

Stereo high Hearing Aid

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Abstract : Hearing aid device is a small and useful electronic gadget that is fit in or out around the ear to improve one hearing and for efficient communication. This work involves the design and development of a hearing aid device with an acoustic signal picked-up using a condenser microphone & 4558D IC is configured to produce an audio amplification which is converted to audio signal through a headphone. After the design, the circuit is constructed and tested on two people with partially hearing problem persons. The result observed that there is a significant improvement in the hearing ability of all the patients tested. The final test showed that the device could prove very useful for people with partial hearing problems. However, the device had no impact on persons suffering from complete deafness. For further improvement, it is recommended that a wireless hearing aid device should be designed and constructed to reduce the cost, weight. The casing of the hearing aid should be made up of more portable, qualitative and lighter wood material so as to reduce the overall weight and size. During the design, more care should be taken so as to avoid feedback signal between the microphone and the headphone which may result in noisy signal.

Index Terms: hearing device, stereo high, voice high, hearing high, efficient communication aid etc.,

1. INTRODUCTION

THIS document is prepared for hearing high,i.e who is suffering with sound problem can listen the voice or sound high with this aid.

It has basic Electronic amplification technique can produce the required high sound with the help of transducer.but Introduced to learn from the basics to made it well. here used IC for implementation, people can use their choice as per the availability in the market.

2. LITERATURE REVIEW

Schum, (2012) designed and constructed a low-cost hearing aid to produce an amplified sound for people with hearing loss. A 9V dc was used as the power supply. The condenser microphone was used as input transducer to pick up sound from the environment for conversion to electrical signal, and then it passes the main amplifier. The integrated circuit (IC) 4558D, available in 8-pin mini chip package and specially designed for portable power amplification was used for the amplification function. A 32 ohms ear phone was used as the output transducer to convert the amplified electrical signals back to sound.

Also, Levitt (2013) worked on A Digital Master hearing aid. They used computer simulation in evaluating conventional and experimental hearing aids. Two illustrative examples are provided. The first involves the simulation of a convention of a master hearing aid and its

application in evaluating different adaptive strategies in the prescriptive fitting of hearing aids. The second example involves the simulation of the hearing aid embodying modern digital signal-processing techniques for the reduction of background noise. A high-speed array processor is used in order to accomplish these simulations in real time.

Yusuf, (2015) designed and constructed a Hearing Aid Device. In their work they used 4558D IC configured to produce an audio amplification which is converted to audio signal through a headphone. Design equations were employed to calculate the physical parameters of the circuit. They employed bridge type amplifier for their amplification. After the design, the circuit was constructed and tested on 5 people with partial hearing problem. The result showed that there was a significant improvement in the hearing ability of all the patients tested. Recommendations were proposed for further improvement. The design of hearing aid carried out in this work will employ stereo type amplification method using commonly available components so as to make it cost effective.

3. OBJECTIVES

3.1 General objective: To design and construct stereo super hearing device.

3.2 Specific Objectives: To accomplish the general objective, the following specific objectives are as follows:

- To develop PCB layout design.

- To design hearing aid circuit.
- To construct the hardware part of the designed hearing aid
- To analyze the characteristics of pre-amplifier and operational amplifier.
- To increase hearing sensitive of sound of the human hearing level.
- To test the constructed device

3.3 Importance of the Project: The main importance of using hearing aid is that to improve one's hearing and consequently communication ability and also there are five basic importance of this

3.3.1. You're a go-getter. People with hearing loss who use hearing aids are more likely to tackle problems actively. Addressing hearing loss shows self-assurance and a willingness to deal with issues head-on. Most hearing aid users in the workforce even say it has helped their performance on the job.

3.3.2. You value your relationships. Healthy relationships rest largely on good communication. Treating hearing loss lets close family and friends know that you want to stay connected and involved in your relationships with them. Most people who currently wear hearing aids say it not only helps their overall ability to communicate effectively in most situations, but it also has a positive effect on their relationships. And they're more likely to have a strong social network.

3.3.3. You like to be active. If you enjoy an active lifestyle, you're not going to let untreated hearing loss stop you. Treating hearing loss means you have every intention of keeping up the pace of a fulfilling life.

