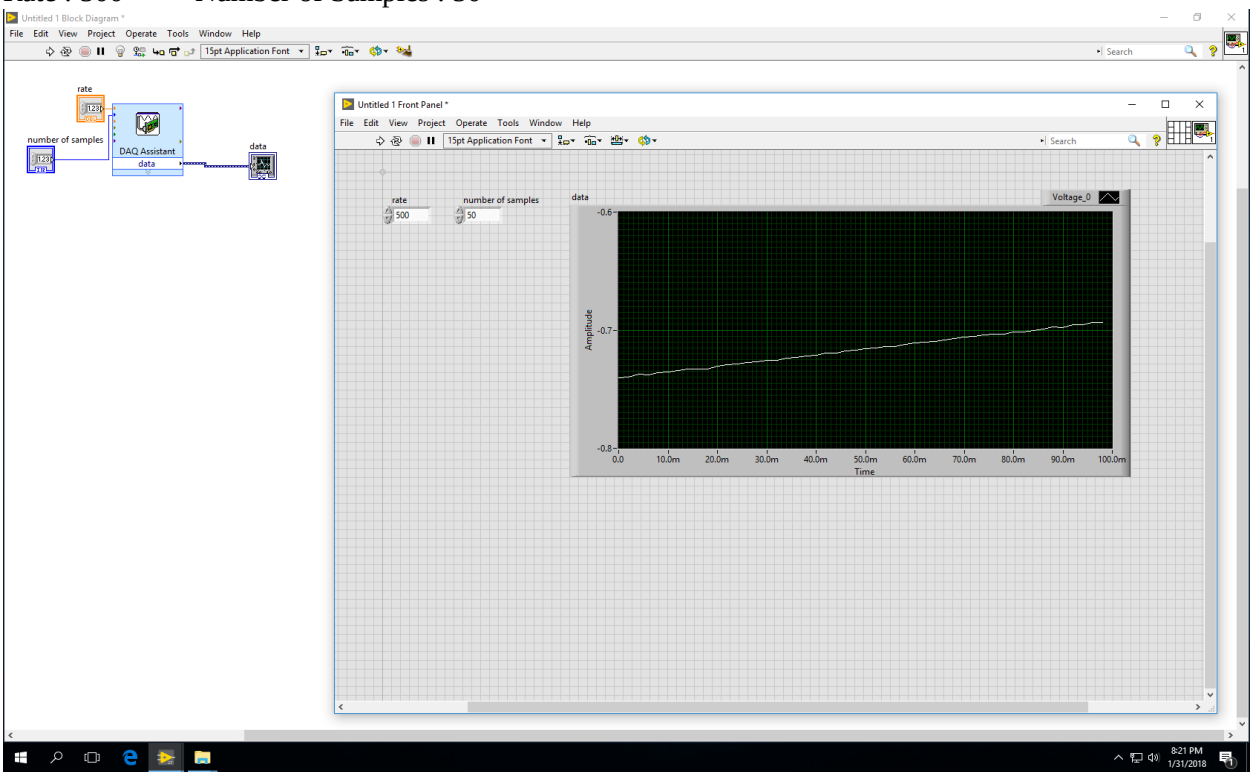
- NI compactDAQ 9215 is connected in parallel with the oscilloscope.
- Select values for “sampling rate” and “number of samples” in the LabView for a time varying signal.
- Fixed value for function generator as given,
  Frequency = 1000 Hz, Amplitude = 5 Vpp



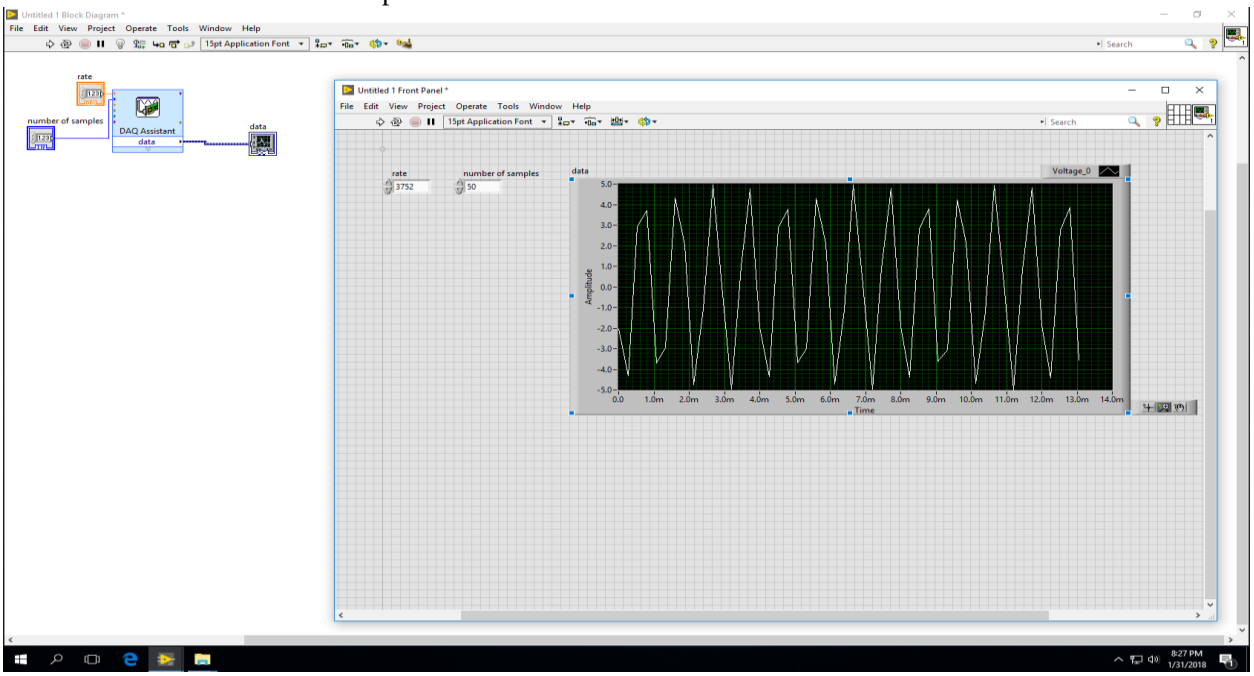

- Below are the graphs which shows for different sampling rate and samples.

