Calibration of VBX-160 & Vises Using Tablet

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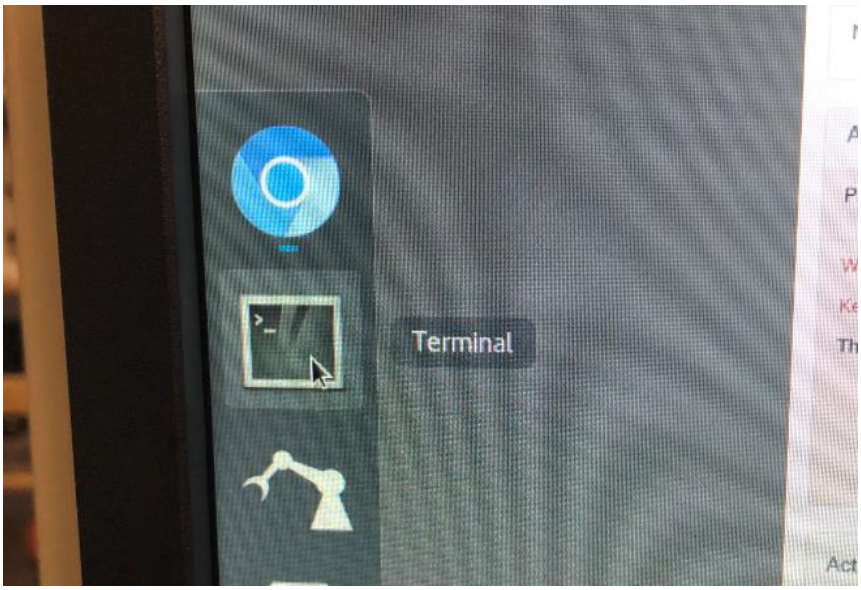
Step 1 – Setup

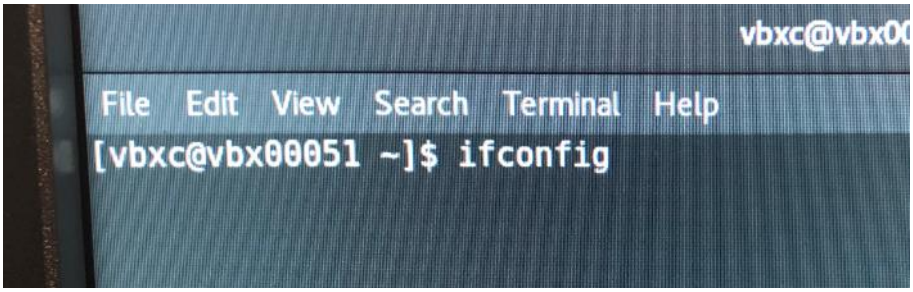
Consists of:

1. **Getting Tablet Connected**

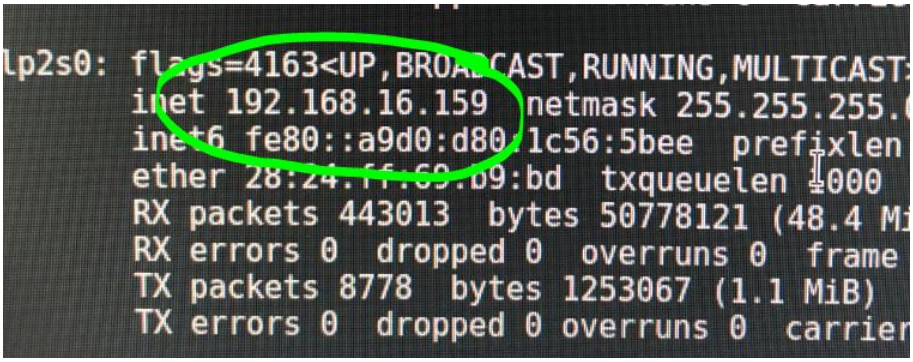
a. **On the VBXC, press the windows key on the keyboard and select the Terminal Icon**



b. **In the command line, type IFCONFIG and hit enter**

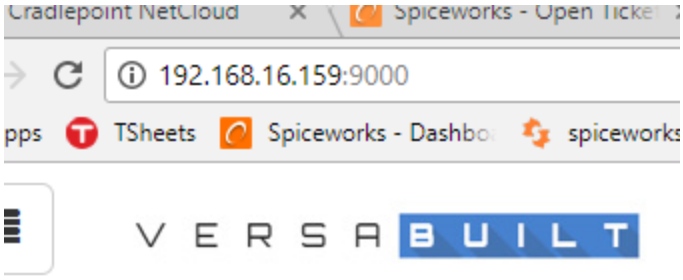


c. **Find the local IP address of the VBXC. It will usually be the last adapter displayed. It should look like this.**



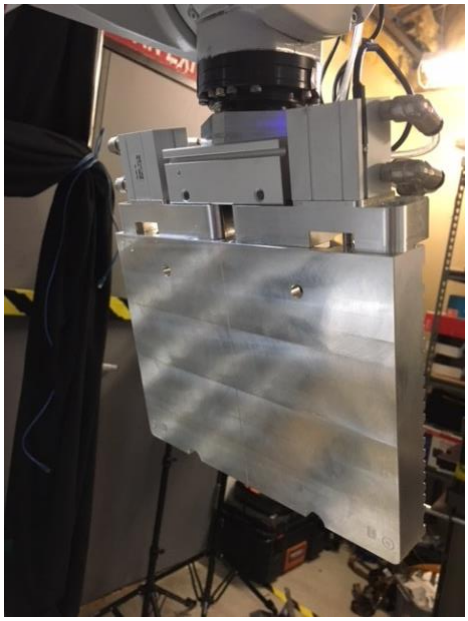
d. **<u>*NOTE:</u> Since this is a local IP address (only on your network), yours may or may not have the same scheme (192.168.x.x). If you are unsure as to what IP scheme your organization runs, please consult your IT department.**

