Half-Blind Dovetails – Both Tails & Pins Cut with a Dovetail Bit using DRO

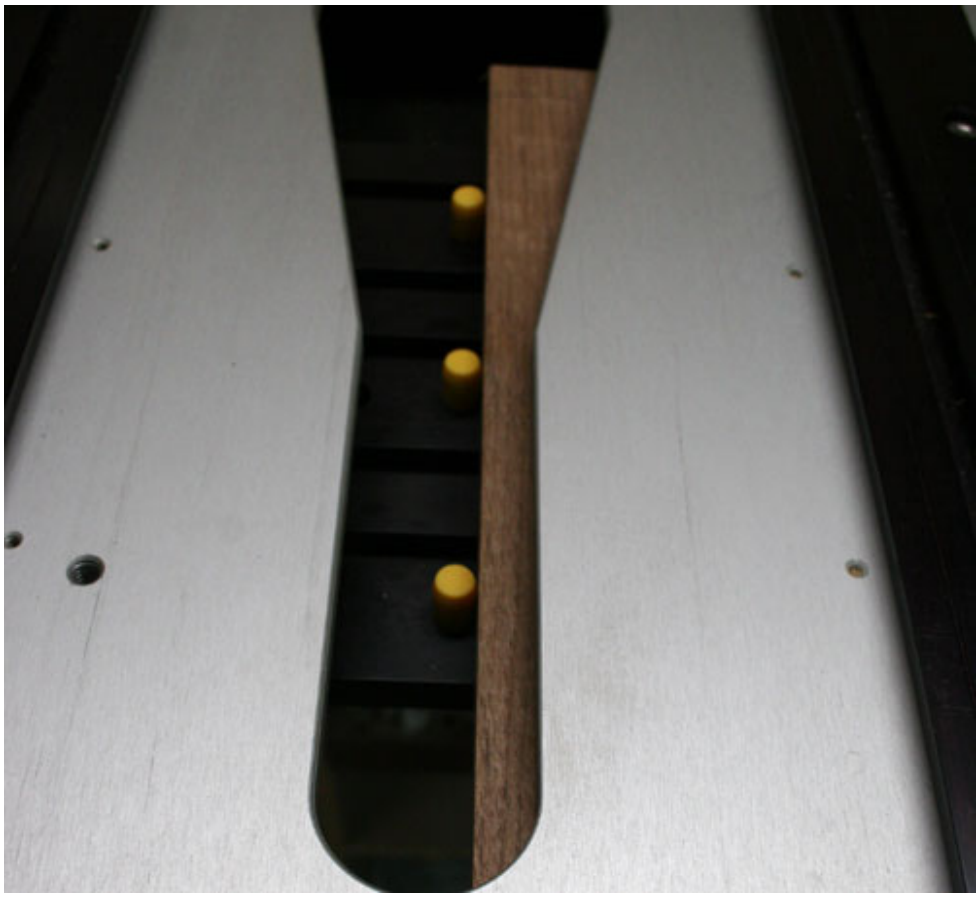
(note: our standard method in user manual uses a straight bit for the pins and is less complex)

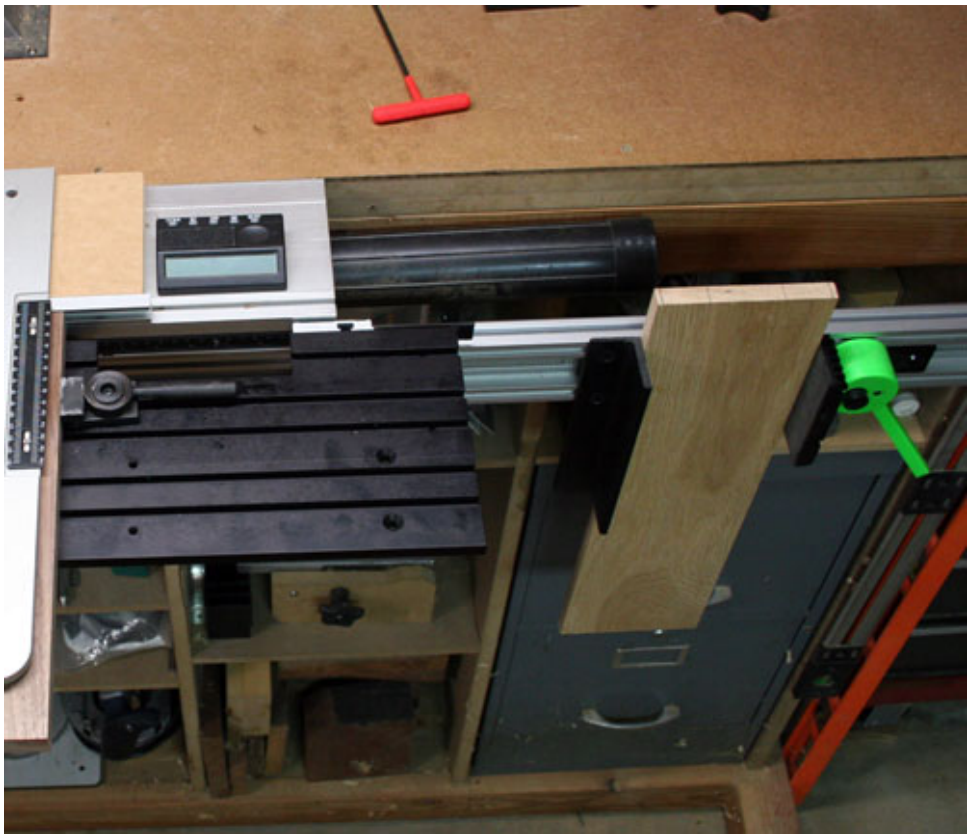
NEW – Design tool now available for the layout and math (click this link)

