# *SERVICE How To*

| Model Number: | Originator: | Topic |
|---|---|---|
| **900 Series LC** | **Des Wichems** | **Calibrating the 440-LC Fraction Collector using Varian MDS software** |

## *Calibrating the 440-LC Fraction Collector*

The fraction collector should be calibrated when any of the following conditions occur:

- Loss of alignment, and re-installing the factory calibration coefficients does not solve the problem
- After mechanical repairs to the drive assemblies
- Replacement of the main control board.

To properly calibrate the fraction collector's probe position both a lower level and an upper level plane calibration must be preformed. The Fraction Collector then extrapolates the positions for all the tubes in any rack from the 3D reference points acquired during the calibration. Before proceeding with the fraction collector alignment procedure make sure that you have all the tools necessary. A fraction collector alignment kit (SPS3 Alignment kit) can be ordered under part number **99-101216-00**. This kit consists of the following items;

- Assy probe 0.8 mm (This is an SPS3 probe, but it is longer than the one on the 440-LC and is easier to use for alignment)
- Alignment tool (see Figure 1)
- SPS 3 Autosampler Resource CD (Not required for the 440-LC)

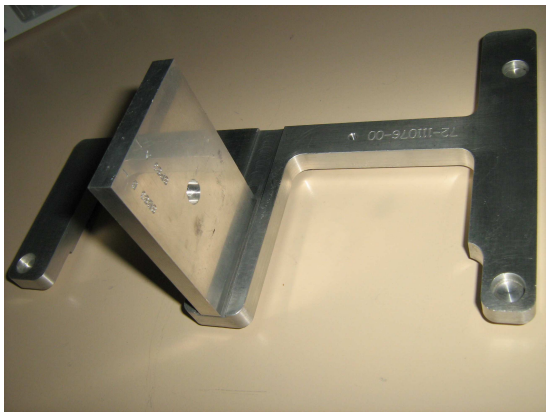

**Figure 1: Top Layer Plane Alignment Tool**

***Fraction Collector Calibration Lower Level Plane***

1. Attach the Calibration Probe (Assy probe 0.8mm) to the Fraction Collector

2. Connect the Fraction Collector directly to the PC with the Varian MDS Software via a serial cable

3. Switch on the Fraction Collector

4. Launch the Varian MDS program and select the *Diagnostics* button (Figure 2)

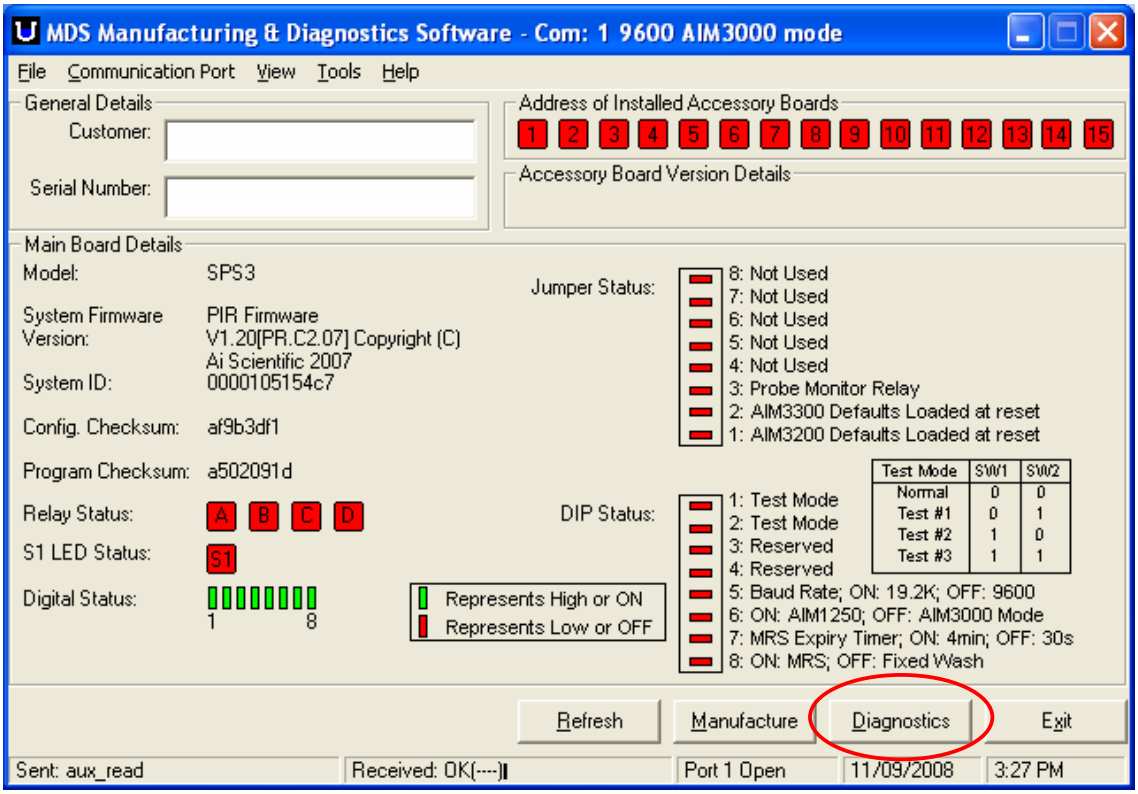


**Figure 2: Varian MDS Software**

5. In the diagnostics window, click on the Calibration button (Figure 3)

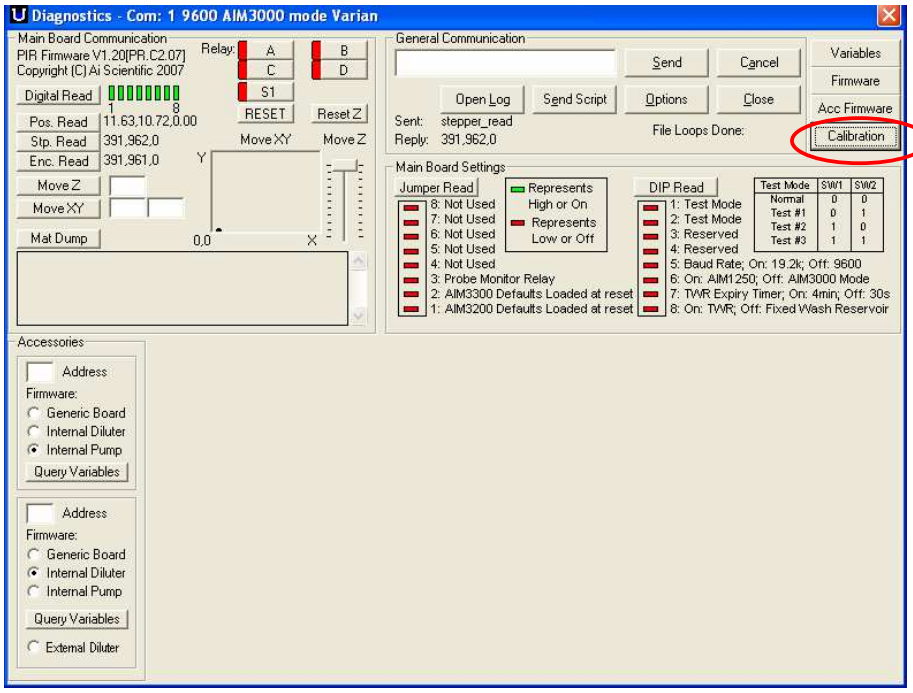


**Figure 3: Diagnostics Screen of the Varian MDS Software**

6. Once the calibration window (Figure 4) opens up *Clear the X and Y Offsets* on the Lower Plane Calibration.

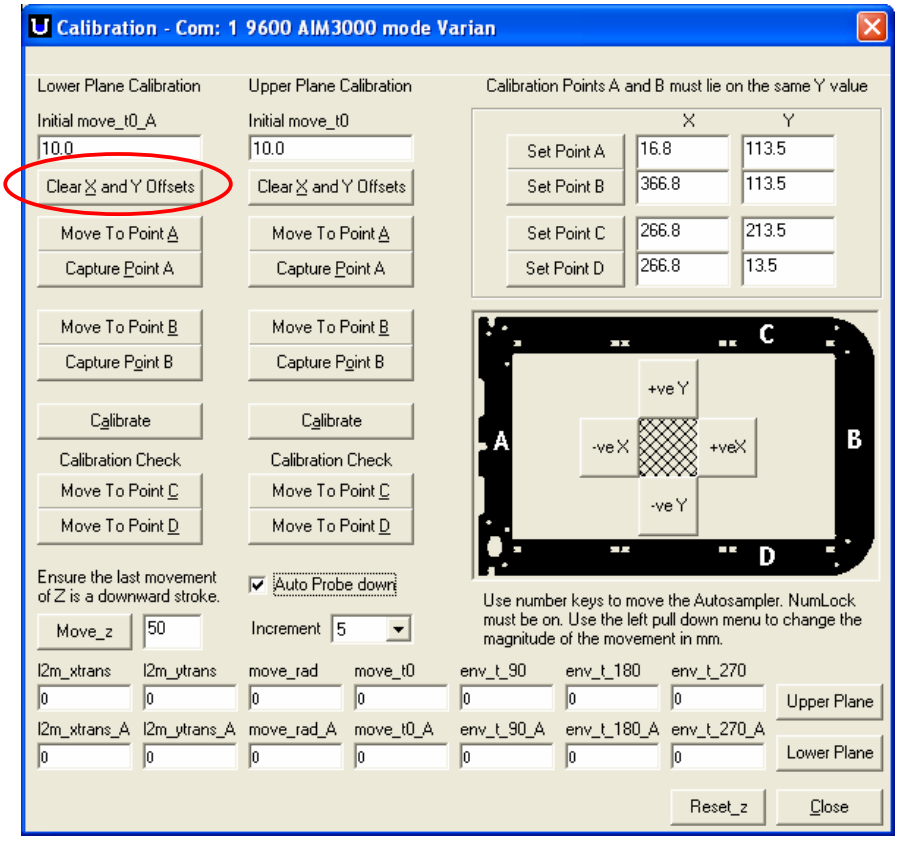

**Figure 4: Clearing the X and Y Offsets**

7. Remove the sample racks from the Fraction Collector tray. With the sample racks off the tray you should be able to see 4 small dimples (Figure 5) in the white plastic rack holder (Figure 6). Each of these dimples corresponds to a position (A, B, C, D).

