Integrated Electronics (ECE214)
Project C: Audio Amplifier Design

Group no.-9
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Abstract

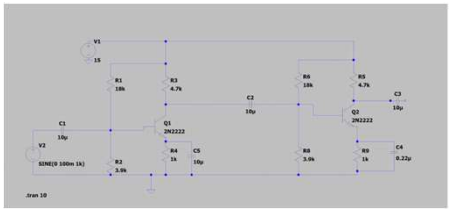
To design an Audio Amplifier system to amplify the analog audio signal coming from a transducer
(Mic), and the amplified audio is fed to a speaker, which can produce the sound with the larger
intensity. The design makes use of suitable transistor stages to amplify the signals. It uses RC filters to filter out noise. The amplification is done in two stages. The first stage gives an amplification of 40, and
the Second stage's Gain is controlled by a Potentiometer.

Features

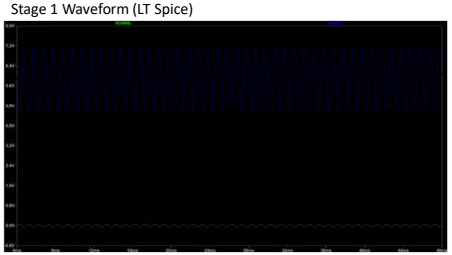
a. The design makes use of BJTs/MOSFETs to Amplify the signals.
b. In the output spectrum, the signal beyond the audio spectrum is suppressed by -40db/decade.
c. The amplifier uses two stages for the purpose of amplification, where the first stage provides an amplification of approx. 40. The second stage gain is controllable using a potentiometer. The output of the amplifier is able to derive an 8ohm/1W speaker so as to produce an audio of reasonable intensity.

Circuit

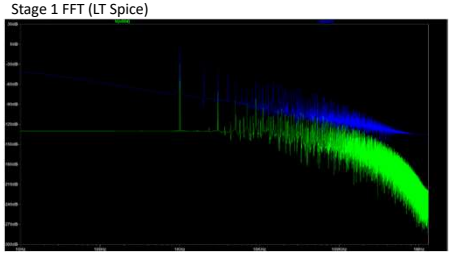
Circuit diagram (LT Spice)



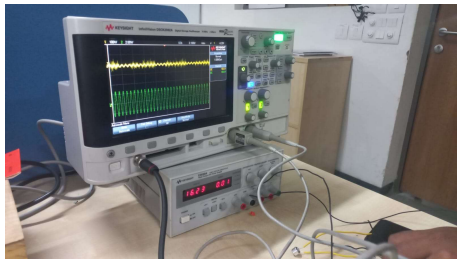
Stage 1 Waveform (LT Spice)



Stage 1 FFT (LT Spice)

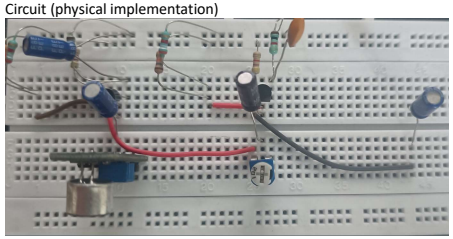


Output at 22kHz

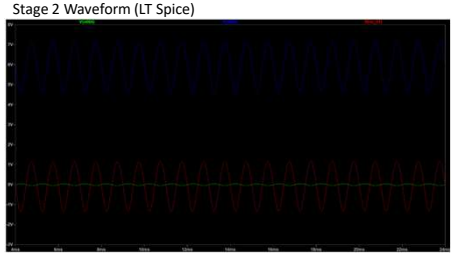


Circuit

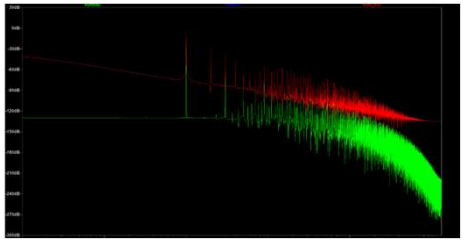
Circuit (physical implementation)



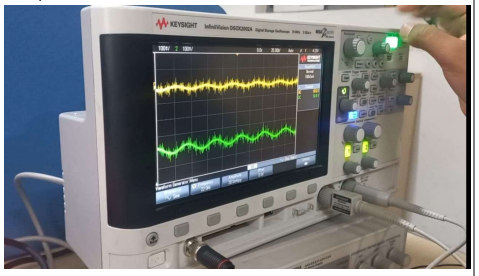
Stage 2 Waveform (LT Spice)



Stage 2 FFT (LT Spice)



Output at 22Hz



Working

An audio amplifier is a device that makes a sound louder. It takes a small electrical signal from as input and makes that signal bigger so it can make it sound louder.
The circuit operates by using a small input voltage to control a larger output voltage, which is known as voltage amplification.
The biasing of the transistor is important for proper amplification and involves setting the base voltage to a particular value to ensure that the transistor operates in the active region.
This bias voltage can be set using a combination of resistors and capacitors.
The circuit typically involves 3 stages, an input stage, amplification stage, and output stage.
In the input stage the audio signal is filtered of any unwanted noise or frequency components that could distort the signal using a capacitor.
The amplification stage is responsible for boosting the signal. We have achieved this by using npn transistors, resistors and capacitors
The output stage is designed to drive the speaker to produce sound

Application

Audio Amplifier Circuits are primarily used:
1.In radio signals broadcasting
2.Signal transmission for long-distance communication
3.Wireless transmission of the signals,
4.In sound systems
5.In headsets, earphones and mobiles