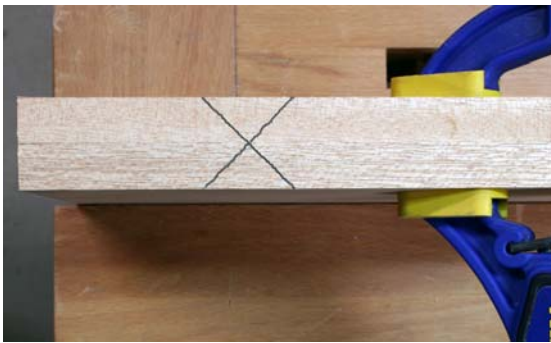


Instructions for making a box with finger (box) joints using WoodRat®, digital scale and spiral bits



In these instructions we will demonstrate how to cut finger joints to make the front, rear and two sides of a box using our digital scale mounted in east/west orientation.

Our box is approximately 10" x 15" x 8" tall. All the wood was dimensioned square to a uniform thickness before starting.



Mark boards

For alignment purposes mark matching front/rear and side boards with a X. Draw the X on an edge that is not to be jointed with best faces on inside. Center of X should be at intersection of both boards.



Layout finger joints on one board

You can layout your fingers in any pattern. We started from the X edge with a $\frac{3}{8}$ " finger cut and then added two $\frac{3}{4}$ " finger cuts spaced $\frac{3}{4}$ " apart. That's the entire layout because after cutting these fingers we will flip board and cut matching fingers on other side. This technique produces a symmetrical joint that can be as wide as 12". The uncut middle space becomes a center finger.



Mount layout board

Clamp the board with layout pattern to WoodRat's sliding bar with the layout marks on top and the X edge against fixed fence

Note: Aluminum guide rails are mounted on base plate.



Align bit to 1st finger cut

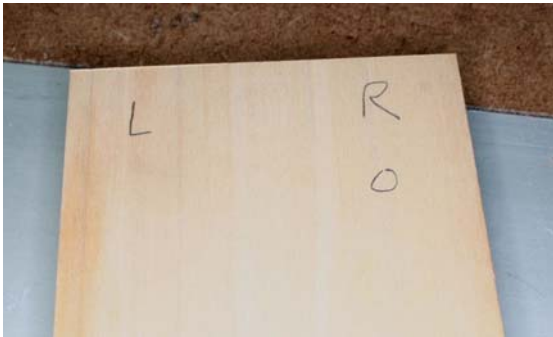
We chose to use a 1/2" spiral bit to cut the fingers. Chuck the bit and rotate it so that its cutting points run left to right. Plunge the bit to top of board then align right edge of bit with right edge of the left finger cut mark on the board.



Zero digital scale

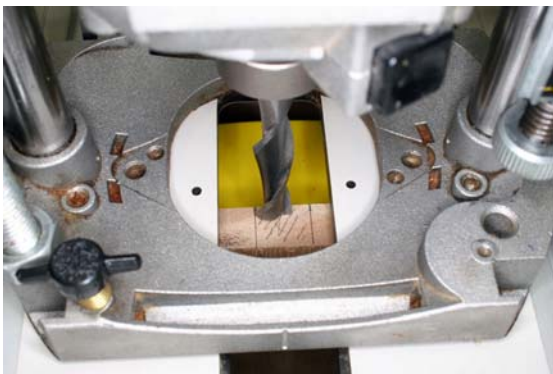
Press 0 button on digital scale to zero the scale. The scale should be set to read in thousandths of inch.

To maintain a consistent reference point this is the only time we will zero the scale.



Record digital scale setting

On paper or scrap board record digital scale setting for first finger cut. You'll need two columns representing left and right side cuts. For this finger there is only a right side cut.



Align bit on left side of second cut

Align left edge of bit with left edge of second finger cut on layout board.

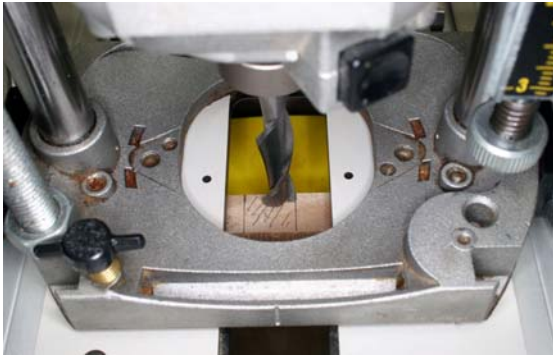
Accuracy is not critical, because finger size and placement is your option. The cut must be at least as wide as the bit being used.



Record left side digital scale reading

Read scale and record left side reading for this finger. Round to hundredths (e.g., 1.25).

For simplicity we round all readings to hundredths. This may slightly change cut position, but it does not affect fit of joint.



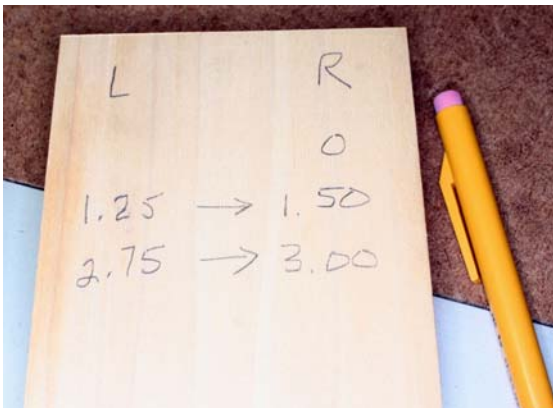
Align bit on right side of second cut

Align right edge of bit with right edge of second finger cut on layout board.



