

Application Notes

Wafer inspection procedure using the MicroWriter ML[®] 3 direct write photolithography system

EXECUTIVE SUMMARY

Here we present the wafer inspection procedure to automatically save the images of the designed patterns on the real-time microscope view using the MicroWriter ML[®] 3 direct write lithography system.

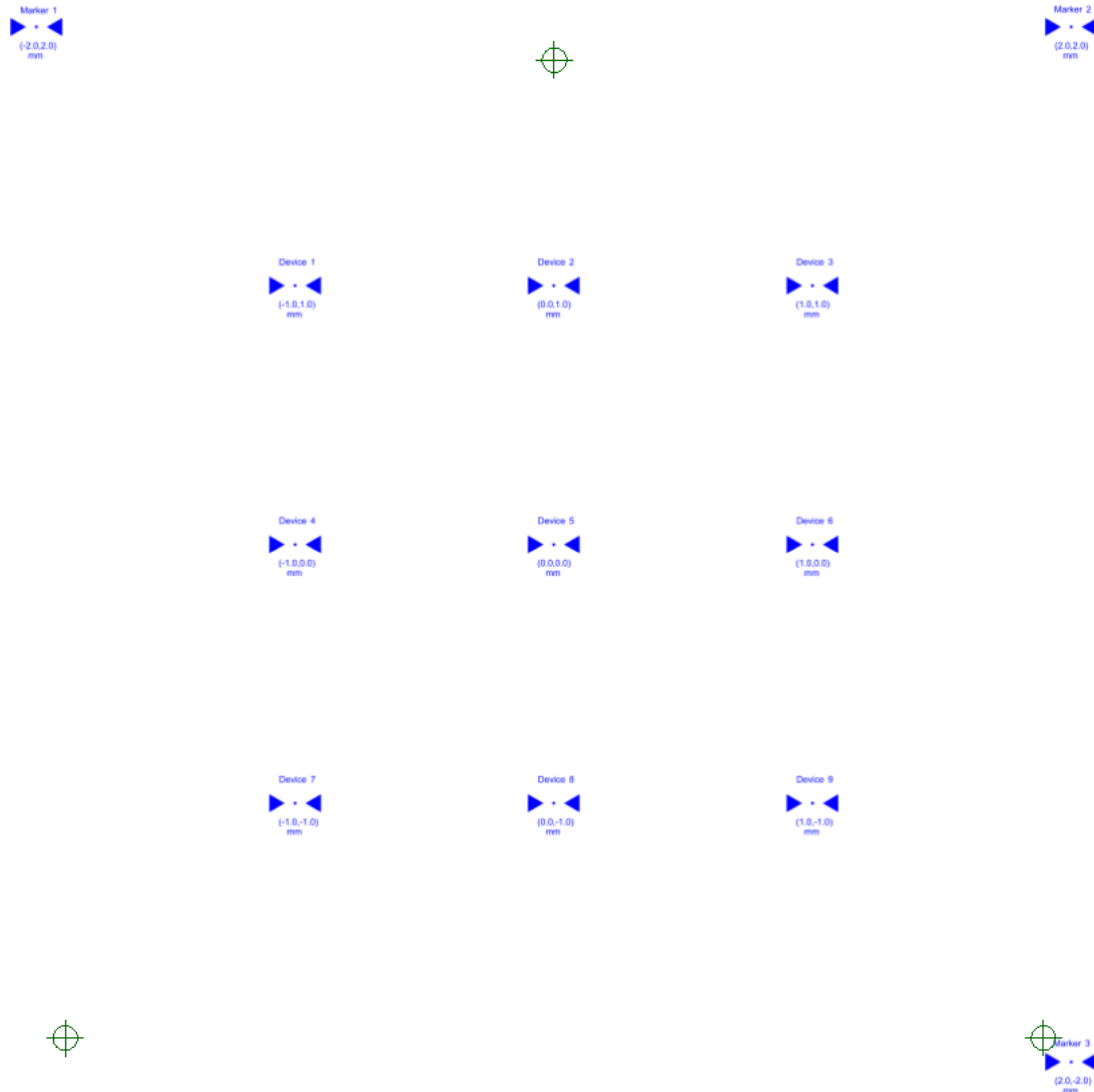
INTRODUCTION

The wafer inspection tool is used to automatically inspect a large number of features on a wafer for quality assurance. In order to get aligned images, it is recommended to include at least three markers on your design to do the alignment after exposure. The first part of this example will guide how to do the alignment with three markers and then how to start the wafer inspection.

