CARLETON UNIVERSITY
Department of Systems and Computer Engineering

SYSC 3203
Project Title: EMG-Controlled Mouse
Lab Milestone #4A: Comparator and Trigger

In the previous lab, we obtained at the output of the integrator a signal indicating the intensity of the muscle contraction. The next step is to have a circuit that triggers for a given time whenever the intensity reaches a certain threshold. The goal for milestone #4 is to implement such a circuit by combining a comparator followed by a monostable circuit. In this lab you will implement the first part of this, consisting of a comparator followed by an edge trigger circuit.

1. Comparator

For designing the comparator, the senior electronics engineer recommends an LT1011. Design a comparator using the LT1011 that will compare the output of the integrator from the previous lab to an adjustable threshold (via a 10 kΩ potentiometer). The output of the comparator should be -3V or +3V.

1.1   Show your design to the instructor and have him/her sign your lab book.

Test your comparator using a function generator and an oscilloscope. You can use for instance a sawtooth or triangular wave to show the comparator is working properly.

1.2   Show your comparator is working to the instructor and have him/her sign your lab book.

2. Trigger circuit

The 555 monostable circuit that you will use in the next lab is a *negative edge triggered* device. In order to interface it to the comparator, the senior electronics engineer thinks a trigger circuit as represented in Figure 1 might be required.
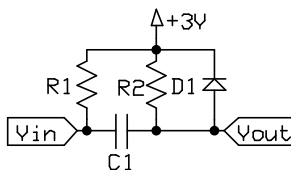

Figure 1. Trigger circuit

2.1   Analyze the trigger circuit to figure out what it does, and draw the Vout signal if a square wave was present at the Vin input. Show your drawing of the Vout signal to the instructor and have them sign your lab book.

You will choose suitable values for R1,R2,C1 in the next lab, as part of the monostable circuit design.