

PreLab 2 – Push-Pull Stage

• GOALS

- 1) Simulate the crossover distortion of a Class B push-pull stage.
- 2) Simulate how negative feedback (with an op amp) significantly reduces crossover distortion.

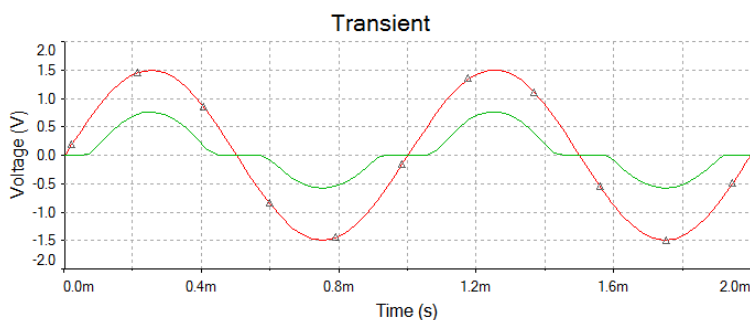
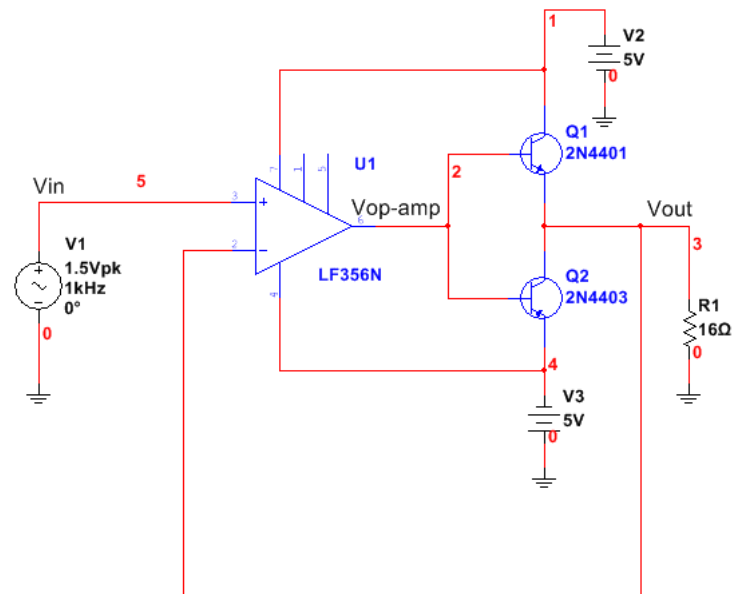
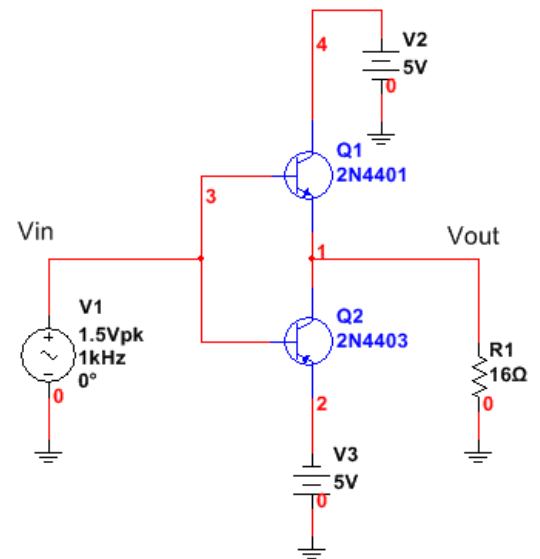
• GENERAL GUIDELINES

- 1) Students are allowed (even encouraged) to work together.
However, you must turn in your own work!
- 2) Prelabs count for 10% of the total lab grade.
- 3) Prelabs are due at the beginning of the lab session. Buma will immediately grade the prelabs using the following binary rubric: reasonable effort = 10 pts, poor effort = 0 pts.

• SIMULATION

Simulate the two circuits shown to the right.

- The voltage source is a $3V_{PP}$ sine wave at 1 kHz.
- The load is a 16 ohm resistor and $\pm V_{CC} = \pm 5V$.
- Use the 2N4401 (nnp) and 2N4403 (pnp) transistors.
- Use the LF356/N op amp.
- Perform a transient simulation for 2 ms.
- Show both circuit schematics.
- Show V_{IN} and V_{OUT} for the first circuit. You should see the crossover distortion (see figure below).
- Show V_{IN} , V_{OUT} , and V_{OPAMP} for the second circuit. The crossover distortion should be suppressed. However, the op amp voltage must change very quickly (large dV/dt) in the crossover region.



V(3) V(1)