Peter Lodato

17 April 2018

**VHDL Encoder Reader Tech Memo**

1. Intro

It is crucial that our rover knows the distance that it has been travelling over time. This is done by reading the encoder signals from the DC motors that turn the rover wheels. As a motor moves, an encoder reads a black-and-white disk and sends a signal high or low depending on whether a non-moving light sensor is reading a bright (white) or dark (black) portion of the disk. As a result, the faster the motor moves, the faster the disk moves along with it and the faster the output signal changes from high to low. The hardware must read this signal and decide what to do with it. For simplicity’s sake, it was decided that the design would count the number of times the encoder output signal goes high over time before a reset signal was sent to the design. It accomplishes this by using a rising-edge detector for the encoder signal with a tick counter being used to count the number of times that the resulting signal for this component goes high.