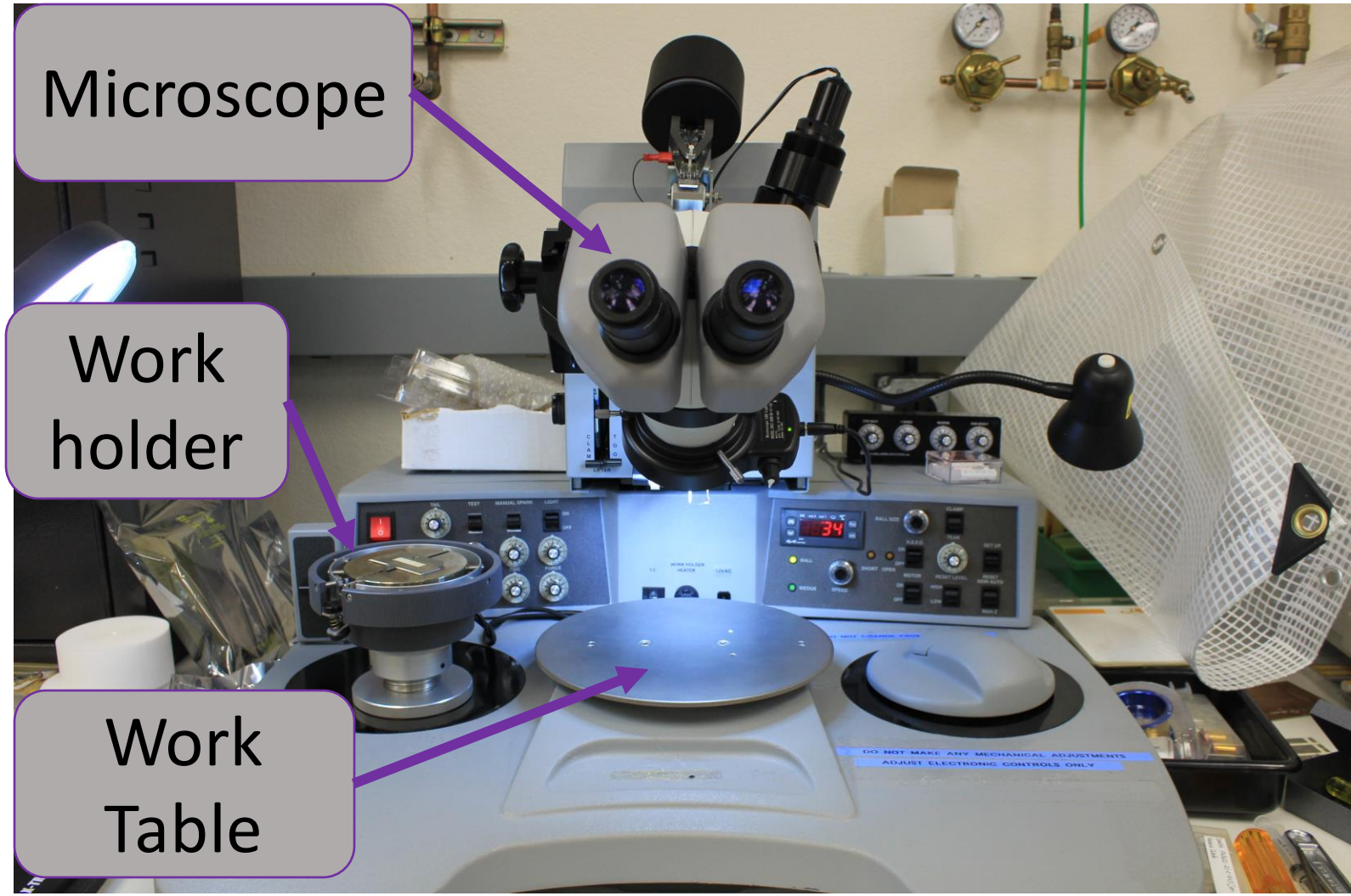
KS Semiautomatic Ball Bonder SOP

Initial Systems Check and Setup

1. Examine the ball bonder for any signs of damage or tampering.



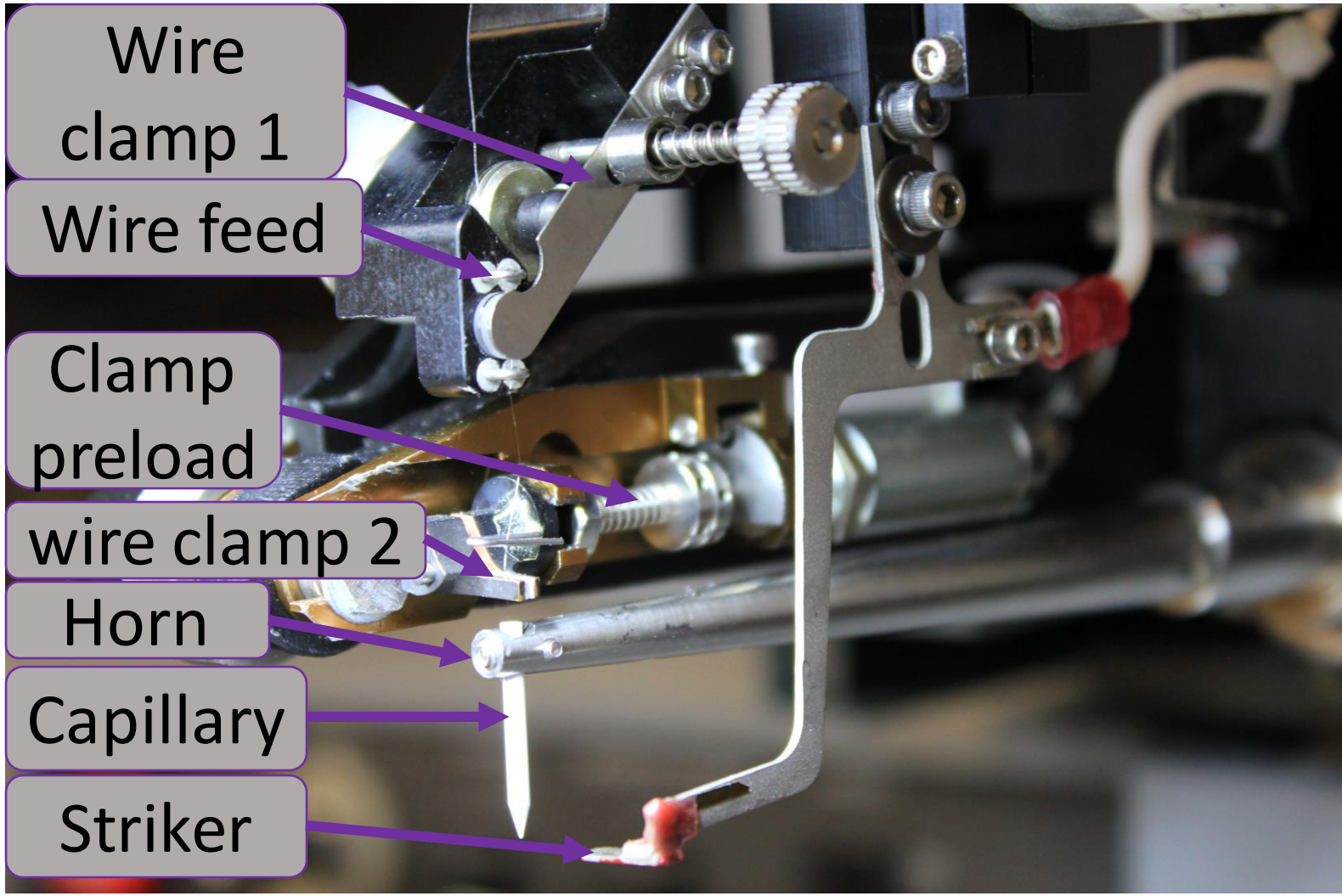
Initial Systems Check and Setup

3. Check the wire guide, and wire feed for any wire kinks…

If there are kinks, you will have trouble bonding. Kinks typically occur due to the preload being set incorrectly, or failed balls.

