Heidelberg Quick Instructions

The goal of these instructions is to provide a quick guide that covers most of the user cases and is easier to use. Many options are not discussed in this guide for brevity. They will be covered during the training. Please contact Swaroop Kommera with any questions.

1. General Setup

1.1 Double click on HIMT MLA program icon.
1.2 The program opens and will give you a status report of all the subcomponents in the tool. Please use the tool only if all the sub components say OK and write head says initialized. Otherwise, please put the tool down in Badger and report the issue.
1.3 If you are creating a new job, please input the job name. You can also load a previous job and save the current job with the buttons to the right of the job field.
1.4 Click on the type of exposuremode you want – Standard, Series or Draw Mode
1.5 Click on the substrate template to load the substrate template. Select the appropriate substrate type. If you have a piece, then you can select automatic rectangular and automatic round. Please make sure to go through Heidelberg precautions to make sure your substrate meets the criteria listed.
1.6 If you are exposing on a blank substrate, you can use FirstExpose which does not need alignment information to run. You can add as many layers as you want to your job file. Layer 2 and subsequent layers are used to expose substrate with alignment to existing layers on the wafer. You can expose the layers in any order you want. Check the exposure with alignment section for exposure with alignment.
1.7 For loading a design to expose, click on double click on design. If you have setup the file conversion already, you can select the design from the list.
1.8 Optional - You can double click on resist and select the appropriate resist as well.

2. Conversion Setup

2.1 If you have not setup the file conversion yet, please copy your file to C:\HIMT\Designs\gdsii or dxf etc depending on your file type. You can use the following file types – gdsii, dxf, cif, gerber, bitmap.
2.2 Double click on convert design. From the gui box that appears, click on new job.
2.3 Input the source file and click add. In the next conversion box, add the appropriate inputs for each file and the layer(s).
2.4 In the next dialogue box, click on appropriate settings for the conversion. Please make sure to check the design extent and the borders of the bounding box of your design. Make sure to check your design by clicking on the viewer button. Please do a check on the design dimensions as well.
2.5 Click on complete tasks and then click on finish in the next box. Make sure your job file appears on the list.
2.6 You can then select this job and click load design.

3. Loading Substrate

3.1 Click on load substrate. Follow the instructions on the screen for loading your substrate.
3.2 Use the alignment jig to align your substrate to the chuck.

3.3 Turn on the vacuum by pressing the vacuum button. Make sure the vacuum reading is better than the setpoint. Check the vacuum on the substrate with the other side of the tweezer.
3.4 Remove the alignment jig. Close the window and click continue.
3.5 The tool will ask you to verify that the write head is above your substrate. Make sure the write head is directly placed above your substrate. For the standard substrates, do a visual confirmation. For the small substrate, use the overhead camera.
3.6 Make sure the write head is directly placed above your substrate. The tool will focus on the substrate and find the edges and the center of the substrate.

4. Exposure without Alignment

4.1 On the exposure panel, input the dose and defocus values. You can use the stage controls to move the stage and the camera controls to switch between cameras and magnifications. You can change the focus and brightness for the cameras as well using the camera controls.
4.2 Click on the start exposure. You can monitor the progress in the progress info panel.

5. Exposure with Alignment

5.1 If you need exposure with alignment, you need to use layers 2 and above.
5.2 Click on Align Crosses. If you have already setup the alignment marks in a file, select the file from the list.
5.3 If not, set up the alignment cross positions by selecting the appropriate settings and click save. Once the alignment file shows up in the list, select the file. Please make sure to use accurate positions from your design file.
5.4 In the alignment panel, you can select manual alignment or cross alignment. You can also search in the whole field of view or resize detection area.
5.5 You can adjust focus or brightness to make sure that you get the sharpest image with good contrast.
5.6 Click on Measure. If you are doing cross alignment, click accept position, if you are satisfied with the position of the cross hair. If you are doing manual alignment, you can manually place the center-cross in the position desired.
5.7 You can also do field alignment by selecting the field alignment option.
5.8 Once the alignments are done, input the dose, defocus and other alignment options in the exposure panel.

6. Series Mode

6.1 Select Series mode from the Setup job panel. Use the appropriate substrate type. For the design, use a part of your design that has your critical dimensions.
6.2 Select series template from a pre-defined list or use _Manual template.
6.3 In the series parameters frame, select the parameters for the dose and defocus test. Make sure to make the X,Y step size greater than the size of the design
6.4 You can also check the box to print the dose and defocus parameters next to the design
6.5 Once the test is run, develop the substrate to check for the best dose and defocus condition

7. Draw Mode

7.1 Select Draw mode from the setup job panel. Use the appropriate substrate type. In the draw mode panel, you can select either to draw a polygon, draw an image or expose crosses. You can use this mode to expose crosses on a wafer without needing to input a design file, usually, on a blank wafer

7.2 Click on Draw image on the draw mode panel, and select an area on the substrate you would like to draw. The area is lighter colour than the surrounding area.

7.3 Use the shapes provided by the program – circle, ellipse and rectangular to draw on the substrate. You can also use a bitmap. Once done, click save to save the drawing. Click submit to submit the drawing for exposure.

8. After exposure

8.1 Unload your substrate by clicking the unload button.

8.2 Turn off the vacuum, remove your substrate carefully from the chuck.

8.3 Close the window by pressing the window toggle button.

8.4 Turn off the light in the flowbox.

8.5 Close the HIMT MLA program and log off badger.