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Development of voltage amplifier electronic reader using NodeMCU

Abstract

Generally, two electrode based amperometric biosensors show extremely low current signal output around pico ampere (pA) to micro ampere (μA) range. This paper describes the development of electronic reader to capture and amplify four different range of current as mili, micro, nano and pico ampere and convert it to detectable voltage range as an output signal to the microcontroller. The MAX4238 op-amp IC was used to amplify micro voltage to mili voltage. NodeMCU was act as the process and control circuit to read the output voltage from the amplifier circuit. The entire system is comprised of a voltage amplifier circuit, filter circuit, microcontroller and power supply unit. The range of the current measurement of the system was from 1 pA to 650mA. The amplifier operation was measured with a high impedance current source and has been compared with the theoretical measurement. The Design Spark PCB software was used to design the voltage amplifier circuit. Arduino software was used to create a programming code to upload in NodeMCU microcontroller.