Configuration of the Model Car

Frame and Mechanical Data

The frame of our model car was originally purchased from the company FG Modellsport GmbH (Sportsline04 series). In order to run the model car inside buildings, we replaced the gas engine with an electric motor from the company Graupner (SPEED 900 BB Torque).

The brake disks are assembled with coded rings which enables us to measure velocity and distance using small photoelectric relays. This is required for getting feedback on the correct functioning of the actuators and for more complex applications such as the parking assistant.

Microcontroller and CAN-Bus System

We have built in two different microcontroller types into the model car:

- ATmega CAN board
- Freescale Dual CAN board

The four ATmega CAN boards are used for monitoring the sensors and also serve as a redundant interface between the RS232 and the CAN-Bus as well as a backup microcontroller. The two freescale dual CAN boards make up a redundant control system and are connected to the servos and the motor via a voter.

Architecture:
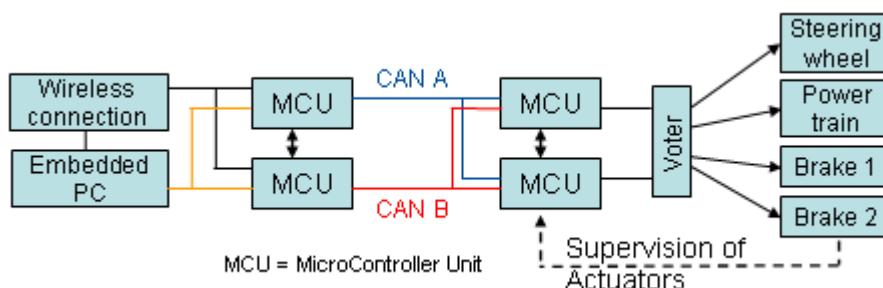
Embedded PC

In the scope of Alexander Mehlkopp's diploma thesis, we mounted an embedded PC onto the car that

is responsible for tasks that require higher computing power than offered by the microcontrollers. We have also included the parking assistant here.

The PC is a AW-P631 with VIA chip set. The currently installed operating system is Realtime Linux OCERA that contains lincan serving as the required CAN bus support and that can interact with the microcontrollers via the Intel 82527 CAN controller.

Due to energy reasons, the current hard drive should be replaced by a compact flash card and the WLAN bridge should be replaced by a WLAN USB stick as soon as possible.

Wireless Interfaces

In order to enable the connection from a second stationary computer (to which we can connect to a remote for example) we use a RS232 wireless interface from MaxStream.

For monitoring sensor data and the car's status, we use an additional WLAN bridge through which we can establish a connection to the embedded PC.

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