The wafer is aligned to the mask using the bottom side alignment microscope (BSA).

1. Load mask. Please refer to Step 1-3 in the previous SOP for loading a mask.
2. Activate BSA MICROSCOPE key that is circled in the Figure 1 (LED on).

3. Press SELECT PROGRAM key. Toggle through the menu up to choose exposure type and confirm by pressing SELECT PROGRAM key again. “VAC” is recommended by the user manual.

4. Edit parameter to adjust exposure time. Please refer to step 9 and 10 in the previous SOP.
5. Load wafer chuck for BSA. Move the BSA-chuck placed onto the transport slide into the machine. **DO NOT PRESS ANY KEY AT THIS STEP.**
6. Make sure the BSA MICROSCOPE key is on. Turn the **SPLITFIELD** switch to the middle position. Turn **MAGNIFICATION BSA** to low.

![Figure 3](image)

7. Turn the **ILLUMINATION** switch to **BSA/IR** and adjust the light intensity by the potentiometers labeled **BSA/IR microscope illumination left/right** so that two images from left and right bottom microscope display.

![Figure 4](image)

8. Turn the **SPLITFIELD** switch to the right position (Either way to start with is fine.). The field of view from the right bottom camera becomes full screen on the monitor.
9. Make sure the **TOP/BOTTOM** key LED is on and adjust the fine focus with **TOP SUBSTRATE RIGHT** regulators.

![Figure 5](image)

**Figure 5**

10. Move the chuck by using the micrometer screws of the alignment stage for **STG-X-Y-Θ-MOVEMENT**, if necessary so that alignment marks on the mask are in the chuck opening.

![Figure 6](image)

**Figure 6**

If the knob for the x direction is set as **10-0** and the one for the y direction is set at **5.5**. Only minor adjustment is needed to make alignment marks in the chuck opening.

11. **Toggle RIGHT** so that only right bottom camera is movable.

12. Move right bottom camera to find the alignment mark by pressing arrows.

![Figure 7](image)

**Figure 7**
13. Turn the SPLITFIELD switch to the left position. The field of view from the left bottom camera becomes full screen on the monitor.

14. Make sure the TOP/BOTTOM key LED is on and adjust the fine focus with TOP SUBSTRATE LEFT regulators.

15. Move the chuck if necessary so that alignment marks on the mask are in the chuck opening. If the knob for the x direction is set as 10-0 and the one for the y direction is set at 5.5. Only minor adjustment is needed to make alignment marks in the chuck opening.

16. Toggle LEFT so that only left bottom camera is movable.

17. Move left bottom camera to find the alignment mark by pressing arrows.

18. Turn the SPLITFIELD switch to the middle position so that images from both camera can display.

19. Align both alignment marks by either moving right camera or left camera.

20. Turn MAGNIFICATION BSA to high. The image grabbed in the following step can only appear for wafer alignment in the high magnification mode.

21. Press GRAB IMAGE to take picture of alignment marks shown on the monitor. First keystroke grabs the mask image. The objectives move to the wafer focus plane (TOP/BOTTOM key LED). The motor control of the microscope manipulator is disabled. The machine informs: “ready for load...BSA image stored”. Second key stroke GRAB IMAGE key deletes stored image and enables the manipulator again.

![Figure 8](image)

22. Load wafer. Please refer to step 4-6 in the previous SOP to load a wafer. The side with features should be down.

23. Toggle the TOP/BOTTOM key to make LED light off. Focus the wafer plane by adjusting the BOTTOM SUBSTRATE LEFT/RIGHT regulators, correct illumination if necessary.
24. The stored BSA image should display on top of the live image of the wafer. Use the micrometer screws of the alignment stage for **STG-X-Y-Θ-MOVEMENT** to align the wafer alignment marks central symmetrical to the mask alignment marks.

25. Depending on your requirements, an alignment check could be helpful using the SEP keys, **ALIGN CONT/EXP** key or the **ALIGNMENT CHECK** key.

26. Exposure and Unload the mask. Please refer to step 11-14 in the previous SOP.