CARVEWRIGHT
WOODWORKING SYSTEM

Setup and use of CarveWright CO_2 Powered Dragster Jig

The CO_2 powered Dragster Jig will arrive from the factory fully assembled, calibrated, and squared. In order to get the best results, your CarveWright machine will need to be checked and adjusted to make sure that the side-to-side travel of the cutting head is perpendicular (or square) to the side of the jig as set by the squaring plate (Figure 1). The jig has factory aligned reference surfaces on the left and right side rails (Figure 2) that will be used to check the square. The 1/8" ball-nose carving bit will be used to touch each of these surfaces on either side of the jig and indicate if the squaring plate is out of alignment. Adjustments to the machine's square will be accomplished using the built in adjustment mechanism on the squaring plate.

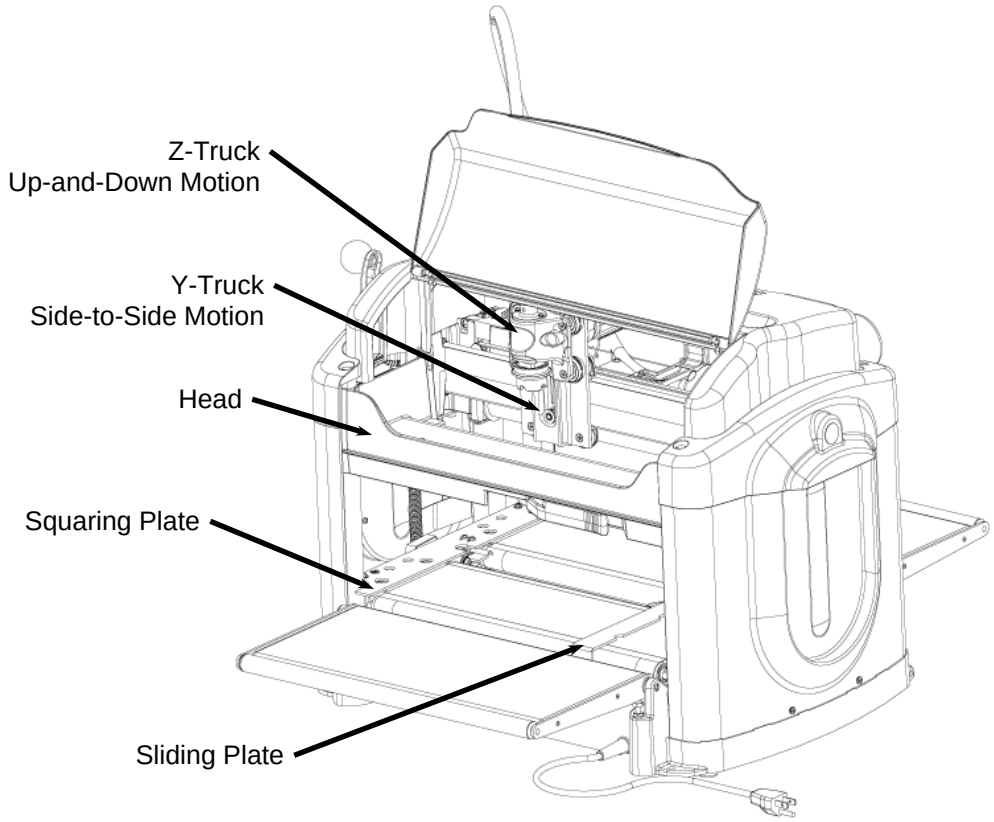

FIGURE 1: THE CARVEWRIGHT MACHINE

The Dragster Jig package comes with the following:

- Owner's Manual
- Instructional DVD with Curriculum Guide
- The Dragster Design Import Software (with Activation Code)
- 1/8" Ball-nose Straight Carving Bit (Mounted in Adapter)
- The Assembled Jig Frame
- The Dragster Wood Blank Nose Clamp
- The Dragster Wood Blank Rear Alignment Pin
- A 3/16" Hex Allen Wrench
- A 4mm Hex Allen Wrench

