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PROFIenergy und Power over Ethernet

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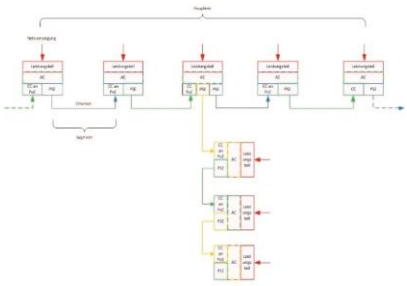
Recent concerns - especially in Germany - about energy use have made saving energy in industrial applications a matter of strategic importance. PROFINET is the communication protocol of choice in major industries. The association of automotive manufacturers chose PROFINET as the only communication protocol to be used among systems in Germany. To respond to the concerns of the automotive industry with respect to energy saving PROFIBUS & PROFINET International defined PROFIEnergy, an energy profile provided by a PROFINET node.

It would be considered an energy-saving factor if the communication section of the PROFINET node could turn the application section of the node on and off. The purpose of this bachelor thesis is to explore the technical feasibility of such an idea and to provide a proof of concept. In order to show their technical implementation a demo application is built. Furthermore, this paper takes a look at the possibilities of using Power over Ethernet (PoE) for powering the control section of a node.

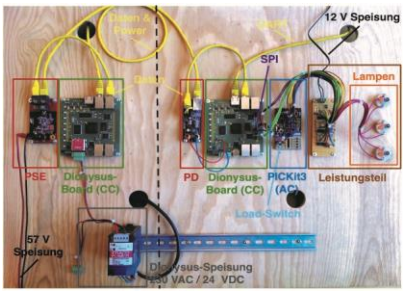
The first section of this thesis describes several concepts for the architecture of a node. The second part takes a look at possible network architectures and the system behaviour, especially the enhancements necessary for using Power over Ethernet. The final section documents the development of the demo application.

The documentation contains two detailed concepts of an energy management using Power over Ethernet including an assessment of costs. In addition, a PoE powered demo application illustrates the energy management inside a node.

This thesis shows some potential for optimising the energy management in industrial networks. Expanding the PROFIenergy profile with several commands generates the possibility of a more autonomous energy management. This would allow every node to manage its power consumption by it self and could take away the task from the master control unit. It is not likely that Power over Ethernet will become widely used in the automation industry. Nevertheless, there are some interesting niche applications for PoE solutions.



Concept for a PoE based network



Demo Application