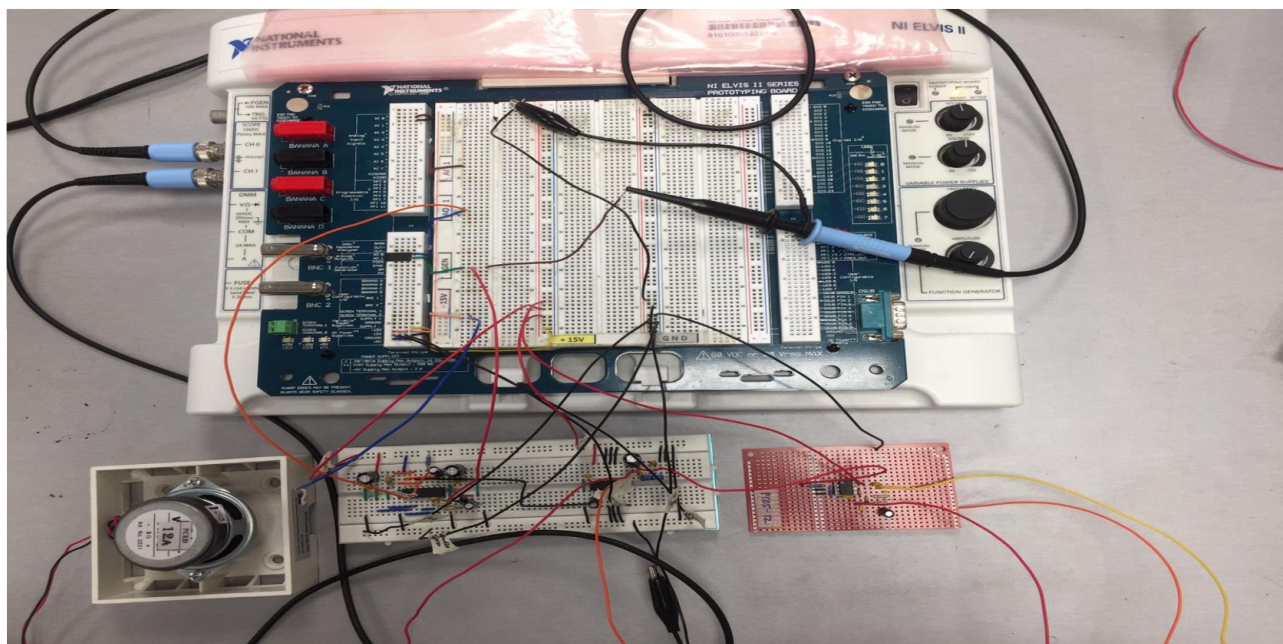# Week 9 Lab Report

OBJECTIVE

To integrate the subsystem circuits constructed so far to form and test a complete audio amplifier system.

