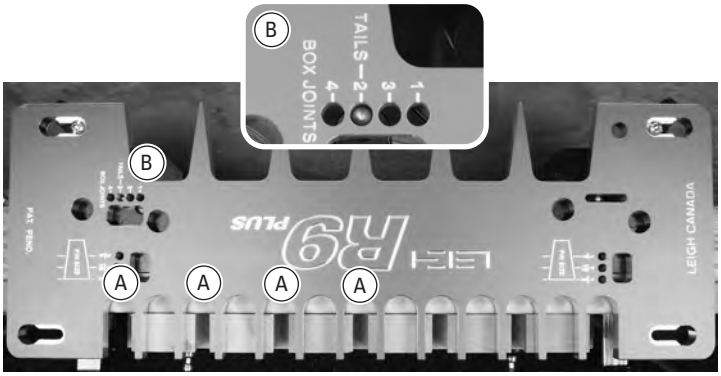
CHAPTER 6
Through Dovetail Joint Procedures

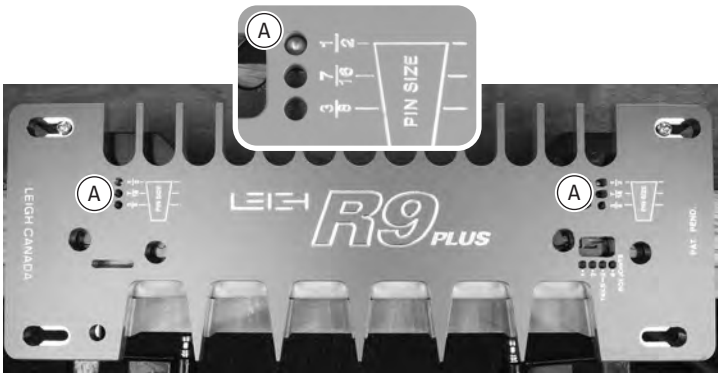
IMPORTANT SAFETY NOTE
Before using your Leigh R9PLUS you must have completed the preparatory steps listed in the previous pages, including reading the jig safety recommendations in Chapter 3.

Note: These instructions show a No.80-8 dovetail bit and 3/4"[19mm] thick boards. Instructions for No.70-8 and 75-8 bits and 3/8"[9,5mm] to 5/8"[15mm] thick boards are identical with the exception of depths of cut and template positions for pins.

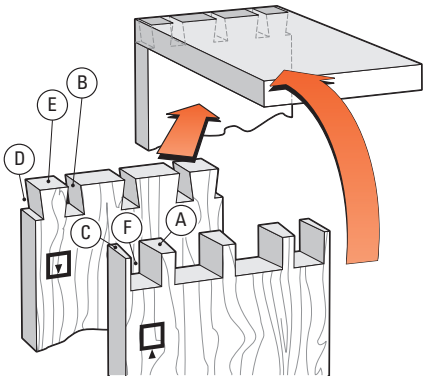
Concept of Operation



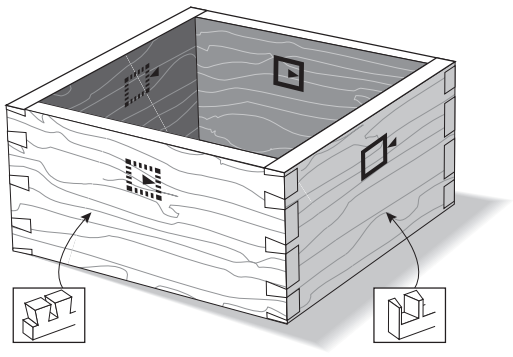
6-1 Dovetail tails are routed with the dovetail bit in the first comb opening and then every other opening Ⓐ. The template is always set in pin plate position 2, Tails Ⓑ.



6-2 Dovetail pins are routed with a ½"[12,5mm] straight bit. The template is set on the pair of pin holes matching the dovetail bit diameter used to rout the tails Ⓐ.



6-3 Terminology This diagram shows the Pins Ⓐ, Pin sockets Ⓑ, Half-pins Ⓒ, Half-pin sockets Ⓓ, Tails Ⓔ and Tail sockets Ⓕ. The pins fit in the pin sockets, and each side always ends with a half-pin.



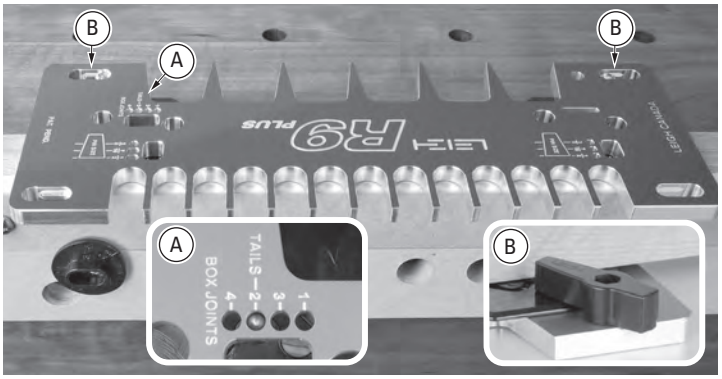
6-4 When you assemble the finished pieces with the faces properly oriented, any one of the pin ends will fit any one of the tail ends. Note the symbols indicating the inside or outside of the pin and tail boards. ■

Board Width Selection

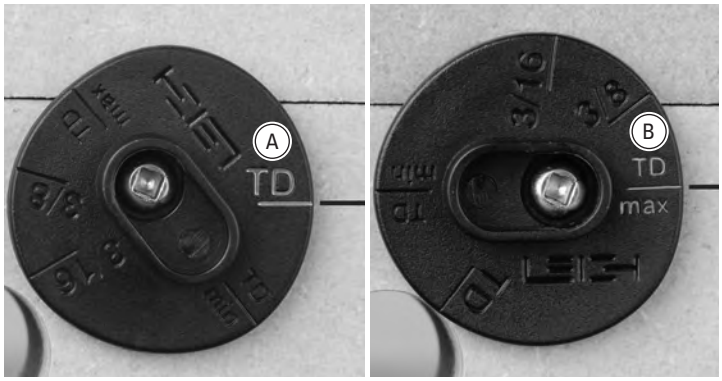
6-5 Board widths are determined by the number of full tails in your design. This chart makes it easy to determine board widths up to 27"[686mm] for the R9PLUS. See leighjigs.com for board widths greater than 27"[686mm].

Through Dovetail Joints

6-6 For this test you will need two identical boards ¾"x 4⅝" x about 8"[19mm x 116mm x 203mm] long. Mark the inside face of the tail board and outside face of the pin board. Fit the e10 eBush to the router, set on index mark 5, and insert the No.80-8 bit.



