



# DESIGN OF A MUSIC SYSTEM USING LM386 AMPLIFIER

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**Abstract:** The project aimed to design and build an audio power amplifier tailored for modern audio devices like CD and DVD players. Thoroughly exploring the complexities of audio amplifier circuits, we meticulously analyzed the signal flow from source to speakers, scrutinizing the functions of each component. The culmination of our efforts resulted in a single-ended audio power amplifier. Rigorous testing and diverse measurements were conducted to comprehensively assess its performance. The ultimate goal was to enhance the music listening experience, allowing for a profound appreciation of the unique qualities offered by a transistor-based amplifier. Through this project, we achieved a synthesis of theoretical knowledge and practical application, culminating in a sophisticated audio amplification system suited for contemporary audio sources.

**KeyWords:** Transistor, Speaker, Music, Audio, Signal Out Put, Amplification, Amplifier.

**1. Introduction:** Audio amplifiers play a crucial role in our daily lives, enhancing the sound from various devices such as smartphones, mp3 players, and laptops. In this paper, we embark on the journey of creating a mini audio amplifier – a compact and portable solution designed to elevate audio experiences in a convenient and efficient manner. Lee de Forest et. al. who was invented the first electronic amplifier in 1907, which helped in development of electronic oscillator and these effectively made radio broadcasting and long-distance telephone lines and it helps in making pictures [1]. The primary objective of this project is to construct a low-power, small-sized audio amplifier that can be utilized with personal audio devices. D.T. N Williamson et. al. made a amplifier in 1947 which known as Williamson amplifier which is a four stage, pull push, class A triode-output valve audio amplifier [2]. These miniature amplifiers are ideal for driving headphones or small speakers, making them a valuable addition to your audio setup. Audio amplifiers, the primary objective lies in the faithful, efficient, and low-distortion reproduction of input audio signals at sound-generating output components, all while attaining the desired sonic amplitude and power levels. John Linsley Hood et. al. in 1999 explain that investigates the ideas and methods that underpin the effective design and application of both analog and digital equipment, including audio design [3]. Jun-Ichi Nishizawa et. al. in 1974 was make the power mosfet for audio amplifier at Tohoku university refer from Mohamed Atalla and Dawon Kahng's mosfet [4]. The loud speaker is converted electrical signal to sound signal by introducing voltage in power amplifier. In power amplifier the voltage level of signal is high by passing it through a multistage voltage amplifier. C.W. Rice and E.W. Kellogg et.



All in 1925 invented the electrodynamic transducer which is the basis for the majority of loudspeakers in use nowadays [5].

- 2. literature review:** There are some researches about the audio amplifier we have included some theories of some papers. Pham Van Bang and Tran Duc Chu yen et. All did the research on sound amplification and design a power amplifier for application in the field of sound selection and entertainment in December 2020 [6]. D. Self et. all in 2009 written a book on audio amplifier in Focal Press, Boston, Mass, USA, 5th edition, 2009 [7]. American electrical engineer Ernst Frederick Werner Alexanderson et al. invented the Alexanderson alternator, which was used in radio transmitters for long-distance radio communication between 1906 and 1930. He also invented a direct current amplifier for controlling anti-aircraft weapons during World War II. [8]. Ed Van Tuijl et. all in 1991, he was the Design Manager for audio power products. In 1992 he made new audio power circuit topologies. [9]. Before Harold Black et. all created negative feedback in 1934, distortion levels in early amplifiers were often high, at least 5%. This reduction in distortion came at the expense of decreased gain [10]. Harry Nyquist and Hendrik Wade Bode et. all contributed additional contributions to the theory of amplification [11]. In 1952, Fender et. all debuted a line of bass amplifiers called the Bassman. The 5B6 Bassman was first designed to amplify bass guitars, but performers also used it to amplify electric guitars, harmonicas, and pedal steel guitars. [12]. The first digital audio player was created by British scientist Kane Kramer et. all and was dubbed the IXI [13]. In 2002, Archos et al. introduced the Archos Jukebox Multimedia, the first "portable media player" (PMP) featuring a small 1.5" colour screen. [14].

### 3. Figures, Tables and Equations:

The LM386 op amp has a non-inverting and an inverting terminal connected to the input of the audio provider and is powered by a voltage regulator. The output of the opamp is connected to a 25 $\mu$ F capacitor and a speaker. The speaker acts as a transducer and produces sound. Pin 1 of the LM386 is the gain pin, which allows you to adjust the gain of the amplifier by connecting the IC to an external capacitor, and pin 8 controls the gain. Pin 4 is grounded and pin 6 is connected to the voltage terminal. Pin 7 is a bypass pin for connecting a decoupling capacitor. The output speaker is connected to pin 5, which is connected to capacitor C1, which has a capacitance of 250  $\mu$ F, in between. Situated between pins 1 and 8, capacitor C2 has a capacitance of 1  $\mu$ F. The audio input and output signals are received upon execution of the Proteus

project and connection of the op-amp's audio input and output wires to the oscilloscope.

