

FMT PRO CHAPTER 5

Multiple Joints

Double In Line Joints
Twin Joints
Quadruple Joints
Triple Joints



Before starting, watch the Instructional Video

Scan the QR Code to stream to your tablet or smart phone, or view it in the support section at Leightools.com



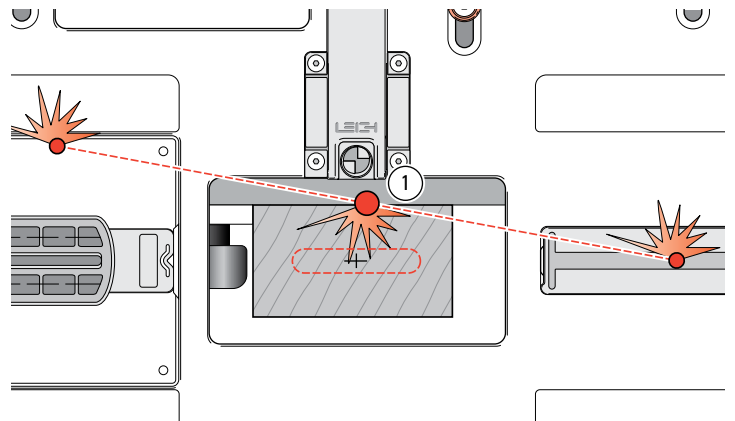
Scan QR Code

Before using your Leigh FMT Pro you must have completed all of the preparatory steps including reading the router safety recommendations on the previous pages. If you haven't done so, it is essential that you do it now.

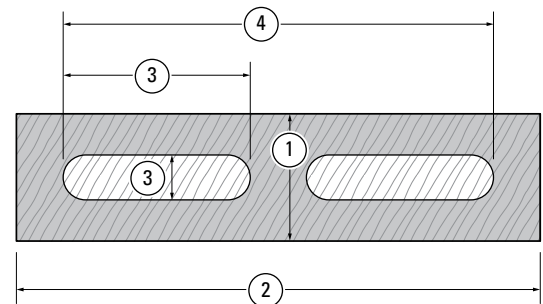
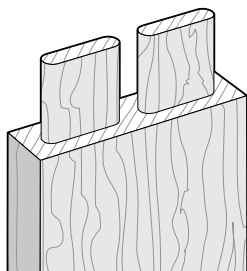
⚠ IMPORTANT SAFETY NOTE

Take great care to not “trap” the bit against the side of tenon rails ①. Do not attempt to rout center tenons in rails thicker than $1\frac{5}{16}$ " [34mm] before referring to 5-39 through 5-44.

Without using the table movement as prescribed, the bit would have to be plunged into the side of the tenon rail causing the bit to powerfully “drive” the router across the jig. **This could be dangerous and can damage the jig.**



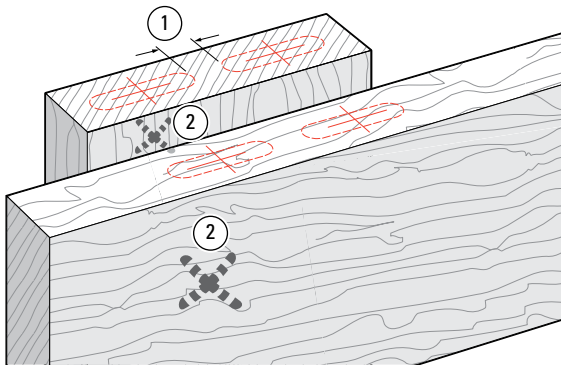
Double In Line Joints



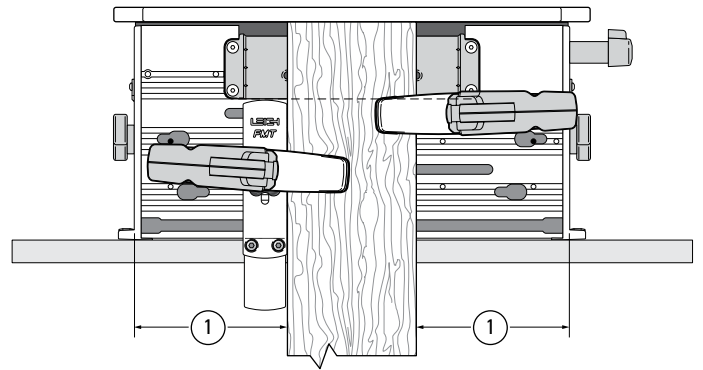
5-1 These instructions are based on the assumption that the correct joint tightness and guide pin setting has been established and that you are thoroughly familiar with the Jig's use for single joints.

5-2 Note: The **maximum** dimensions for double in line joints are:

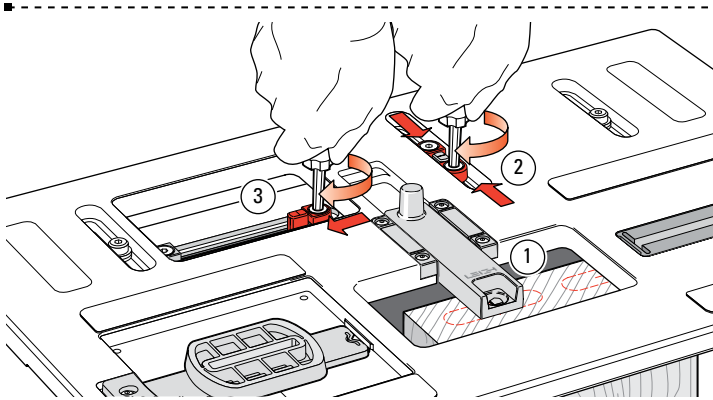
- ①② Tenon Workpiece: $1\frac{5}{16}$ x $5\frac{1}{2}$ " [34x140mm]
- ③ Tenon: $\frac{1}{2}$ x 2" [12x50mm]
- ④ Tenons, both Overall: $\frac{1}{2}$ x $4\frac{1}{2}$ " [12x115mm]



