

Make high precision joints for drawers, boxes and furniture easier than ever before with the *Route-R-Joint* from Woodline USA.

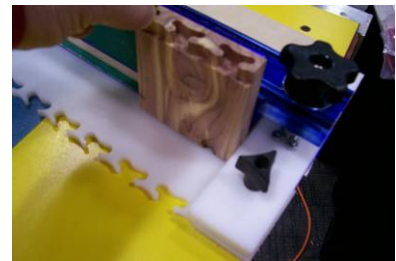
This instruction covers the system currently produced. Upgrades to earlier models are available from Woodline. Changes have been made to improve the hold down capability. Colored templates are identical to the white ones except for color. The hold down upgrade was introduced to improve material holding. The toggle clamps are no longer used in favor of the lock bar extrusion and clamping knobs. Some pictures show the old style toggle clamps but this is only for reference for owners of the older style jig.



Half blind dovetails, keys and even heart shaped joints as well as many others are simple to create using Woodline USA's *Route-R-Joint* system.



Interchangeable guide templates allow switching from dovetails to heart shaped joints in less time than it takes to change a router bit.



Amateurs, children and professional woodworkers will enjoy the ease of use, safety and simplicity of the Route-R-Joint system from Woodline USA.



No more complicated setups, no having to re-learn complex setups after a few days out of the shop. Just put in a bit, install the guide bushing, clamp the wood in the jig and *PRESTO* great joints every time!



Some of the templates available for the Route-R-Joint system.



10 year old Samantha making a box for her mother. The system is safe and easy to use. Her hands are far away from sharp router bits.

### Assembly Instructions

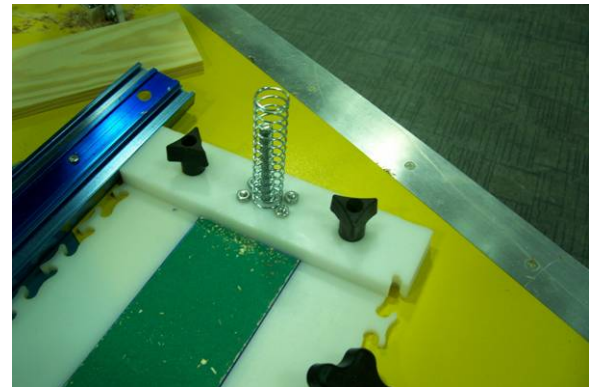
The kit consists of the following components:

End block	2	#8 lock washer	8
Position gauge block	1	#8 pan head screws	3
Aluminum center plate	1	No-Slip sand paper strip	2
T-bolt 1/4-20 x 1"	4	Brass bushing centering pin	1
T-bolt 5/16 x 3"	2	3/16 Spiral bit WL-1002S-ES	1
Knob 1/4-20 triangle	4		
Knob 5/15-18 star	4	Templates included depend on the system selected.	
Aluminum Angle	1	Part numbers are at the end of these instructions.	
Plywood sub-plate	1		
Cross Bar Extrusion	1	Dovetail bit is included with the WL-1303-1 WL-RJ1	
Slip Bushing	1	Dovetail template and will only be included if you	
Standard Bushing	1	have selected those templates with your set.	
7/16" Bushing	1		
O-ring for bushing	1	<b>(Optional accessory kit)</b>	
# 8-32 7/8" flat head screws	8	Dovetail bit	1
# 8-32 nuts	8		

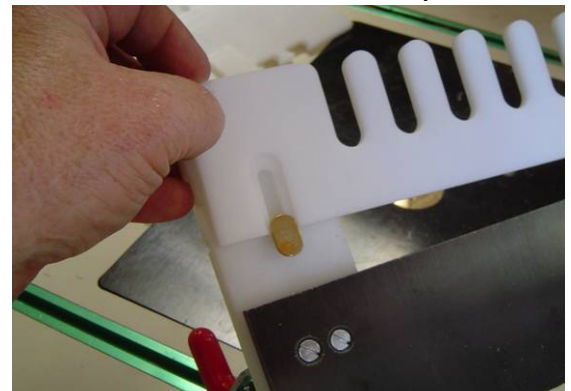
These instructions are a supplement to the instructional video that came with the system. Watch the video for additional instructions. The video shows the original style jig featuring the toggle clamps. The new version improves clamping power dramatically but the operation is the same. Templates are subject to change with the system purchased

Assemble the center unit as shown.

1. Insert the 5/16" "T" bolts through the end blocks so the head of the bolt fits into the recess cut into the block. Mount the end blocks and center aluminum piece with # 8 flat head screws, nuts and lock washers. Fasten one end block firmly to the plate with the edge of the block against the rabbet cut into the aluminum plate. Mount the second end block assembly but do not fully tighten the screws.
2. Select any template guide set slide the templates onto the T bolts until the guide template is against the center piece as shown. The head of the T bolts must fit into the recess in the end of the templates. Finger tighten the knobs at each end of the template to hold it firmly in place as shown in Figure 6. Tighten the 4 screws that hold the second end block in place. Check with a square to assure the end blocks are square to the



