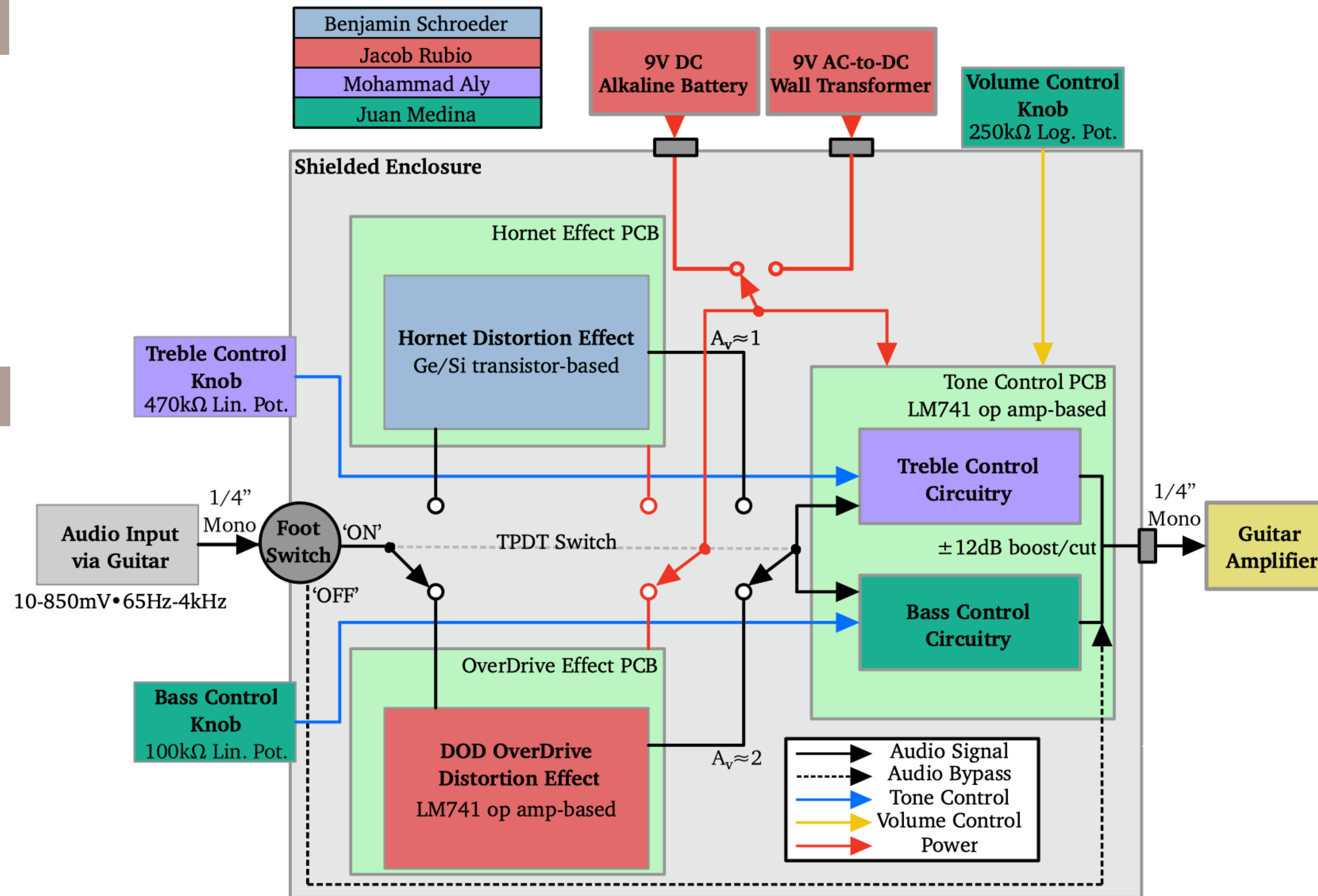


## E1.06 - Guitar Effects Stompbox

Benjamin Schroeder (PM), Mohammad Aly, Jacob Rubio, Juan Medina

### Top Level Block Diagram



### Project Overview

Our project is a dual-effect guitar pedal consisting of a transistor-based distortion circuit called the Hornet, and an op amp-based distortion circuit called the DOD Overdrive. The distortion effects and a tone control circuit will be encased in a shielded "Stompbox" enclosure!

- Design Hornet distortion and tone control circuits
- Construct the pre-existing DOD Overdrive on PCB
- Create a custom PCB for the Hornet and tone control
- Create a characterization plan to evaluate circuits

### Requirements

#### Features

- Custom PCB
- Shielded enclosure
- 9V DC power supply
- True bypass implemented footswitch
- Boost or cut of high and low frequencies
- Inputs and outputs 1/4" monoaural

#### Characterization Plan Requirements

- Current Draw (8-hour battery life)
- Input & Output Impedance
- Signal to Noise Ratio
- Total Harmonic Distortion
- Output waveforms of Hornet and DOD Overdrive at:
  - Frequencies: 82.4Hz, 164.8Hz, 329.6Hz, 659.3Hz
  - Amplitudes: 100mV, 200mV, 300mV

### Results of D1 Semester

- Hornet designed and constructed on breadboard
- Ordered and soldered DOD Overdrive on PCB
- Tone control constructed on breadboard
- Simulations of individual subsystem circuits
- Functional testing using guitar and amplifier
- Set biasing resistor values for Hornet
- Characterization plan created