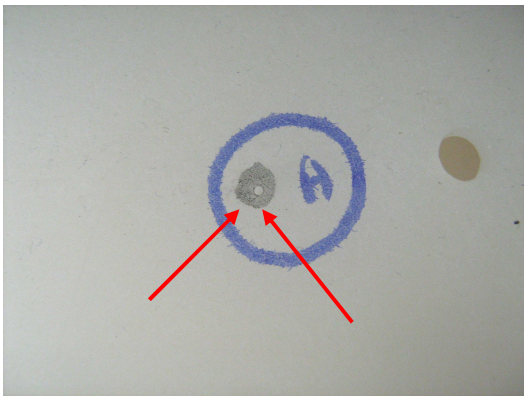

**Figure 5: Example Dimple in Position "A"**

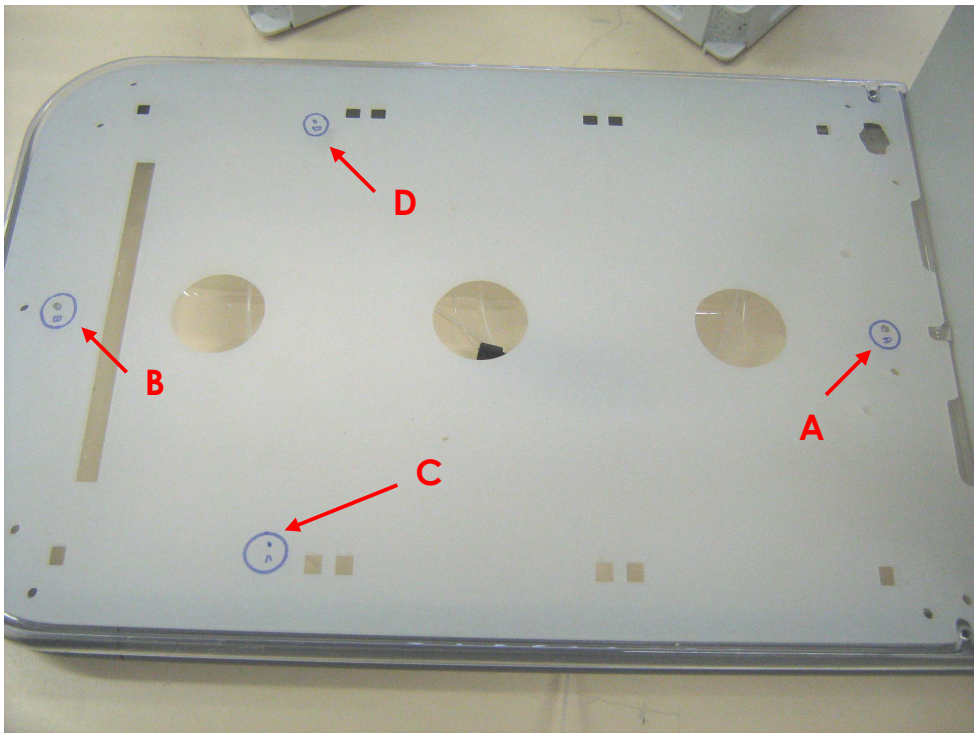


**Figure 6: White Sample Rack Holder Tray with 4 Dimples**

8. Move the probe to position A by selecting the Move to Point A (Figure 7). Lower the probe by selecting the *Move_z* button (Figure 7), and change the depth of the downward stroke (the higher the number the further down it goes). In order to move the probe in the X and Y direction use the buttons marked +/- ve X and Y (Figure 7). The step increment can be adjusted by changing the value in the *Increment* pull down menu (Figure 7).