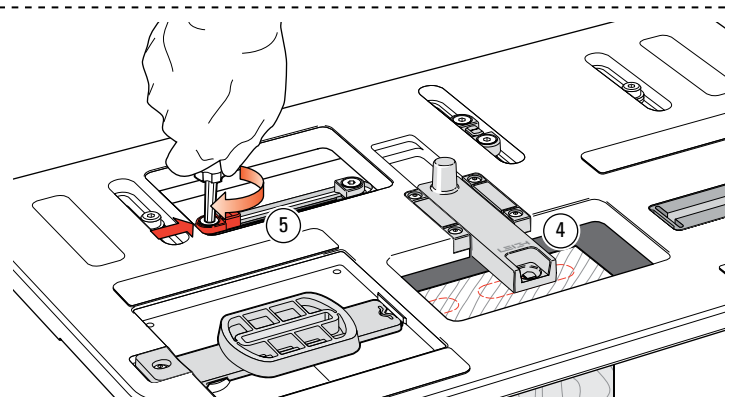
5-3 Mark the two mortise and tenon centers, taking care to allow space between the joints ① at least equal to the tenon bit diameter. Mark the faces that go against the clamp plate ②.



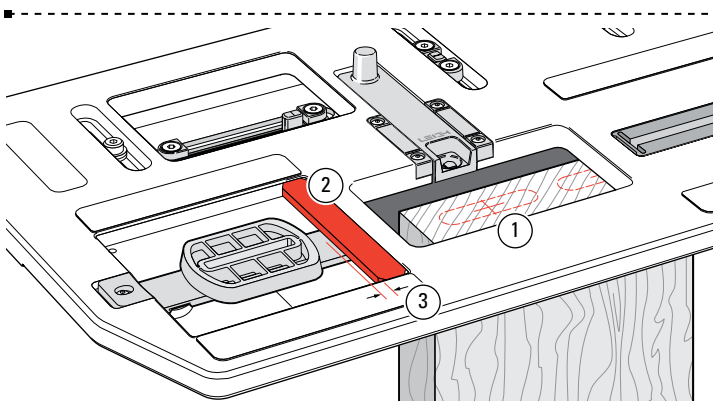
5-4 Set the sidestop fence so that the tenon piece is clamped approximately centrally on the clamp plate ①.



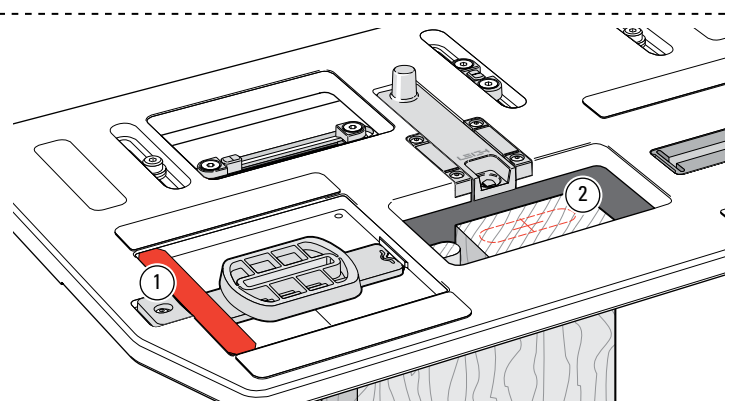
5-5 Sight the left hand tenon and lock the table ①. Set and lock both **FB** limit stops against their stop post ②. Set and lock only the right hand **LR** limit stop against its post ③.



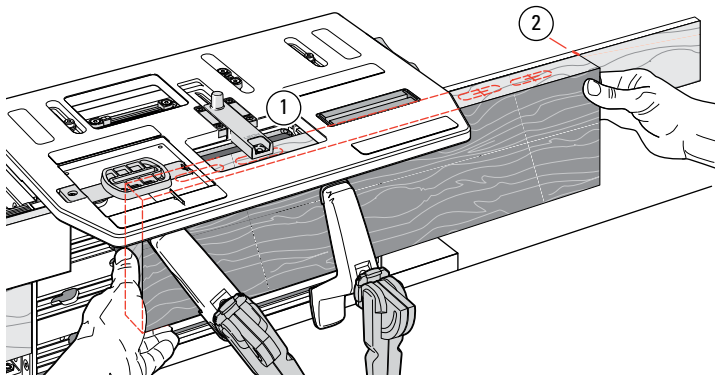
5-6 Unlock the table and sight the right-hand tenon ④ and lock the table. Set and lock the left hand **LR** limit stop against the post ⑤. Release the table clamp and move the table left and right against the **LR** stops to double-check sight alignment to the two tenons. Retract the sight.



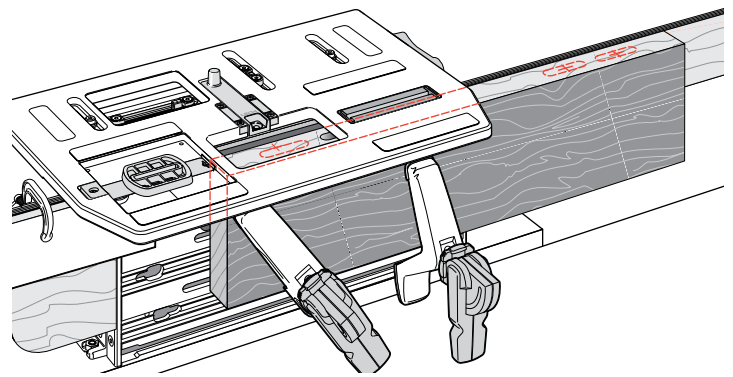
5-7 Move the table left and lock. **Do not rout yet.** While with practise it is fairly easy to avoid routing “into” the right tenon while routing the left ①, we recommend that beginners use a small shop-made “guard” to prevent this ②. Use 1/4" [6mm] thick MDF or plywood. Allow a 3/16" [5mm] gap between the end of the guide and guard ③. Rout the left tenon.



