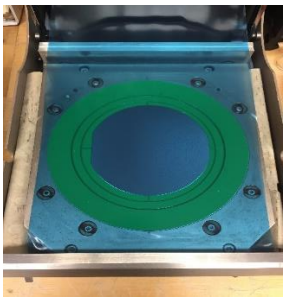
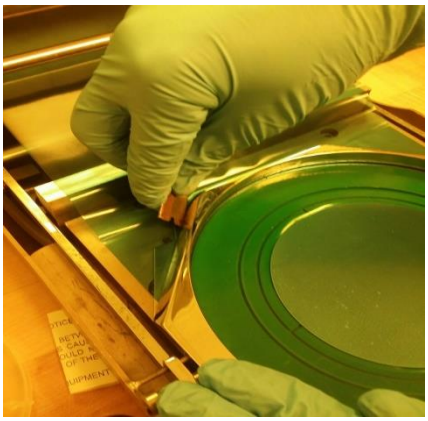
Disco Model DAD321 Dicing Saw

The Disco DAD321 Dicing saw is an easy to use automatic/semi-automatic dicing saw capable of cutting wafers as large as 6 inches in diameter. While most NCF users are accustomed to the Micro-Automation Model 1006 dicing saw, the principles of operation of the Disco model are fortunately very similar. This operational manual is intended to guide the user through the startup, wafer cutting, and shutdown procedures of the system. *Sign out the equipment key from the NCF office.*

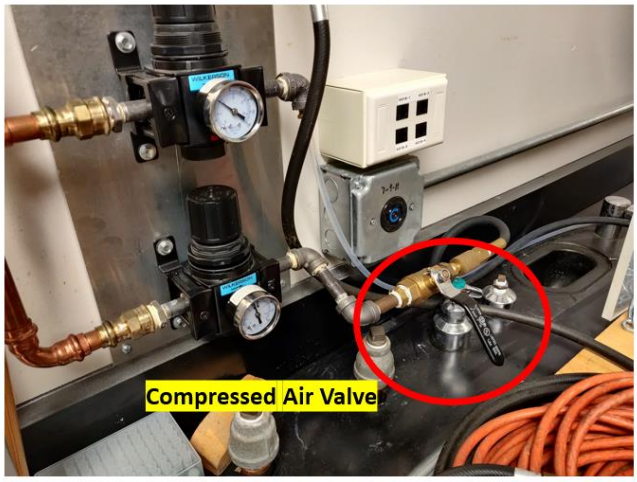
1. Sample preparation is like the Micro-Automation saw, the exception being the metal holding plates are not needed.
2. Place the sample on the preparation stage and pull the tape over it. Use the roller to roll the tape over the sample.