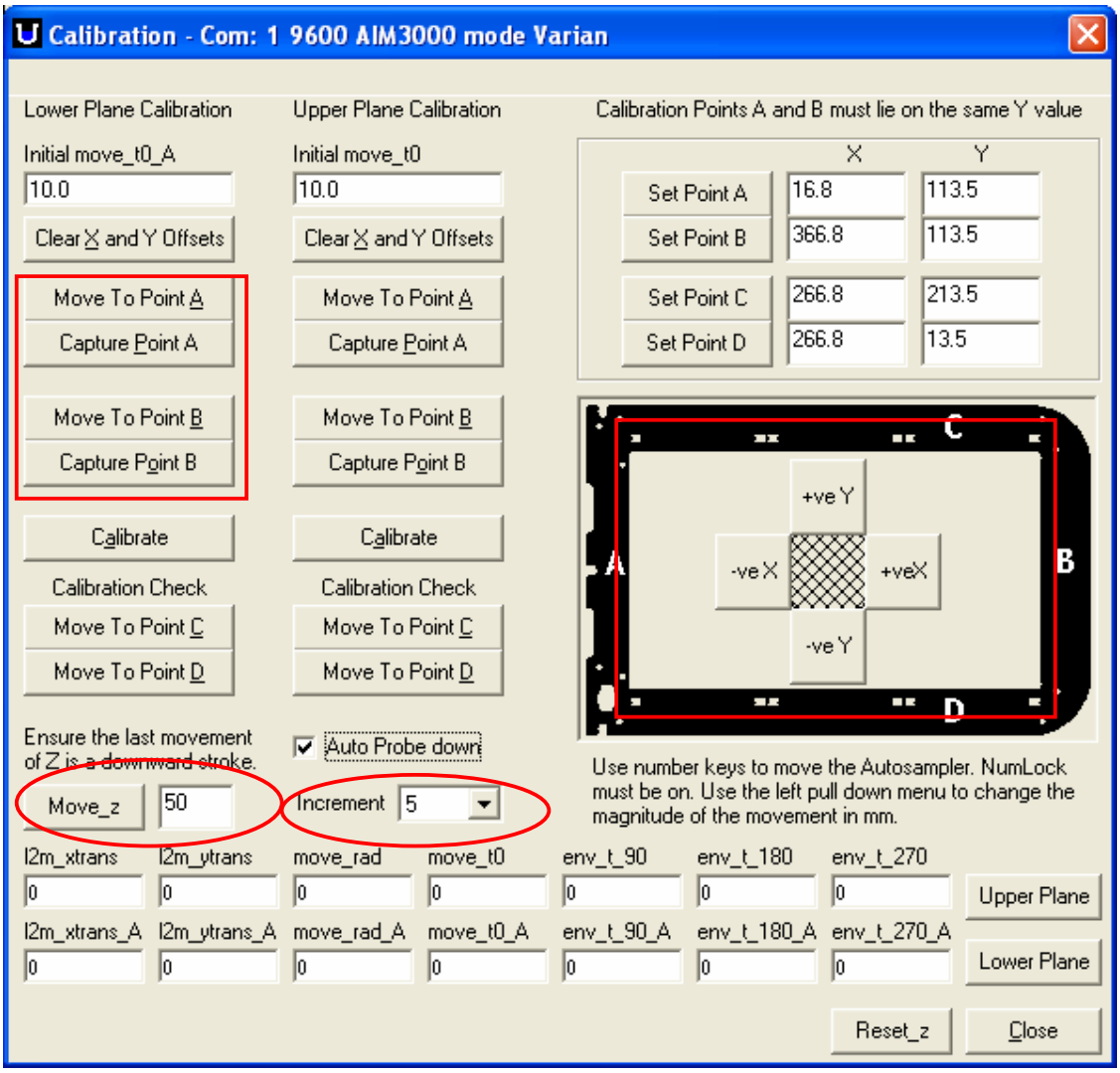


**Figure 7: Calibration Page**

9. When the probe is correctly positioned over position A, then press the *Capture Point A* button (Fig 7) to lock in the coordinates.

10. Repeat the above steps for Point B making sure that you use the *Move to Point B*, and *Capture Point B* button (Figure 7).

11. Once both the A and B points have been calibrated, click on the Calibrate button to lock in the calibration coordinates of the lower level plane (Figure 8)

12. The Calibration can be checked by moving the probe to position C (*Move to Point C*) Figure 8. The probe should be within 1 mm of the point C. Moving the probe to position D (*Move to Point D*) will further confirm (assuming that it is also within 1 mm) that the whole lower level has been calibrated properly

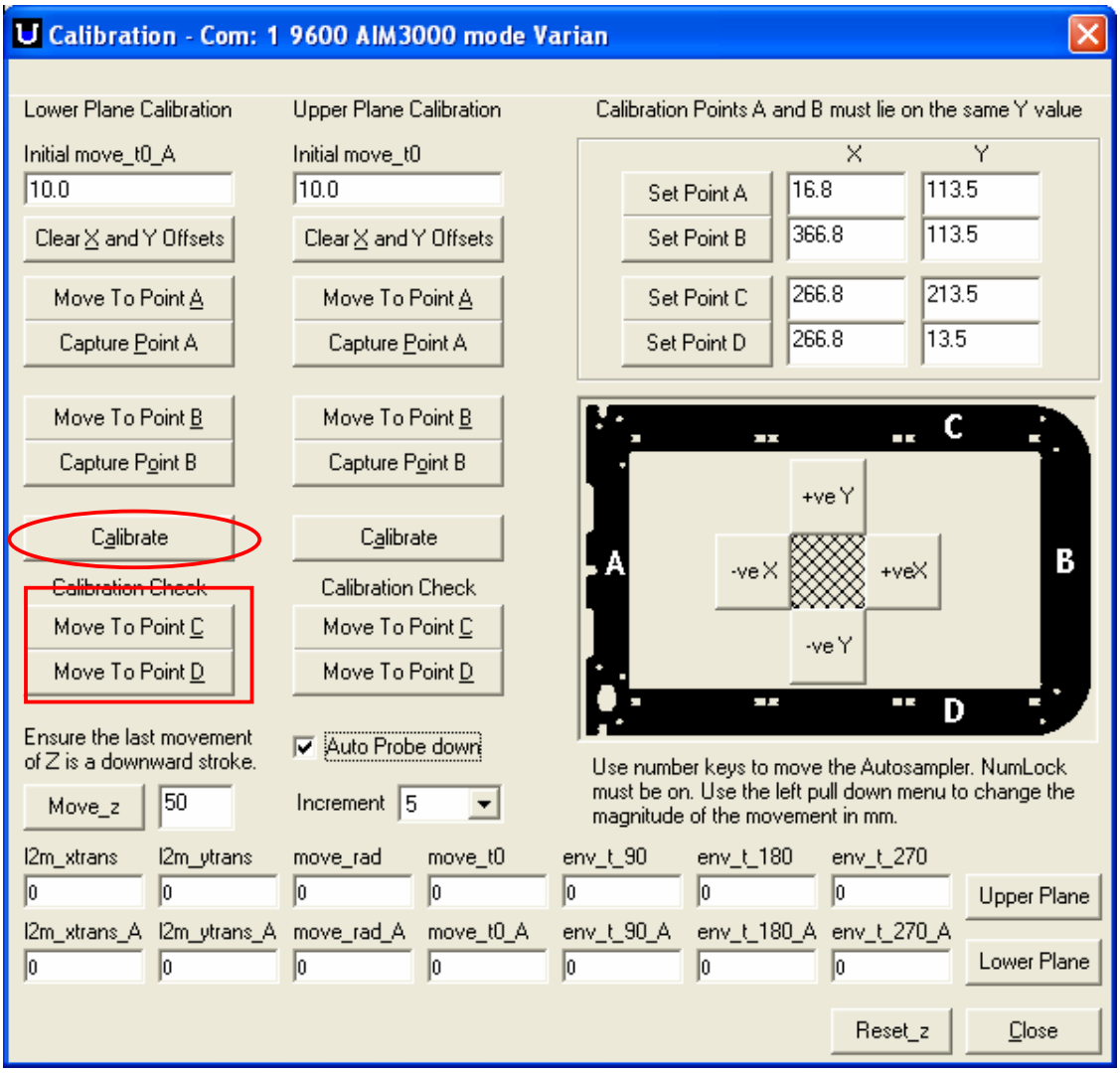


**Figure 8: Calibrating and Checking the Calibration**

13. Proceed to the upper level Calibration.

***Fraction Collector Calibration Upper Level Plane***

This portion of the Calibration requires the alignment tool (SPS 3 Alignment kit P/N 99-101216-00).

