Title
Ultra-Low Power Radio Systems

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Publication Date
2008

Ultra-Low Power Radio Systems

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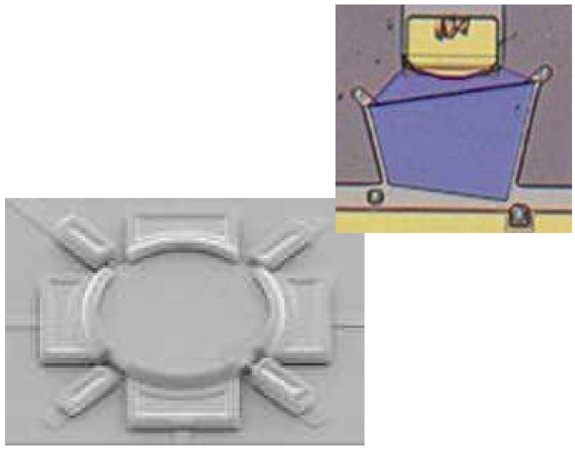
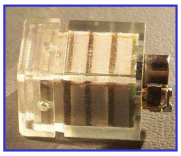
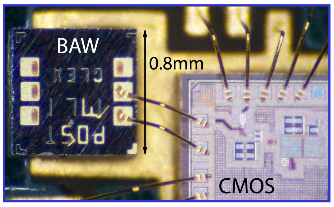
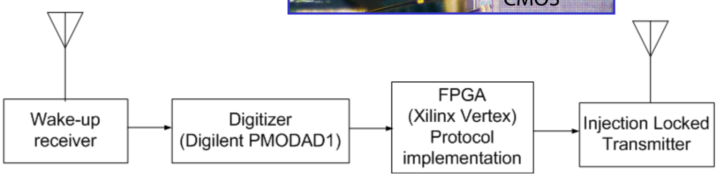
Vision

- We are developing ultra-low power radio circuits and building reliable communication systems based on these circuits.
- For the circuits we are investigating new devices and technologies such as MEMS based electrostatic resonators or Film Bulk Acoustic Resonators (FBAR)
- Based on the circuits we are building prototypes of communication systems to optimize them under real life conditions









Methods

- Circuits designed and build in state-of-the-art 90 and 65 nm CMOS (ST Microelectronics)
- Active development and fabrication of new resonators tailored for radio circuits (UC Berkeley Microlab)
- FPGA based rapid prototyping in combination with custom designed integrated circuits to investigate efficient communication protocols under real life conditions

Research Questions

- Can new devices such as MEMS resonators help to overcome fundamental limitations in circuit design?
- What is the best way to integrate all these different technologies in order to achieve small, cheap, and reliable solutions without sacrificing too much performance?
- How do these systems perform in real world scenarios?

Findings

- New devices and technology can significantly help reducing the power consumptions of wireless systems while increasing the level of integration at the same time
- Prototypes are necessary to develop energy efficient and highly reliable communication protocols and systems