Circuitry

Integration of the subsystem circuits is performed and tested using Personal Computer (PC) with LabVIEW and NI ELVIS launcher/driver NI ELVIS II.
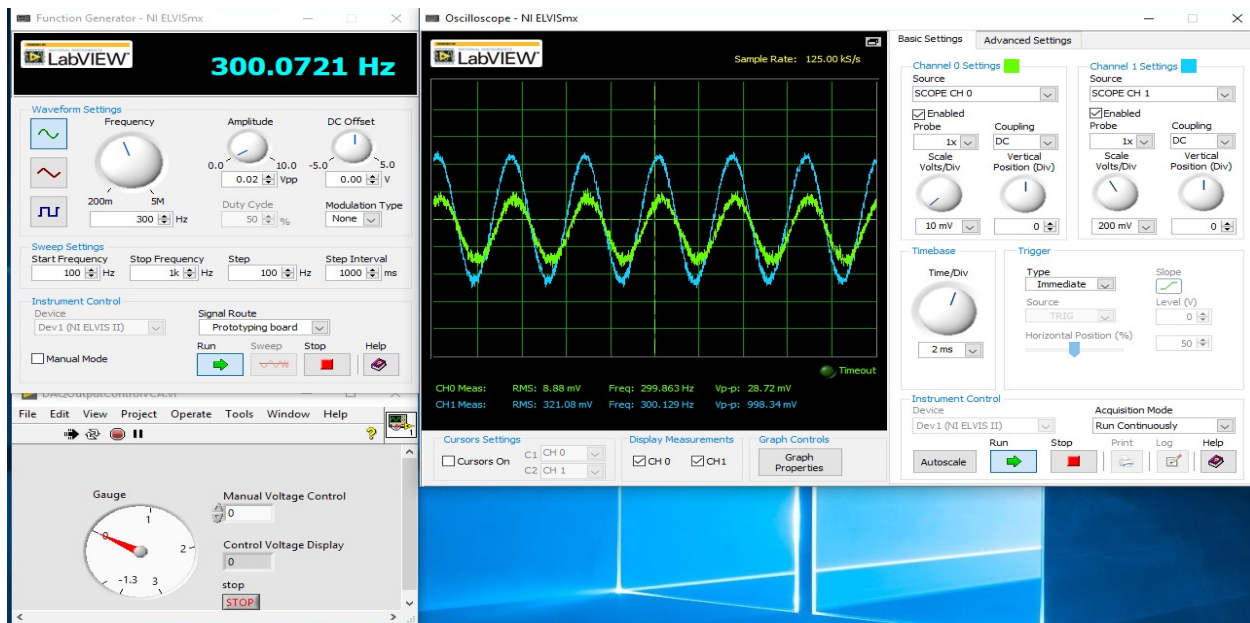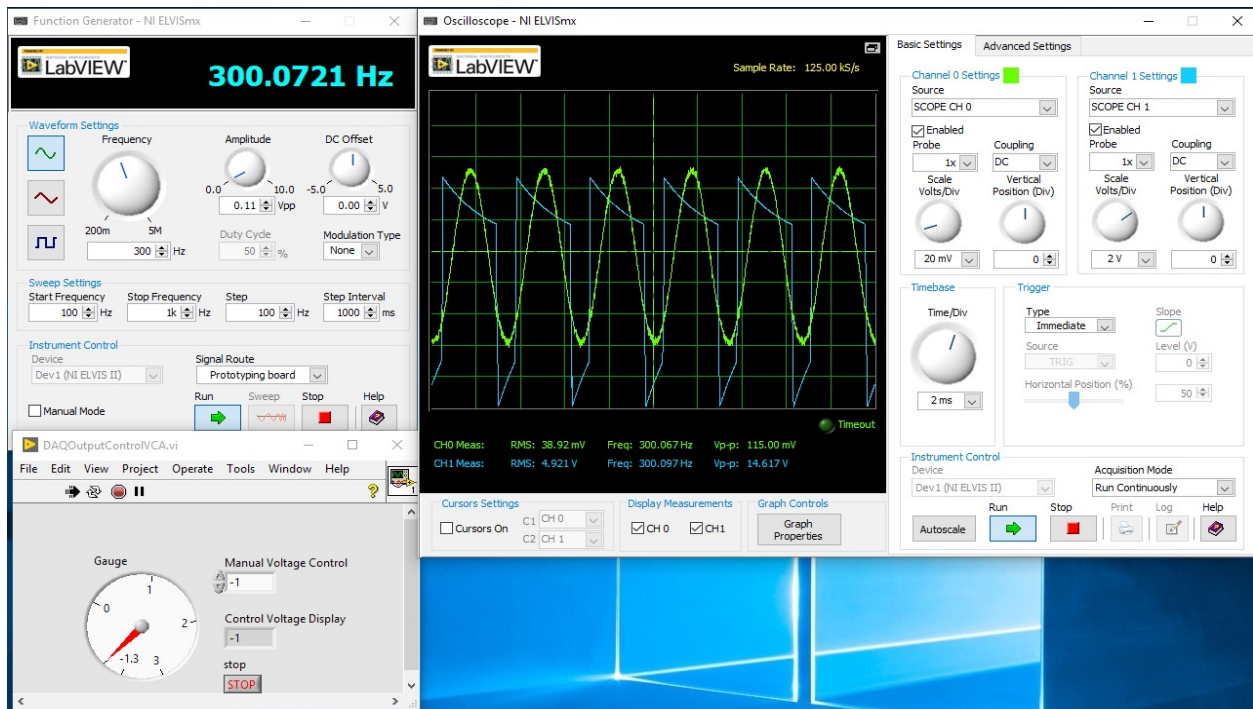

