

Wireless Data Acquisition for the SAE Car

Functional Requirements List and Performance Specifications

Students: J.P. Haberkorn and Jon Trainor

Advisor: Mr. Gutschlag

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Intro:

The Wireless Data Acquisition for the SAE Car project consists of gathering data from the SAE car and transmitting it wirelessly from the microcontroller to a computer. The transmitted data shall include car velocity, engine velocity, acceleration, engine water temperature, oil pressure, and suspension travel. This data will be transmitted using the Aerocomm AC4790-200 wireless transceiver, which has a range of up to four miles when used with an external antenna.

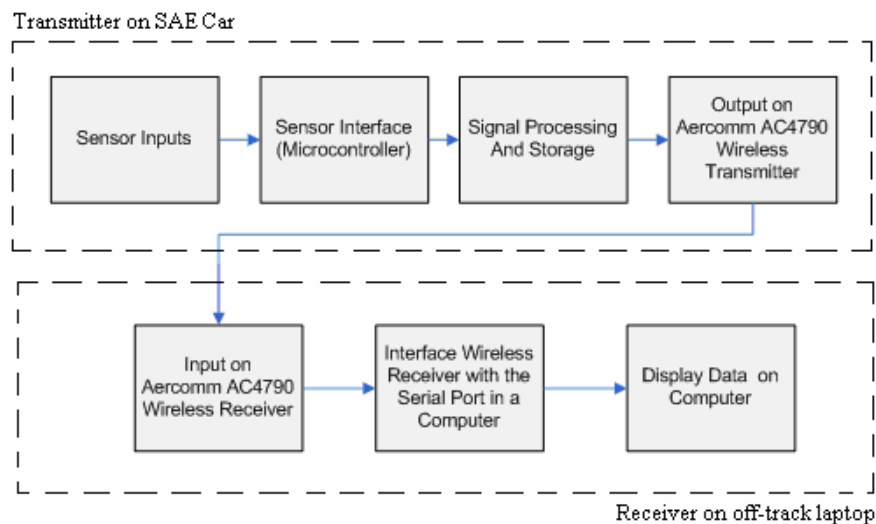


Figure 1.1: High Level System Block Diagram

Functional Requirements:

The signals from the sensors will be read by the A/D converter on the microprocessor so protection circuitry is required to keep the signals between -3 V and 5 V . The data we are acquiring from the SAE car will need to be updated differently depending on the source. The engine water temperature and oil pressure sensors will be sampled every 0.5 seconds and the other sensors (car velocity, engine velocity, acceleration, and suspension travel) will need to be sampled much more often, at 10 ms.

Each time a sensor is updated, the previous value will be transmitted to the off-track laptop and stored and the value will be replaced by the current value. The algorithms to convert the signals from the sensors to useful data will need to be limited to 10 ms of processing time so the data is always ready to be transmitted. The display on the receiving laptop will be updated every .5 seconds so the program written to receive the data from the RS232 port will need to be programmed with this specification in mind.