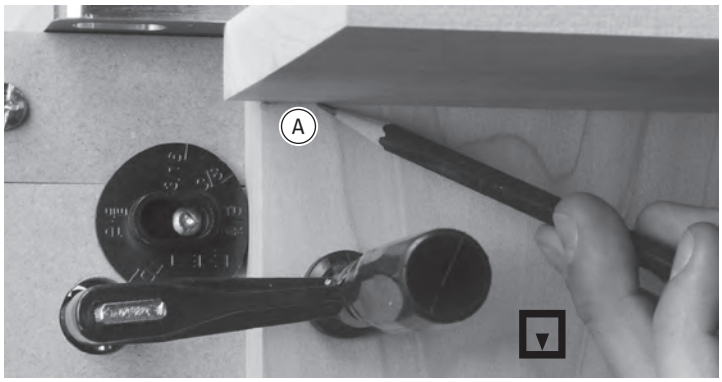
6-7 Position the template at the left hand (sidestop) end of the beam in pin position 2 Tails Ⓐ. **CAUTION: Always secure the template latches under the pin plates Ⓑ after relocating the template.**



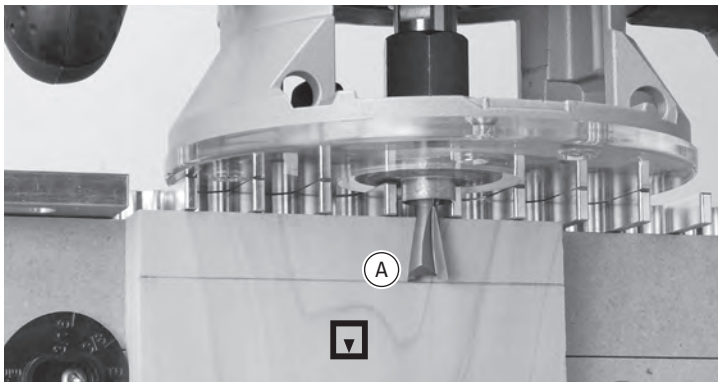
6-8 If your board width matches the dimension in the board width chart exactly, set the sidestop to the TD position Ⓐ place the board against the sidestop, flush under the template and clamp in place. If the board **does not** match the chart width, set the sidestop to the TD Max Ⓑ position and proceed to **6-9**.

6-9 Through dovetail board widths may be ⅛"[3mm] less or ⅜"[9,5mm] greater than the chart width. If the workpiece is greater or less than the chart width, first center the board under the template, with equal spacing on both edges of the board Ⓐ, then clamp the board in place.

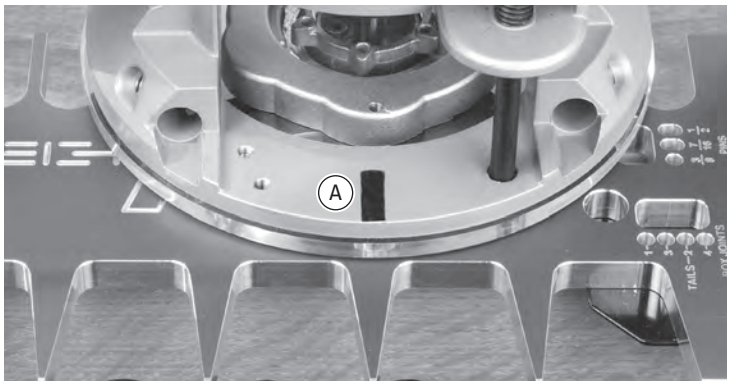
6-10 Next, rotate the sidestop counter clockwise until it touches the workpiece. All boards of the same width will be routed at this sidestop position.



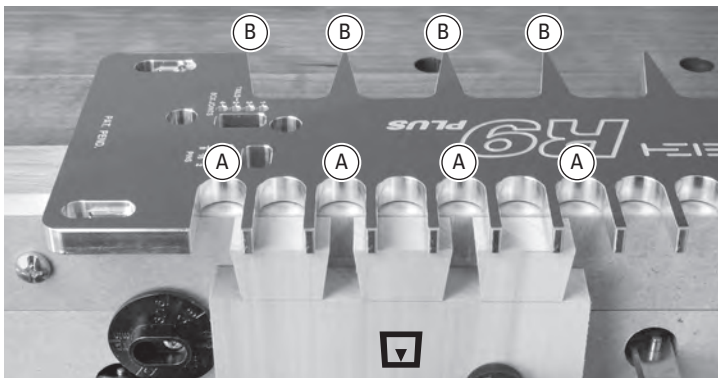
6-11 Place the edge of the pin board under the template and pencil a line on the workpiece Ⓐ.



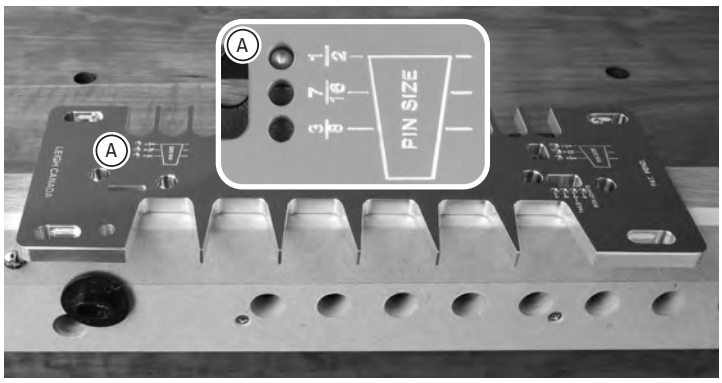
6-12 Place the router onto the template and lower the dovetail bit until the bit tip touches the center of the line Ⓐ.



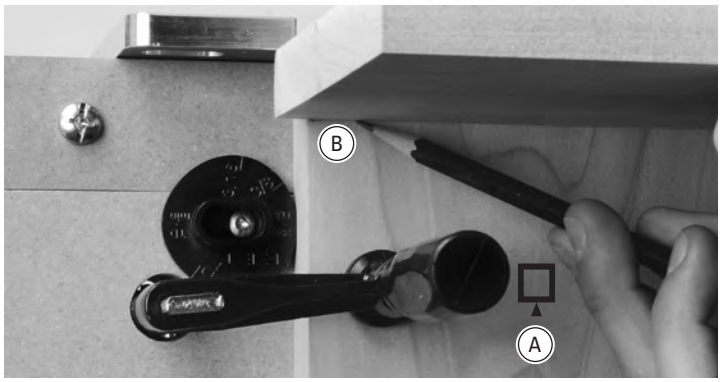
6-13 ⚠ You will be routing into "every other" opening. **Hint:** Mark a bold line at the 12 o'clock position on the router base Ⓐ, to help you with steering and alignment when looking over top of the router as you rout.



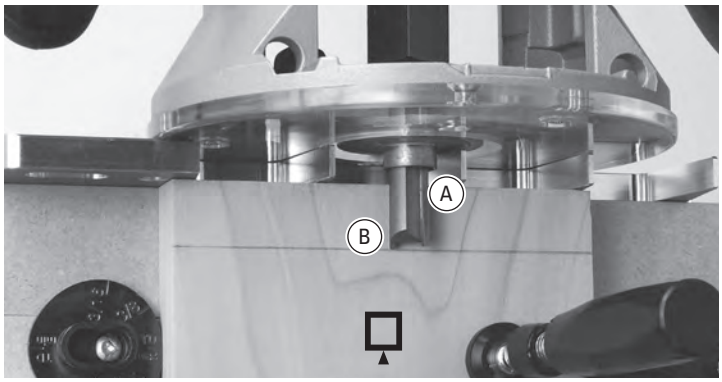
6-14 Rout in the first and every other opening (first, third, fifth openings and so on Ⓐ. **Hint:** When steering the router, it helps to visually align the bold line you marked on the router base with each of the TD pin guide "points" Ⓑ. Then remove the tail board.