(Figure 1 – Circuitry)

WAVEFORM

The oscilloscope displays the Audio output (CH1) with the input of Audio input (CH0). The diagram below shows how the Audio output values (Vpeak-to-peak) and sinusoid graph change with varies DAQoutputControl voltage (Vc) and Audio input (Vpeak-to-peak):
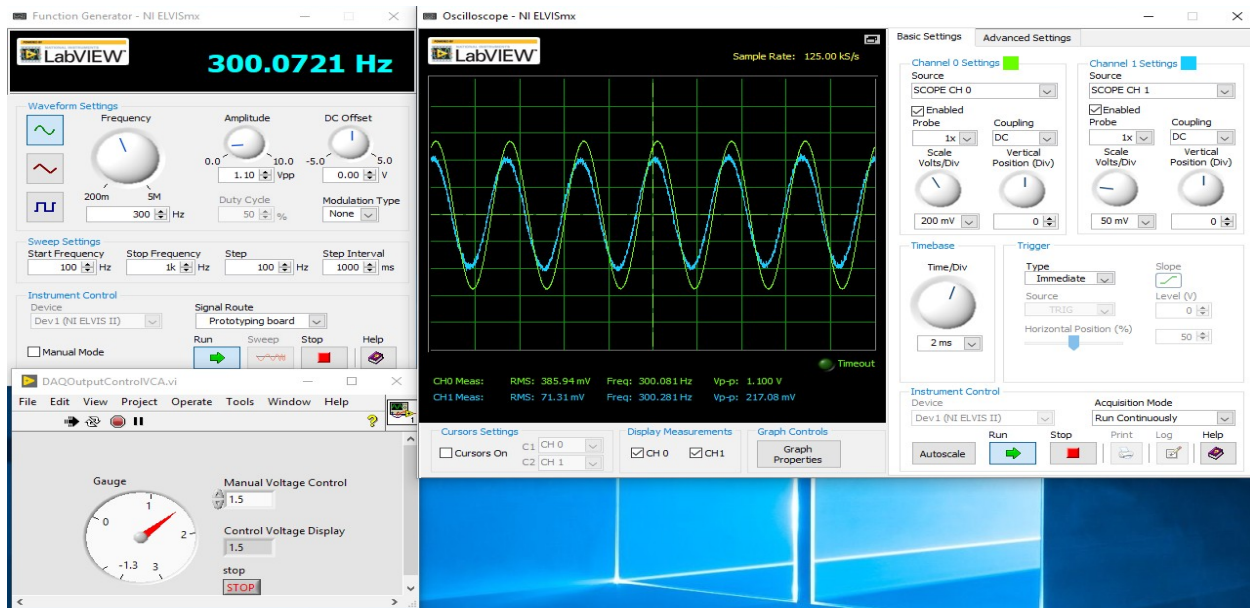
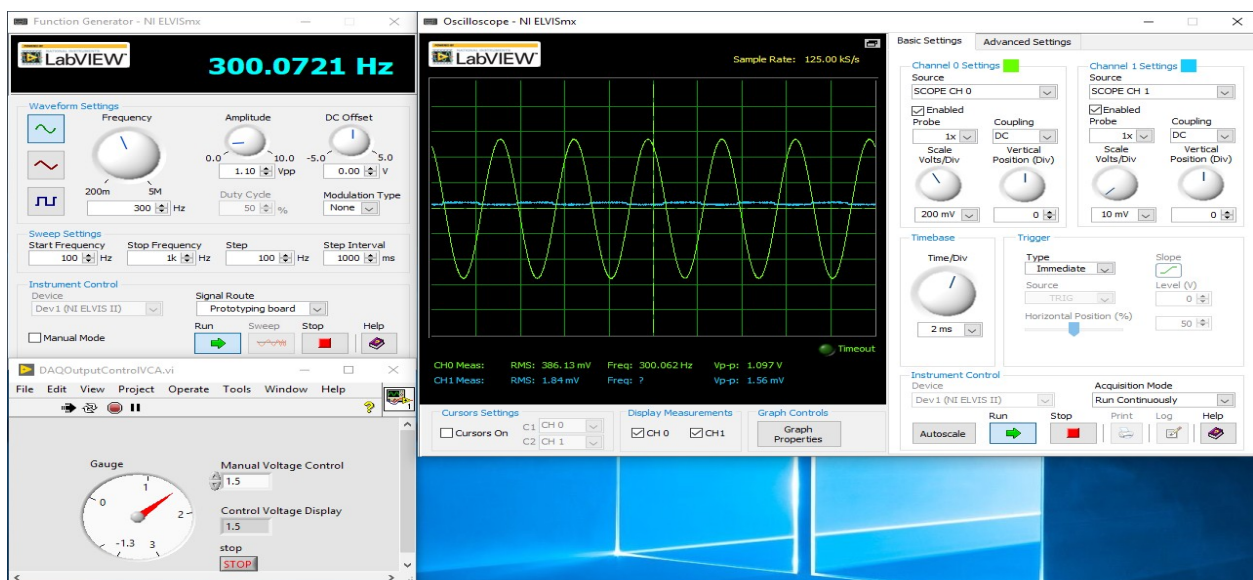