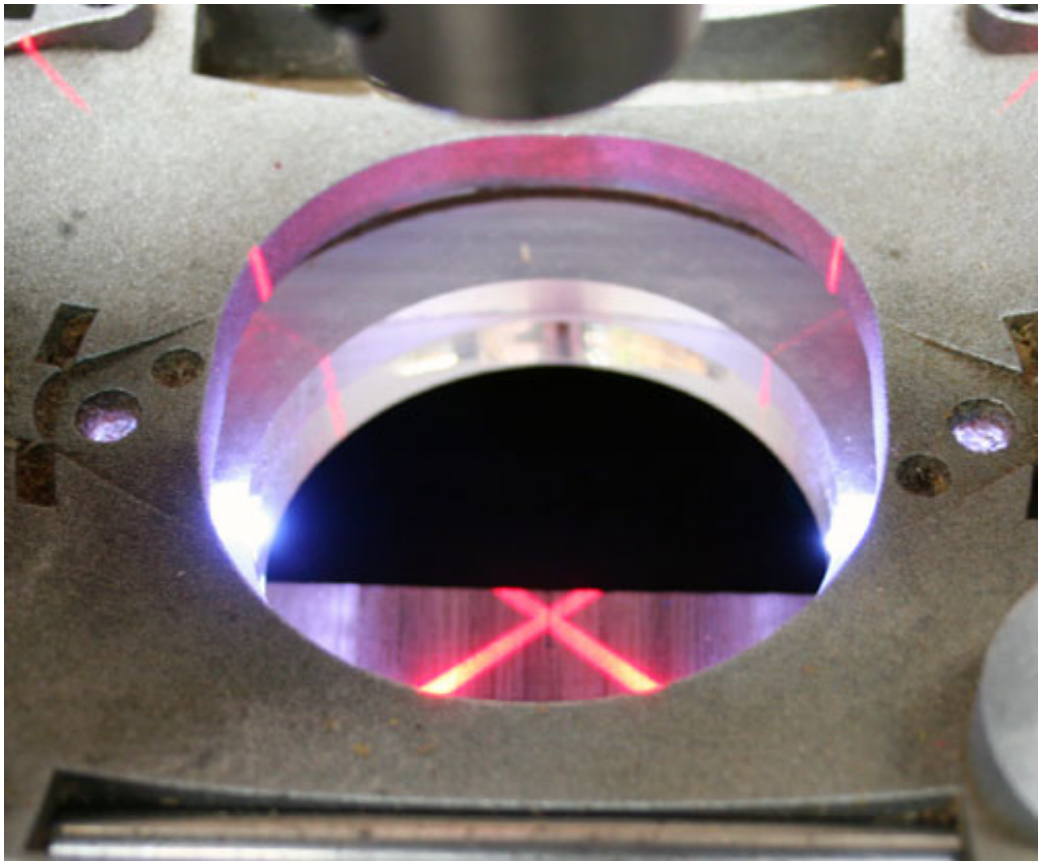
The half-blind dovetail jigs use templates that define the joint and limit you to certain bits, spacing and incremental board widths. Instead of templates to define the joint, with Router Boss you can use our digital read out (DRO) and forget all those limitations of the jigs. By also using our mortise table you can cut both the tails (sockets) and pins with a dovetail bit, but unlike with the jigs you can choose any bit.

