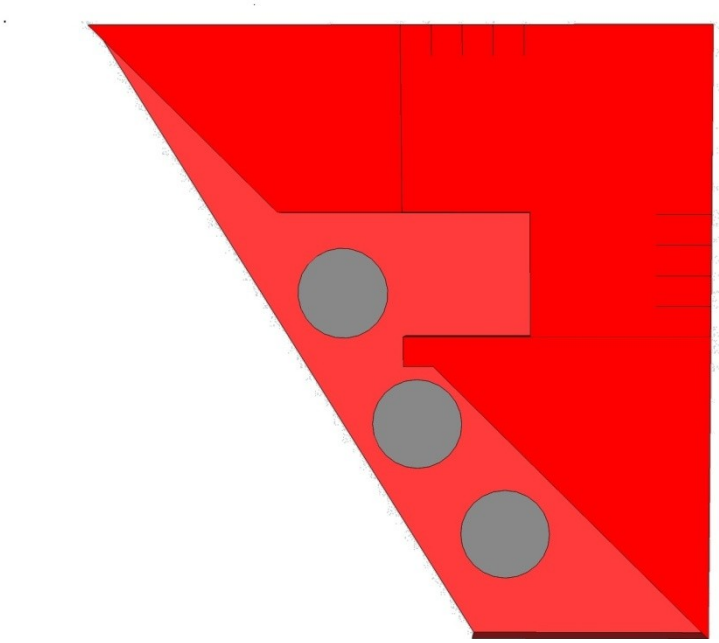
Rev. 2, 15 October 2013

The Infinity Lock Miter Master

A set-up jig that simplifies cutting lock miter joints and opens up new possibilities!



The lock miter joint like many other close-tolerance woodworking joints (dovetails, box joints, etc.) requires accurate cutter and machine set-ups. With these joints, "close" is NOT good enough. The Lock Miter Master makes it easier for you to achieve excellent results, but still requires care during set-up.

This revision adds information on how to use the LMM with certain shaper cutters that have offset carbide cutting edges. See pages 14 & 15.

The Lock Miter Master is a Schaffter designed product, manufactured in the USA by Infinity Cutting Tools, Inc.

Safety Precautions

Observe all router and router table operating and safety instructions.

Always use lock miter router bits in a table-mounted router or shaper.

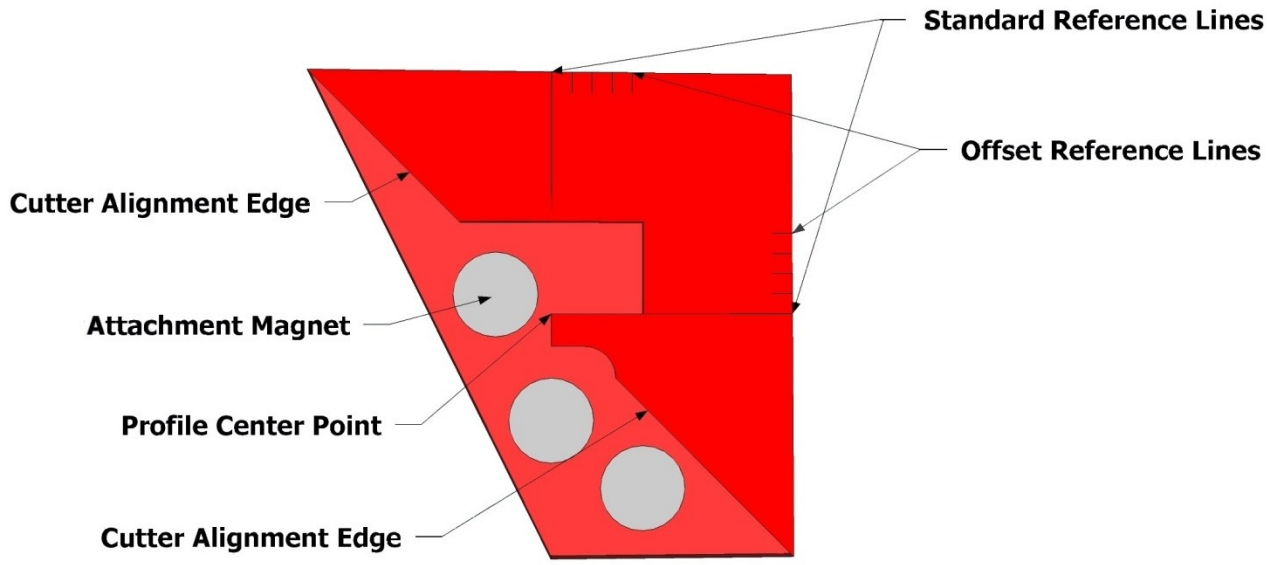
Use the smallest router table insert compatible with the lock miter bit and adjust the fence for minimal clearance. Prior to turning on the router make sure the bit will not contact the fence or insert.

Always use push blocks and keep hands and fingers clear of the router bit.

Remove the Lock Miter Master from the bit prior to turning on the router.