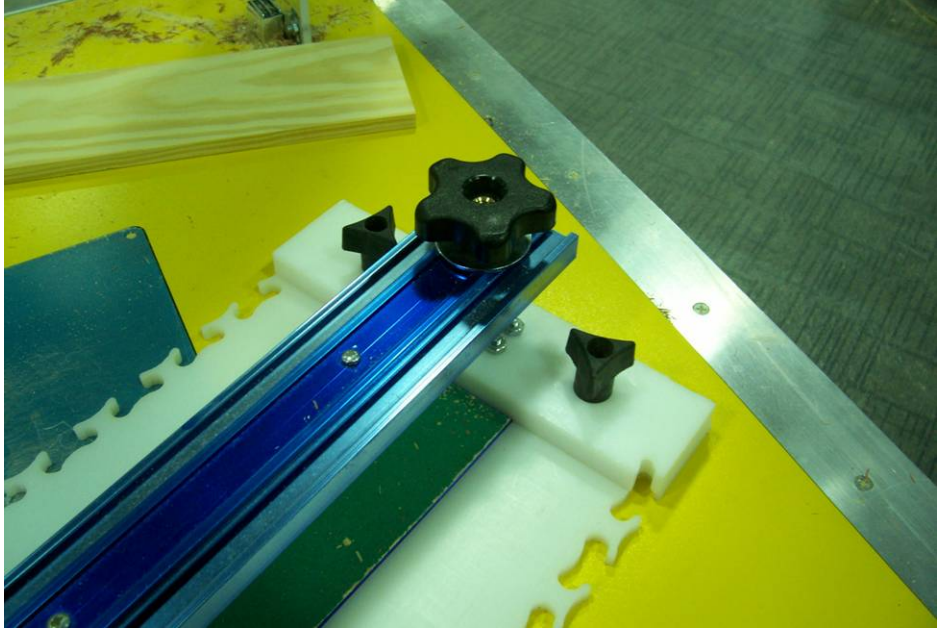
Assemble end blocks t bolts and springs as shown



Slide template over head of "T" Bolt. Bolt head must fit into recess

templates.

3. Mount the  $\frac{1}{2}$ " plywood sub plate to the aluminum angle with 3 #8 pan head screws. The edge of the plywood must align with the outside edge of the aluminum angle as shown in Figure 3. If you plan to work with mainly  $\frac{3}{4}$ " thick material you may want to replace the sub-plate with a piece of  $\frac{3}{4}$ " thick material to prevent accidentally hitting the aluminum fence with the router bit.

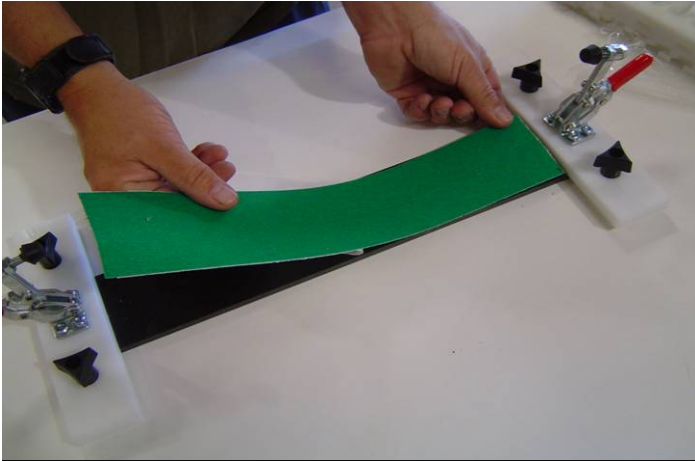


4. Trim both sheets of sand paper to 13 7/8" length. Carefully remove contact paper and place one sheet on the face of the aluminum angle (do not cover the plywood) and one piece in the center of the center piece as shown Sandpaper may be a different color than shown in these instructions.

Completed assembly with locks templates installed. Note washers are used between knobs and the extrusion. Extrusion is installed with "foot" down. Some instructions referenced a plastic foot which had to be installed. "Foot" is now made of metal and comes preinstalled on the extrusion.



Angle attached to plywood sub-plate showing correct placement of sandpaper. 3 screws secure the angle to wood sub-plate



Trim sandpaper to 13 7/8 and install between end blocks. This picture shows the older model with toggle clamps which are no longer used.

- Using the supplied O-ring as a lock washer, secure the bushing in the router table plate. For half blind dovetails use the 7/16" bushing. For hearts, keys and the pins of through dovetails use either the "Standard" bushing or the slightly (.005") smaller "Slip" bushing if a slightly looser fit is desired. Many applications with some difficult woods or complex patterns such as the locks, the slip bushing is preferred because it is easier to assemble the completed joint without chipping or splintering the material. The variation in individual router performance makes it impossible to say that you always use one bushing

versus another. Use the slip bushing if your joints are too tight with the standard bushing. If you have large gaps make sure you are using the correct bit. All joints except traditional dovetails use the 3/16" straight router bit.



Bit must be centered in bushing.

- There must be NO lateral movement in the bushing. If the hole in your router table is larger than the top lip of the bushing then the bushing **WILL** move. No amount of tightening the nut will prevent it from moving due to vibration during routing. Uneven gaps and poor fitting joints may occur if movement is allowed. If you have movement, simply wrap the upper lip of the bushing with clear tape until the movement is completely eliminated. Insert the bushing and trim any extra tape flush to the table top with a knife. Secure with the nut and O-Ring.

**The bushing must be as close to centered as possible or the joint may not fit properly.** Gaps or poor fit may result from an off center bushing. Adjust the position of the router base plate or bushing center if required to properly center the bushing. The optional accessory kit includes a tapered centering pin to aid in centering the router to the bushing. The tapered pin is inserted

through the bushing into the router and the router lowered to draw the tapered portion into the bushing. The tapered portion will cause the bushing to be centered and the holes for mounting the router can be marked and carefully drilled. **DO NOT TURN THE ROUTER ON WITH THE CENTERING PIN INSTALLED.**



**Centering pin is useful for centering bushing.**

**UNPLUG THE ROUTER! DO NOT TURN  
ROUTER ON WITH CENTERING PIN  
INSTALLED!**

If you are installing your router for the first time you can find instructions on Woodline.com for a method of installing the router that will assure the router is properly centered.

