DATALOGGER IOC (INITIAL OPERATING CAPABILITY) GOALS

A.K.A. WHAT NEEDS TO BE DONE FOR THE DEADLINE...

Summary

The deadline for datalogger code is Thursday, February 24, which I take to mean as the time when we need to have basic operating capability instead of full-featured code. So, the initial version will probably be quite simplified, and here are the proposed features for each of the software modules as defined in the main documentation file:

SD Card Layer

Requirement: Basic read/write functionality - does not need to be optimized (i.e., SPI transfers to the card can run in the foreground, and relying on CAN to update in the background through DMA provided delay is not long enough for the CAN receive buffers to overflow)
Future: Implement double buffering so MCU write cache can be written to while MCU is shifting data out to the SD Card.
Future: Allow SD Card transfers to run in the background by releasing the CS line during programming and/or using DMA and interrupts to handle SD writes. If using interrupts, code must be written with parallelism bugs in mind - and methods must be created to effectively control shared variables.
Future: Implementing LED functionality depending on SD Card status - although this might be the responsibility of the upper layers

FAT32 Layer

Requirement: Basic FAT32 file table read and parsing - getting things like block size and allocation table
Requirement: Creating and allocating files in root directory
Requirement: Basic file system access - including file read / write
Requirement: At least 50kb/s sequential single-file write throughput
Future: Optimized write operations, taking advantage of background SD Card write operations
Future: Other optimized operations, such as caching relevant parts of the file table to improve performance

Glue Logic

Requirement: Write CAN data to a human-readable .csv file
Future: Writing CAN data to alternate, more compact, file structures designed to be interpreted by a program
Future: Communicating fault conditions through CAN