(Figure 2.a - 1.1Vpp with 1.5V VCA)

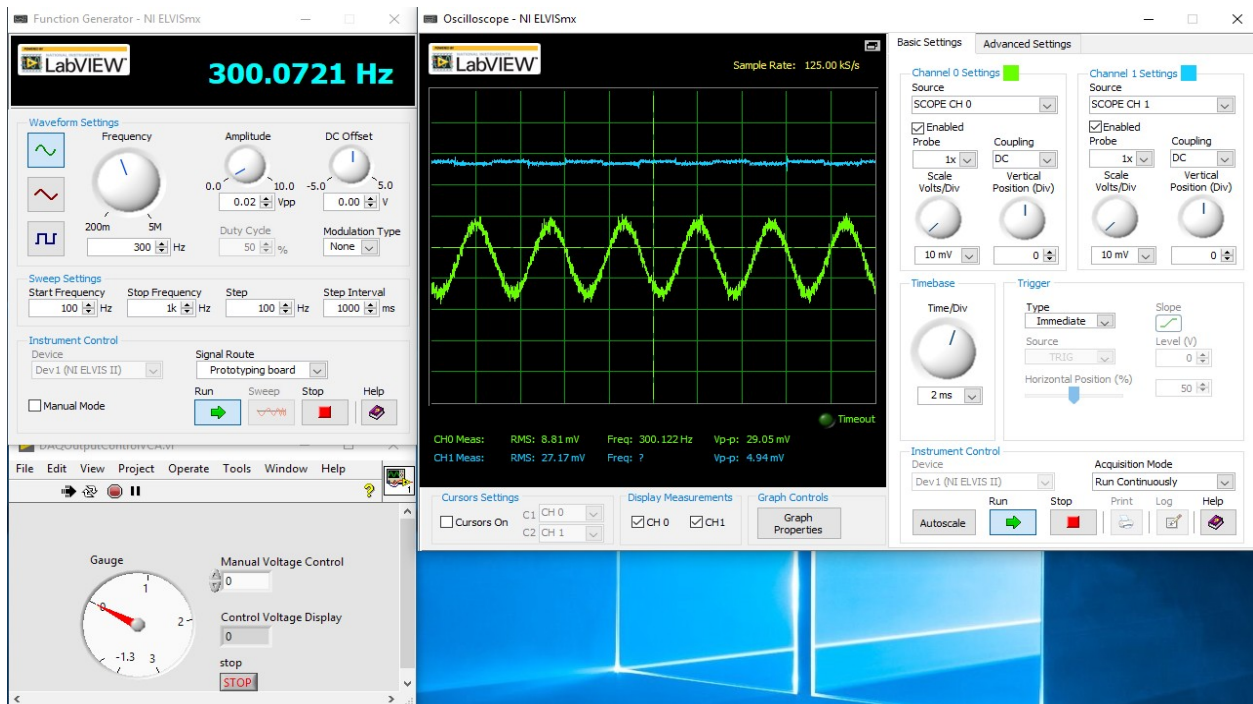