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Abstract
The digital radio system DAB (Digital Audio Broadcasting) is the most fundamental advance in radio technology since the introduction of FM stereo radio. DAB was initially developed in the 1990s by Eureka 147/DAB project. With the coded orthogonal frequency division multiplexing (COFDM) technique, it is very well suited for mobile reception and provides very high robustness against multi-path reception. Further, it allows use of single frequency networks (SFNs) for high frequency efficiency. In addition to CD-like digital audio services, DAB is able to transmit program-associated data (PDA) and a multiplex of data services (e.g. traffic and travel information,weather reports, paging, emergency warning, still and moving pictures, etc.). A dynamic multiplex management on the network side opens up possibilities for flexible programming. In this thesis, we introduce a new methodology to design and implement a DAB (Digital Audio Broadcasting) channel decoder that is completely conforming to DAB specifications defined in the European Telecommunication Standard (ETS 300 401) including energy-dispersal, de-interleaving, and punctured Viterbi decoding technologies. Further, by using MATLAB/Simullink software, Xilinx System Generator, Xilinx Alliance tools, Xilinx XSE & ISE and Modelsim XE software, we build up a transceiver platform to simulate and analyze the performance of the DAB channel decoder based on FPGA hardware implementation. The hardware can be used directly in practical DAB systems.
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