### Plans for D2 Semester

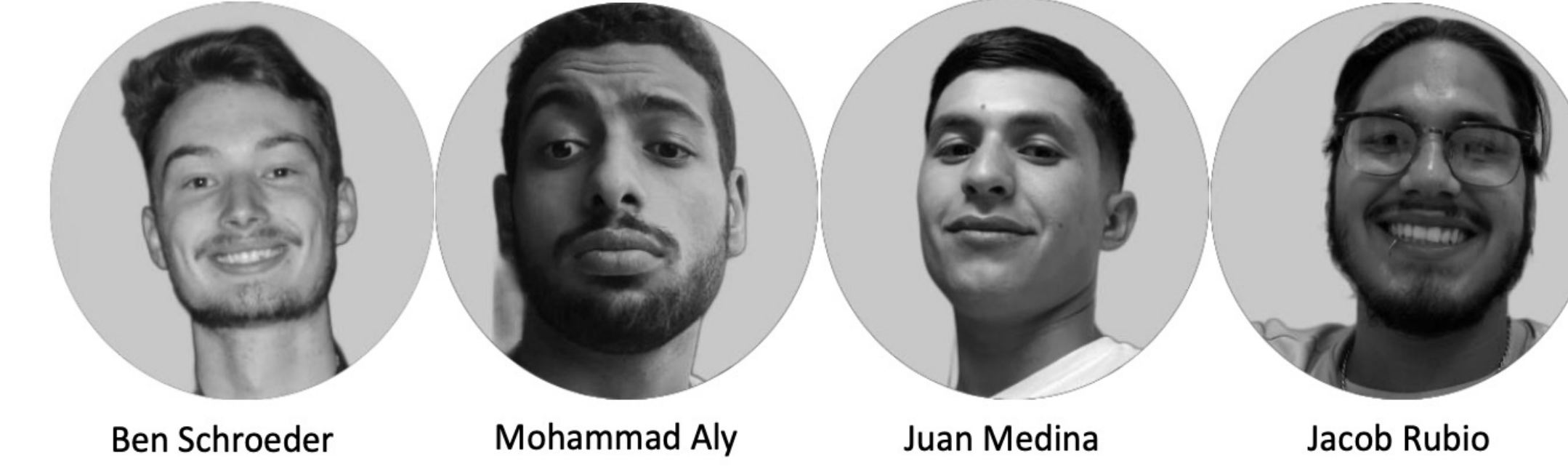
- Fully characterized circuits for distortion effects
- Full function capabilities with combined systems
- Custom PCB for Hornet and Tone Control
- Shielded enclosure to fit all circuits
- Full system demonstration with guitar and amp

### Acknowledgements

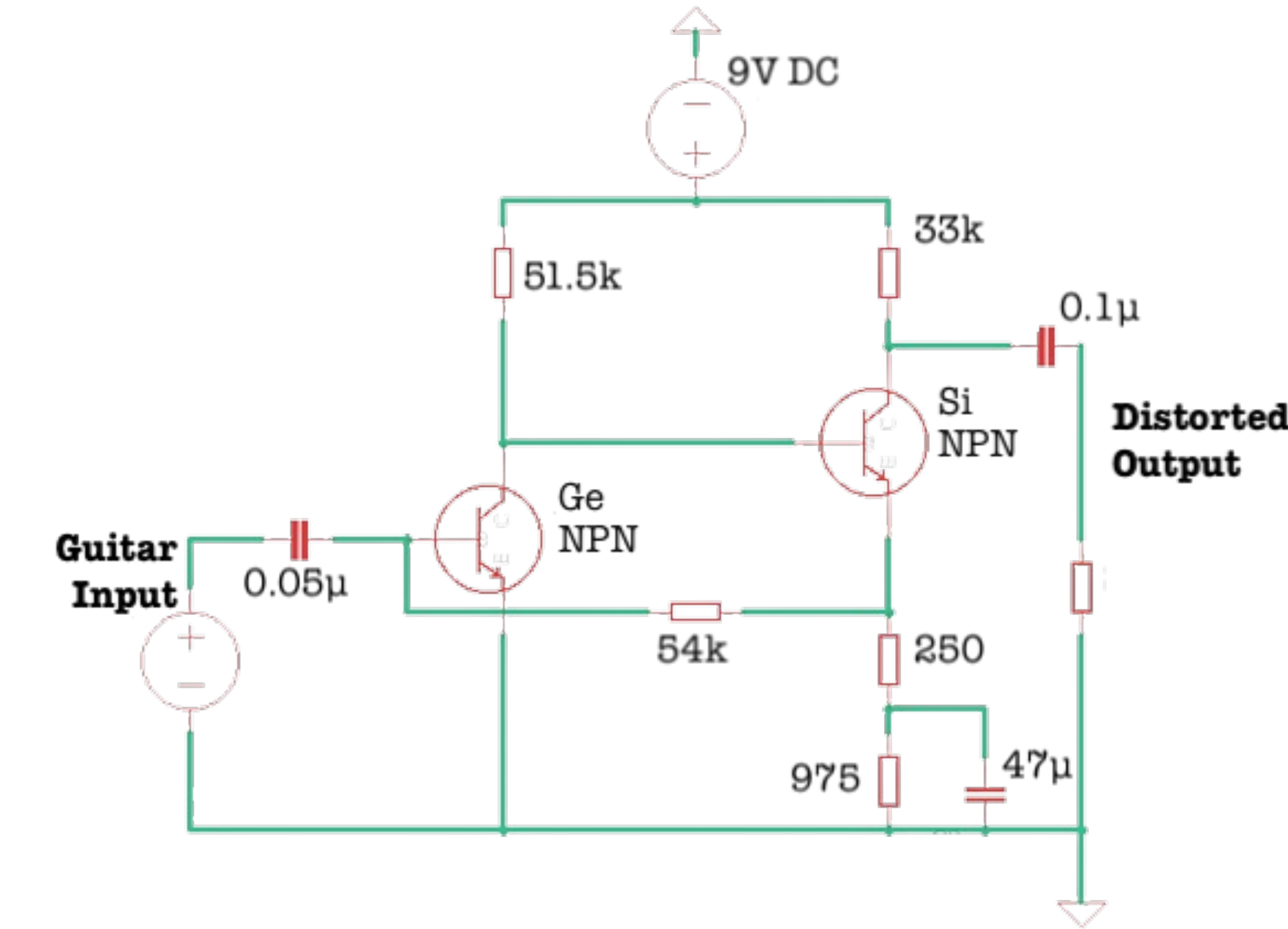
Sponsor/Faculty Advisor: Dr. Richard Compeau

