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

- 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

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**Program Parameters**
- **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
- 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.

Running a process:
- Press Water Test once to verify cooling water is present, press it again to turn it off
- 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
- 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 release 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

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**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