  GRAPHS:

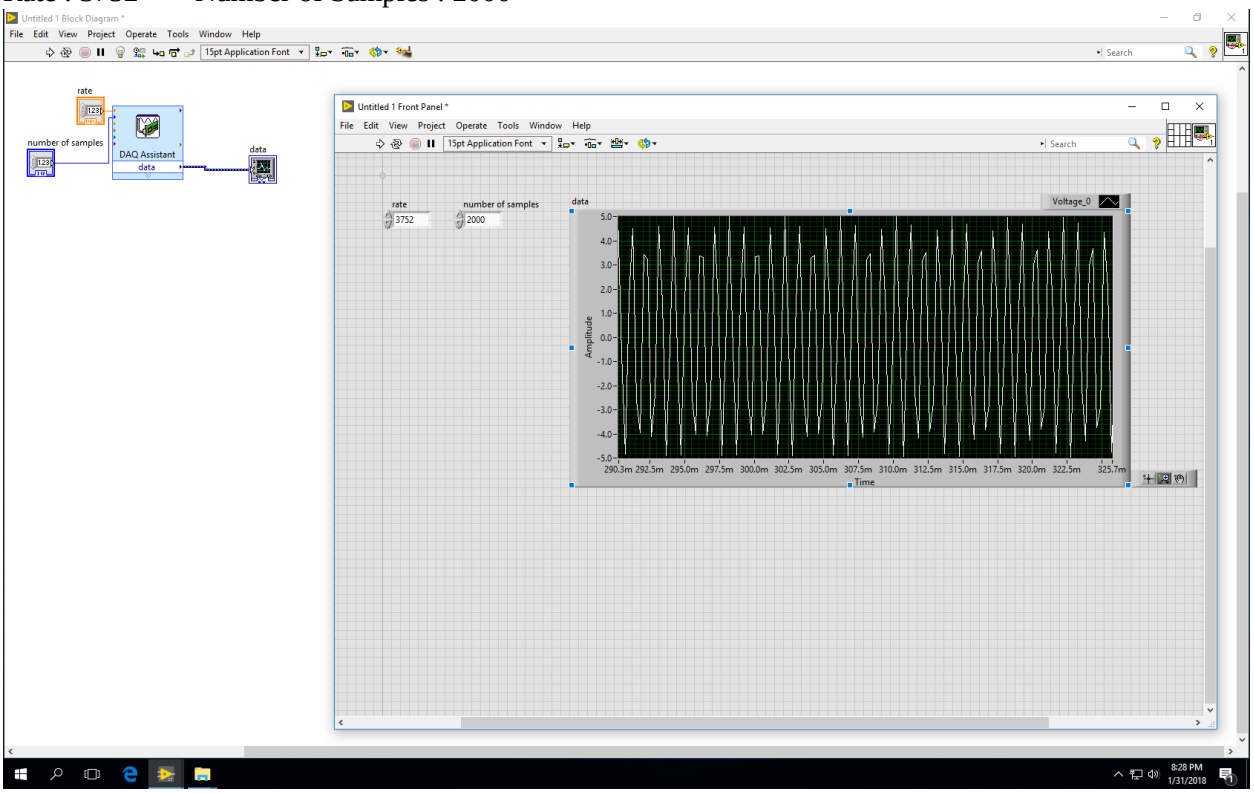
Rate : 500 Number of Samples : 50



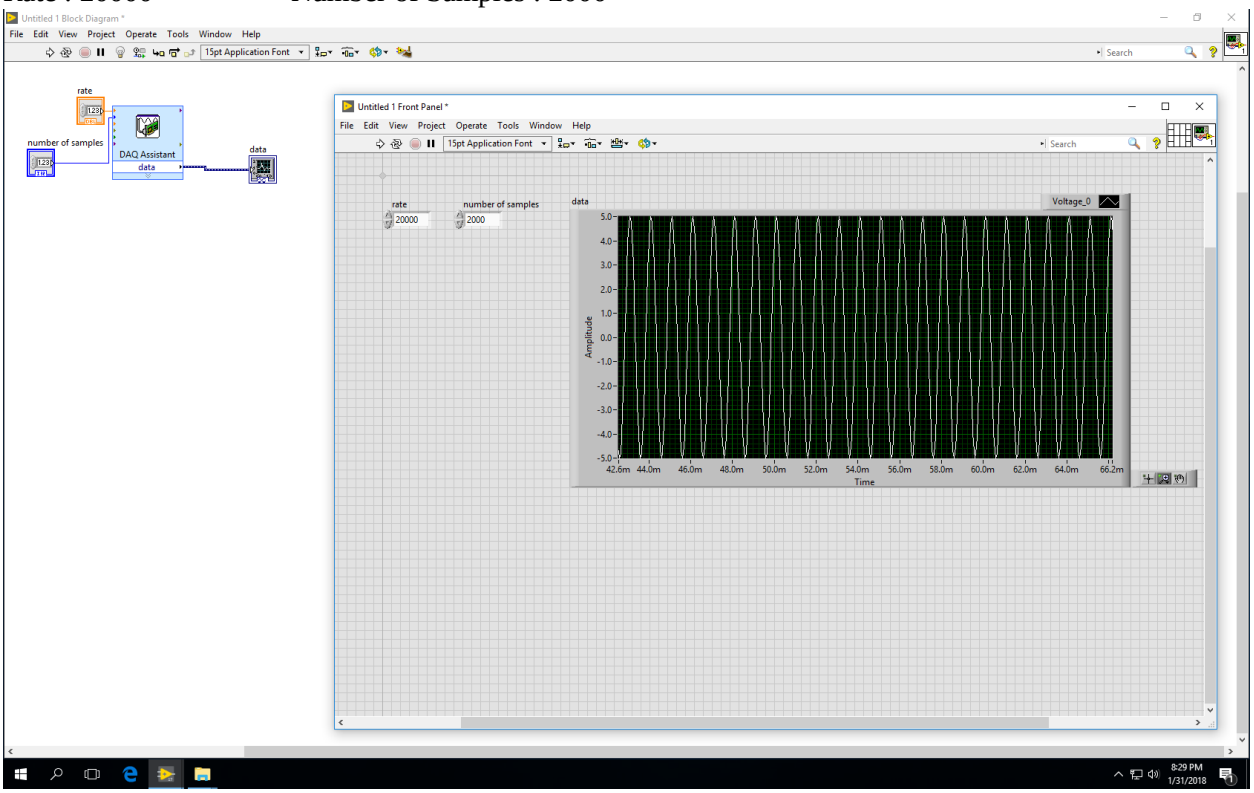

Rate : 3752 Number of Samples : 50



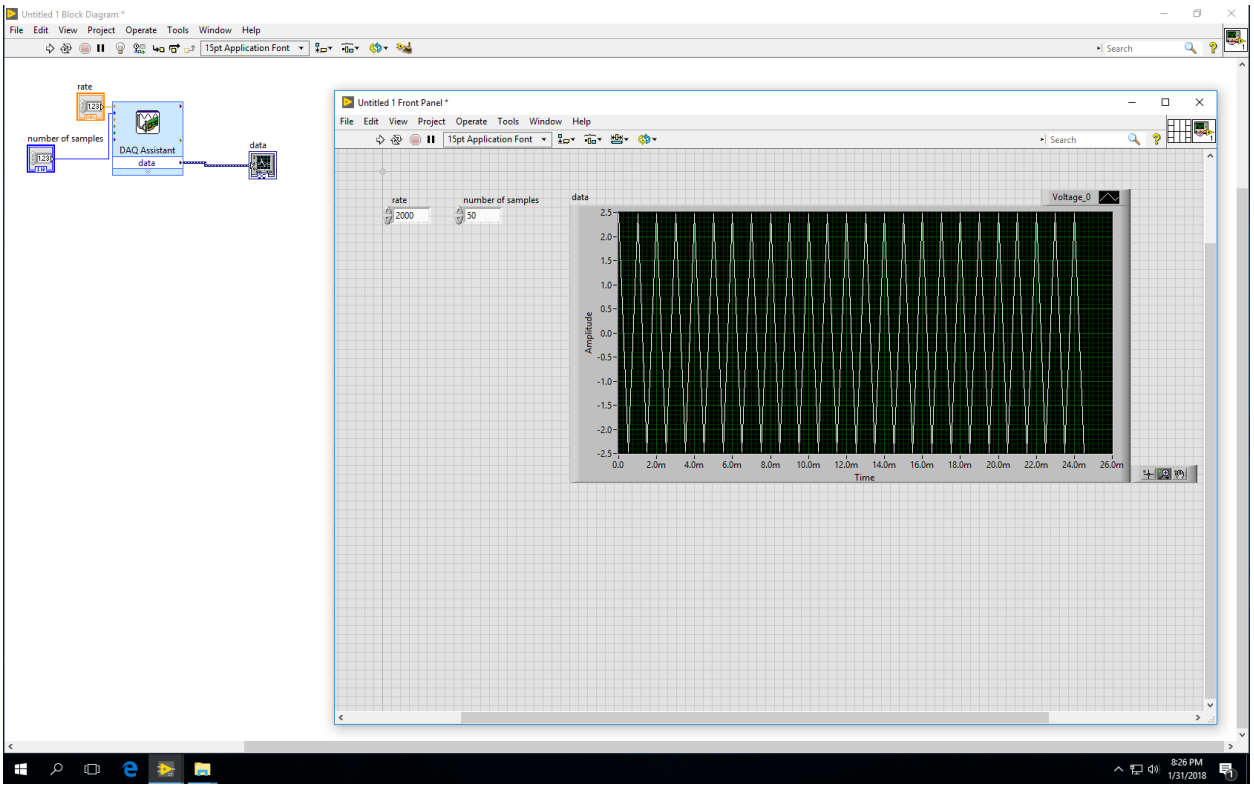
Rate : 3752 Number of Samples : 2000