Special thanks to Dr. Rich Compeau, the course instructors, and our mentor team E2.05 Hoover Headphones!

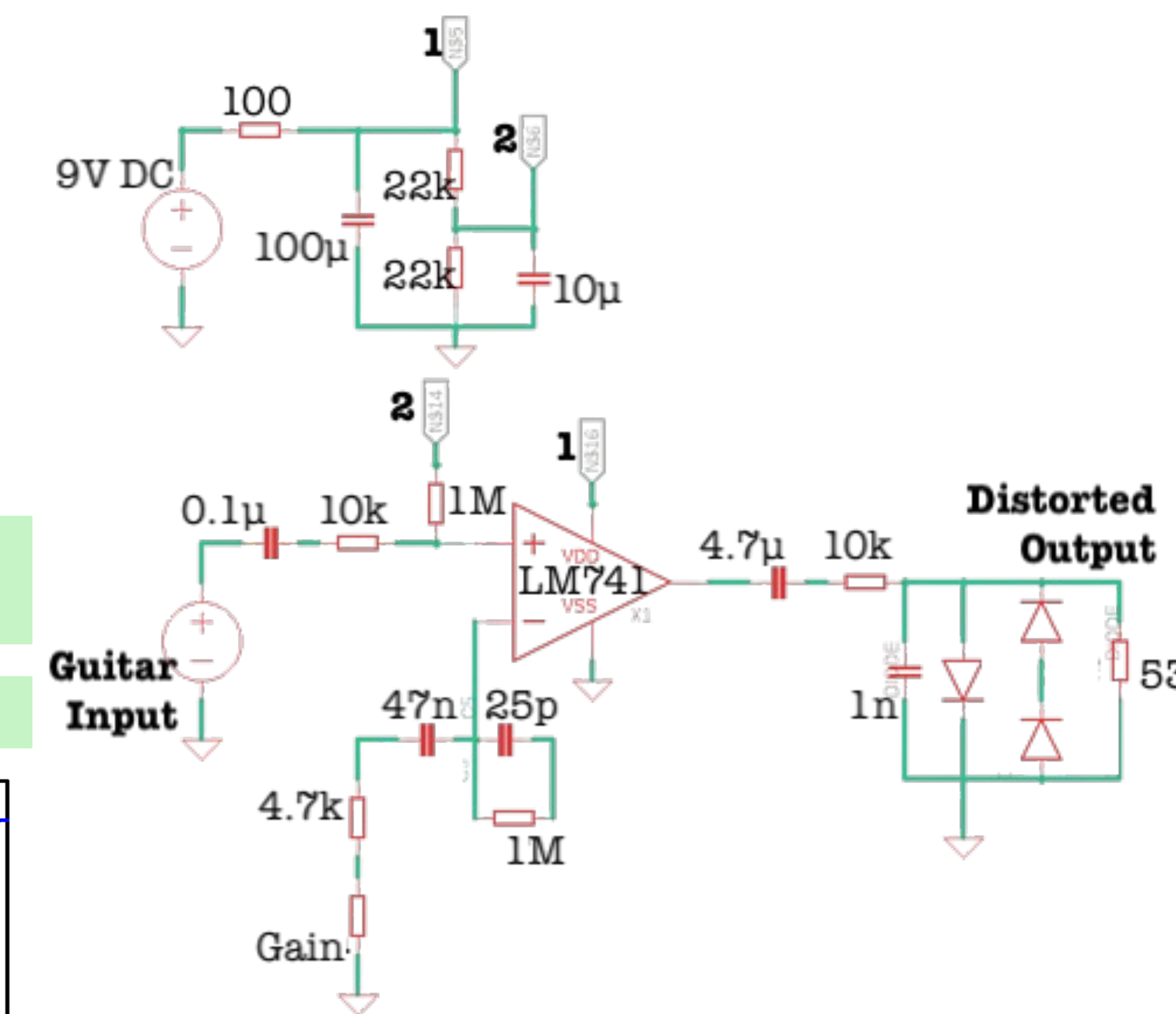
### The Team



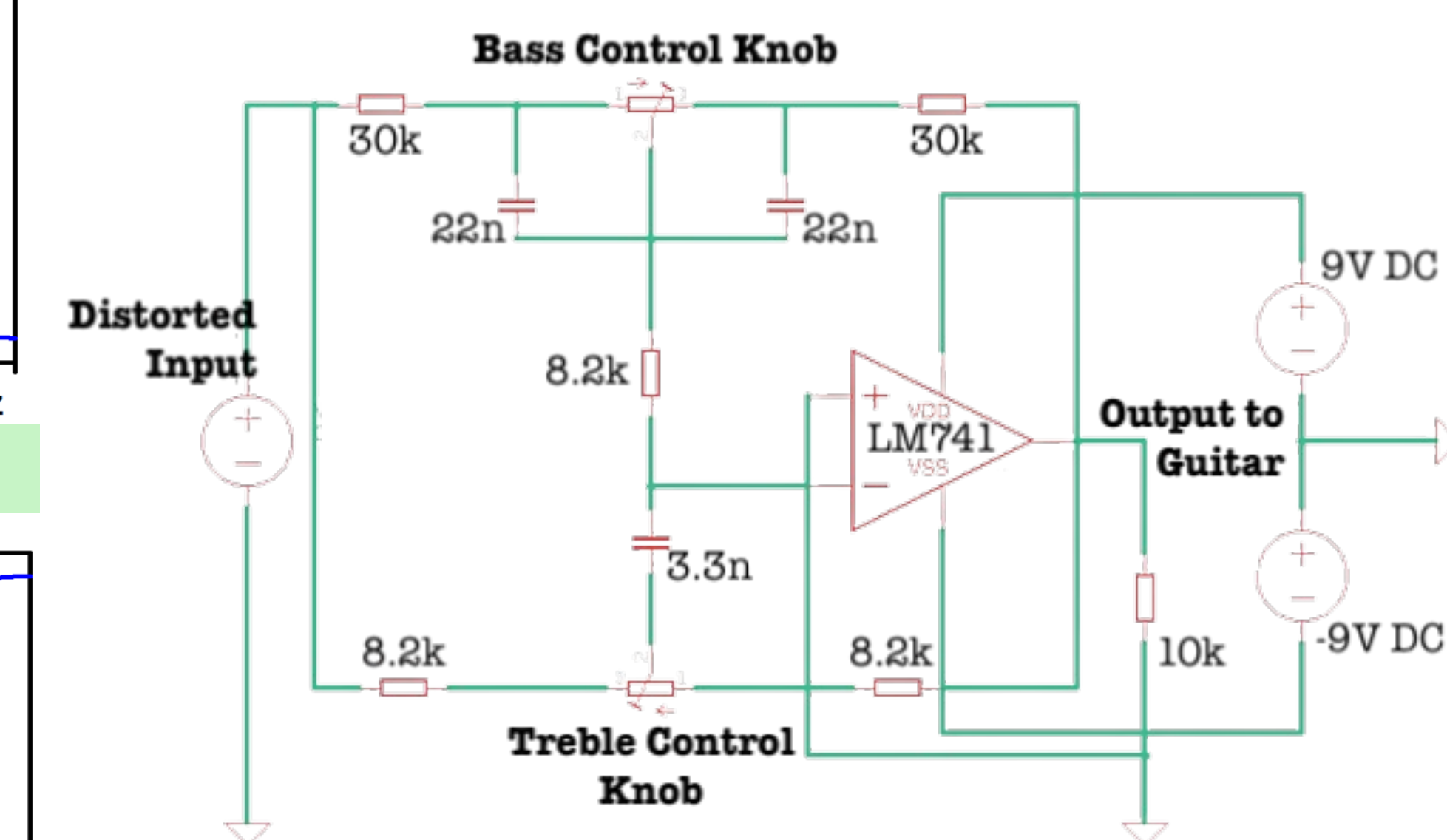