If you are not able to completely center the bushing you may still be able to make acceptable joints if you are careful. One method to minimize the effect of an off center bushing is to keep the jig in the same relative plane as the joints are made. Example; if you are moving from left to right (3 o'clock to 9 o'clock) then do not rotate the jig relative to the bushing as you are cutting. When you make the mating parts move the jig in the same relative plane.

Do not rotate around an off center bushing as it will leave gaps in the joint.

## General Overview

**READ ENTIRE INSTRUCTIONS FIRST!  
INJURY MAY RESULT IF DIRECTIONS AND CAUTIONS ARE NOT FOLLOWED.**

The *Route-R-Joint* system will produce precision joints in a variety of patterns. The system uses a guide bushing to limit the router travel relative to the material. Templates guide the material to produce the desired pattern. Three guide bushings are supplied with the *Route-R-Joint* system.

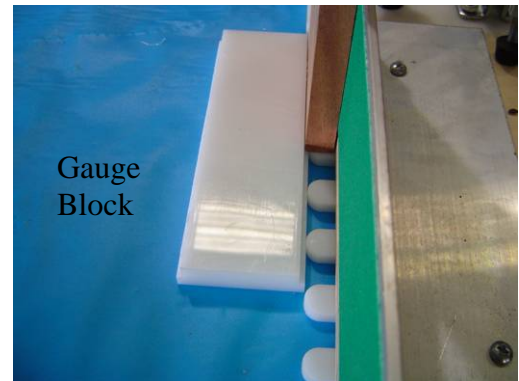
The joint spacing is fixed when using the *Route-R-Joint* system. The centering of the material can be accomplished two ways.

1. Select a material width that is a multiple of the joint spacing. This is easily accomplished by using the template as a measuring device. Set the material up against an end block and select a width that falls within the center of one or more template patterns as shown. A larger width can be used and the parts trimmed on a saw to fit any width. Joints up to 14" wide can be accommodated in the jig.
2. If the material width will not accommodate a convenient division of joints, you can move the material away from the end block and center the material over the desired template protrusions. A convenient method to prevent tear out is to use an additional wood piece inserted as a spacer between the material and the plastic end block. Use the same spacer when cutting the piece using the vertical fence.

Place the gauge block firmly against the template fingers and place the material on top of the jig and against the gauge block then tighten the knobs on the clamp bar. In the picture shown here, the gauge block is used to set the overhang of a piece being cut vertically. The same technique is used to set the overhang of a horizontal piece.



Material centered on heart pattern template.



Rabbet in gauge block sets the overhang of the material

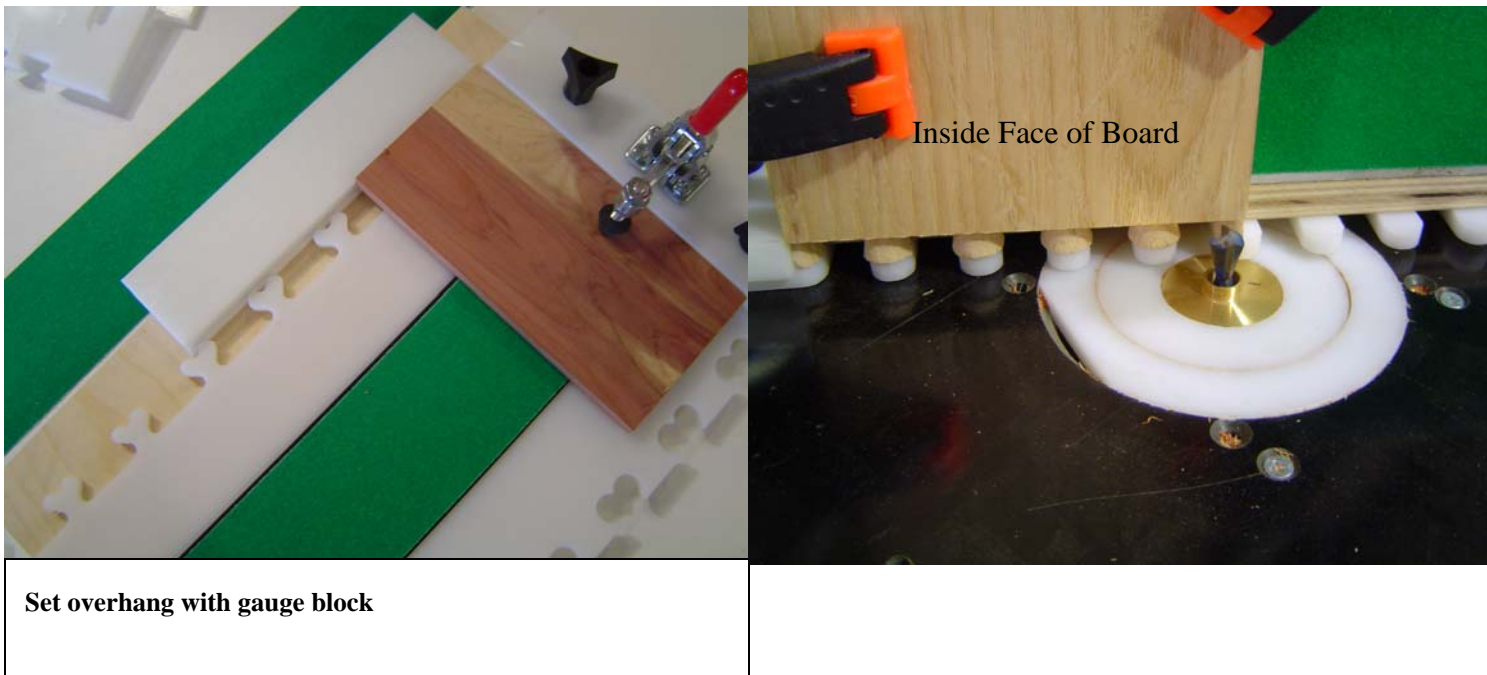
## Order of making the joints for a box

The four joints required to make a box must be done with the correct orientation relative to each other or the joints may not fit properly.

