The use of PIC Microcontroller in Hearing Aids with Automatic Gain Control

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Abstract

PIC Microcontrollers have been achieving low-cost product development and control solutions for medical device manufacturers over the past years. This paper presents a PIC microcontroller-based automatic gain control system for digital hearing aid devices. Noise reduction and speech enhancement are achieved through a wavelet transform-based digital signal processing unit. According to the recognized noise condition in the audio signals, the microcontroller is programmed to send a control signal to the digital volume controller to adjust the volume level in real time. Experimental tests are carried out on real data of hearing impairments suffering from different types of hearing losses. The microcontroller used in this work is the high performance enhanced flash PIC18F4520 of microchip which has an on-chip analog to digital converter (ADC) peripheral. The ADC features of PIC are used to detect and compare the sound level. ‘C’ and assembly language programs are developed to control the function of the microcontroller. MPLAB Integrated Development Environment (IDE) is applied for the development of the proposed embedded application employing PIC microcontroller.
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References

1. www.microchip.com/medical/Solutions for medical applications

Index Terms

Computer Science

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Keywords

automatic gain control , hearing aid, PIC microcontrollers, stationary wavelet transform.