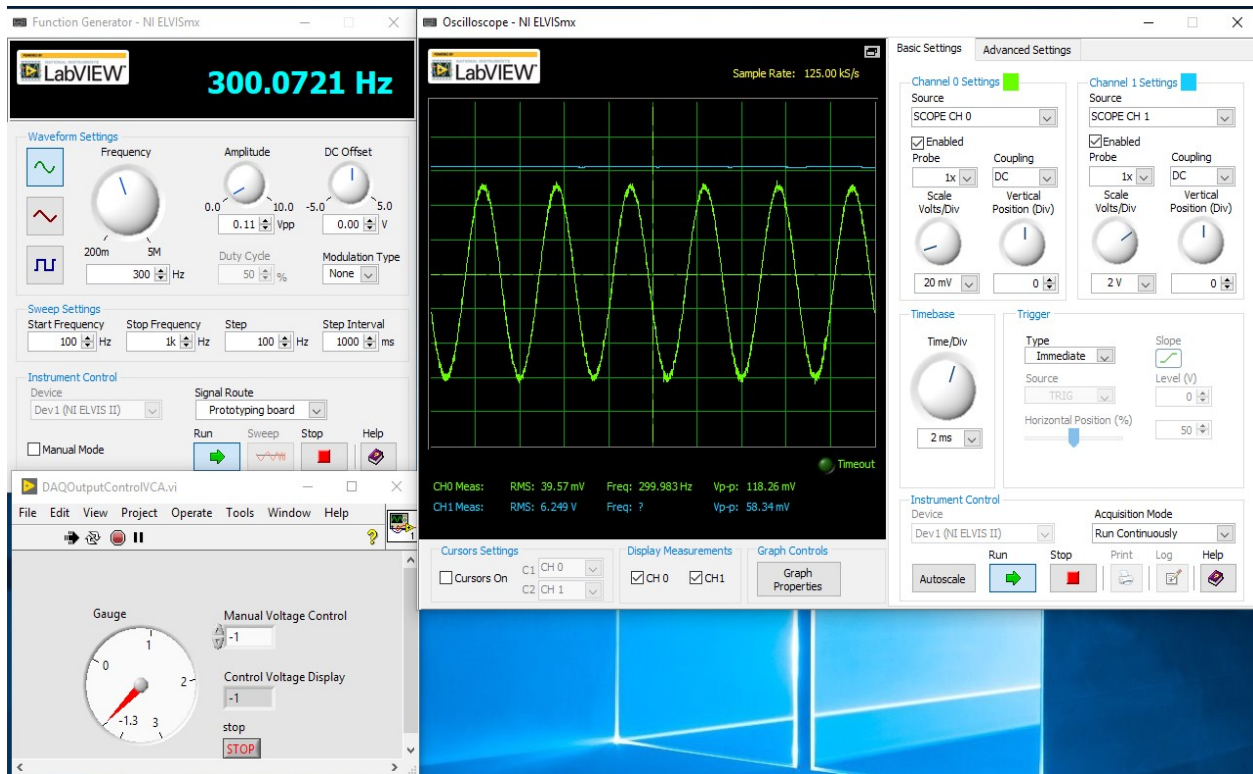(Figure 2.b - 0.2Vpp with 0V VCA)