Draw a Reference mark on the edge of one side of each piece of wood. The reference side should always be adjacent to an end block. This will assure each side is properly referenced during assembly.

Usually the pieces laying flat are cut first. Place the reference side against the end block and position the board using the gauge block as shown. When the cut is complete, turn the part end for end keeping the same side against the end block and repeat the cut. Do this twice for both sides of the box.

When cutting the ends of the box with the fence, mark the reference side and the side of the board that is the inside of the finished box. The board is placed with the reference side against the end block and the inside of the finished box away from the fence. Make the first cut then remove the board and rotate it to the other end block keeping the inside face away from the fence. Make the second cut and then repeat for the second board. This operation is shown very clearly in the DVD that came with the system.



**IT IS NORMAL FOR THE PLASTIC END BLOCKS TO BE CUT BY THE ROUTER BITS. The first cut must be made very carefully to assure the bit does not grab the jig and cut excessively. When using a dovetail bit use extreme caution when trimming the end block for the first time as they tend to grab and can cause injury if you are not careful. Once trimmed, the templates will not bind or grab. Watch the video for additional explanation.**

End blocks will last for many projects and can be reversed to use the other side if they become used to a point they no longer provide support. Replacement end blocks are available for a small fee from Woodline USA at 800-472-6950.

## **Traditional Half Blind Dovetails**

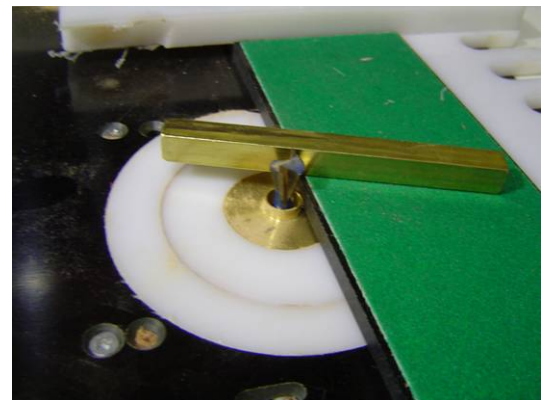
### **READ GENERAL INFORMATION FIRST!**

Half blind dovetails are made up of Pins and Tails. They fit together into a strong 90° joint commonly used for drawers and boxes. The joint is called “half blind” because the joint is only visible from the side. Typically the joint is used with the tails made into the side of a drawer. A matching a set of “pins” is cut into the front and rear of the drawer and the two parts fit together into a joint that is very strong.

#### **Install the 7/16” bushing and set the bit height.**

Insert a 7/16” diameter bushing into the router table. Install a ½” 14° dovetail bit (WL 1303-1). Adjust the height of the bit relative to the jig center with the finger template removed. Adjust the bit height until the bit is 3/8” above the center. Use a brass bar or similar setup aid as shown. This is a “close” adjustment, the height of the bit will probably need to be fine tuned using the rule “heighten to tighten, lower to loosen”. Once set and joints tested you should make a sample cut and save it a future reference “setup” block.

Place the two dovetail fingers in the center jig. The round ended fingers are used for the tails in the side of a drawer (and for the tails of through dovetails). The square ended fingers are for the pins. Note the dovetail fingers have a small rabbet on each end. The height of the bit is set relevant to the center plate not the fingers. This is because the clamping reference is the center plate.



**Setting bit height for dovetails. Set just slightly above 3/8”.**



## MAKING THE TAILS (Drawer sides)

Tails are made using the vertical holding board and the **round ended** fingers. The vertical holding jig is held in place using the toggle clamps. The jig must be clamped parallel to the front edge of the jig. Adjust the knobs to hold the vertical fence in place firmly.

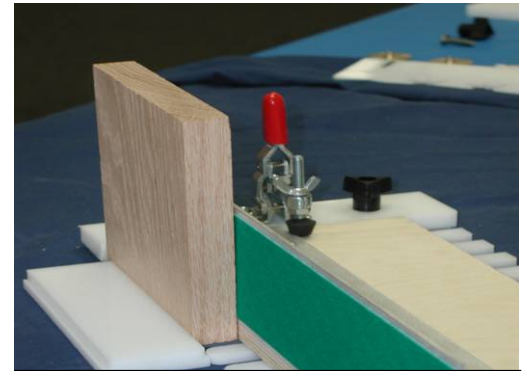
Clamp the material vertically against the end block and align using the set gauge block to determine the amount of overhang as shown in Figure 12. Assure the fence is set to the proper position by checking at **both** ends of the finger board. Aligning the board against the end block assures the edge of the joint will have  $\frac{1}{2}$  a tail and match the corresponding pin in the drawer front or back.