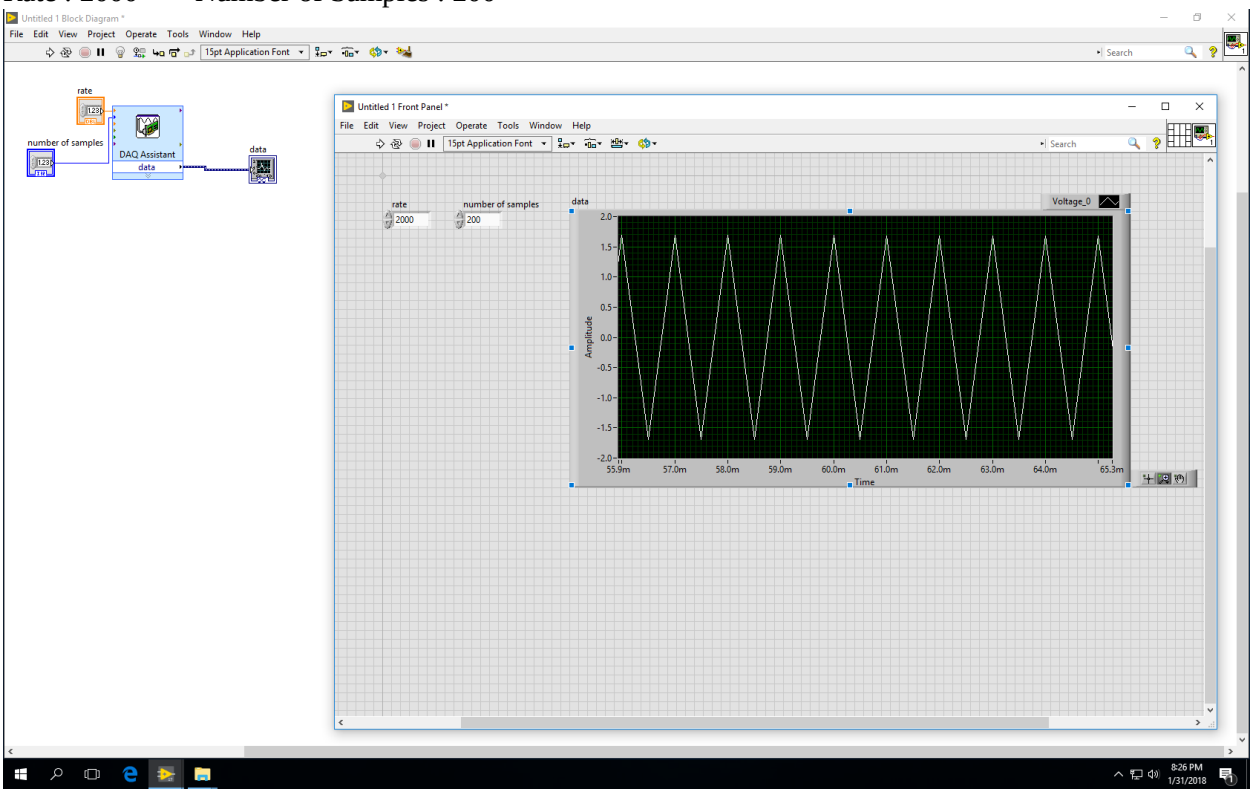
Rate : 20000 Number of Samples : 2000



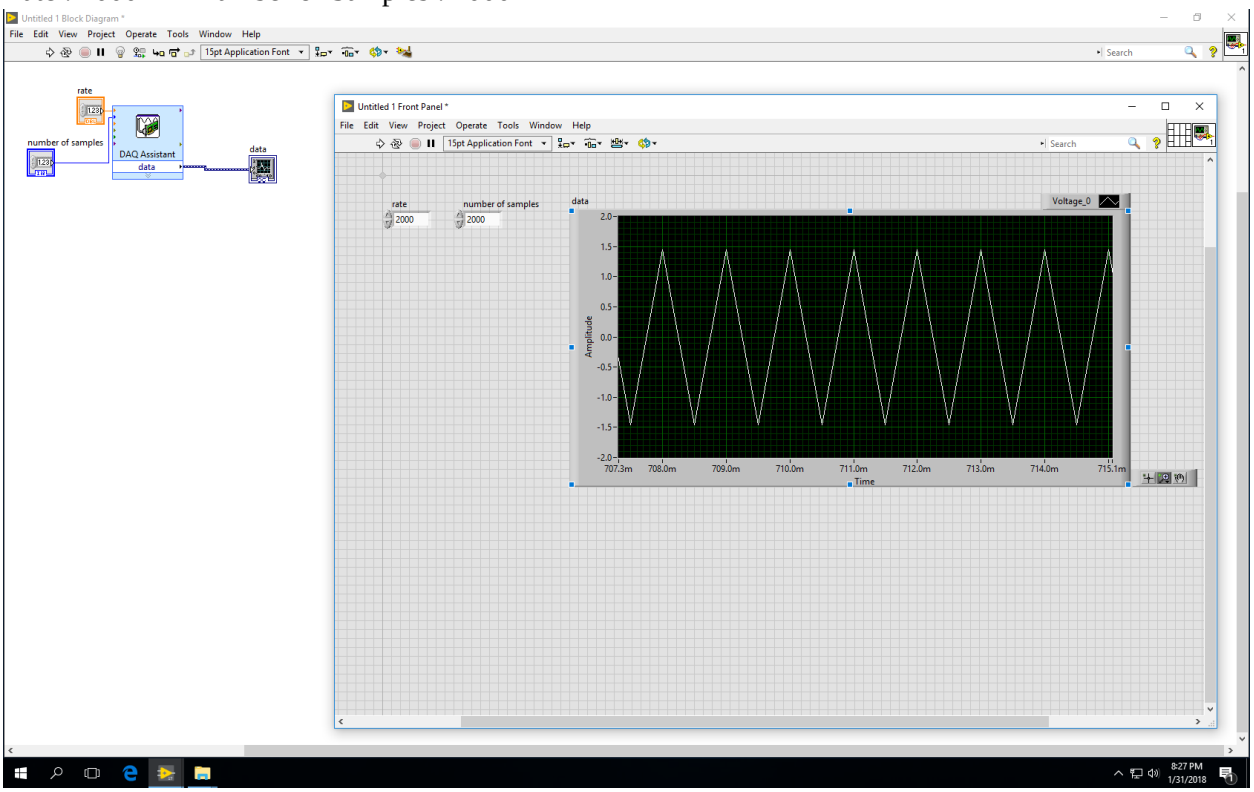

Rate : 500 Number of Samples : 2000



Rate : 2000 Number of Samples : 200




Rate : 2000 Number of Samples : 2000



**Observation:**

- We can see that with increasing sample values, the sine waves formed in the graph increases with respect to time. Whereas when the sample decreases, the wave form decreases.

  i.e. **Number of samples** ↑↑(increase), then **Amplitude** ↑↑**(**increase)