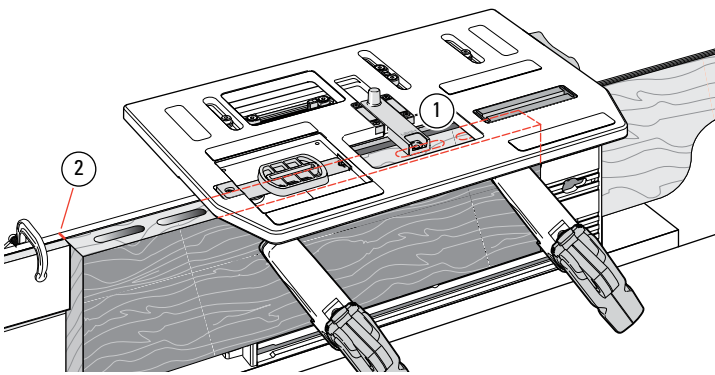
5-8 Move the table right and lock. Lift the left end of the (stationary) router and move the “tenon guard” left ①. Rout the right hand tenon ②. Repeat as required for all tenon ends, moving the table “guard” piece only once for each pair. Leave the table to the right. Remove and save the guard. Note: If you change the plunge height between tenons, there’s the chance of having a step in the shoulder. We recommend leaving the bit plunged.



5-9 Extend the sight. Position and clamp the mortise piece so the right hand mortise of the first pair is centered under the sight ①. Either mark an outrigger or set a stop block for successive mortise pieces ②. Rout the right hand mortise. Note: Outriggers are referenced in Step 3-19.

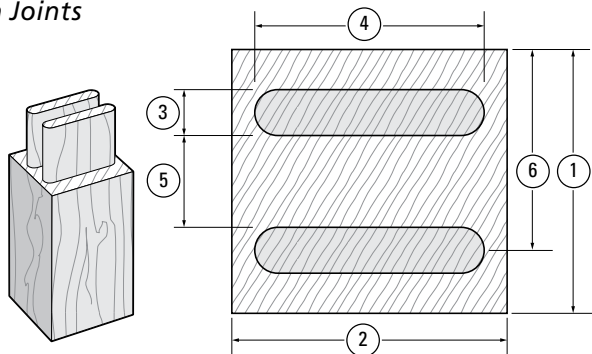


5-10 Move the table left and lock. Rout the left hand mortise. Leave the table to left.

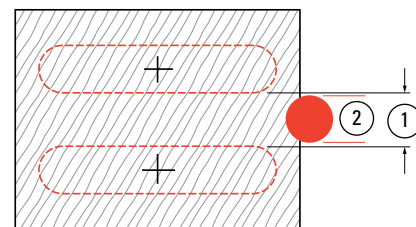


5-11 Extend the sight and unclamp. Sight the left of the other pair of mortise positions ① and re-clamp. To avoid re-sighting each board, mark the left hand outrigger or set a stop at the workpiece end ②. Rout the mortise, then move the table and rout the right hand mortise. The table limit stops and outrigger marks (or stops) are now set for successive workpiece mortising. ■

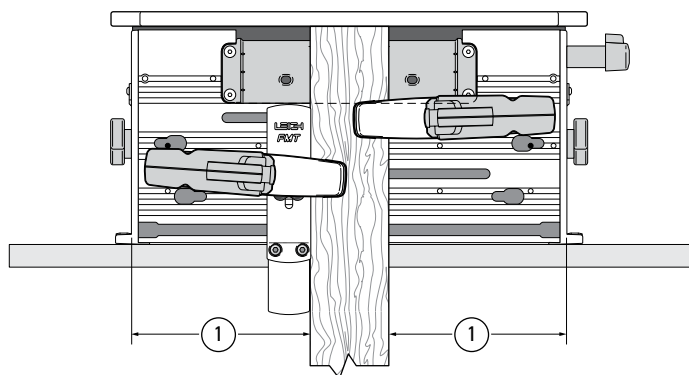
Twin Joints



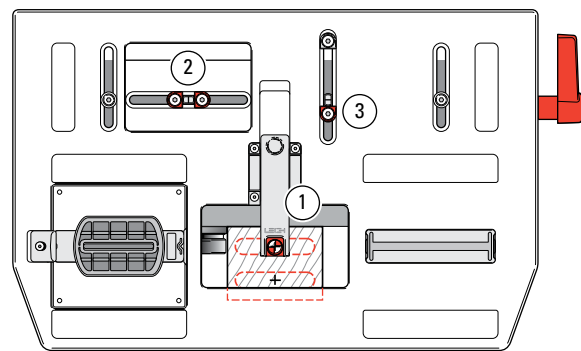
5-12 Note: The **maximum** dimensions for twin joints are:
 ① ② Tenon workpiece: 3" x 3 1/8" + [76x79+mm]
 ③ ④ Tenon size: 1/2" x 2 1/2" + [12x65+mm]
 ⑤ Min. spacing: 1/16" [13mm]
 ⑥ Max. distance from board edge to center of tenon: 2 3/8" [60,3mm]



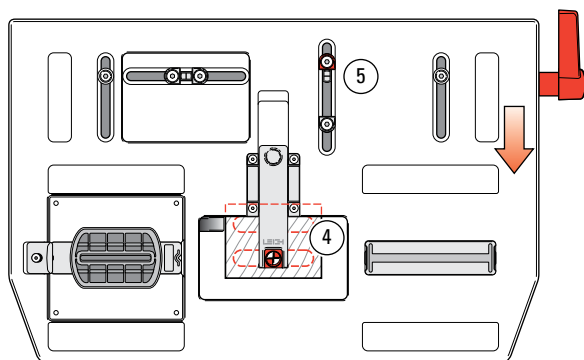
5-13 Mark the two tenon centers taking care to allow space between the two joints ① **at least slightly greater** than the tenon bit diameter ②.



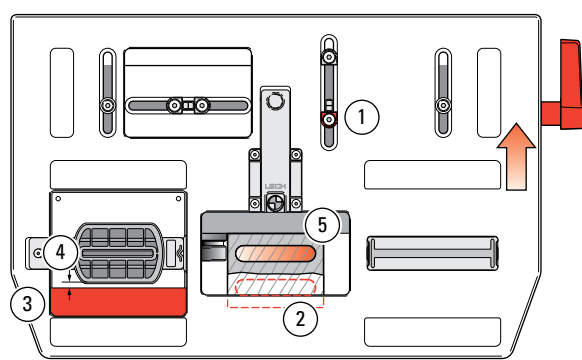
5-14 Approximately center the table left to right and lock ①. Extend the sight. Clamp the tenon piece against the sidestop fence, the tenon piece lightly touching the underside of the sight.



