

Aligning Lasers for LLP (Laser Light Plane) Multi touch solutions

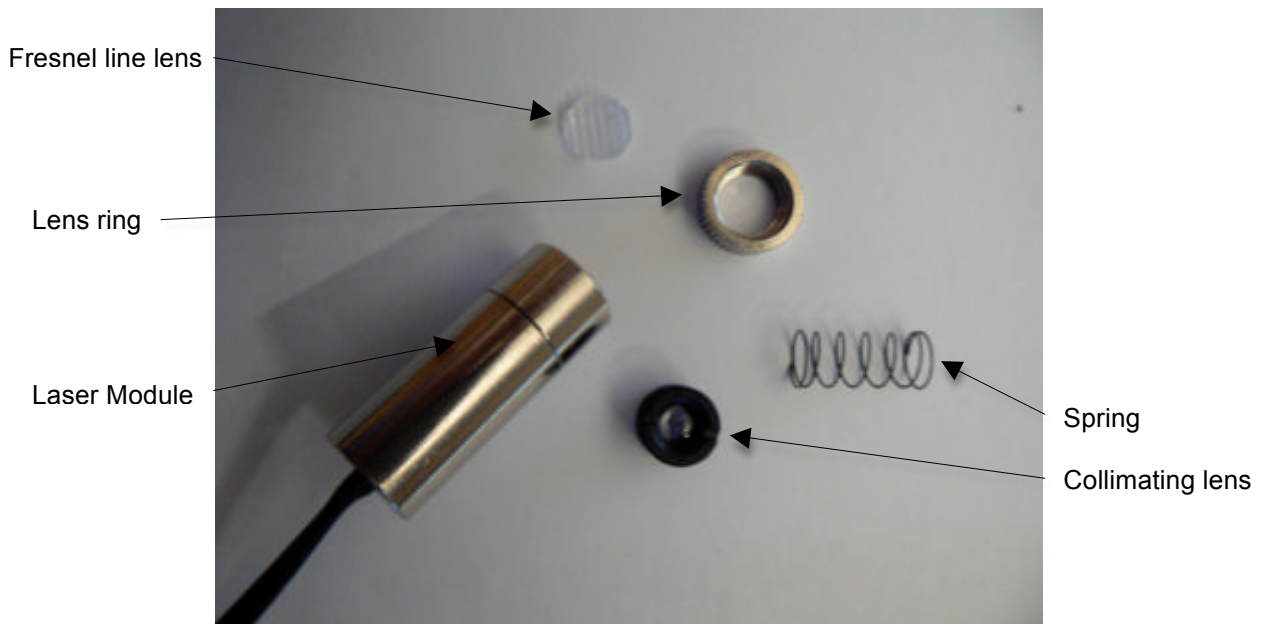
The following sets out to explain the process behind focusing and aligning Lasers used for LLP optical multi touch systems.

DISCLAIMER

Lasers are dangerous do not stare directly at the beam! Wear laser safety glasses and just use common sense. Please also see the Laser safety info on NUI group.

Lasers

Most people on NUI have been buying lasers from Aixis <http://www.aixiz.com>
The following information is based on 850nm 10mw lasers which have 12mm Dia x 35mm cases.



To generate the light plane it is necessary to have a line generating lens as pictured above. These come in a variety of different fan angles from narrow 30° to wide 120°. The screwdriver slot goes towards the Fresnel lens.



Laser module without lens



Line lens

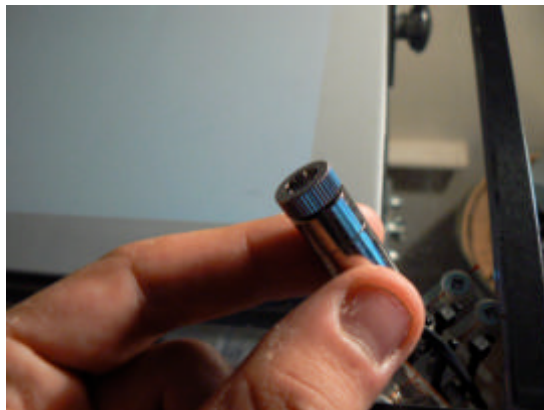
Focusing

- Step 1

Find a flat wall or ceiling and point your modified IR web cam towards it.