A Quick Look at the Lock Miter Master

The Infinity Lock Miter Master is a simple, yet precisely machined, set-up jig for use with lock miter router bits (in table-mounted routers) and lock miter shaper cutters. Unlike other set-up jigs or blocks, it is easy to use and versatile. It requires no math, no tables of "sweet spots" and no multiple test cuts. With it you can quickly and easily set the proper bit height and fence position for precise-fitting standard and special case lock miter joints. It attaches securely to your bit with rare earth magnets.



Its geometry, precision milled shape, and engraved reference lines make it easy to set any brand of lock miter bit or lock miter shaper cutter* for flawless standard lock miter joints and a variety of special lock miter joints only possible with the Lock Miter Master.

* See page 14. when using the Lock Miter Master to set shaper cutters.

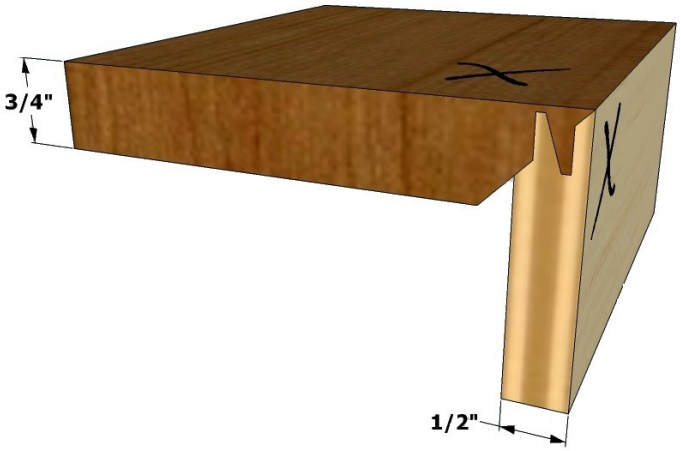
In addition to the standard joint, you can use the Infinity Lock Miter Master to set your router table or shaper to cut lock miter joints in stock of different thicknesses, and offset and dual offset (rabbetted) lock miter joints:

Standard lock miter joint. (both pieces of stock are the same thickness)

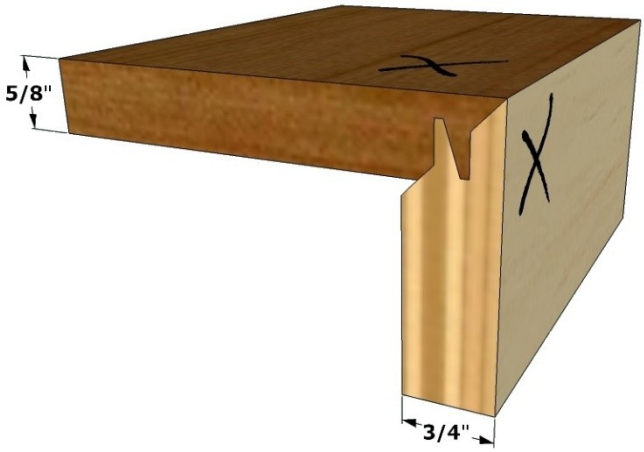
Lock Miter Joint (unequal stock thickness)

1. Face frame thicker than side

2. Face frame thinner than side



1.

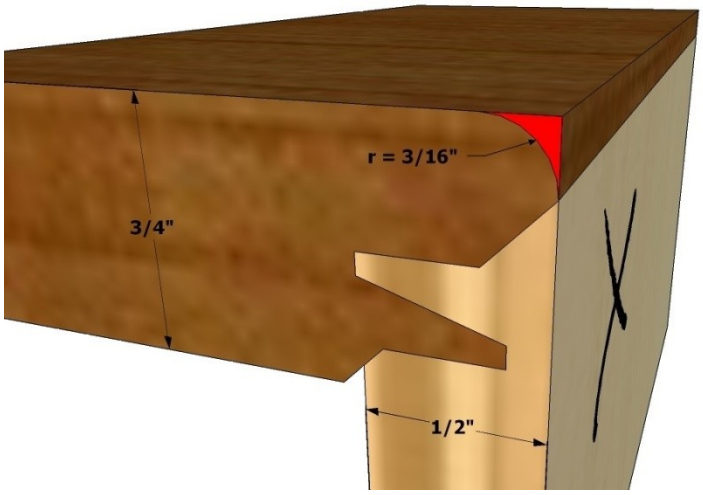


2.

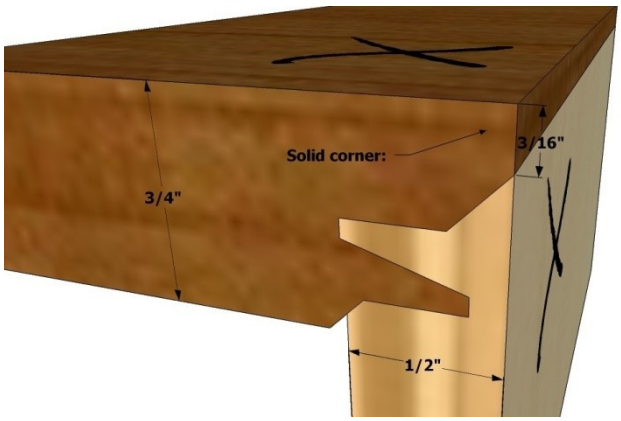
Offset Lock Miter

The Offset Lock Miter shifts the miter line to one side of the corner or the other.

