PCB Design Document

Basics

The satellite power supply is assumed to be of 28 V. A buck converter has been used to convert the voltage level to be within the acceptable limit for the choice of microcontroller Arduino Nano. The LM2596S − 5 is used to obtain a 5 V DC supply from the satellite power supply and this is used to power the Arduino Nano. The microcontroller has been programmed with the control logic to operate the motor driver DRV8833PW.

Further Details on Choice of Components

The motor driver DRV8833PW was selected to run a DC motor which was decided to be the actuator. This uses MOSFETs which are much more efficient compared to the alternative Bipolar Junction Transistors (BJTs). They consume significantly less power and is an optimal choice since power consumption and the resultant temperature rise is of concern.

PCB Layout

The area covered is much less than the limit of 10cm x 10cm. The components have been arranged to aid in heat dissipation. There is a copper layer that acts as ground plane. This also aids in heat dissipation helping to maintain the temperature in a sustainable range by preventing overheating. The board will have 4 layers. This will help reduce the lengths of traces as well. The placement of traces has been done to achieve a balance between trace length and interference. There are also heat sinks for both the power converter LM2596S - 5 as well as the motor driver DRV8833PW.