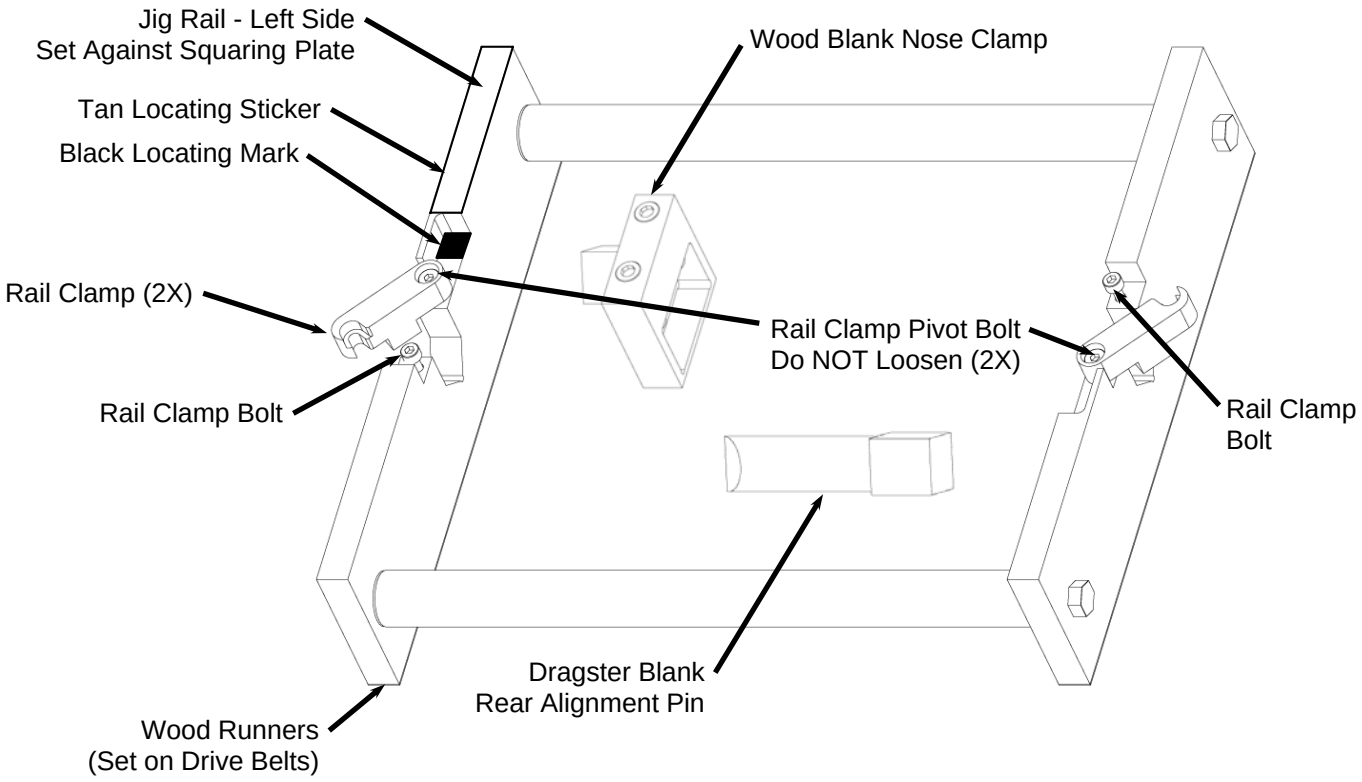

FIGURE 2: THE CARVEWRIGHT DRAGSTER JIG PARTS

To adjust the square of the machine you will need the following tools:

- #2 Short Phillips screwdriver (magnetic tip preferred)
- #2 Short Flathead screwdriver

Jig Setup - Check the machine for square. Note: checking and squaring the machine should only be required the first time the machine is used with the dragster jig under most operational circumstances.

1. **Ready the machine.** Unplug the machine from the power outlet and place it on a stable work platform. Move the y-truck (the cutting head that moves from side to side) to the center of the machine for best access.
2. **Prepare the jig.** Make sure that the jig is empty and that the two rail clamps are loose and free to move (Figure 2). Use the 4mm Allen wrench to loosen the bolts holding the clamps, if necessary. Note: Only loosen the bolt that is on the slotted side of each clamp. The rear pivot bolts should never be loosened.
3. **Insert the jig into the machine.** Crank the head of the machine up to within one inch from the top of the four vertical posts. Insert the empty jig into the machine with the wood runners down, being careful not to snag a belt with the jig. Position the jig roughly in the center of the machine, sliding it tightly up against the squaring plate along its entire length. Crank the head down until the compression rollers on the underside of the head barely touch the jig rails. The jig needs to be free enough to be easily moved by hand in and out of the machine. Move the sliding plate firmly up against the right side of the jig (Figure 3).

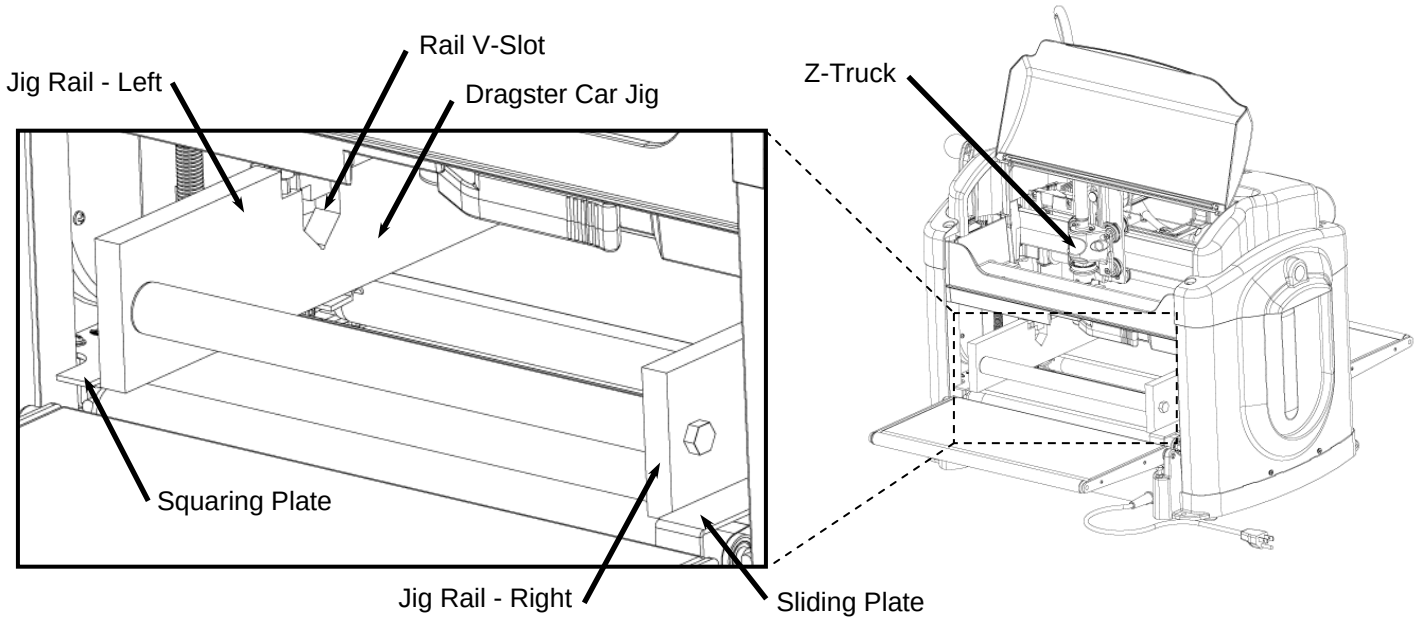

FIGURE 3: VIEW OF THE DRAGSTER JIG INSERTED INTO THE MACHINE

4. **Insert the bit.** Insert the 1/8" ball-nose carving bit into the quick change chuck. It will be used as an indicating device to gauge any offset in the square of the machine. Move the z-truck to its full up position.
5. **Touch the reference surface on left jig rail.** Move the y-truck to the left until the bit is directly above the left side jig rail. Rotate the rail clamp out so that it is perpendicular to the rail. Move the jig in or out until the v-slot in the rail is directly under the bit. Move the z-truck down until the tip of the bit is about a half inch below the top surface of the rail. Gently pull the jig forward until the bit touches the back wall of the v-slot (this is the reference surface). Rotate the bit slowly in order verify that the maximum diameter of the bit is touching the surface. Be very careful to do this gently, as the bit can break if it is impacted forcefully or bent.