PROCESS

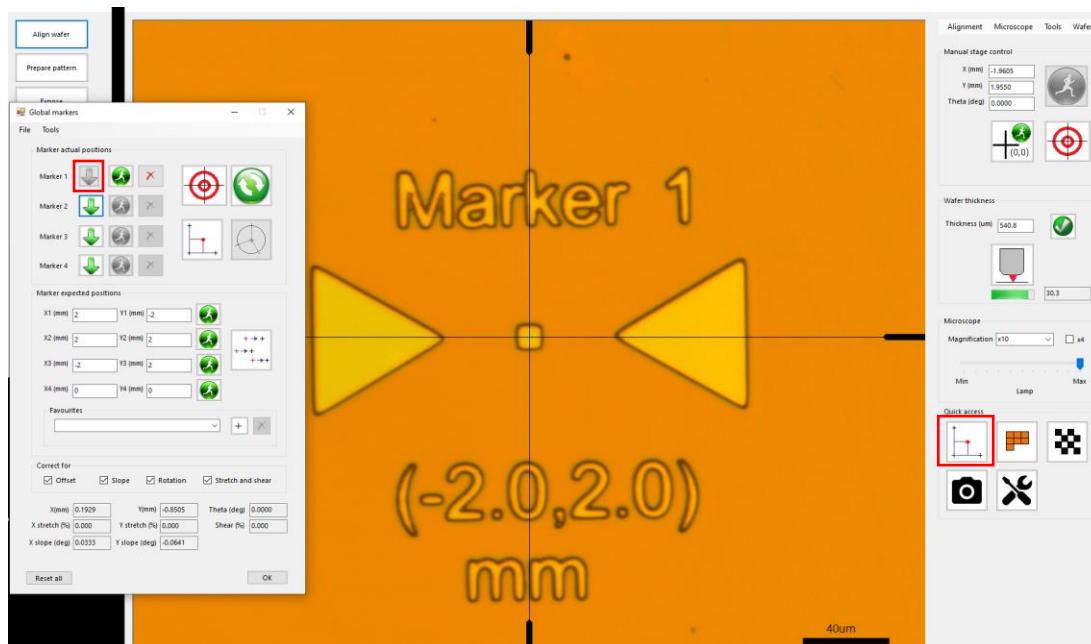
A. Load a previously exposed chip with markers and features on it.

For the purpose of this tutorial a 20 x 20 um chip was exposed with the pattern shown in the next image. Three markers to align the chip after exposure and 9 devices to take a picture of each one centered.