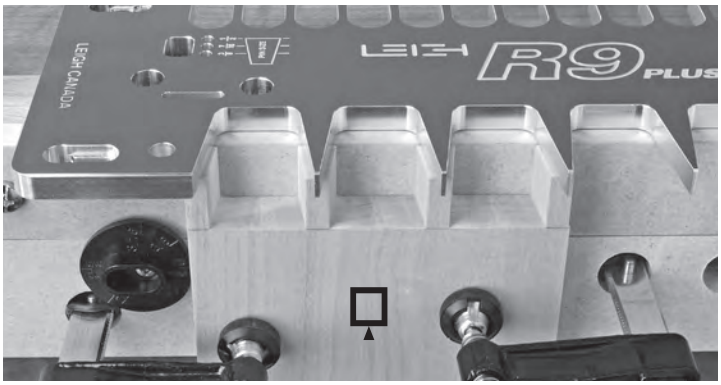
6-15 Turn the template to the TD pin mode and position the template in the ½"[12,7mm] pin position Ⓐ. The ½"[12,7mm] holes match the diameter of the No.80-8 bit that was used to rout the tails. If you had used the No.75-8 bit you would position the template on the 7⁄16"[11mm] holes. For the No.70-8 bit you would use the ⅜" holes.



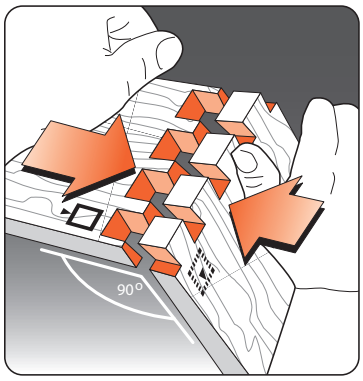
6-16 Clamp a pin board against the stop, marked outside face out Ⓐ. Place the edge of the tail board under the template and pencil a line on the pin board Ⓑ.



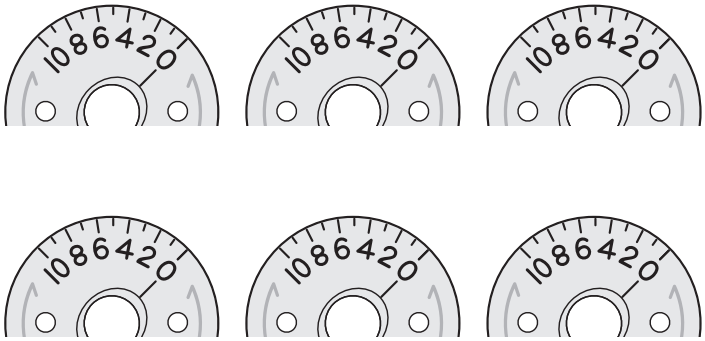
6-17 Replace the dovetail bit with the included ½"[12,7mm] Leigh 160 straight bit Ⓐ and leave the e10 eBush set to index mark 5. Place the router onto the template and lower the straight bit down until the bit tip is touching the center of the line Ⓑ.



6-18 Rout out the waste between the pins. Check to make sure no parts have been missed.



6-19 Remove the pin board and test it for fit in the tail board sockets. Make sure the outside faces face outward on both pieces. A firm push fit is perfect. Having to use a mallet means the joint is too tight for gluing.

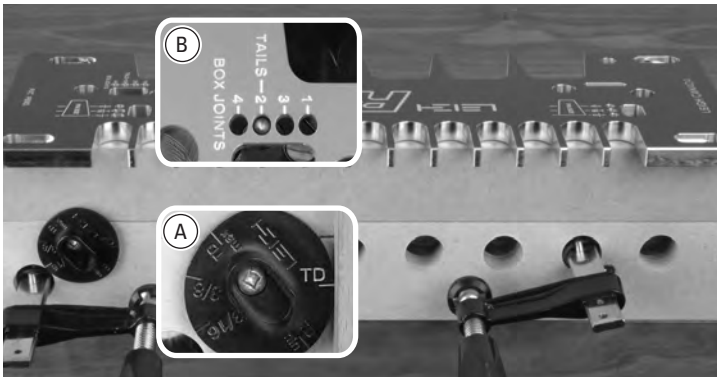


6-20 If necessary, adjust the eBush as required for a looser or tighter fit and rout a new pin board and a new tail board. Record the eBush setting for future use. ■

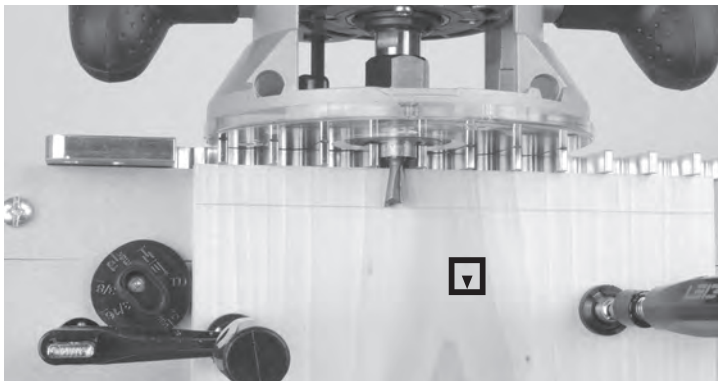
Half-pitch Through Dovetail Joints

6-21 The pitch of the R9PLUS Template (distance between the pin centers) is 1½"[38mm] (1.555 to be precise [39,5mm]). Some projects may benefit from closer pin centers. The following procedure details how to use the R9PLUS to rout through dovetails with ¾"[19mm] pin centers. ***Note: This procedure is only possible with the 7/16"[11,1mm] (75-8) and 3/8"[9,5mm] (70-8) router bits. An e7 eBush and 5/16"[8mm] straight bit are also required. A shop made spacer, 0.777"[19,685mm] wide, is used to offset the pin board. See page 4 for bit and guide bushing options.***

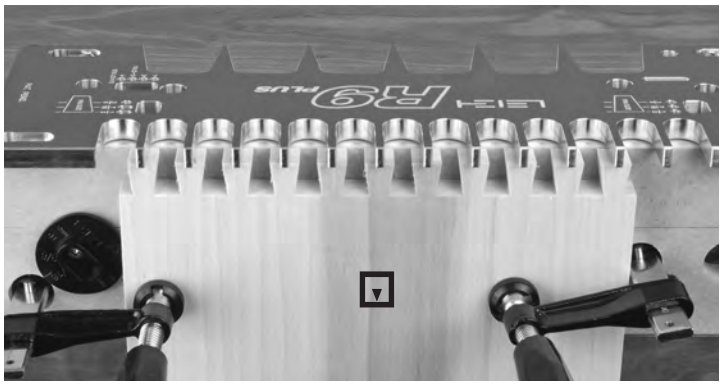
This example uses a 7/16"[11mm] (75-8) Dovetail Bit and the 5/16"[8mm] (140-8) straight bit with 5/8"[15mm] thick stock.