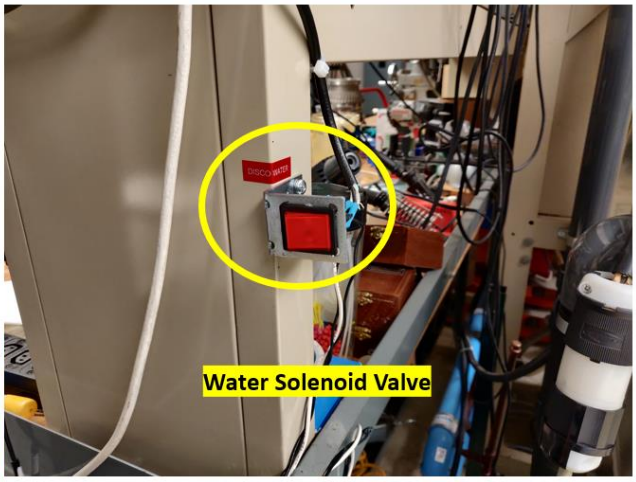


3. Pull guard ring down and cut the tape with a small blade. Push the air button to release the sample

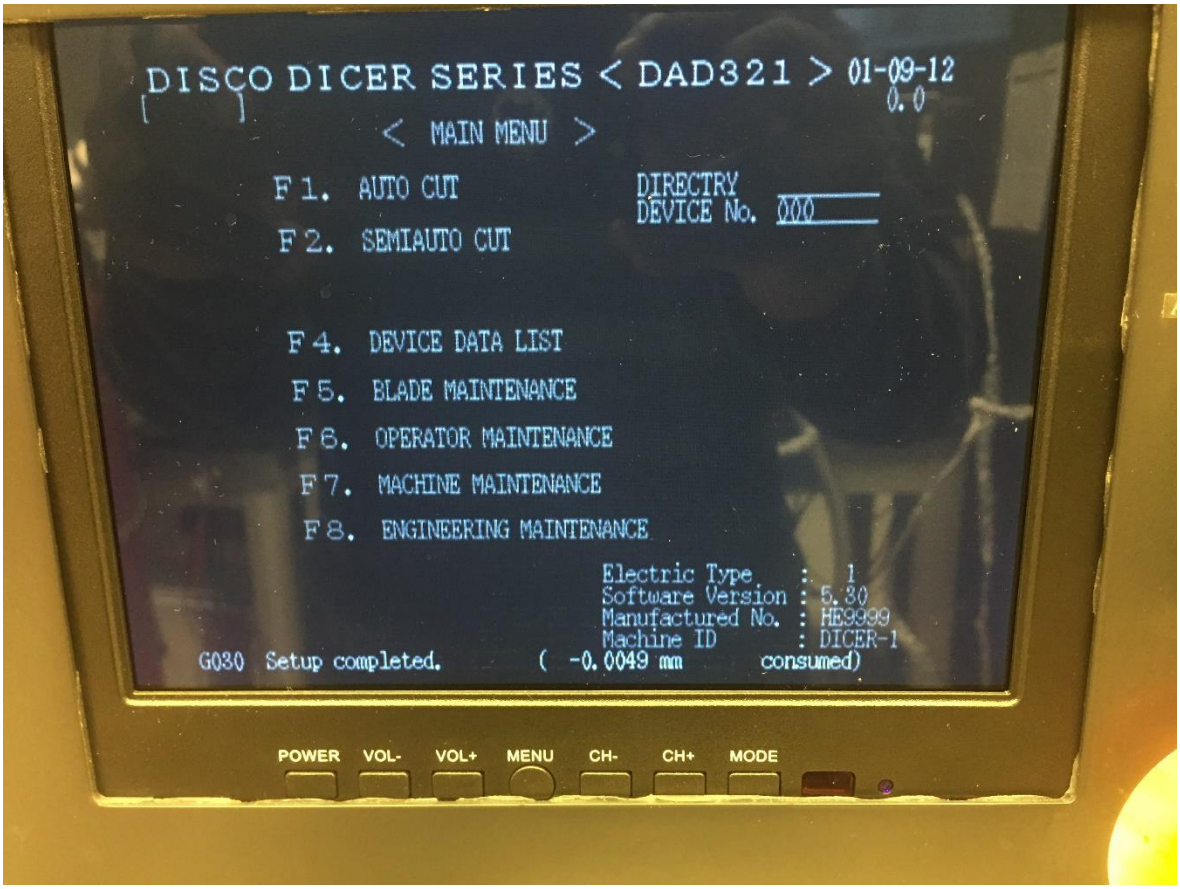


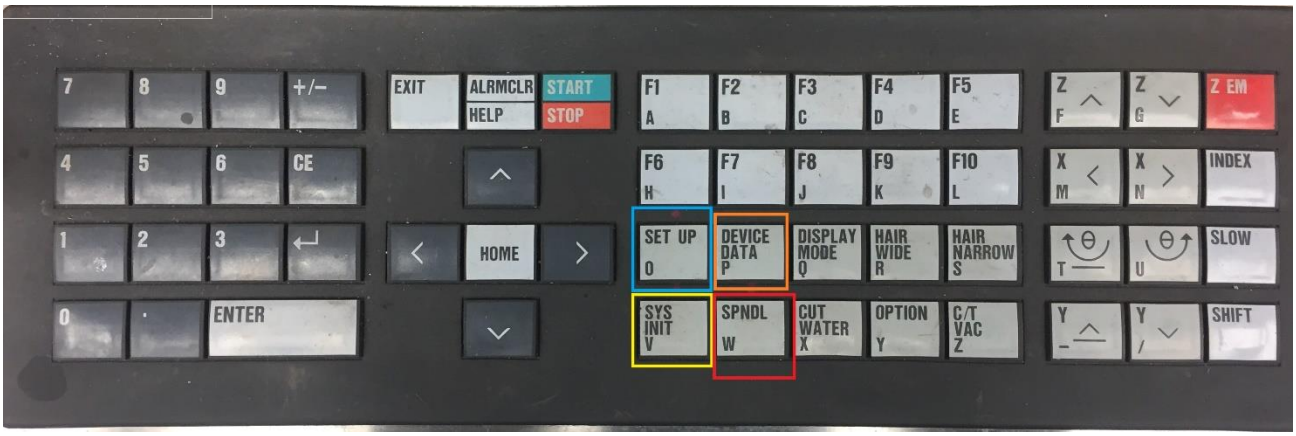
4. Open the compressed air near the door of NCF corridor and switch on the water solenoid valve using the button located at the back of disco dicing saw.