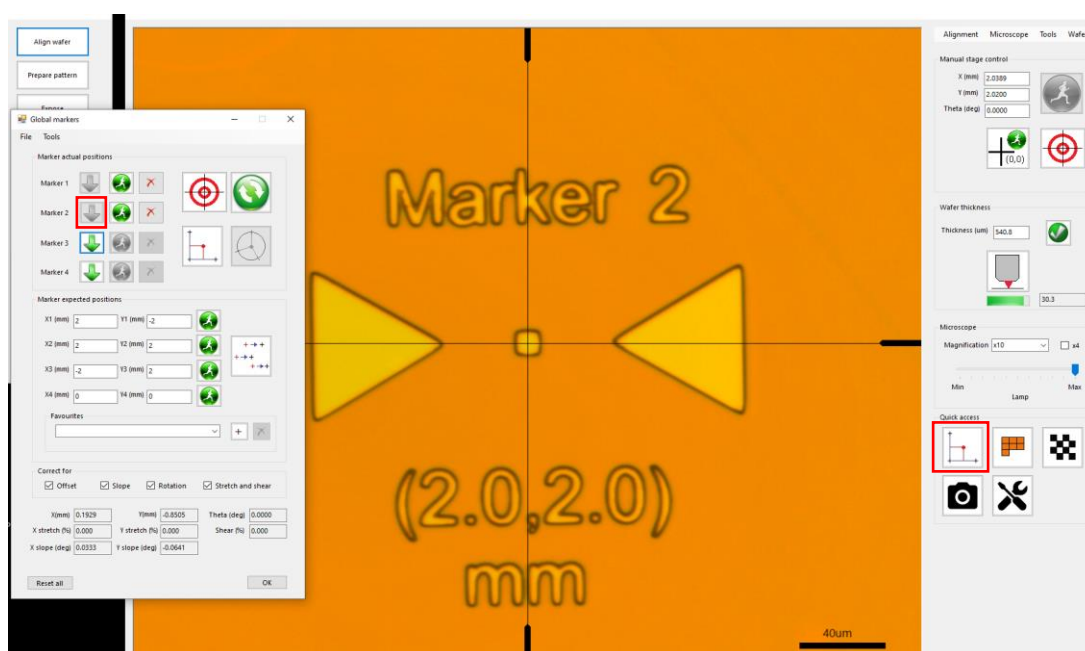
B. Bring the top surface of the chip in focus and find Marker 1.

Locate the first alignment marker (here Marker 1). Move the centre of the real-time microscope view to the centre of the Marker 1. Go to Centre wafer in the Quick access section, red square. Then, Place Marker 1 here: In the Global markers window, click the Green downward arrow next to Marker 1 (green color before placing and grey after placing the Marker 1).



C. Move to Marker 2

Move the centre of the real-time microscope view to the centre of the second alignment marker. Go to the Centre wafer in the Quick access section. Then, place Marker 2 here: click the Green downward arrow next to Marker 2.

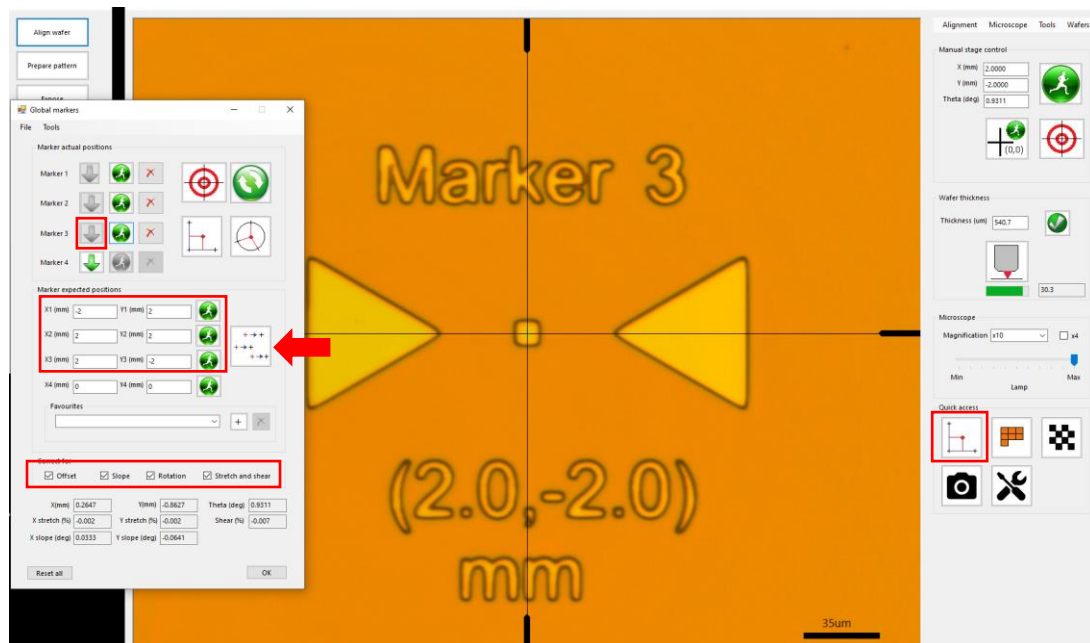


D. Move to the Marker 3.

Move the centre of the real-time microscope view to the centre of the third alignment marker. Go to Centre wafer in the Quick access section. Place Marker 3 here: click the Green downward arrow next to Marker 3.

