

Design of Wireless Readout System for Resonant Gas Sensors

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Abstract : This paper presents a design of a wireless read out system for tracking the frequency shift of the polymer coated piezoelectric micro electromechanical resonator due to gas absorption. The measure of this frequency shift indicates the percentage of a particular gas the sensor is exposed to. It is measured using an oscillator and an FPGA based frequency counter by employing the resonator as a frequency determining element in the oscillator. This system consists of a Gas Sensing Wireless Readout (GSR) and an USB Wireless Transceiver (UWT). GSR consists of an oscillator based on a trans-impedance sustaining amplifier, an FPGA based frequency readout, a sub 1GHz wireless transceiver and a micro controller. UWT can be plugged into the computer via USB port and function as a wireless module to transfer gas sensor data from GSR to the computer through its USB port. GUI program running on the computer periodically polls for sensor data through UWT - GSR wireless link, the response from GSR is logged in a file for post processing as well as displayed on screen.

Keywords : gas sensor, GSR, micromechanical system, UWT, volatile emissions

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