# Assembly Chuck Offset Measurement

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When assembling modules on the gantry, the HDI bond pads are first surveyed on the HDI launch pad. We need to calculate the positions of the bond pads after the HDI has been moved to one of the five assembly chucks. The first step is to determine the displacement vectors from the HDI launch pad to each of the assembly chucks. For definiteness, we use the center of the top (round) alignment pin on these chucks to define the HDI pickup tool's axis of rotation and measure the location of the bottom (diamond) alignment pin to determine the angle at which the chuck is oriented on the tooling.

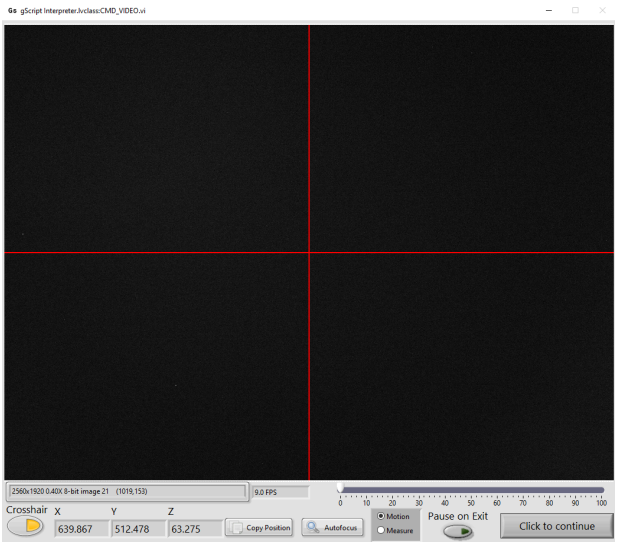
## Script Installation

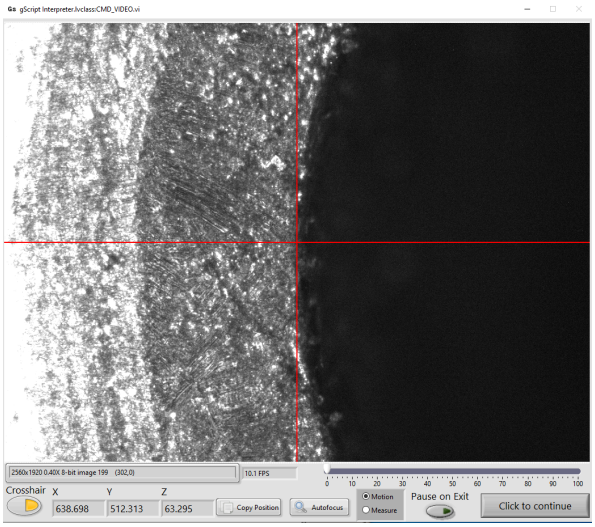
Initially, the location of the top pin on the HDI launch pad will be known from the initial gantry survey. It's coordinates should be retrieved from the flex-config file, or coded into the script. The nominal position of the bottom pin can be calculated from the top pin location and the nominal pin separation, which is 65 mm on the 1x2 tooling and 75 mm on the 2x2 tooling.

## Procedure

1. The first step is to survey the location of the top (round) pin on the HDI launch pad. Since this was already done in the Initial Gantry Survey, this step can be skipped. However, it is important that once it is measured, it is not changed because all the chuck offsets will be defined with respect to its coordinates. As in the Initial Gantry Survey script, survey points on the circumference of the hole in the top surface of the pin.

   The circle to be surveyed will initially occupy almost the entire field of view of the camera, and is quite sensitive to the lighting. If the pin location is already accurately determined, the initial camera view will look completely blank as you view down the hole in the middle of the pin. But if you move by about 0.5 mm to the edge of the hole, you will be able to survey the circumference as shown:




Select points on the circumference of the hole and fit the circle. If the fit is satisfactory, the process is repeated for the bottom pin. The script will then report the positions of the centers of the top and bottom pins, and the changes in their locations, compared to previous measurements. Changes should be recorded in the flex-config file, or coded into the script.

2. The script then prompts for the assembly chuck to survey. Select one of them.

3. Survey the top and bottom pins on the selected assembly chuck and record their absolute coordinates as well as the *incremental* rotation angle. This is the angle relative to the orientation of the HDI launch pad. When prompted, you can write the new pin coordinates to the flex-config file.

4. Repeat this process for all 5 assembly chucks and save their coordinates in the flex-config file, or in subsequent scripts.