4. The capillary should be sharp, and clean, and have a well defined point.

5. The cappillary should be firmly fixed in the horn.

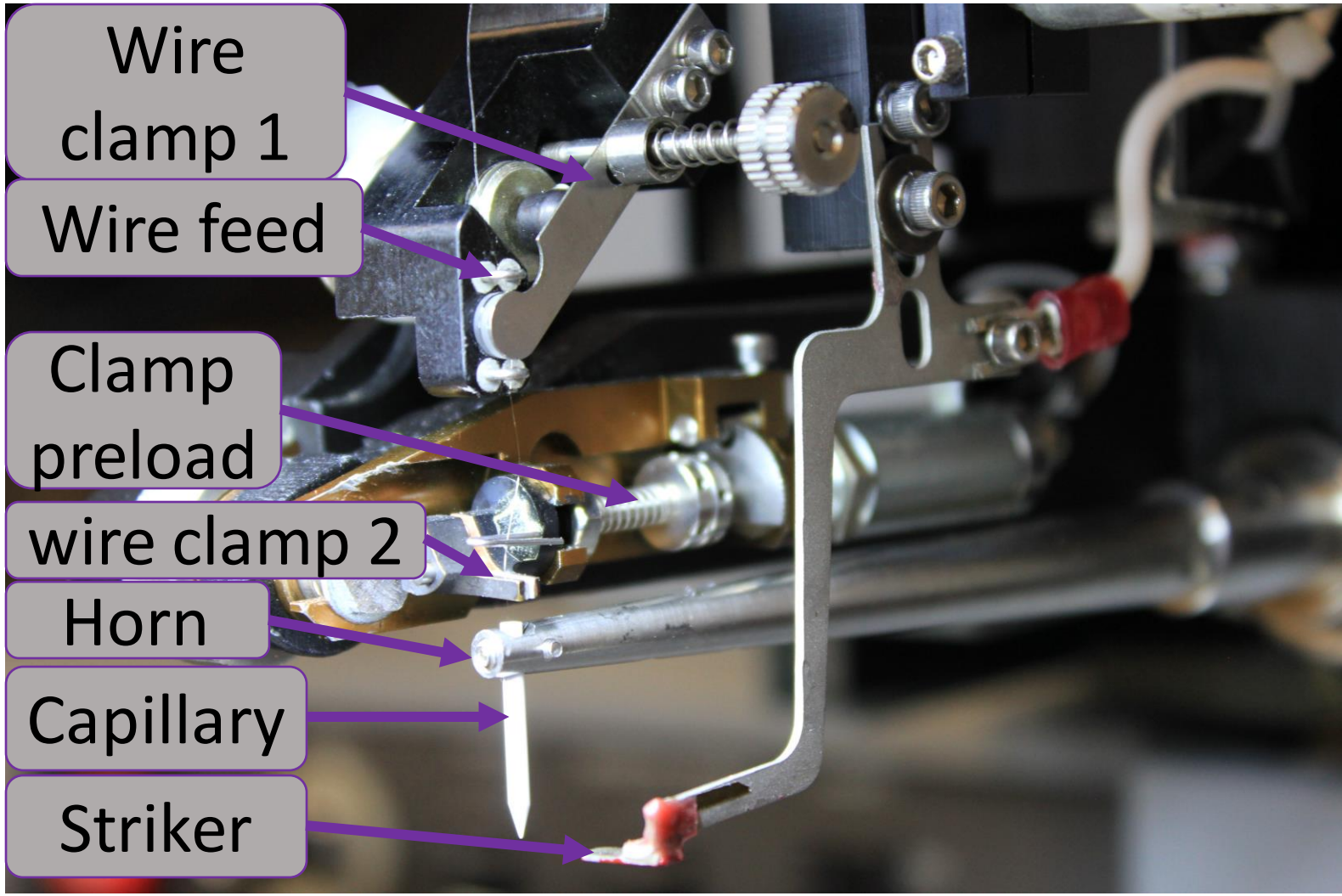


Initial Systems Check and Setup

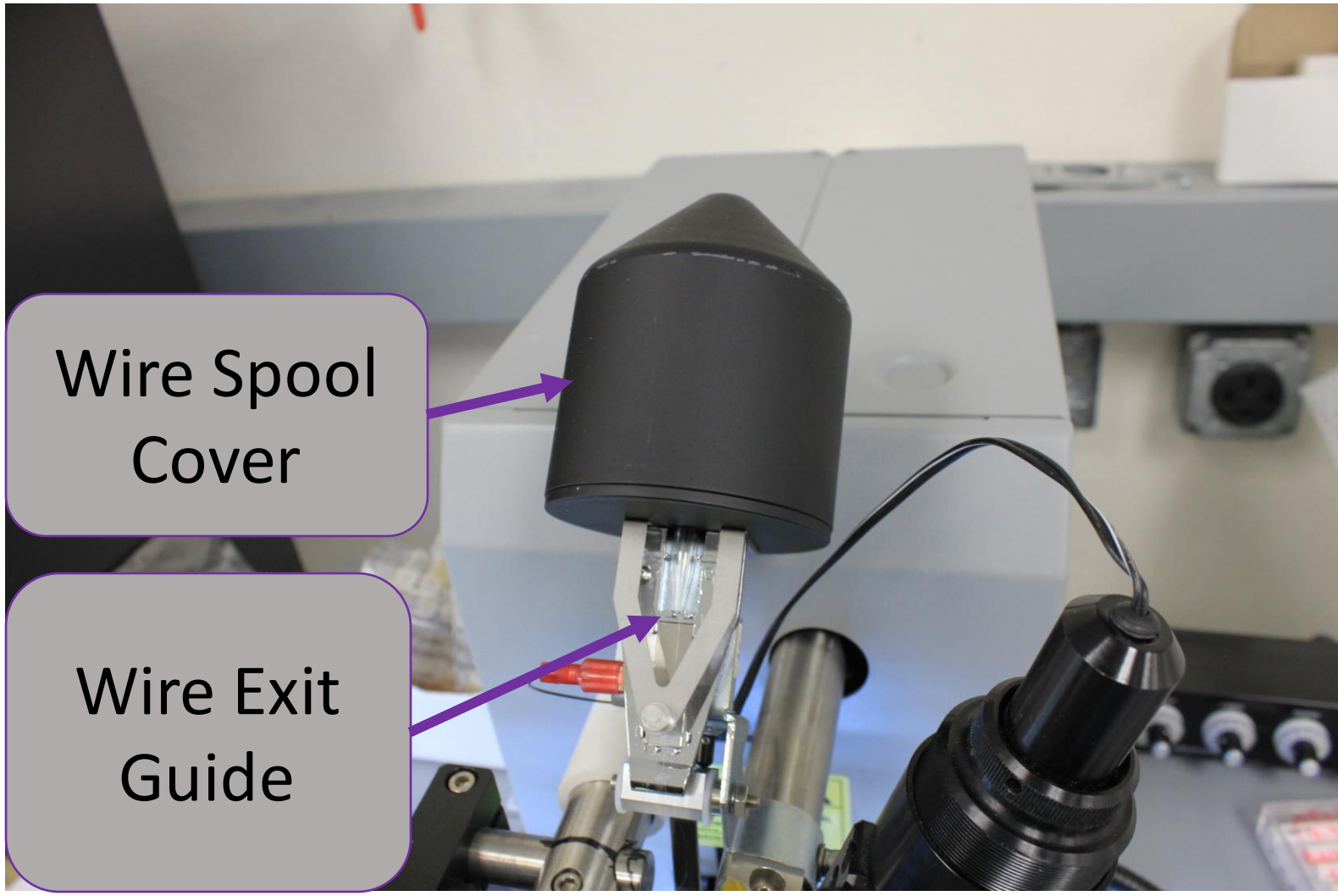
4. DO NOT TOUCH THE STRIKER! Check the striker for signs of damage visually

4. The capillary should be sharp, and clean, and have a well defined point.

5. The cappillary should be firmly fixed in the horn.

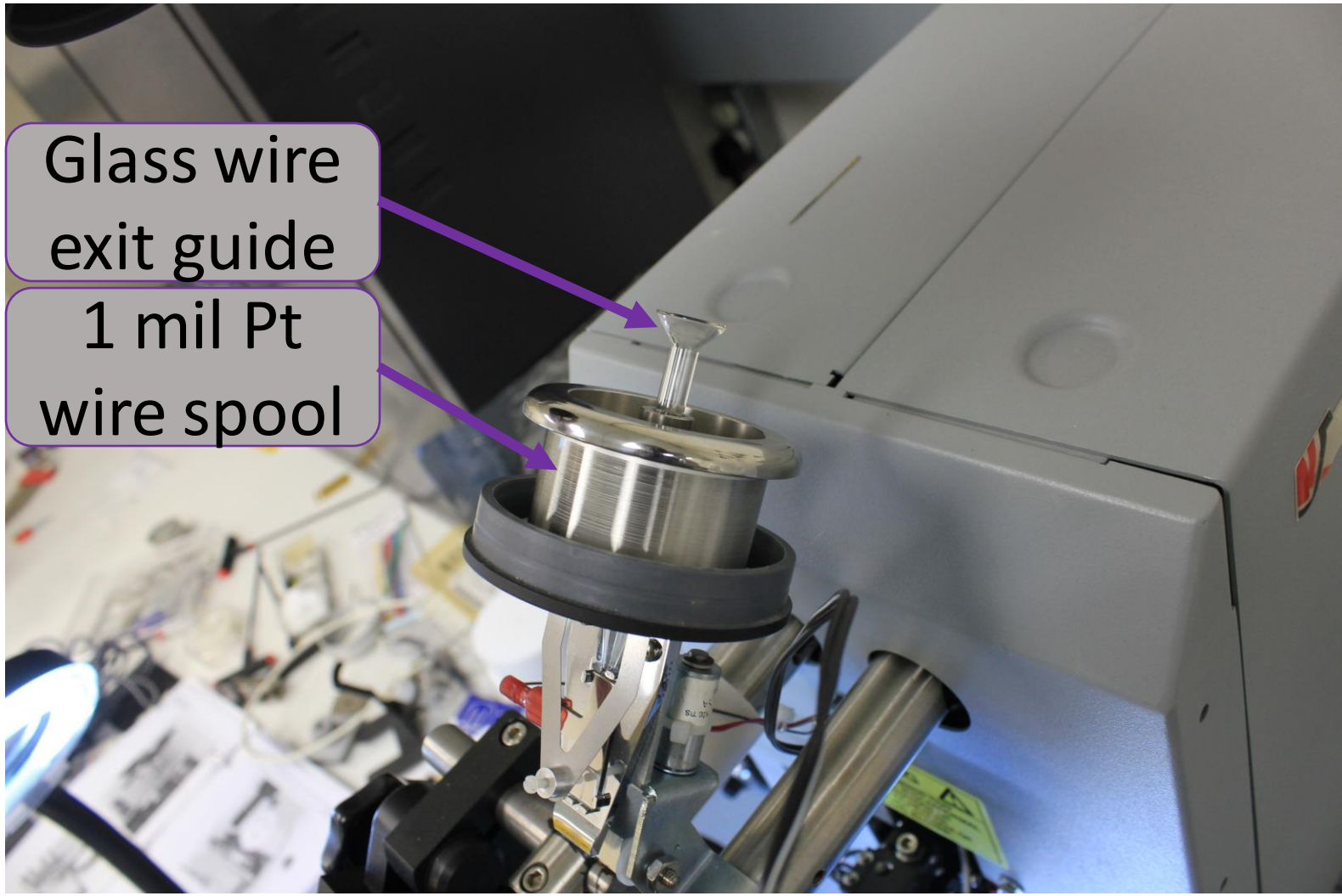


6. before you begin bonding or any other task, check under the wire spool cover to make sure there is wire on the machine.