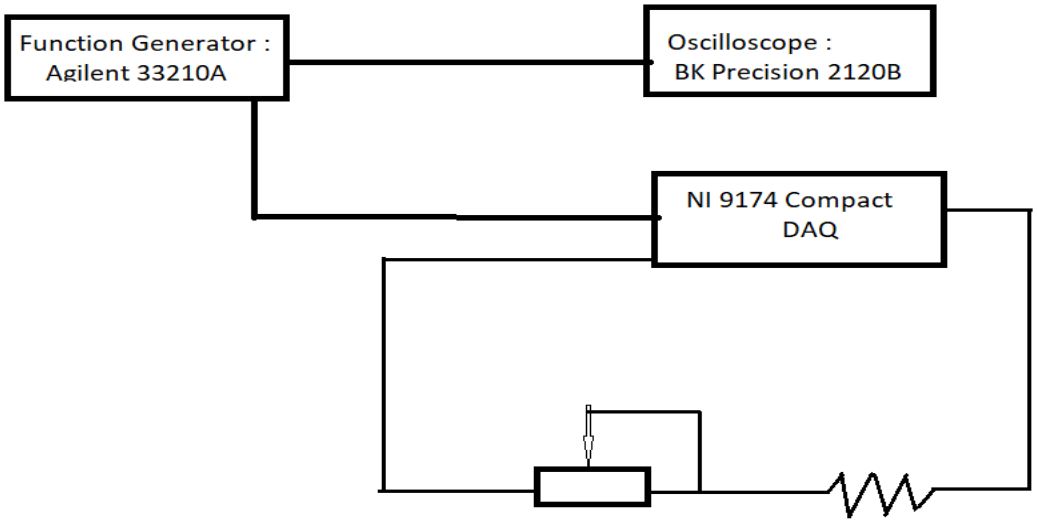
- We also observe that, when the sampling rate increases, the peak to peak value in the graph also increases with respect to time.

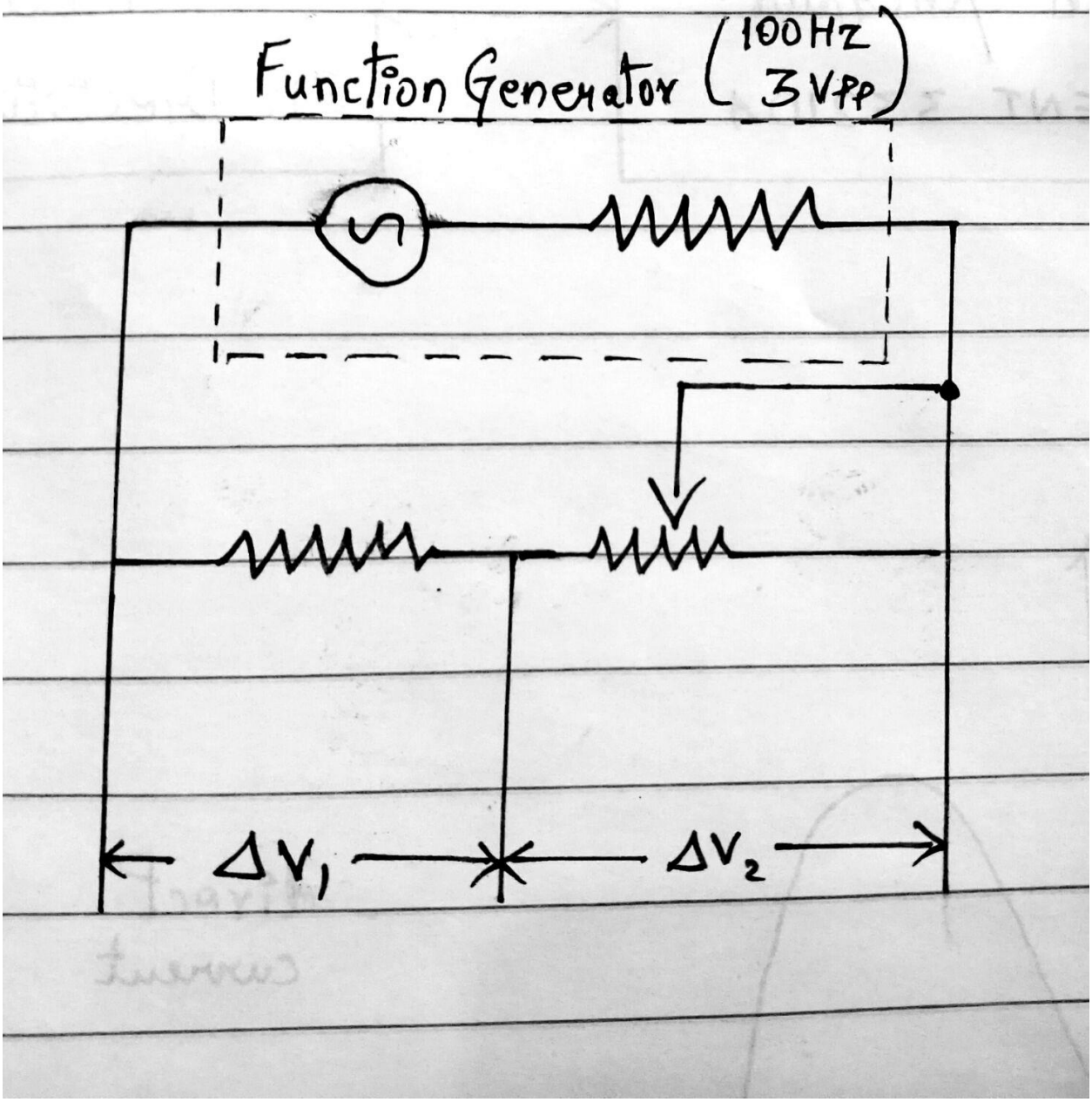
  i.e. **Sampling rate** ↑↑(increase), then **Peak to peak** ↑↑(increase)