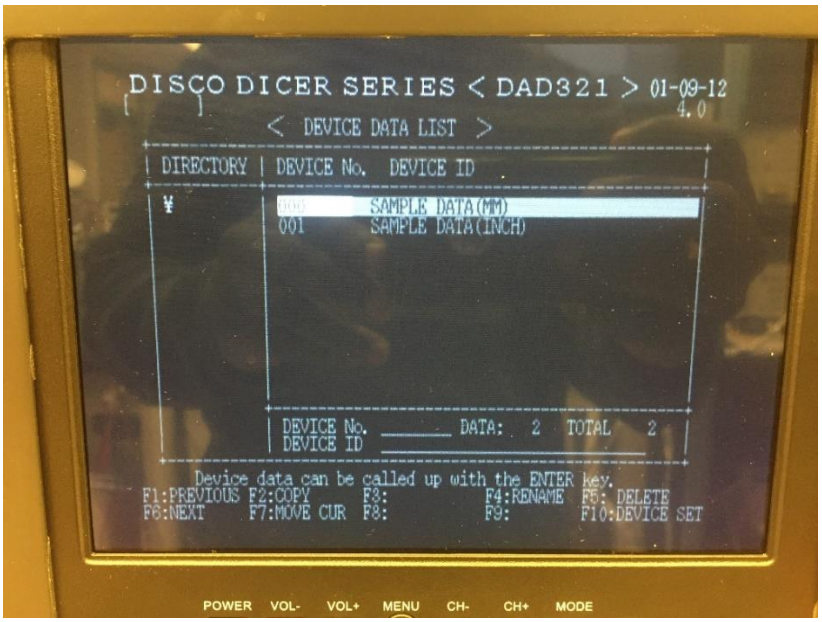


5. Insert the Disco key into the key slot and turn it to the **ON** position. After a few seconds, turn the key to the **START** position.
6. Once the machine starts up, press the **SYS INIT**. The machine will perform system initialization. Once done, a '*Initialization Completed*' message will appear at the buttom of the LCD screen.

