



Master's Thesis

Student's name: Andrzej Zamojski

Field: Engineering Cybernetics

Title (Norwegian): Design, realisering og testing av nedre lag i PDCP på AVR-plattformen

Title (English): Design, Implementation and Testing of Low-level Layers of the PDCP for the AVR Platform

Description:

The prosthetics industry is dominated by companies that primarily use their own proprietary standards. This is an increasing hindrance to interoperability of components from different vendors. Following an initiative by NTNU in 2005, international actors have started the development of a standardized bus interface that will enable such interoperability. The protocol is mainly developed at the University of New Brunswick, Canada, and currently only implemented on the PIC (Microchip) controller platform. This implementation is proprietary. We now want to implement the protocol on the Atmel AVR platform and release the code so that all vendors and researchers can use it. The software will be implemented for the ITK AVR controller card.

This assignment primarily concerns the lower levels of the protocol stack, while the upper layers will be developed in a parallel activity.

1. Give a concise description the CAN bus standard in relation to the ISO OSI model.
2. Familiarize yourself with the present PDCP draft standard. Provide a brief overview of its main features related to the OSI model. Point out properties that relate explicitly or implicitly to hardware resources and that is relevant for the implementation's portability to other HW platforms primarily based on the AVR controller family and secondarily on other controller architectures.
3. Suggest a suitable software architecture for the implementation of the protocol stack, and provide a detailed description of the interface between the lower and the higher levels of the software stack, respectively. This task should be carried out in close cooperation with the student responsible for the higher levels to ensure compatibility between the two.
4. Perform a detailed design and implementation of the lower level software on the given hardware.
5. As far as the time permits, test the results with the higher-level AVR implementation and with a node based on the Canadian implementation.

Advisor(s): Associate Professor Øyvind Stavdahl, NTNU

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Øyvind Stavdahl
Supervisor