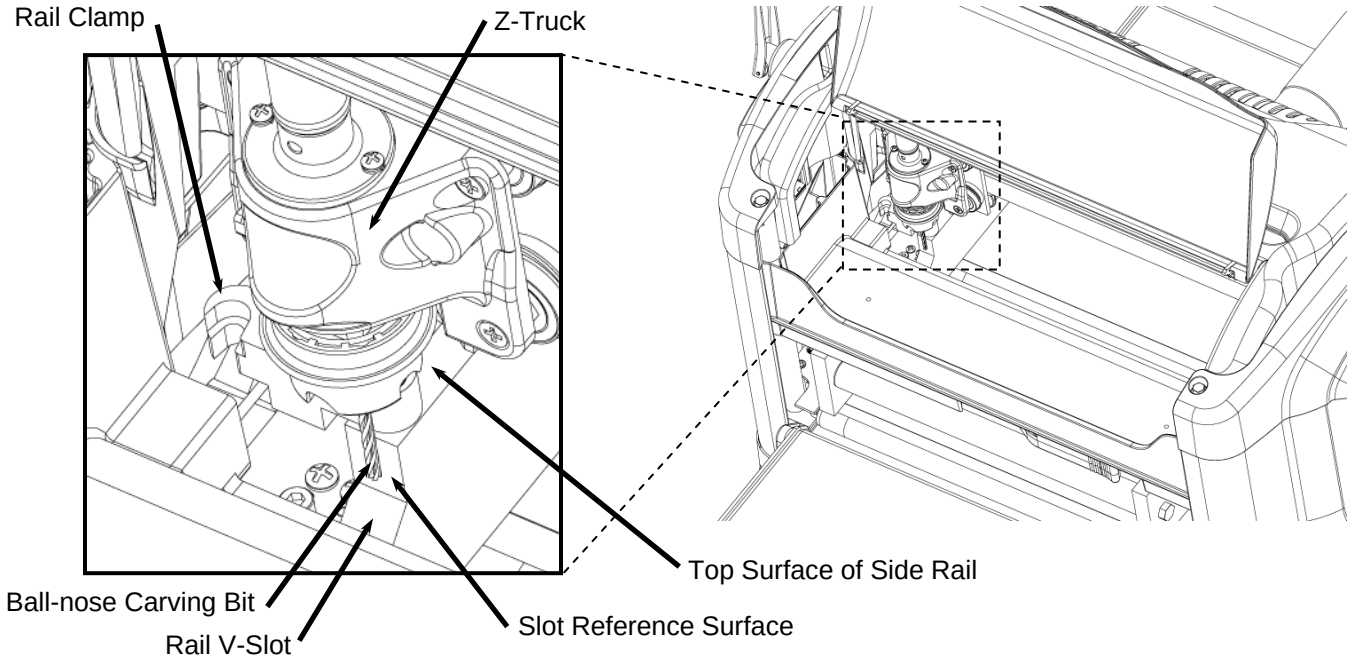

FIGURE 4: LINING UP THE BIT TO THE JIG ON THE LEFT SIDE

6. **Touch the reference surface on right jig rail.** Once the jig has been positioned so that the bit is touching the left rail reference surface, lift the z-truck to clear the jig and move the y-truck all the way to the right side of the jig, so that the bit is centered over the right jig rail. Rotate the rail clamp out so that it is perpendicular to the rail. Slowly move the z-truck down until the tip toward the jig rail. If the machine were perfectly square, the bit would slide right down the back wall of the right rail, like on the left side. If the bit does not align precisely with the reference surface, the machine square plate will need to be adjusted. Note the direction and distance of the displacement by the position of the bit, which will either be in front of or behind the v-slot wall.

