

Aufgabe der Abschlussarbeit im ISE Bachelorstudiengang

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Thema: Signal-Processing and Display Subsystem for 24 GHz-Doppler-RADAR

Deskription of Problem:

For the measurement of velocity, e.g. of road users (traffic) or objects in industrial processes, microwave RADAR-systems based on the Doppler frequency are often employed: A directive antenna radiates a wave of constant frequency (Continuous Wave, CW) towards a moving object where it is reflected and received again by the same antenna. The reflected wave exhibits a frequency shift, the so-called Doppler frequency which is proportional to the radial velocity of the object.

At the department of HFT, the various subsystems of a Doppler Radar demonstrator are under development which shall be used to capture the movement of walking persons and other objects in a laboratory environment and which shall make the Doppler frequency audible through a loud speaker and which shall measure and display the Doppler frequency and the velocity.

The Task:

The task of this bachelor thesis is the development of the circuit boards that process the audio-signals from the microwave subsystem of the RADAR. Depending on the time available for the thesis, the following functions and circuits shall be realized: Audio-frequency filtering, amplification and limiting (clipping), a trigger circuit to start counting, a programmable counter for frequency and velocity and a suitable display board.

The processor circuits shall be designed using state-of-the-art integrated circuits and components in a printed circuit technology (PCB). In particular, the following steps are foreseen:

- Definition of the specification for the subsystem
- Selection of suitable integrated circuits and display panel
- Circuit design, based on manufacturer data sheets and application notes
- Layout of the PCB and production (by the electronics workshop)
- Assembly and integration of the hardware components and functional test
- Integration with the microwave subsystem for a functional test of the RADAR

After completion of thesis work a public presentation of results is to be given at the department.