3.3.4. You love living life the more exuberance you have for life, the less likely it is you'll let untreated hearing loss get in your way. When you address hearing loss, you let the world know you love living life

3.3.5. Your tech savvy and make the most of what modern life has to offer at its best, technology offers solutions, enriches life, and makes us more efficient.

4. SCOPE AND LIMITATION

4.1 Scope: Hearing aids can greatly improve the quality of life for those with hearing loss as well as their family, friends, and associates. The degree (levels) of the hearing aid as shown in the table below.

S.No	Source	Intensity
1	normal range	0 to 24 Db
2	mild loss	25 to 45 Db
3	moderate loss	46 to 65 Db
4	severe loss	66 to 85 Db
5	severe loss greater	86 Db

Here chooses to design this project depend on the moderate loss and based it on the following features:

- Compatibility: for any person ear.
- Material: wood.
- Size: small. 10 cm with 10cm
- Input: 9 VDC.
- Efficiency: >85%
- Receiving distance: up to 0 - 8 m

4.2 The limitation: The limitation of this device i, ear molds which helps to secure hearing aid to the patients' ear is not included in the design, Lastly the device with only improve sound for those with hearing impaired situations and not to correct permanent impairment.

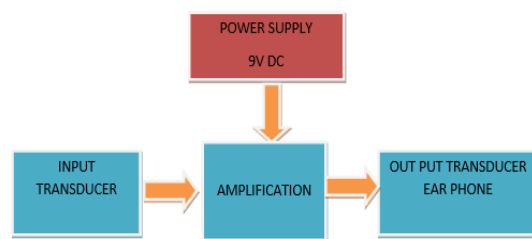


Figure 4.2: block diagram

5. SYSTEM DESIGN

Table 4.1 the Level of Sound Intensity

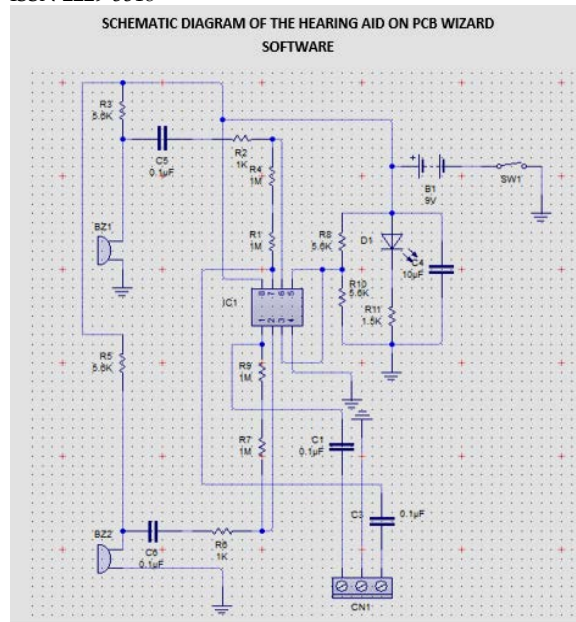


Figure 4.3: PCB DESIGN ETCHING PROCESS

Convert the above schematic diagram to a PCB layout on the wizard software then it converts like this in the figure below.