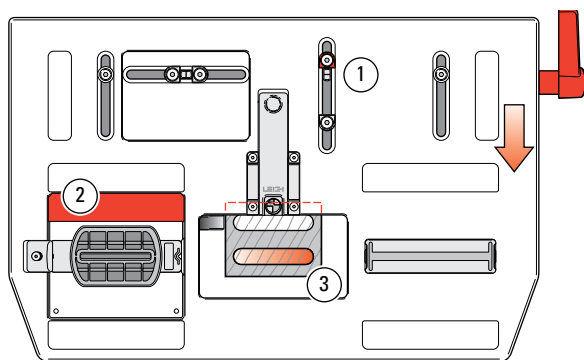
5-15 Unlock the table, sight the rear tenon center and lock the table ①. Set and lock both ^{LR} limit stops against their stop post ②. Set and lock the front ^{FB} limit stop against its stop post ③.



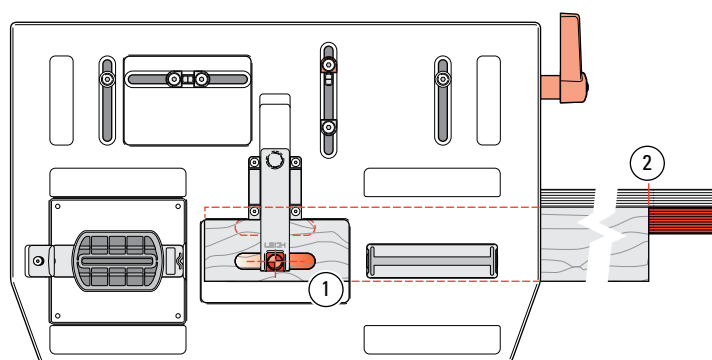
5-16 Unlock the table and sight the front tenon ④ and lock the table. Set and lock the rear ^{FB} stop against its post ⑤. Unlock the table and move the table front to back against the stops to double-check the tenon sighting.



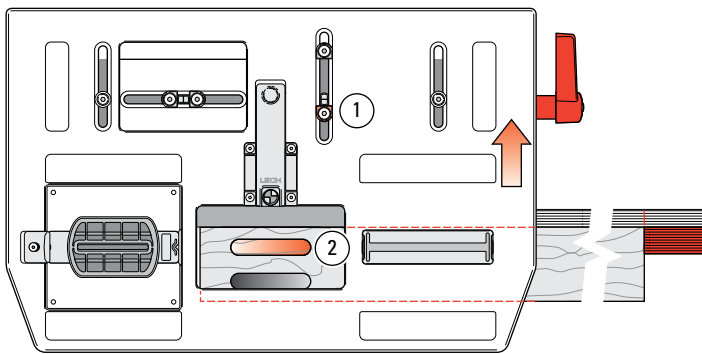
5-17 Move the table to the rear against the stop and lock ①. Do not rout yet. While with practise it is fairly easy to avoid routing into the front tenon ② while routing the rear, we recommend that beginners use a simple shop-made “guard” ③ to prevent this. Use $\frac{1}{4}$ " [6mm] thick MDF or plywood. Allow a $\frac{3}{16}$ " [5mm] gap ④ between the side of the guide and guard. Rout the rear tenon ⑤.



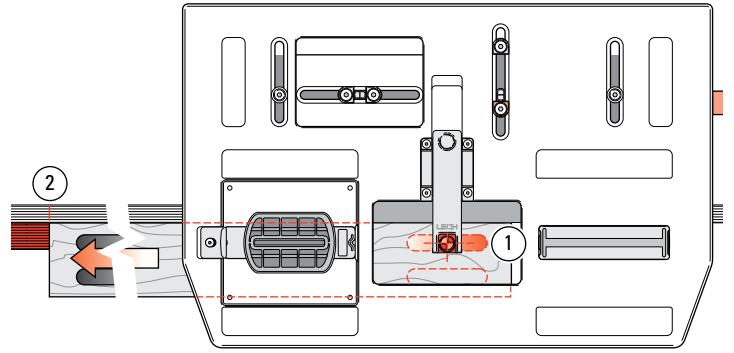
5-18 Move the table forward and lock ①. Lift the left end of the router and move the “tenon guard” to the rear ②. Rout the front tenon ③. Repeat as required for all tenon ends, moving the table and guard piece only once for each pair. Leave the table forward. Note: By using two or three left-right table positions, (in addition to the front-back positions), the workpiece width and tenon width may be increased to the maximum (see Chapter 6, Longer and Shorter Joints).



5-19 Mortises Extend the sight. Position and clamp the mortise piece so the left end front mortise is centered under the sight ①. Either mark the right hand outrigger or set a stop block for successive mortise pieces ②. Rout the front mortise.

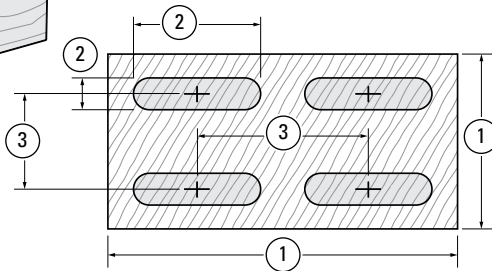
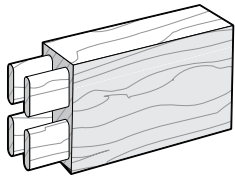


5-20 Move the table back against its stop ① and lock. Rout the rear mortise ②. Leave the table back.