Makes sure that you have run the Lower Level Plane calibration completed before proceeding to the upper level calibration.

1. Clear the upper plane calibration X and Y offset (*Clear X and Y Offset*) Figure 9.

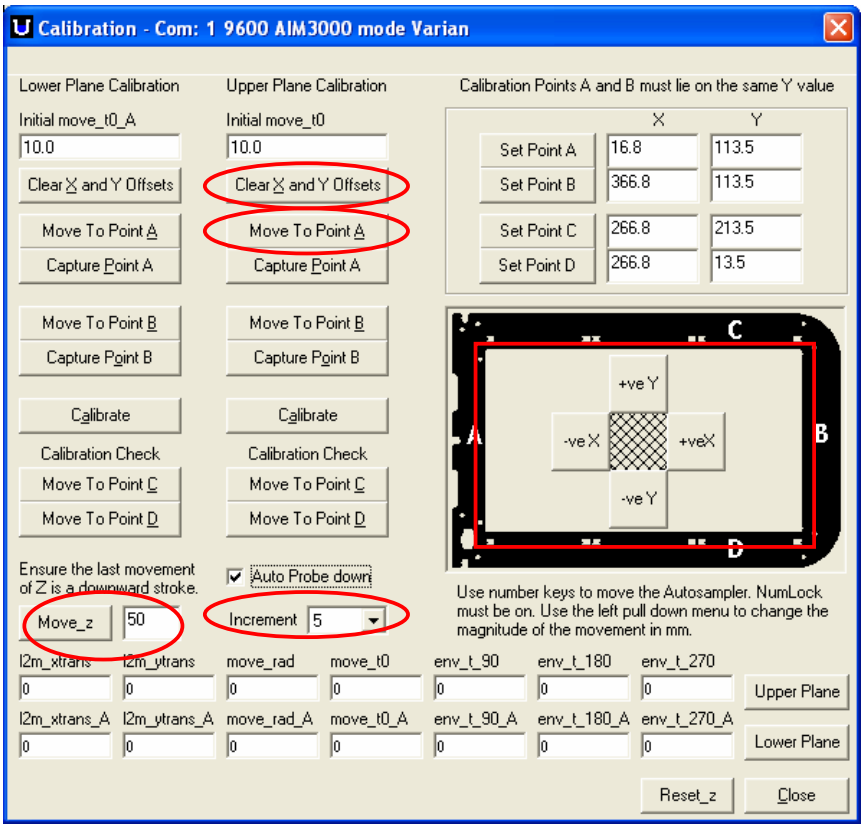


**Figure 9: Clearing the Upper Level Calibration Coefficients**

2. Place the alignment tool on top of the sample rack tray holder in such a way that the top 2 feet (they will have a pointy bottom) slip into the two holes in the tray (Figure 10). Once the alignment tool is in place it should look like the one in Figure 11.

