MicroAutomation Dicing Saw

Startup:

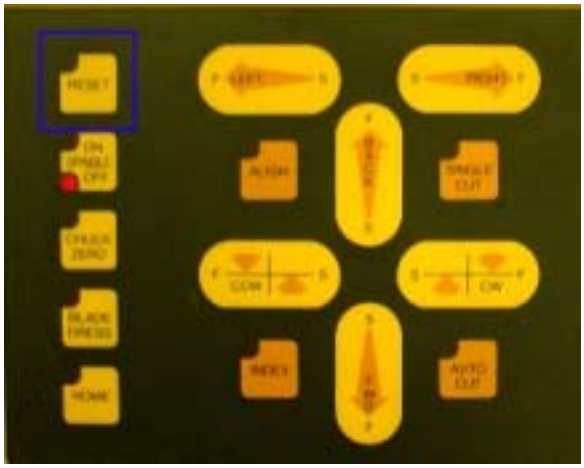
- Turn on the compressed air and set the pressure to 80PSI
  - The compressed air is critically required for the motor, failure to supply the proper pressure will cause thousands of dollars in damage to the machine

- Turn on the cooling water
  - In Room 108A next door, it is the one with the green handle

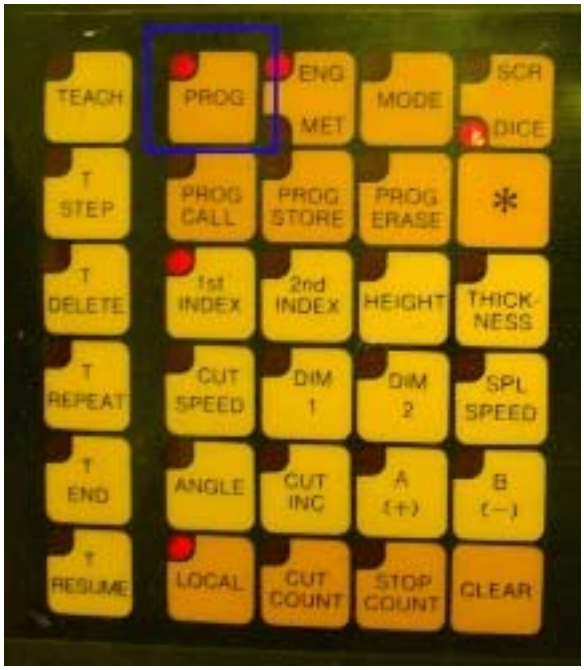
- Plug in the vacuum pump

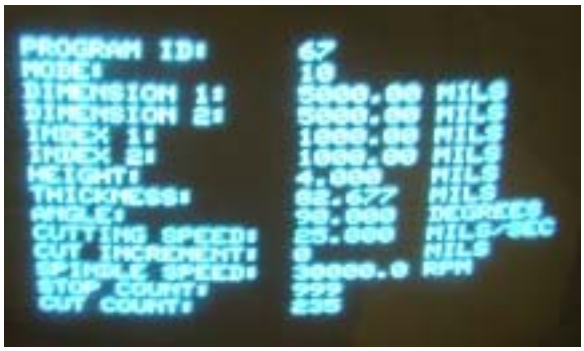
- Turn on the machine by twisting the red power switch

- Press the reset button



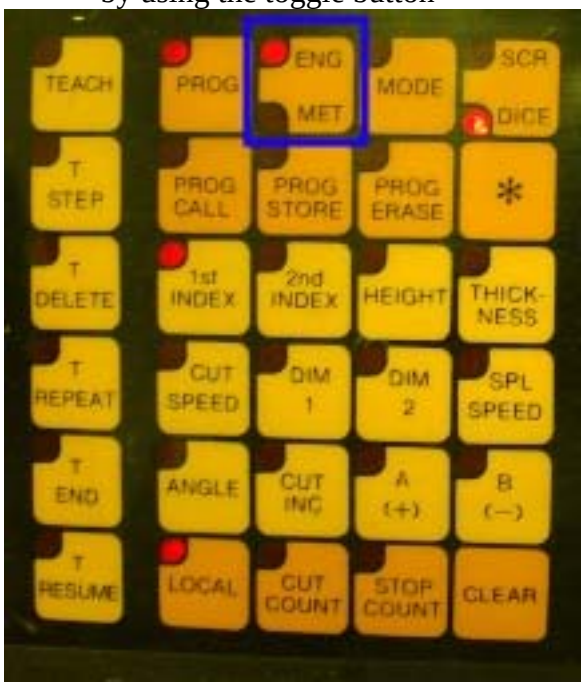
- Press the program key and set the parameters for your cuts
  - The spindle speed should always be set to 30000RPM