In casework with solid face frames and plywood sides, the offset allows you to ease or add a radius to the corner without exposing plywood core laminations. Each edge of the jig has four small “Offset Reference Lines” spaced at 1/16” intervals that allow offsets up to 1/4”.



The lines on the top edge of the jig are used to put an offset in boards cut in the vertical position like a typical face frame shown in the previous photo. The lines on the vertical edge allow you to add the offset to boards cut in the horizontal position. Drawer boxes made with offset lock miters will have sides set back from the solid wood fronts, and no miter line at the corners. In appearance, the setback will be similar to half-blind dovetails or drawer lock joints. This technique preserves the length of drawer fronts and backs.



An off-set can be added to lock miters in boards of different thicknesses such as this example with a 3/4” faceframe and 1/2” thick side.

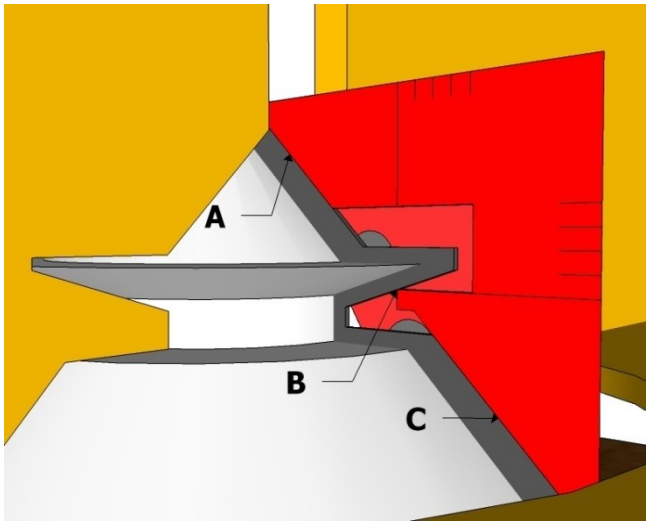
Double Offset Lock Miter

The Double Offset lock miter joint yields a rabbetted corner that can be filled with a decorative insert of contrasting colored wood or other material. The rabbet cross-section can be either square or rectangular.

Set-up for a Standard Lock Miter

1. Install a lock miter bit in your router or shaper. Place the Lock Miter Master on the bit as shown. Rare earth magnets will hold it in position.

Ensure both raised diagonal edges (A & C) and the "profile center point" (B) firmly contact the bit's cutting edges.

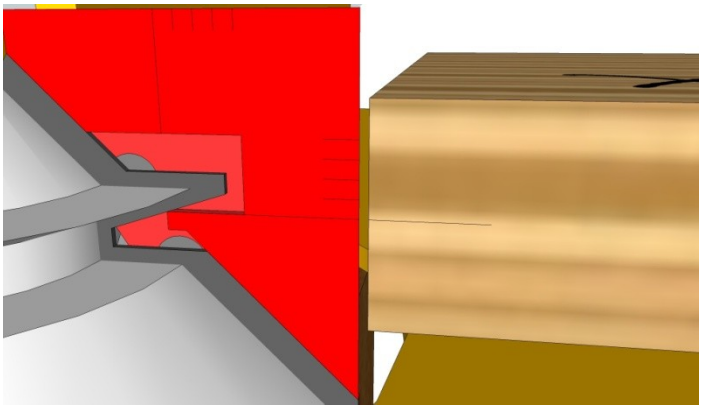


2. If the joint(s) will be cut in boards that are exactly the same thickness, mark a precise, fine centerline on the edge at each end of one board (see tip for marking the center at the end of these instructions). If the boards have a "preferred" or "outside" face, put an "X" or other mark on it- this applies to all lock miter joints.

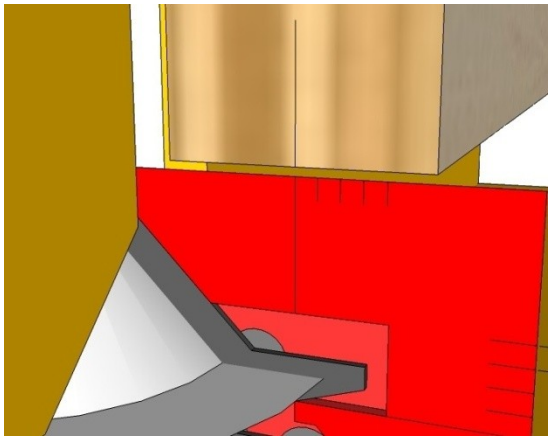
<u>If the boards have different thicknesses skip to the next section.</u>

3. Place a board on your router table with the "outside" face pointing up and the centerline mark close to the jig. Adjust the bit height until the standard reference line on jig's vertical edge aligns precisely with the mark on the board.

