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COLLEGE OF ENGINEERING
NAAC Accredited Autonomous Institution
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ISO 9001:2015 Certified Institution
Thalavapalayam, Karur, Tamilnadu.

MINOR PROJECT IV

First Review

09/03/2024

TITLE: PCB DESIGN OF LOW NOISE CLASS-D AMPLIFIER

GUIDED BY,
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INTRODUCTION

- A Class D Amplifier is a type of amplifier which provides about 100% efficiency Theoretically.
- It uses a switching circuit to produce those kinds of efficiency.
- However, most of the Class D Amplifiers generates noise overtime.
- This project focusses on Designing a PCB design which reduces the noise and the Electromagnetic Interference produced in the circuit.

PROBLEM STATEMENT

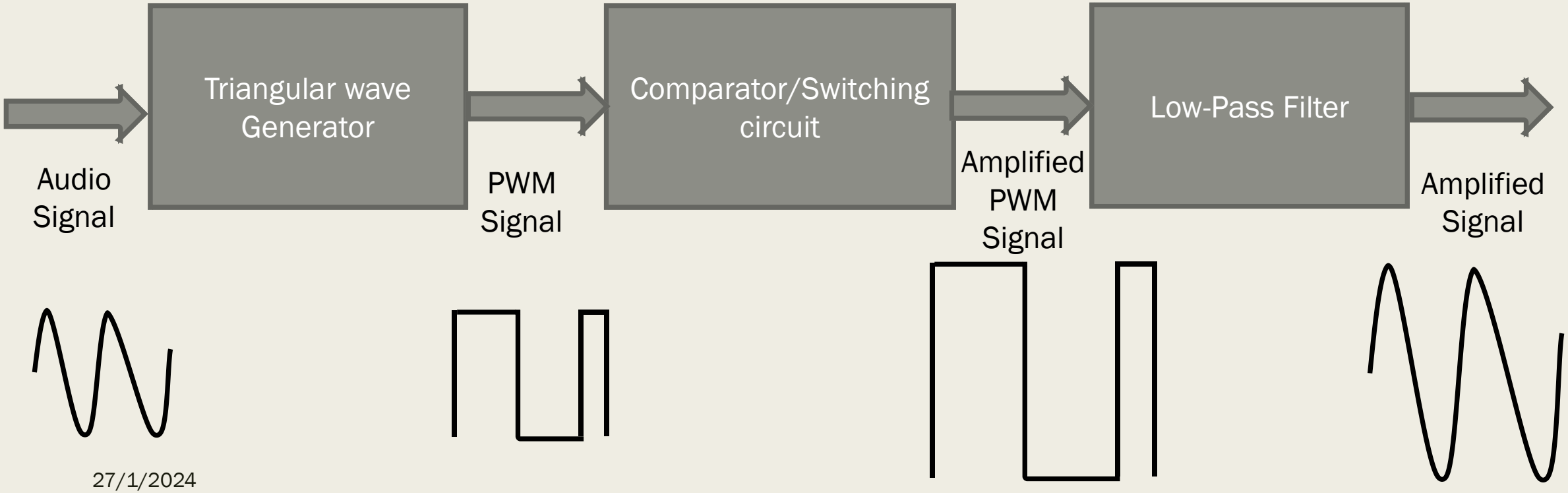
- Most of the Class D Amplifiers are generating noise even though they are good in efficiency.
- Its also important that the design must be done in a way which does not have a Electromagnetic Interference.
- So the Design of the PCB should be in a way that has low Signal to Noise Ratio(SNR).

OBJECTIVE

- To Design a PCB for a Class D Audio Amplifier that
  - Manages compact thermal considerations
  - Minimizes noise
  - Electromagnetic interference
- Aiming to optimize performance and audio quality for diverse applications.