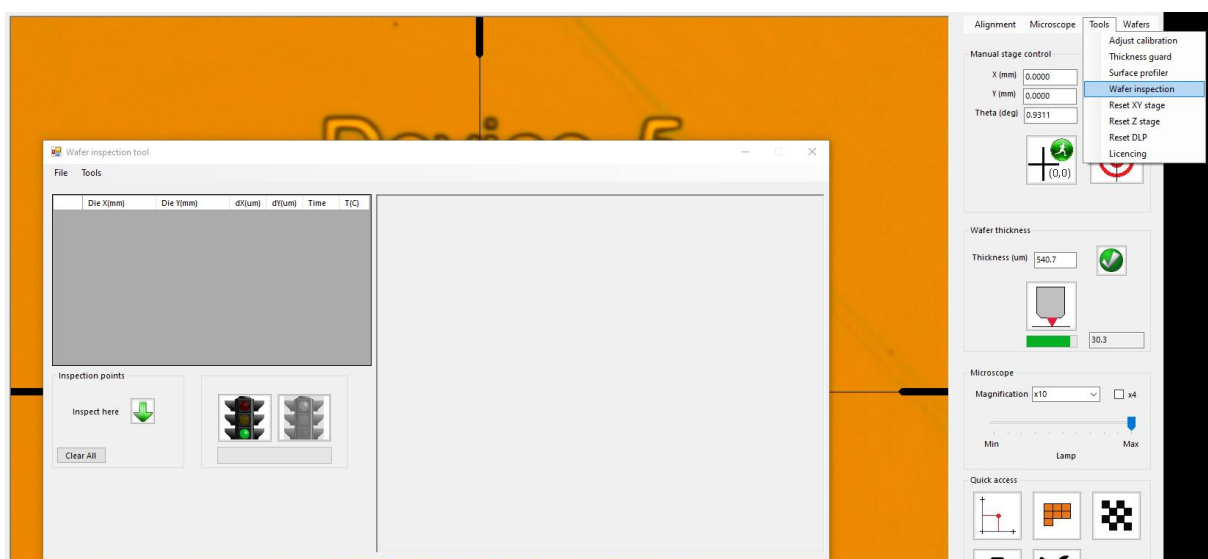
Input the marker expected positions: Enter the expected positions of the three markers into the designed boxes in the “Marker expected positions” section (**Error! Reference source not found.**). Here X1 (mm) and Y1 (mm) are for the Marker 1 position, and X2 (mm) and Y2 (mm) are for the Marker 2 position etc.

Check all four options (Offset, Slope, Rotation, and Stretch and shear) in the “Correct for” section Transform coordinates: Click the “Transform coordinates” button in red arrow. We would see some reasonable correction values shown at the bottom of the “Global markers” window.