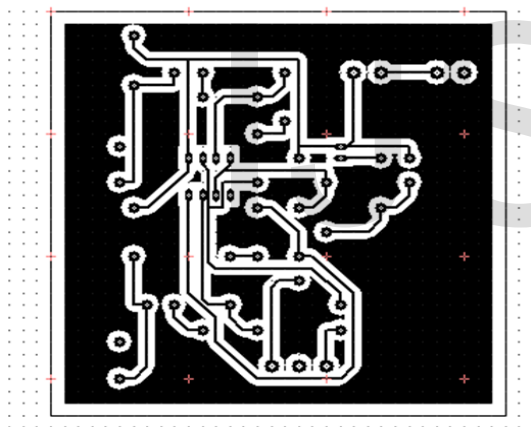


Figure 4.4 layout

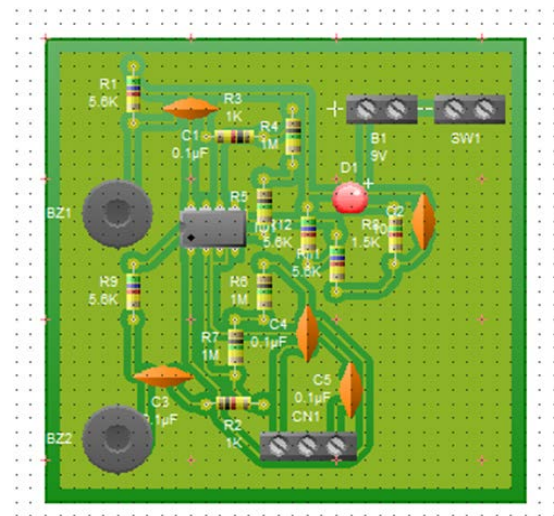


Figure 4.5 implemented final layout

6. SYSTEM IMPLEMENTATION AND INTEGRATION

In this Step, the Audio Power Amplifier system will be divided into two stages. Therefore, developer can be more focus on a small module and become more effective compare to doing the whole system at once. Besides that, it also helps to refine the vital components of the system that needs more time to develop.

Stage 1: Hardware Implementation: Implementing, setup and configuring all the hearing aid and come out with functional prototype. This prototype will be developed based on the hearing aid design that was defined in the previous Step

Stage 2: System Integration: integrating the hardware and software systems to produce the final system

- ✓ Solve the system errors or hardware errors once integrate.

7. SYSTEM TESTING & EVALUATION

After the system is completely built functionality and usability testing will be carried out. Feed backs gather from the tests will be used to further improve the final system. Documenting process will also be carried out in line with the testing and evaluation.

7.1 testing of the components:



S.No	Degree of deafness	Response To Using Of Hearing Aid
1	Partial deafness	Improvement in hearing
2	Complete deafness	No improvement in hearing

figure 7.1 testing of components on the hearing aid circuit

7.2 Construction steps:

- Place the Select the materials according to the requirement.
- Initial testing of the entire component used in the design.
- Design the PCB.
- Drill the necessary holes for the component terminals.
- Placement of the components on the designed board and testing.
- Assembling of the component on the project board.
- Soldering of the individual components and link wires into place on the board.

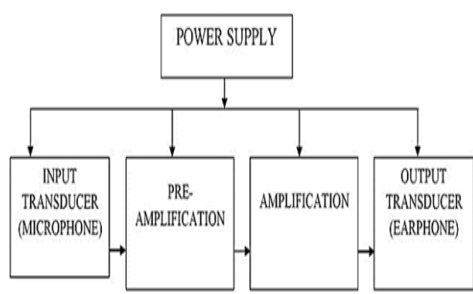


Figure: 7.2 Assembling blocks.

8. RESULTS & DISCUSSION

8.1 RESULT: Response to use of hearing aid

Table 8.1 Response to use of hearing aid

8.2 RESULT of Measurement Device its Power:

consumption: The result of power consumption of the reference (bridge) and (stereo) hearing aids devices as given by the current that flows through the device at the interval of 10 minutes is shown in the table is Measurement of the Device Power Consumption

Table 8.2: Measurement of the Device Power Consumption

Time T (min)	I1 (mA)	I2 (mA)
10	133	33
20	133	33
30	129	32
40	128	32
50	128	31
60	125	31
70	125	31
80	125	30
90	124	29
100	122	29
110	122	29
120	120	28

where I_1 :is the current through the old design & I_2 : is the current through the new development.

DISCUSSION: This proposal on the design and construction of a hearing aid device we check this device with two person both are hearing problems in both ear. Then they are very interesting and very happy to get the device, if this device is more fabricate or produce they are the one who use this device. both are communicating effectively with us as they say that the import device is very cost and the total amount of the import device is 1200 and they have not buy the device because of money but our device total amount of money is 345 birr only so any person can buy this device easily.

8.3 Conclusion: The aim of this work was to design a hearing aid system that pre-amplifies an acoustic signal Picked up by a condenser microphone; the pre-amplified signal is then further amplified before being converted to sound by another transducer (speaker). The

designed and constructed circuit was tested on different set of people with different degree of hearing problem. The final test showed that the device could prove very useful for people with partial hearing problems. However, the device had no impact on persons suffering from complete deafness.

9. RECOMMENDATIONS

For further improvement, it is recommended that a wireless stereo high aid need be design and construct to reduce the weight. The casing of the hearing aid should be made up of more portable, qualitative and lighter plastic material so as to reduce the overall weight and size. During the design, more care should be taken so as to avoid feedback signal between the microphone and the headphone which may result in noisy signal.

10. REFERENCES

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11. BIOGRAPHY



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