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ENGS 31 - 14X Final Project

Four Function Bike Computer

This bike computer measures current speed, distance travelled, ride duration, and the average speed of a bike ride (assuming the bike has a default wheel size of 700 mm diameter). The FPGA multiplexes between these quantities on its 4-digit, 7-segment display using the MODE CHANGE button. Four LED's indicate which mode the computer displays: CURRENT SPEED (00.00 - 99.99 mph), DISTANCE (000.0 - 999.9 miles), RIDE TIME (HH.MM), and AVERAGE SPEED (00.00 - 99.99 mph). This bike computer examines the rate of wheel rotations by using a magnet and Hall effect sensor located on the tire. If the biker is moving at less than .5 miles per hour, the time and distance calculations will stop incrementing. In this stationary state, the ride enabled LED turns off and the ride mode is disabled. The ride enabled LED reactivate once the rider surpasses .5 mph and calculations begin to increment again. The rider can change the multiplexed display or reset the distance, time and average time after hitting the UNLOCK button and then pressing either the CHANGE MODE or RESET button. The computer also indicates its locked state to the rider by illuminating the locked LED. After hitting the UNLOCK button, the computer will remain unlocked for twelve seconds, unless the rider changes modes or resets, in which case the twelve second timer resets. After an inactive twelve seconds, the bike computer will lock again and the reset and change mode buttons will be disabled.