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Abstract

Rapid pathogen detection is an urgent necessity in order to ascertain contamination and diseases caused by pathogens such as Salmonella typhimurium or Escherichia coli. Rapid detection of pathogen is essential in several critical fields such as national security, food safety, and human and animal healthcare, to name a few. Thus, a rapid and controlled mechanism to counter the threat of mass contamination is needed. A low power, low cost, and simple electronic readout system has been simulated and implemented for rapid bacteria detection for impedance biosensor responses. Such an interface will enable the label free and rapid impedance biosensors convenient for field use. Experimental reading shows that the variation

in sensitivity is not affected significantly by a 10% fluctuation in frequency but the signal amplitude has to be maintained within 30 mV. The readout system generates automatically sinusoidal waveforms of discrete values in the wide range 100–100 kHz by interfacing a high-Q band pass filter with a rectangular waveform of maximum frequency 15 kHz obtained from ATMEGA128 microcontroller, by configuring the PWM and Timer modules. The duty cycle of the rectangular waveform generating from microcontroller is tuned so that the control of voltage is maintained within 30 mV amplitude. Also, the power consumption of the sine wave generator is maintained within 30mW.

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Keywords

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