

Course Title:	Electronic circuits
Course Number:	404
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<i>Assignment/Lab Number:</i>	4
<i>Assignment/Lab Title:</i>	Wave shaping circuits

<i>Submission Date:</i>	03 - 08 - 25
<i>Due Date:</i>	03 - 09 - 25

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*By signing above you attest that you have contributed to this written lab report and confirm that all work you have contributed to this lab report is your own work. Any suspicion of copying or plagiarism in this work will result in an investigation of Academic Misconduct and may result in a "0" on the work, an "F" in the course, or possibly more severe penalties, as well as a Disciplinary Notice on your academic record under the Student Code of Academic Conduct, which can be found online at: <https://www.torontomu.ca/content/dam/senate/policies/pol60.pdf>

Introduction and Objective:

The purpose of this lab is to investigate the ability of a diode to reshape input signals to a circuit into a desirable form, such as converting a sinusoidal signal into a triangular signal. Such wave-shaping circuits will be shown in the following report.

Experiment and results:

The implemented circuits with their corresponding waveforms:

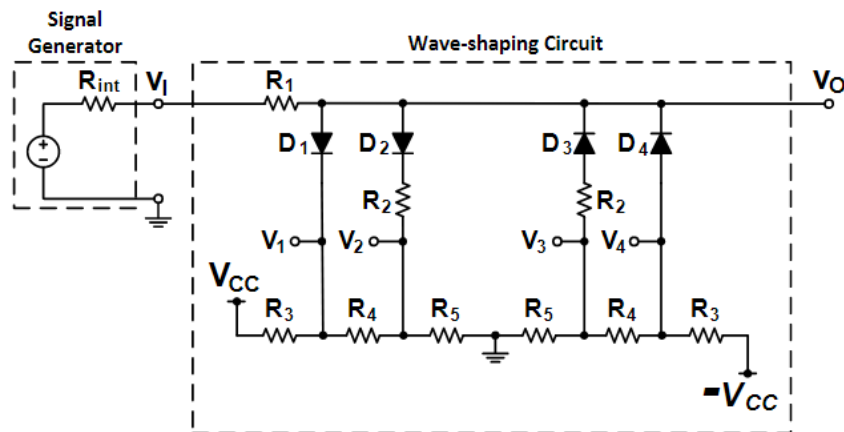
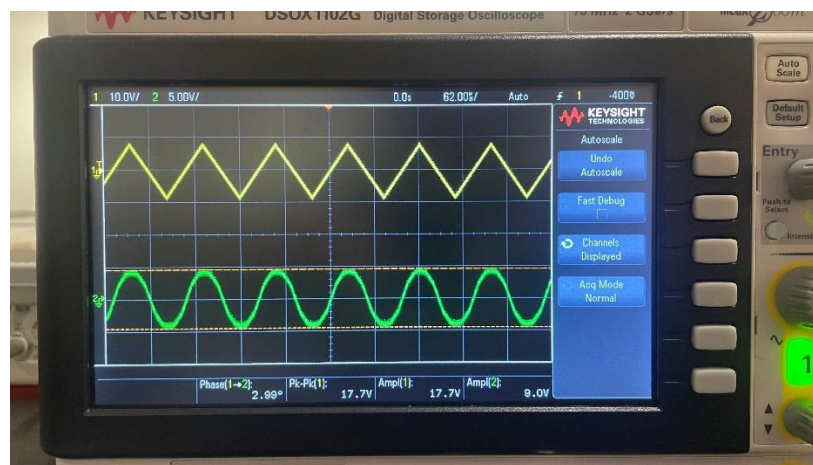
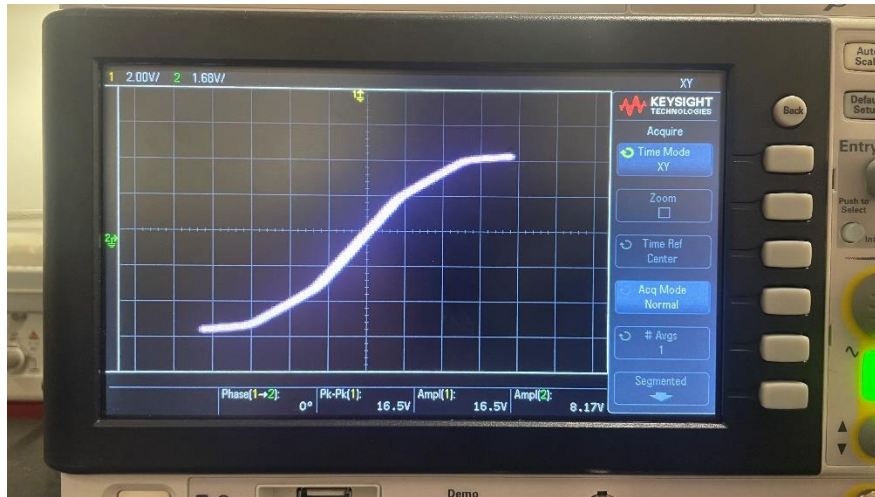


