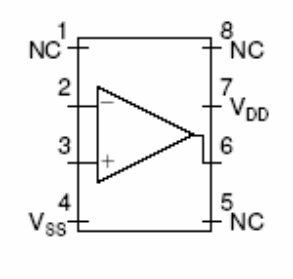
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

6.071 Introduction to Electronics, Signals and Measurement

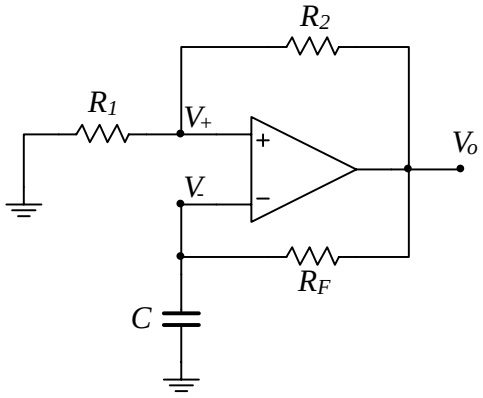
Spring 2006

Laboratory 23: Schmitt Trigger Oscillator

Using the LF356 op-amp the pinout of which is shown below,



1. Design, build and test a square wave generator oscillating at a frequency of 1kHz and a duty cycle of ~50%



With what voltage(s) would you power the op-amp?

Calculate the list the values you would use for the following components:

R1:

R2:

RF:

C:

Use the scope to observe *Vo* and *V-* and draw the signals below.

2. What is the highest frequency square wave that you can generate with this circuit? (Try changing C in decades and observe the result.) What would the signal Vo look like at high frequencies? Can you explain the reason for this behavior?

3. Modify the circuit so that the square wave can have variable duty cycle. (Hint: use your 20kΩ variable resistor to change the voltage level that powers your op-amp) What is the basic idea here?

Show your circuit schematic below.
Vary the potentiometer and observe the signals *Vo* and *V-*.