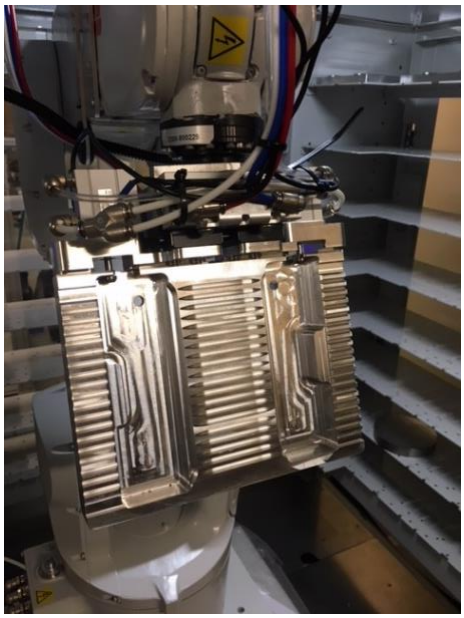
e. **Open google chrome, and in the address bar type your VBXC's IP address followed by :9000. It should look like this:**



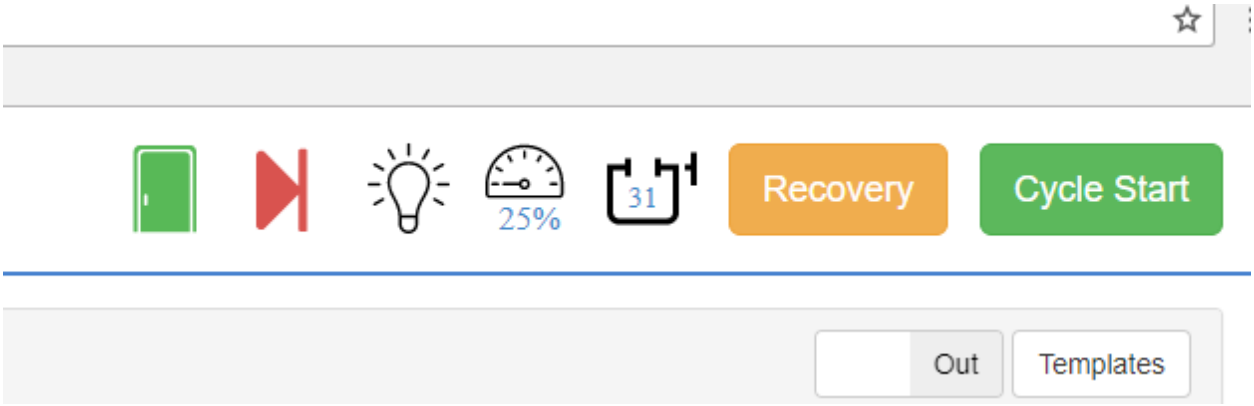
f. Your tablet should now be connected to your VBXC's main page.

2. Connect Calibration Jaws

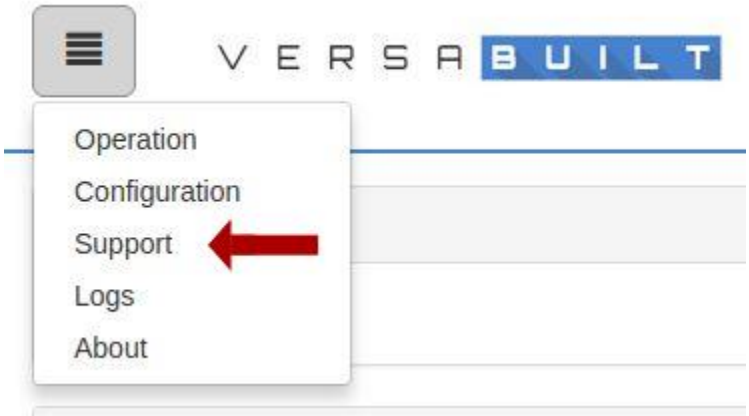




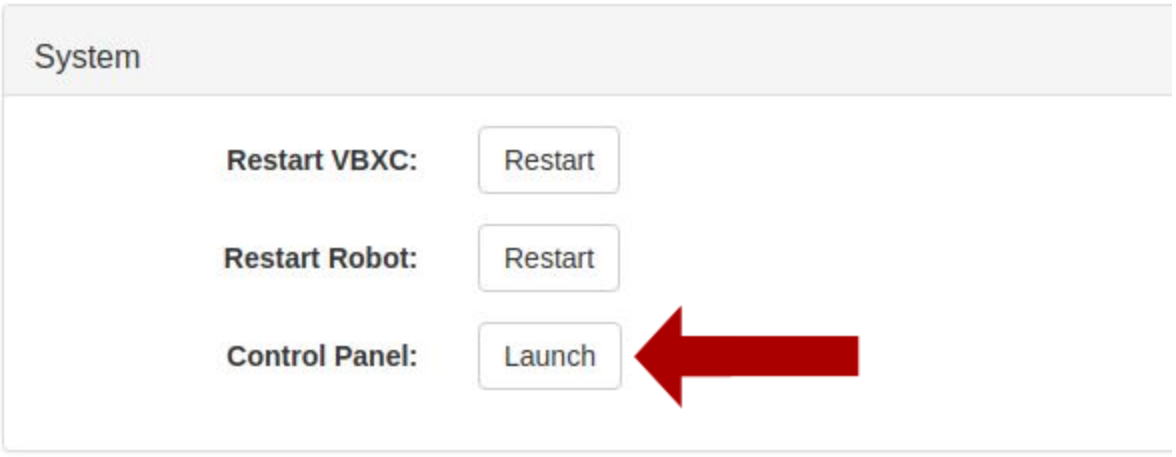
3. **Recovery Mode**
    a. **To enter Recovery mode, simply click on the yellow button in the upper right hand corner of the VBXC titled "Recovery" If you do not have a recovery, you may need to click the yellow button titled "Reset". This will put you into recovery, with the controls to drive the robot manually and allow you to operate the Calibration Panel.**



