

# Music System Integrated with 200 Watt Stereo Amplifier, Bluetooth, USB and Mic Accessibility

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## Abstract

This paper explores the design, simulation, and real-world implementation of a 200W high-fidelity audio amplifier based on a Class AB topology. The amplifier is engineered to provide clean, high-power sound output with low distortion, making it ideal for use in both professional sound systems and premium home audio setups. This project utilizes the MV Collection 1200W PMPO board and integrates multiple input options including Bluetooth, USB, and AUX. A transformer-based power supply ensures stable performance, while active bass and treble controls offer flexible audio tuning. Key aspects such as the working principle of Class AB amplifiers, component selection, and practical performance testing are discussed in detail.

**Keywords:** Class AB Amplifier, Audio System, Peak Music Power Output (PMPO), Heat Sink.

## 1. Introduction

Audio amplifiers play a vital role in modern sound systems from small portable gadgets to powerful setups used in concerts and public events. When high sound pressure levels are needed, such as in live performances, cinemas, or outdoor gatherings, amplifiers with power outputs above 100W become essential. As the need for better sound quality and energy efficiency grows, so does the push for improved amplifier designs that offer low distortion and effective heat management. Amplifiers are responsible for boosting weak audio signals so they can drive speakers effectively[2]. This project focuses on the practical development of a 200W mid-power audio amplifier using readily available components, aiming to create a reliable and efficient sound system that balances performance with accessibility. Objective of this project as follows:

1. Design and construct a functional 200W audio amplifier system [8].
2. Incorporate user-adjustable bass and treble controls
3. Add support for Bluetooth, USB, and AUX inputs for flexible audio sources
4. Implement thermal management using heat sinks and a cooling fan
5. Test and analyse the amplifier's sound quality and power efficiency in real conditions.

### 1.1 200W Audio Amplifier Design

For this project we have used the MV Collection amplifier which is a pre-assembled, high-power audio module and is well-suited for driving mid to large sized speakers with clean and balanced sound output.

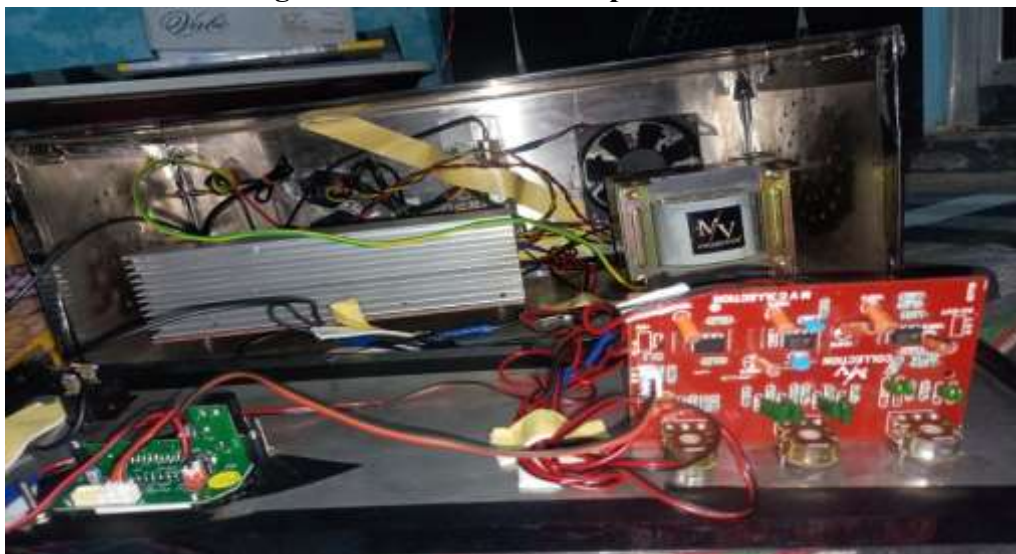
Although the board is marketed with a 1200W PMPO (Peak Music Power Output) rating, this project is configured to deliver a more realistic and stable 200W RMS output, using two 100W speakers. This setup ensures dependable performance without compromising on audio clarity or system safety[1].

The major key strength of this amplifier board is its practicability and versatility. It supports multiple input modes including USB, AUX, and Bluetooth which allows seamless connectivity with smartphones, laptops, and audio players. The integrated bass and treble control circuit gives users the ability to adjust sound characteristics in real time, tailoring the output to suit different environments or listening preferences.

