

EE321 – Lab 9

Bipolar Junction Transistors, Part III
A Two-Stage BJT Amplifier

Design a two-stage BJT amplifier. Both stages should be common emitter amplifiers, such as Figure 1 of [Lab 8](#). The amplifier should amplify the output of a signal with a 10 k Ω source resistance and a 20 mV amplitude. The output should drive a 2 k Ω load and an amplitude of about 4 V. The amplifier should not respond to DC signals — i.e., capacitively couple the input and output from the amplifier. You can use 2N3904 (NPN) and/or 2N3906 (PNP) BJTs. You can use the circuit from the design problem in [Homework 10](#).

Design and analyze the amplifier before coming to lab. Be sure to determine the bias voltages (V_E , V_C and V_B for each transistor), the overall gain, and the input (R_{in}) and output (R_{out}) resistances.

Build and test your amplifier.

1. Measure the bias voltages and compare them to the calculated values.
2. Measure the gain at 1 kHz and 10 kHz.
3. Measure R_{in} and R_{out} as you did in Lab 8.

When done write a (word-processed) report on the lab (in addition to the notes kept in your lab notebook). The report should be fairly short — include a schematic of the design, the analysis of the bias voltages, gains and input and output resistances, and the measured bias voltages, gains and input and output resistances.