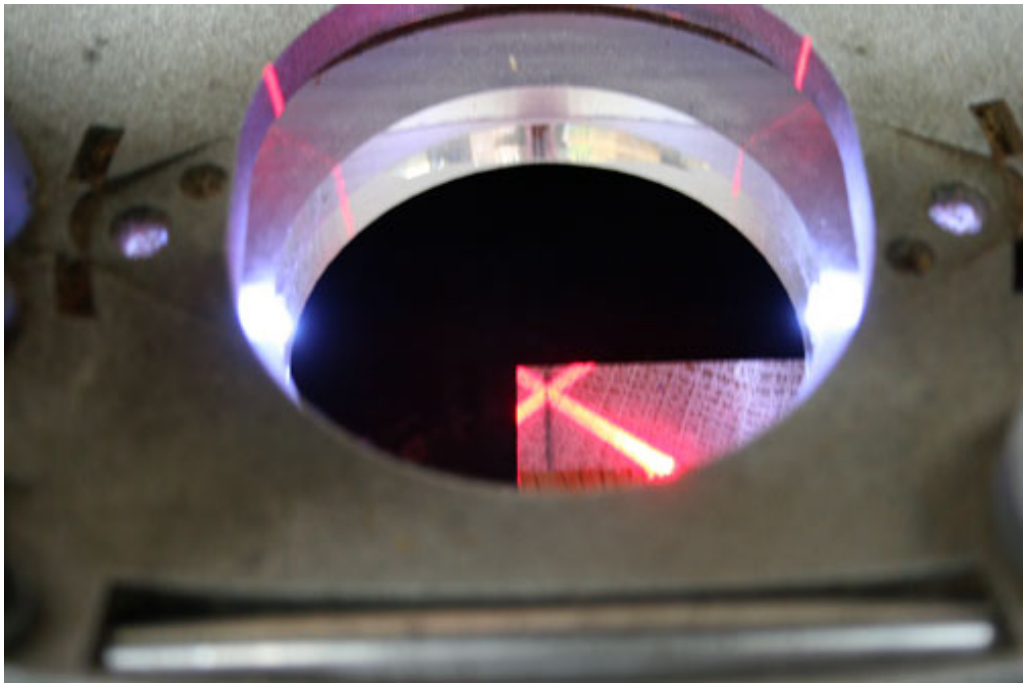
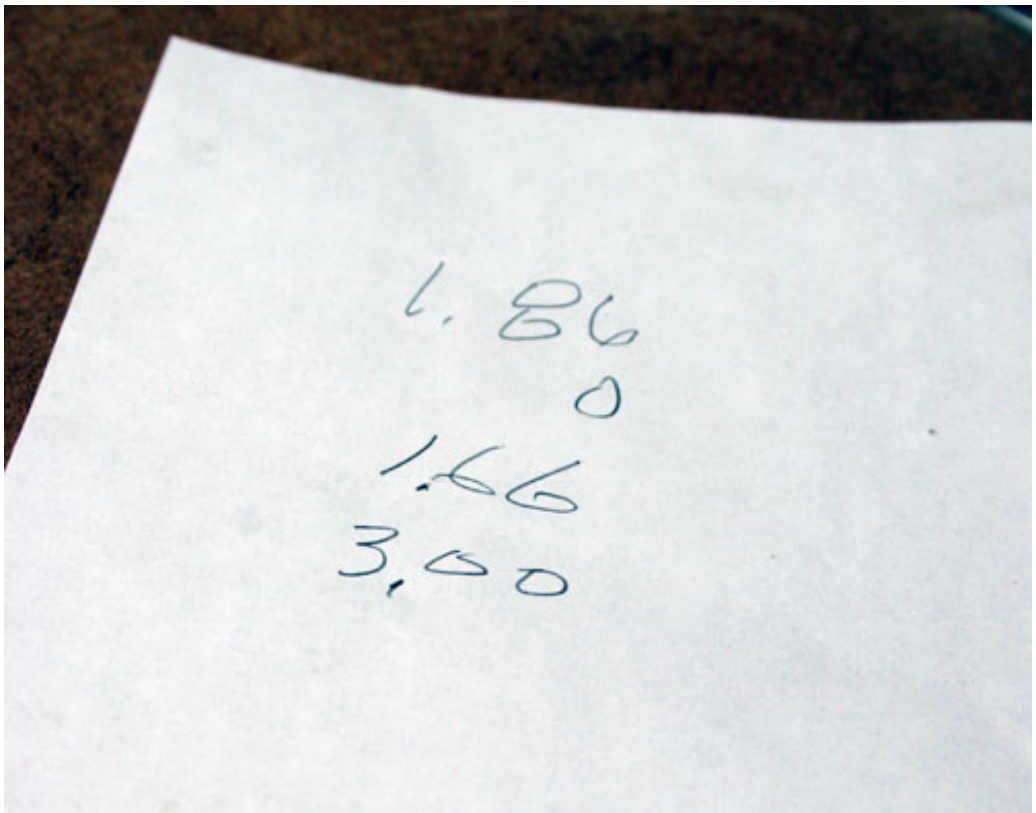
1. Select Boards – I chose a 9/16" oak board for the tails and ¾" walnut for the pins. Both boards were cut 5-1/8" wide.
2. 
3. Mark thickness of tail board on end of the pin board with pencil or striking knife.
4. 

