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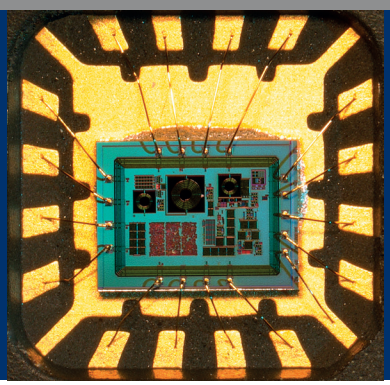

LOW CURRENT WAKEUP-RECEIVER FOR THE »INTERNET OF THINGS«

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The WakeUp-Receiver operates continuously and receives wireless signals for years. The device, which functions without a microcontroller, boasts an extremely fast response time of 32 ms and is suitable for around-the-clock monitoring of wireless sensor networks. Power can be supplied via energy harvesting technology.

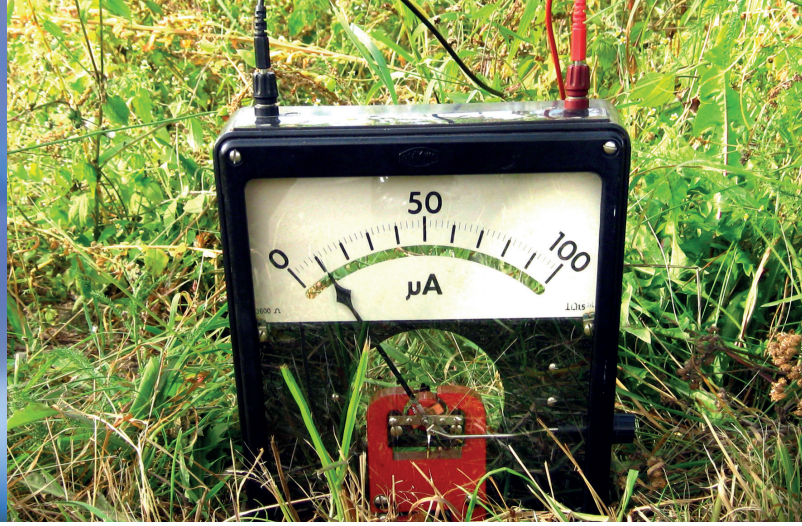
The WakeUp-Receiver continuously monitors the wireless channel - without the use of a microcontroller - and recognizes two separate wake-up patterns. Apart from the pure WakeUp mode, coded data can also be received. Furthermore, a selective wake-up of certain wireless nodes can be performed, using a 16-bit address.

Microampere current consumption

The Fraunhofer WakeUp-Receiver technology significantly increases the operating life of wireless receiver systems. In terms of energy consumption and data rates, the device can be configured in a wide range, thus ensuring several years of battery operation or fully autonomous operation via energy harvesting.

Millisecond response time

The current prototypes, which are based on 130-nm CMOS technology, operate in the 868-MHz and 2.4-GHz frequency bands and feature -80 dBm sensitivity. When operating in the standard configuration at a data rate of 1 kbit/s, energy consumption is reduced to a mere 3 µA with a response time of 32 ms.



Broad field of applications

The Fraunhofer WakeUp-Receiver technology represents a key technology for the »Internet of Things« and »Smart Object« environments. It offers utility across a vast array of applications including building automation, intelligent lighting, electronic labels, remote maintenance, remote control and wireless sensor networks.

Current Consumption and Latency for various Data Rates

Data Rate	Current Consumption @ 2.5 V	Latency
256 bit/s	1.0 µA	484 ms
1 kbit/s	3.0 µA	30.3 ms
8 kbit/s	24.0 µA	3.8 ms

Availability

Fraunhofer IIS provides the WakeUp-Technology as IP, which can be transferred to various CMOS technologies. At the same time basic functions, frequency bands and additional functionality can be modified to customers needs.

Key features WakeUp-Receiver-Technology

- Supply current : < 3 µA @ 1.6 V (1 kbps)
- Frequency bands: 433 MHz, 868 MHz, 915 MHz, 2.4 GHz
- Sensitivity: -80 dBm
- Continuous RF reception
- Operation without microcontroller
- Detection of two independent WakeUp events
- FEC coded data reception
- Selective WakeUp with 16 Bit ID
- low-cost 130 nm standard CMOS

Applications

Home
- Automated meter reading
- Building automation
- Wireless alarm/security systems
- Smart lighting

Logistics
- Electronic shelf labels
- Indoor localisation
- Geofencing

Automotive
- Remote keyless entry

Industry
- Industrial condition monitoring
- Remote wireless control
- Wireless sensor networks