Sight along the fence face and router table top to avoid parallax error.



4. Temporarily clamp the board to the fence with the “outside” face pointing at the operator. Rotate the bit until the jig is perpendicular to the fence. Adjust the position of the fence until the mark on the board precisely aligns with the standard reference line on the top edge of the jig:



5. Decide which profile you want on the edge of each board. (see drawing)

Note: Cabinet face frames are typically cut in the “vertical” position against the fence. The front edges of cabinet sides, top, and bottoms where they will meet the face frames are cut in the “horizontal” position. Cabinet sides and bottoms will have alternating profiles. Drawer fronts (and backs) should be cut in the “horizontal” position.

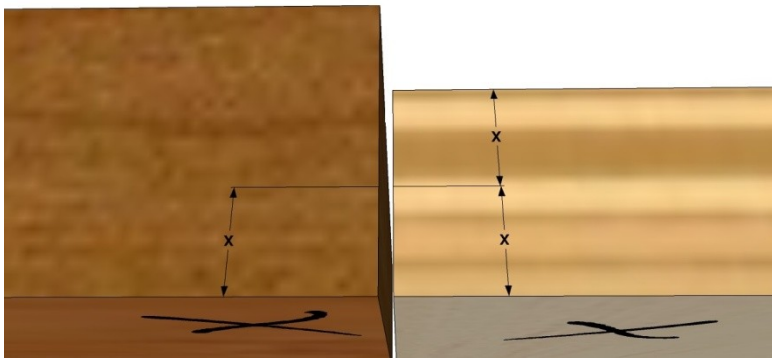
6. Remove the jig. Turn on the router and carefully adjust the fence halves for minimal bit clearance. Install feather boards.

7. Cut all boards. Remember the “outside” or “good” face of the boards should always point up or at the operator when they are being cut.

Setup for a Lock Miter Joint in Stock with Different Thicknesses

It is sometimes necessary to cut lock miter joints with stock having different thicknesses, e.g. cabinets with 3/4” thick solid wood face frames and plywood sides that are 1/2”, 5/8”, 11/16”, 23/32”, etc. thick. The Lock Miter Master makes simple work of this special joint, but it requires that you mark the boards differently and follow a slightly different, two part procedure- cut all thin boards, reset bit height and fence position, then cut all thick boards.

1. Regardless of the position in which the parts will be cut, draw a centerline mark on the edge of one thin board. Use the same marking gauge setting and measuring from the “outside” face, carefully transfer the mark to a thick board (which will be cut in the opposite position.)



(Alternatively, place both boards end-to-end with their “outside” faces down and carefully transfer the “centerline” mark to the thick board.)

Note: Since the boards have different thicknesses, the mark will not be in the center of the thick board. This is normal. Place the thick board aside for now.

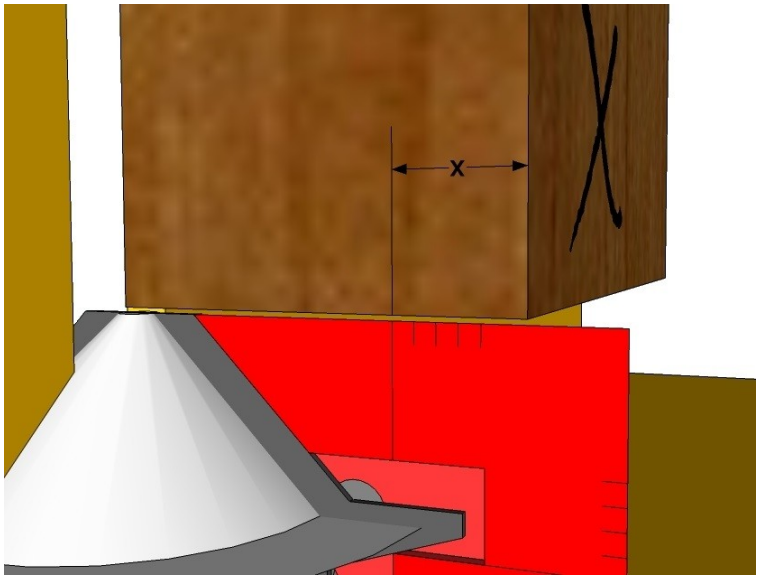
2. Using the thin board, set the **bit height <u>AND</u> fence position** as you would for a standard lock miter joint (see steps 3. & 4. in the previous section)

3. Depending on how you plan to assemble the joint, cut **<u>ALL</u> thin boards** in either the “horizontal” or “vertical” position.

If the thick boards will be cut in the "vertical" position:

4. Put the Lock Miter Master back on the bit. Clamp the thick board to the fence in the vertical position with the "good" side facing the operator.

5. **Adjust the FENCE POSITION** until the mark aligns precisely with the standard reference line on top edge of the jig. Remember, the mark will not be in the center of the board. Also, ensure the jig is perpendicular to the fence.