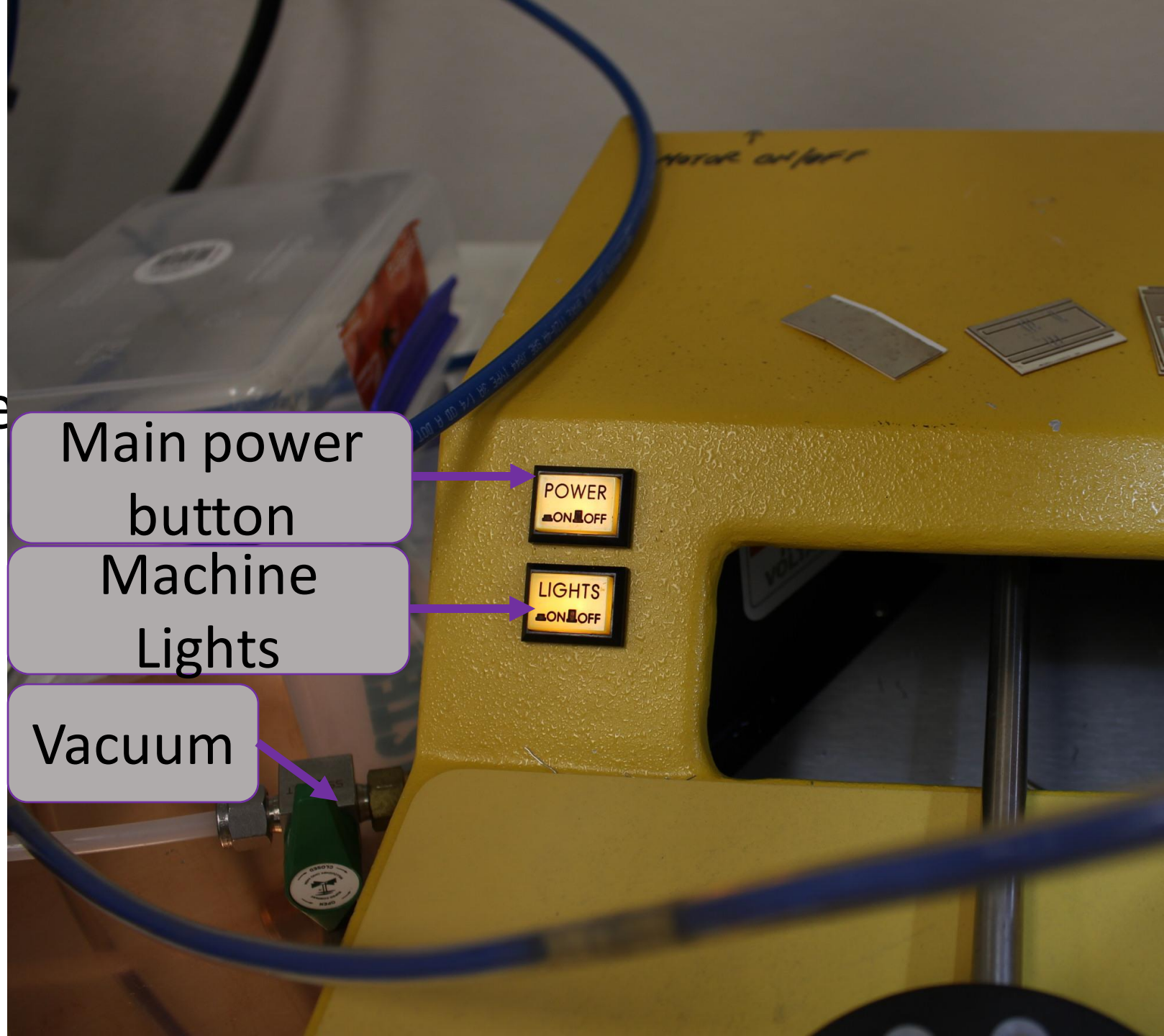


7. Before you begin bonding, check to see if there is wire loaded on the machine on the spool towards the back.

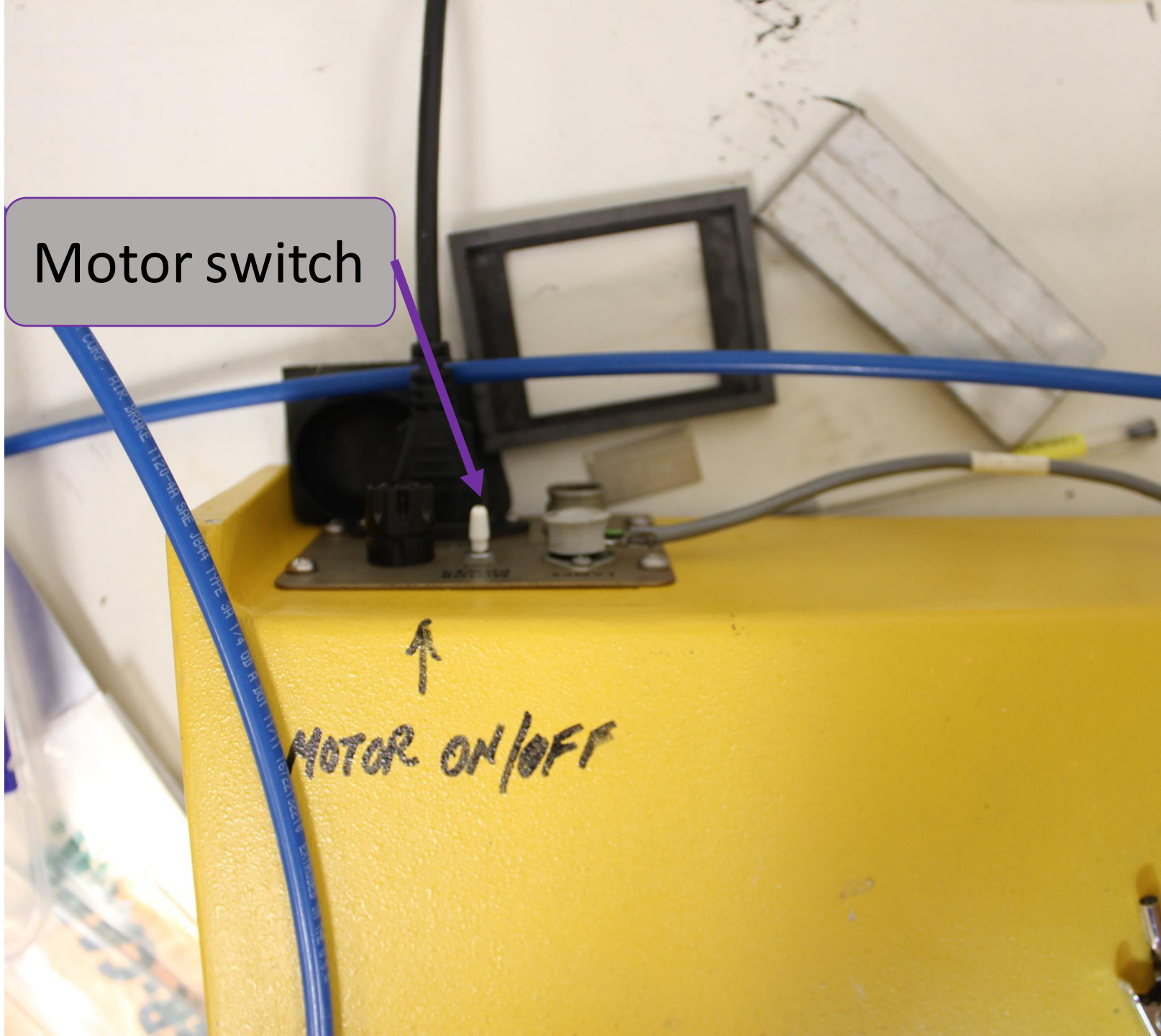
If there is no wire, you want a custom material selection, or the wire is low, contact HiDEC staff.



8.Once you are sure nothing is broken or otherwise out of working order, press the main power button and the machine lights button to let the machine start warming up.



9.Immediately after you have turned machine main power and lights on, turn on the motor. Allow the machine ~5-10 minutes to warm up.