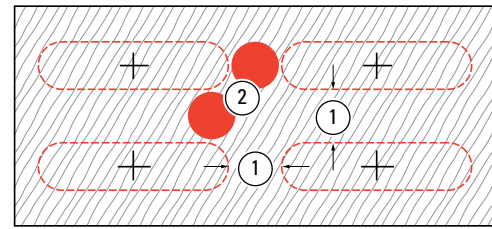


5-21 Extend the sight, unclamp and move the mortise board left so that the rear mortise of the pair at the right end of the piece is centered under the sight ① and re-clamp. Mark the left hand outrigger or set a stop ② adjacent to that end of the workpiece. Rout first the rear mortise at this (right-hand) end, then move the table and rout the front mortise. The outrigger marks or stops are now set up for successive workpiece mortising. ■

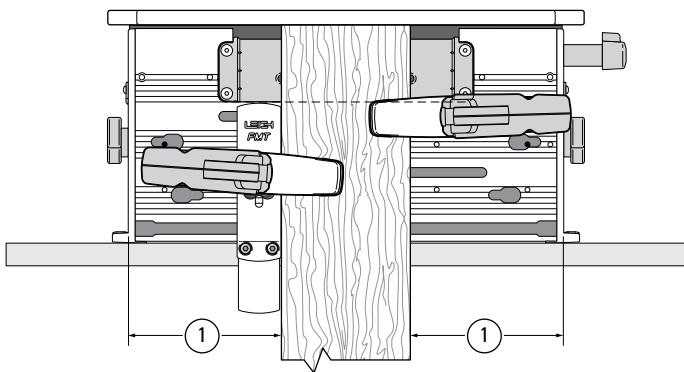
Quadruple Joints



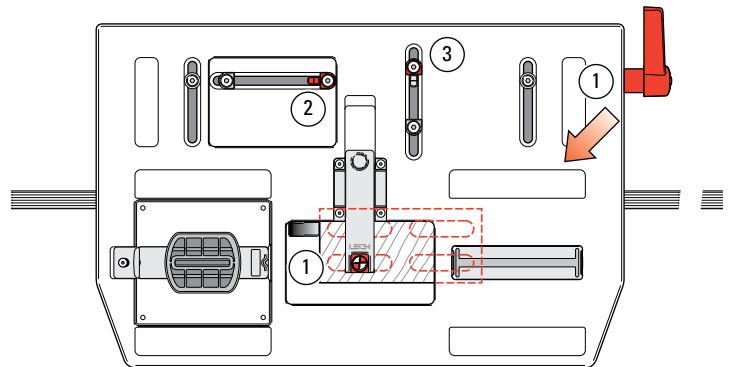
5-22 The **maximum** dimensions for quadruple joints are:
 Tenon Workpiece ①: 3" x 5½" [70 x 140mm]
 Tenon Size ②: ½ x 2" [12 x 50mm]
 Center Spacing ③: 1½ x 2½" [38 x 63mm].



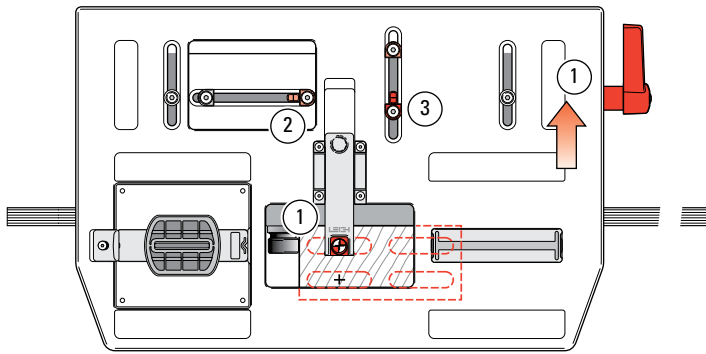
5-23 Tenons Mark the four tenon and mortise centers to suit your layout. Take care to leave a space between tenons ① at least slightly greater than the tenon bit diameter ②.



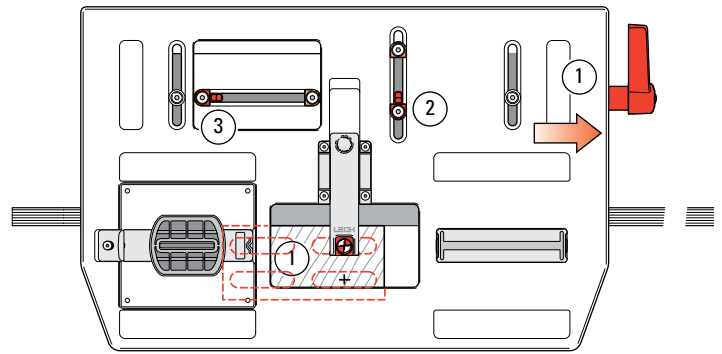
5-24 Center (approximately) ① and clamp the tenon board on the clamp plate and set the side stop fence. Note: If the tenon board does not touch the underside of the table, extend the sight to stop the board.



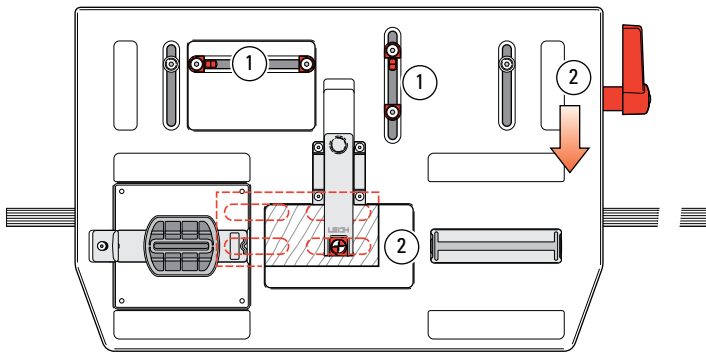
5-25 Extend the sight, release the table clamp and move the table to sight the **left hand front** tenon ①. Lock the table. Move the right hand **LR** stop to its post and lock ②. Move the back **FB** stop to its post and lock ③.



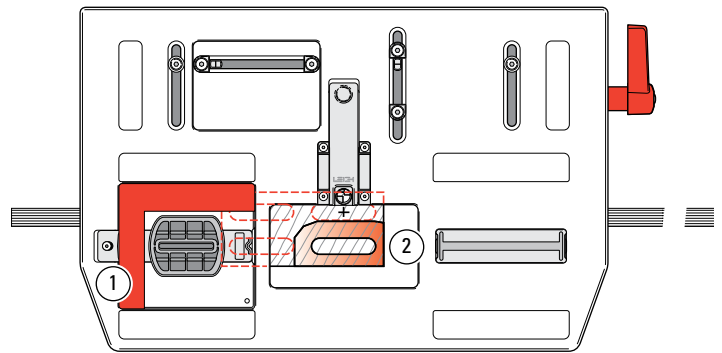
5-26 Release and move the table to sight the rear left-hand tenon ①.
Note: Ensure the LR post is still touching the right-hand limit stop ②.
 Lock the table.
 Move the front FB stop to its post and lock ③.