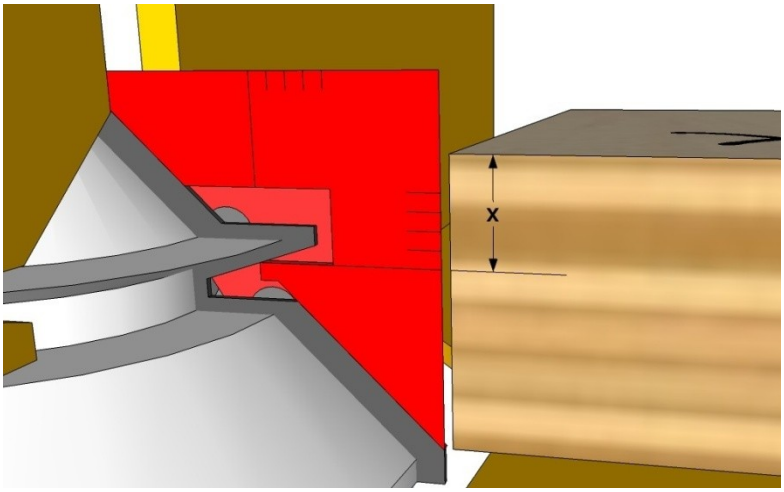
DO NOT ADJUST THE BIT HEIGHT!

6. Cut miters in **ALL thick boards** in the "vertical" position.

If the thick boards will be cut in the "horizontal" position:

4. After cutting all thin boards, put the Lock Miter Master back on the bit. Position the thick board on the table with the "good" side facing up.

5. **Adjust the BIT HEIGHT** until the standard reference line on the jig's vertical edge aligns with the mark on the thick board. Remember, the mark will not be in the center of the board.



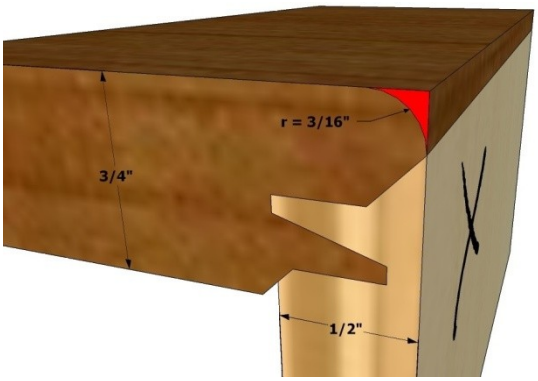
DO NOT ADJUST THE FENCE POSITION!

6. Cut miters in **ALL thick boards** in the "horizontal" position.

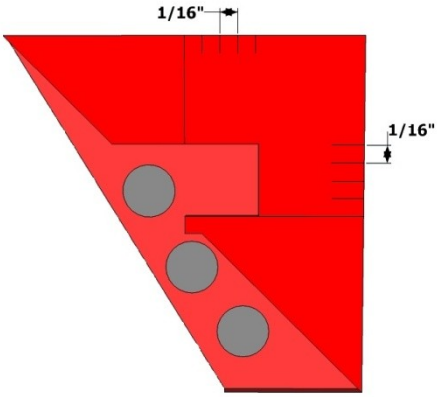
Setup for Offset Lock Miter Joints

(for eased (rounded) face frame corners)

Lock miters can leave sharp mitered corners. Unfortunately, easing or rounding the corner may highlight the miter line or expose unsightly layers of plywood core material. The Lock Miter Master makes it easy shift the miter line “around the corner”- where it will be less visible and only solid wood will be rounded.



The Lock Miter Master has four short offset reference lines on the top and vertical edge. The spacing between marks is 1/16” and corresponds to the amount of offset.



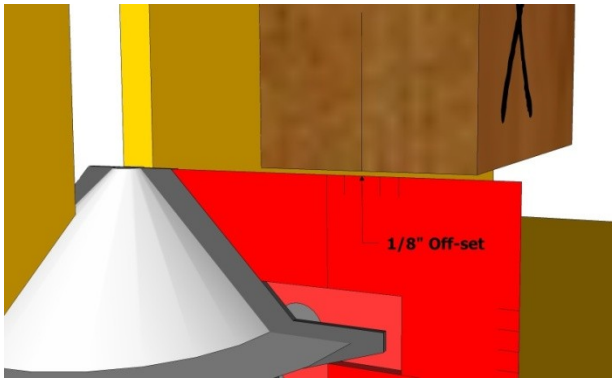
1. Follow the procedures outlined in previous sections for marking the boards, and setting bit height and fence position for the boards that will **NOT** receive an offset.