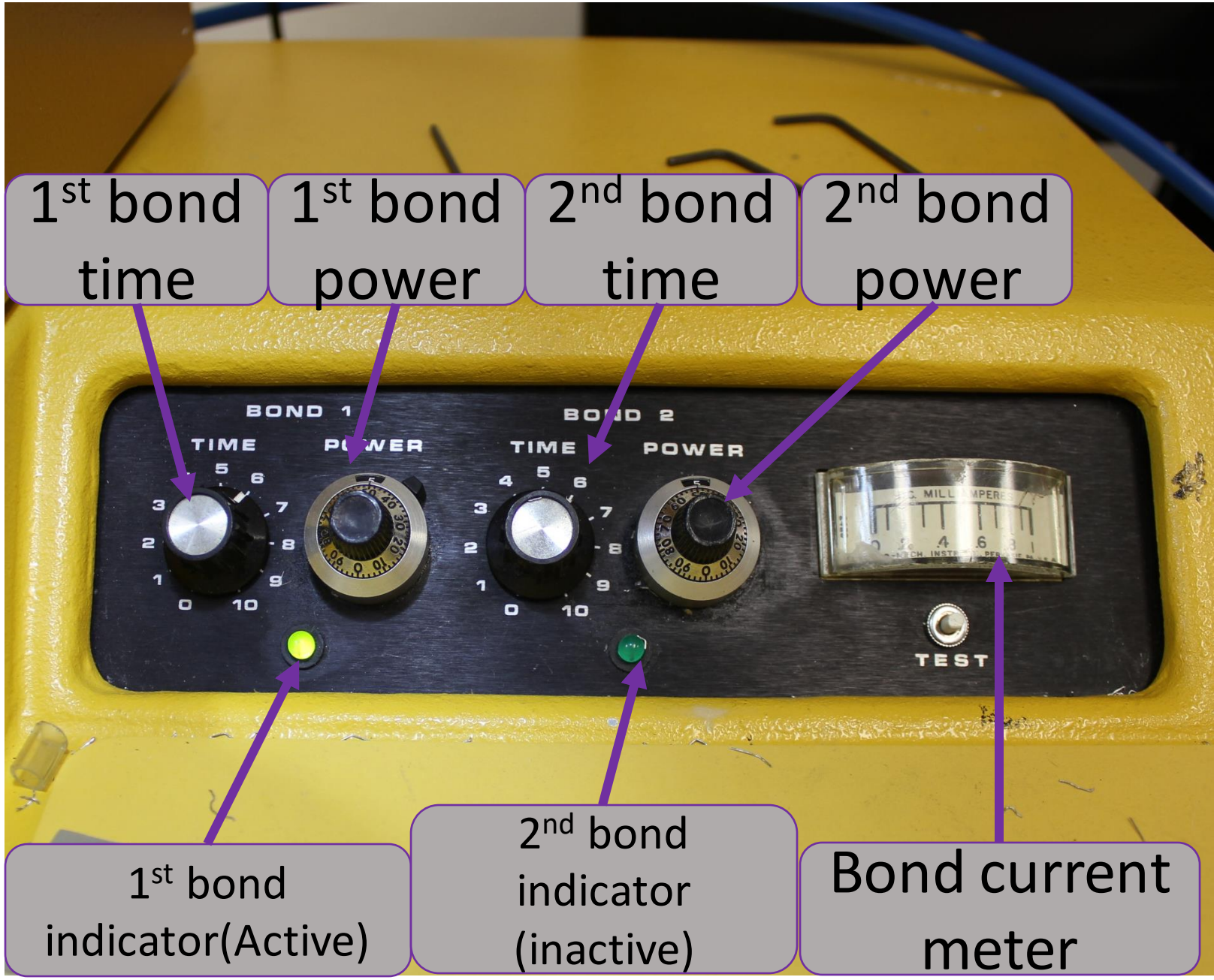


10.If you know the bond power and bond time required for your specific application, set those now.

The bond time knob controls the time, in tenths of a second, that the ultrasonic power will be applied to the wire for.

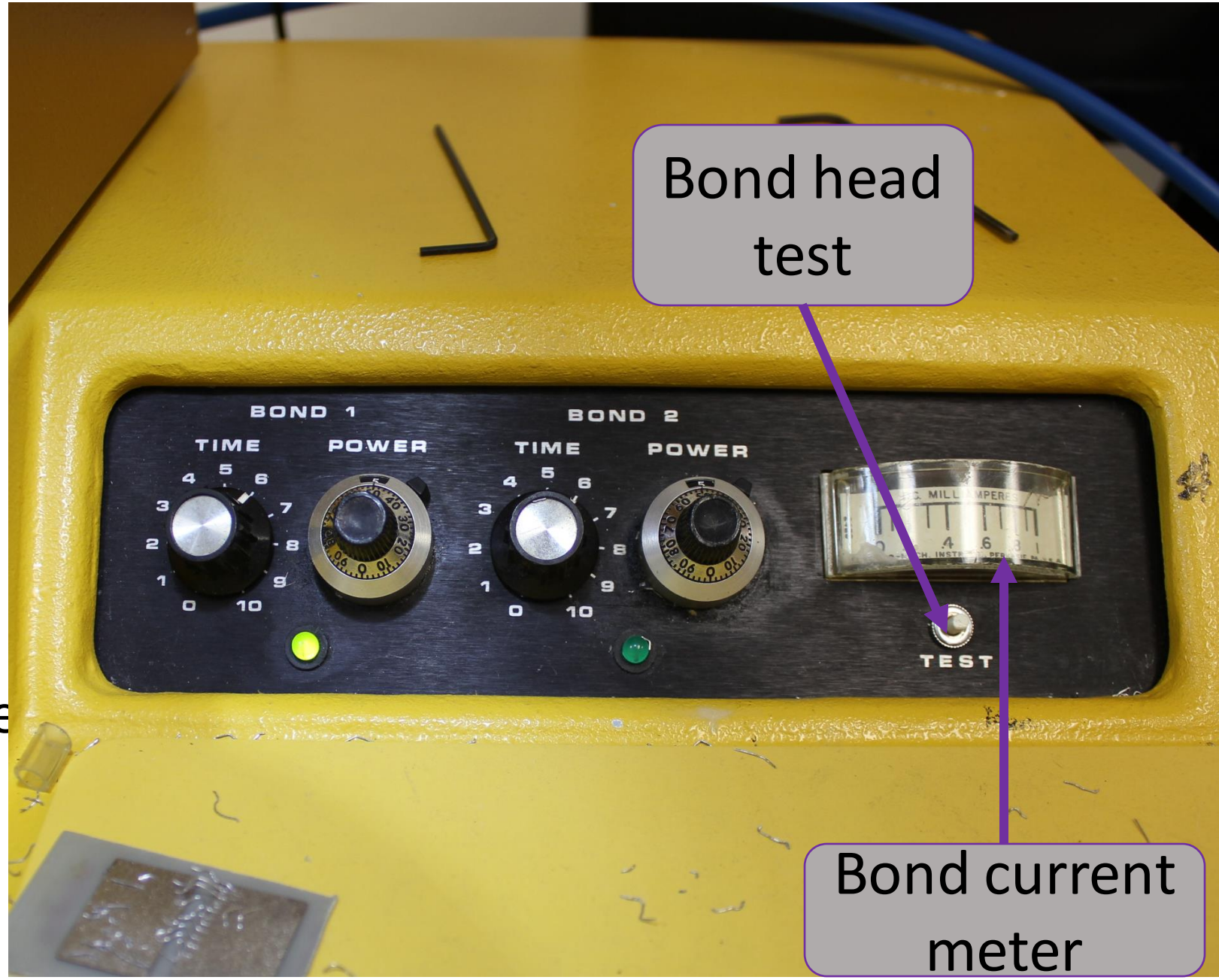
The bond power knob controls the power in milliwatts that is applied to the wire.

The bond indicator lights when you are on the step of the bonding process that is using the setting for the knobs above the indicator light.



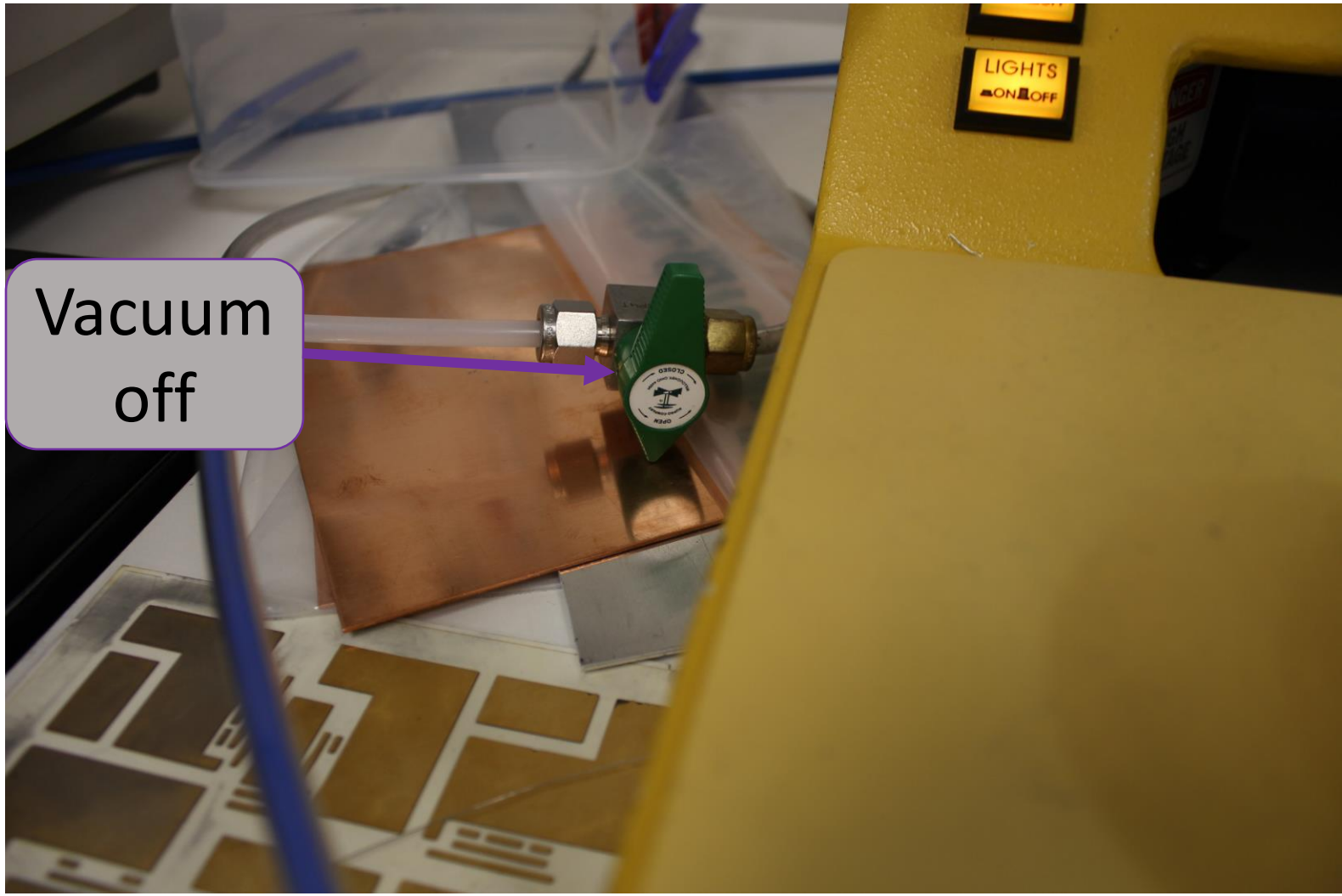
The current meter indicates how much current flows through the ultrasonic transducer during a bond. You can move to a bond by clicking the middle mouse button on the chessman, and then press the test button to see how much current is displayed, (briefly) on the meter.

