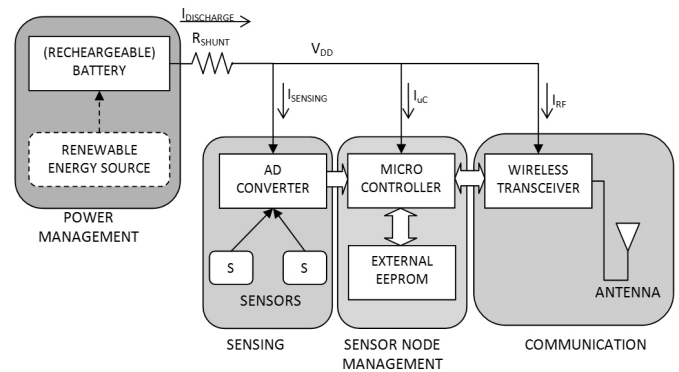


## IIPE033 A Method for Estimating State of Charge in Energy-Aware Wireless Sensor Nodes

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The state of charge estimate of a lithium-based battery is not trivial. Accurate measurements of this quantity require the implementation of complex and expensive, in terms of energy, measuring systems. In a wireless sensor node these methods need to be implemented on-board, thus the energy consumed by the measurement system must be negligible. In this paper we propose a method based on a virtual Coulomb counting, which is able to provide enough accuracy while maintaining negligible the power consumed by the node. Nevertheless it requires a preliminary characterization of the sensor node behavior through laboratory tests.

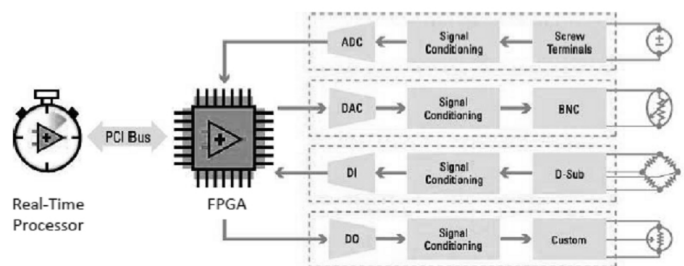


System level block diagram of a wireless sensor node

## IIPE084 Multi-channel System for Remote Power Quality Monitoring of Electricity Supplied by Public Distribution Networks

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Multi-channel system for remote power quality monitoring of distribution power stations in low and medium voltage supply networks is presented in the paper. The goal was to develop low-cost, space saving device that could simultaneously take measurements from all (usually eight or up to twelve) outgoing three-phase feeders in distribution substation. In that case, we should perform at least 3 voltage measurements and 36 current measurements at the same time. In order to save space, but not to reduce the measurement accuracy, a data acquisition system is designed based on real-time multiprocessing with microcontroller and FPGA circuit. Voltage and current measurements and their corresponding high-order harmonics are calculated using fast FPGA circuit, while other calculations (power, power factor, voltage and current phase angles, etc.) are performed in microcontroller. Further savings are obtained using multichannel analog input modules with multiplexed inputs. Communication with supervising computer is done using GPRS modem or wireless network module depending of station location. Results obtained on the developed industrial prototype confirm proposed solution.



Block diagram of multiprocessor data acquisition system