2. Cut **ALL** boards that will **NOT** receive the off-set in the desired horizontal or vertical position.

If boards that will receive the offset will be cut in the “vertical” position:

3. Reinstall the Lock Miter Master and clamp the marked board to the fence with the “good side” facing you.

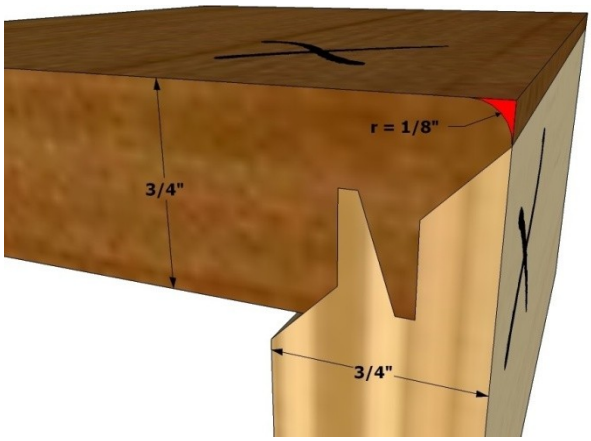
4. Adjust the fence position so the mark on the board aligns with the offset reference line on the jig's top edge for the amount of offset desired.



<u>DO NOT ADJUST THE BIT HEIGHT!</u>

Using the line closest to the standard reference line will result in a 1/16" off-set. Each additional mark increases the off-set by 1/16".

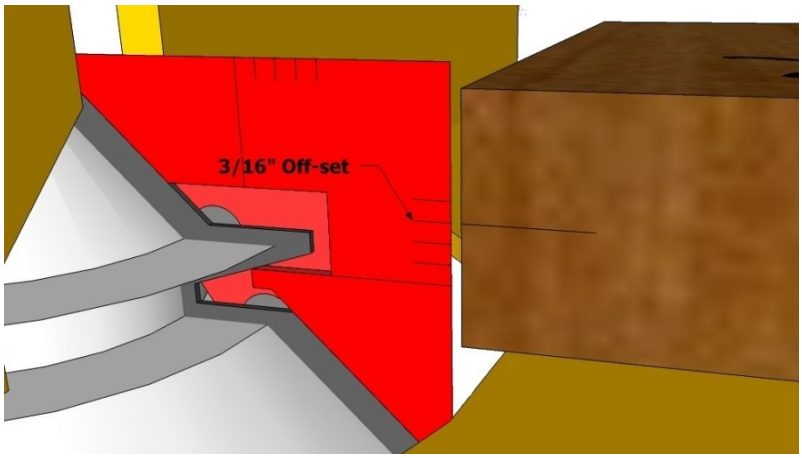
5. Cut **<u>ALL</u>** boards receiving the off-set in the "vertical" position.



Ease or round over the corners after assembly.

<u>If boards that will receive the offset will be cut in the "horizontal " position:</u>

3. Reinstall the Lock Miter Master and place the marked board flat on the table with the good side facing up.

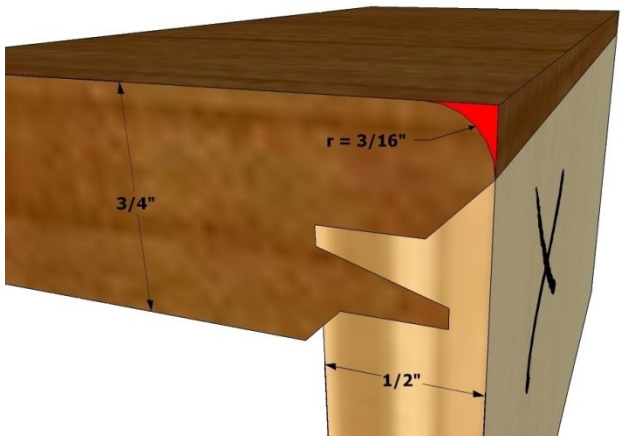


4. Adjust the bit height so the offset reference line representing the desired amount of offset aligns with the mark.

<u>DO NOT ADJUST THE FENCE POSITION</u>!

5. Cut **<u>ALL</u>** boards receiving the off-set in the "horizontal" position.

Ease or round over the corners after assembly.



*Note: The example above illustrates that an off-set lock miter joint can also be cut in stock with different thicknesses. Follow the procedures for cutting lock miters in boards of different thickness. When it is time to set the fence position or bit height for the boards that will receive the off-set, use the desired offset reference mark.

Setup for Double Offset Lock Miter Joints

(also called a rabbetted lock miter joint):

These procedures expand on those required for a single offset.

1. Mark centerlines on two boards, one representing each side of the joint.

2. Position the board that will be cut in the vertical position flat on the table and adjust the bit height for a normal joint using the centerline mark and the standard reference line on the jig's vertical edge.

3. Reposition the board against the fence in the vertical position.

4. Adjust the fence position so the centerline mark aligns with the offset reference line on the top edge of the jig for the desired amount of offset (rabbet dimension).

5. Cut all "vertical" boards.

6. Position one of the boards that will be cut in the horizontal position against the fence in the vertical position.

7. Readjust the fence position until the centerline mark aligns with the standard reference mark on the top of the jig.

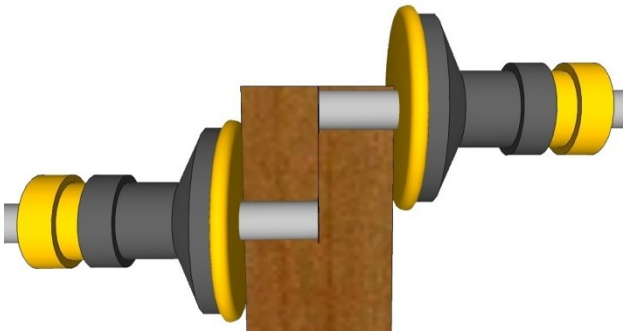
8. Reposition the board so it is flat on the table and adjust the bit height so the desired offset line aligns with the board's centerline mark.