If you know your appropriate bond current, you can tune for it using the test button and the bond meter.



11. Once you have set your time and power settings, turn on the vacuum to the work holder using the ball valve next to the machine.

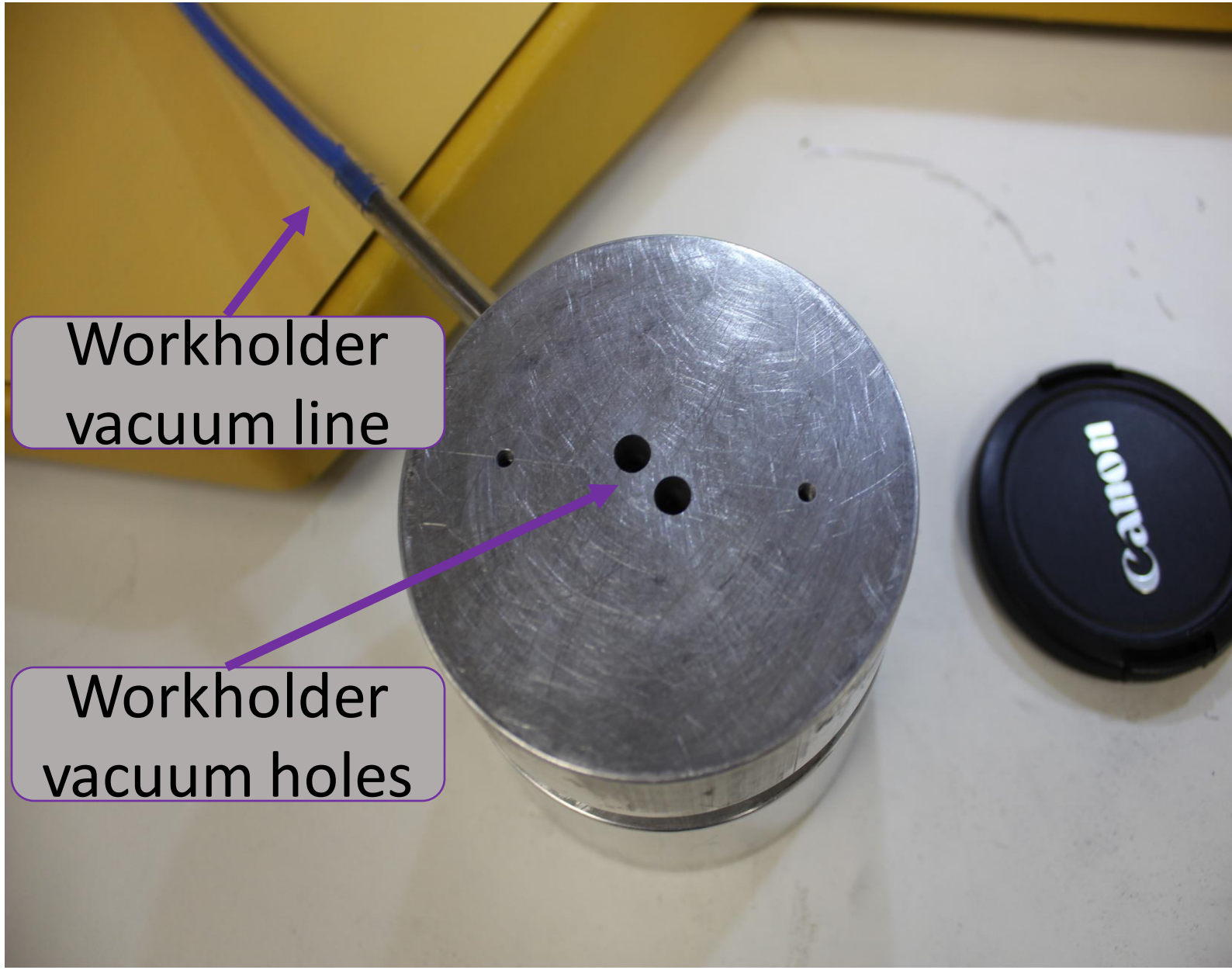
This will allow you to firmly secure your part to the work holder and prevent it from shifting under bonding loads.



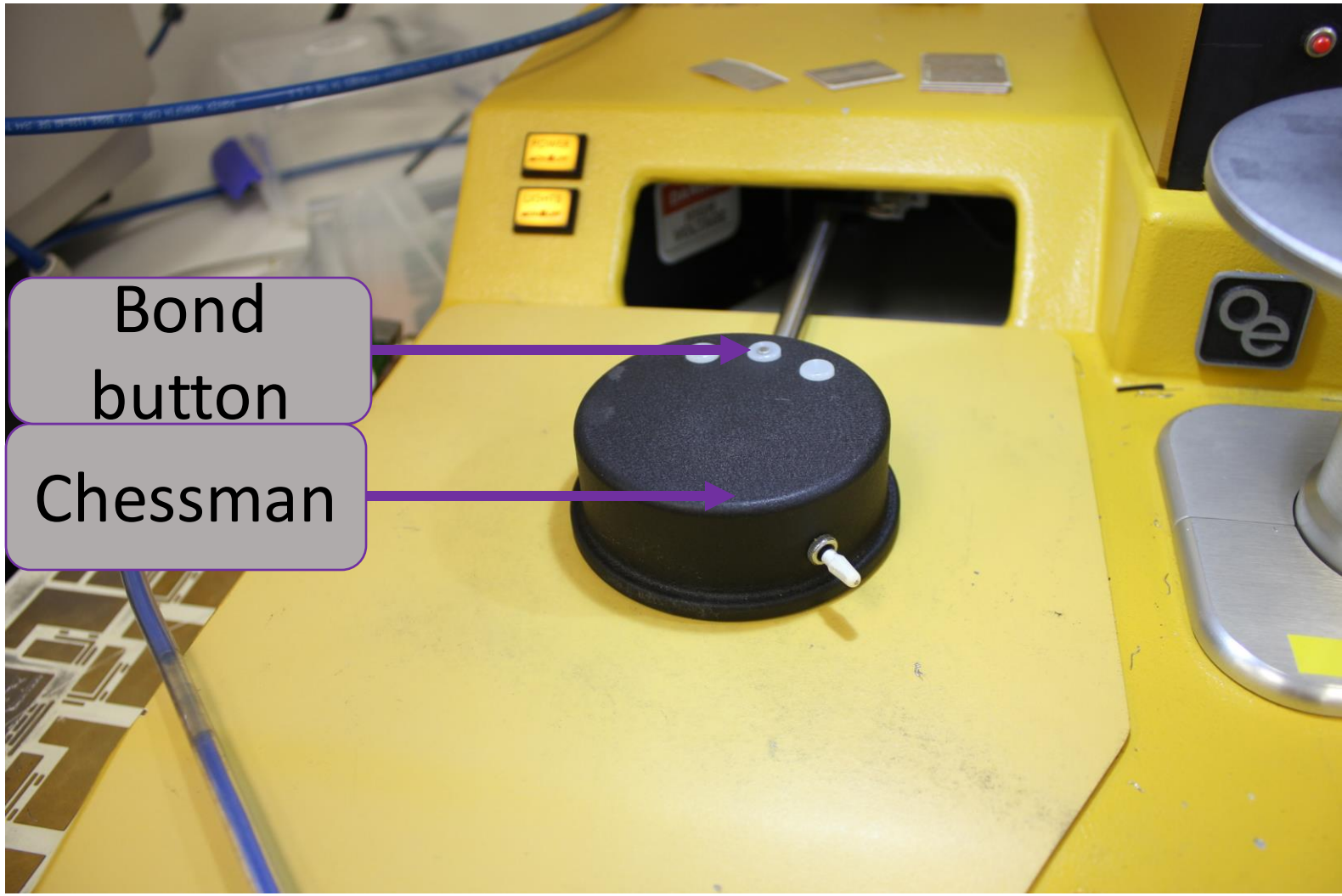
12. The workholder has holes on top near its center, these holes should make an audible hissing noise when the vacuum is turned on and should be silent when the vacuum is turned off.

You can place your part over these holes to allow the vacuum to hold your part in place.