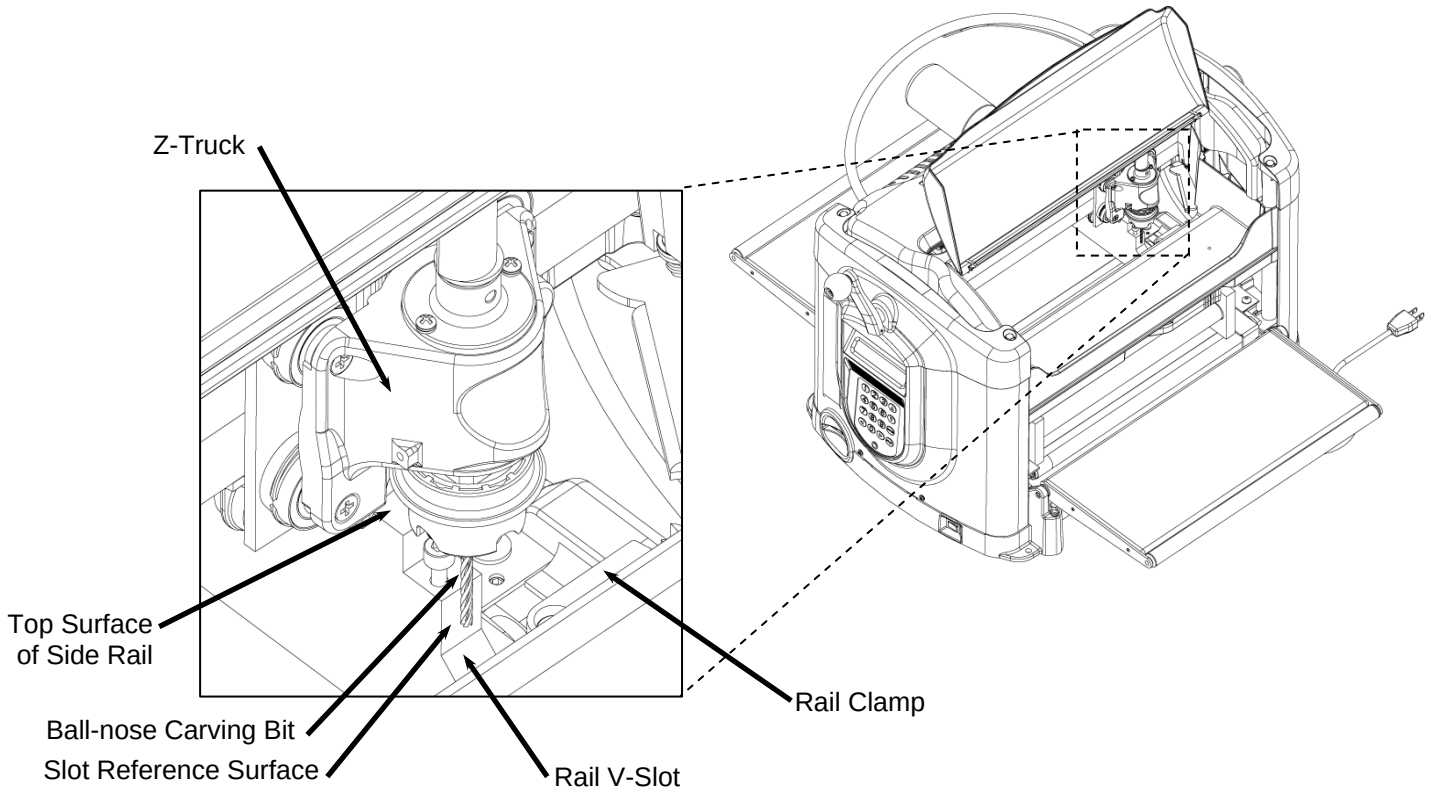

FIGURE 5: LINING UP THE BIT TO THE JIG ON THE RIGHT SIDE

Adjusting the Square of the Machine

7. **Loosen the squaring plate.** Crank the head of the machine up to within one inch from the top of the four vertical posts. Gently remove the jig. With a short Philips screwdriver, loosen, but do not remove the front squaring plate screw (Figure 6). This will allow the squaring plate to be rotated.

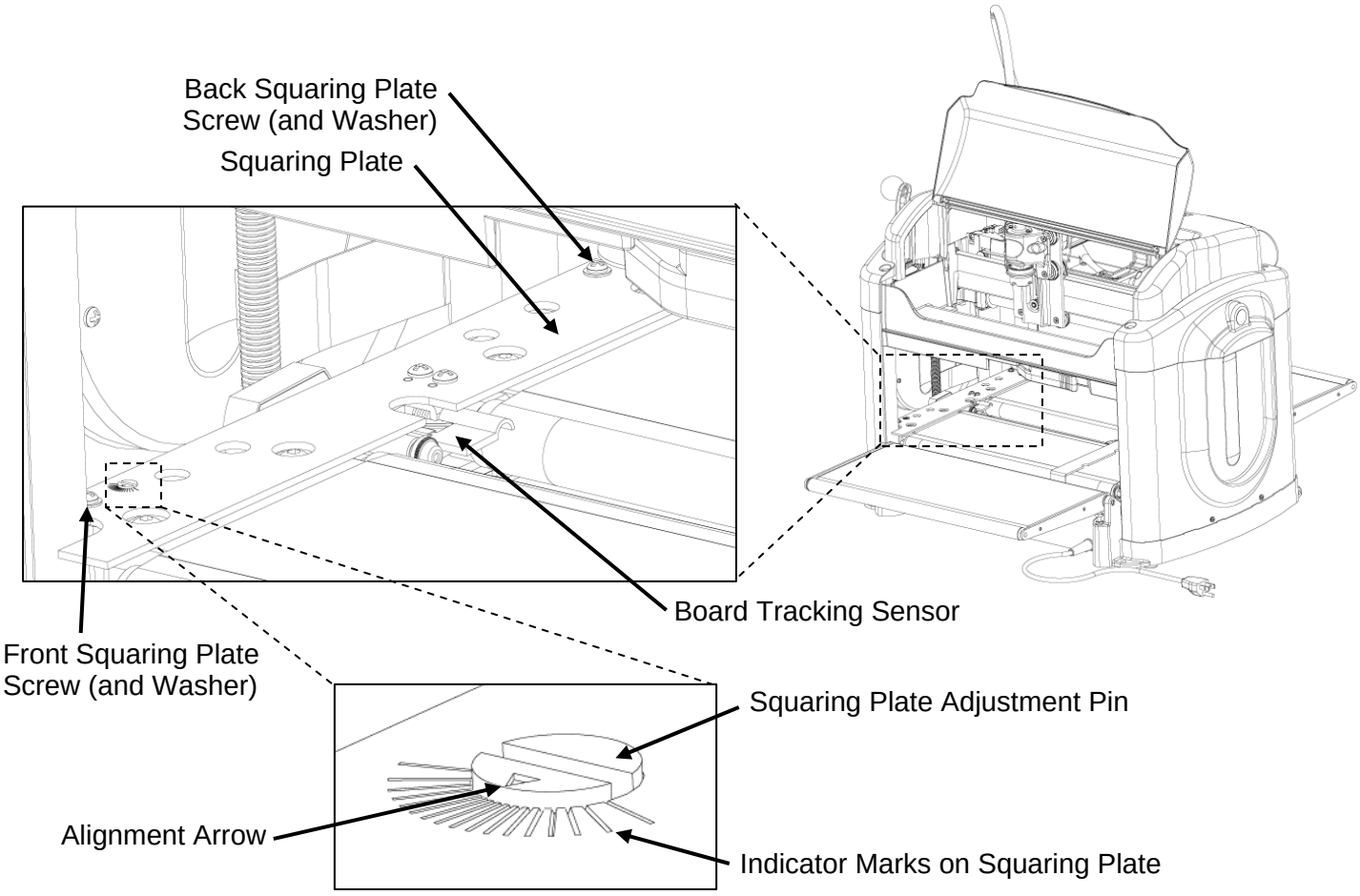

FIGURE 6: DETAILED VIEW OF THE SQUARING PLATE ADJUSTMENT

8. **Adjust the squaring plate adjustment pin.** Based on the determination of offset in Step 6 above, the adjustment pin (Figure 4) will be rotated in either a clockwise or counterclockwise direction. Before beginning, make sure to record and/or mark the current location of the squaring plate alignment pin arrow relative to the marks on the plate.

