Zurich University
of Applied Sciences

**School of
Engineering**

InES Institute of
Embedded Systems

Sigrid Node Device

This bachelor thesis documents the development of the prototype software for the control unit Sigrid Node Device SND. The objectives and requirements are formulated and the components for the hardware and software are documented. With regard to the Demonstrator, which is built during the KTI project Sigrid, a model is constructed on which the command and control function of the SND can be shown.

For the realization of the hardware three power switches are used. Two of them are used to connect both bus sides, so that each power switch controls one direction of the flow. The third switch connects the load with the bus. Next to each switch, the current is measured in order to detect over current and short-circuit. The voltage is measured at both sides of the bus so as to make a statement about the flow of power. This allows both under and over voltage detection.

The time-critical detection of a short-circuit and security is implemented with an intelligent ADC having an integrated state machine. The control element of the SND is a Raspberry PI running with Linux.

Subsequent to this hardware configuration, the software for the SND was implemented. Therefore, an SND Daemon has been developed on the Raspberry Pi, which is responsible for both the creation and management of the shared memory. Furthermore, it manages all the data in the shared memory. Thus, the direct read access for other applications is possible. In order to enable the control of the power switch and examination of the states and to simplify the configuration of the SND, a web interface was implemented in HTML. It is provided by a web server on the Raspberry Pi. In addition to the web server, the SND can also be accessed over SNMP. This function is used in the Demonstrator as an interface to the host system, the SMU. The internal communication is carried out over POSIX message queues.

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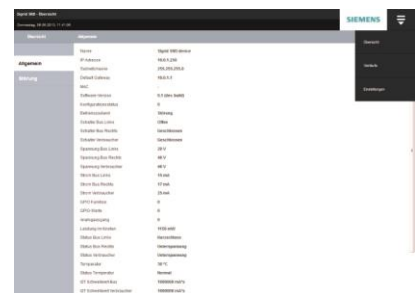
Overview of the Webinterface

Linegraph and Speedometer