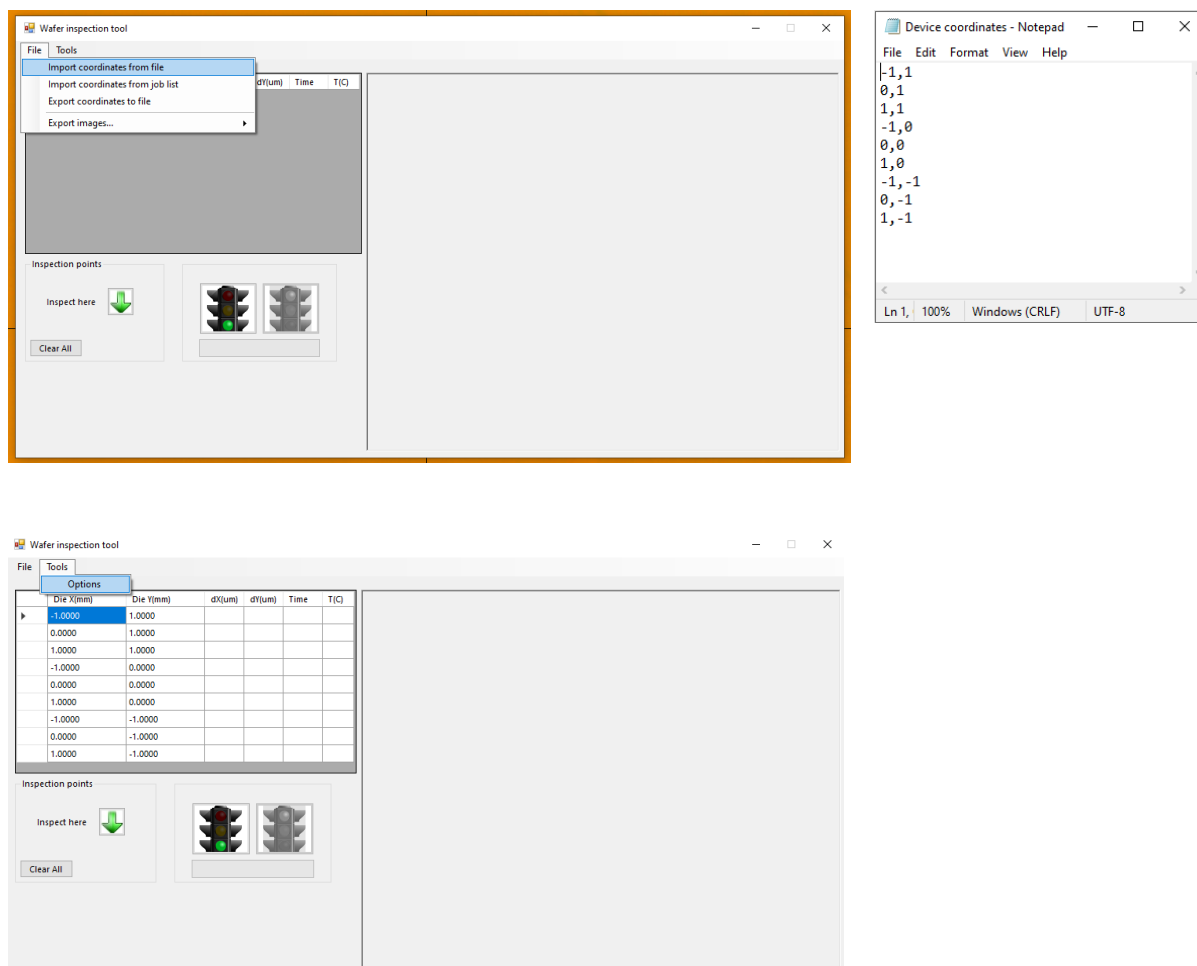
E. Open wafer inspection tool.