## Task 3

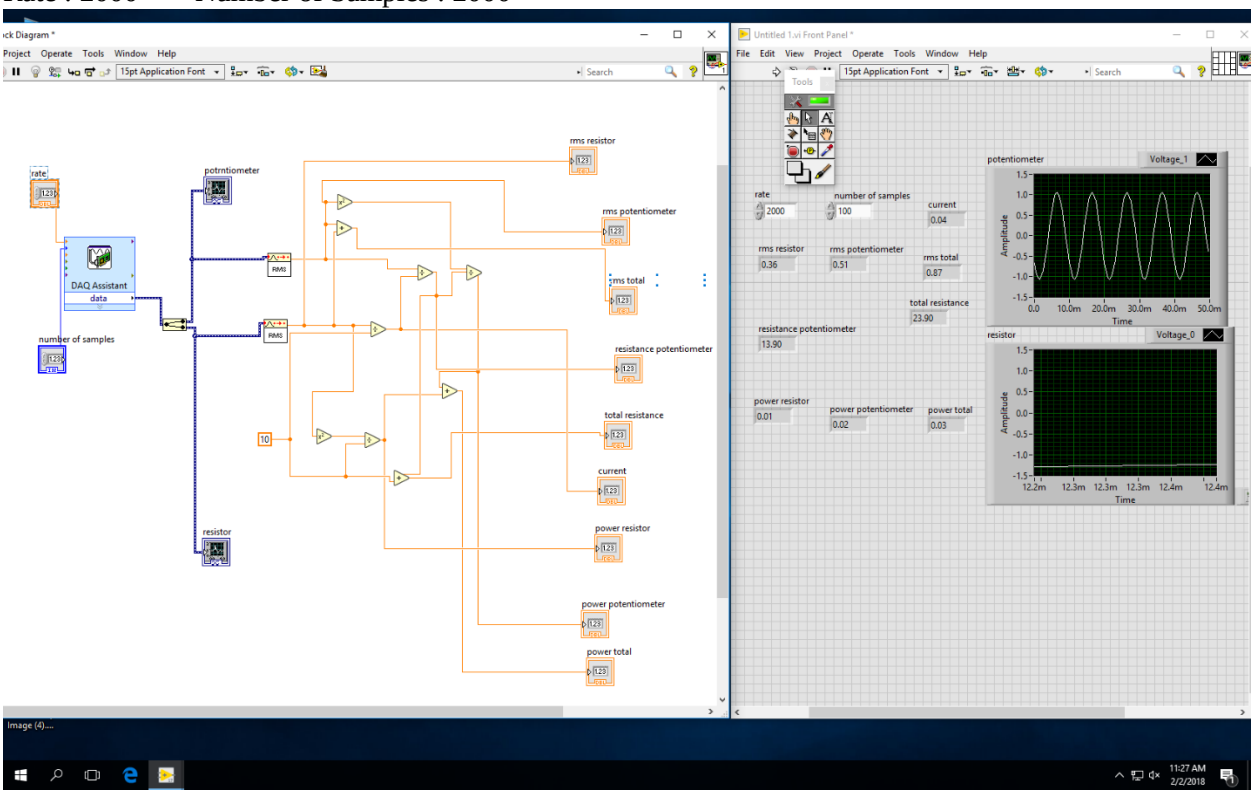
### Resistance/Power Measurement across a potentiomenter w/ Function Generator

- Fixed value for function generator as given,
  Frequency = 100 Hz, Amplitude = 3 Vpp
- We can select the value for "sampling rate" and "number of samples" in the LabView.