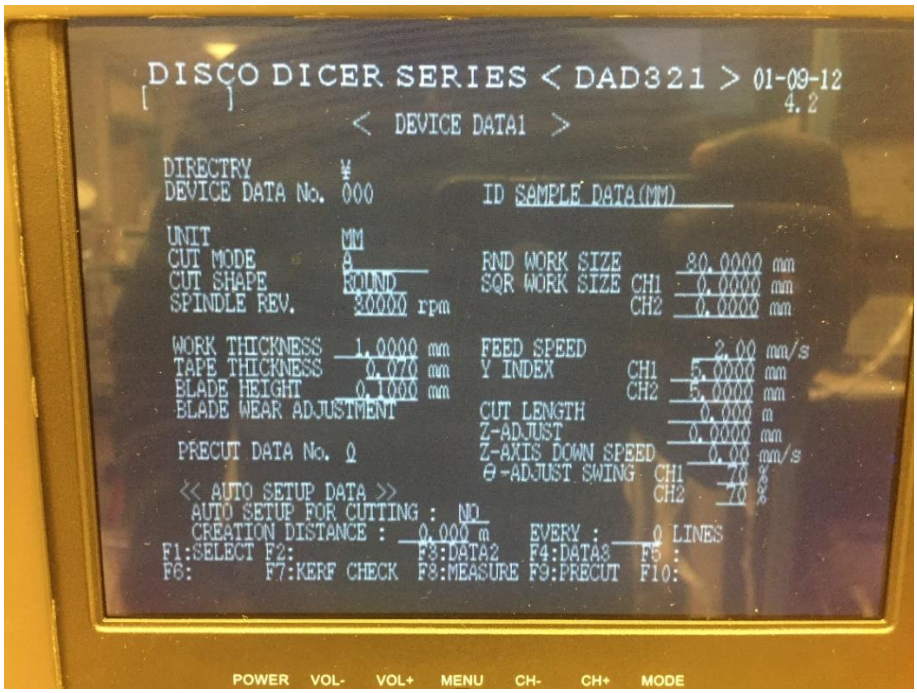




7. Press the **DEVICE DATA** button to program the cutting parameters. Note that the machine saves the previous user's cutting parameters, so be sure to double check all relevant parameters.
8. Use the arrow keys to select the first option in the Units menu. Press the **ENTER** button to select the metric **MM** option. All parameters will then be entered in metric.



9. Used the arrow keys to navigate to the parameters you want to change. Press **CE** to clear the current value, enter the new value, and then press **ENTER**. A '*Data Updated*' message will appear at the bottom of the LCD.



NOTE: Make sure you have the correct CUT SHAPE. ROUND is for wafers and SQUARE is for small pieces. Press F1 to switch between ROUND and SQUARE.

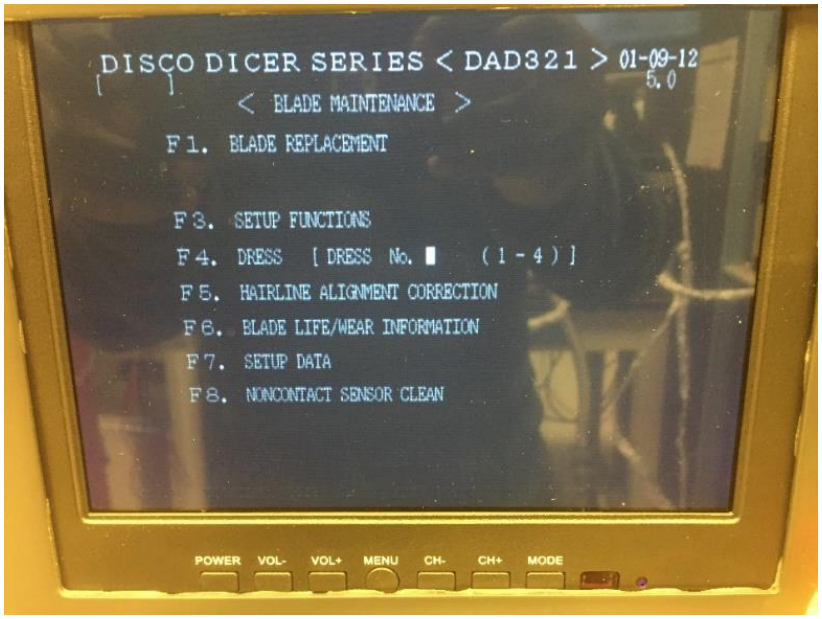
Parameter	Description	Usual Value
Cut Mode	Specifies how the rotation before cutting second index	A - 90°; *Other cut modes exist for other angles*
Cut Shape	Shape of sample to be cut. It can be a whole wafer or small pieces.	Round – a whole wafer Square – for oddly shaped samples You can switch between round and square by pressing **F1**
Spindle Revolution	Spindle speed of the blade.	30,000 rpm
Work Thickness	Sample thickness – change this number if your sample is thicker than 1mm.	1 mm
Tape Thickness	Thickness of blue tape	0.07 mm
Blade Height	Thickness of sample + film left over after cutting	Usually 0.1 mm Increase this number if your **Work Thickness** is greater than 1.5 mm
Work Size	Dimension of sample	Diameter for round wafer XY dimensions for other shapes
Feed Speed	Speed wafer is fed into the saw	2 mm/sec
Y Index	Dimensions of the pieces the sample will be cut into	Channel 1 – sample specific Channel 2 – sample specific