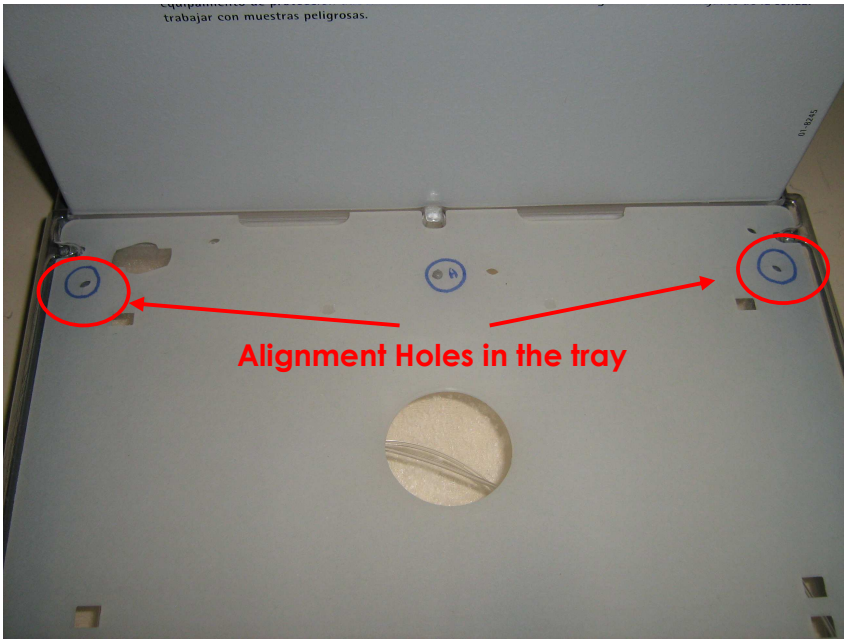


**Figure 10: Holes in the Plate to Calibrate Point A**

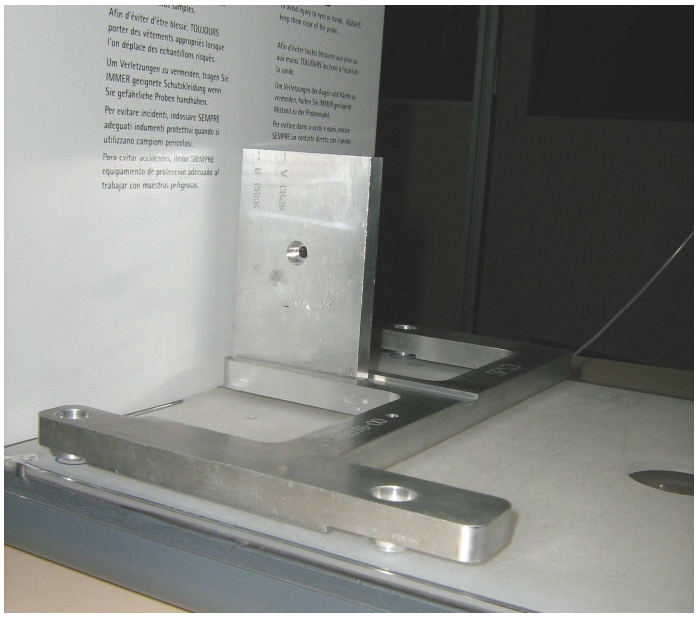

**Figure 11: Alignment Tool in Position to Calibrate Point A**

3. Select the *Move To Point A* button(Figure 9), and then using the X & Y movement buttons (Figure 9) align the probe so that it rests right above the point A dimple (Figure 12) in the tool. Do not forget to adjust the *Move_z* (Figure 9) depth adjustment to avoid running the probe into the alignment jig. Remember that fine adjustment of the probe can be made by changing the *Increment* pull down menu (Figure 9)

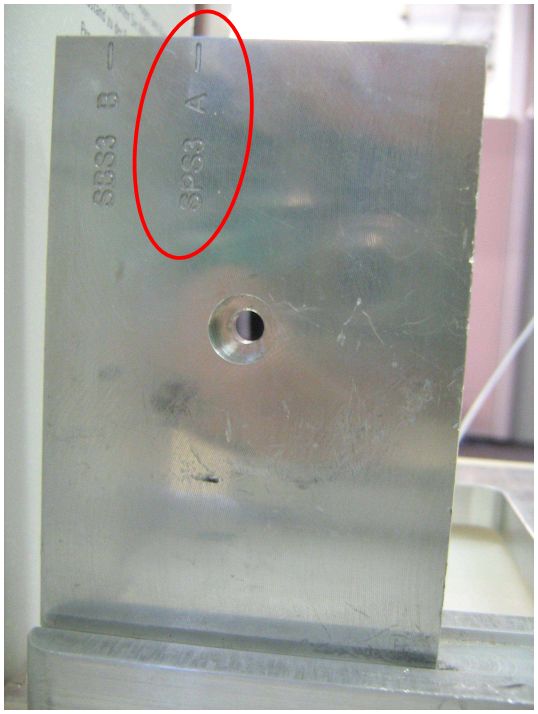


**Figure 12: Point A on the Alignment tool**

4. Once the probe is positioned over the point A dimple, then select the *Capture Point A* button (Figure 13).

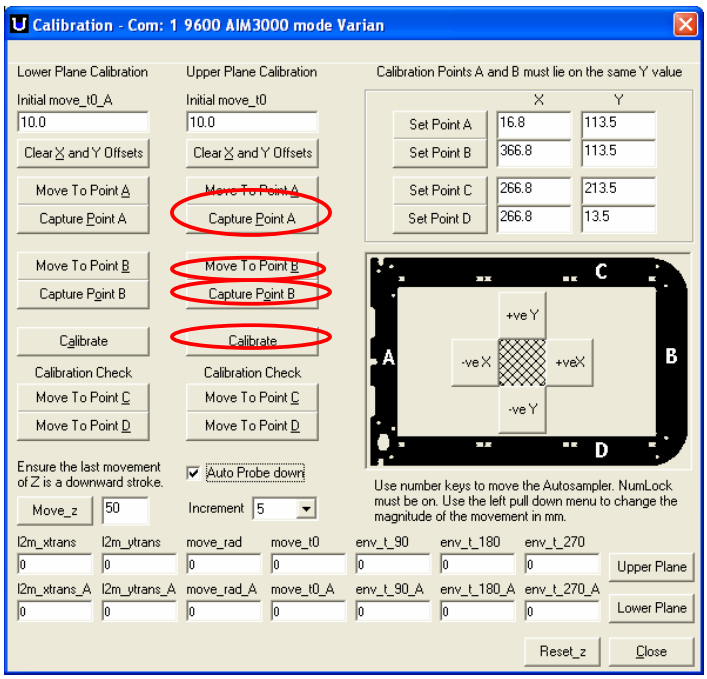


**Figure 13: Capturing Point B**

5. Locate the holes in the front side of the fraction collector rack holder tray (Figure 14) and move the alignment tool in such a way that the front pointy feet are now in the second set of holes shown in Figure 14. Once the alignment tool is positioned, it should look like Figure 15.

