

**MJB 3 Mask Aligner**  
*Standard Operating Procedures*

1. Open the two gas tanks (Low Pressure Nitrogen (Nitrogen Guns), High Pressure Nitrogen tanks), and their respective valves.
2. Sign in.
3. Turn on (move upward) the two gas switches at the Manometer Box.
  - a. Druckluft air pressure (Pneumatic Switch Compressed Air)
  - b. Stickstoff nitrogen (Nitrogen)
4. Turn on the vacuum pump under the table.
5. Turn on the microscope illuminator, which is beside the mask aligner. Turn it on by reaching the back part of it and finding the switch for power.
6. Turn on also the UV power supply that is at the right of the illuminator (here the switch is at the front)
7. If the Mask Aligner has been used recently (last three hours), give it 10-15 minutes to cool down. Wait until the word “rdy” comes.
8. BEFORE THE NEXT STEP, DOUBLE CHECK THAT THE POWER TO THE MASK ALIGNER IS TURNED OFF. The power to the UV power supply should be on, however the power to the Mask Aligner should be off (power surges during the firing process can damage the electronics in the Mask Aligner).
9. Press the “Start” button under the switch that you just turned on.
10. It might display “Fire”, or “Cold”. If it says “Fire”, wait until the word “rdy” comes again, and then press “Start” again. This might happen more than once.
11. Once the word “Cold” comes, after a couple of minutes it will display a number (i.e. 274)
12. Turn on the Power of the Mask Aligner
13. Place your mask on the mask holder. It should be placed in such a way that the patterned side faces “up” (Eventually it will face down and your sample).
14. Press the vacuum Mask button.
15. Slide the Mask Holder with your mask, on the stage.

16. Tight the Mask holder Clamping Knobs. They are located at the left of the Mask Holder stage.
17. Pull the Transport Slide (sample holder) “out”, (take it away from the bottom of your mask holder).
18. Place your sample on the Transport Slide.
19. Push the Transport Slide back “in” (under the mask holder and your mask). At this moment, the patterned side of the mask will be facing the side of your sample that will be patterned.
20. Now you are ready to align your sample. For controlling the contact and separation mode, you need to move the handlers (Contact and Separation Levers) at the lower left side of the mask aligner.
21. The Separation Lever (bottom one) only moves forward and backward. The Contact Lever (the one above) will turn toward or away from you.
  - a. The Contact Lever controls the Z-axis movement of the chuck. It is used for bring the substrate into contact with the mask.
  - b. The Separation Lever is used to move the substrate in and out with the mask in order to perform alignment, once the contact lever has been engaged.
22. While you are in the “Separation mode” you are ready to align your sample. NEVER MOVE YOUR SAMPLE WHILE IN “CONTACT”. This will result in scratching your sample with the mask.
23. You can align your sample by using the Alignment Knobs. Alignment for X-position is below the Transport Slide, the Y-position knob is at the front of the Mask Aligner, and the  $\theta$ -position knob is just above this last one.
24. Use the microscopes eyepieces for looking at the aligned area, and the Microscope Manipulator Brakes for moving the Microscope Objectives around the area of interest. For moving the manipulator brakes, you will need to press the two buttons on the handler.
25. Select the time interval for which you want to expose your sample.
26. Exposure can only be initiated when the Separation Lever is in the “CONTACT” position (Contact Light is on)
27. Once you have aligned your sample with the mask and you are in the contact mode, you can hit the “EXPOSURE” button. DO NOT LOOK AT THE MASK ALIGNER AFTER YOU PRESS EXPOSURE. UV light is dangerous.

28. Once the exposure is finished, move the Contact lever to separate your sample from the mask. Once your sample is no longer in contact with the mask, you can pull the Transport Slide out and retrieve your sample.
29. Loosen the Mask Holder Clamping Knobs, and take the mask holder out. Place it somewhere with your mask facing up.
30. Press the Vacuum Mask button. Retrieve your mask
31. Turn off the Vacuum under the table, the Illuminator, the Mask Aligner, and the UV Power Light.
32. Do not turn off (move downward) the Druckluft air pressure and the Stickstoff nitrogen yet.
33. Let it cool for about 20 minutes.
34. Cover the Mask Aligner
35. Now you can turn off the Druckluft air pressure and the Stickstoff nitrogen.
36. Sign out.
37. Turn off the gas tanks used.

Prepared by:

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