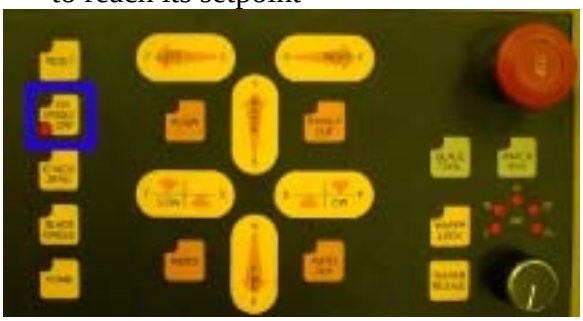


- *<u>Program Parameters</u>*
- *Program ID:* The saved program number
- *Mode: 10* Recommended default value
- *Dimension 1:* Length of substrate to be cut
- *Dimension 2:* Width of substrate to be cut
- *Index 1:* Length of final die size
- *Index 2:* Width of final die size
- *Height:* Distance between the bottom of the blade and top of the chuck during the cut
- *Thickness:* Total height of substrate plus tape multiplied by 3
- *Angle:* Desired rotation between Index 1 and Index 2
- *Cutting Speed:* Feed rate of substrate beneath the blade
- *Cut increment: 0* Recommended default value
- *Spindle Speed: 30000* Recommended default value
- *Stop Count: 999* Recommended default value
- *Cut Count: 235* Recommended default value

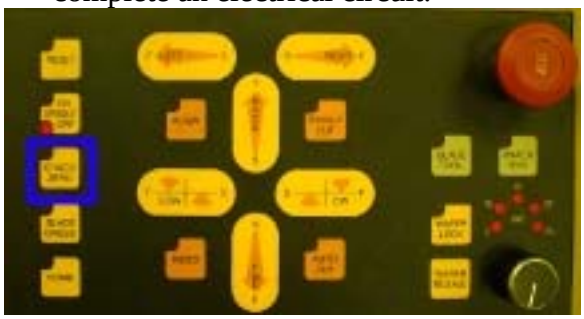
- You can switch between English and Metric units while looking at the program screen by using the toggle button



- Press the spindle on key to start the motor
  - It will take a few minutes for the spindle to reach its setpoint



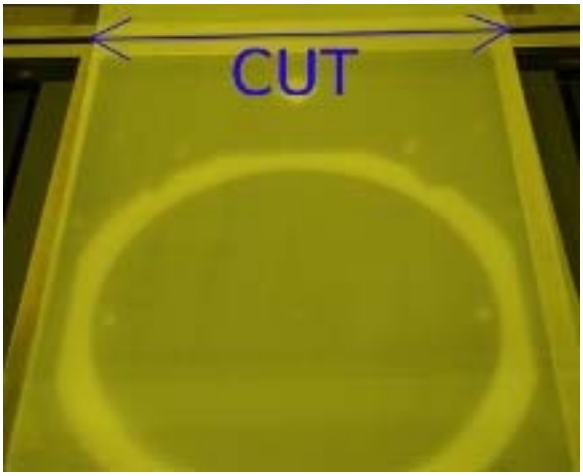
- Press the Chuck Zero key.
  - You will be asked if you are using a porous chuck, answer it by choosing the key corresponding to the correct response
  - The blade will then move to come into close proximity to the chuck and complete an electrical circuit.



