KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY

Project Proposal

Department: Elecctronics and Communications Engineering

Course No.: ECE 1210

Course Title: Analog Electronic-I Laboratory

Topic: Audio power amplifier

Submitted To:	**Submitted By:**
Dr. Md. Foisal Hossain Professor Department of Electronics and Communication Engineering Khulna University of Engineering & Technology (KUET) **Arif Hossan** Assistant Professor Department of Electronics and Communication Engineering Khulna University of Engineering & Technology (KUET)	Muntasir Billah Nakeeb – 2109016 Anab Ahmed – 2109017 Faizunnessa – 2109018 Rukaiya Alam Nidra – 2109019 Foysal Mahmud Srabon – 2109020

Audio Power Amplifier

Objectives:

1. To get high power gain.
2. To get 9.5 × 10^5 power gain at low distortion.
3. To increase strength of output signal.
4. To keep stability factor less than 10.

Apparatus:

Table-1: List of required apparatus: -

Apparatus name	Quantity	Ratings
Diode	2	1N4004
Transistor	5	2N2219, 2N6547, 2N6609
Resistor	13	150kΩ, 10kΩ, 1kΩ, 200kΩ
Capacitor	6	10µF
Speaker	1	8Ω
Ac voltage source	1	--
Dc voltage source	1	(0-30) V
Oscilloscope	1	--

Description:

The electrical signal from an audio source, such as a microphone or musical instrument, is amplified by an electronic device known as an audio power amplifier to a level that is adequate for driving speakers or headphones. A power amplifier's main purpose is to boost the signal's strength, or in other words, to make it louder.

Here we will make this project for audio amplifying. We will use Pre-amplifier, RC coupling and an AB push pull power amplifier.

At first A preamplifier circuit is an electronic circuit that changes a weak signal from a microphone, players, or sound pickups to a strong one. Alternatively, it strengthens a call to the required level. It acts as a link between a signal source and the power amplifier. It will amplify the signal from an audio input before sending it to the amplifier. Then it will send the signal into Rc coupling stage.

RC coupling will be used for amplifying voltage. When an AC input signal is applied to the base of first transistor, it gets amplified and appears at the collector load which is then passed through the coupling capacitor to the next stage. This becomes the input of the next stage, whose amplified output again appears across its collector load. Thus, the signal is amplified in stage by stage action. The important point that has to be noted here is that the total gain

is less than the product of the gains of individual stages. This is because when a second stage is made to follow the first stage, the effective load resistance of the first stage is reduced due to the shunting effect of the input resistance of the second stage. Hence, in a multistage amplifier, only the gain of the last stage remains unchanged. As we consider a two-stage amplifier here, the output phase is same as input. Because the phase reversal is done two times by the two stage CE configured amplifier circuit. At first, we will connect the AC source to get a signal and then the capacitor will help to provide a pure AC signal. The voltage of the signal will be amplified in two stages. And then the amplifying signal will enter the AB power amplifier.

AB push pull amplifier will be used for power amplifying of the signal. the *Class AB Amplifier* is a combination of Classes A and B in that for small power outputs the amplifier operates as a class A amplifier but changes to a class B amplifier for larger current outputs. This action is achieved by pre-biasing the two transistors in the amplifiers output stage.

Thus, each transistor will conduct between 180^o and 360^o of the time depending on the amount of current output and pre-biasing. Thus, the amplifier output stage operates as a Class AB amplifier. The 0.6 to 0.7V (one forward diode volt drop) dead band that produces the crossover distortion effect in Class B amplifiers is greatly reduced using suitable biasing. The pre-biasing of the transistor devices can be achieved in several different ways using either a preset voltage bias, a voltage divider network, or by using a series connected diode arrangement. The entering signal may carry some distortion. So, to avoid this distortion we will use diodes. AB amplifier will be used for power amplifying. NPN will amplify positive half-cycles and PNP will amplify negative half-cycles. And the capacitor will help to get the exact AC signal into the transistor. And after all this processing, which signal entire that will be amplified and we will hear that by the speaker.