   - If the bit is offset to the front of the machine, (the bit was in front of v-slot wall) turn the squaring plate adjustment pin **clockwise** no more than 2 indicator marks.
   - If the bit is offset to the back of the machine, (the bit was behind the v-slot wall and unable to drop into the v-slot at all) turn the squaring plate adjustment pin **counterclockwise** no more than 2 indicator marks.

   Note: Make a maximum adjustment of only 2 marks at a time in order to not significantly over-adjust.

9. **Recheck the machine for square.** Tighten the front squaring plate screw when adjustment is done. Re-insert the jig in the machine and repeat Steps 5 to 8 as needed to check for, and re-adjust, until the machine is square.

Inserting a Dragster Wood Blank into the Jig

After precisely squaring the machine to the jig, the system is ready to use. Properly inserting the triangular wood blank into the jig is critical to the final results. It is import that you follow the directions closely.

To insert a Dragster wood blank into the jig, you will need the following tools:

- 3/16" Allen Wrench (included with jig)
- 4mm Allen Wrench (included with jig)

1. **Attach the nose clamp to the wood blank**. Insert the wood blank into the nose clamp in the orientation shown (Figure 7). Make sure that the front surface of the blank is tight against the bottom surface of the pocket in the nose clamp. Tighten the two nose clamp setscrews only enough to hold the blank in the clamp with the 3/16" Allen wrench.

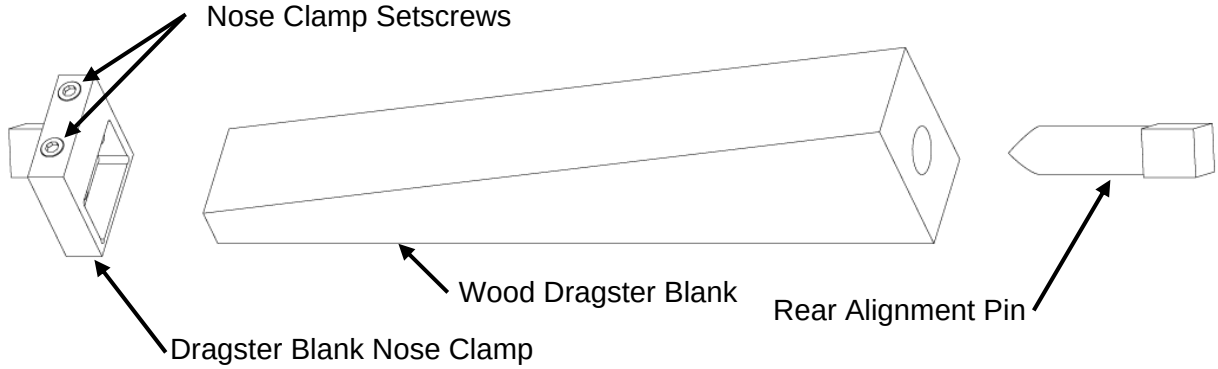

FIGURE 7: PREPARING THE DRAGSTER WOOD BLANK

2. **Assemble the rear alignment pin**. Insert the rear alignment pin into the 3/4" hole in the back of the Dragster blank. Push it in all the way and orient it so that the corners of the square shaft are pointed to the flats of the wood blank (Figure 8).

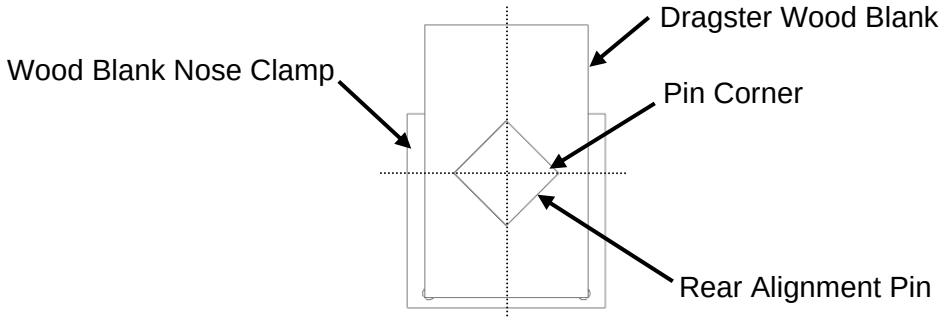

FIGURE 8: ORIENTATION OF THE ALIGNMENT PIN

3. **Prepare the jig.** Make sure that the two rail clamps are loose and free to move. If necessary, use the 4mm Allen wrench to loosen the bolts holding the clamps. Note: Only loosen the bolt that is on the slotted side of each clamp. The rear pivot bolts should never be loosened.