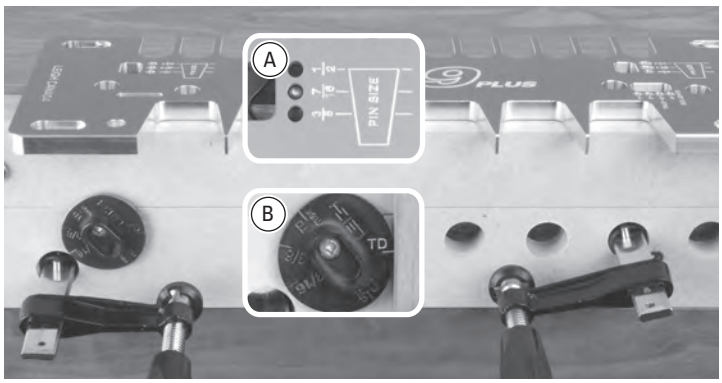
6-22 Set the sidestop to the TD position Ⓐ and place the template in pin position 2 Tails Ⓑ. Secure the pin plate latches.



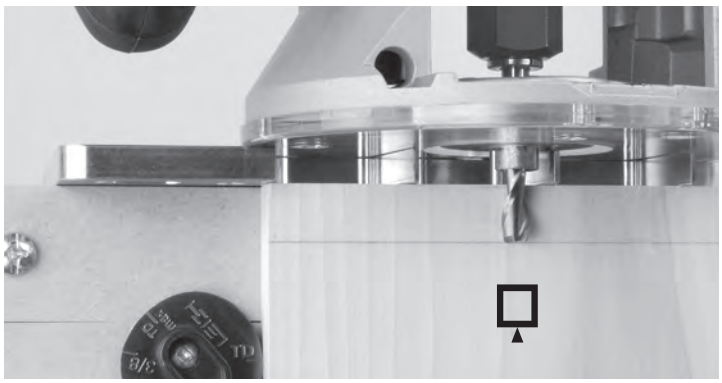
6-23 Clamp a tail board flush under the template and against the sidestop. Mark the depth of cut and set the router bit.



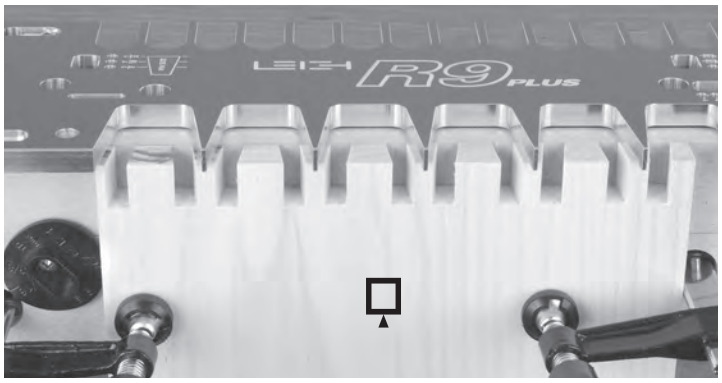
6-24 Rout the tails, being sure to rout in every template opening.



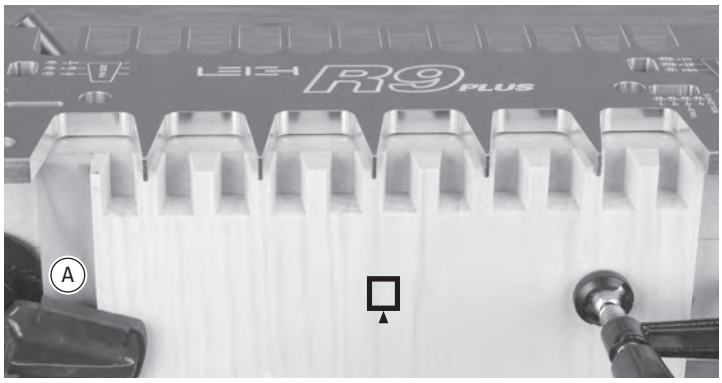
6-25 Place the template in the 7⁄16"[11mm] pin plate position Ⓐ and secure the latches. Leave the sidestop set on the TD position Ⓑ. Remove the 75-8 dovetail bit and e10 guide bushing and install the e7 bushing and a 5⁄16"[8mm] straight bit.



6-26 Insert the pin board and set the bit depth.

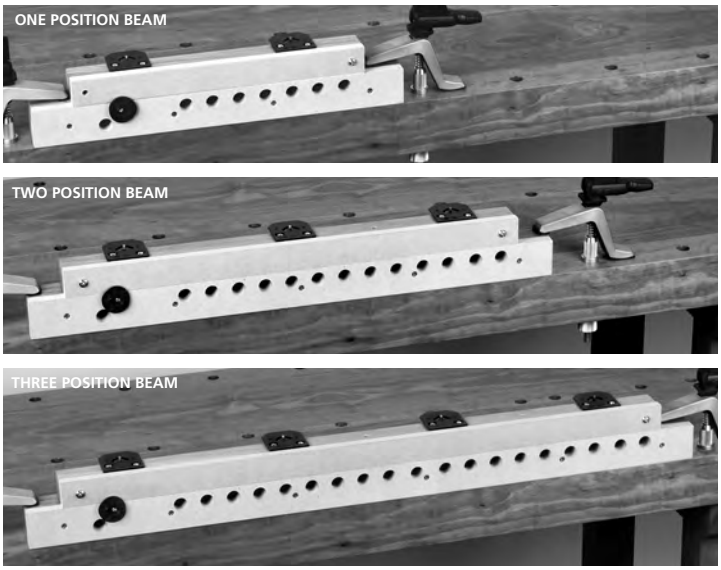


6-27 Rout the first pass of the pins. ⚠ ***Half-pitch pins are routed in two passes. When routing the first pass, the guide bushing must remain in contact with the guide pin at all times. DO NOT rout away the waste between the pins.***



6-28 Now, remove the pin board, add the shop made spacer Ⓐ against the sidestop. Reinstall the pin board against the spacer and flush against the template above. Rout the second pass again being careful to keep the guide bushing against the guide pins at all times. ■

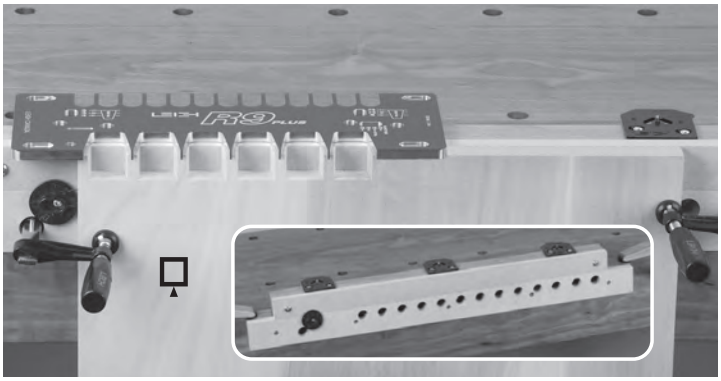
Wide Boards



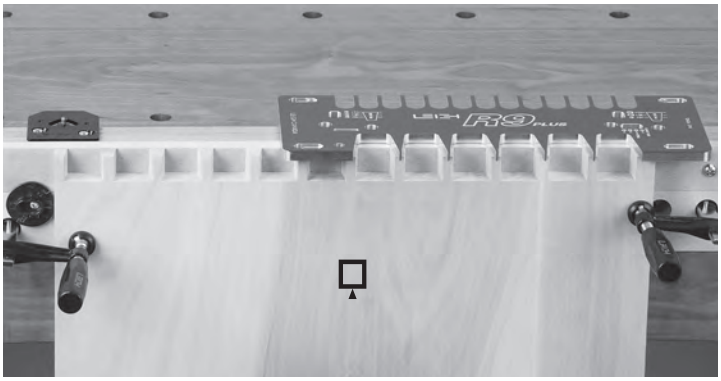
6-29 ***Routing boards of any width is simple with the R9PLUS.*** The unique pin plate positioning holes on the template, and the pin plates mounted on the beam, accurately index the template each time it is "stepped over".