4. **Locating and using Calibration Panel**
    a. **Steps:**
        1. **Make sure you are in recovery mode (see Setup - Recovery Mode)**
        2. **Enable the robot, select the enable button in the upper right corner of the VBXC.**
        3. **Using the tablet that you connected to the vbx-160 (see Setup - Getting Tablet Connected),select the three lined menu box in the top left.**
        4. **Select Support:**



        5. **Then scroll down to the System panel and select Launch next to Control Panel.**



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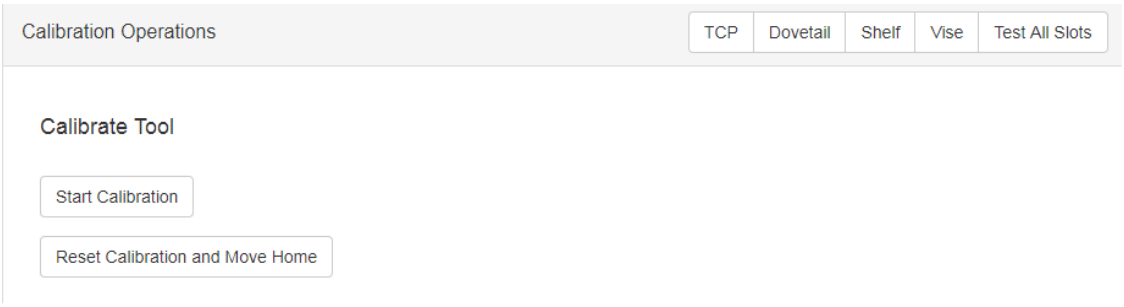
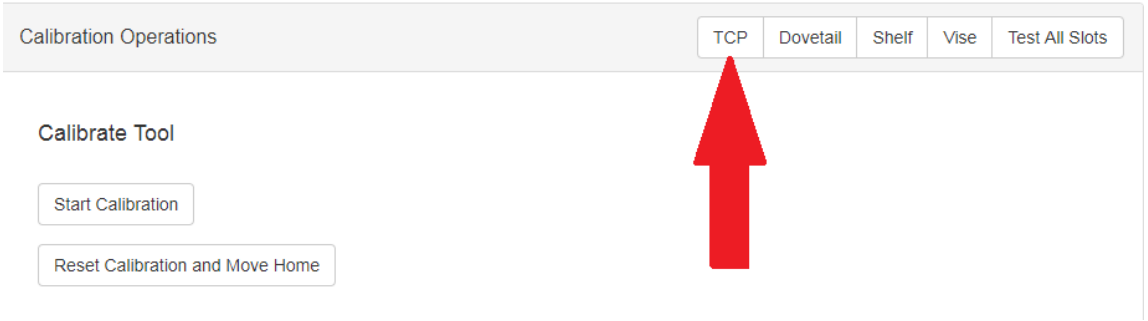
6. **Once you are in the Control Panel page scroll down to find Calibration Operations.**

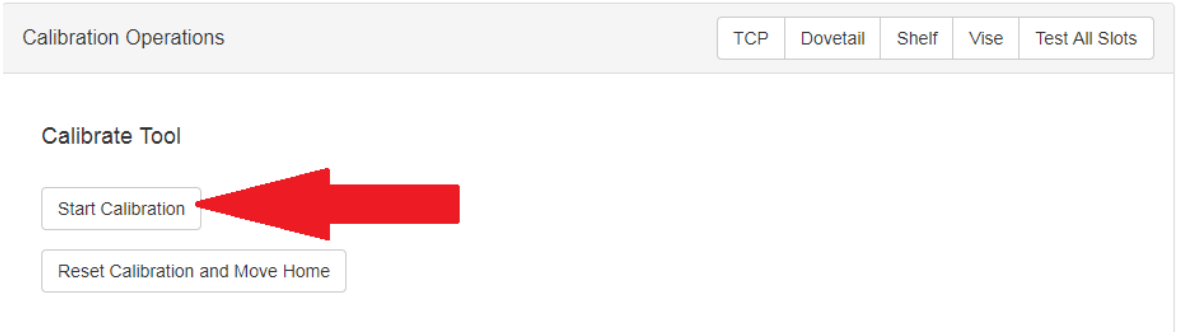


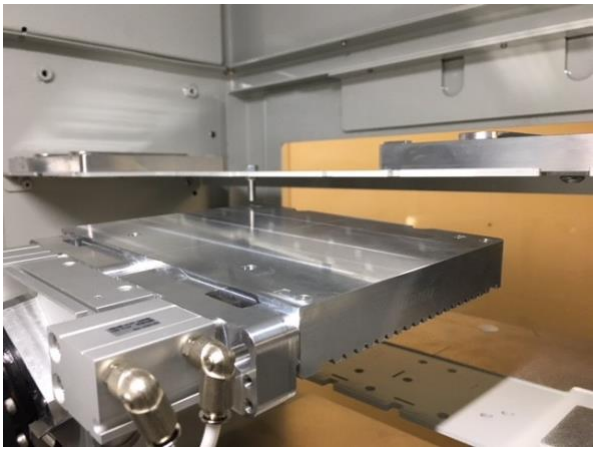
Step 2 – Tool Calibration (TCP)