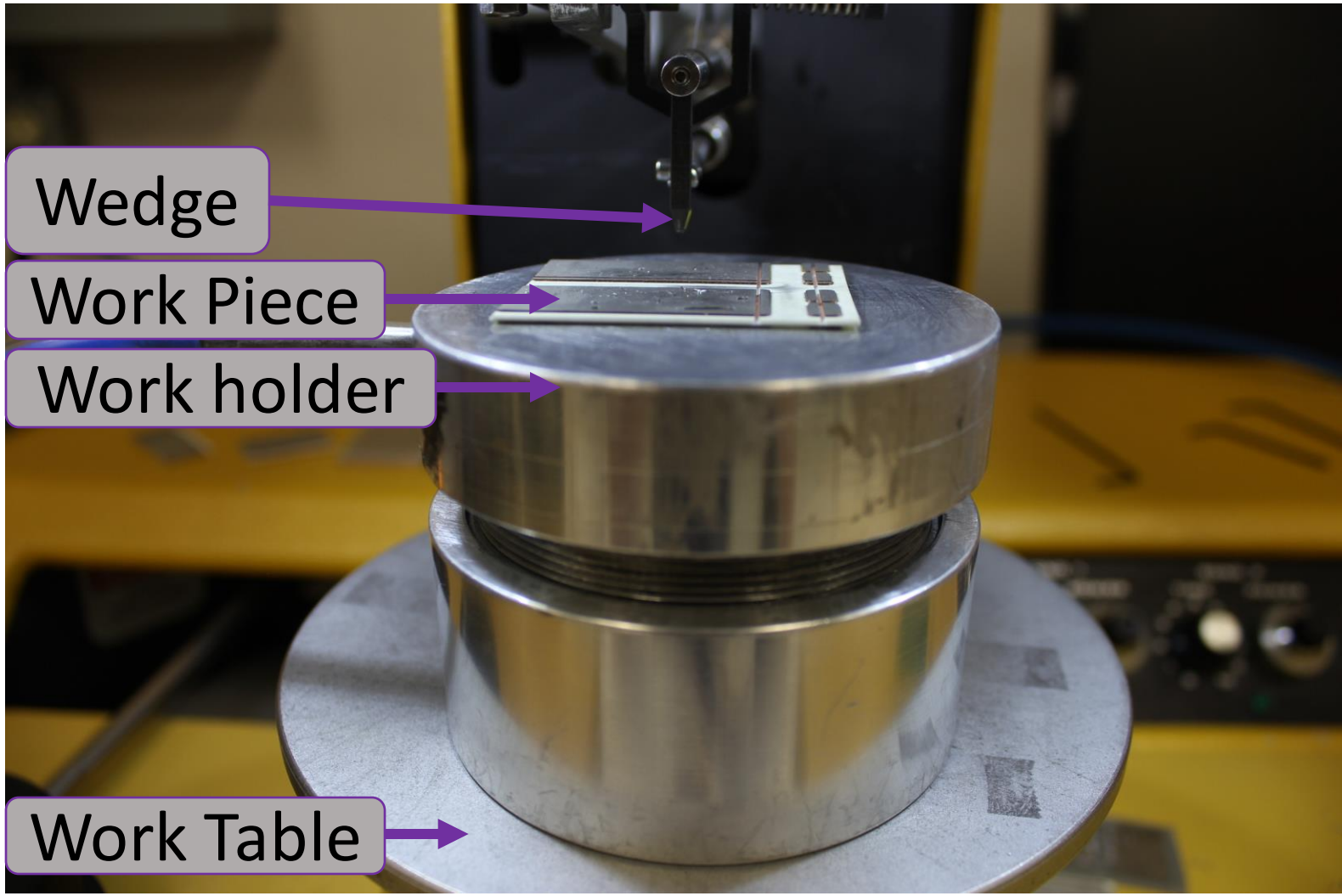
The work holder is also typically adjustable, by gently lifting it, and turning the base clockwise(to lower)/counterclockwise(to raise).



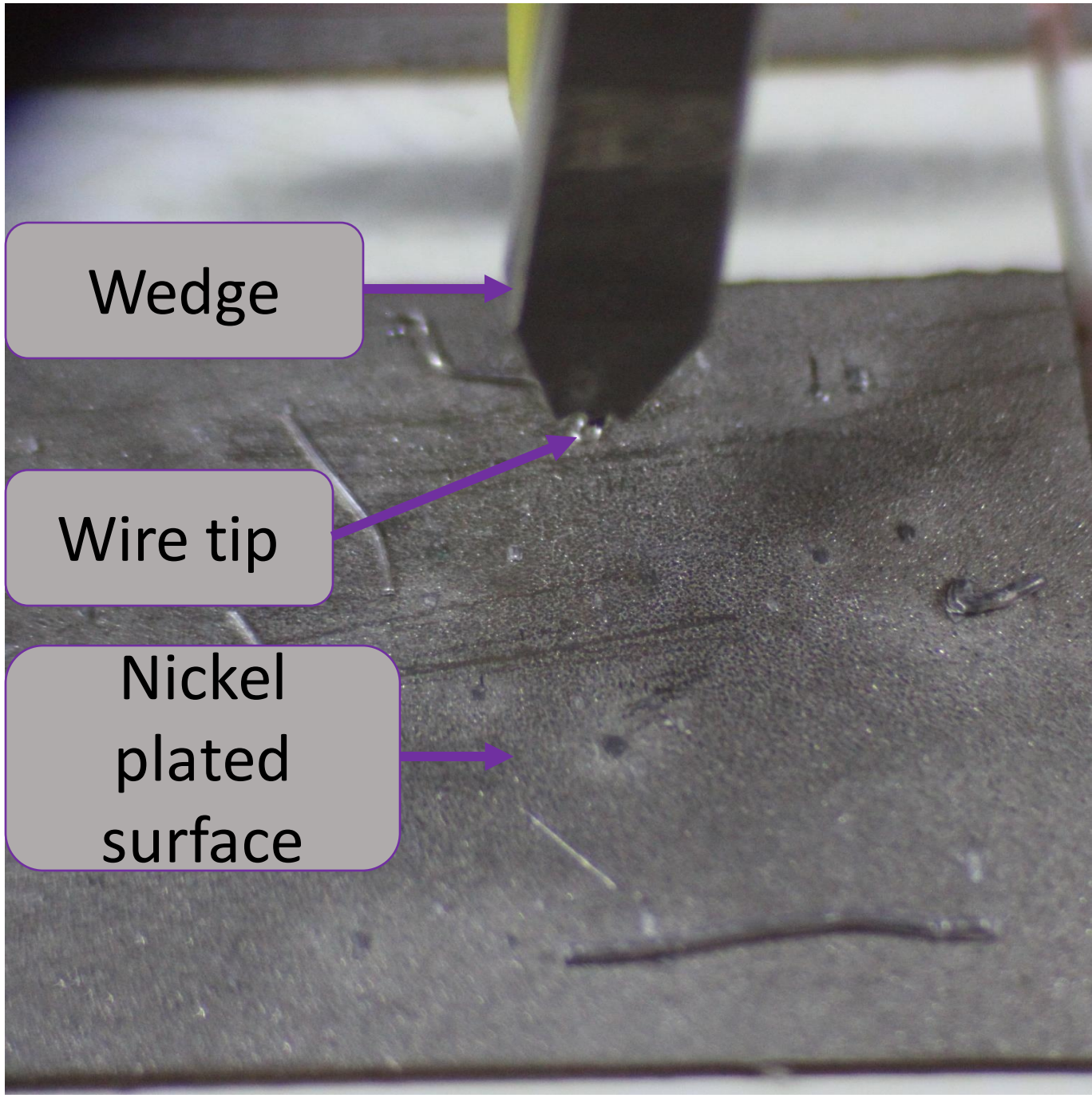
13. The mouse like object on the machine with a switch on its side and 3 buttons on top, is called a “chessman”. It is used for finely manipulating the position of the work stage, and the center button on top is for starting the bonding process.



14. After placing work piece on the work holder, place the work holder and work piece carefully onto the work table and do not hit the wedge as you do so!

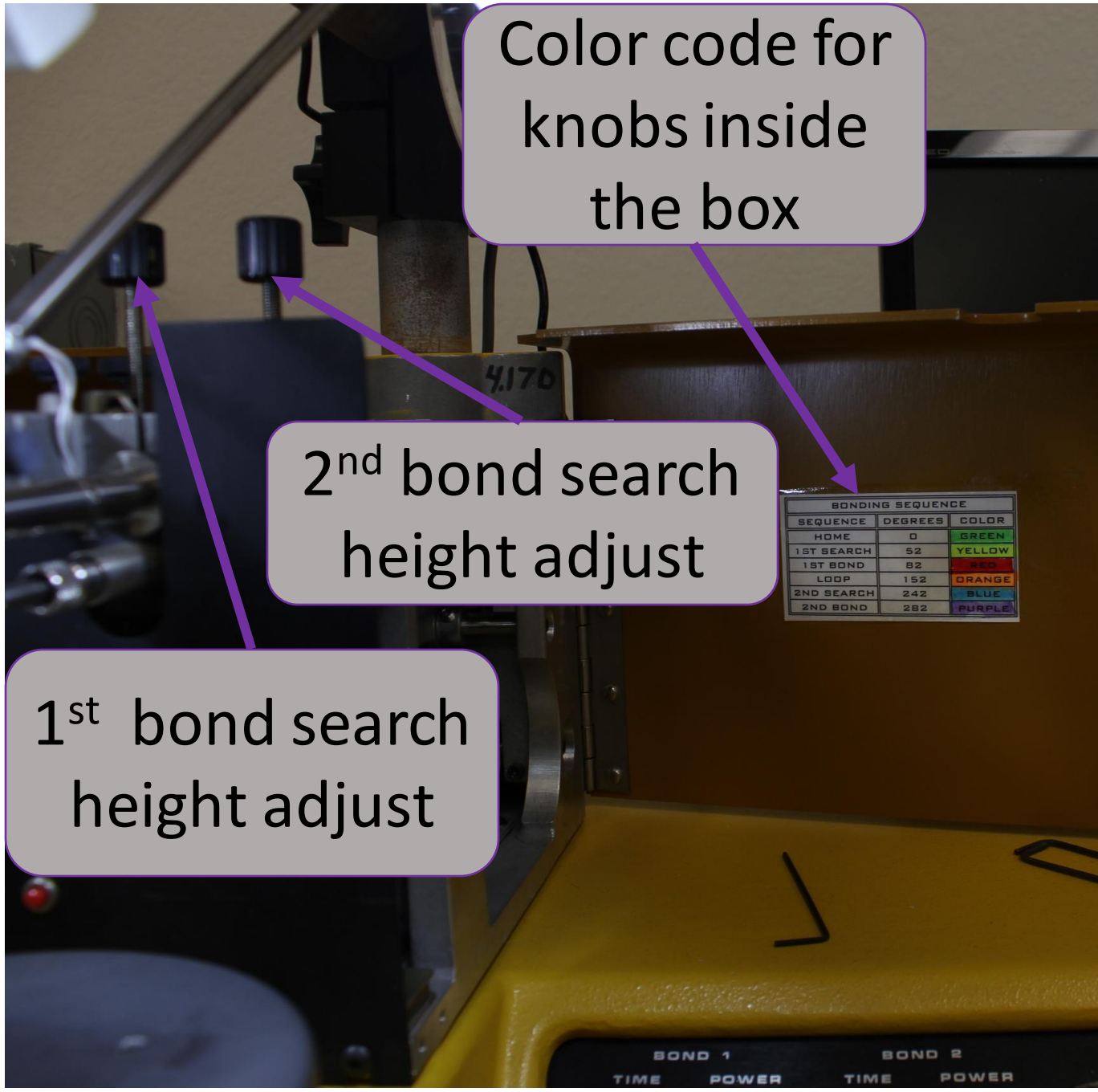


15. Looking through the microscope you should be able to see the wedge and wire tip over your work piece. If you cannot, turn on the lights, and move your work piece until you can see it under the wedge, through the microscope.



