Motion Controller SPI Specifications

# Introduction

This document provides a detailed specification for a Motion Control PCB that incorporates the DRV8243 motor driver and LS7366R encoder reader for advanced feedback control of DC motors. The document focuses on technical specifications, SPI communication protocols, control register access, and usability features to support developers in integrating this PCB into their projects.

# DRV8243 Motor Driver

## SPI Communication Protocol

The DRV8243 motor driver supports full-duplex 4-wire synchronous communication for setting device configurations, operating parameters, and reading out diagnostic information. The communication involves a 16-bit word for serial data input (SDI) and output (SDO), comprising command and data bytes for the SDI, and FAULT\_SUMMARY along with report byte for the SDO【22†source】.

## Register Map

The DRV8243 offers a comprehensive register map for configuration and control, including DEVICE\_ID, FAULT\_SUMMARY, STATUS registers, COMMAND, SPI\_IN, and CONFIG registers among others. Each register is tailored for specific functions, such as fault logging, operational status, control modes, and protection settings【33†source】.

# LS7366R Encoder Reader

## Registers Description

The LS7366R includes several key internal registers for operation: DTR for input data, CNTR as the main counter, OTR for output transfer, STR for status information, and MDR0 and MDR1 for mode configurations. These registers support various count modes, index configurations, and filter settings【41†source】【45†source】.

## SPI Command Examples

To facilitate integration, examples of SPI command sequences for configuring and operating the DRV8243 and LS7366R are included. These examples demonstrate how to write to registers, read status, and control motor operation effectively.

# Conclusion

This detailed specification aims to provide developers with the necessary information for integrating the Motion Control PCB into their systems. The document highlights the capabilities, flexibility, and robustness of the DRV8243 motor driver and LS7366R encoder reader, making this PCB an ideal choice for advanced motor control applications.