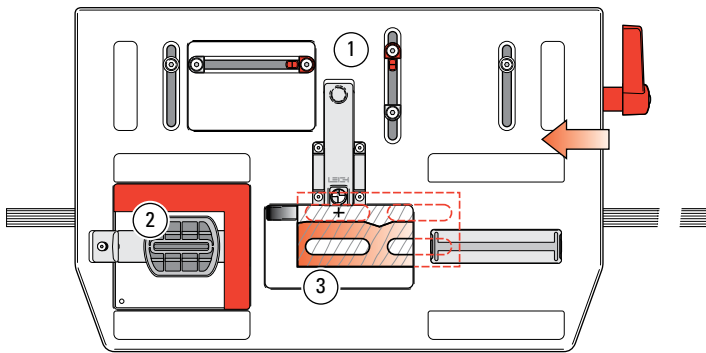
5-27 Unlock the table and move to the rear right-hand tenon and sight ①.
Note: ensure the FB post is still touching the front limit stop ②.
 Lock the table.
 Move the left-hand LR stop to its post and lock ③.



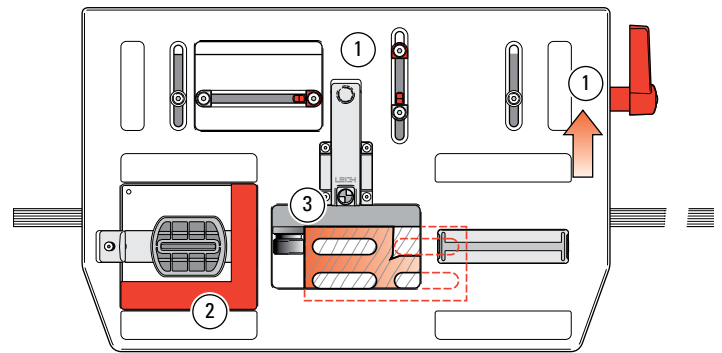
5-28 All four stops are now set ① and provided you have symmetrically marked out the joint, moving the table to the front right-hand tenon, the sight should automatically align with that mark ②. If it does not, do not change anything. Just check the other three positions; the actual joint will be symmetrical.



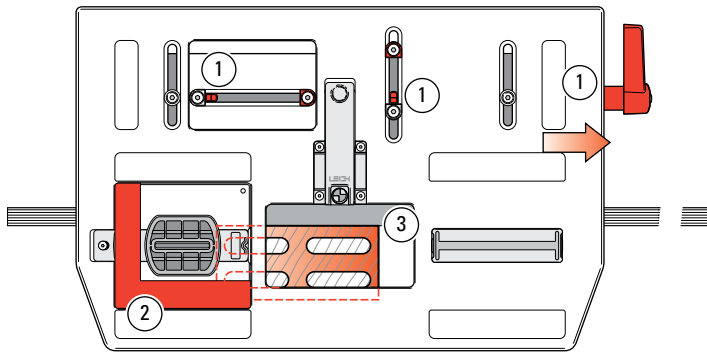
5-29 With practice, it is fairly easy to avoid routing into an adjoining tenon; however, we do recommend that beginners use a simple “L”-shaped shop made guard to prevent this ①. Use 1/4" [6mm] MDF or plywood and allow a 3/16" [5mm] gap between the guide and guard. Rout the front right tenon ②.



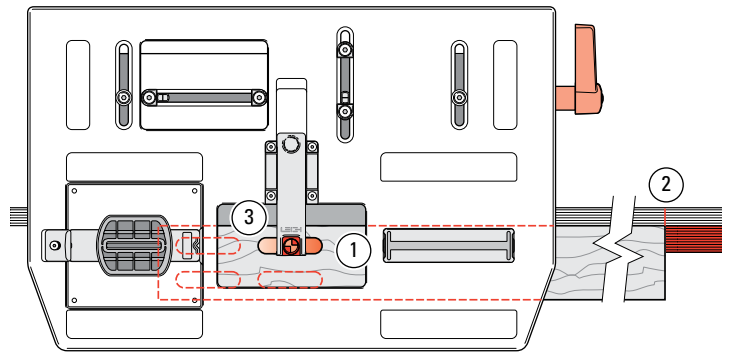
5-30 Move the table to the front left against the stops and lock ①. With the “guard” at the rear-right ②, rout the front-left tenon ③.



5-31 Move the table to the rear left, and lock ①. Move the “guard” to the front-right ②. Rout the rear-left tenon ③.

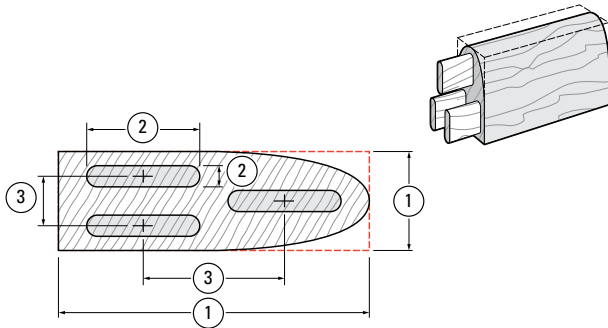


5-32 Move the table to the rear right against the stops and lock ①. Move the “guard” to the front-left ②. Rout the rear-right tenon ③. Rout all other tenon ends required. Leave the table to the rear-right.