You may find that the wedge is too high or too low for your substrate. If you must adjust the search height for the 1st or 2nd bond, the two knobs on top of the central box of the machine, with an orange-yellow and a purple dot on top can be adjusted clockwise(to lower) counter clockwise (to raise) the search height of the 1st, and second bonds respectively.

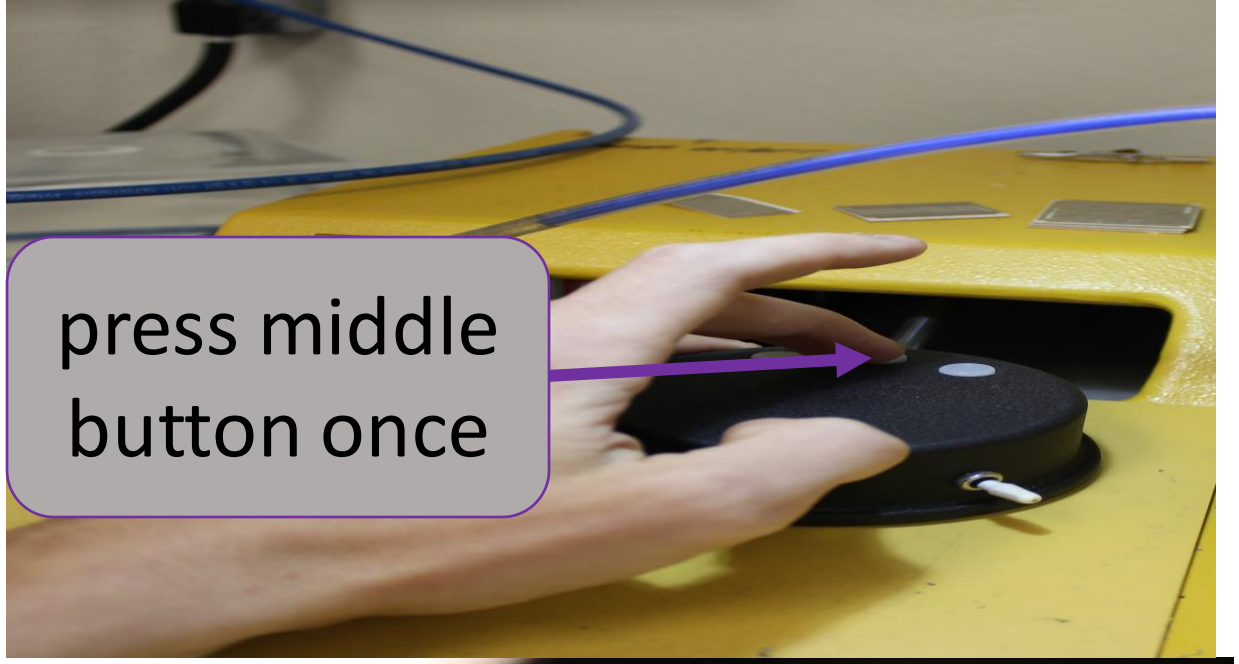
There is a color code inside the right door panel. It tells you the color of the adjustment knobs inside the box for adjust height of each search, bond, and loop height. (how tall your bond loop ends up being). **Contact HiDEC staff before making fine adjustments.**

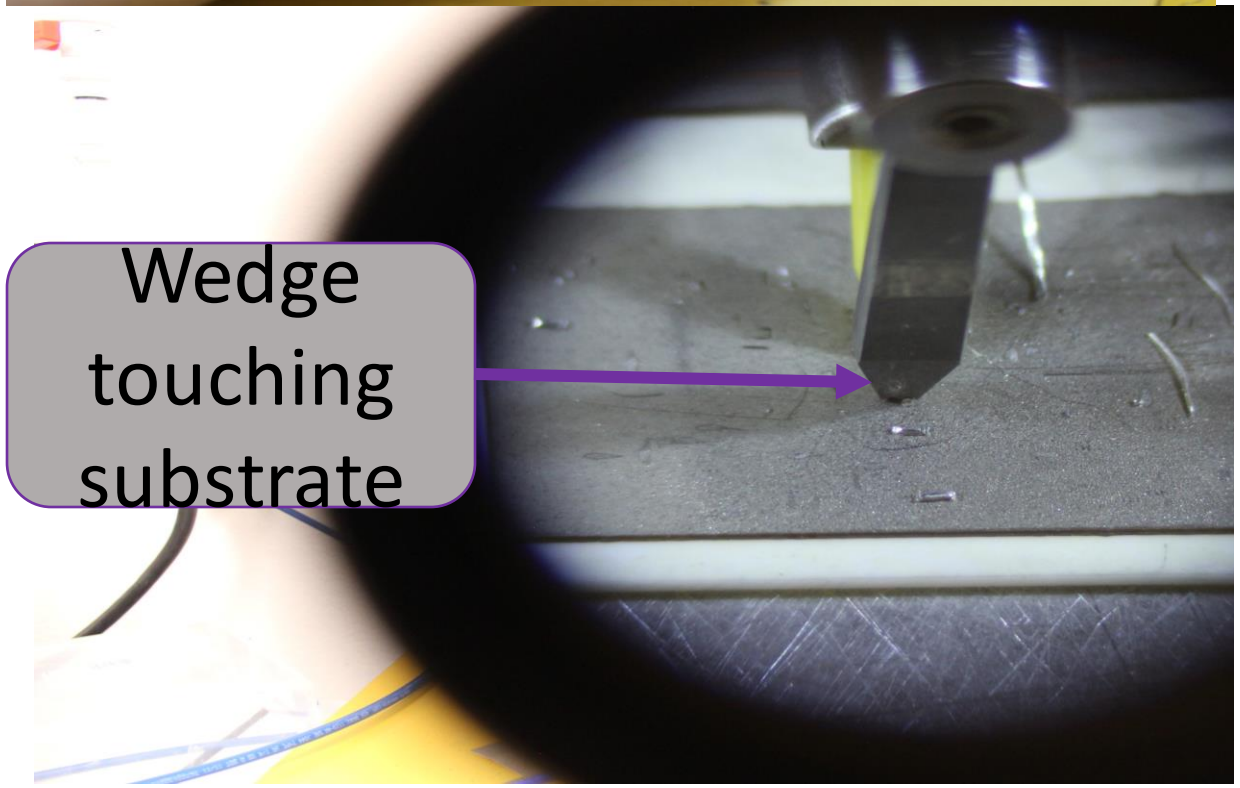


16. When you press the middle button on the chessman, the wedge should descend to touch the substrate surface at the first search height.

Position the wedge and wire where you would like it to be on the substrate, making sure not to push the substrate away from you, lest the wire be pulled with it.

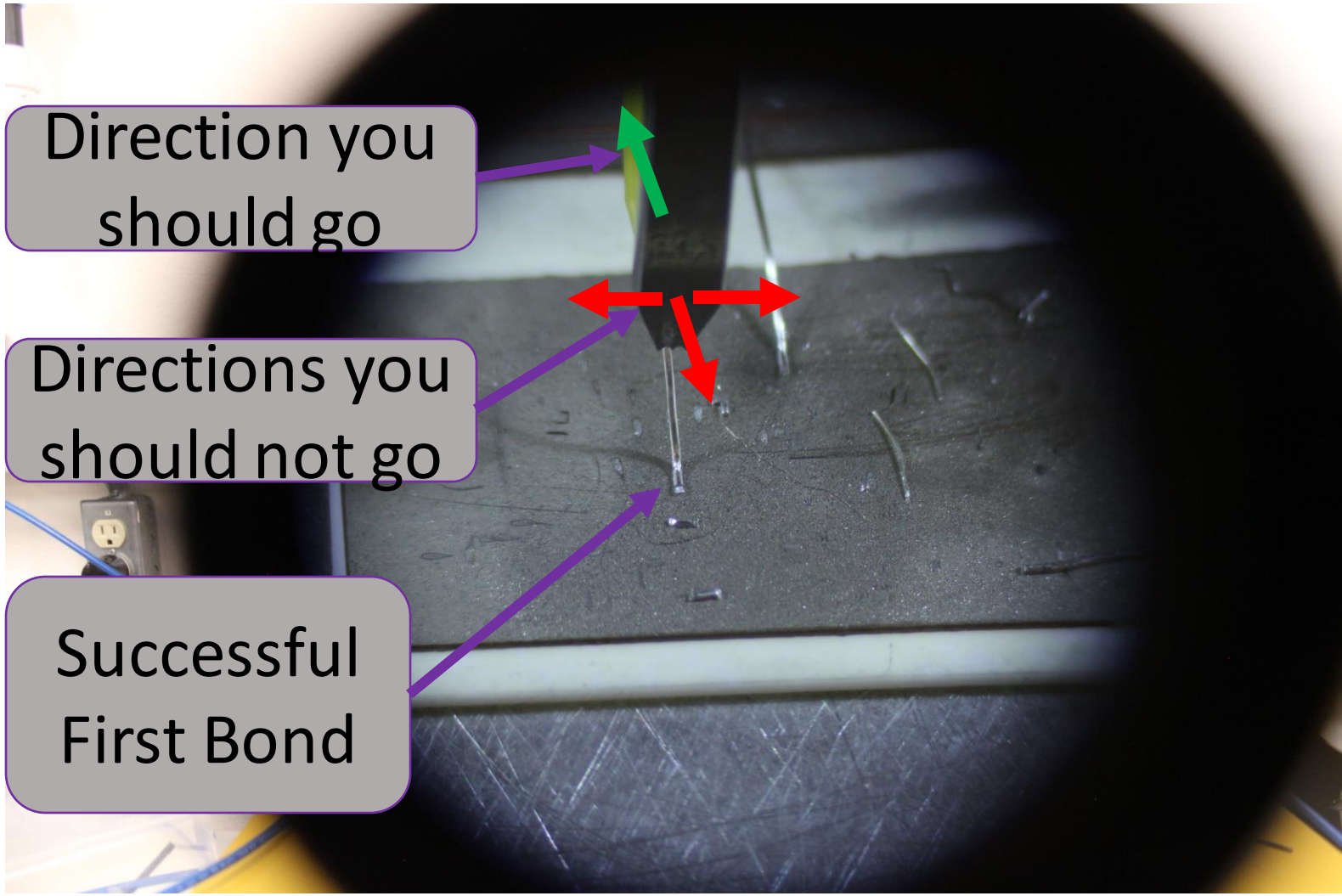
Another press of the middle button will attempt to bond the wire to the surface once you have found your spot.