METHODOLOGY

- Class D amplifier is divided into three sub-parts



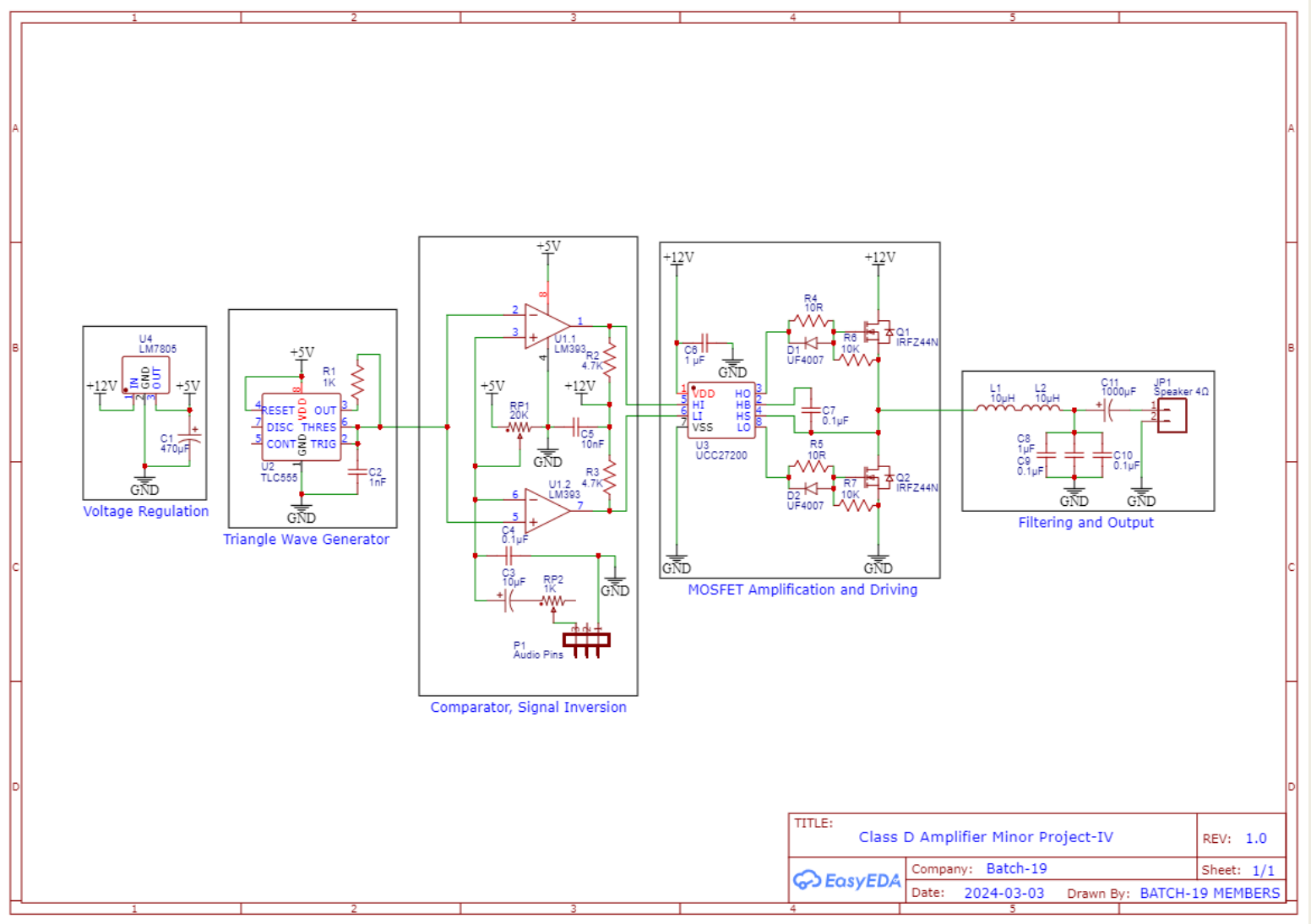
EXISTING SYSTEM

- The existing system for the PCB design of a Class D Audio Amplifier [1] prioritizes efficient power delivery through optimized component placement and trace routing.
- It incorporates robust thermal management strategies, utilizing thermal vias and strategically positioned heat sinks to mitigate heat buildup during amplifier operation.
- Additionally, the system employs dedicated noise mitigation techniques, including filtering components and proper grounding, to ensure a clean and interference-free audio signal.

PROPOSED SYSTEM

- The proposed system for PCB design of a Class D amplifier aims to optimize performance, minimize size, and reduce interference(NOISE).
- By strategically selecting components, implementing efficient layout designs, and incorporating noise-reduction techniques, the system seeks to enhance the overall efficiency and reliability of the amplifier.
- Additionally, emphasis will be placed on thermal management strategies to ensure optimal operation and longevity of the amplifier in various audio applications.

SCHEMATIC DIAGRAM



PLAN OF WORK COMPLETION

- **Initial PCB Layout (1-2 weeks):**
  - We begin by translating the schematic design into an initial PCB layout, focusing on component placement and rough routing.
  - This stage involves establishing the basic layout structure and ensuring compatibility with the intended enclosure

- **Iterative Refinement (2-3 weeks):**
  - Over the next few weeks, iterate on the initial layout, refining component placement for optimal signal flow and thermal management.
  - We will Pay close attention to high-frequency signal paths and critical grounding considerations to mitigate potential noise issues

- **Finalization and Testing (1-2 weeks):**
  - Finalize the PCB layout, incorporating any feedback from design reviews and ensuring compliance with manufacturing guidelines.
  - We will conduct thorough testing, including signal integrity analysis and thermal simulations, to validate the design before proceeding to production

REFERENCES

- [1] M. Berkhout, "An integrated 400-W class-D audio amplifier," in IEEE Journal of Solid-State Circuits, vol. 38, no. 7, pp. 1198-1206, July 2003, doi: 10.1109/JSSC.2003.813238.
- [2] Honda, Jun, Manuel Rodríguez, and Wenduo Liu. "25W-500W scalable output power class D audio power amplifier reference design using the IRS2092 protected digital audio driver.” Acesso em 9 (2008).
- [3] Mei, S.; Hu, Y.; Xu, H.; Wen, H. The Class D Audio Power Amplifier: A Review. Electronics 2022, 11, 3244.

THANK YOU

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