

Energiemessgerät mit Bluetooth Low Energy Schnittstelle

For most people the power consumption of their electrical devices is quite intransparent. The electricity bill shows only the overall consumption of the household over several months. Commercial energy meters for the personal need are useful but often not really user-friendly in the handling because these devices are mostly installed directly at the electric socket and are therefore difficult to access.

The aim of this bachelor thesis is to develop an energy meter, which can send its measured data via Bluetooth Smart to an iPad. Thereby the circuit of the load should not be interrupted. Furthermore, the energy meter should log the data over several days to show the user detailed measurements of the power consumption. These three aspects are the main advantages of this energy meter compared to other devices. Following a thorough research of the relevant literature, a strategy was developed in order to assign the tasks within the team. The work was divided into three main parts: Hardware-, firmware- and app-development.

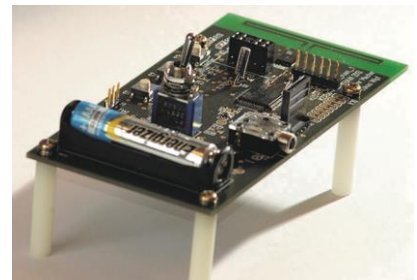
The main goal of the hardware design was to create a circuit board with all the required functions. In addition to the board we did program a firmware for the microprocessor which had to be optimized for low-power and still be able to measure and handle the data. In the app-developing we did create an app for the iPad. The app receives the data sent via Bluetooth Smart and calculates the power and energy for the measured data. Afterwards it presents the data numerically and graphically on the screen of the iPad. The graph with the presented data will refresh itself in a defined interval.

The realised, battery-powered device is capable of taking measurements on a load without interrupting the circuit. It can operate for several months on a single AAA battery.

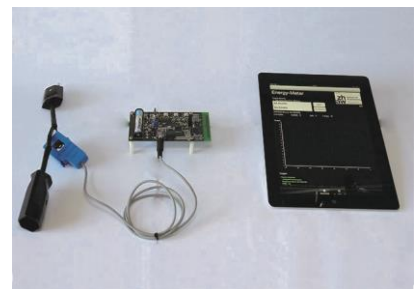


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Developed print operating with a
single AAA battery



The whole system, including adapter,
sensor, print and the iPad-App