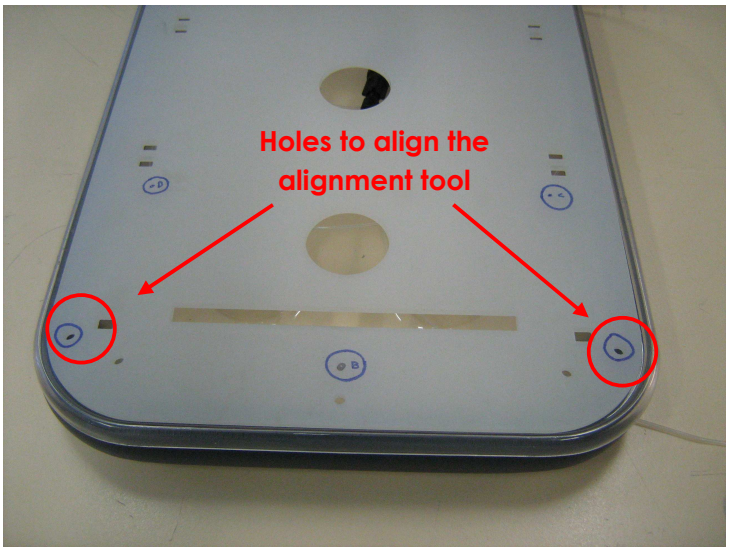


**Figure 14: Alignment holes on sample tray**

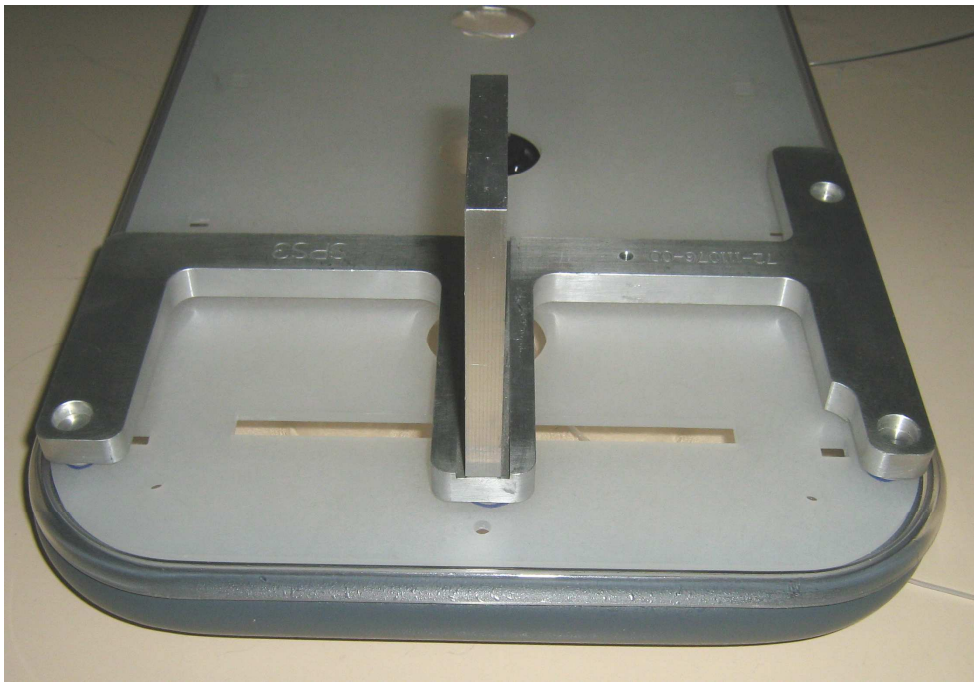

**Figure 15: Alignment Tool Position in the Tray for B Point Calibration**

6. Move the probe to position B (*Move To Point B*) Figure 16, and follow the same alignment process as mentioned for the position A calibration. Once you are happy with the probe alignment over position B (Figure 16) in the alignment tool, click the *Capture Point B* button (Figure 13). Click the *Calibrate* button (Figure 13) to lock in the new calibration coordinates. There is no need to check Point C and D.

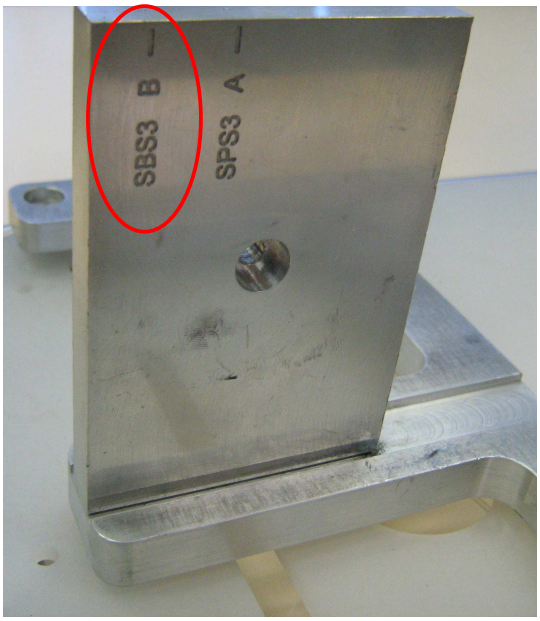


**Figure 16: Calibration Point B in the Alignment Tool**

***Calibration Test:***

To test the new calibration coordinates remove the assy probe 0.8mm and re-attach the fraction collector probe. Once you have successfully attached the fraction collector probe, go back to the main page of the Varian MDS software and follow the procedure below:

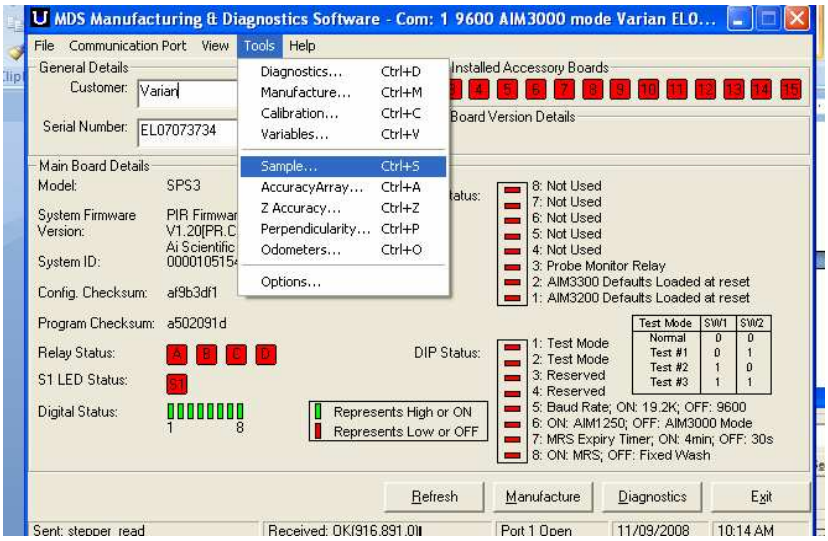


**Figure 17: Main Page of the software**

1. Select the *Tools* option from the pull down menu and click on *Sample* (Figure 17). This will open the window in Figure 18 where you can choose which racks the Fraction Collector has and the rack size.