Loading a sample:

- Place a frame on the mounting table aligning the notches to the pins

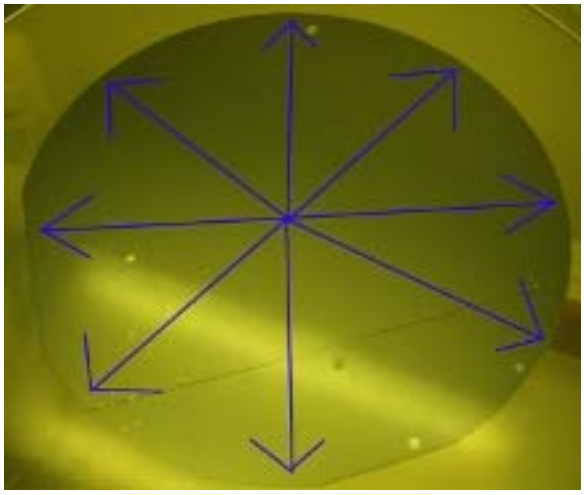
- Pull the tape down over the frame and cut it with a razor blade



- Roll over the tape with the blue roller a couple of times

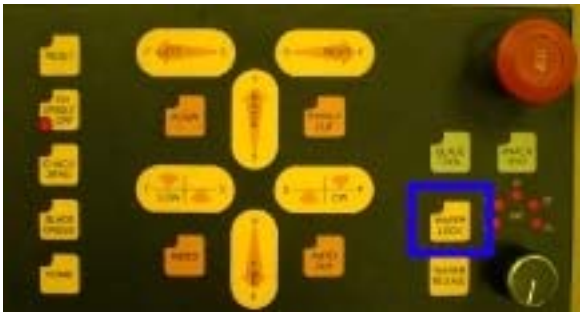
- Stretch the tape tight over the frame this will help reduce vibrations during the cut. lower the risk of breaking the blade, and provide a cleaner cut edge

- Place your sample on the tape roughly aligning your desired first cut direction parallel to the two notches on the frame
  - Work large air bubbles out by lightly pressing on the back of the wafer and moving radially outwards. You won't be able to eliminate all of them in a reasonable amount of time.

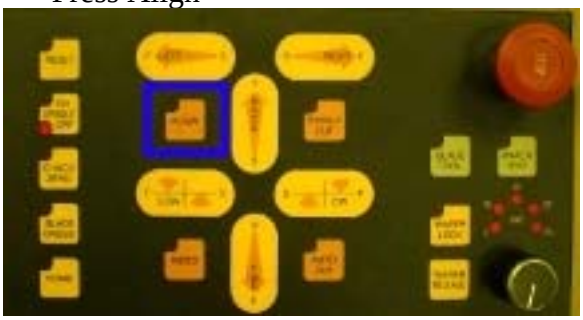


- Align the notches in the frame to the two pins on the right side of the chuck.
  - Be very careful placing the frame on the chuck, it is possible to break the blade and injure yourself

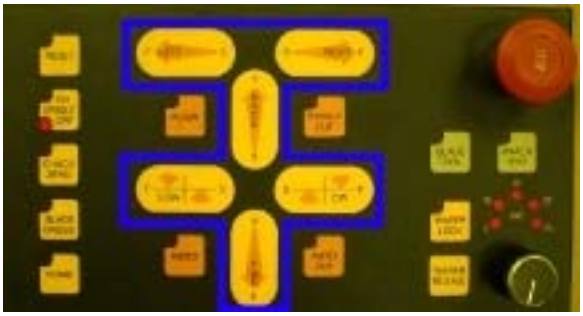
- Press the Wafer Lock key to pull vacuum on the chuck



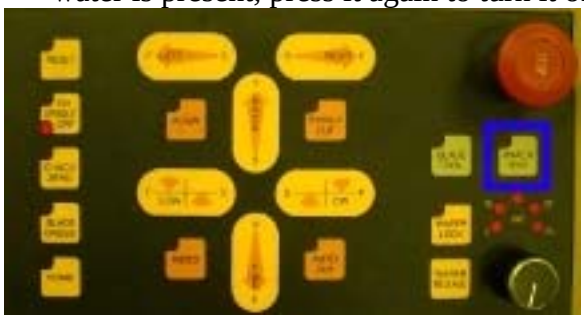
- Press Align



- Move the chuck and blade using the direction keys until your dicing alleys are lined up between the horizontal bars on the monitor.