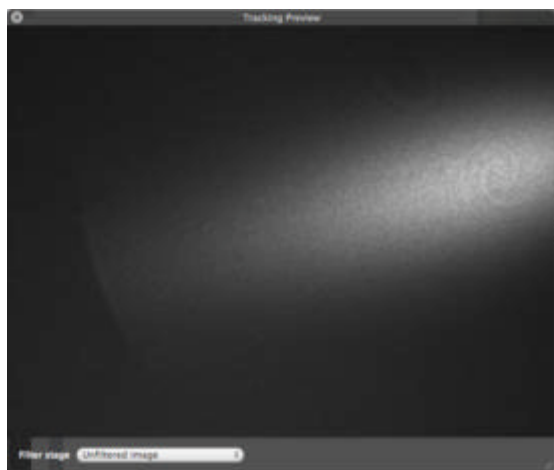
Firefly MV, pointed toward the ceiling and plugged into Touche as a Tracker



Laser pointed toward the ceiling

- Step 2

Wire up the laser module to the correct power supply and point away from face before turning on! Point the laser toward a flat surface such as the ceiling or wall.



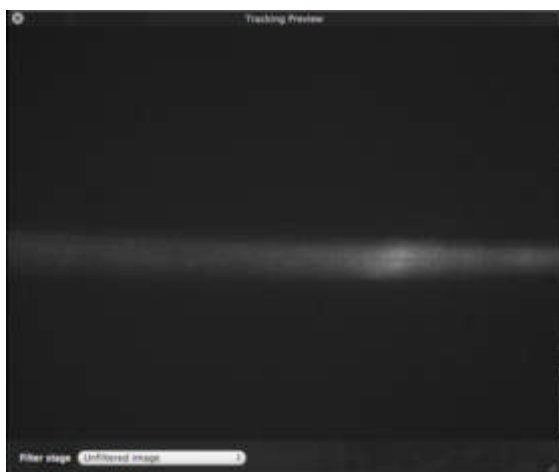
Laser with no lens



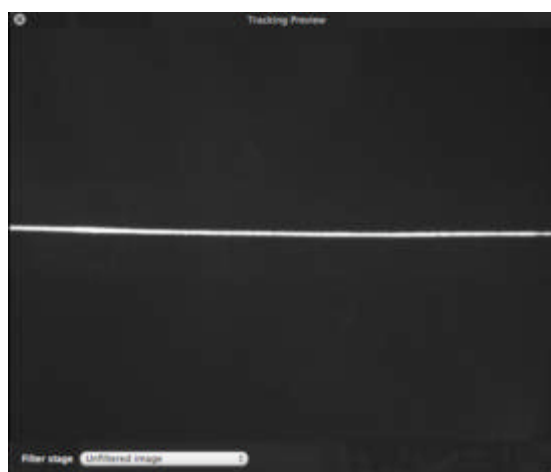
Laser with Collimating lens

- Step 3

Screw on the line lens assembly and rotate the lens until the beam comes into sharp focus.



Beam out of focus

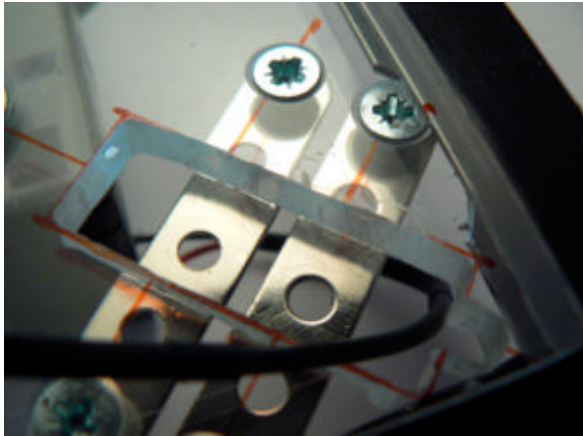


Beam in focus

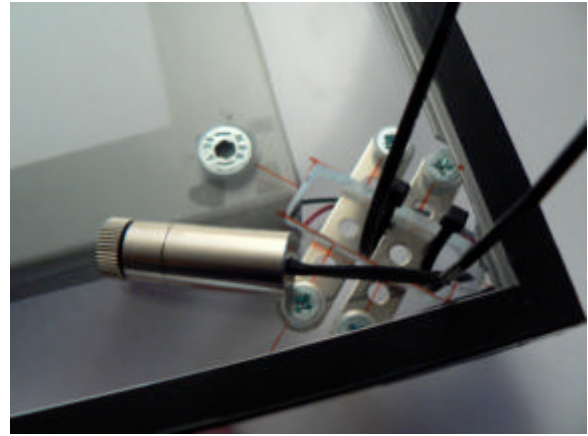
Using thread lock or similar it is possible to lock the thread in place semi permanently, I found that the line lenses were very loose fit and once focused a small amount of blue tack in the thread worked well. DO NOT SUPERGLUE! You need to be able to rotate the lens insitu on the table.

