

## Procedure for laser alignment relatively to the 3 O'clock position

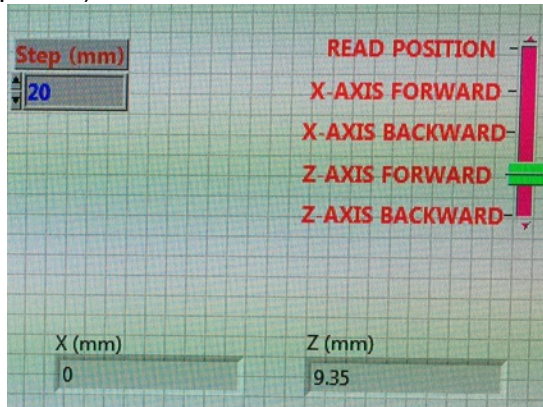
1. Before clicking the run button on any program, make sure the Controller type is GSC-02 and the VISA resource name is the COM to which the XY controller is plugged. In our case, the XY controller was plugged into COM 3.



2. Additionally, the software reads distances as half the distances you input. Therefore, to move 10mm, you will need to input 20mm, 1mm for .5mm, and so on. I will be referring to distances as the software would understand them for clarity sake in this document.
3. Install the webcam in front of the view port as centered as possible, but not in the line of the direct or specular laser beam or else the laser could damage the camera. On the desktop there is an application called "Debut Video Capture Software"; open it and the live-stream footage of the Aluminum target in the vacuum chamber should appear. The laser should appear as a pink or red dot depending on the input power.
4. Turn on the laser after the web camera and all other components of the setup are secured. Use 10% input power at first, but if the beam is dim from the web camera, you can increase the input power to 20%.
5. Open "C:\Alena\LIDT in vacuum" on the LIDT computer usually found in room B137. There should be three objects in the folder, all of them shortcuts.
6. Open the LLB window that is called "Sigma Koki stepping motor controllers.lvlib:home.vi Front Panel" (shorted to "home.vi" in the shortcut folder) and click the run button. **This should take the laser to the home position** in the top right corner of an imaginary square in which the lens slot's circular shape is circumscribed.
7. Go back to "C:\Alena\LIDT in vacuum" and click on the object that says "move-control-1.vi"
8. Go to the "move-control-1" window and move the pink vertical slider to the notch that reads "read position" and click the run button. The XZ coordinates at the bottom on the page should read (0,0) when at the home position.



9. The down direction is the Z positive axis and the left direction is the X positive axis. To calibrate with the 3:00 position, enter 20mm into the “Step” box and move the slider to “Z-axis forward.” Click the run button. Note: you are really moving 10mm due to the software.  
 \*\*When making steps reading more than 10mm at a time, the X or Z coordinate box may read a number you were not intending to reach (usually a nine followed by two or three decimal places).



This number does not correspond to what is physically happening to the XZ coordinates of the laser, but if it annoys you, just run “read position” after every time you run a certain step.\*\*  
 \*\*If the camera is mounted in the ideal position (directly head-on and centered on the Aluminum target) the laser should be in the middle of the white + at the 3:00 position. Since it is impossible for the camera to be located where the laser will shine from, the laser may not look perfectly centered on the +. The camera must be moved every time the chamber door is opened.\*\*

10. If the laser does not appear at the + mark, check the optical layout. If the laser spot is not centered, use knobs on the upper periscope mirror and watch the web camera for fine tuning.