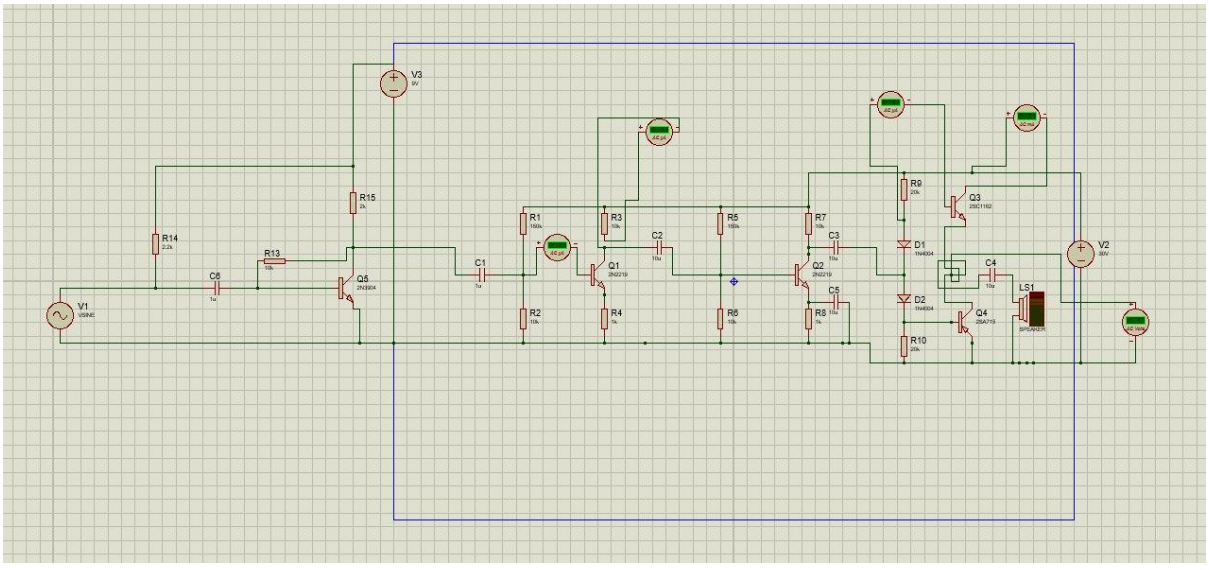

Figure: Circuit diagram for audio power amplifier

Application:

1. Stereo Amplifiers: These amplifiers are used in home stereo systems to boost the audio signal from sources such as CD players, turntables, or streaming devices to drive passive speakers.
2. Home Theater Systems: Audio power amplifiers are essential in home theater setups to amplify the audio signals from AV receivers and deliver immersive surround sound experiences.
3. Public Address Systems (PA Systems): PA amplifiers are used in settings like schools, churches, stadiums, and conference rooms to amplify the voice of a speaker or the audio from a microphone or playback device so that it can be heard by a large audience.
4. Live Sound Reinforcement: In live music performances, audio power amplifiers are used to amplify signals from musical instruments, microphones, and other sound sources to drive loudspeakers and provide sound reinforcement for the audience.
5. Recording Studios: Studio monitors require power amplifiers to accurately reproduce audio signals during recording and mixing processes, ensuring that producers and engineers can hear the nuances of the audio.
6. Guitar Amplifiers: Guitar amplifiers include both preamp and power amp stages to amplify the signal from an electric guitar, allowing musicians to control the tone and volume of their instrument.
7. Car Audio Systems: Car audio amplifiers are used to enhance the audio quality and power output of in-car entertainment systems, including speakers and subwoofers.
8. Professional Audio: In professional audio setups like concerts and stage performances, high-power amplifiers are used to drive large PA speaker arrays and deliver sound to large audiences with clarity and volume.
9. Home Recording Studios: Musicians and audio producers use power amplifiers to drive studio monitors and ensure accurate audio playback during recording, mixing, and mastering.
10. Telecommunications: Amplifiers are used in telecommunications systems to boost audio signals for telephone communication, intercoms, and public announcement systems in large buildings or facilities.