8. Cut all "horizontal boards.

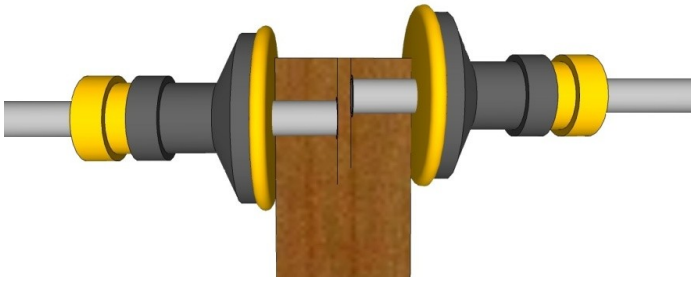
NOTE: It is possible to make a rectangular rabbet by selecting a different offset for each board.

Marking the center on the edge of your stock.

1. If you have an accurate automatic center-finding marking device, use it. If not, use a marking gauge or combination square and a sharp knife or pencil to make a fine line near the center of the edge. "Close" is good enough for the first try.



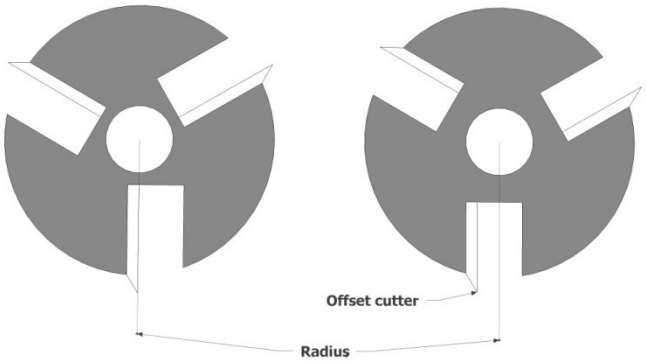
2. Flip the marking gauge around and make a second line from the opposite face. If you are lucky both lines will appear as one. That line is the center of the edge.



3. If you end up with two lines, the center will be halfway between them. Reset the marking gauge to split the difference and make another set of lines. Repeat the process until it results in only one clean line.

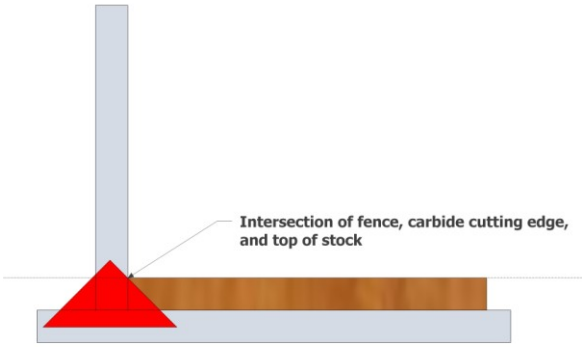
How to use the Lock Miter Master with certain Shaper Cutters

The Lock Miter Master can be used to set the height of a shaper cutter and fence position in the normal manner if the carbide cutting edge is, or is close to, a radius of the cutter. However, the effect of typically large size of most shaper cutters makes it very difficult to use the Lock Miter Master to set the fence position if the carbide cutting edge is offset (a chord). A different technique is needed to set the fence position.



1. If the cutting edge is not a radius, is an offset chord where the line of cutting edge doesn't pass through the center, use the Lock Miter Master to set the **bit height only**.

2. Once the bit height is set, adjust the fence position close by eye. Set it so that the angled edge of the cutter intersects with the top, inside corner of the board at the fence.

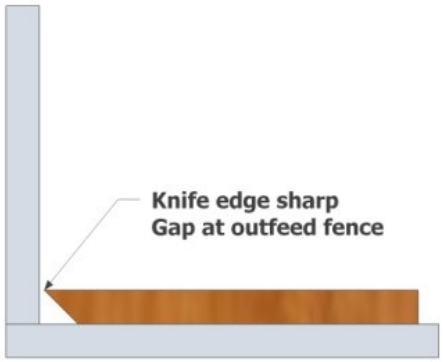


Correct fence position

3. Make a short test cut about 1/2" long. Stop the shaper. Hold the stock against the infeed half of the fence, examine the edge of the 1/2" cut section.

