

Portable Electronic Stethoscope with Phonocardiogram

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Abstract

The main aim of this project is to design a portable phonocardiogram with electronic stethoscope. It is portable so that people can use it and carry it anywhere with them, mainly in remote areas. The purpose of using the electronic stethoscope is that we can convert the heart sound into electrical form which will be able to see on any display unit which gives us a facility to store it, record it & transmit it.

Introduction

This is an attempt to transfer the heartbeats sound and heart wave through mobile, computer, etc; It is an easiest way to get quick response from the doctors in the emergency cases. We are using normal stethoscope then we are modifying the basic structure of stethoscope into electronic stethoscope. Through this electronic stethoscope we can hear the heartbeats more clearly and with the help of phonocardiogram we are able to see the heart waves on the screen.

Block Diagram

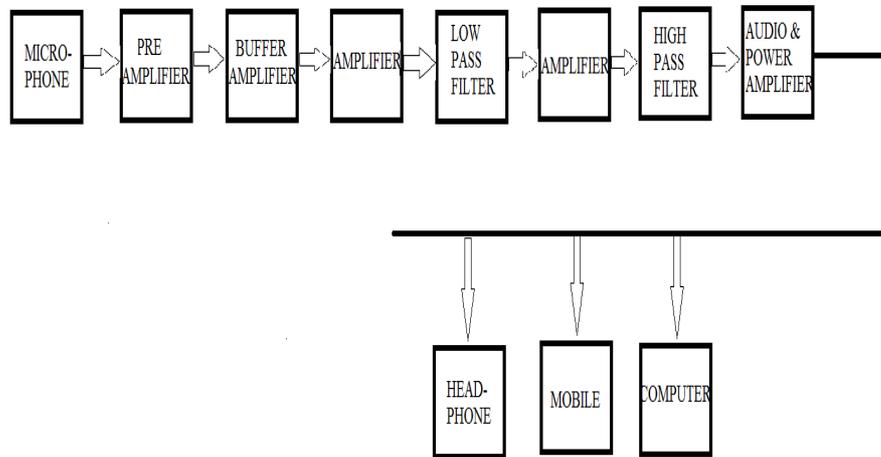


Fig (1) : Block Diagram

(1)Microphone:-Microphone is a basic sensor used in a phonocardiogram with electronic stethoscope. It converts voice signal into electrical signal. We are using capacitive microphone.

(2)Pre Amplifier:- A pre amplifier is an electronic amplifier that prepares a small electrical signal for further, this is the stage between microphone and main amplifier.

(3)Buffer amplifier:- It has high input impedance and low output impedance, due to this loading of the signal get reduced .Buffer amplifier is a amplifier which has unity gain.
Gain=1

(4)Amplifier:- The amplitude of the signal getting from microphone is very less hence to amplify signal we are using amplifier.

(5)Low pass filter:-We are using 20 KHz low pass filter. It passes low frequency.

(6)Amplifier: Again to increase the strength of signal we are using amplifier

(7)High pass filter:-We are using 20Hz high pass filter. It passes high frequency.

We are calculating higher cut-off frequency and lower cut-off frequency by using this formula-:

(8)Audio and power amplifier:- Power amplifier amplifies the both voltage and current simultaneously. To amplify the audio signal we required audio and power amplifier.

(9)Headphone:-This slot is connected for hearing purpose.

(10)ADC:-Analog to digital converter by using ADC we can see the sound waves on the computer.

(11)Mobile:-Through mobile we can also send these waves to another device

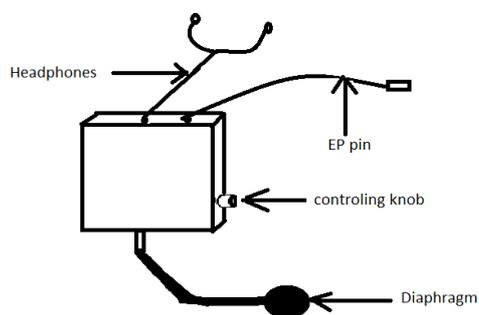


Fig (2): View

Conclusion

Electronic stethoscopes offer new opportunities for computerized analysis of cardiac cycle based on heart sounds. We conclude that it is an easier method to transmit the heart sound wave through transmitting device. It can be affordable. By using phonocardiogram we can see the heart sound waves clearly and using 'capacitive microphone' it is possible to hear sound more clearly. The stethoscope is used by each and every doctor and nurse. So if we can incorporate into the electronic stethoscope, the technology of automated detection of cardiac disorders, then it will become even more useful.



Fig. (3)

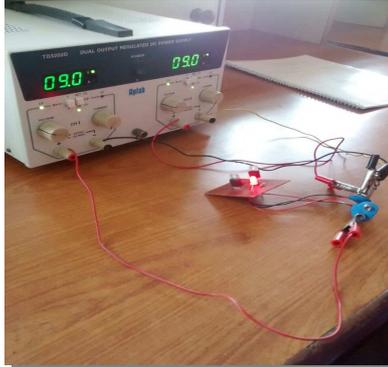


fig. (4)



fig. (5)

Need

Now a day's doctors are still using acoustic stethoscope to hear heart sound but as the year passes out doctors will prefer to use portable phonocardiogram with electronic stethoscope, so they can visualize the heart sound clearly on any display unit and also can hear the heart sound more clearly. Since, it is portable, it will able to store the heart sound and transmit through any transmitting device.

For example, if the person went in the remote areas for his work and unfortunately if he/she will not feeling well and there is no near by consultant available for his/her treatment. But, the area has reliable network.

So in this situation he/she can use the portable phonocardiogram with electronic stethoscope through which he/she can record his own heart sound and send to expert doctor and doctor will also be able to recognize the disease easily. Hence, people will get proper treatment.

References

- [1] Praveen Kumar Sharma, Sourav Saha, Saraswati Kumari, "Study and Design of a Shannon-Energy-Envelope based Phonocardiogram Peak Spacing Analysis for Estimating Arrhythmic", International Journal of Scientific and Research Publications, Volume 4, Issues 9, September 2014 ISSN 2250-3153.
- [2] Bassam R. PHONOCARDIOGRAPHY SIGNAL PROCESSING (synthesis lectures on biomedical engineering). CA: Morgan and Claypool; 2009.
- [3] THE ELECTRONIC STETHOSCOPE, article in Biomedical Engineering