On align wafer panel, go to tools/wafer inspection



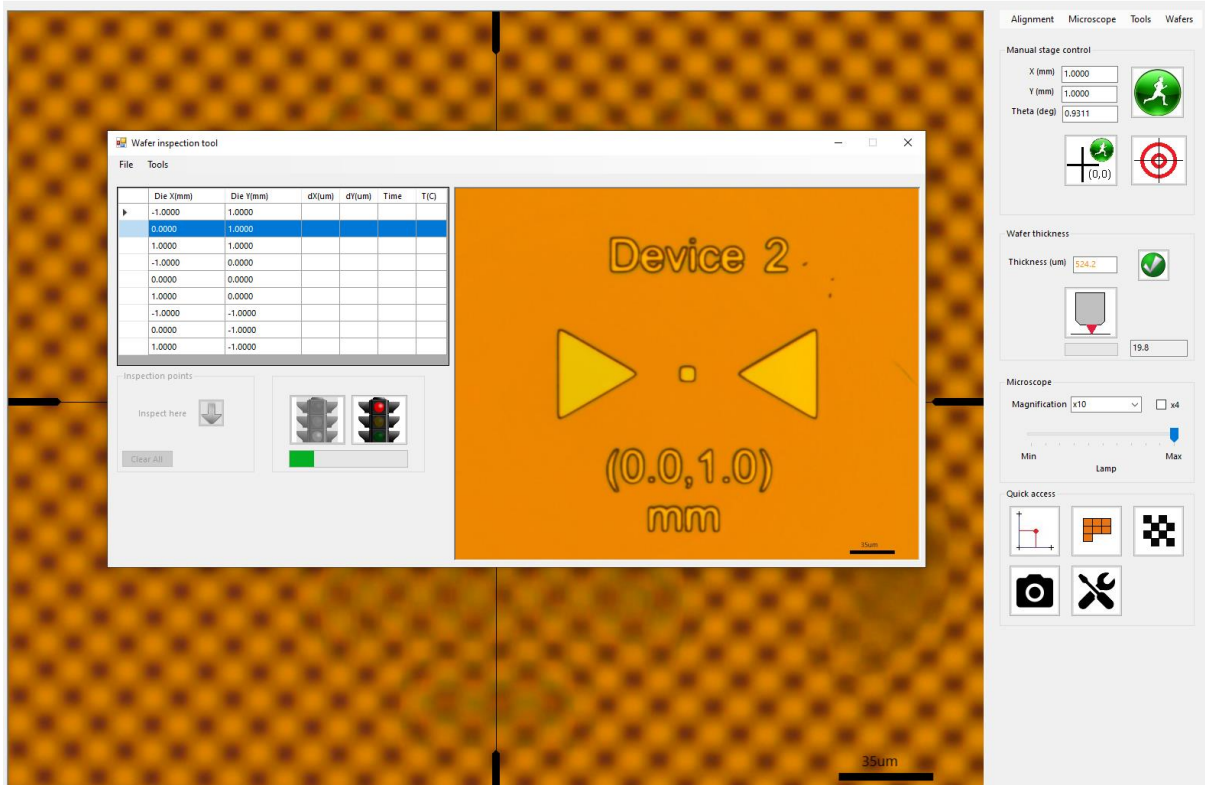
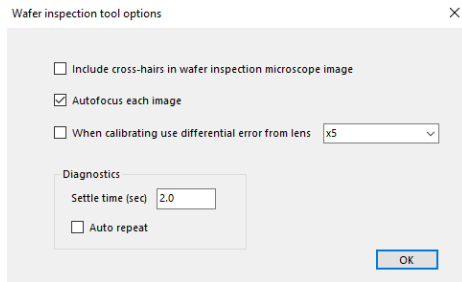
F. Load the coordinates from a file.

A text file (tab delimited) is supplied via the File menu which gives a list of coordinates of different locations on the wafer which are to be automatically visited, the file for this example is attached as .txt file. Once the file has been loaded Alternatively, a list may be built up manually by moving the stage to the desired location and clicking the 'Inspect here' button.



G. Start the Wafer inspection.

Once the green traffic light start button is clicked, the system will automatically visit each of these locations and take an image using the real-time microscope. The options menu allows the user to select whether to perform an autofocus at each location (takes much longer time but gives better results for high magnifications in cases where the background slope correction applied through the Centre Wafer panel is insufficient to keep the microscope in focus) and whether to include the microscope cross-hairs in the image.



H. Save the images

The saved images can be reviewed from the View menu by selecting Recorded image and then selecting any coordinate in the list; the saved image from that coordinate will then be displayed in the right-hand panel of the window. Captured images can be exported using File | Export images.

In many cases, the list of coordinates to inspect may be the same as the list of jobs in the Prepare Pattern form (if, for example, each job corresponds to an identical die repeated across a wafer). In these cases, File|Import coordinates from job list will automatically build a list of inspection coordinates from the current job list.