Route the dovetail tails by firmly holding the jig at the toggle clamps, starting at the left side of the board and moving the entire jig assembly over the router bit from **left to right** with the jig close to you. **Moving from left to right assures minimum tear out and smoothest operation while cutting.**

**DO NOT LIFT THE JIG OFF THE ROUTER TABLE WHILE OVER THE ROUTER BIT AS DAMAGE TO THE JIG COULD OCCUR IF THE TEMPLATE FINGERS CONTACT THE BIT INSTEAD OF THE BUSHING!**

The path of the bit will be guided by the template fingers. Make multiple passes to assure all desired material is removed. It is normal for the router bit to contact the end block. The end blocks are reversible and inexpensive to replace. Inspect the cut before the material is removed from the clamps by turning the assembly over and checking to assure full cut was made as shown in Figure 14.

To cut the other end of the board, reverse the part by turning the board over keeping the same face of the material towards the outside of the jig and referencing the same edge of the material against the other end block.



Dovetail tails set with gauge block.



Routed dovetail tails



Inspect cut before removing from template guide. Assure all cuts are complete.

**MAKING THE PINS (sometimes called “sockets”)**

Pins are cut with the board laying down flat against the jig and against the end block as shown. The position of the board determines the depth of the pin sockets and thus how deep the tails will fit into the pins. To set the correct position of the board use the pin board as a gauge. Reference the inside edge of the pin finger template and match the edge of the tail board to the edge as shown.

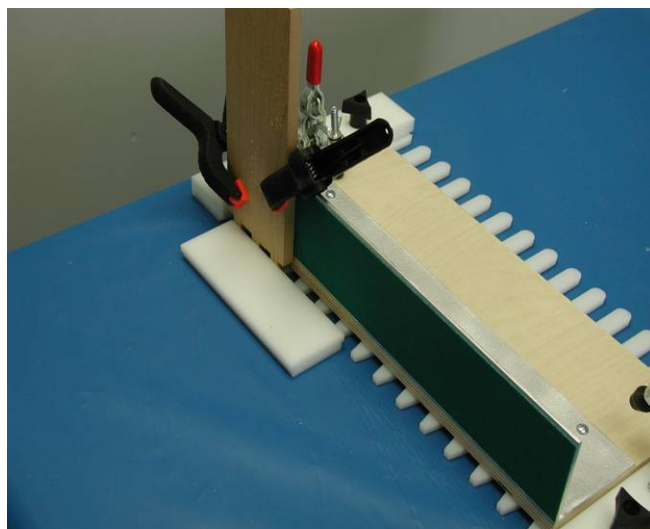
Clamp the pin board even with the outside surface of the tail board while it is being held in place. Remove the tail board and make the cut. Slight adjustments may be made if the depth of cut requires fine tuning.

**CAUTION!** Cut dovetails slowly with a firm grip on jig. Light cuts will reduce tear-out.

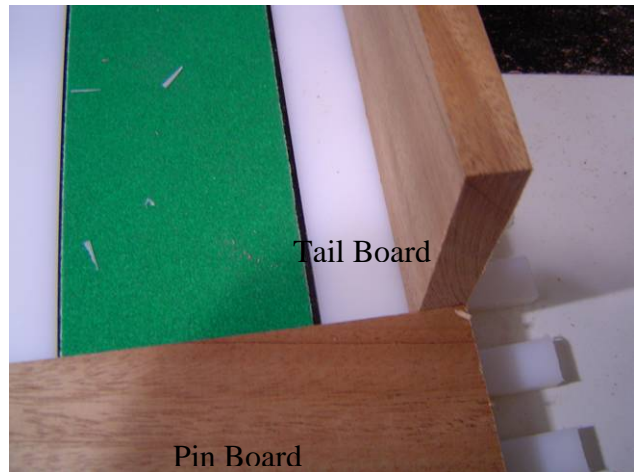


Tail Board Aligned to inside edge of fingers

Use tail board as set gauge against inside edge of pin template.



Positioning the Pin board. Position material using the gauge block to set it back from the edge.



Tail Board

Pin Board

Using tail board as gauge set pin board position.

**THROUGH DOVETAILS**

Through dovetails are made with the **rounded finger template** and the **angled through dovetails templates**. Through dovetails pins are identical to half blind except that they do not use the rounded portion of the template. Moving the board back from the rounded edge produces the required sharp corners.

You can choose either the 14 degree dovetail or the 8 degree dovetail template for the pins. Both 14 degree and 8 degree are used with the round ended finger template as the mating template. The decision of which to use is based on the thickness of the

material. A 1303-1 14 degree bit is limited to 3/8 thick material by the geometry of the bit. A WL-1305 8 Degree bit can cut up to 3/4" thick material.

Insert a 7/16" guide bushing in the table and either part number WL-1303-1 1/2" 14° dovetail bit ( for use up to 3/8" thick material) or the WL-1305 8° 3/4" . Carefully center the bit and set bit height to the thickness of the pin board (pin board is typically the front and back of a drawer). Bit height is set by clamping a board laying down and setting the bit to the top surface of the board. The board is then removed and reinserted using the fence with the board standing up as shown in the pictures.

Use the position guide block to set the position of the material in relation to the ends of the fingers as shown. **NOTE: FOR THROUGH DOVETAILS** position the material back from the rounded ends of the guide template. Placing the material back from the edge of the rounded finger tips eliminates the rounded portion of the tail when cut.

Pins are cut with the 3/16" spiral bit (WL-1002S) and standard (5/16) guide bushing.

Through pins are limited in thickness to the height of the bit. This is generally about 3/8" with a 14° 1/2" dovetail bit and 3/4" with an 8° bit. Use the vertical clamping guide and place it on the center clamp. The position guide is also used to set the wood and vertical clamp position for the pin portion. **Use the position guide with the rabbet against the template (upside down from how it is used with other templates) so the material will be set back from the edge by the amount of the offset.** The position guide is used to set the edge of the material back from the edge of the angled template as shown in the pictures. Make a trial fit. The position of the vertical guide will determine the fit of the dovetail.

