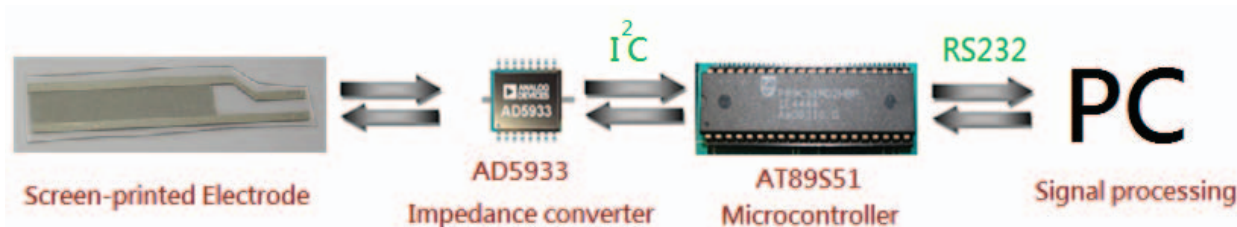


Portable Bio-impedance detection system development

Kuan-Yao Wang, J.Z. Tsai, J.T. Liu, C.J. Chen, S.J. Chang and M.W. Lee

National Central University, Taiwan

Bio-impedance technology extracts both physiological and pathological information from the human body through the use of biological cells, tissues, and organs. These biological elements can be characterized by their electrical properties (impedance, conductance, dielectric coefficient, etc.) and their changes are measured. This is a non-destructive testing technique, which is widely in use. The purpose of this system is to achieve an inexpensive, useful, portable, and highly precise impedance measurement. The system we designed consists of two parts. The first part is an AT89S51 microcontroller. The second is a bio-impedance measuring device produced by Analog Devices, the integrated circuit AD5933. Together the AT89S51 and AD5933 combine to produce a portable bio-impedance detection system. The AT89S51 is an 8-bit microcontroller that provides a simple, cheap, small, and low power-consuming design. The AD5933 is a highly precise impedance converter that is composed of three parts. The Direct Digital Synthesizer provides a stable AC output signal. A dual stage OP amplifier, which converts the current signal into a voltage signal and then amplifies the signal by 1 or 5. Then the signal is passed through a low-pass filter that eliminates high frequency noise. The final component is an ADC which converts analog signals into digital signals. Through the use of DFT, digital signal processing is achieved. With such a cheap and portable system, medical researchers can easily monitor cell growth by bio-impedance detection.



Biography

K.Y. Wang is a MS student of Electrical Engineering in National Central University, Jung-Li City, Taiwan. He received the BS degree in Electronic Engineering from Chang Gung University, Taoyuan City, Taiwan. His current research interests include biosensor, biomedical signal processing, micro-processor, C, LabVIEW and Matlab programming.

initiald1123@gmail.com