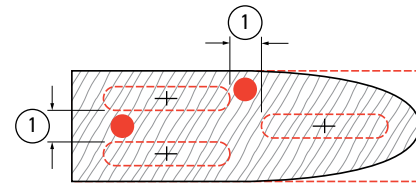


5-33 Mortises Extend the sight, position and clamp the mortise board so that the rear right mortise is centered under the sight ①. Either mark an outrigger or set a stop-block for successive mortise boards ②. Rout all four mortises in their respective positions ③. **Note:** The FMT Pro vacuum port may prove ineffective on wide mortise pieces, particularly on the front mortises. ■

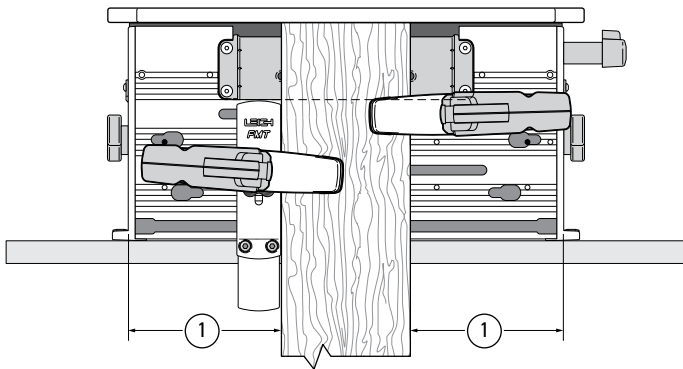
Triple Joints



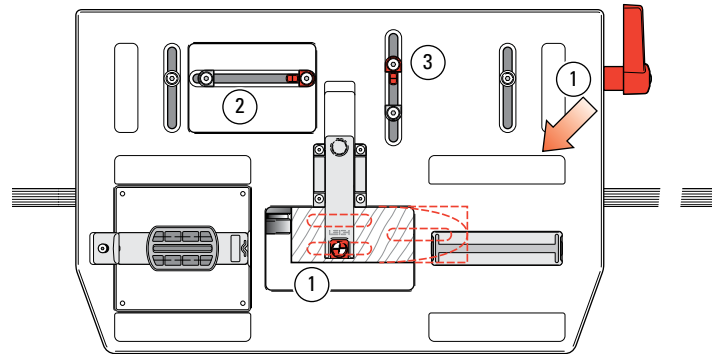
5-34 Because of safety considerations it is only practical to rout triple joints with $\frac{3}{8}$ bits and guides or smaller. Maximum dimensions for triple joints are:
 Tenon Workpiece ①: $1\frac{3}{4} \times 5\frac{1}{2}$ " [44 x 140mm]
 Tenon Size ②: $\frac{3}{8} \times 2$ " [10 x 50mm]
 Center Spacing ③: $\frac{7}{8} \times 2\frac{1}{2}$ " [22 x 63mm].



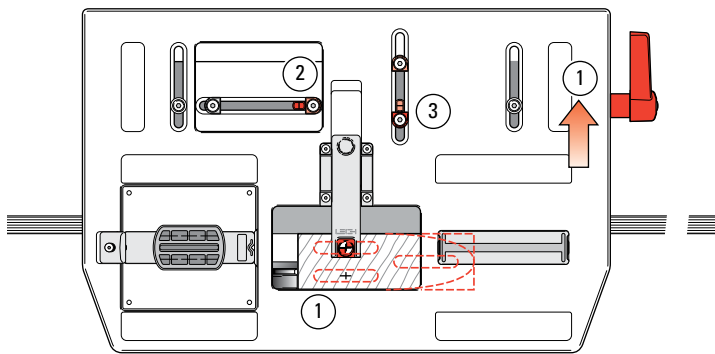
5-35 Mark the three tenon and mortise centers, taking care to leave a space between tenons at least slightly greater than the tenon bit diameter ①.



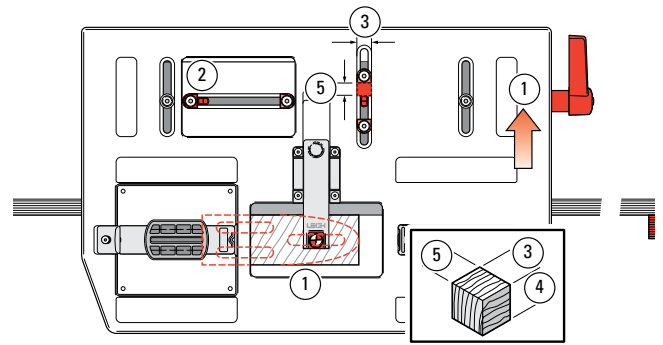
5-36 Tenons Center (approximately) and clamp the tenon workpiece on the clamp plate ① and set the side-stop fence.



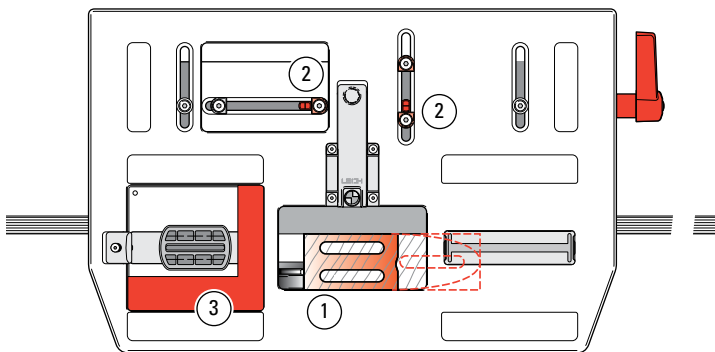
5-37 Extend the sight, release the table clamp and sight the front tenon of the pair ①. Lock the table, move the right hand LR limit stop to the post and lock ②. Move the back FB limit stop to the post and lock ③.



5-38 Release the table clamp and sight the rear tenon of the pair ①, making sure that the right-hand LR stop is against its post ②. Lock the table. Move the front FB limit stop to its post and lock ③.

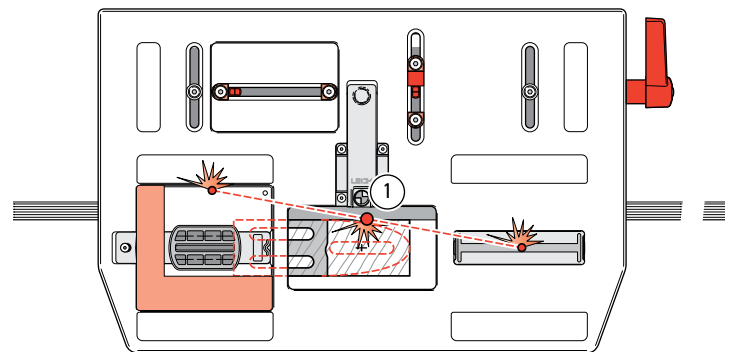


5-39 Release the table clamp and move the table to sight the third (single) tenon ①. Lock the table. Set and lock the left-hand LR limit stop to its post ②. Cut a small hardwood block to the following size: Width ③ 1/2" [13mm], Depth ④ 5/16" [8mm], Length ⑤: Cut to length to a snug fit between the rear FB limit stop and its stop post. This block will be used for the "third" tenon position.