(Figure 2.c - 0.11Vpp with -1V VCA)

The oscilloscope displays the Audio output (CH1) with the input of VUoutput3 (CH0). The Vrms value of the VUoutput3 varies with the DAQoutputControl Voltage (Vc) and Audio Input (Vpeak-to-peak) as shown below:

(Figure 3.a - 1.1Vpp with 1.5Vc)


(Figure 3.b - 0.02Vpp with 0Vc)

(Figure 3.c - 0.11Vpp with -1Vc)

4.1(a) Using Microsoft Excel, plot the graph of Gain (dB) versus Vc. Does the output performance of the audio amplifier system meet the desired objective?

Graph of the Gain (dB) versus Vc

| Audio Input (Vpp)	VC (V)	Audio Output (Vpp)	Gain (dB)	VUoutput3 (Vrms)
1.1	1.5	0.2	-14.807	0.002
1.8	1	1.9	0.470	0.257
1.2	0.5	7.75	16.202	2.2
1.2	0.25	13.6	21.087	4.13
0.02	0	0.98	33.804	0.026
0.13	-0.25	12.1	39.377	3.55
0.16	-0.5	14.8	39.323	4.69
0.11	-1	14.8	42.577	6.3

Gain (dB) VS Vc (V)
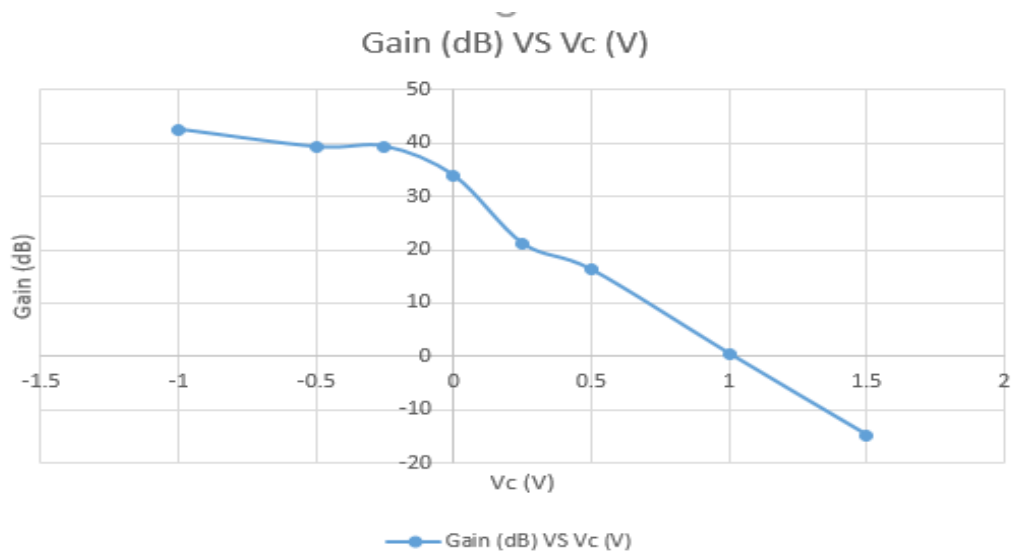
The system successfully amplified small input signal to high output signal.

4.1(b) Increase the frequency of the FGEN to 100 kHz. Explain what happens and why.