### Hornet Fuzz Schematic



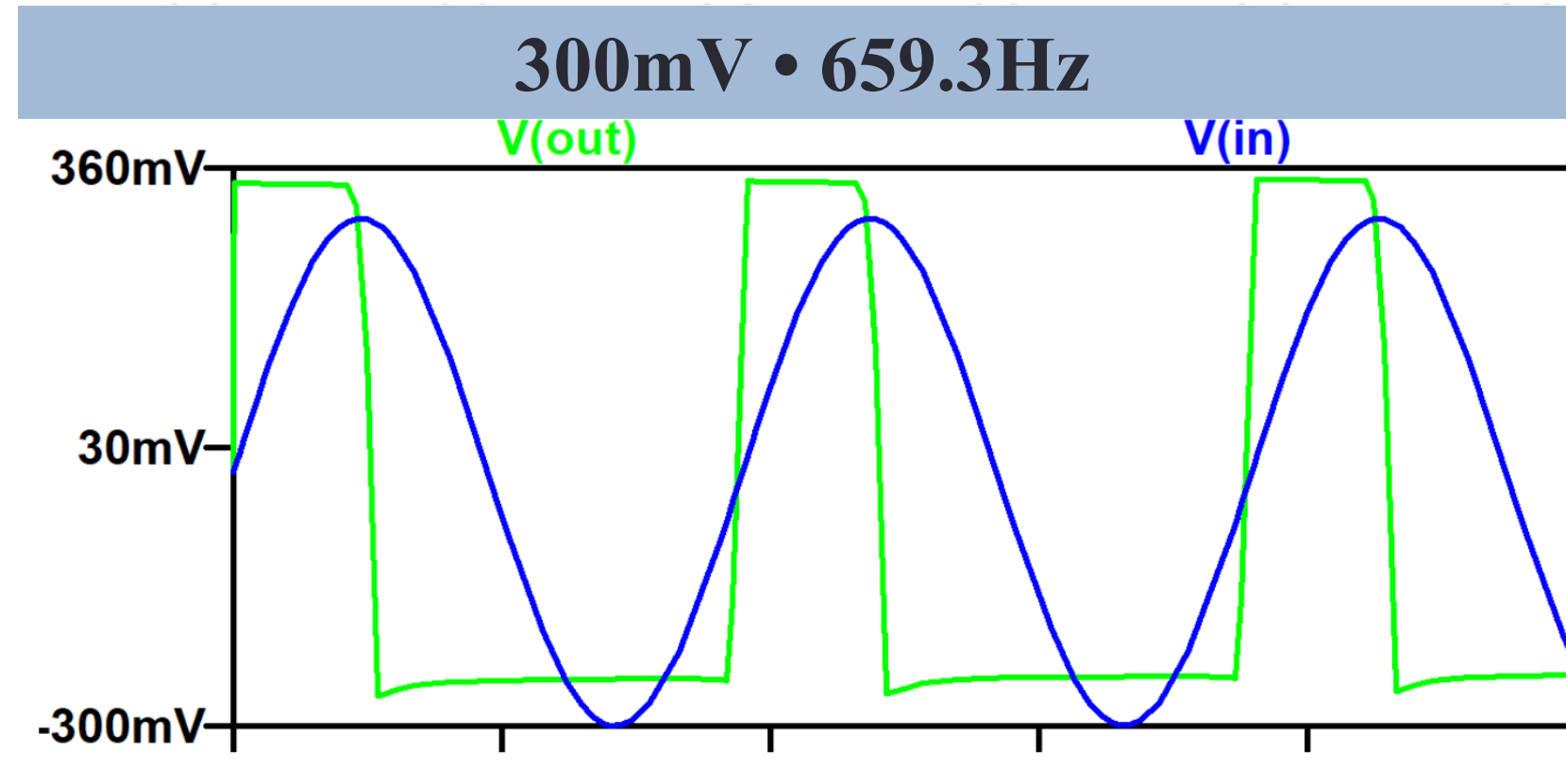