Aligning the Lasers on the Table

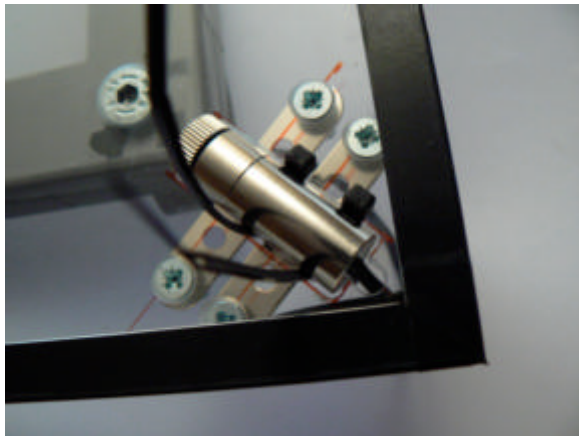
Once the lasers are in focus it is now possible to place them on the table.



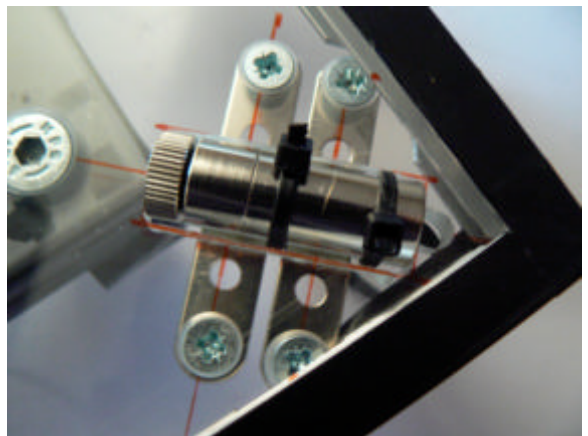
Cut out acrylic with supports



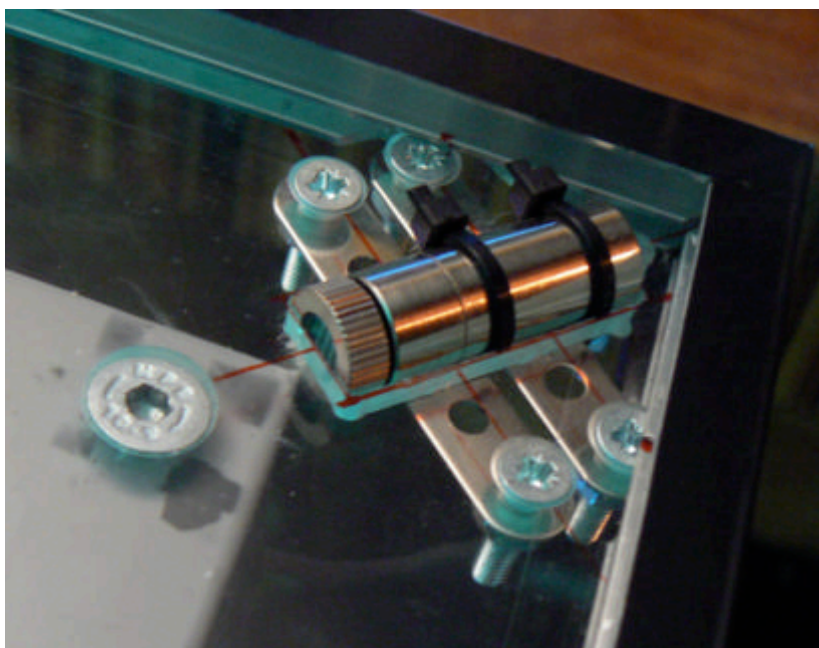
Zip ties to hold laser to bar under the supports