Figure 1.0 Circuit to be implemented.



Graph E1(a) Waveforms of the input and output for the circuit in Figure 1.0



Graph E1(b) Transfer characteristic of the circuit in Figure 1.0

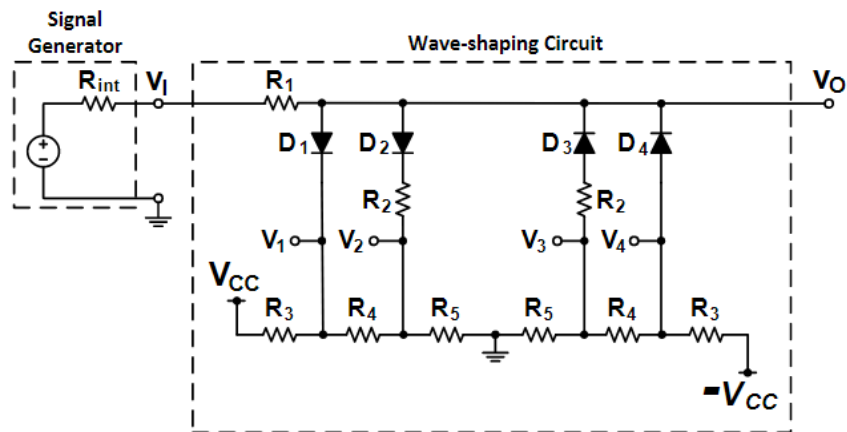
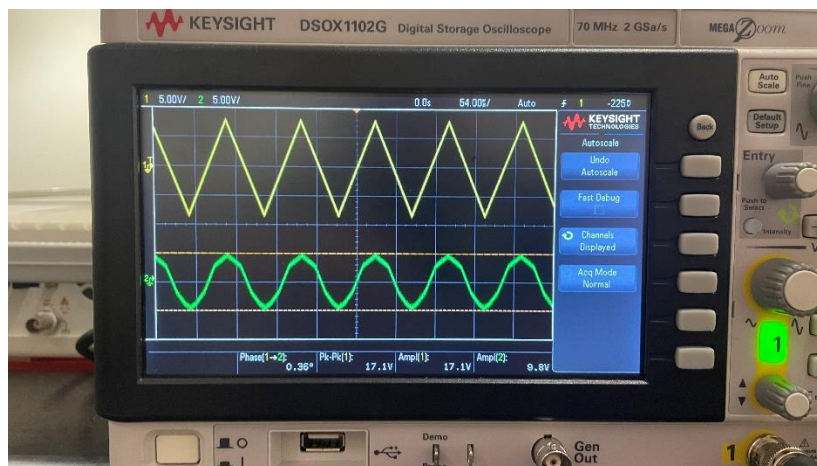
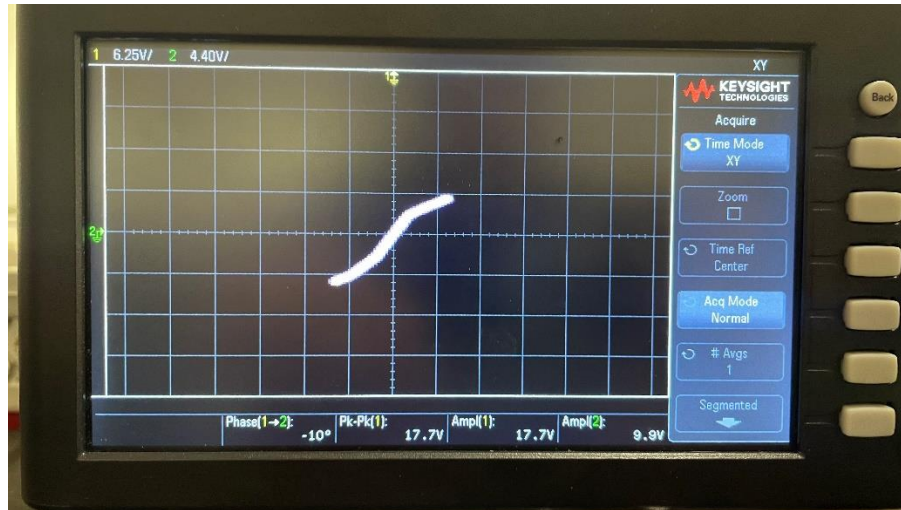


