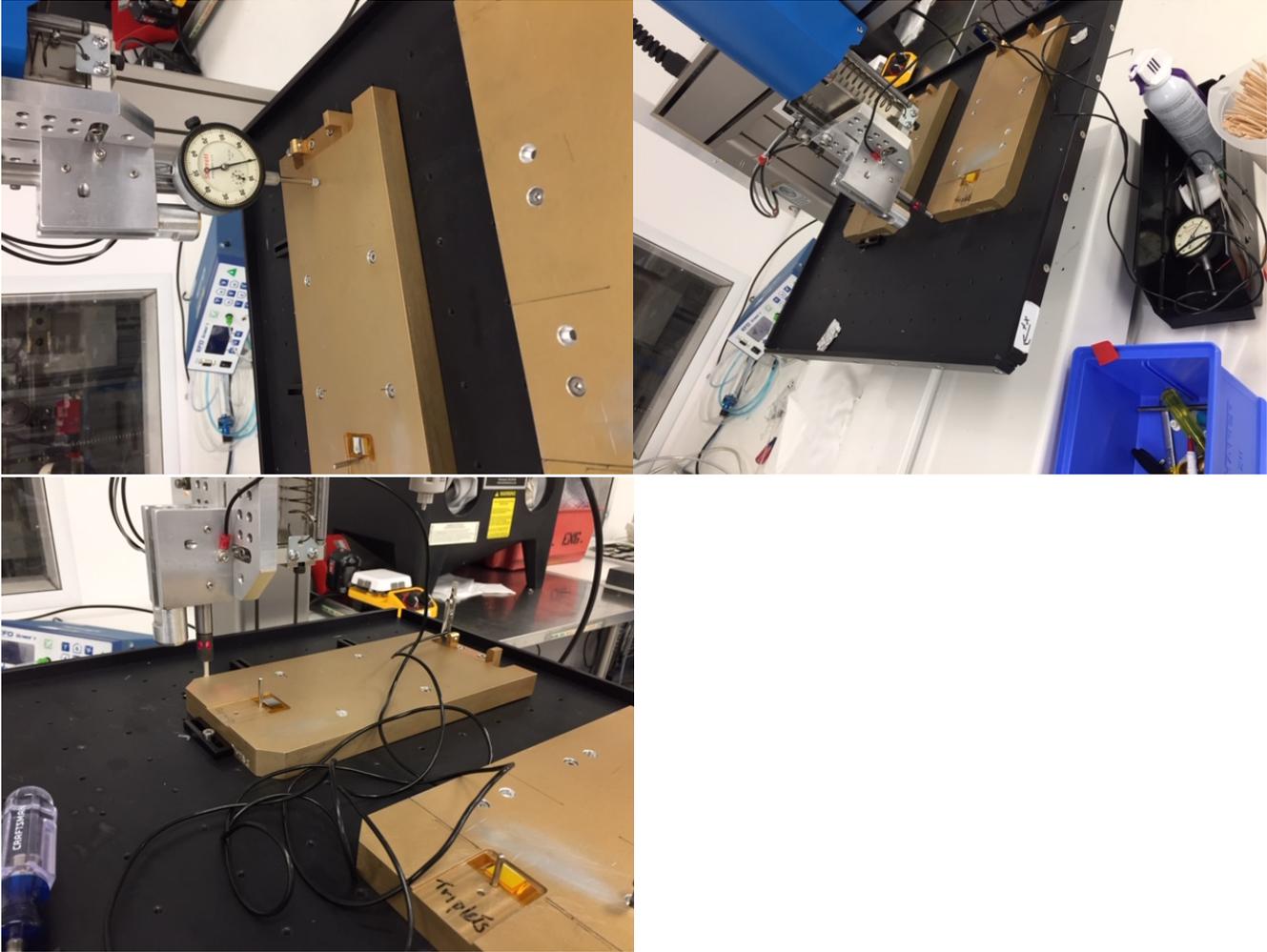


Edge finder

Pin is 3 mm



Using the edge finder to define module mounting positions

Matt & Rachel used the edge finder to locate the edges of the temporary module mounting baseplates after the rework in late February 2021. To calculate the expected positions of the centers of the modules from these edges, we need a variety of dimensions, including the length and width of the baseplates themselves. Scott provided those dimensions:



