

AUDIO AMPLIFIER

Hoang-Long.Vu

May 2, 2021

1 List of Abbreviation and Symbols

List of Figures

1 System Block Diagram 7

Contents

1	List of Abbreviation and Symbols	2
I	Introduction	6
2	Description	6
3	Requirement	6
3.1	Functional Requirement	6
3.2	Non-Functional Requirement	6
4	Specification	6
4.1	Input parameters	6
4.2	Output parameters (Speaker)	6
5	Block Diagram	7
II	Calculation and Simulation	8
6	Calculation	8
6.1	Stage 1: Pre-Amplifier	8
6.2	Stage 2: Voltage Amplifier and Phase Reverser	8
6.3	Stage 3: Current Amplifier	8
6.4	Stage 4: Power Amplifier	8
7	Simulation	8
III	PCB Design	9
IV	Making Product and Testing	10
V	Conclusion	11

ABSTRACT

Electronic Circuit is an essential subject for every Electronics and Telecommunications Engineering student. This subject covers a huge amount of knowledge about electronic devices and circuit theory, help students to profoundly understand the fountain of the related concepts, also how to apply them to the real life. Accordingly, to have a general look of what we have learned, I try to do a project about making *An Audio Amplifier*.

Within four parts, this report covers the entire process I have followed to accomplish my final product. In the first part ***Introduction***, I will describe in details the specification of my amplifier, also its internal structure and features. The second part ***Calculation and Simulation*** will reveal the way how I got the specific values for each individual parameters, also the schematic design of my circuit through each stage, then cover up by the simulation. To manufacture the product, I have to make its PCB Design, and this step will be introduced in ***Part III: PCB Design***. The last part ***Making Product and Testing*** will finish the whole procedure by comparing the practical measured parameters with the theoretical calculated ones.

Throughout this project, I have found my happiness of the first productive circuit I have ever made. Thanks to it, I also understand more about what you have taught us. Anyway, due to the first time I make a multi-stage circuit myself, my product maybe not the well-being one, even sometimes I stuck in difficulties. Nevertheless, it is very kind of you that you are always ready to help me overcome those drawbacks and accomplish my achievement.

Sincerely,
Long.

Part I

Introduction

2 Description

- An audio amplifier is a device or a system that helps to amplify audio signals with low-power source such as output signal from smart phone's audio jack. The application of audio amplifiers can be seen everywhere, mostly in loudspeaker or music system in house club, movie theater, etc.
- The audio amplifier receives a very small input signal, normally measured as mili-watts (mW) and amplifies each individual parameter of the original signal through multi-stages. At the output, the obtained power is much higher than the pure one (about some watts), depends on the properties of the output speaker(s).
- Those parameters that will be modified (particularly amplified) are usually amplitude (Voltage), strength (Current), or power. In some complex system, also frequency could be change to shift the tone's height (deeper within lower frequency and vice versa). However, in the restriction of this project, my device only works with amplitude, intensity and power.

3 Requirement

3.1 Functional Requirement

- Able to amplify the audio signal.
- Minimize the effects of noise, signal distortion.
- Compatible with variety of common sources.
- Working properly with 12V DC-supplier.

3.2 Non-Functional Requirement

- Easy to use, repair and customize.
- Low price.
- Small and portable.

4 Specification

4.1 Input parameters

- Supplier: 12V-DC.
- Input audio signal:
Voltage(RMS): 10-100mV-AC.
Frequency: 1.5kHz.

4.2 Output parameters (Speaker)

- Resistance: 4Ω .
- Power: 3W.
- Voltage amplification factor: 32.

5 Block Diagram

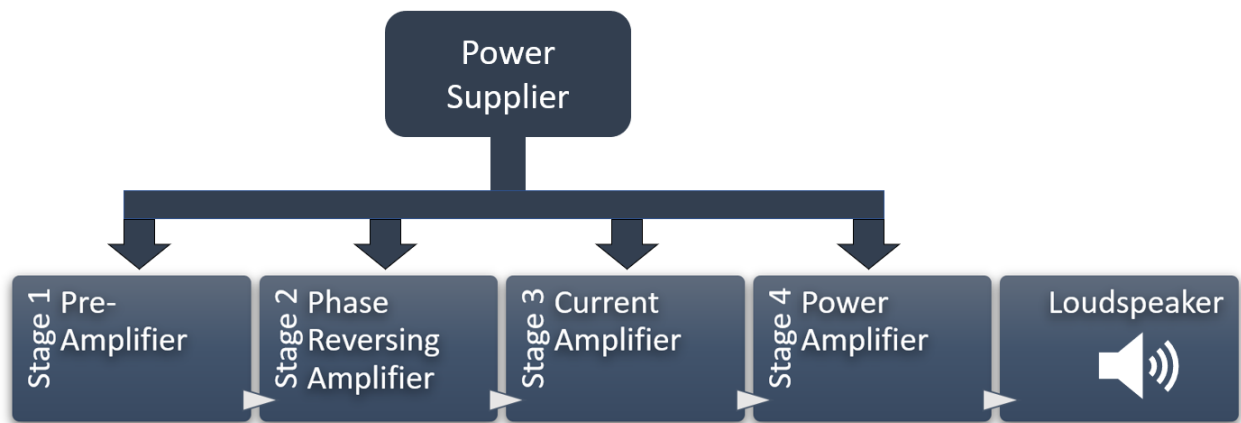


Figure 1: System Block Diagram

Part II

Calculation and Simulation

6 Calculation

6.1 Stage 1: Pre-Amplifier

6.2 Stage 2: Voltage Amplifier and Phase Reverser

6.3 Stage 3: Current Amplifier

6.4 Stage 4: Power Amplifier

7 Simulation

Part III

PCB Design

Part IV

Making Product and Testing

Part V

Conclusion

Reference