# EE 315 Course Project:

## General Description & Individual Preparation



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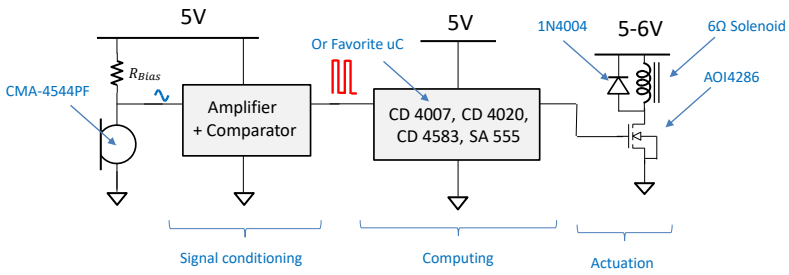
## EE 315 Course Project: General Description




**Desired Functionality:**

*You decide the value*

- The solenoid is energized when the frequency of the audio tone > 'target frequency'
  (no response if the frequency is < target)
- (much) Harder: Actuate within a narrow frequency range only

*Required if you use a Micro Controller*



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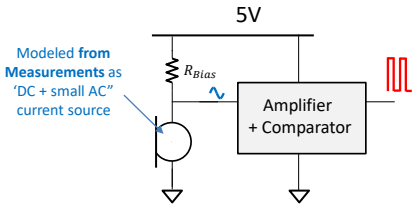
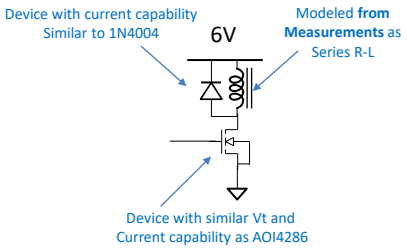
# Individual Preparation: 15% of Course Grade

**Design and Verify in Spice:**

- The Front-End Circuitry (Amp + Comparator)
- The FET-Solenoid Actuator



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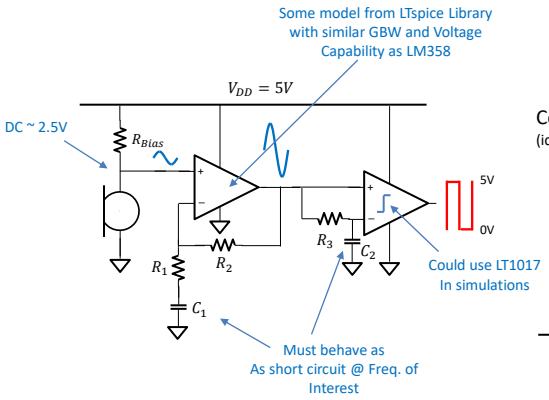
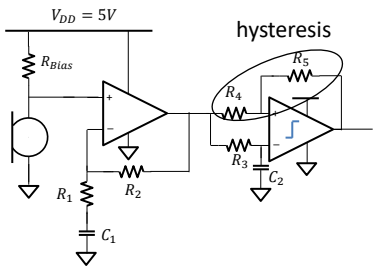
# Amplifier + Comparator Architectures: Select One




Components must have standard values
(ideally those you already have)



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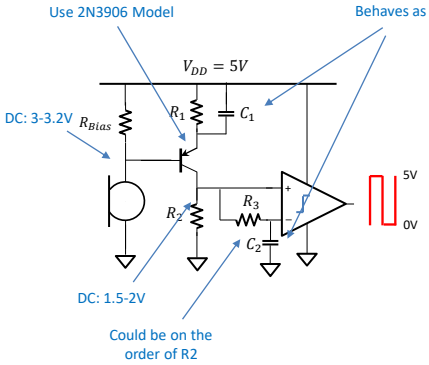
## Alternative Amplifier + Comparator Architectures




- Transistor MUST remain in FA!
- Keep $I_C$ small ( 100-150uA)
- Use standard-value components

Hysteresis can be created by connecting single Resistor between the output of the comparator and comparator "+" node.



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## Provide a PPT containing the following

1. SPICE print-out of Schematics (must contain component values)

2. AC simulation results of amplifier (outputs taken at $R_2$ and $C_3$)
   - Log frequency 10Hz to 100kHz

3. Transient Response of amplifier + comparator (output taken at R2 and Comparator output)
   - Input signal: AC current with magnitude of 1uA @ the chosen frequency

4. FET Solenoid Driver & Diode (output taken at the drain of the FET)
   - Input signal: 0-5V square-wave

5. A paragraph explaining how the team plans to implement the 'decision-making' digital circuit

**This ASSIGNMENT is INDIVIDUAL. PLEASE Complete ALONE.**



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