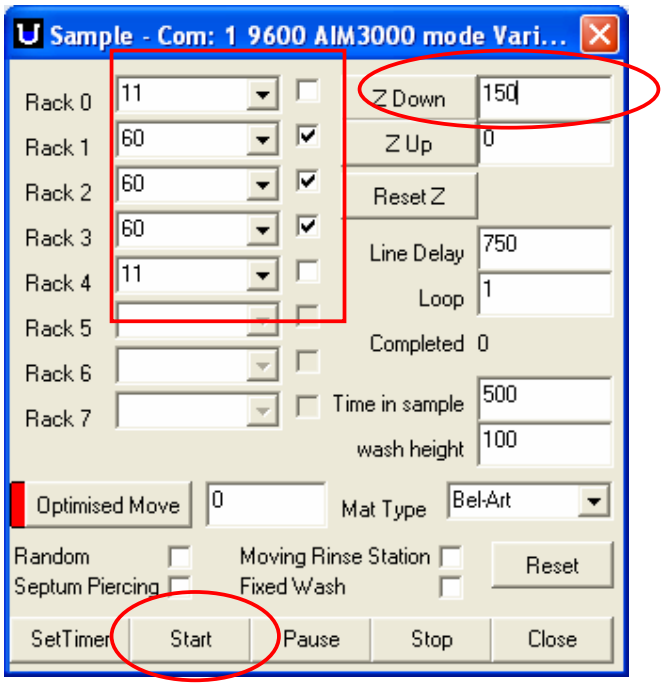


**Figure 18: Fraction Collector Rack Configuration**

2. The different rack positions are shown in Figure 19

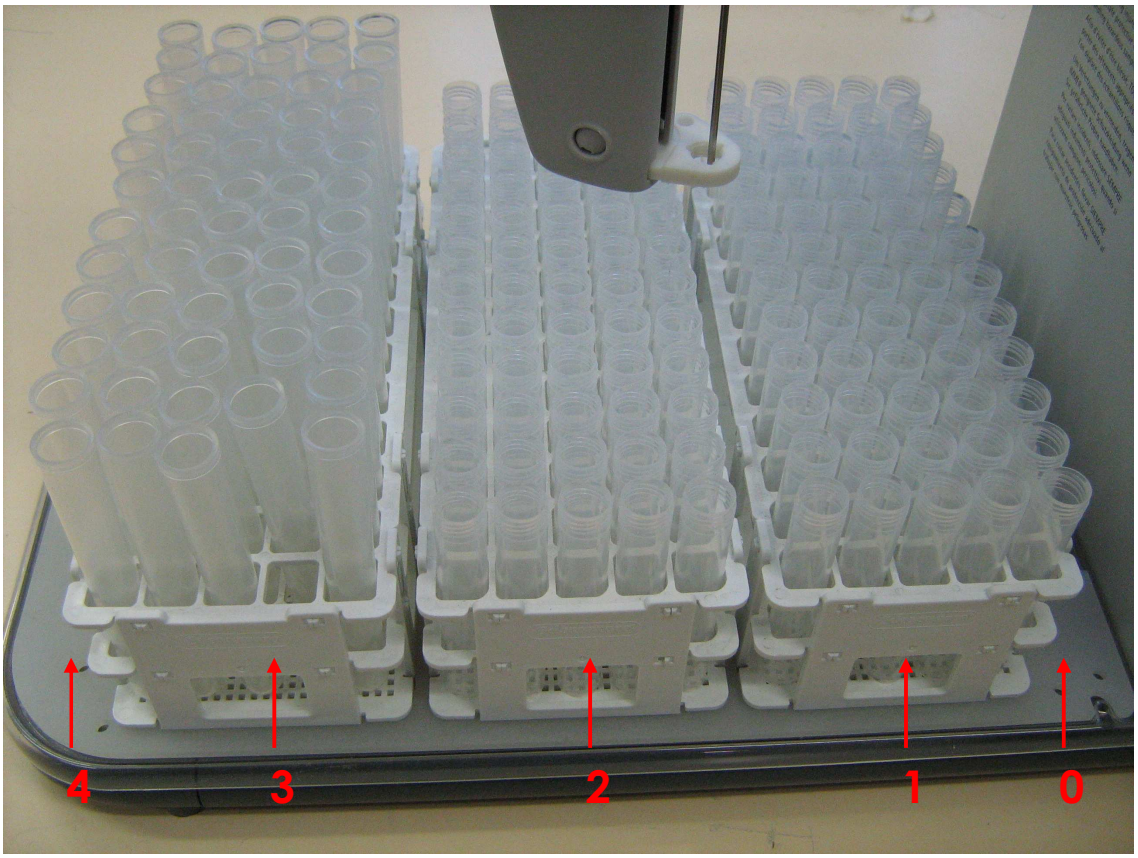


**Figure 19: Rack Positions on the Fraction Collector**

3. Select a Z down (Figure 18) value so that you can easily see if the probe is going into the sample collection tube properly. I usually pick a value of about 150. Once you are happy with the setup, click on the Start button and the probe will move through all the positions for the number of racks you have selected.

4. If the probe goes into all the fraction collector tubes without any problems, then close the Varian MDS software and reconnect the serial cable from the fraction collector to the back of the 900-Series back panel (P4).