19-0 table with... 3march2021.pdf



19-0 QUAD tabl...3march2021.pdf

He noted that the overall baseplate dimensions have some tolerance. The guiding pin, as noted above, is a 3mm pin. In these sketches, the modules are 22 mm x 22 mm for triplets, to reflect the commercially available coverslips we used for glass-glass tests.

The ball on the edge finder is 0.200" (see packing list).



Rachel Hyneman described the calculation process like so:

I'm not having much luck debugging the module center discrepancy. If anyone has time to look this over, I'm writing out in detail the steps I took to get to the baseplate origin points from the edges:

First, note that the "down" direction on Scott's sketch is the -X direction, and the "right" direction is the -Y direction in the robot's coordinate system.

Y-edge (the long edge) measurements taken with the edge-finder yesterday: 367.61(at both tested points along this edge)

*X-edge (the shorter edge) measurements taken with the edge-finder yesterday: 321.75 mm and 321.65 mm
-> I chose to just average these and take the X edge as 321.70mm (since the above measurements were taken at the far left and far right edges of the plate, and the origin is in the center of the plate, this should be a good approximation)*

Now, I need to adjust the above edges based on the width of the edge finder ball. The ball is 0.2" = 5.08mm wide, and I need to add /subtract half of this width from the edges.

The Y-edge was taken on the left side (facing the robot from the computer), so the probe center is slightly in the negative y direction compared to the true edge. So I need to add half the ball width = 0.5×5.08 to the measured edge of 367.61mm. This gives me 370.16 mm.

I need to do the same for the X-edge, but since the X-edge was taken at the bottom of the plate (facing the robot from the computer), the probe center is slightly positive in the x direction compared to the true edge. So, I subtract half the ball width = 0.5×5.08 to the measured edge of 321.70 mm. This gives me 319.16 mm.

The origin point is 24.35mm "down" from the shorter (X) edge when looking at Scott's sketch. This means that the origin point is -24.35mm in x from the true X-edge. Its X coordinate is therefore $319.16 - 24.35 = 294.81$ mm.

The origin point is 62.4 mm "to the side" of the longer (Y) edge when looking at Scott's sketch. This means that the origin point is +62.4mm from the true Y edge. Its Y coordinate is therefore $370.16 - 62.4 = 434.36$ mm.

Now I need to get the module centers based on Scott's sketch, which should be easy now that I have the origin. I believe the center points drawn on the sketch correspond to the glass coversheet centers, since the "modules" drawn on the sketch are 22mm x 22mm (the glass sheet size).

*The middle "module" is slightly to the right of the origin, by a distance of 0.75mm. This corresponds to a shift of 0.75mm in the -y direction. So, the middle module's Y coordinate is $434.36 \text{ mm} - 0.75 \text{ mm} = 433.61 \text{ mm}$.
The middle module is also 46.5mm "down" from the origin, meaning it is shifted by -46.5mm in X. The middle module's X coordinate is $294.81 \text{ mm} - 46.5 \text{ mm} = 248.31 \text{ mm}$.*

I won't include the left/right triplet modules for now, since if something is causing an offset to the calculation of all three modules, it should show up in the above center module calculation.

I'm concerned that I am getting consistent numbers from both the edge and the pin calculation methods. This leads me to believe that I am maybe somehow misreading the dimensions of the sketch relating the module centers to the origin. Or, I may be missing a detail in the relation between the true module sizes and the glass cover sheets. I was assuming the centers in the sketch correspond to the cover sheet centers, but let me know if I am missing an adjustment here.

*Thanks a ton,
-Rachel*

She used dimensions from Scott's drawings.