1. **Remove dovetail plate from rack one, shelf 1, slot 3. This should be at the door opposite of the operator door at the very top and second slot from the right when looking in.**
2. **Put tool calibration pin in the shelf where the edge most dovetail screw was.**
3. **Go to calibration panel (see Setup - Finding Calibration Panel) and select TCP.**



4. **To begin the tool calibration click Start Calibration and the robot will move you into the starting position. From here you will use the linear jogging movements in the Arm tool to move point A on the jaws directly underneath and touching the calibration pin. Once finished select Next Loc.**

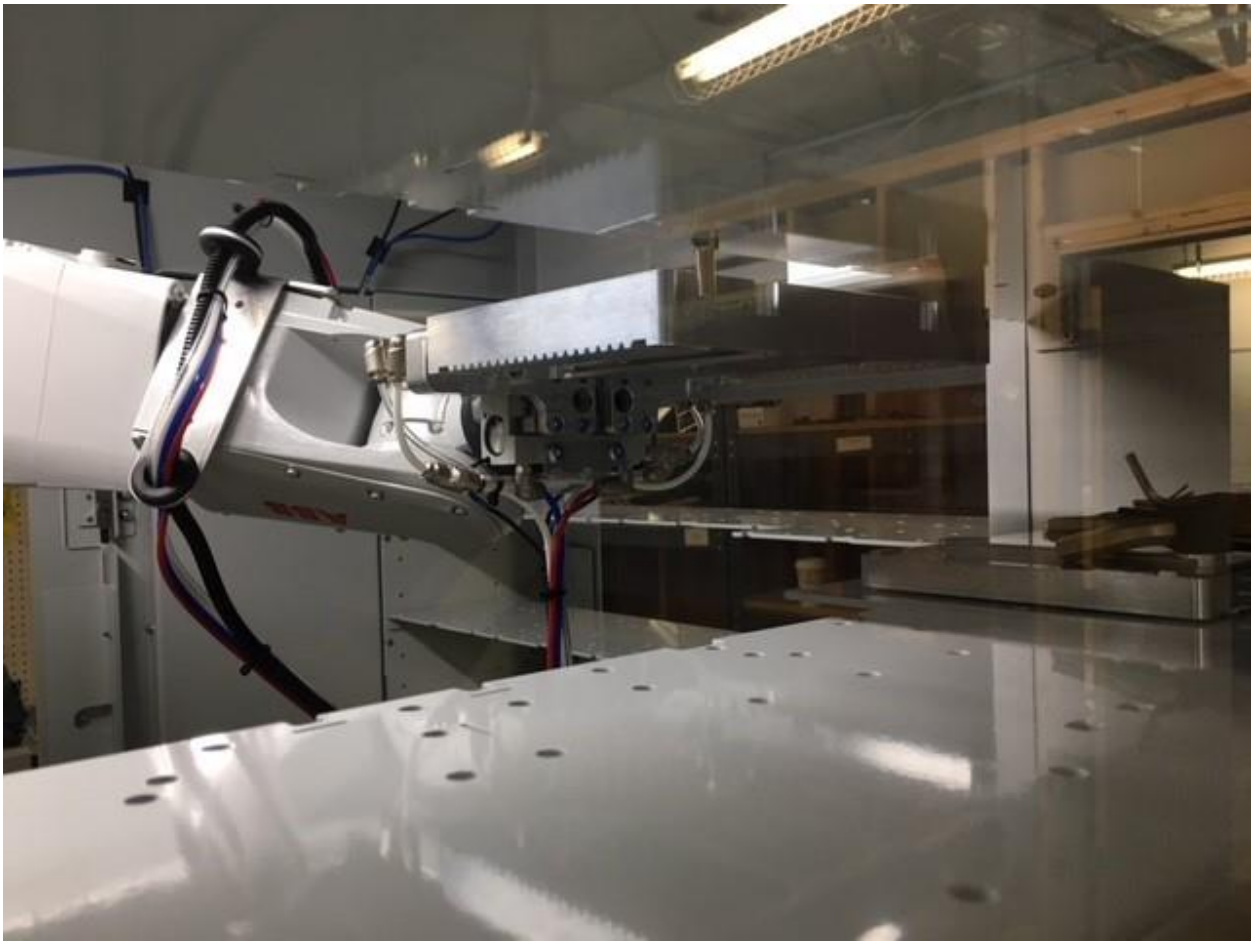




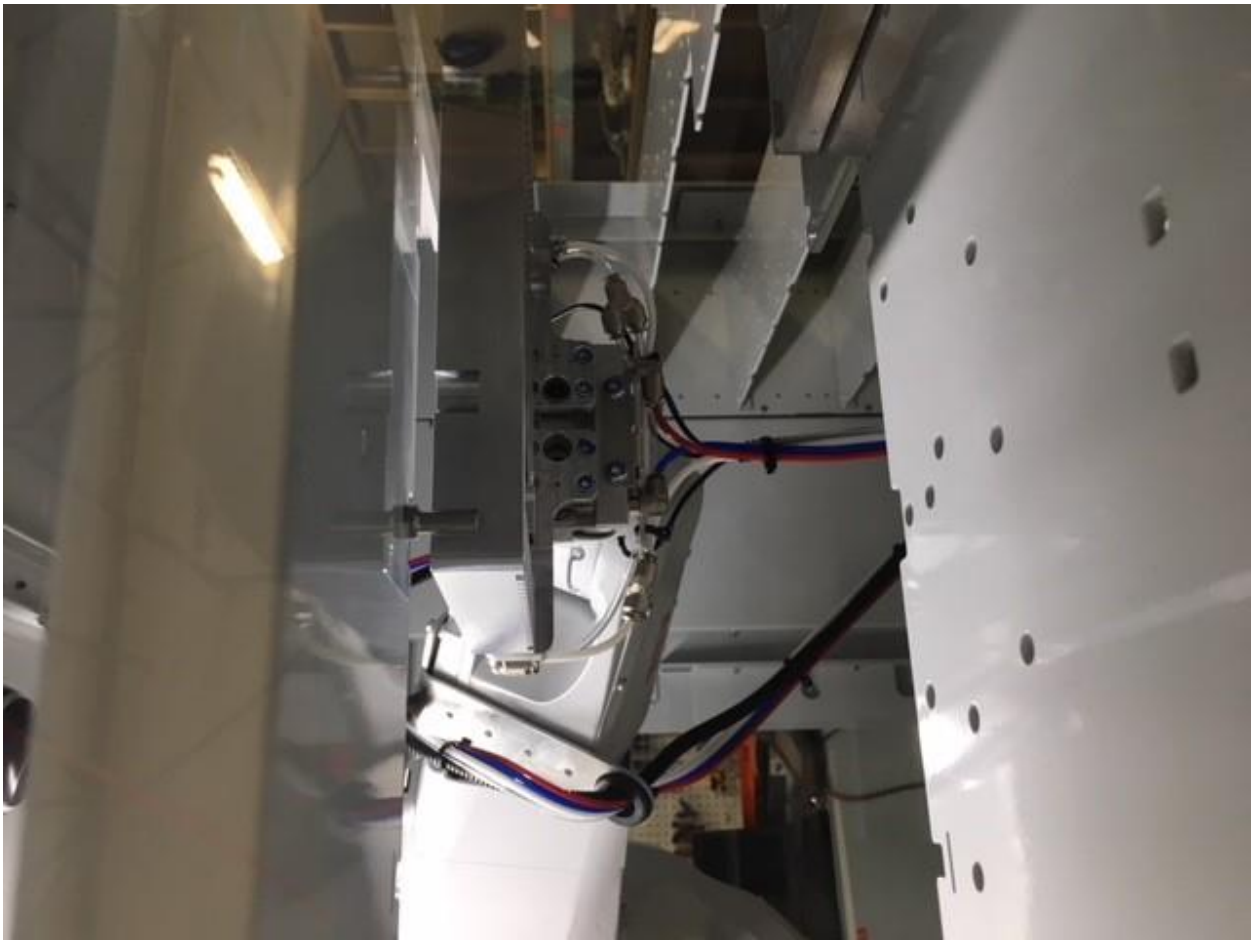
5. **Once the robot moves the jaws to the next location you will use only the Rotate TCP tool to rotate about the Y axis. The –Y will move point B up closer to the pin and +Y will move point B down away from the pin. Once you have point B touching the pin like point A was select Next Loc.**

6. **The robot will now move to point C. You are going to use the same Rotate TCP tool here as the last step but now you will rotate about the X axis. The –X will move point C up closer to the pin and the +X will move point C down away from the pin. Once again, when you have point C touching the pin like point A and B were select Next Loc.**

7. **The robot will now move the jaws to point D. Here you will use the linear jogging tools like we did in Step 4. For this step you want the pin covering your view of point D and the jaws should be touching the pin. When you are done select Next Loc.**



8. **Now the robot will move over to point E. For this final step you will be using the Rotate TCP tool again and will be rotating about the Z axis. The –Z will move the jaws closer to the pin and +Z will move the jaws further away from the pin. Now the TCP is ready to save select Save and Finish Calibration which will save the TCP calibration and move the robot to a safe position.**