Move the material toward the outside of the guide to make the joint fit more loosely. This is the equivalent of the old dovetail adage "heighten to tighten, lower to loosen". In the case of through dovetails cut with a straight bit, it is "forward to loosen back to tighten".

## PATTERN DOVETAILS HEARTS AND OTHERS

### READ GENERAL INFORMATION FIRST!

RJ3 Heart shaped joints are cut using a straight router bit and the RJ3 Heart templates.

Insert the male and female templates into the jig and tighten the locking knobs.

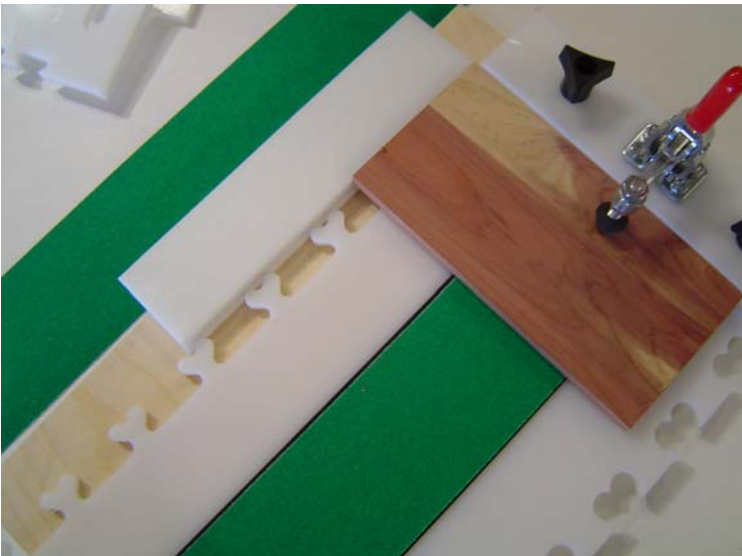


Heart Joints made half blind.

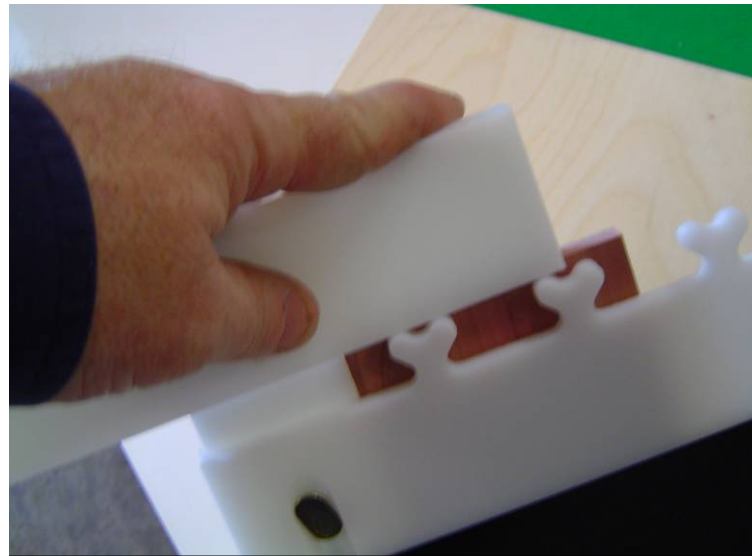
Tails are the male portion of the heart dovetail. To produce a typical joint as shown in Figure 18, clamp the material to be cut into the jig using the gauge block to set the amount of overhang as shown in Figure 19 and 20.

Hearts are cut with either the 5/16" bushing or the undersized bushing. Select the undersized bushing if the joint fits to tightly when using the 5/16" bushing.

Install a 3/16" spiral router bit (WL-1002S-ES). **MAKE SURE THE BIT IS TIGHT IN THE COLLET AND CENTERED IN THE BUSHING.** Set the bit height to the thickness of the material when clamped in the template. When routing, the bit should just barely go through the top of the wood.



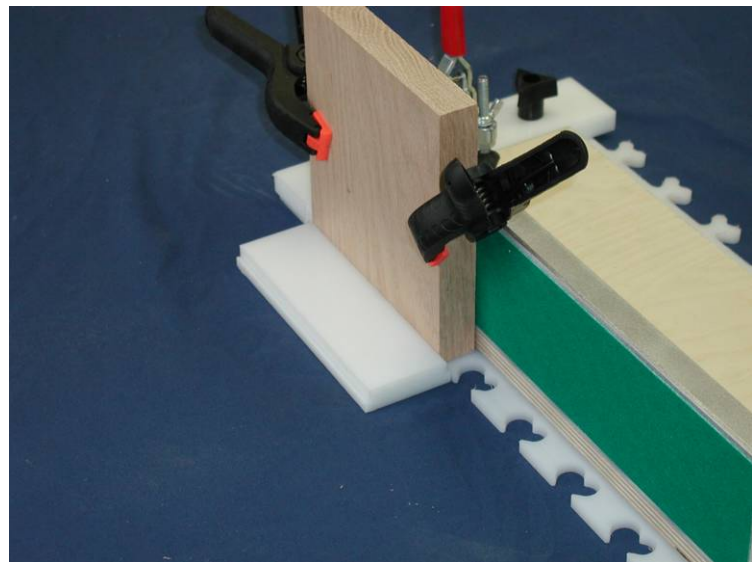
Set overhang with gauge block. This picture uses the old style end block clamp system which has been upgraded.



Bottom view of offset gauge in use.

