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Development of a Transmission Power Amplifier for Underwater Communication.

ABSTRACT - Masterthesis

The amplification of signals is a significant factor in the transmission path of underwater communication. Due to the efficiency and the performance a class D amplifier is developed in the present work. Special requirements apply to the insulation regulations, since the module is designed for a supply voltage up to 350V. This high voltage is necessary because underwater sound transducers represent a capacitive load and require high voltages to deliver acoustic power. The amplifier is controlled digitally by a second-order sigma-delta modulator with an oversampling ratio of 32, which is implemented in a Xilinx Zynq 7020 FPGA. With the oversampling output of the modulator, the MOSFETs of the full bridge are driven using isolated gate drivers. Switching speed is 1.536 MHz. The switched output is filtered with an LC low-pass filter. With the complex load of the converter, an SNR of approximately 66 dB is achieved.