**Documentation for SMC100Final**

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SMC100Final was adapted based on pySMC100 that is under the MIT License on Github, see License/License-SMC100

Overview:

This code is how the control of the rotation stage is done through the SMC100 controllers from Newport. The code uses the serial port (RS232) and serial commands to send and receive data from the stage. The commands were listed in a manual from the distributor Newport. Several functions in this method are never called in any of the GUI based scripts as they are unnecessary and some unstable for the specific stage used at OSU. Two “improved” movement functions were created in an attempt to ensure the called movements actually went to the positions that were expected. An issue with the repeatability of specifically the rotation stage at OSU drove the creation of these functions. The stage does the requested movement and then checks the location versus where it was supposed to go, if there is a mismatch over 0.001 degrees, it attempts to move once again. Overall, the initialization, homing, relative movement, absolute movement, and changing the speed are the main commands the user sends to the stage. Other commands that are internal to the code to actually communicate with the stage involve encoding commands to send to the stage, reading the results from the stage, and waiting for certain states. Finally, there is a reset function to restart the communication to the stage (never worked from original code) and a general test of the code which I have altered due to the nature of some of our experiment setups. Originally each time the stage connected, the general test would rotate 10 degrees, then rotate back 10 degrees and ensure it is within 0.001 of zero. Due to the proximity of the stage to the light tight box when in the beam, some objects would hit the stage when rotated the 10 degrees for the test so it was removed and now simply connects.

Notes:

Some of the code that was written previously is beyond my knowledge base and would require further testing to make changes. For example, troubleshooting of the configuration function that does not work would have to be done to try to figure out the error commands. The original pySMC100 was written for Python2 and adjustments had to be made to update it to work with serial commands in Python3.