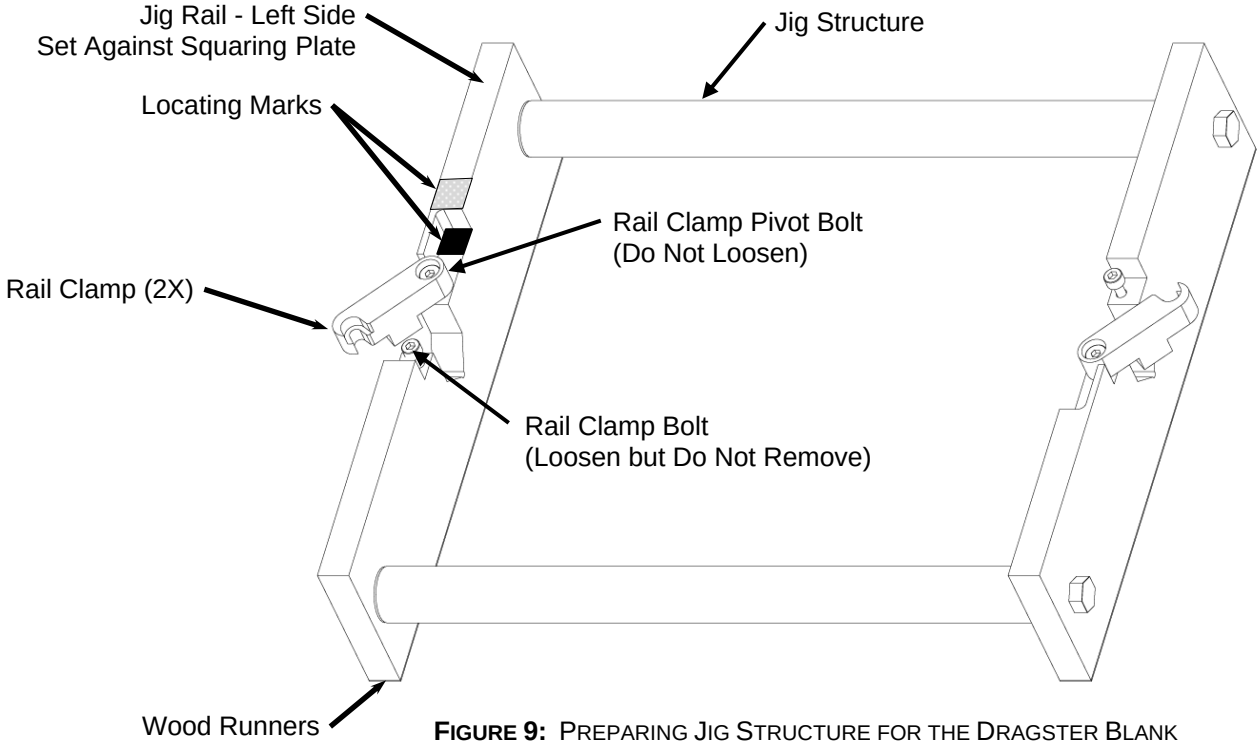

FIGURE 9: PREPARING JIG STRUCTURE FOR THE DRAGSTER BLANK

4. **Insert the blank into the jig.** Place the wood blank with assembled nose clamp and alignment pin into the jig structure with the nose of the blank facing the left side rail. The square bosses on the nose clamp and alignment pin should rest and align with the v-slots in the side rails. Swing the rail clamps into the closed position (in line with the rails).

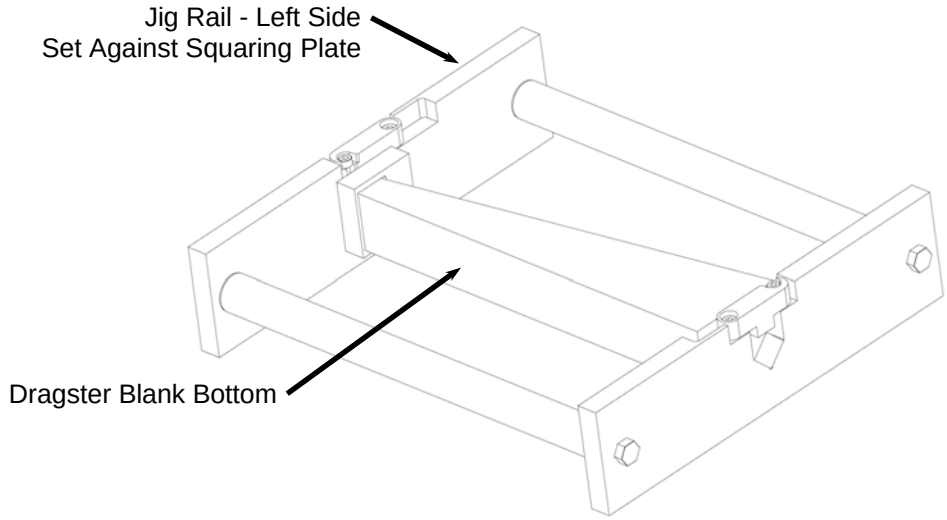

FIGURE 10: INSERTING THE DRAGSTER BLANK INTO THE JIG STRUCTURE

5. **Align the Dragster blank in the jig structure.** 1) Hold the wood blank and press the assembly firmly up against the face of the left side rail. This will make sure that the nose clamp is sitting flat against the left side rail. 2) Tighten the rail clamp bolt on that side with the 4mm Allen wrench. 3) Visually make sure that the alignment pin square is correctly oriented in the v-slot. 4) Tighten the rail clamp bolt on the right side with the 4mm Allen wrench. 5) Tighten the two setscrews holding the Dragster blank into the nose clamp with the 3/16" Allen wrench. Tighten securely. If the blank is balsa wood, tighten until the setscrews penetrate the wood about 1/8".