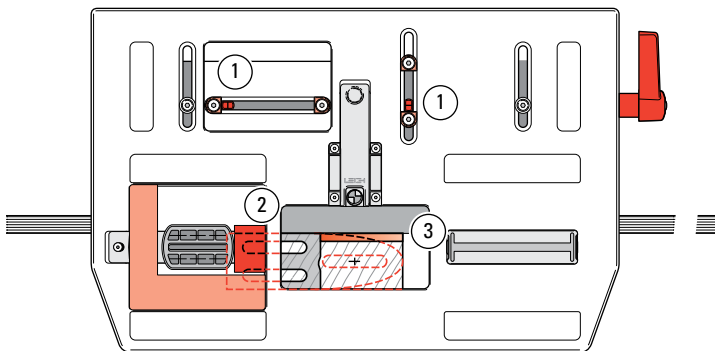


5-40 Rout the left pair of tenons in the same way as for the quadruple tenons ① (see 5-30 and 5-31), using the Limit Stops ② and an L-shaped guard ③ in the guard recess to prevent accidental routing of adjacent tenons.

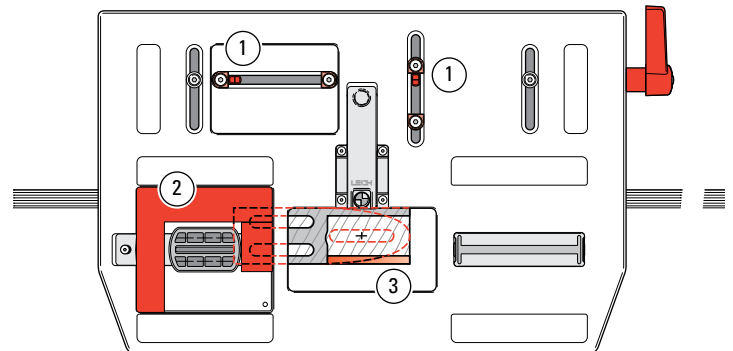
⚠ Do not attempt routing the third tenon before reading on.



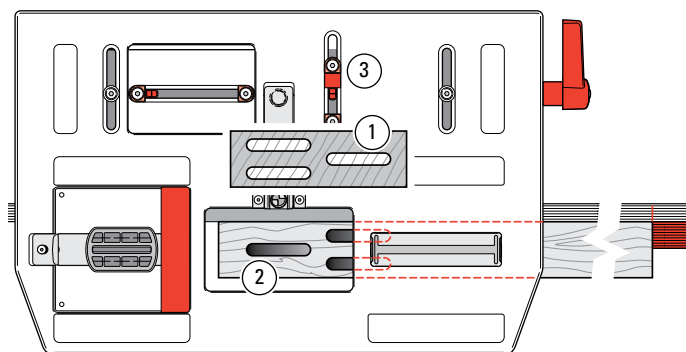
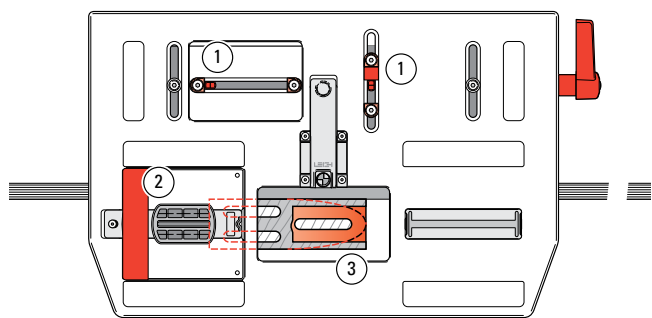
5-41 ⚠ If the tenon rail is thicker than 1 5/16" [34mm] (as is most likely with this type), then great care must be exercised not to "trap" the bit ① when routing the third tenon. i.e. The bit would have to be plunged into the side of the tenon board. This could result in the bit "driving" itself across the board which could be dangerous.




5-42 So to reduce the thickness, move the table right and rearward against the stops ① as if to rout a quadruple tenon. Then add a small "guard" piece ② to the L-shaped guard in the guide recess. Now route away part of the workpiece ③.

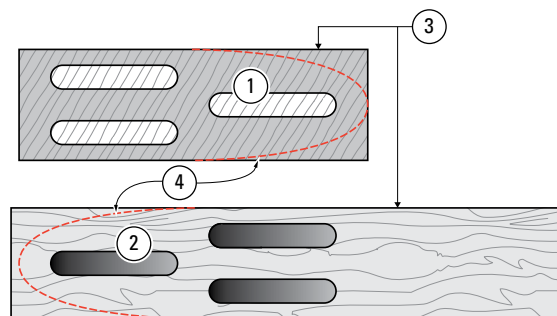


5-43 Move the table forward, keeping it to the right ①. Flip the guards to the back ②. Now route away the front-right part of the workpiece ③.



5-44 Release the table clamp. With the table to the right, against the **LR** stop, put the small block between the rear **FB** stop and its post ①. You must always use the same limit stop for all other third tenons and mortises. Using a guard to avoid routing, into the other two tenons ②, rout the rest of the third tenon ③.

5-45  **Mortises** Triple mortises are routed the opposite way around. If the single tenon is to the right ①, the single mortise must be to the left ②, and vice-versa, using the same block on the same side of the stop post ③.



5-46 Remember, mortises are routed the opposite way around to their matching tenon, e.g. in this illustration the single tenon is to the right ①, single mortise to the left ②. Keeping the reference faces together on the finished joint will ensure that the mortises and tenons will align ③. It's much easier to clamp square section workpieces so do not do any shaping of workpieces until after the joints are routed ④. ■