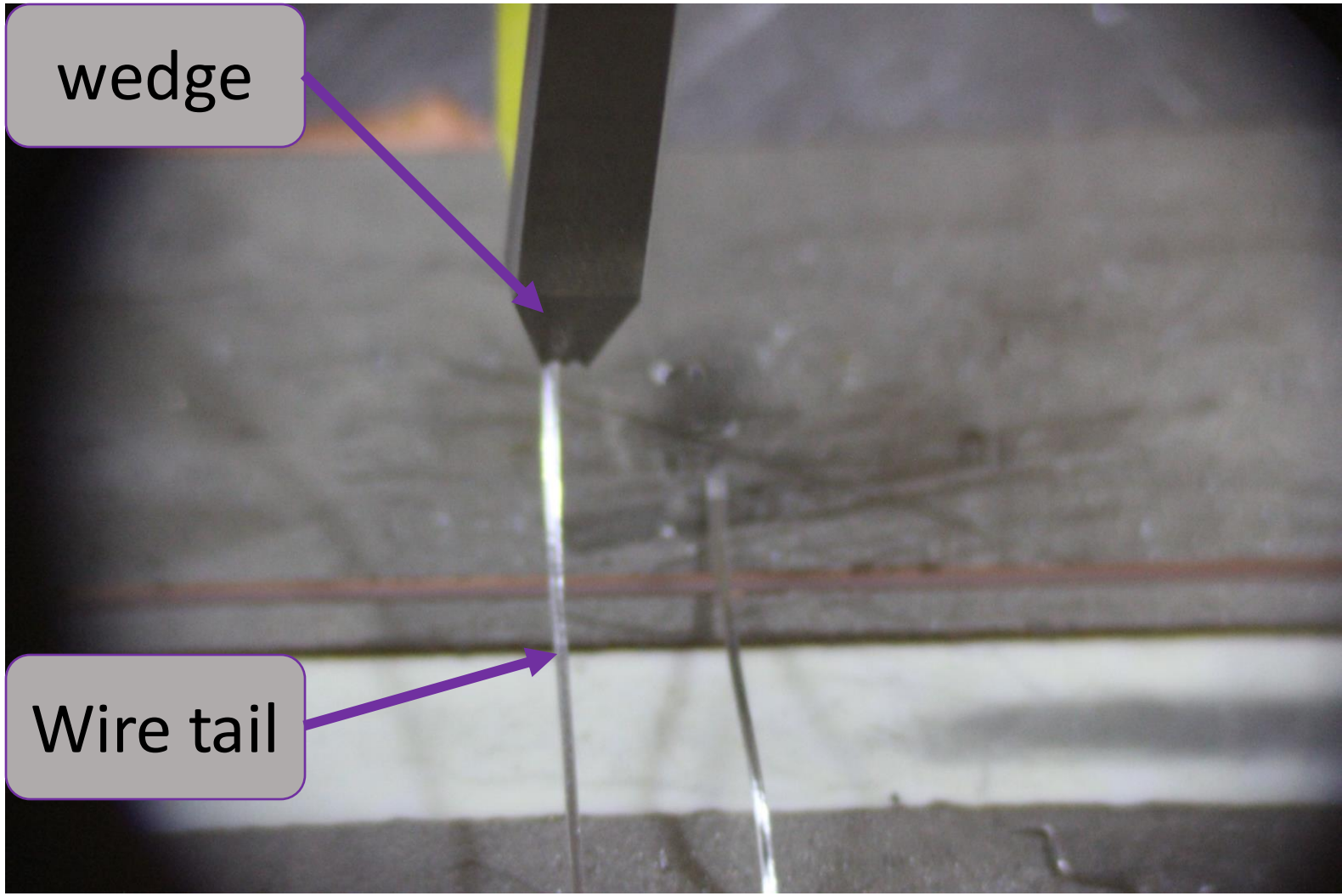
17. If the first bond is successful you should see the wedge rise to the loop height, and pull some wire out from where your first bond was made.

You may now move to make your second bond. Try to keep your wire bonds as straight as possible, their ends should not be offset from each other laterally. The indicator light should now illuminate under the “Bond 2” controls to your right.

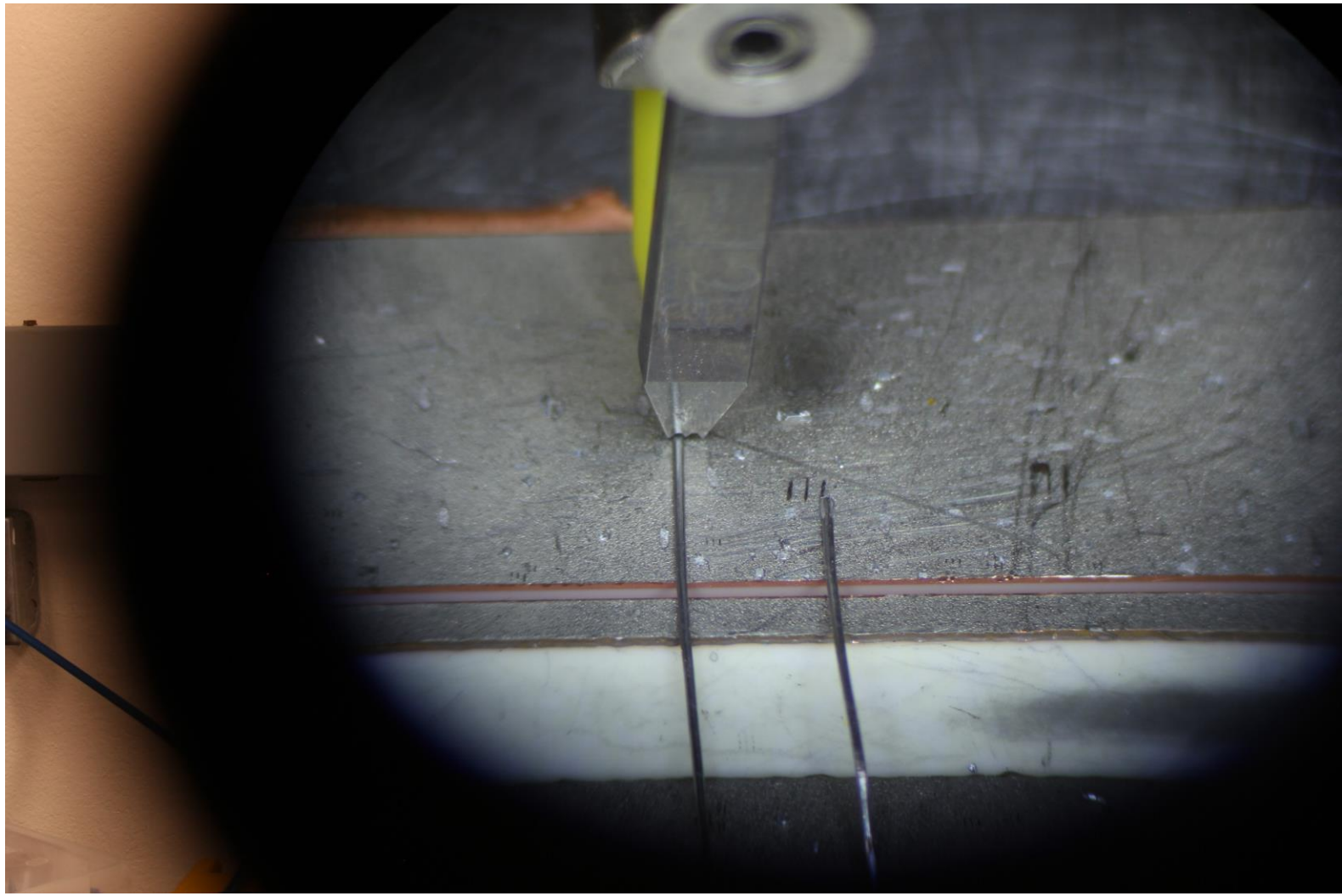


18. As you move the chessman toward you, the substrate will move toward you on the work platform as well, and this will cause the wire to pull out into a tail behind the wedge as shown.

This is a wedge bonder, thus it is highly recommended you keep your two bonds as close to in line with each other as possible. If you do not, the wire may break free, get kinked, or simply fail to bond.



19. As before, press the middle button on the chessman to descend to second search height, and click again to attempt the second bond. A buzzing noise might be heard as the ultrasonic transducer tries to weld the wire, the indicator light under the “ Bond 2” controls should turn off and revert to “Bond 1”.



20. If the bond is successful, the buzzing sound will cease, the wedge will rise, and the wire should stay behind, stuck to the substrate.

You should now be back on “Bond 1” and ready to move to the next place you want to start a bond on your substrate.

If your bonds are failing, clean your substrate thoroughly being sure to remove all organics, try again. If the problem persists contact HiDEC staff.