Figure 2.0 second circuit to be implemented.



Graph E2(a) Waveforms of the input and output for the circuit in Figure 2.0



Graph E2(b) Transfer characteristic of the circuit in Figure 2.0

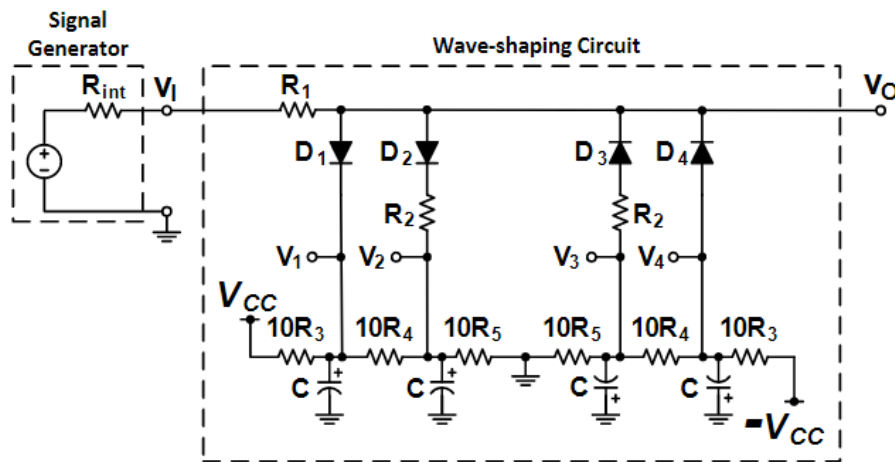
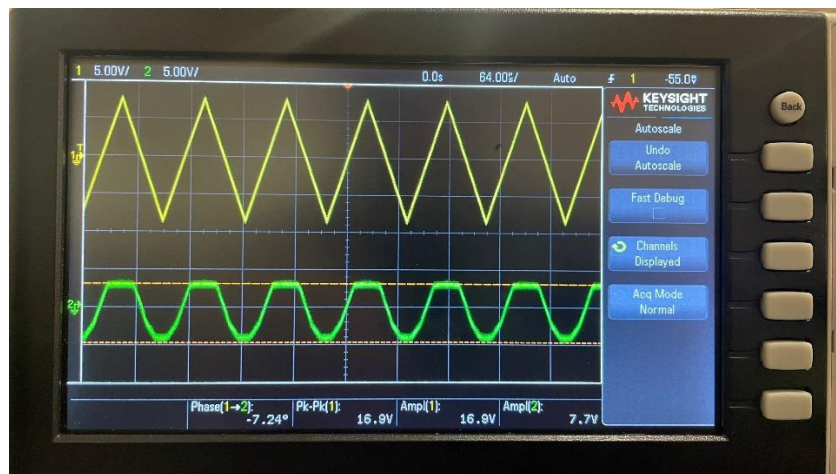
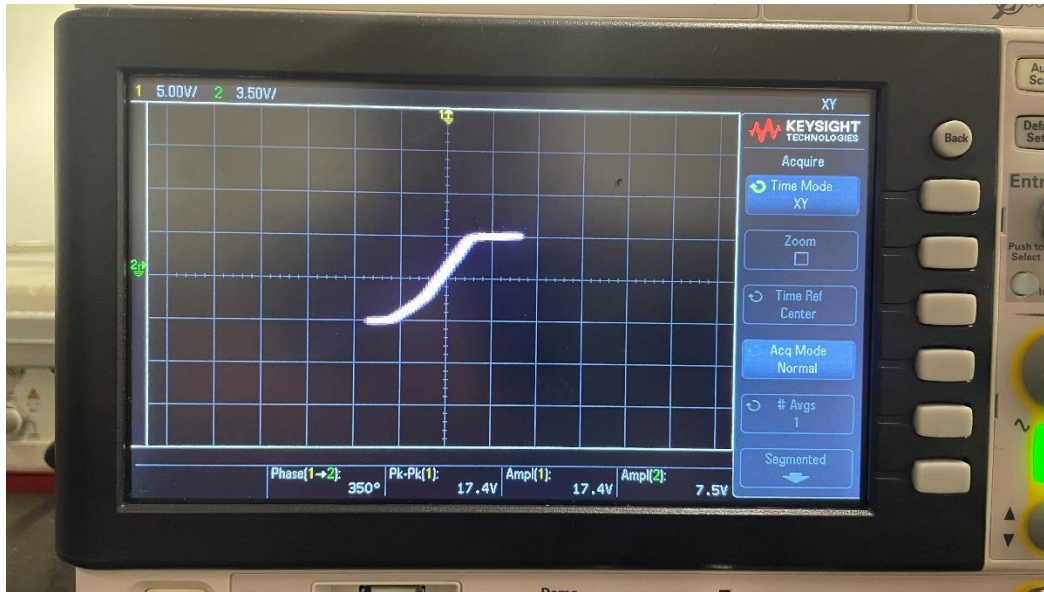


Figure 3.0 Third circuit to be implemented.



Graph E3(a) Waveforms of the input and output for the circuit in Figure 3.0



Graph E3(b) Transfer characteristic of the circuit in Figure 3.0

Conclusions and Remarks:

C1.

It can be seen that the output voltage resembles that of a symmetrical and periodic sinusoidal wave, which is synthesized from a symmetrical periodic triangular input voltage.

C2.

Both Graph P1 and Graph P3(b) are identical and are in agreement. They both have the same V_{peak} of 4V and have the same identical shape.

C3.

The transfer characteristic in graph P1. Is similar to that of graph E1(b) and graph E2(b), however, the peak values of the transfer characteristic in graph E2(b) seem to be higher than that of the transfer characteristic of graph E1(b), and the peak values of the transfer characteristic of graph E1(b) is higher than that of graph P1.

C4.

The transfer characteristic in graph P1 differs from the transfer characteristic in graph E3(b) in the way that the output voltage remains constant after a certain value, which can be seen by the flattened portion of the waveform. This constant voltage is due to the effect of the bypass capacitor, where after a certain voltage value the capacitor bypasses the resistors, causing the diodes to go into reverse-bias, in-turn stopping a change in the output voltage.

C5.

Graph P1 has similar characteristics as Graph E1(b), Graph E2(b), and Graph E3(b) thus making them in agreement. Our graphs are taken from the oscilloscope, and it seems that from Graph E1(b) through Graph E3(b), the graph gradually became steeper. All graphs still have the same shape making them in agreement.

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