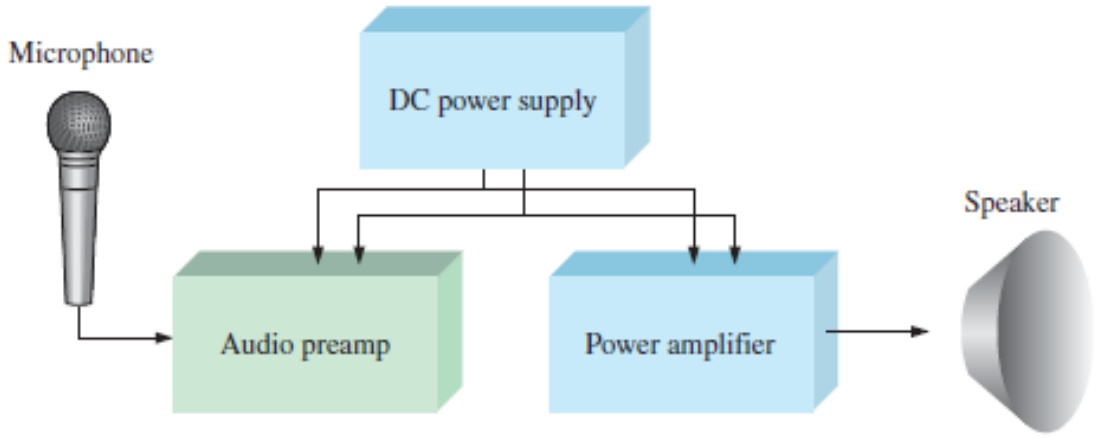
Project

Audio Amplifier

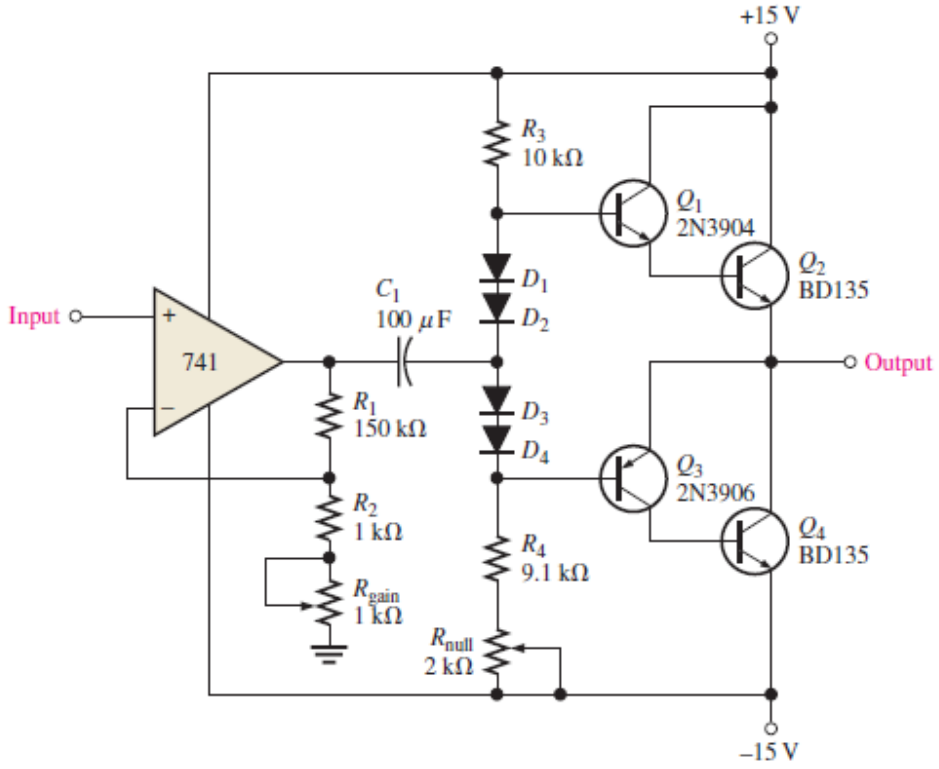
The audio frequency spectrum is defined to be in the range of frequencies from 20 Hz to 20 kHz. The range of frequencies of the human voice is generally between 300 Hz and 3 kHz. In this project, it is required to implement an audio amplifier system that consists of a pre-amplifier system followed by a power amplifier stage to drive the speaker.

System Block Diagram



Schematic Diagram

The main components of the circuit are (1) the pre-amplifier stage which is a noninverting op-amp with a negative feedback loop to reduce the nonlinearity and (2) the output stage which is a push-pull power stage.



Simulation

Simulate the op-amp audio amplifier using Multisim.

- Observe the signal voltages with the oscilloscope.
- Determine the voltage gain of the op-amp stage.
- Determine the overall voltage gain.
- Measure the frequency response of the system by using the Bode plotter.
- What is the voltage gain at 5 kHz in dB?

Prototyping

Build and test a prototype circuit on a breadboard. *Bonus will be given for finalizing the circuit on a printed circuit board.*

- State the maximum signal power and the resistance of your speaker.
- Measure each signal voltages and the amount of power delivered to the load.
- Compare the simulation values with the measured values.