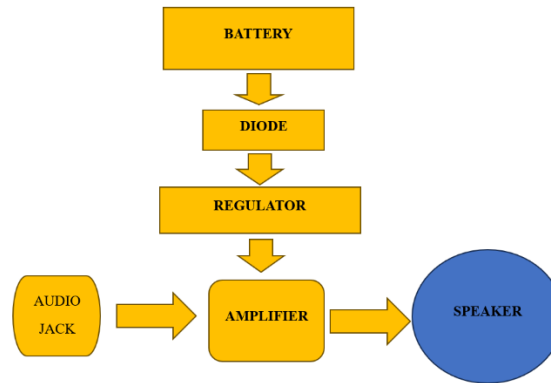


Figure 1: Block diagram audio amplifier

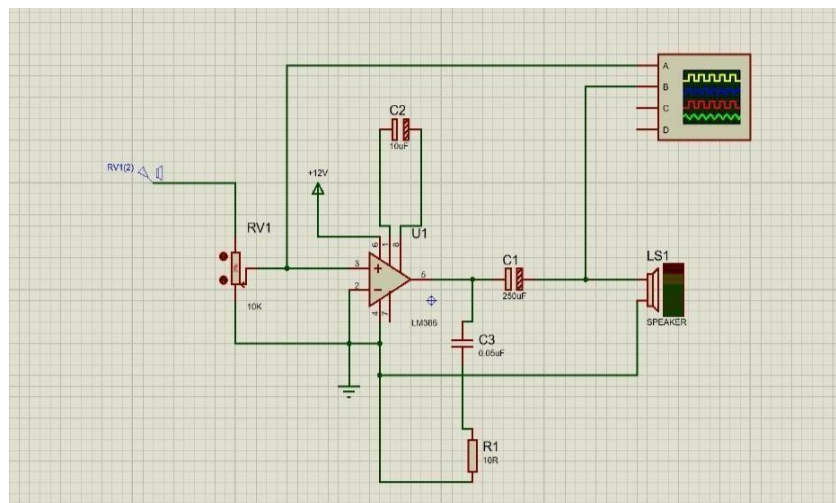


Figure 2: Circuit diagram of proteus design using Im386 audio amplifier

#### 4. Simulation parameter

To define various aspects that are relevant to the simulation process. These parameters are used in the device according to the result needed. Proper connection of these parameters helps in achieving the required performance of the audio amplifier.

Table: -1 Simulation Parameters

components	specification
Audio amplifier	Lm386
Potentiometer	Pot hug
Resistor	10k,10R
Capacitor	0.05uf,10uf,250uf
Speaker	Analog

## 5. Result Analysis

The audio amplifier circuit can take a weak signal as input and produce a strong audio signal at the output. It can be done by power amplifiers by taking input from microphone. After connecting all the components and wires to the bread board the speaker produces sound when we switch on the device and input audio signals, we can get a desired volume and power level properly at low distortion in output. It provides excellent sound quality, and we can also adjust its volume. We can use this signal with dry speakers or headphones, which allowing us to listen to audio from various sources.

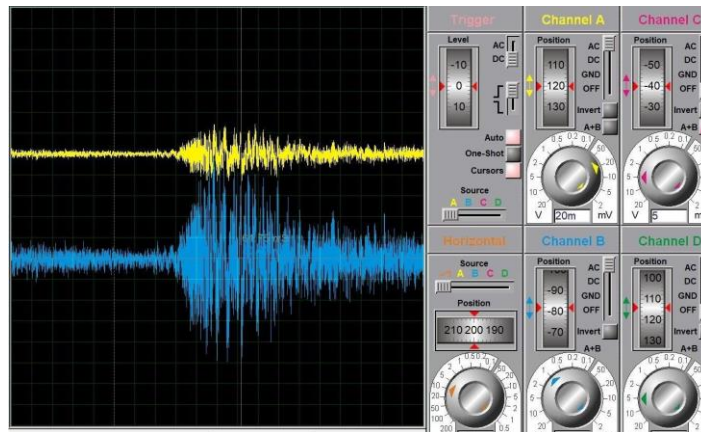


Figure 3: output of audio amplifier

## 6. Conclusion

The audio amplifier project has allowed us to design and build a compact and efficient amplifier that enhances audio quality. This amplifier not only amplifies sound but also serves as a testament to our ability to take on electronics projects. These days, amplifiers



are incredibly helpful in the entertainment and educational sectors of human existence. Sound amplifiers in classrooms benefit educators by overcoming vocal strain and communication challenges. For students, especially those with hearing impairments, amplified audio enhances comprehension and engagement, fostering inclusivity. The deployment of sound amplifiers creates a more effective and inclusive teaching environment, addressing both teacher and student needs for optimal educational outcomes. As technology continues to advance, the knowledge and experience gained from this project will undoubtedly prove beneficial in future.

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