Note: Amount of Si left after cutting = Blade Height - Tape Thickness

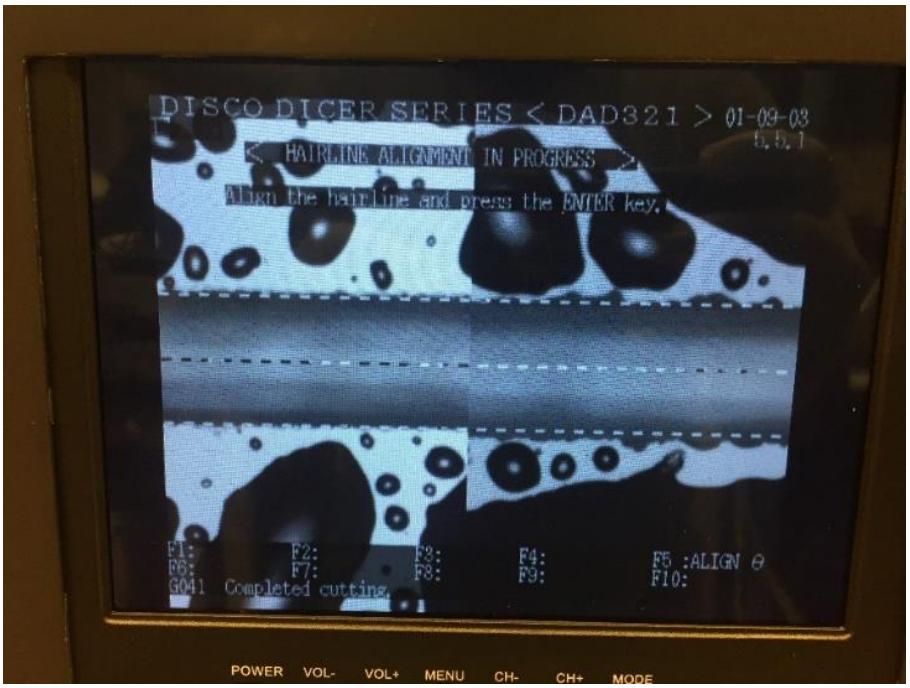
10. Press **EXIT** **2 times** to return to the main menu and then press **SPINDL**. The blade will start to spin. When the blade is at speed, a '*Spindle On*' message will appear at the bottom of the screen.
11. Press **Set UP**. This performs the chuck zero operation which will calibrate for the saw's distance from the stage. The system will prompt you to press the **ENTER** button twice more to confirm that set up is about to begin. Once done, a '*Setup Completed*' message will appear at the bottom of the screen.

It is important to do a test cut to get an outline of the blade cutline. This tells you how wide the cut will be and this cutline can be aligned to your actual sample.

12. Load a dummy sample and then press the **C/TVAC** button.
13. Press **F5** on the keypad for **BLADE MAINTENCE**. Then press **F5** again for **HAIRLINE CORRECTION**.



