LEGO® AFM Operation Manual

The following will guide you in the operation of the LEGO® brick based AFM.

Before Operating

Before you attempt to operate the AFM, it should be fully assembled per the assembly instructions. In addition, the correct version of operation software should be loaded to your computer.

Scan Preparation Checklist

- Place the platform properly on the tracks, ensuring gears are properly engaged. The platform should be as close to the laser tower as possible.
- Ensure the cantilever is securely connected to the laser tower.
- Plug the power adapter into the NXT brick and turn the NXT brick on.
- Turn on the laser and adjust the orientation of the laser housing until the laser reflects off of the cantilever directly onto the bottom light sensor diode.
- Load the operational software on a computer.
- Connect to the NXT brick through the operational software.

Beginning a Scan

- Set the operational parameters for the scan. These parameters should be set in accordance to your goals:
  - For alternating rows that properly line up, select the creep correction value that best corrects for any creep caused by the motors. This value is found experimentally.
  - For a full scan of the platform, select the proper value of y-iterations. This value is found experimentally.
  - For less background noise in the scan, select the desired value of noise suppression.
  - If you want to save the row contours, engage the save row contour switch and select a save path.
- Press the START button to begin the scan.

During a Scan

- Do not touch the platform
- Do not touch the laser assembly
- Do not touch the sensor tower

- Do not shake the AFM
- Do not cast shadows over the AFM
- Do not use the computer for any other task other than scanning
- Do not right click in the operational software
  - To properly stop the scan, click the STOP button next to the START button.

After a scan

- If you wish, you can take a screen shot of the surface map to save.
- Closing out of the software will erase the current scan data.
- To reset and scan again, consult the Scan Preparation Checklist at the top of this guide.

Things to explore?

The operational parameters are included in the software to help correct for errors caused by the LEGO® brick hardware and to demonstrate what the effects of changing the parameters would have on the resultant scan. All of the operational parameters need to be found, in one way or another, through experimentation, since every LEGO® motor spins at a slightly different rate, and every LEGO® light sensor detects slightly differently. Once found, these values should not differ much, however, they can be changed to demonstrate the effects of them. Part of the fun, too, is trying to determine the best values of these parameters.