5. Layout centers for dovetail bit on tail board. I plan to cut with a 3/8” HSS dovetail bit with a half-pin on each side, so for the pin centers I started 5/32” in from each side then set a full pin 2” in from left edge and another full pin 1-1/2” in from right edge. Thus creating an asymmetrical pin arrangement. Choose any layout you like.
6. 
7. With the board edges flush, use the first full pin location on tail board to mark a common zero mark on the pin board. This will allow you to use the zero feature of the digital display (DRO).
8. 

9. Remove back spine from Mortise Table and mount on Router Boss as shown (extending out from left). Mount fixed fence and movable cam on right side of the sliding bar. To attach the Mortise Table to its supports use the small knobs with ½" shanks furnished with the L-clamps.
10. 
11. Place 3 yellow locator pins in the center pin holes to service as a fence for the pin board.
12. 

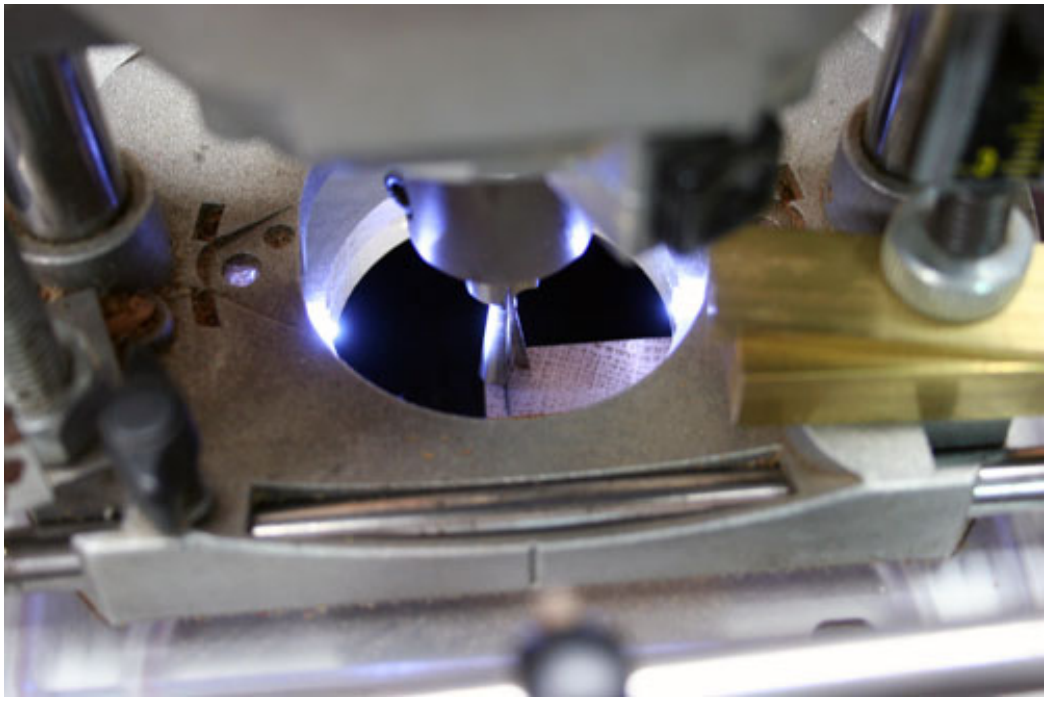
13. I clamped the pin board to Mortise Table using a ShopFox t-track cam that pushes the pin board against the locator pin fence. Two of the ShopFox cams would be best or a pair of shop made cams. You could also use a shop made wood fence, rather than the locator pin fence.
14. 
15. Clamp the tail board to the right of mortise table with the sliding bar cam and fence. The top surface of both boards should be flush with underside of the Router Boss base plate.
16. 

17. With Router Boss's laser cross hair locate the zero mark on the tail board. We've used the center of cut location for first full dovetail pin as a common zero point for both the tail and pin boards.
18. 
19. Set DRO display to zero. All other cuts will be an offset from this zero location.
20. 