Move the jig with material attached against the bushing and bit so the material is cut to the shape of the template. Blow the sawdust away from the template and make multiple passes to assure all material is removed. If dust or chips are trapped against the material it may result in poor fitting joints. Assure no chips or sawdust is trapped between the template and the bushing. Make a final finishing pass.

If a flat joint is desired, the mating part can be cut using the pin template in a similar fashion. If a 90° joint is used as shown above, install the vertical clamping fence and clamp the material against the fence and up against the end block as shown. Use



Setup for 90° joint.

the gauge block to set the amount of overhang when positioning the vertical fence.

Route the female portion with multiple passes. Before removing the wood from the jig check to assure the pattern is fully cut into the material. Make additional passes if required to assure complete cut.

## **OTHER PATTERNS**

The dovetails system can produce joints in a variety of patterns. The method of cutting each is identical to the heart joint shown in these instructions with some small exceptions. Some joints such as Dog bones and arrows require a careful approach to avoid excessive force on the male portion which could bend the template during routing and cause poor quality fit. On the female portion of dog bones, teddy bear heads and arrowheads the bushing just barely fits into the template and you may feel a definite “snap” as the template goes into the corner. If any debris is in the template the bushing may not fit into this area, blow out the sawdust and make the cut again.



Pin and Crescent joints are easy to make. Route the pattern without the holes. Glue the joint together and then take the template and place it over the joint aligning the template with the joint. Use a pen to mark the center of the holes and remove the template. Drill holes in the joint with a brad point drill. Drill them deep enough to go into both boards. Glue in a plug or dowel. Plugs made from a matching end grain wood will make the joint appear as if the plugs were part of the original board.

It is possible to use the vertical fence with either template and thus make either portion of a joint the tail or the pin. Imagination is the only limiting factor when creating joints with the system.

## **WOOD THICKNESS Limitations**

### **MAXIMUM THICKNESS**

Wood thickness limits are determined by the bit being used. The 1002S-ES 3/16 straight bit will cut material up to ¾” thick. When cutting with any small diameter router bit be careful to go slow and not to try to remove too much material at one time. When working with hard woods go especially slow and take light cuts. Heavy cuts will cause chatter which will result in poor fitting joints or broken bits. The limiting factor is the thickness of the board cut in the laying down position. Boards cut with the board against the fence can be of greater thickness since they are not cut all the way through.

For 14 degree (WL-1303-1) THROUGH dovetails the thickness of the material is limited to 3/8" by the geometry of the 14 degree angle of the router bit. For 8 degree dovetails (WL1305 bit). For half blind traditional dovetails the wood thickness is not relevant since all pieces are cut in the vertical position.

## **MINIMUM THICKNESS**

The minimum thickness will vary with the joint selected. If a joint is desired to be half blind then the board cut vertically must be large enough to conceal the joint, an example of this is the RJ3 Heart Joint. The piece cut lying down can be as thin as veneer but the piece cut using the vertical fence must be 3/4" thick to completely enclose the joint.

## **Three Dimensional Joinery**

A variety of very attractive joints can be made by varying the wood thickness and the depth of cut. By raising the bit higher than the wood thickness when cutting the end of a vertical board, the resulting joint will set deeper in the cut than if it was flush. This can be used to make an attractive "sculpted" joint and when sanded with a flexible mop sander can produce a very unique and desirable look.

Using wood that is too thin to fully conceal the joint will result in the tail of the joint protruding through the mating board. We call this three dimensional joinery. The piece extending can be sanded or cut off to form an almost unlimited variety of joints.

## **End to End of "Flat" Joinery**

Joints can be made end to end. The fence is not used and both pieces are cut lying down. Joints cut this way may not appear as precise as 90 degree joints but with glue up and sanding they are usually quite nice. Remember you can vary the bushing used to control the tightness of fit.

## **USING THE TEMPLATES ON LARGE PIECES OF MATERIAL**

Templates can be affixed to large pieces that will not fit into the jig. The template can be held in place using double stick tape. Heavy carpet tape works well for this application and will allow templates to be used on very large items such as table legs or large carcass parts. It takes a little creativity but with care you can make a joint of infinite length. When making long joints, overlap the template one joint and continue the cutting.

