

# DICING SAW (DISCO DAD 321)



Location: 10K Area

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### 1. Overview

This tool is used for dicing (cutting) Si and similar substrates. The chuck can support 6" wafer (full size) and anything smaller than that. The substrates can be bare, with thin films or without, patterned or etched. If there is a delicate device on the substrate, thin layer of photo resist can be used for protection.

# 2. SAFETY PRECAUTIONS

If you are bringing any new materials into the NanoFab for use in your process, it is necessary to fill out a chemical import form (available on our website, http://www.nanofab.ualberta.ca) and supply an MSDS data sheet to Stephanie Bozic.

# 3. Operating Instructions

- 1. Begin by heating up the hotplate in between the disco and diamond touch dicing saws. Turn on high heat.
- 2. Mount the substrate (silicon wafer or piece) to be diced in the center of the correct metal frame.



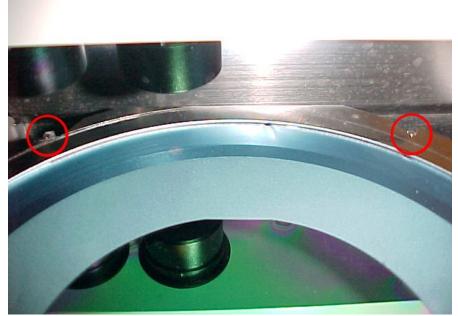
- a. Substrate is placed feature side down on the heated hot plate. Turn on the substrate vacuum. Place it as close to the center as possible.
- b. The correct frame is placed around the substrate. Frames are kept separated in separate labeled boxes.
- c. Match the notches on the frame to the shaped posts on the hotplate.
- d. Pull the blue tape across the substrate and frame and press "Table Up".
- e. Roll/push out the air bubbles. The larger the air bubbles the less likely the pieces will stay stuck to the tape once cut.
- f. Close the top and spin to cut the tape around the frame.
- g. Raise the top, turn off the substrate vacuum, and remove mounted substrate and frame.
- 3. Turn on the Disco Dicing saw by turning the key to START until the green light comes on. Let go of the key and let it return to ON. (Just like starting a car). The screen will remain dark for a while.



- 4. Once the screen comes on it will read "Initialize System" at the bottom left. Press the SYS INIT button. The system will then initialize and once done will read "G007 Initialization complete"
- 5. Blade Setup
  - a. Go to the Blade Maintenance menu (F5)
  - b. Enter the Blade Setup menu (F3)
  - c. Start the Non-Contact Setup (F3)
  - d. When the bottom left of the screen reads "G074 Press the ENTER key to execute" press ENTER



- e. When the bottom left of the screen reads "G173 !Attention: press ENTER, axis moving to setup point" press ENTER
- f. When the bottom left of the screen reads "G173 !Attention" press ENTER, axis moving to 0 point", press ENTER
- g. Once completed, press EXIT twice to return to the main menu.
- 6. Load your substrate onto the chuck, now press the C/T VAC button, the frame should be against the two pins as shown below. The vacuum gauge should move from red to green, if it does not you will need to adjust your dicing frame and substrate until it does.



- 7. Select Device Data (F4) to choose a program. Scroll up and down and press ENTER when the one you wish to use is highlighted. Any program may be chosen and modified.
- 8. Using the up and down scroll through and change the program to suit your substrate or piece. Values are entered using the number pad and then pressing the arrow to replace the previous value.
  - a. RND WORK SIZE: the diameter of the work area in millimeters.
  - b. WORK THICKNESS: the typical thickness of a silicon substrate is 0.5000mm.
  - c. TAPE THICKNESS: the thickness of the blue tape is 0.0700mm.
  - d. BLADE HEIGHT: the blade is set to cut down to 0.0500mm.
  - e. FEED SPEED: is the speed the blade moves, typically between 10-20mm/sec
  - f. Y INDEX CH1: is the distance between the first set of cuts (not applicable if only one cut is being made)

CH2: is the distance between the second set of cuts (not applicable if only one cut is being made or cutting in only one direction)

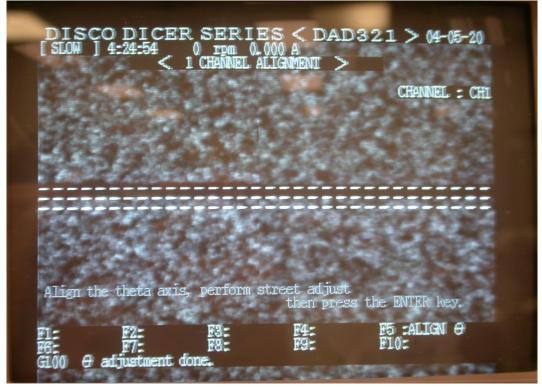
- 9. Press ENTER to save the changes to the program.
- 10. Press EXIT twice to return to the main menu.
- 11. In the main menu choose Semi-Auto (F2)
- 12. Press F8 to enter the measure view and see the substrate through the lenses.
- 13. Press EXIT once to return to the commands at the bottom of the screen.



14. The substrate can be moved using the X, Y, and Q keys. Use the SLOW key to make finer movements. The INDEX key will move the substrate the distance set in the program.



15. Choose a line that runs across the width of the substrate (or two features that are even). Using the movement keys, align to the three dashed lines across the screen.





- 16. Once the substrate is aligned, position the first cut. The cut is made between the three lines on the screen. To increase accuracy place the first cut at the end of the substrate closest to you.
- 17. Choose the cut direction: F5 if you are at the front of the substrate

F10 if you are at the back of the substrate

- 18. Select START to start the cut.
- 19. The program may ask to verify the jog direction of the movement keys. Perform the verification by <u>briefly</u> touching the specified underlined key.
- 20. Reselect the cut direction and press START.
- 21. When the cut(s) are finished, dry off the substrate using the nitrogen gun. The cuts can be inspected by moving the substrate under the lenses.
- 22. To rotate the substrate exactly 90° select the INDEX and press the Q counter clockwise (ie. the one not underlined)
- 23. Repeat steps 16-20. The substrate does not need any additional aligning.
- 24. Exit to main menu.
- 25. Turn off chuck vacuum (C/T VAC).
- 26. Remove substrate, turn off dicing saw (key to OFF position), and ensure everything is clean and dry.

### 4. Troubleshooting

If you encounter an unexpected error or require assistance please contact the primary or secondary trainer listed above. Should they not be available, please contact any staff member for assistance.

#### 6. APPROVAL

QUALIFIED TRAINER: Jolene Chorzempa
Training Coordinator: Stephanie Bozic