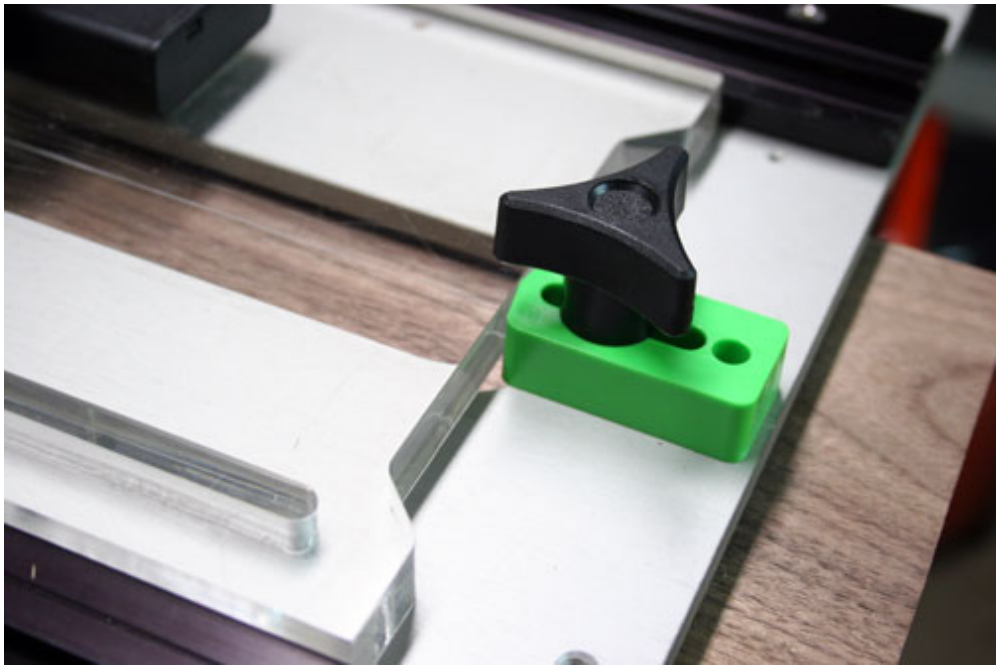
21. Beginning with the left pin location record all pin locations by moving the laser cross hair over the center line mark for each dovetail pin.
22. 
23. Log all dovetail pin cut locations. All of the cuts in both the tail and pin boards will use these cut locations. I record the cuts from left to right. The numbers to right of zero will be negative numbers on the DRO.
24. 

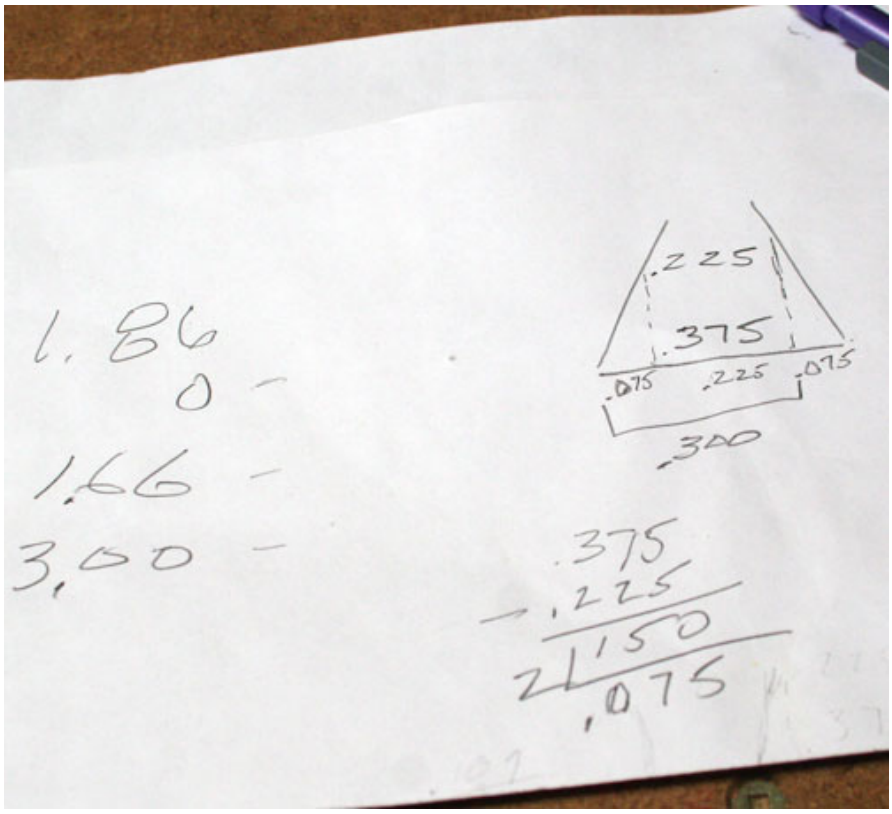
25. Turn crank to move sliding bar to first cut location. I always record cut locations in hundredths. The thousands reading will show me how close I am when I make the cut. If within +/- .003 then I stop without any noticeable effect in fit of the joint. Perfectionists may strive for +/- .001.
26. 