Each template position will allow 9"[229mm] of joint pattern, therefore, on a one position beam (1 template) the maximum board width will be 9"[229mm]. A two position beam (2 templates) will accommodate boards up to 18"[457mm]. Increasing the beam length to three template positions will allow dovetails or box joints on boards up to 27"[686mm]. There is no limit to the length of a beam.

A one position beam is 20"[508mm] in length. Each additional template position requires 10"[254mm] of beam length.



6-30 This beam has two template positions. Position the template on the sidestop end of the beam (operator's left side), secure the pin plate latches and clamp the board against the sidestop. Rout the first half of the joint.



6-31 Leave the board clamped on the beam, release the pin plate latches and shift the beam to the next position. Secure the pin plate latches. Now rout the second half of the joint. ■

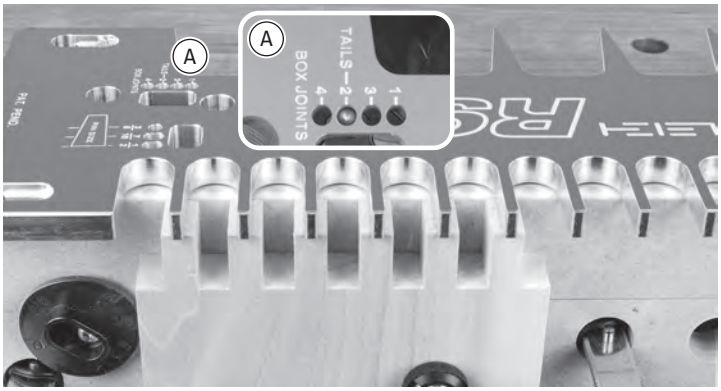
CHAPTER 7
Box Joint Procedures

IMPORTANT SAFETY NOTE
Before using your Leigh R9PLUS you must have completed the preparatory steps listed in the previous pages, including reading the jig safety recommendations in Chapter 3.

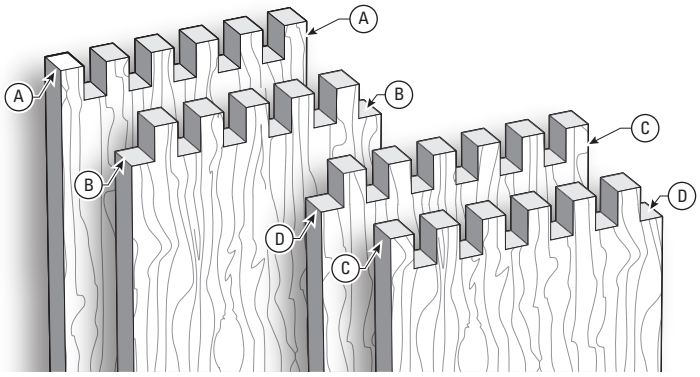
Note: These instructions show a 3/8"[9,5mm] straight router bit and 3/4"[19mm] thick boards. Any board thickness up to 1"[25,4mm] may be used for 3/8"[9,5mm] joints.

Concept of Operation

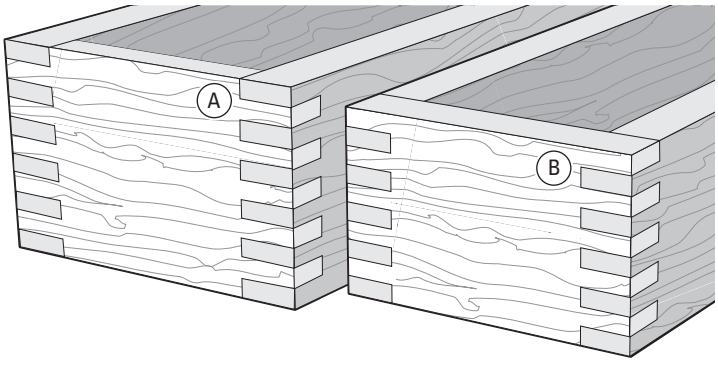
7-1 The template has positioning holes 1, 2, 3 or 4 Ⓐ that fit on the raised pin of the pin plates. Box joints are routed in two steps: the pin board, as shown, and...



7-2 ...the socket board. The pin positioning hole used depends on the part of the joint being routed.



7-3 Terminology This diagram shows the pins Ⓐ and mating pin sockets Ⓑ. Symmetrical joints have pins Ⓐ on both edges of one board and sockets Ⓑ on both edges of the mating board. Asymmetrical joints have a pin Ⓒ on one edge and a socket Ⓓ on the other edge of each board.



7-4 Any one of the pin ends will fit any one of the tail ends. Most joints will be symmetrical Ⓐ but may be asymmetrical Ⓑ to fit a specific board width. ■

Board Width Selection

7-5 Board widths are determined by the total number of pins and sockets in your design and whether the joint is symmetrical or asymmetrical. This chart makes it easy to determine board widths up to 27" for ⅜" and ¾" joints [686mm for 9,5mm and 19mm joints], and up to 9" for 3⁄16" joints [229mm for 4,75mm joints]. See leighjigs.com for board widths greater than 27"[686mm].

BOARD WIDTH (inches)