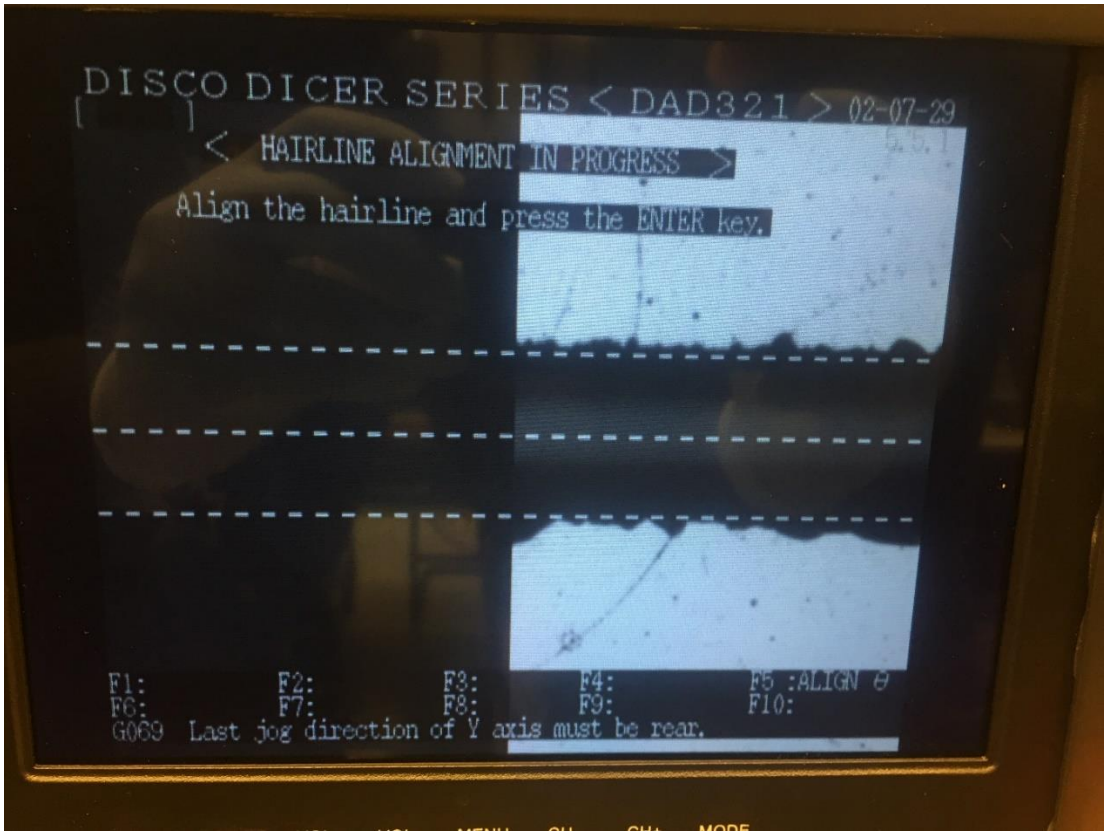
14. Press **START** and a test cut will be performed on the sample.
15. Use the **HAIR WIDE** or **HAIR NARROW** buttons to widen or narrow outline on screen.



16. You can adjust the focus of the image on screen using the knob on the side of the dicing saw. You can also adjust the brightness and contrast on the image with knob on the side of the screen

17. Once a satisfying outline of the cut is gotten, press the **ENTER** button. Then press **EXIT** **2 times** to return to the main menu.