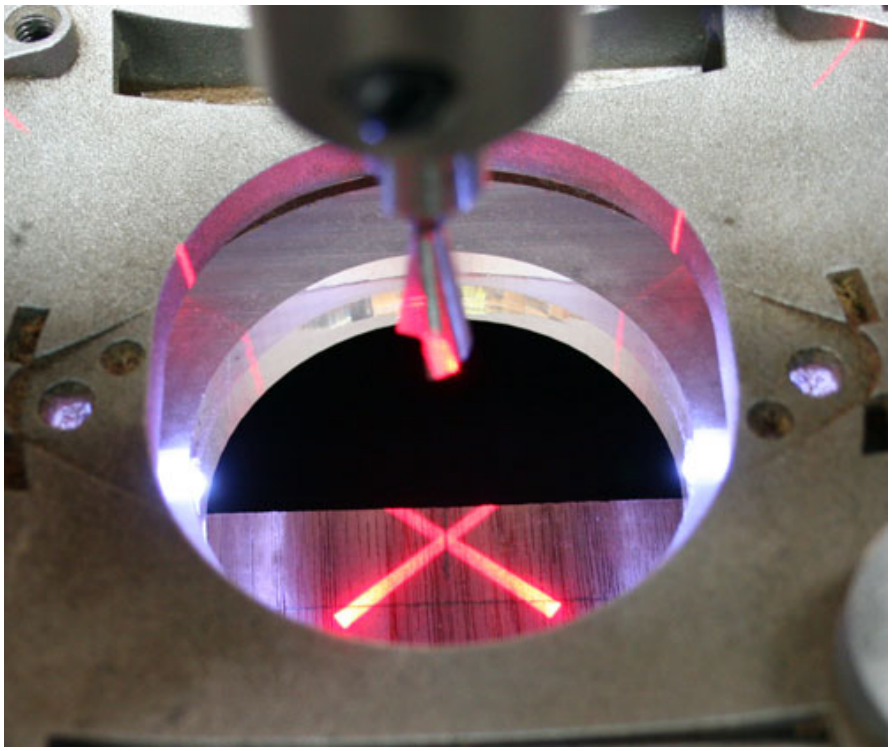
27. Set plunge depth for the dovetail bit. Zero bit on top of the tail board then insert gauge bars in the router depth stop mechanism to establish the router plunge depth. In this case I used a ½" plus a 1/8" gauge bar (middle right in picture) to set plunge depth to 5/8". Later we'll also cut the pin board at this plunge depth. You can choose any plunge depth, but for half-blind dovetails the plunge depth must be less than thickness of the pin board (¾" in this case).

