

Brushless Motor Controller  
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We are planning on designing an FPGA implementation of Field Oriented Control (FOC) for brushless motors. An FPGA is perfect for controlling a brushless motors because it allows complex control loops with substantial amounts of digital processing to execute at high frequency and low latency. Our motor controller will implement field-oriented control---an advanced digital control strategy for driving various types of multiphase motors. Designing the FPGA implementation of field oriented control will involve optimizing and pipelining trig functions and matrix math. A variety of modules will need to be developed for a variety of mathematical operations, transforms, signal conditioning, as well as designs for interfacing with the hardware, including serial interfaces, pwm generators, and large telemetry file handling.