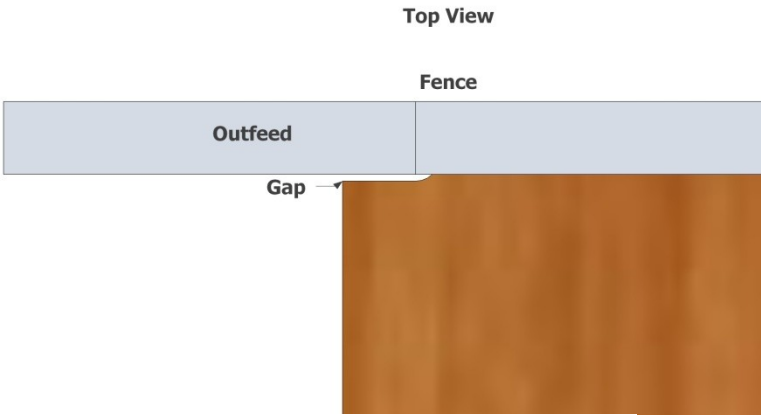
(The cutter and interlocking profile were omitted from the drawings below.)

a. If the fence is positioned too far from the cutter, the cut section will have a sharp edge, but it will be narrower than the uncut section because too much material will have been removed.

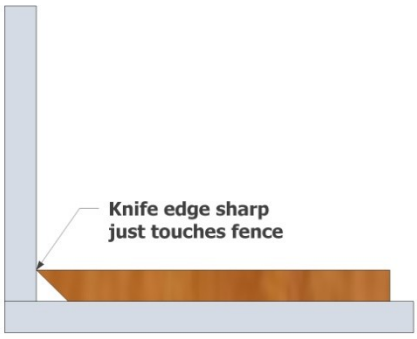


Fence too far from cutter

When closely viewed from above, you will see a narrow gap between the knife edge of the cut section and the outfeed half of the fence. Adjust the fence closer to the cutter by the width of the gap. Cut an additional 1/2" section and check again.

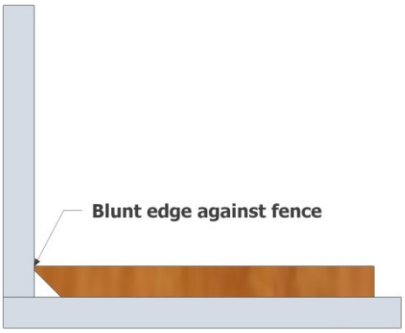


b. If the knife edge is sharp and touches the outfeed half of the fence, the fence is set correctly.



Fence set properly

c. If the edge of the cut section is blunt (no knife edge) where it meets the fence, the fence is too close to the cutter- move it away from the cutter slightly and test again.



Fence too close to cutter

Tips and Hints

1. Take special care putting lines on the edges of the boards. A pencil with a wide, dull tip can result in an unsatisfactory joint.

2. Double check that the Lock Miter Master is positioned properly on the bit during set-up, especially if you bump it while positioning the stock. Check it often.

3. Always ensure the jig is perpendicular to the fence when setting the fence position.

4. Hold the board firmly on the table and against the fence when setting the fence and bit.

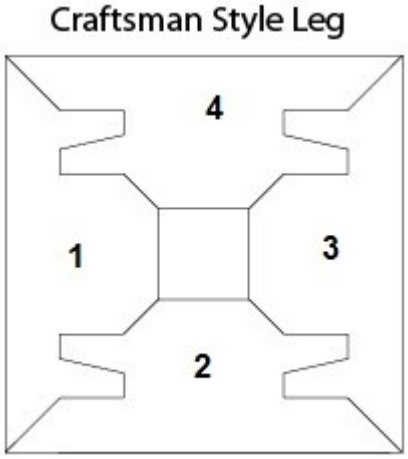
5. Make sure you are in a good viewing position to avoid parallax error when aligning the your marks with the jig's reference lines.

6. If the setup is wrong the miter bit may remove too much material leaving the tip of the miter unsupported on the outfeed side of the bit. The joint surface may be gouged. If too much is being taken off the "horizontal" or "vertical" board tip, adjust the fence very slightly towards the operator.

7. Hold the stock firmly against the fence and table with push blocks, feather boards, etc. or use a secondary fence to "capture" the stock if your feather boards do not provide enough pressure.

8. When cutting lock miters in the ends of narrow stock keep the boards perpendicular to the fence or router table top. Support the stock with a square or right triangular piece of plywood that rides against the fence. Do not use a miter gauge unless you are certain the miter track is parallel to the fence. Do not attempt to make the fence parallel to the miter slot once the setup is done.

9. A joint with an offset other than one of the jig's 1/16" intervals is possible. Put a pencil mark on the gauge the desired offset distance away from the main reference mark. Use that mark to set your offset. Verify the offset is compatible with the capacity of the bit.



10. It is easier to assemble and clamp Arts & Crafts legs with the trademark quartersawn grain visible on all four sides, casework, drawer boxes, etc. if you cut both edges of sides 1 & 3 in the vertical position and both edges of sides 2 & 4 in the horizontal position.

11.To make a lock miter cube first cut 6 identical squares. Use the procedures in tip #10 above to cut the adjoining edges of the four sides. Cut the top and bottom edges of the sides in the "horizontal" (cabinet side) position. Cut all four edges of the top and bottom in the "vertical" (face frame) position.