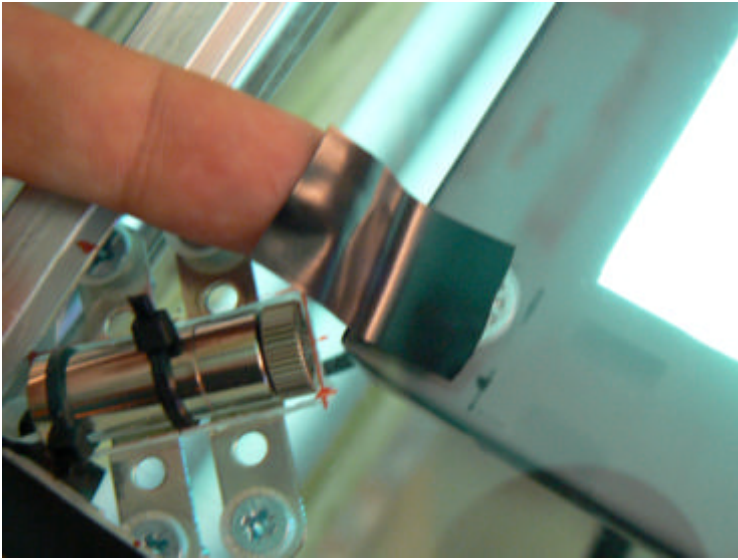
Adjusting the module



Zip ties fixed



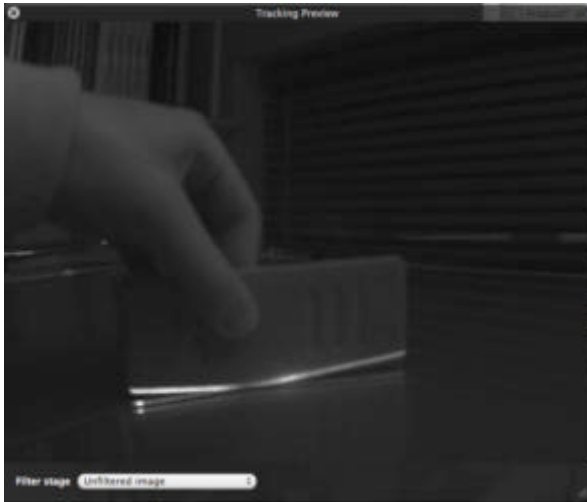
It is important that the laser ride as close to the surface as possible, to do this I cut a rectangular hole for the laser to sit into the acrylic.



I have wired up 4 lasers so it is necessary to eliminate 3 of them from the alignment and just concentrate on 1. To do this I just put black tape in front of the other 3 to block them.

Sit the camera on top of the screen pointing away from the laser

Using a flat piece of plastic or in my case a remote control it is possible to see the flat plane of infra red light in the camera.



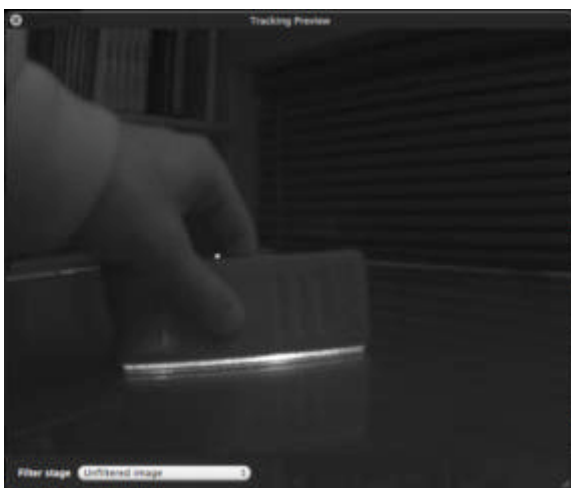
1



2

Image 1 shows that the laser light plane is rotated and out of alignment, rotating the laser module should level it out.

Image 2 looks much better, but look closely and you will realise that the laser is actually bouncing of the screen. By pushing elevating the nose of the laser module it is possible to correct this.



A really bright distinct line is the result it should be like this all over the surface



Now you should repeat the process for focusing and aligning the rest of the lasers, remember to cover the previous lasers with black tape, or unplug them.



I hope this document helps and if there are any ways in which you feel it could be improved please comment on the thread.

AJ Lovegrove