Function Generator (100Hz 3Vpp)
ΔV1
ΔV2

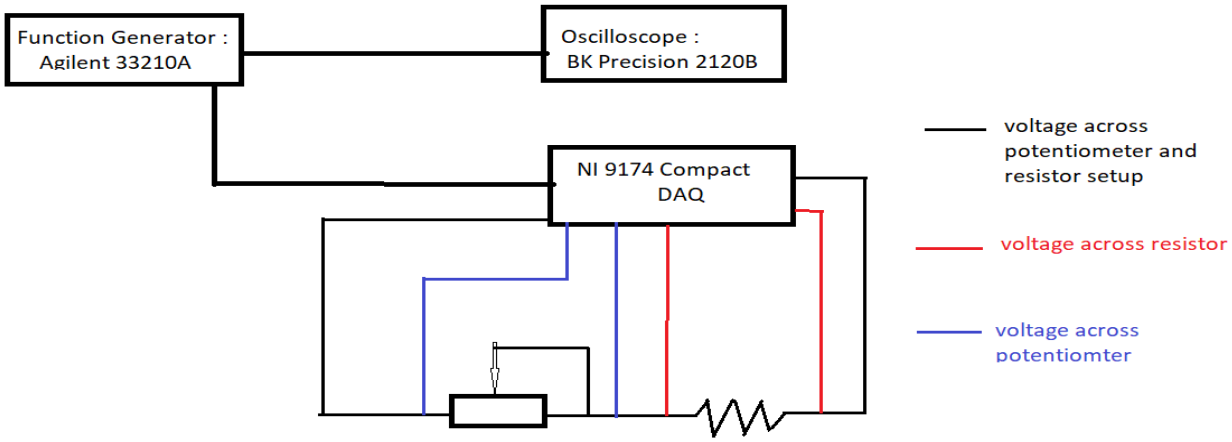
Rate : 2000 Number of Samples : 2000



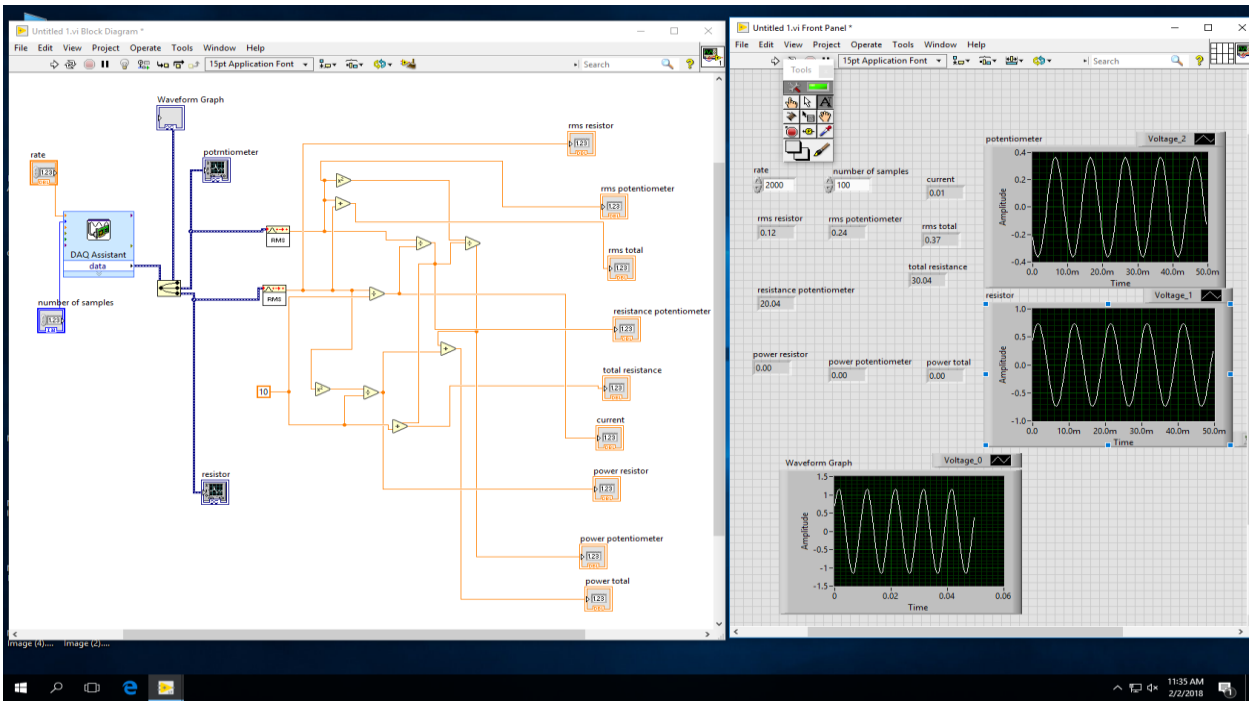

# Task 4

## Find the maximum power output of a function Generator

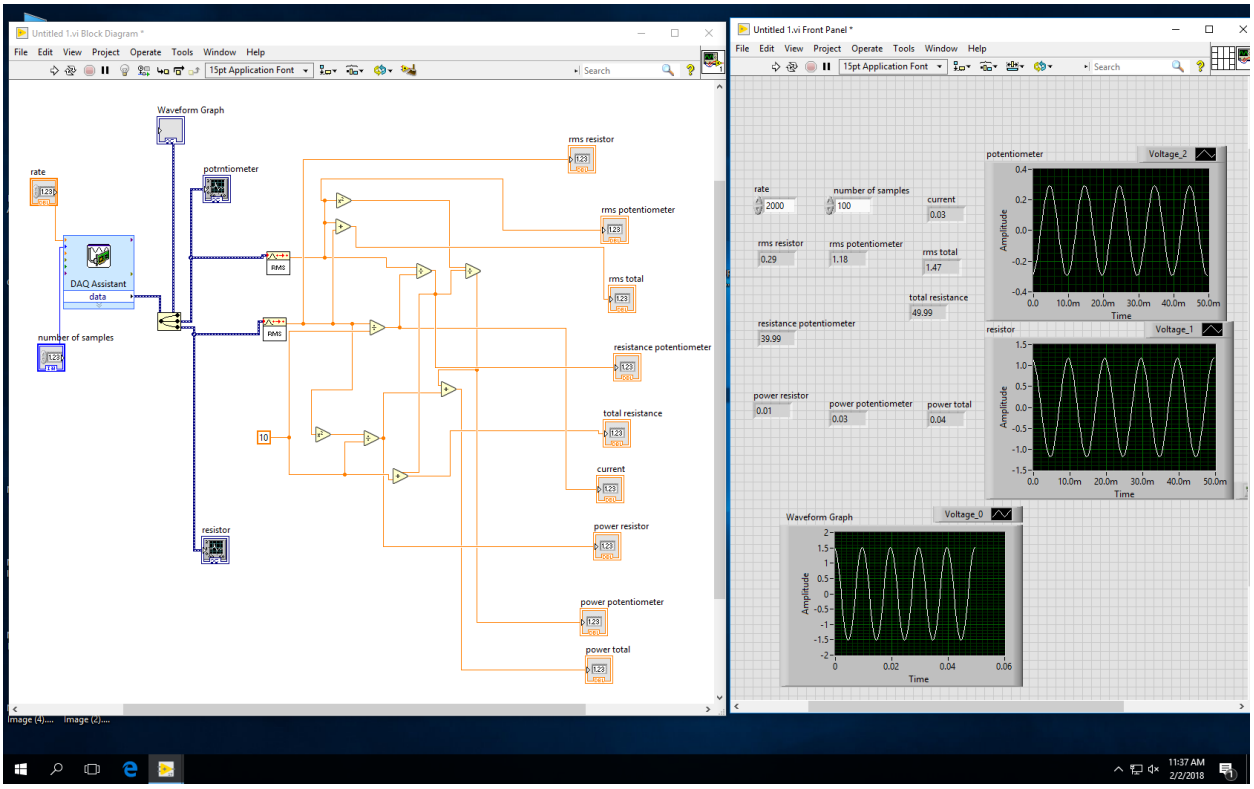
- The power dissipation is calculated by adding the function in LabView across the two resistors.
- Tune the potentiometer to set the resistance.
- The suggested resistance value of the potentiometer are 20, 40, 60, 80, 100, 150 and 200 ohms.



