

## Design and Implementation of a Nano-Power Wireless Sensor Device for Smart Home Security

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**Abstract :** Most battery-driven wireless sensor devices will enter in sleep mode as soon as possible to extend the overall lifetime of a sensor network. It is necessary to turn off unnecessary radio and peripheral functions, especially the radio unit always consumes more energy than other components during wireless communication. The microcontroller is the most important part of the wireless sensor device. It is responsible for the manipulation of sensing data and communication protocols. The microcontroller always has different sleep modes, each with a different level of energy usage. The deeper the sleep, the lower the energy consumption. Most wireless sensor devices can only enter the sleep mode: the external low-frequency oscillator is still running to wake up the sleeping microcontroller when the sleep timer expires. In this paper, our sensor device can enter the extended sleep mode: none of the oscillator is running and the wireless sensor device has the nanoampere consumption and self-awaking ability. Finally, these wireless sensor devices were deployed in a smart home security network.

**Keywords :** wireless sensor network, battery-driven, sleep mode, home security

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