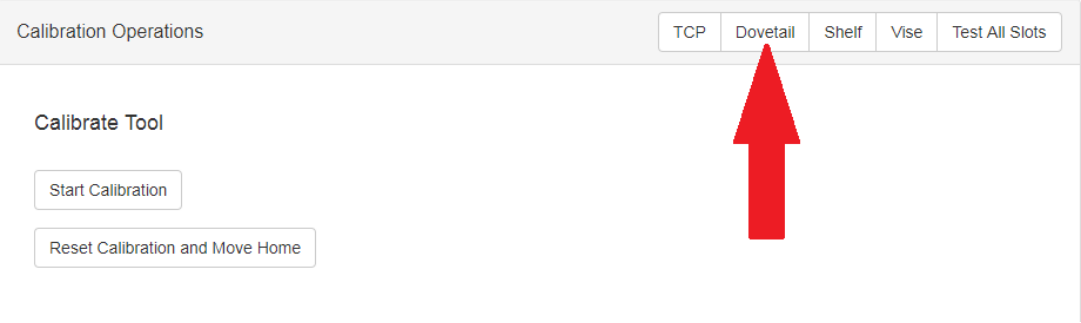


Step 3– Dovetail Calibration

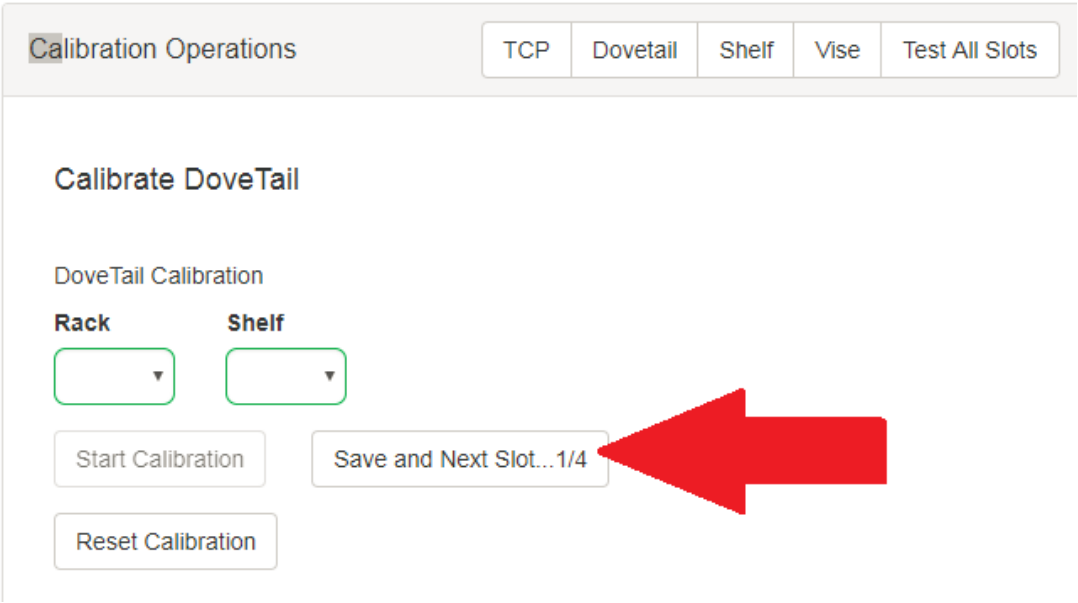
Here is a rough video on how to calibrate the dovetails. It should also cover connecting your tablet to the VBXC:

https://youtu.be/13t_YFlfznc

1. **Remove tool calibration pin in the shelf where the edge most dovetail screw was. Replace the removed dovetail plate from rack one, shelf 1, slot 3.**
2. **Go to calibration panel (see Setup - Finding Calibration Panel) and select Dovetail.**

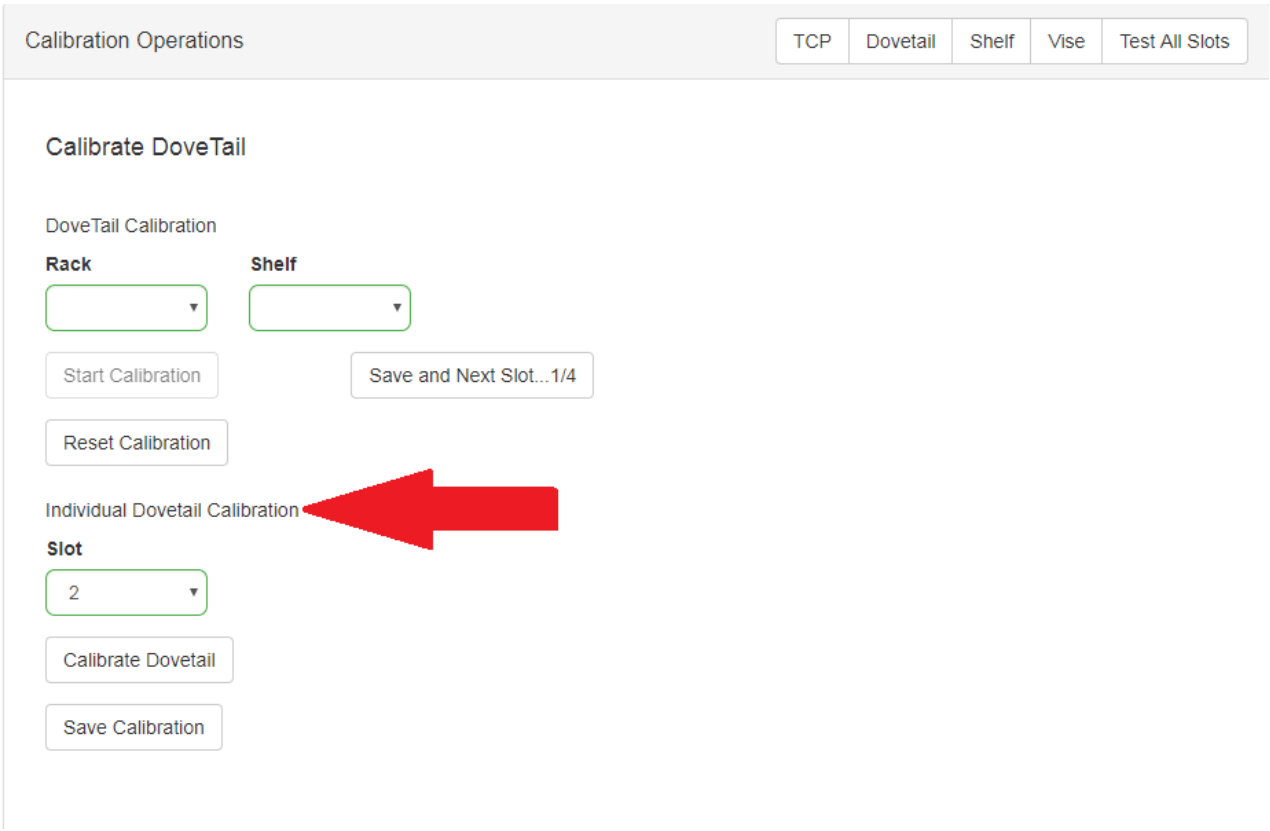


3. **To begin the tool calibration click Start Calibration and the robot will move you into the starting position above the slot 2 dovetail plate on whatever rack and shelf you choose.**