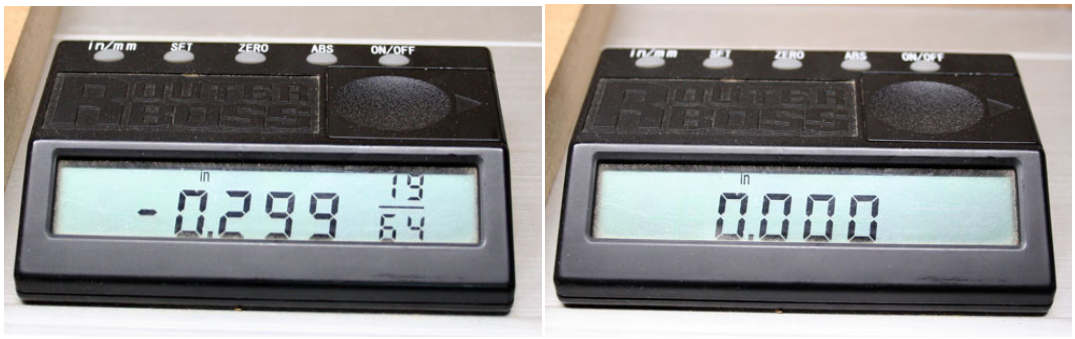


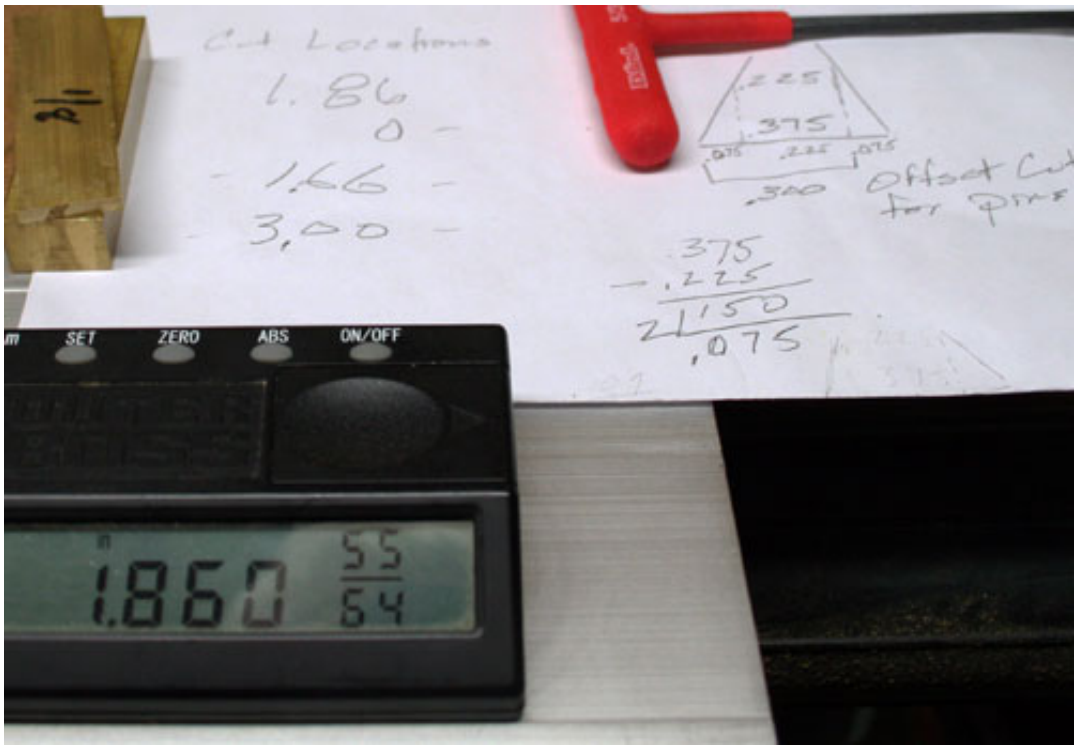
28. Complete all tail board cuts at the logged cut locations. Cut slowly so as not to break the dovetail bit. I do a climb cut when making the half-pin cuts on each side by starting the left half-pin from the front of the board and the right half-pin from the rear of the board.
29. 
30. Rotate the dovetail bit so that the cutting edge is toward you. Align the cutting edge on the previously drawn line on the pin board that indicates thickness of the tail board. This represents the maximum that the dovetail bit should cut into the pin board. Since the dovetail bit is angled, when the bit is plunged the top of the cut will not reach the line and we will later need to cut a recess in the tail board for this difference.
31. 

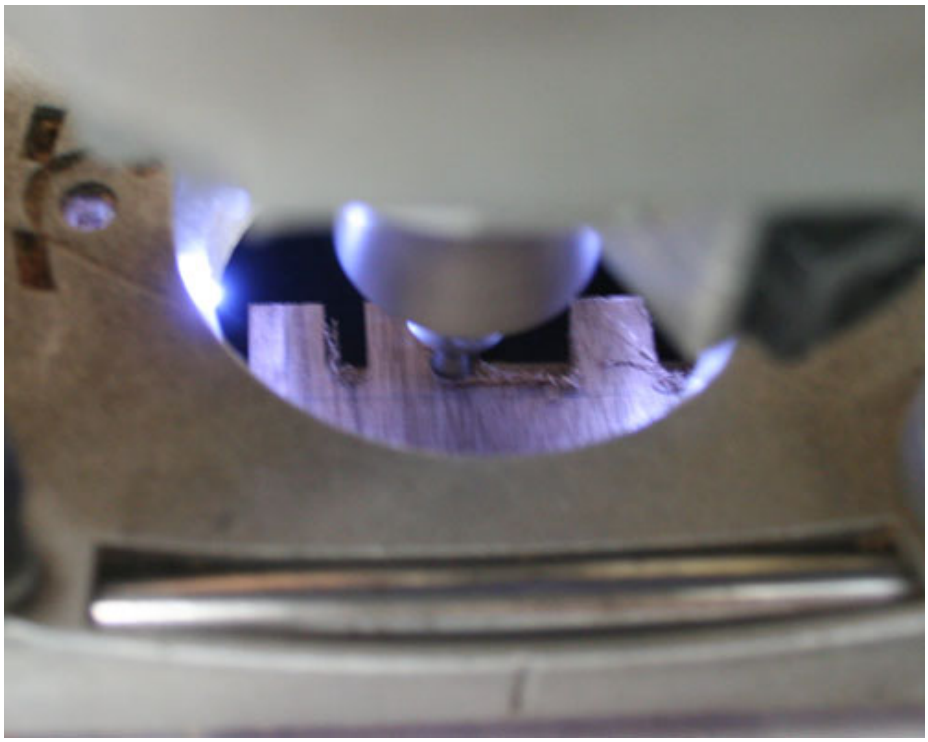
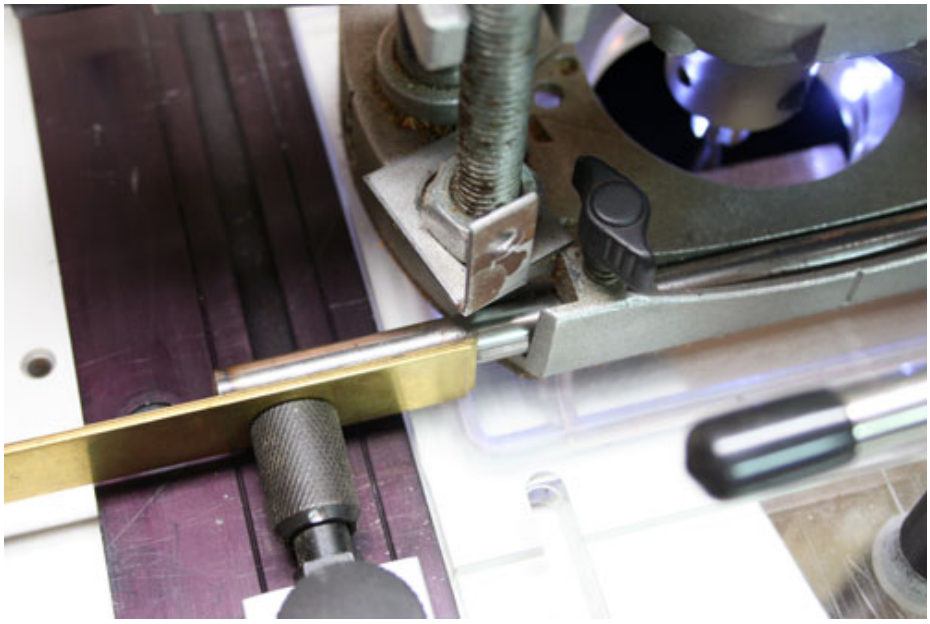
32. We can use one of Router Boss's green stops to limit travel of the router bit beyond the line drawn on the pin board (as seen above). Leave this stop set for all pin board cuts
33. 
34. Now for the math part. For each full pin we need both a left and right cut in the pin board. We will accomplish this by cutting to offsets from the cut locations we used for the tail board. We will start our calculation by measuring the small opening at the top of each tail board cut. In this case we measure .225". We plug that number into the calculation below.
35. 