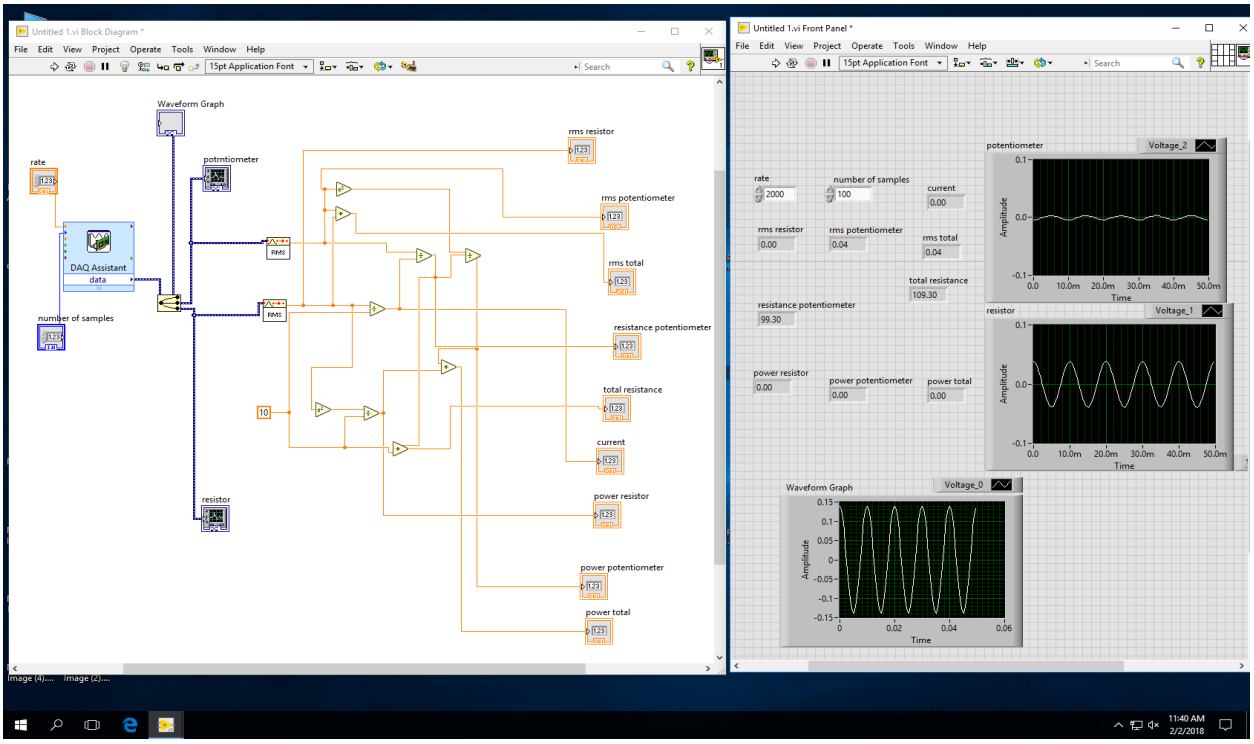

Potentiometer Resistance = 20 ohm

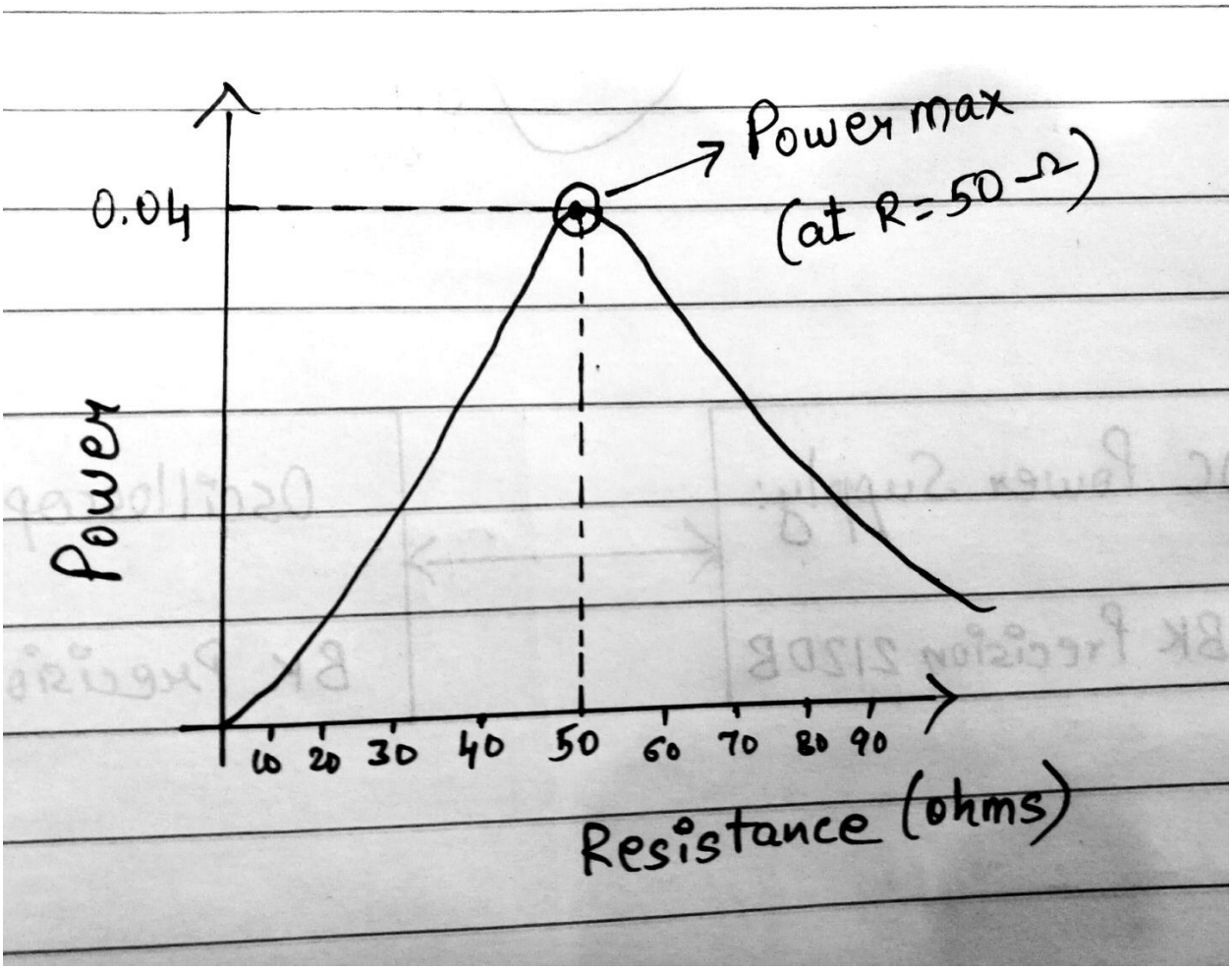



Potentiometer Resistance = 40 ohm




Potentiometer Resistance = 100 ohm






From the graph, we can see that maximum power occurs at resistance 50 ohms.