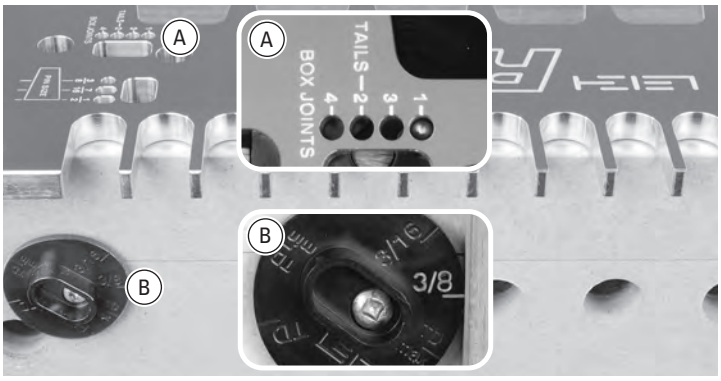
No. of Pins and Sockets	3/16" Symmetrical	3/16" Asymmetrical	3/8" Symmetrical	3/8" Asymmetrical	3/4" Symmetrical	3/4" Asymmetrical
1						
2						
3	9/16		1 5/32			
4		25/32		1 9/16		
5	31/32		1 15/16		2 5/16	
6		1 5/32		2 5/16		3 3/32
7	1 11/32		2 23/32		3 5/32	
8		1 9/16		3 3/32		
9	1 3/4		3 1/2		3 7/8	
10		1 15/16		3 7/8		4 21/32
11	2 1/8		4 9/32		4 21/32	
12		2 5/16		4 21/32		
13	2 17/32		5 1/16		5 7/16	
14		2 23/32		5 7/16		6 7/32
15	2 29/32		5 13/16		6 7/32	
16		3 3/32		6 7/32		
17	3 5/16		6 19/32		7	
18		3 1/2		7		7 25/32
19	3 11/16		7 3/8		7 25/32	
20		3 7/8		7 25/32		
21	4 1/16		8 5/32		8 9/16	
22		4 9/32		8 9/16		9 5/16
23	4 15/32		8 15/16		9 5/16	
24		4 21/32		9 5/16		
25	4 27/32		9 23/32		9 5/16	One Template Position
26		5 1/16		10 3/32		
27	5 1/4		10 1/2		10 7/8	
28		5 7/16		10 7/8		
29	5 5/8		11 9/32		11 21/32	
30		5 13/16		11 21/32		12 7/16
31	6 1/32		12 1/16		12 7/16	
32		6 7/32		12 7/16		13 7/32
33	6 13/32		12 27/32		13 7/32	
34		6 19/32		13 7/32		14
35	6 13/16		13 19/32		14	
36		7		14		14 25/32
37	7 3/16		14 3/8		14 25/32	
38		7 3/8		14 25/32		15 9/16
39	7 9/16		15 5/32		15 9/16	
40		7 25/32		15 9/16		16 11/32
41	7 31/32		15 15/16		16 11/32	
42		8 5/32		16 11/32		17 3/32
43	8 11/32		16 23/32		17 3/32	
44		8 9/16		17 3/32		
45	8 3/4		17 1/2		17 7/8	
46		8 15/16		17 7/8		18 21/32
47	9 1/8		18 9/32		18 21/32	
48		9 5/16		18 21/32		Two Template Positions
49	9 17/32		19 1/16		19 7/16	
50		9 23/32		19 7/16		20 7/32
51	9 29/32		19 27/32		20 7/32	
52				20 7/32		
53			20 19/32		21	
54				21		21 25/32
55			21 3/8		21 25/32	
56				21 25/32		22 9/16
57			22 5/32		22 9/16	
58				22 9/16		23 11/32
59			22 15/16		23 11/32	
60				23 11/32		24 1/8
61			23 23/32		24 1/8	
62				24 1/8		24 7/8
63			24 1/2		24 7/8	
64				24 7/8		25 21/32
65			25 9/32		25 21/32	
66				25 21/32		26 7/16
67			26 1/16		26 7/16	
68				26 7/16		27 7/32
69			26 27/32		27 7/32	
70				27 7/32		28
71			27 5/8		28	
72				28		

BOARD WIDTH (millimeters)

No. of Pins and Sockets	4,75mm Symmetrical	4,75mm Asymmetrical	9,5mm Symmetrical	9,5mm Asymmetrical	19mm Symmetrical	19mm Asymmetrical
1						
2						
3	14,5		29,5		59	
4		19,5		39,5		79
5	24,5		49		99	
6		29,5		59		118
7	34,5		69		138	
8		39,25		79		158
9	44,25		88,5		178	
10		49,25		98,5		197
11	54,25		108,5		217	
12		59		118,5		237
13	64		128		257	
14		69		138		276
15	74		148		296	
16		78,75		158		316
17	83,75		168		336	
18		88,75		177,5		355
19	93,75		187,5		375	
20		98,5		197,5		395
21	103,5		207,5		415	
22		108,5		217		435
23	113,5		227		454	
24		118,25		237		474
25	123,25		247		494	
26		128,25		256,5		514
27	133,25		266,5		533	
28		138,25		276,5		553
29	143		286,5		573	
30		148		296		593
31	153		306		612	
32		158		316		632
33	162,75		326		652	
34		167,75		335,5		672
35	172,75		345,5		691	
36		177,75		355,5		711
37	182,5		365,5			
38		187,5		375,5		
39	192,5		385			
40		197,5		395		
41	202,25		405			
42		207,25		415		
43	212,25		424			
44		217,25		434,5		
45	222		444,5			
46		227		454,5		
47	232		464			
48		237		474		
49	241,75		484			
50		246		494		
51			503,5			
52				513,5		
53			523,5			
54				533,5		
55			543			
56				553		
57			563			
58				573		
59			583			
60				592,5		
61			602,5			
62				612,5		
63			622,5			
64				632		
65			642			
66				652		
67			662			
68				671,5		
69			681,5			
70				691,5		
71			701,5			
72				711		

3/8"[9,5mm] Box Joints

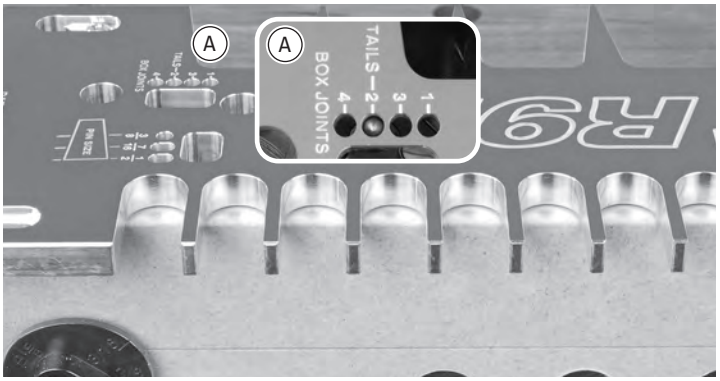
7-6 Use the e10 eBush (guide bushing) and a ⅜"[9,5mm] straight router bit. For 3/16"[4.75mm] and ¾"[19mm] box joints, see following sections. For straight bit options see page 4.



7-7 Position the template at the left hand (sidestop) end of the beam, in pin position 1 Ⓐ, with the box joint comb on the sidestop side of the beam. **Secure the template latches on the pin plates** and set the sidestop to ⅜"[9,5mm] Ⓑ.

7-8 Clamp a pin board with the marked edge against the sidestop and flush under the template. Either face can be out. Set the depth of cut.

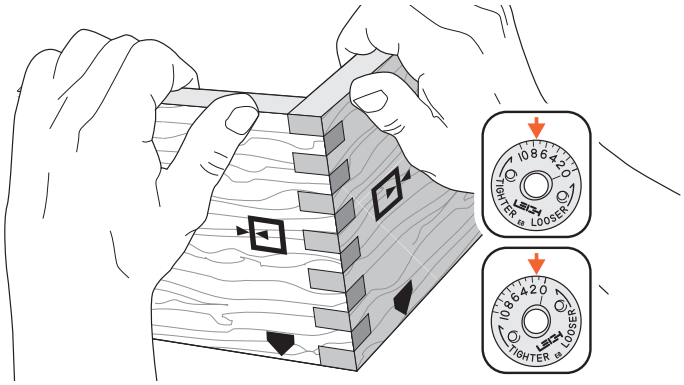
7-9 Rout in all of the openings of the pin board, making sure the eBush contacts all guide surfaces, then remove the board.



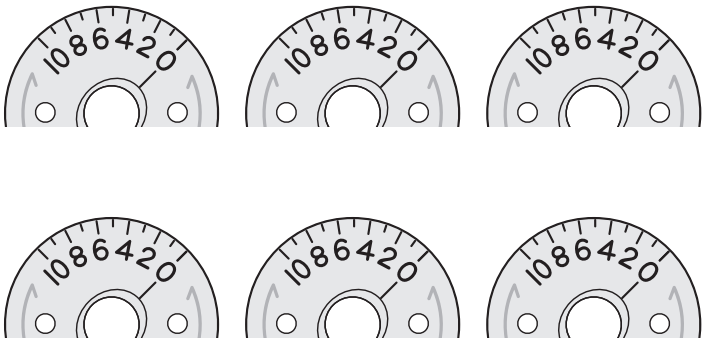
7-10 Unlock and move the template to pin position 2 Ⓐ and secure the template latches.