Record right side digital scale reading

Read scale and record right side reading for this finger. Round to hundredths (e.g., 1.50).



Complete readings

Repeat above for other finger cuts on layout board and record the digital scale readings. Each reading will be a finger cut.

You are now ready to proceed with cutting the fingers.



Mount side pieces

We can cut two matching boards at same time. Clamp both of the box side pieces to WoodRat's sliding bar, flush to underside of base plate. The edges marked with X should be against the fixed fence.

You may also want to secure the boards together with a quick clamp.



Set router depth stop

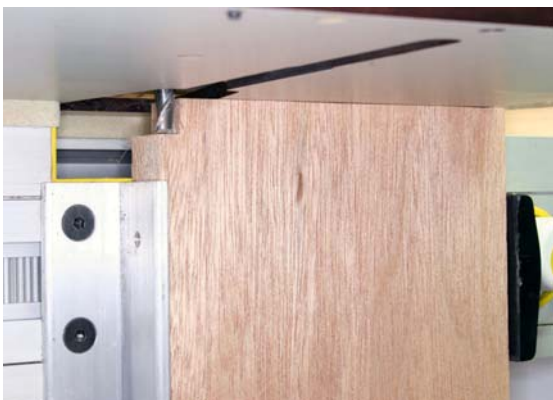
Plunge bit to top of boards to be cut. Insert one of the front/rear mating boards in router depth stop (turret removed) and set the depth stop to thickness of board.



Position at first cut

Turn handle on WoodRat to crank the sliding bar left until digital scale reads 0.00 within +/- .0025. This is first cut position.

The .0025 tolerance is sufficient for a good joint fit. It is about 1/6th of 1/64" and much finer than pencil marks.



Make first cut

Start router, plunge bit to depth stop and make first cut. To avoid breakout you can cut half-way in from both sides. Because there is no breakout between the meshed boards, our later assembly will place any breakout that does occur on inside of box.



Make the additional cuts

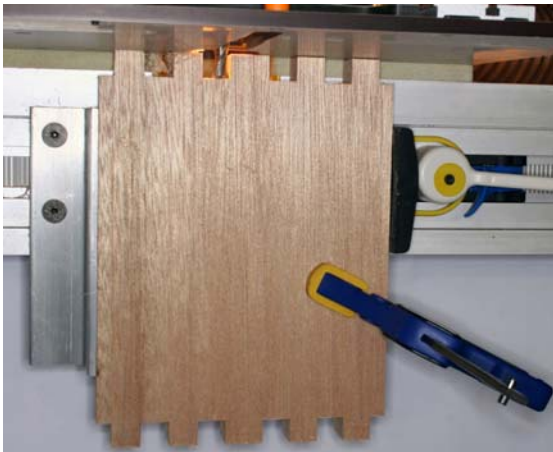
Observing digital scale, crank handle to move sliding bar to the recorded digital readings within .0025 tolerances and make left and right cuts until all are completed.

Any wood remaining between left/right cuts should be removed.



Flip board and repeat

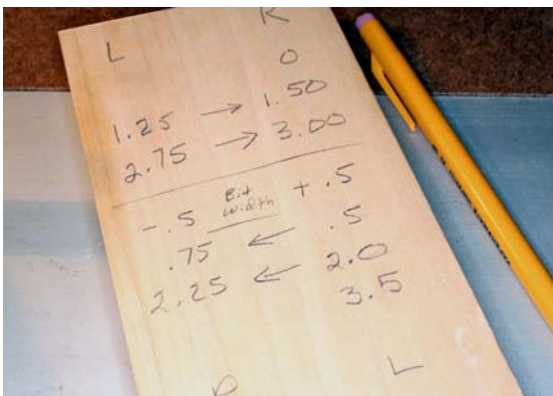
Flip board then repeat the above cuts. This completes the fingers on this end of the side boards.



Reverse ends and repeat

Reverse board ends and repeat all of the above cuts starting with the X edges against fixed fence. This completes the fingers for box sides.

Tip: Our symmetrical joint could be cut in either direction, but following the X rule aids assembly and is critical when layout is random or asymmetrical.



Calculate settings for mating pieces

It's best not to reset the digital scale to cut mating fingers in front/rear pieces. Instead you can calculate the appropriate readings. Simply add the bit width to each of your previous right settings and they become your left settings. Subtract bit width from previous left settings to determine new right settings for a mating joint.



Position for first mating cut

For our mating pieces we calculated:

<u>New Left</u>		<u>New Right</u>
$0 + .5 = .50$	→	$1.25 - .5 = .75$
$1.50 + .5 = 2.00$	→	$2.75 - .5 = 2.25$
$3.00 + .5 = 3.50$		N/A

We begin at the .50 setting.



Repeat procedure used for side pieces

Cut both front and rear pieces at same time. Begin with edges marked with X against fixed fence. Use digital scale settings for left half of board then flip and repeat for right half. Avoid breakout by making half the cut from both sides. Clean out any remaining wood between left/right cuts.



Cut both ends to complete joinery

After both board ends are cut, the finger joints are complete and you are ready for assembly or you may want to perform other operations like adding grooves for a bottom.



Assemble box

In assembly, edges marked with a half X are at top of box and angle bracket (>) formed by each half X points to outside of box.

You can achieve a perfect joint fit every time with our digital scale. You choose finger size, spacing and joint size up to capacities of digital scale and WoodRat.

Please email us at info@thecraftsmangallery.com with any corrections or improvements to these instructions. Check our web site www.chipsfly.com for our products and additional information.