Mixed Signal PCB Design

Requirements Sheet

Task Description

**Central Controller Board**

You are to create the:

* + Schematic
  + Followed by Board Layout

For a central controller board that can be incorporated into a product. The schematic and board layout can be done with any design software you are comfortable with (though we prefer Altium or Mentor Graphics PADS).

**Components and Interfaces:**

* + MicroController:
    - STM32F407 Controller with Debugger on STM32F103.
  + Communication Interfaces:
    - Ethernet (Transfer Speed: 2MB/s) o USB 2.0 o CAN Bus (Transfer Speed: 1MB/s), UARTs
  + Other components:
    - The controller board also hosts a 24-bit ADC: ADS122C04IPW with external reference and clock, PGA 128, Sample Rate: 100SPS. This ADC measures an input that has a differential voltage range of 0-10mV (with CM Voltage of 2.5V)
    - The controller board also has the ability to run 2 bi-directional motors (with varying duty cycle of 0-100%) with a Power Rating of 36W (12V 3A) each. The board must host the switches and connectors to make this possible. (\*Here we’ll use DRV8701 motor Driver with Mosfet Bridge)
    - Stereo DAC w/Headphone & Speaker Amps using I2C interface.
    - Microphone which will be connected to Codec.

The Following devices/chips can be selected at your discretion.

* + All Phys.
  + Voltage References, Regulators and Clocks.
  + All Discrete components.
  + All Power Switches.
  + All Connectors.