7-11 Clamp the socket board with the marked edge against the sidestop. Mark the depth of cut and set the router bit.

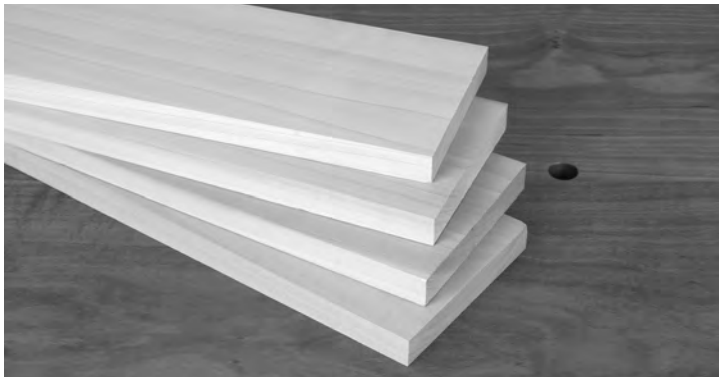
7-12 Rout all of the sockets. Remove socket board.



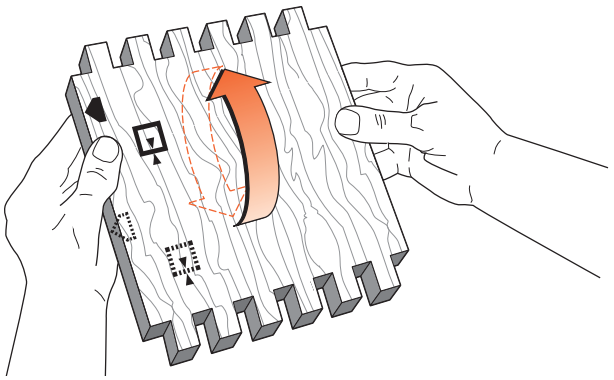
7-13 Test for fit, keeping the marked edges together. If required, adjust the eBush for a looser or tighter fit, and rout a new pin board and a new socket board.



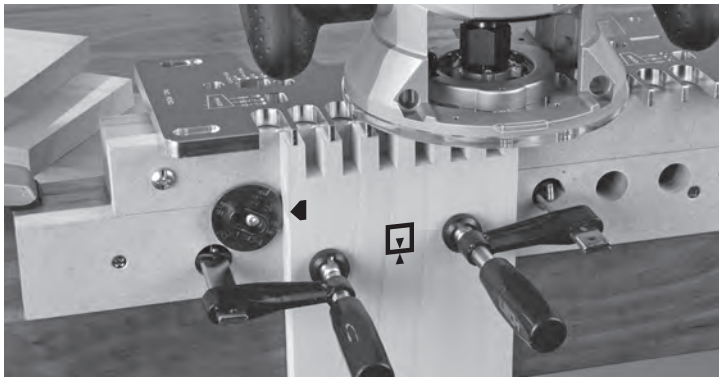
7-14 Record the eBush setting here for a quick setup the next time you use this bit/guide bushing combination.



7-15 Let's make a box. Prepare four boards and mark them 1, 2, 3, and 4. Then select the grain alignment and mark the common top (or bottom) edge. Don't worry about face side selection — this can be done after routing.

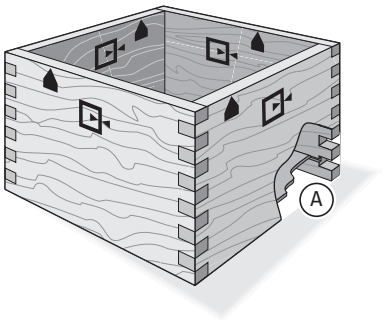


7-16 All square box joint boards (for boxes) are clamped alternately face in and face out, always with the same side edge against the sidestop.



7-17 Rout both ends of Boards 1 and 3 in pin position 1. Be sure to keep the same edges to the sidestop.

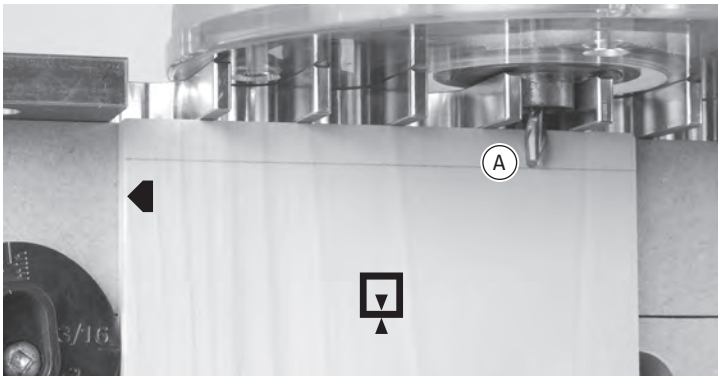
7-18 Rout both ends of Boards 2 and 4 in pin position 2. Keep the same edges to the sidestop.



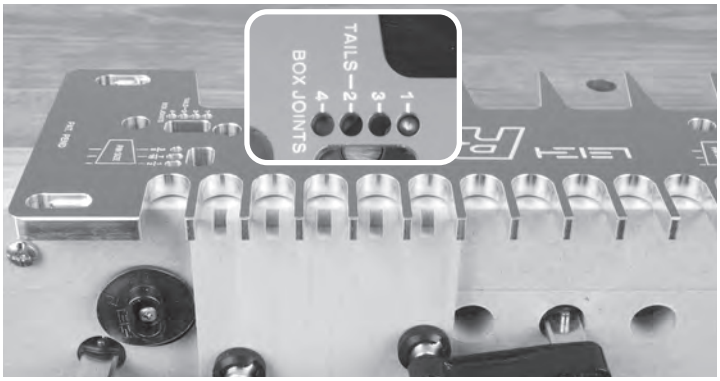
7-19 Keeping the marked sidestop edges of all boards toward the top (or bottom) of the box, select the preferred outside faces before marking and routing the grooves Ⓐ for the box bottom. Box joint corners need clamping from both directions, or use strap clamps and blocks.

3/16"[4,75mm] Box Joints

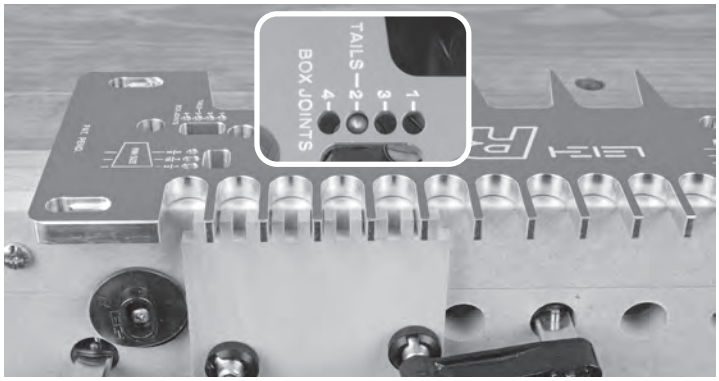
7-20 ***You should be thoroughly familiar with the 3/8"[9,5mm] joint procedure before routing 3/16"[4,75mm] joints.*** Set the sidestop on the 3/16"[4,75mm] mark.