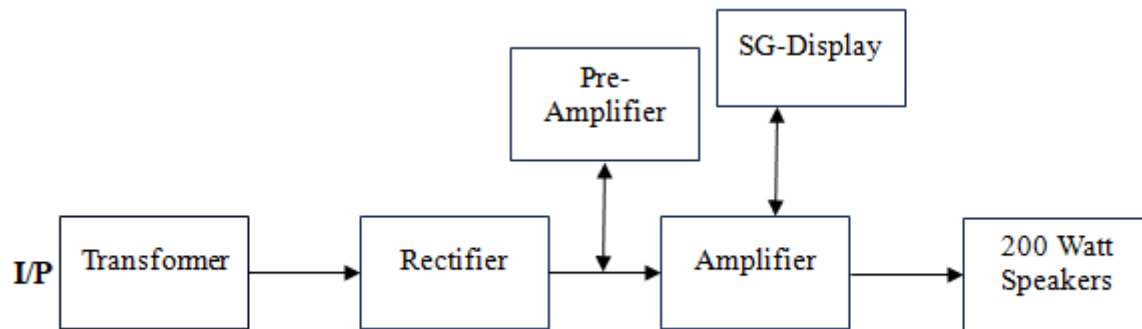
To maintain performance during long hours of use, the system incorporates a dedicated power supply unit paired with an active cooling mechanism. A pre assembled large aluminium heat sink with the amplifier board and a 12V cooling fan are installed to efficiently manage heat buildup, preventing thermal overload and enhancing system longevity. Power is delivered through a step-down transformer, which supplies the necessary voltage and current to different parts of the circuit with both stability and safety and a separate 12v dc is provided for the cooling fan[5]. For the housings of all the electrical components of the amplifier systems a rectangular shaped chassis is designed and is made up of steel plates, this enclosure provides a strong protection for all the components of the amplifier systems against damages that may be caused during the handlings and transportation.

This amplifier project is a blend of theory and hands-on work, designed to apply fundamental principles of electronics such as Class AB amplifier operation, impedance matching, thermal design, and load distribution[3]. Building the system involved careful component selection, circuit assembly inside a protective enclosure, safe wiring practices, and multiple testing phases to verify both audio quality and reliable operation. This 200W stereo audio amplifier stands as more than just a functional sound system. It represents a modular, accessible, and customizable platform that can be built using affordable components, yet delivers performance on par with many commercial-grade systems. Moreover, the design lays a strong foundation for future enhancements such as wireless remote control, digital equalization, or smart integration demonstrating the potential of DIY electronics in real-world applications.

**Figure 1: Hardware of Amplifier Board**



**Figure 2: Layout of Music System**



## 1.2 Component for the Amplifier Hardware

1. **MV Collection 1200W PMPO Amplifier Board:** This module serves as the heart of the amplifier system, responsible for processing and amplifying the stereo audio signals. It comes pre-assembled and is designed for plug-and-play use, making it ideal for the project. This board acts as the central amplifier unit, handling the main audio signal processing[4]. Providing stereo output with integrated bass and treble controls, allowing users to adjust tone characteristics directly. Its compact, modular design simplifies assembly and reduces the need for external tone control circuitry.
2. **2x 100W Speakers:** For the project we used two 100W speaker each for left and right output compatible with the board. This speaker provides clear and loud audio delivery with proper impedance.
3. **USB/AUX/Bluetooth Card Module:** This module provides multiple input for playing audio, such as for wireless connectivity Bluetooth is provided and for wired connectivity USB/AUX is available[7].
4. **Transformer (AC to DC Power Supply):** For the power supply 12-0-12, 3 ampere high quality transformer is used for the amplifier board. This converts the main AC voltage to lower DC voltage for rectification and regulations.
5. **Cooling Fan:** A 12V dc fan is used for the cooling process of the amplifier systems, it is installed near the heat sink of the board for the good thermal management. It also increases the system reliability and the lifespan.
6. **Power supply for cooling system:** A separate external 12V dc supply is provided for the 12V dc cooling fan[6].
7. **Enclosure:** For the housings of all the electrical components of the amplifier, a rectangular shaped chassis is designed and is made with steel plates. This enclosure provides protection to all the electrical components and provides airflow for the cooling process.

## Conclusion

This project successfully showcases the process of designing, building, and testing a 200W stereo audio amplifier using the MV Collection 1200W Peak Music Power Output board. The system brings together key features such as bass and treble tone control, Bluetooth/USB/AUX connectivity, and a dedicated power supply with active cooling, resulting in a fully functional and flexible audio setup. It proves to be a solid solution for a range of low to mid power applications like home audio systems, DIY educational kits, or public address use.

The amplifier delivers clear and powerful sound output, and throughout the assembly and testing stages, this project provided valuable hands-on experience in audio circuit design, signal flow analysis, and system troubleshooting. Features like wireless audio input and real-time tone adjustments also improved the overall usability and listening experience.

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