The frequency hits the -3db limits therefore it shows distort waveform with a close to 0 gain. The DC does not have enough sampling rate therefore it is unable to obtain the desired output.
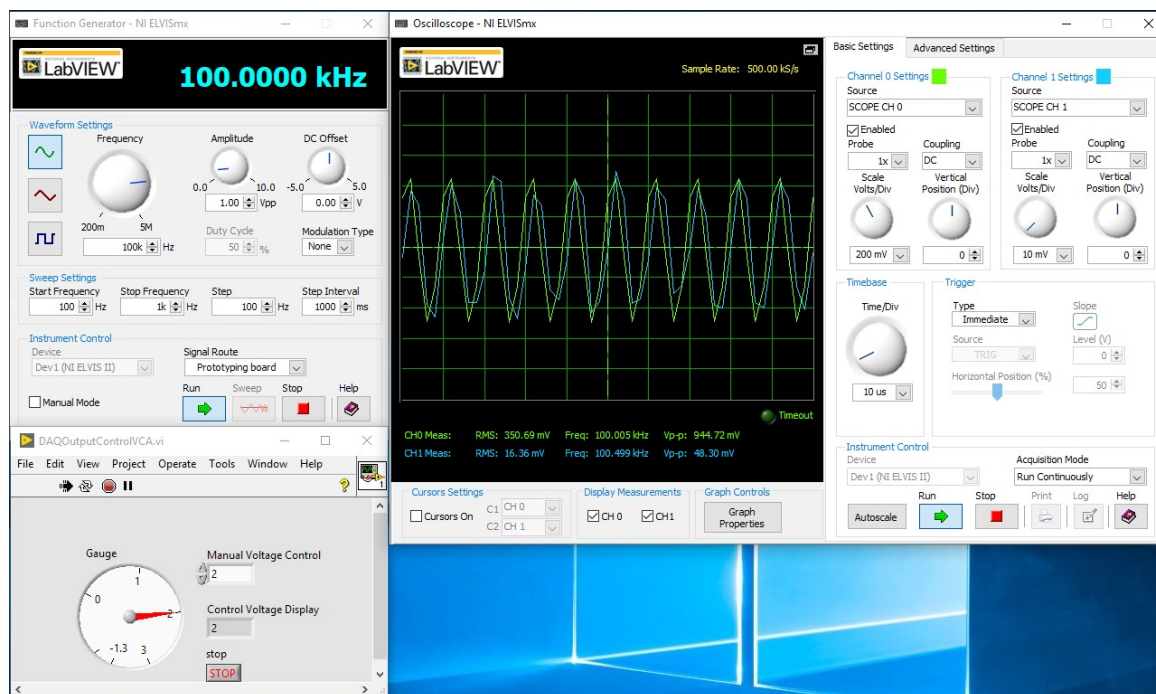
- Three sample of different VCA voltage of 100kHz with 1Vpp were captured as shown below:
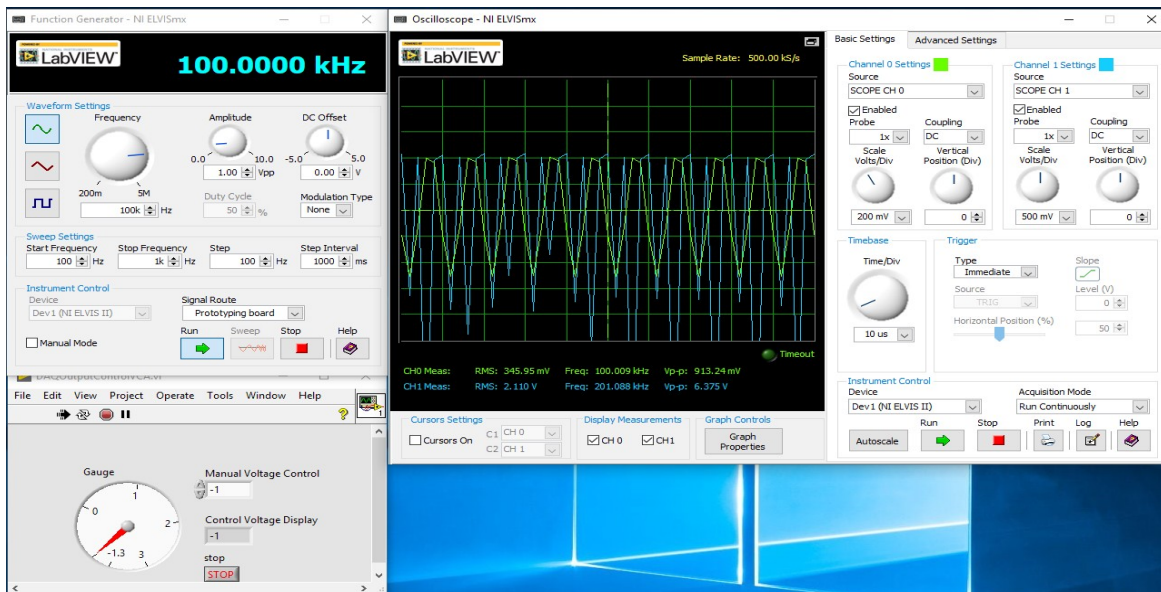
(Figure 4.a - -1V VCA)
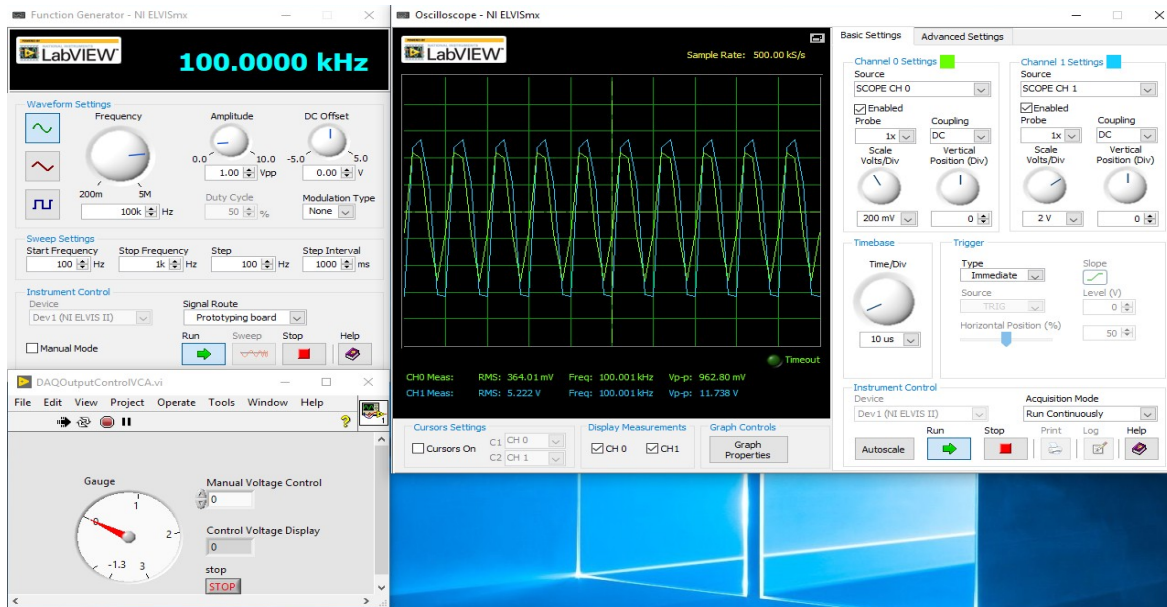
(Figure 4.b - 0V VCA)

(Figure 4.c - 2 VCA)

Open Ended Questions

Please describe the problems you encountered when integrating the circuit. How did you troubleshoot the problems?

Initially, we connected the VCA output pin to PA input pin wrongly. We got a phase difference waveform and Vpp being clipped off. We did not realized where went wrong and tested the individual subsystem one by one again. However, everything was found to be working. After many tries we still did not know where went wrong, we tried to reconnect the pins we integrated and realized we connected the pin wrongly. The connection was rectified and it started working.