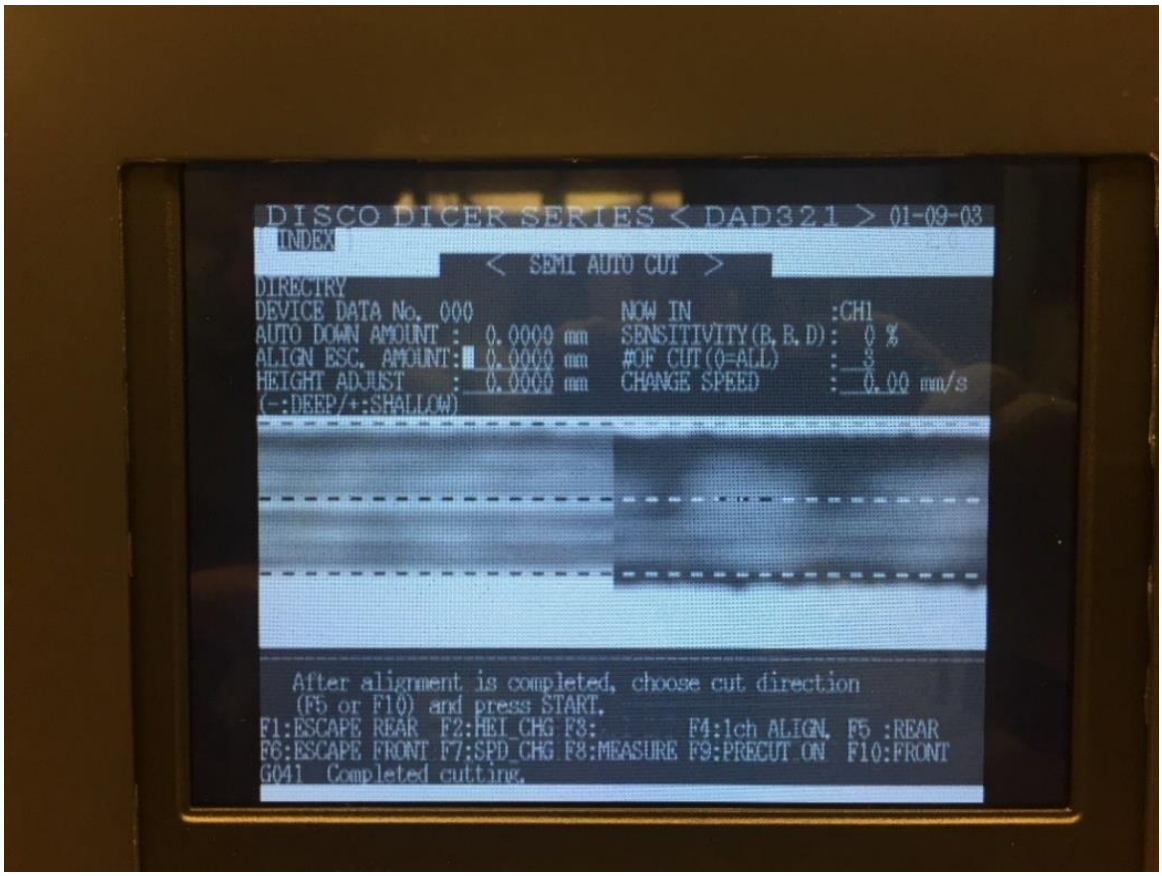
NOTE: Sometimes you might get a message on the screen that says, 'Last Jog Direction of Y axis Must Be Rear'. This means that the last movement of the camera and blade assembly must be away from you. So, Press ^ Y and press ENTER again.



18. Release the vacuum by pressing the **C/T VAC** button and then unload the dummy sample.
19. Load your sample and press the **C/T VAC** button again to turn on the vacuum.
20. Press **F2** to select the **SEMIAUTO CUT** option on the main menu.

NOTE: Semiauto cut is a mode that cuts the sample the number of times specified in the # OF CUTS parameter. This parameter is accessible once you are in the Semiauto cut menu. Setting # of Cuts to 1 means the dicing saw cuts only once, however, setting it to 2 or more means the saw will make the first cut, move back or forward by the Y Index parameter and make the second cut and so on. NEVER LEAVE CUT COUNT AT 0. ALWAYS MAKE SURE THAT CUT COUNT IS AT LEAST 1.

21. Once in the semiauto cut menu, you can set the **# of Cuts** parameter by pressing **CE** to clear the current value, entering the new value, and then pressing **ENTER** to confirm.



22. Adjust the angular offset between the cutline and a flat part of the sample using the two **θ** rotation buttons. Don't hold down the buttons since they rotate the sample by a lot if you do so.
23. Move along the xy-axes by using the **< X, X >, ^ Y, Y ˅** buttons. This is to make sure the cutline is aligned parallel to the flat part of your sample.

24. Once done, select the direction of the cut by pressing **F5** or **F10**
    a. **F5** – a cut is made; blade moves back (away from you) by Y INDEX parameter then cuts again
    b. **F10** – a cut is made; the blade moves forward (toward you) by Y INDEX parameter then cuts again
25. Press the **START** button to begin cutting.
26. Once cutting is finished, press the **ALRMCLR** button to clear the alarm. The alarm signifies that the cutting is finished.

Depending on the # of CUTS you entered, the saw will cut that many times and then stop. Once the saw has reached the maximum dimension of the sample that was entered in the Work Size parameter, it will rotate by 90°. When the stage rotates, skip Step 28. If it doesn't, do Step 28.

27. To rotate the sample 90 °, press the **INDEX** button and then the θ button to rotate counterclockwise.
28. Find the new place you want to cut and repeat steps 25-27.
29. When finished, press **EXIT** and then press **CT/VAC** to release the sample.
30. Remove the sample and then press **SPINDL** to stop the blade.
31. Turn the machine off and remove the key.
32. Close the water and air valves by the wall.
33. Return the key to the key box and sign it back in.