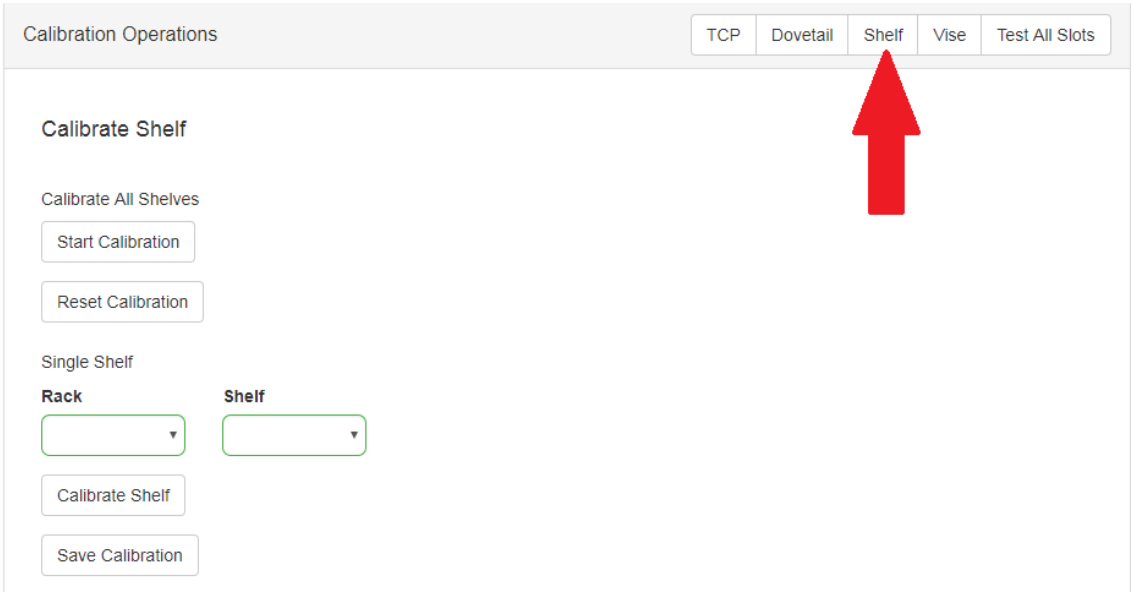
4. **For the majority of systems the dovetails should only be located on Rack 1, Shelf 1, and Rack 2, Shelf 9. From here you will use the linear jogging movements in the Arm tool to move the calibration jaws directly on top of and touching the dovetail plate. The centerpoints should align, the rotation about X, Y and Z can be changed if necessary to center and touch the calibration jaw to the dovetail plate. Make sure the calibration jaw isn't pushing down in Z to the extent it is moving the shelf. Once the desired location is achieved click the "Save and Next Slot" button to move onto the next dovetail. This calibration has 4 steps for the 4 dovetail plates per shelf. Repeat for Rack 2, Shelf 9.**

5. **These is also an ability to perform Individual Dovetail Calibration in the Calibration Operations Panel.**