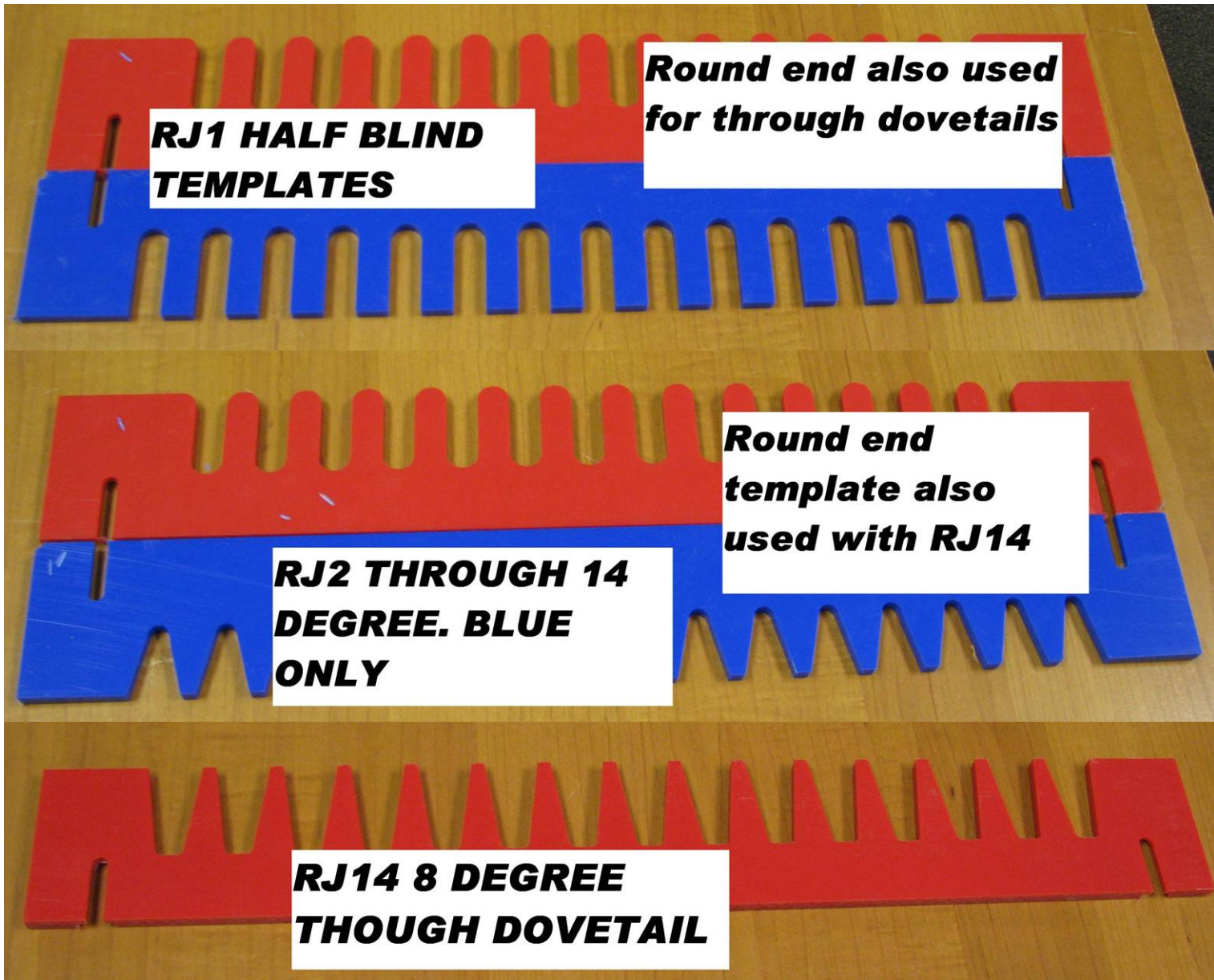
## Troubleshooting your joints

Symptom	Possible Cause/Solution
<p>Poor fitting joint. How the fit is poor makes a difference in the likely problem.</p> <p>Very bad fit: big gaps all around nearly 1/8" in size.  <b>You are using the wrong bit! Use a 3/16 bit only.</b></p>	<ul style="list-style-type: none"> <li>• Bit not centered in bushing. Center bit.</li> <li>• If still tight use undersized bushing.</li> <li>• If joint fits in some places and not in others then the bushing may be moving. The brass nut can not be tightened enough to prevent moving in a poorly fitting bushing hole. Try wrapping the bushing upper lip with tape to make it fit the table properly. Trim off excess tape once installed</li> <li>• Excessive run out in router. Some routers may have excessive run out. Clean collet or try another router.</li> <li>• Joints too loose, use standard bushing if still too loose, wrap tape around standard bushing to make it larger. This is frequently caused by worn router bearings.</li> <li>• Defective template. Contact Woodline for replacement. Send a picture to <a href="mailto:Sales@woodline.com">Sales@woodline.com</a> if possible. Use part numbers at end of instructions.</li> </ul>
Edges not aligned.	Wood not firmly against end block when cut. Clamp and cut the material again.
	End blocks not square to the jig. Check to assure blocks are square to the aluminum plate.
Board will not stay in place.	Sandpaper worn. Replace. Poor clamping practice. Use a board to aid in clamping. Use double stick tape if necessary for small parts.
Jig bows in use.	Excessive clamp force. Re-adjust knobs to reduce bowing.

Specifications are subject to change without notice and components or templates packaged with unit are subject to change also.

Additional joint templates are available from Woodline USA. Contact Woodline at 800-472-6950 for parts or service support.

The pictures on this and the following page are for identifying the templates used for a specific joint. Other joints may be available as they are created. Check our website from time to time for the latest templates and upgrades. Note RJ14 uses the RJ2



round ended template to make 8 degree dovetails. Color of all templates is subject to change and is not important to the operation of the jig.





**RJ3 HEARTS  
TEMPLATES**



**RJ4 KEYS  
TEMPLATES**



**RJ5 NEW HEARTS  
TEMPLATES**



**RJ6 BIG KEYS  
TEMPLATES**



**RJ7 LOCKS  
TEMPLATES**



**RJ8 NEW WAVE  
TEMPLATES**



**RJ9 LOLLIPOP  
TEMPLATES**



**RJ10 ARROWHEADS  
TEMPLATES**



**RJ11 TEDDY BEARS  
TEMPLATES**

A long, white, rectangular template with a series of small, bear-shaped cutouts along its top and bottom edges. Two vertical slots are visible on the left and right sides.



**RJ12 PIN &  
CRESCENT  
TEMPLATES**

A long, rectangular template with a red top half and a blue bottom half. The bottom edge features a series of crescent-shaped cutouts. Two vertical slots are visible on the left and right sides.



**RJ13 DOG BONE  
TEMPLATES**

A long, white, rectangular template with a series of dog bone-shaped cutouts along its top and bottom edges. Two vertical slots are visible on the left and right sides.