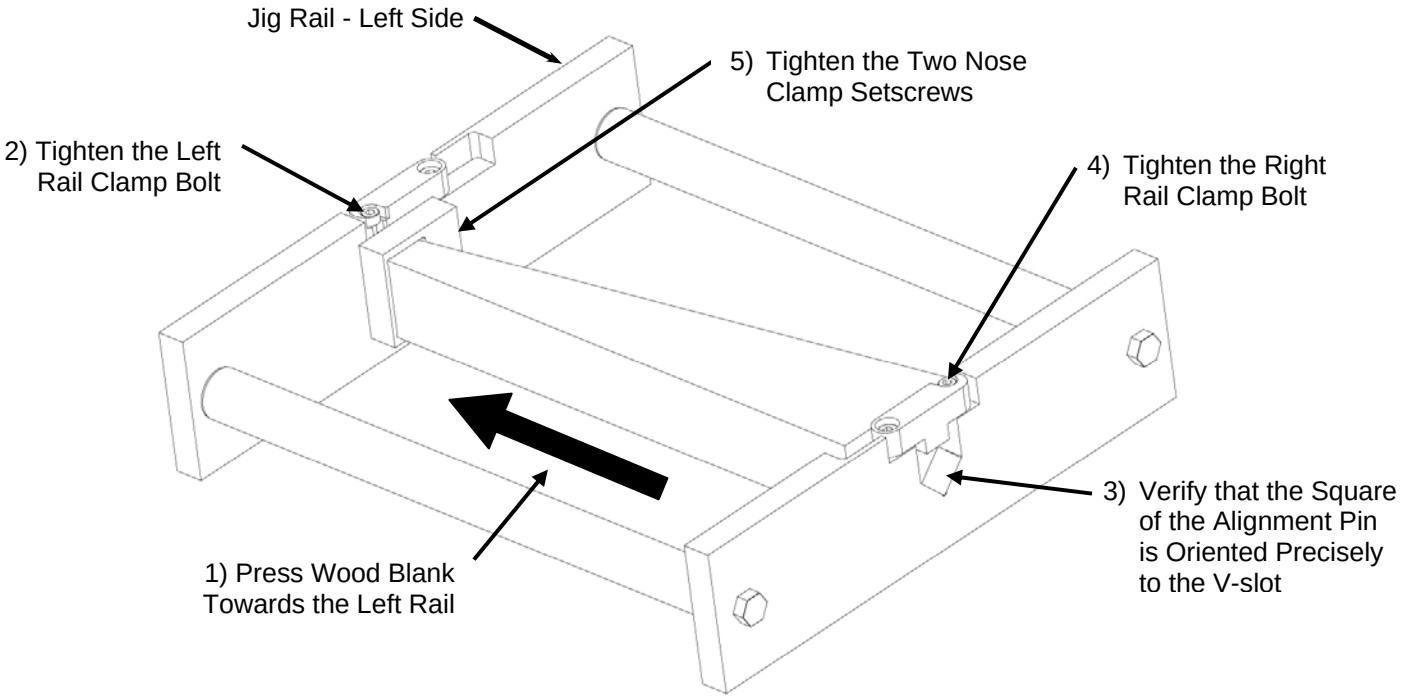

FIGURE 11: PROPERLY SETTING THE DRAGSTER BLANK IN THE JIG

6. **Insert the jig into the machine.** Crank the head of the machine up far enough to clear the height of the jig. Insert the jig into the machine, so that the left rail (the one with the indicator stickers) is up against the squaring plate. Be careful not to snag the belts with the jig. Position the jig roughly in the center of the machine, sliding it tightly up against the squaring plate along its entire length. Move the sliding plate firmly up against the right side of the jig. Crank the head down until the clutch clicks at least five times.
7. **Run the first side of the project.** Load your design project on the memory card, load it into the machine, and follow the machine instructions to begin cutting.
8. **Flip the Dragster Wood Blank.** Once the first side of the project is complete, the machine will prompt you to flip the now carved wood blank. DO NOT CRANK UP THE HEAD OR MOVE THE JIG IN THE MACHINE. DOING THIS WILL ABORT THE PROJECT. Open the cover, loosen the clamp bolt on each side rail, and flip the blank end for end as shown below (Figure 12) with the jig still clamped in the machine. Repeat steps 5 and 6, and run the second side of the Dragster project. Once the second side is done, remove the jig and clean the machine.

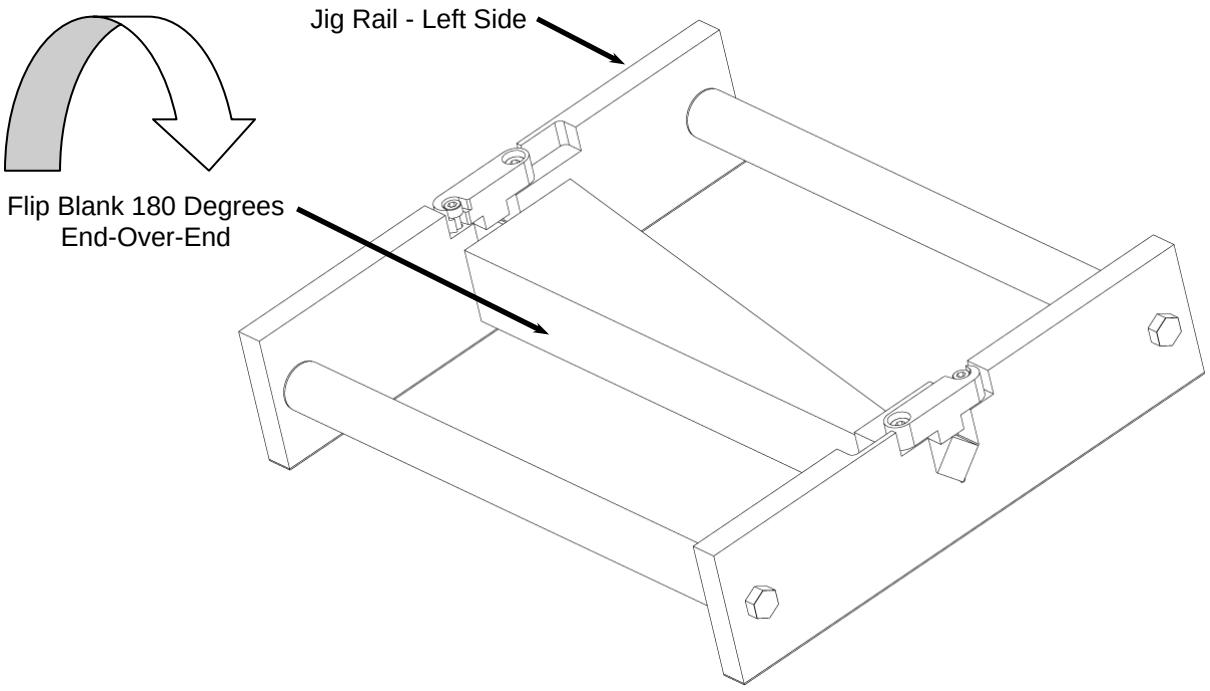

FIGURE 12: VIEW SHOWING THE DRAGSTER BLANK FLIPPED IN JIG

9. **A Note about Carving Keep Out (KO) Zones.** Because of the way that the dragster system is configured, there are two zones on the wood blank that the machine will not carve. At the narrow end of the 12” wood blank there is a 7/8” no-carving zone, and around the 3/4" cartridge hole on the wide end there is a 15/16” diameter no-carve zone that extends 2-3/16” into the blank. The import portion of the Dragster software will add material in these areas if your design is lacking material in these zones. It is good design practice to consider these zones into your car design from the beginning. In no way do these no carving zones preclude you using the entire length of the blank. It simply means that you will have to manually remove any material in these zones after the machine finishes carving.