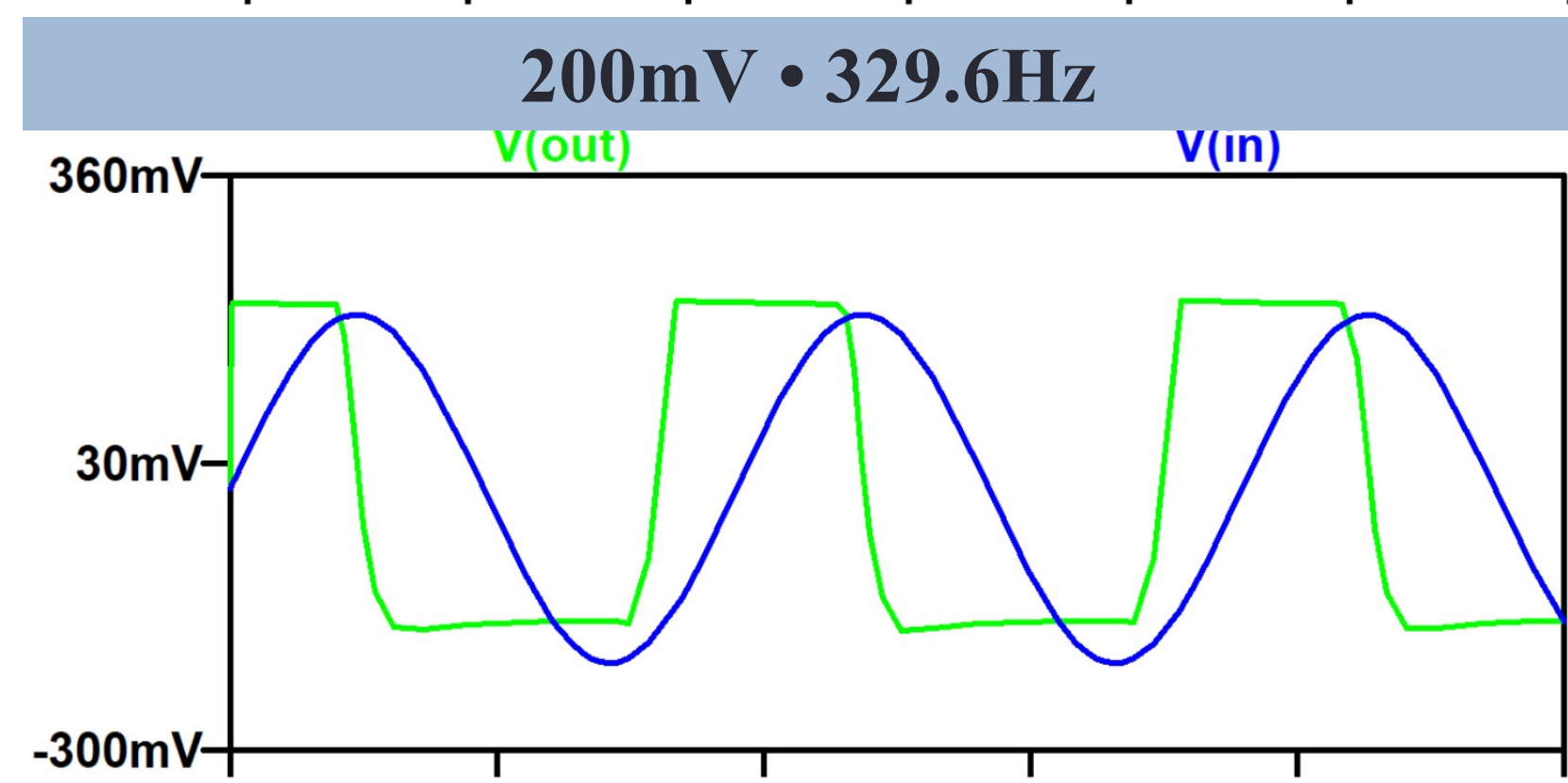
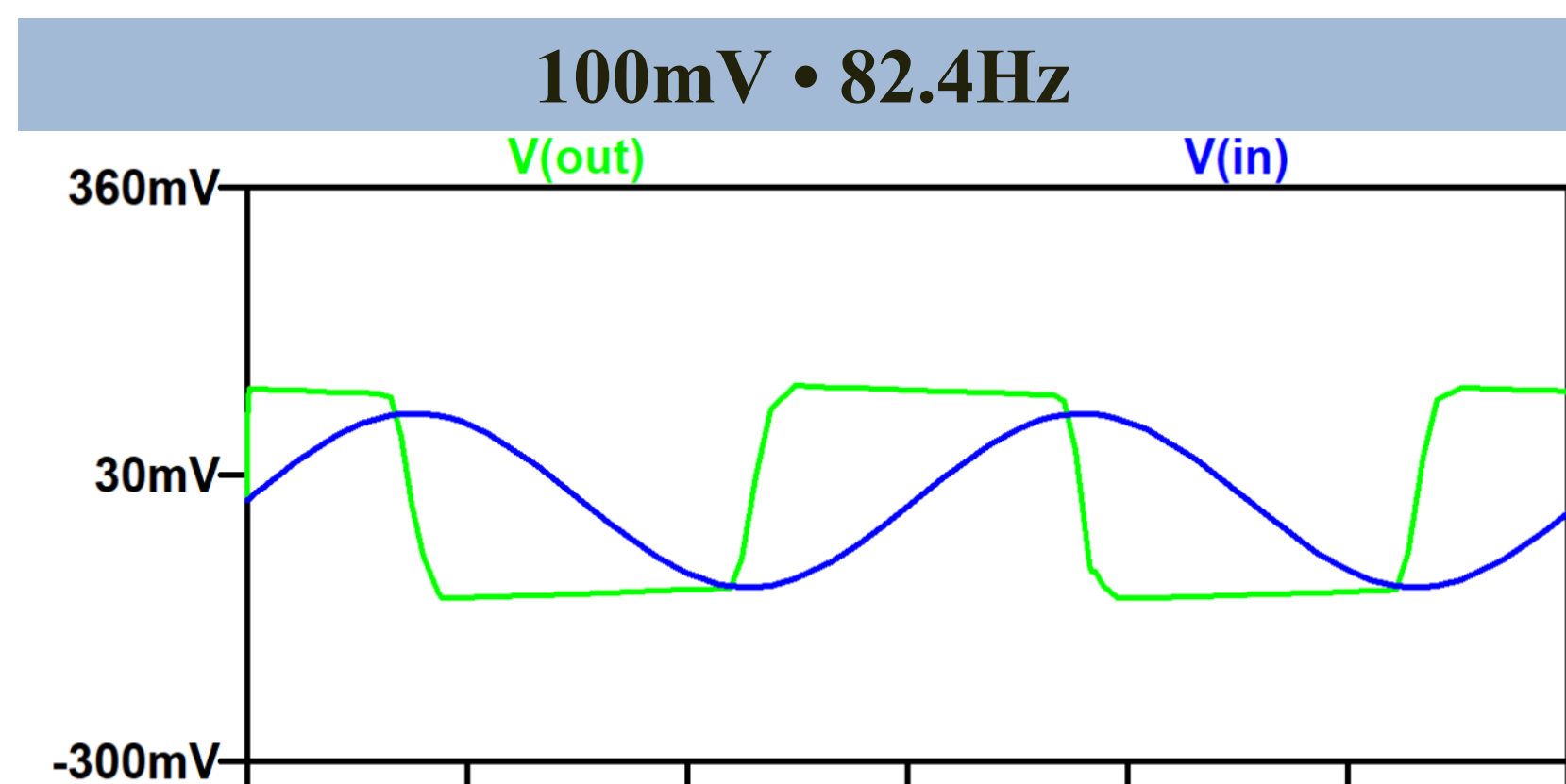
### DOD Overdrive Schematic