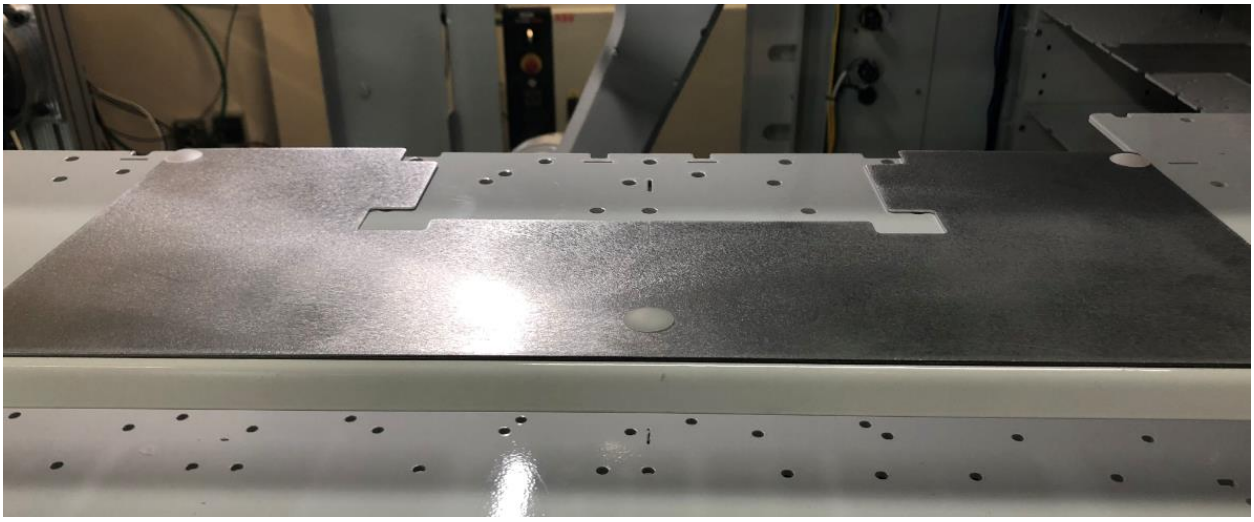


Step 4- Shelf Calibration

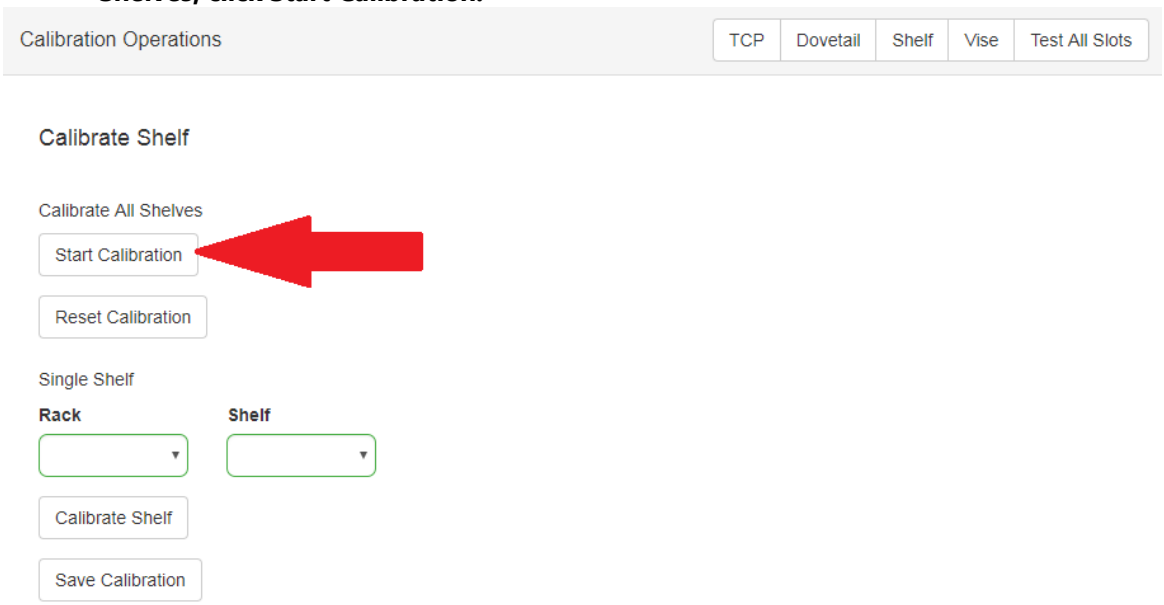
1.) **Select the Menu to the left of the Versabuilt logo in the upper left hand corner of the VBXC screen, choose the support menu. *NOTE: As with all calibration, you need to be in recovery mode to calibrate. You will also need to have your custom locators removed, and the shelf calibration locator installed on the shelf you wish to calibrate.**



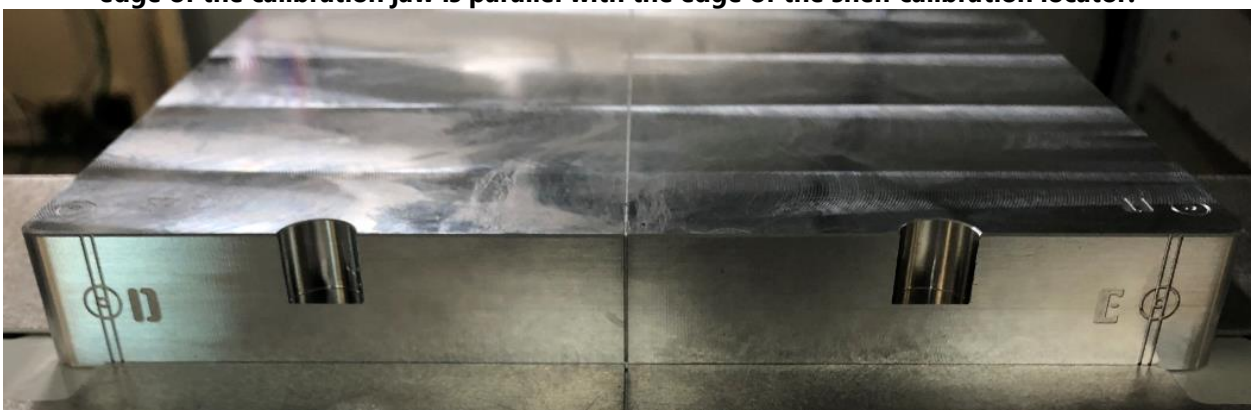
2.) **In the case of Calibrate All Shelves, you will need to start with Rack 1 Shelf 2. Installed, the shelf calibration locator looks like this:**



3.) In support, scroll down to Calibration operations and select SHELF. Under Calibrate All Shelves, click Start Calibration.



4.) Just like with Dovetails, use the robot controls to maneuver the calibration jaw into the slot outlined by the calibration shelf. You want the bottom of the jaws to be no more than .005" above the shelf. You want equal gaps on the left and the right between the calibration jaws and the shelf calibration locator. You also want to make sure that the rotation of the jaws about X, Y and Z are also adjusted. You should be touching or evenly spaced on all 4 corners of the calibration jaw, you also want to make sure that the front edge of the calibration jaw is parallel with the edge of the shelf calibration locator.



5.) Once you have the jaw aligned, click Save and Next Shelf.

6.) Repeat this process until calibration has been completed.

Step 5- Vise Calibration

1.) **Insert second set of calibration jaws into the vise that is going to be calibrated with points D and E facing the CNC door. Ensure you close vise with the calibration jaws seated correctly.**
2.) **Make sure you have the CNC table in the position you will be loading and unloading the vise from.**
3.) **Go to calibration panel (see Setup - Finding Calibration Panel) and select Vise.**
4.) **Use the drop down to select which vise number you are calibrating.**
5.) **<u>*Be sure to stand ready to feedhold the robot at the VBXC in case the robot gripper and jaws hit the vises during this next process</u>. To begin the vise calibration click Start Calibration and the robot will move you into the starting position. From here you will use the linear jogging movements in the Arm tool to move the jaws attached to the robot until they are lined up with the jaws on the vise.**
6.) **Once you have the jaws lined up as best as you can with linear movements use the Rotate TCP tool to adjust the rotation of the jaws until you can fit one of the vise calibration pins in each hole made by the two jaws.**
7.) **Repeat steps 5 and 6 until calibration jaws line up and pins fit in holes snug. You should be able to pull them out but not be able to wiggle them. Once you have completed the steps above you should be ready to select Save Calibration. The robot will stay in the CNC if you want to use the jogging tool to get to the next vise or you can select the home icon if you are done.**