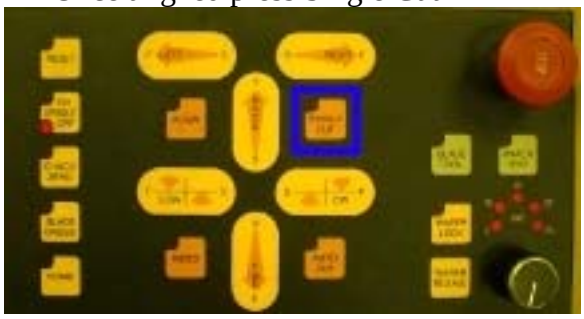


- Press Water Test once to verify cooling water is present, press it again to turn it off

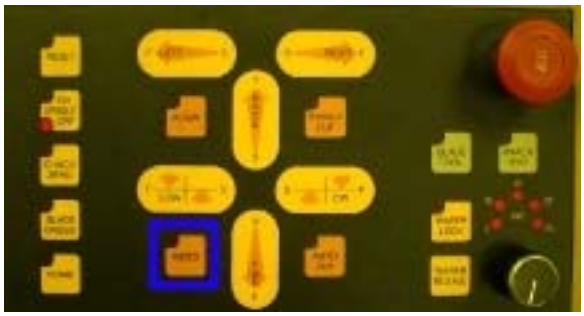


Running a process:

- Once aligned press Single Cut



- Press Index to allow the blade to move directly to your next dicing alley and press forward or backward to move the blade



  - When properly programmed the next alley should line up within the horizontal bars on the monitor

- When all of the cuts are made in the first direction press the counter clockwise key to align for the second direction's cuts

- Press Align and then use the direction keys to line up your dicing alleys within the horizontal bars on the monitor

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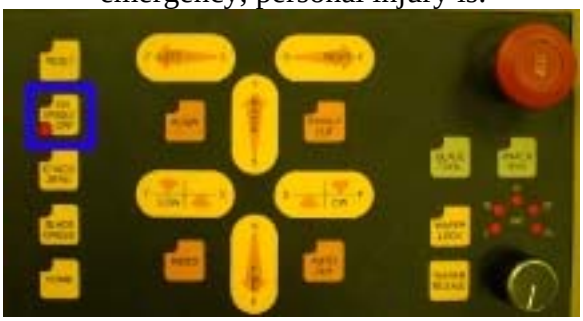
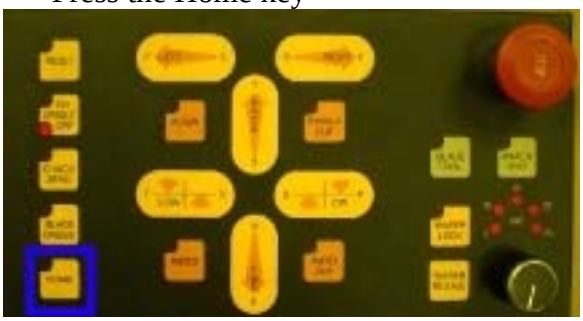
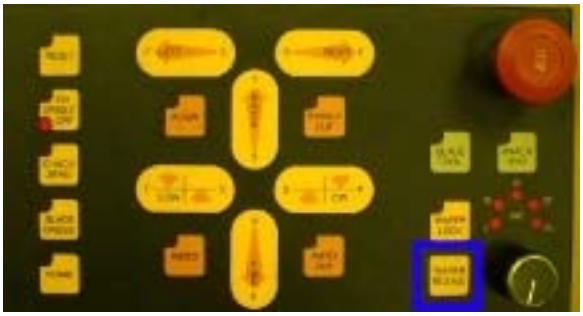
- Press Spindle Off when all of the dicing is complete
  - Only during an ***emergency*** should the red power switch be used to power off the spindle. Ruining your sample is not an emergency, personal injury is.



- Press the Home key



- Press wafer relase to remove vacuum from the chuck and remove the frame



- Once the spindle has come to a stop the red power switch may be used to turn off the machine

- Turn off the compressed air, cooling water, and unplug the vacuum pump

Process Parameters

- Silicon and glass, 400 micron nominal thickness
  - Spindle speed: 30,000RPM
  - Cutting speed: 50 mils/s
  - Thickness: 40 mils
  - Height: Dependent on tape thickness but 4 mils is safe

- Ultem, requires two layers of tape and a progressive cut
  - Spindle speed: 30,000RPM
  - Cutting speed: 50 mils/s
  - Thickness: 120 mils
  - Height for 1st cut: 25 mils
  - Height for 2nd cut: 4.4 mils