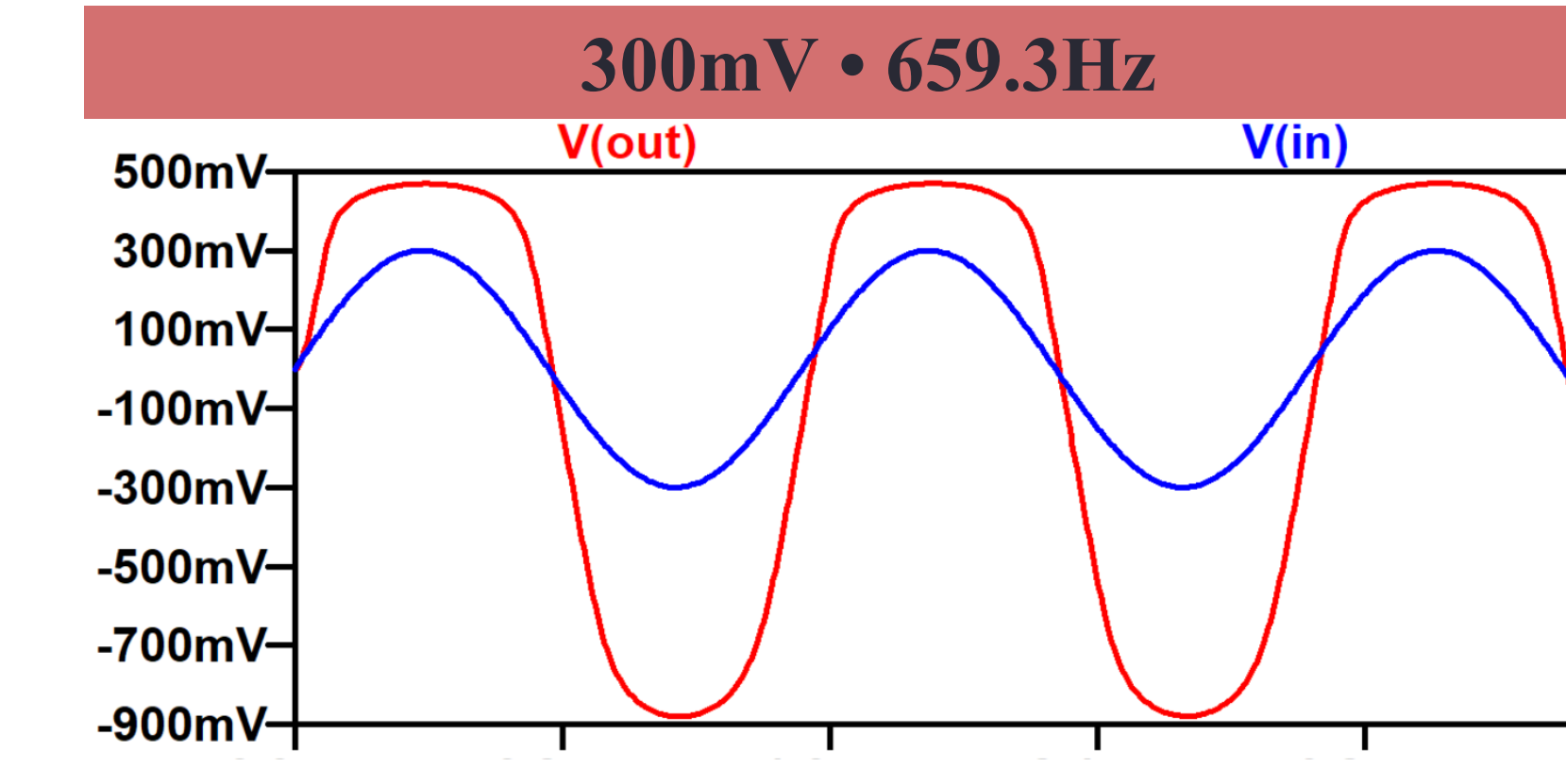
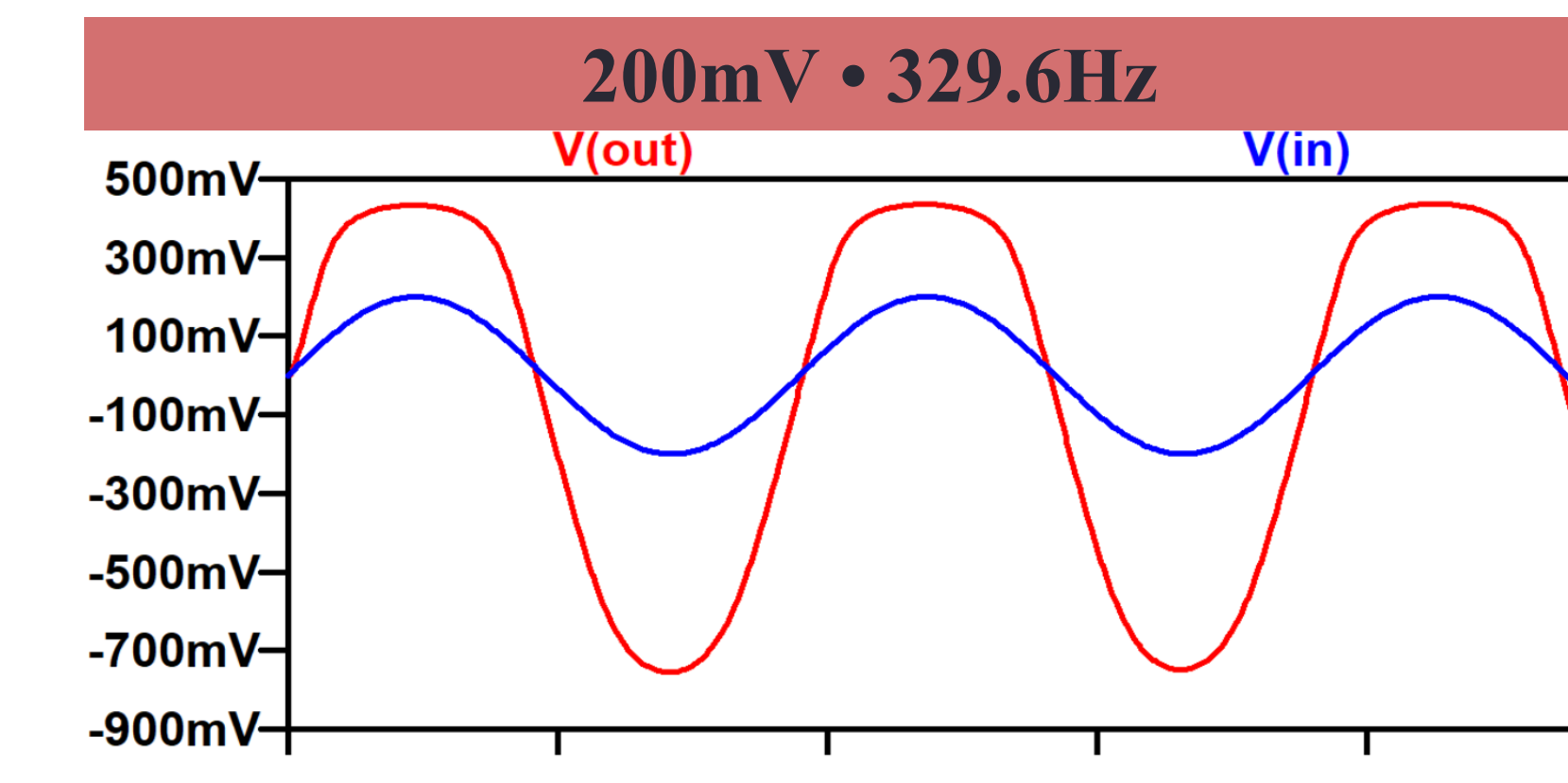
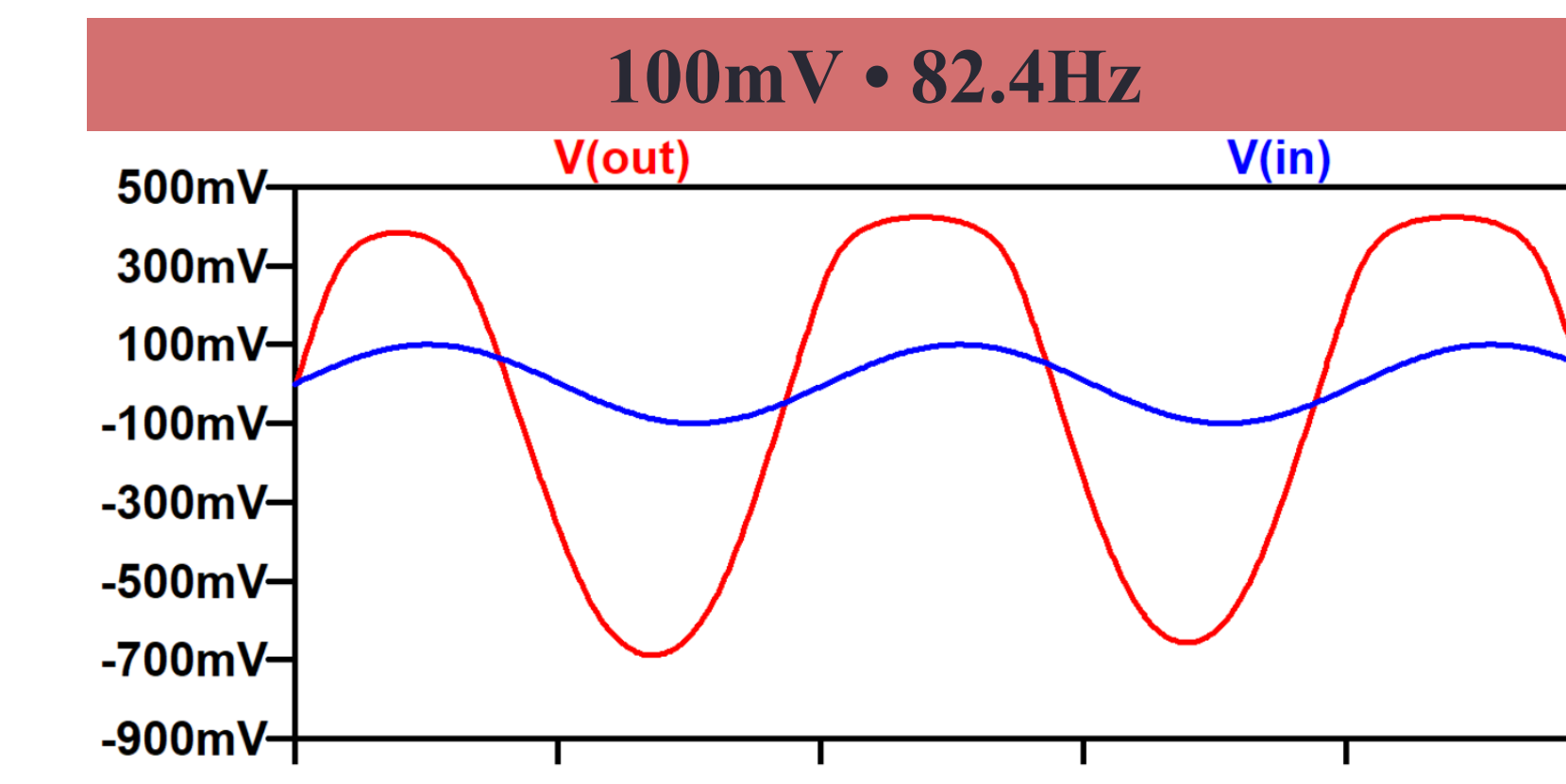
### Tone Control Schematic



### Hornet Fuzz



### DOD Overdrive



### Tone Control