36. It is lengthy to explain the mechanics, but the offset calculation is width of our dovetail bit minus width of the top opening in the tail board divided by 2 then the result is added back to the width of the top opening. In this case all offsets are to be .300”
37. 

38. Before we can do the offsets we need to locate our common center on the pin board.
39. 

40. We'll cut all of the right offsets first then the left offsets. Zeroing the digital display then cranking the sliding bar to move the cut to right results in negative numbers. In the case of our example we stop at -.300 or within a few thousands then we once again zero the digital display.
41. 

42. The offset pin cuts are straight cuts to the stop previously set. Make all the right side pin cuts beginning with the first cut location at 1.86 then continue to the 0 location followed by -1.66. These are the same numbers that we used to locate the tail board cuts, except that they have all been offset by .300 to the right when we zeroed the digital display. We do not make a cut at the final -3.00 half-pin location because the right half-pin has no right side. Next we will use the laser cross hair to again find common center on the pin board. Again we zero the digital scale, but this time we'll crank the sliding bar to the left until we reach a positive .300 then zero again. We make all of the left side pin cuts exactly the same as the right side pin cuts skipping the first cut at 1.86 since the left half-pin has no left side. So, the first left cut is at the 0 location followed by -1.66 and -3.00. That completes all of the left/right pin offsets, but we still have work to do. We have to clean out the waste between pins and the best way to do that was while we were cutting each pin's left offset. See next page.
43. 

44. To clean out the waste between pins, on each left side offset cut lock the router plate by turning the locking star knob when the cut is stopped. With the plate locked, crank the dovetail bit to the left until just short of the previously cut right offset cut then loosen the star knob, move the router bit rearward to board edge then crank the bit back right to remove any remaining waste. Only the pins in your layout plan should remain.
45. 
46. As a final step, cut the relief in the back side of the tail board. We can do this by setting a stop. With bit zeroed against rear of the tail board, we need to move the router forward to cut the slant (.075”) determined earlier when calculating the pin offsets. Use gauge bars and/or a micro-adjust stop (1/4 turn = .010”) or our north/south digital to control this router movement.
47. 

48. Make the relief cut on back of tail board. A climb cut (left to right cut) avoids breakout. After making the relief cut you must pare off the corners nearest the relief cut with a chisel. The pared corners will be hidden when the joint is assembled.
49. 
50. That's it. Assemble the joint and admire your work. There is no half-blind dovetail jig that can claim this versatility. You can use any dovetail bit on the planet to make all the cuts, use any size boards, cut the joint at whatever depth you want, space the pins however you like, no angles to set or cut, no templates or guide bushing, complete freedom. Unleash your creativity.
51.