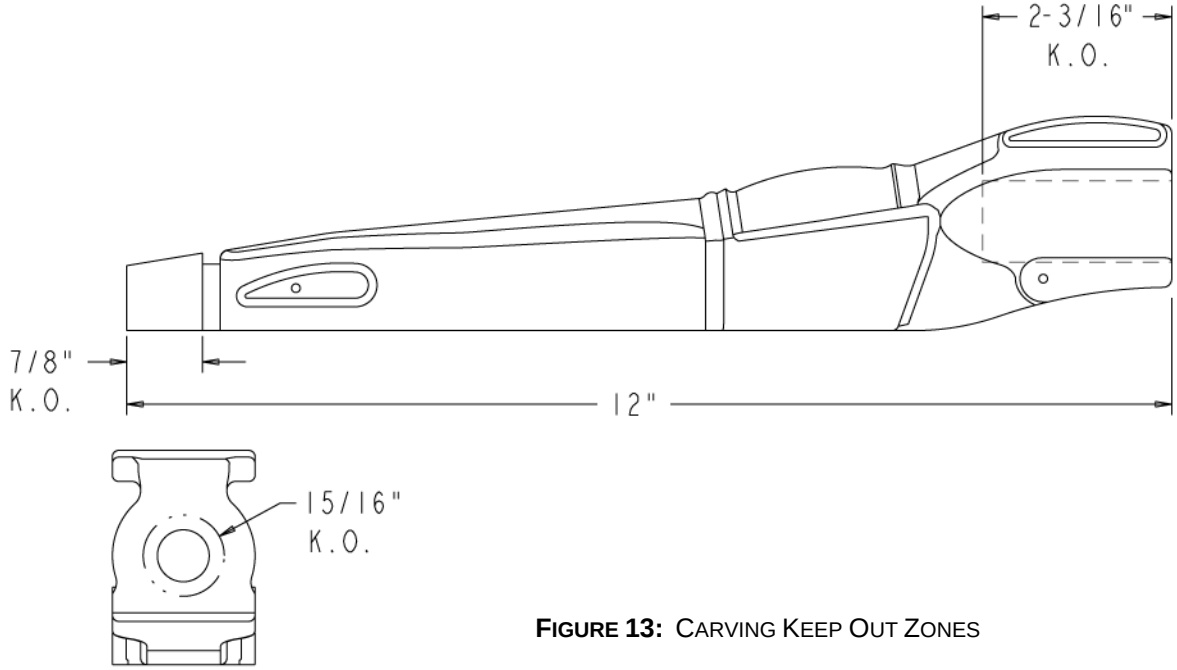

FIGURE 13: CARVING KEEP OUT ZONES

Adjusting the X Axis Offset

After squaring the machine and carving the first Dragster blank, we want to verify that the carving is not offset with respect to the bottom of the wood blank. Examine the finished Dragster along its bottom edge and determine if the carving is shifted either into the car blank or out of it relative to the bottom surface of the block.

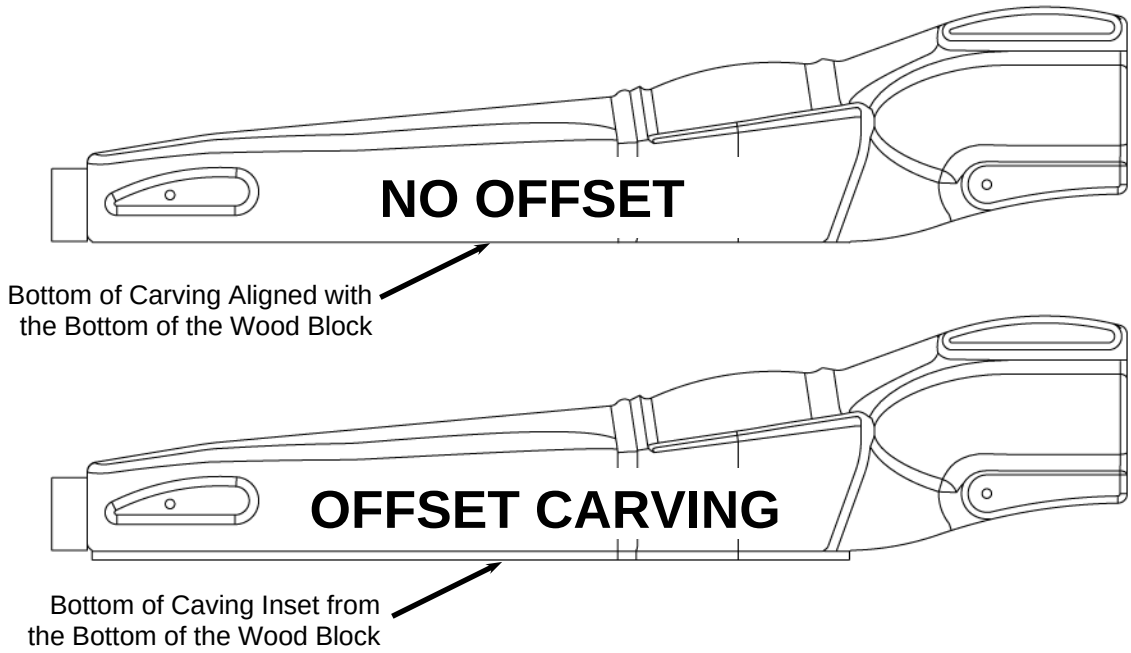

FIGURE 14: VIEW OF THE DRAGSTER CARVING OFFSET

If machine parameters are adjusted properly, you will not see any offset in the carving (as evidenced by the line in the bottom car of Figure 14). If an offset does appear, you will need to adjust the offset parameter on the machine keypad. Follow the instructions below to complete the offset calibration.

1. Navigate to the *Configurations Menu* from the *CarveWright Main Menu* by using the **up/down arrows** or pressing the "**0**" (**Options**) key on the keypad. Navigate to or select item 6, *Calibrate Offsets*. Once inside the Calibration menu, scroll down or press "**5**" to select the *CO2 Jig Offset* menu item.

2. Select the direction of the offset adjustment. If car is carved too much inside the blank then select "Off Car" for the offset direction. If machine carved the car slightly off the wood blank then select "Onto Car" for the offset direction.

3. Measure the carving offset to the best you are able with a caliper or a ruler. Enter the value measured at the prompt. You can use a fractional or decimal input.

Once the value is entered, it will be stored in the machine's memory for all future measurements. Repeat the Dragster carving and evaluate the offset again.