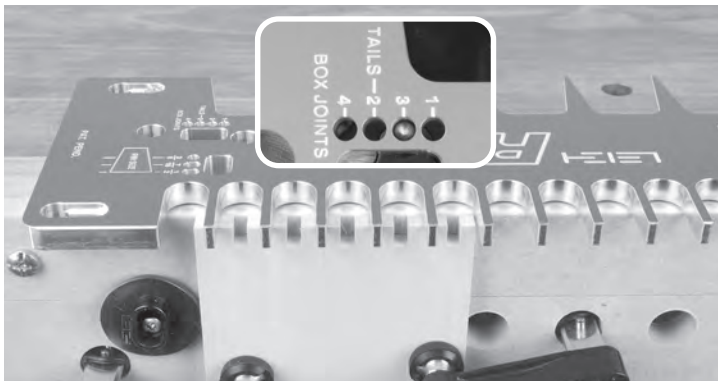
7-21 Clamp the socket board against the sidestop and flush under the template. Install a 3/16"[4,75mm] router bit and set the router bit depth to suit the mating board as before Ⓐ.



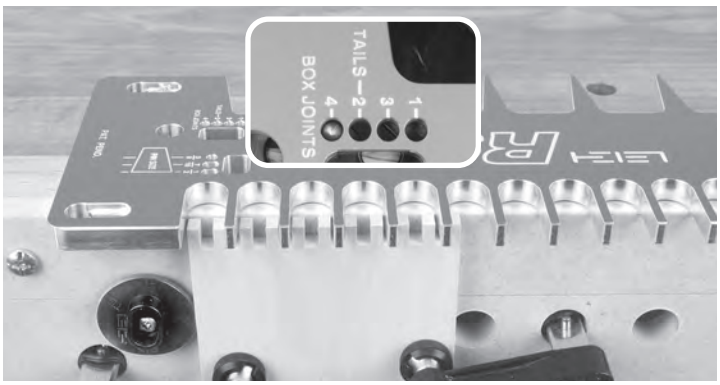
7-22 Set the template in pin position 1, lock it and rout in all openings — but don't remove the board. Note: Nothing will be routed in the first socket of the template.



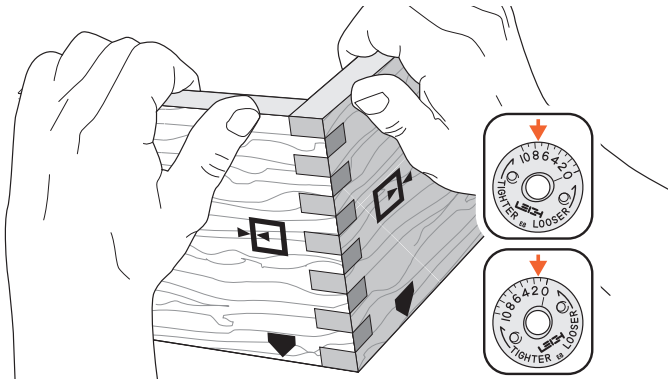
7-23 Move the template across to pin position 2 and lock. Rout the rest of the sockets.



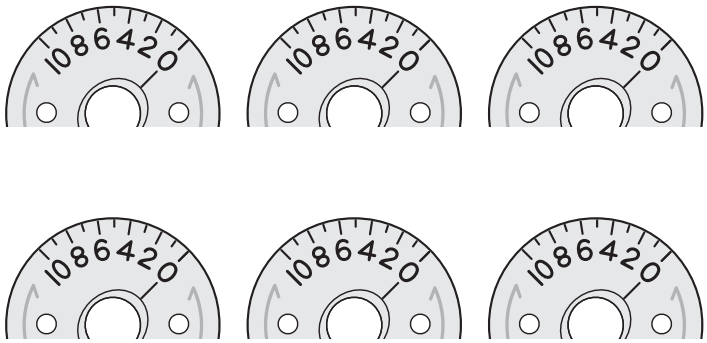
7-24 Remove the socket board and clamp in the pin board. Move template to pin position 3 and rout in all of the openings — but don't remove the board.



7-25 Move the template across to pin position 4 and lock. Rout all the rest of the pins.



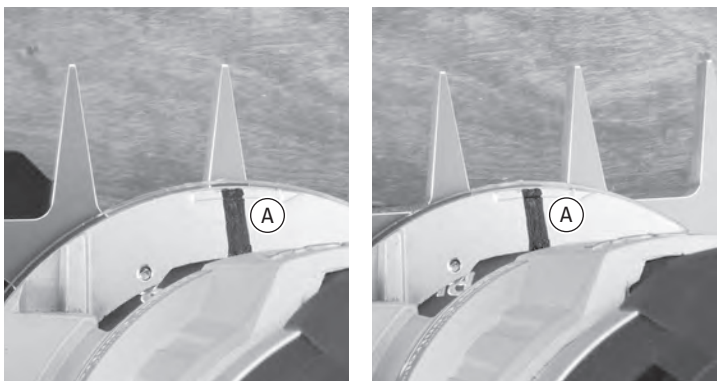
7-26 Test for fit, keeping the marked edges together. If required, adjust the eBush for a looser or tighter fit and rout a new pin board and a new socket board.



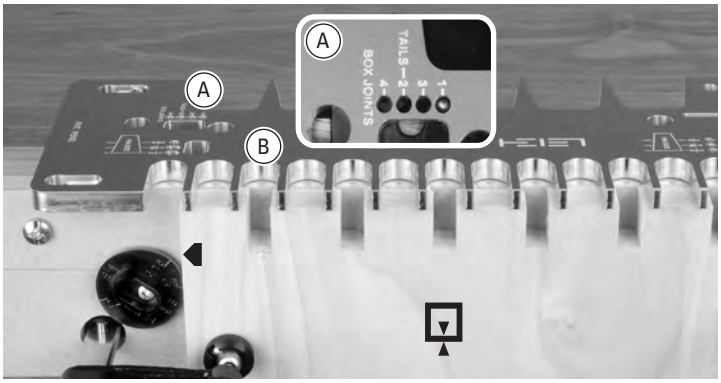
7-27 Record the eBush setting here for a quick setup the next time you use this bit/eBush combination. ■

3/4"[19mm] Box Joints

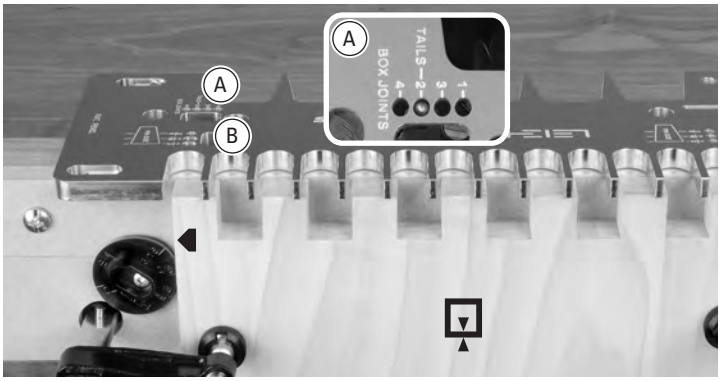
7-28 ***You should be thoroughly familiar with the 3/8"[9,5mm] joint procedure before routing 3/4"[19mm] joints.*** Set the sidestop on the 3/8"[9,5mm] mark and use the same 3/8"[9,5mm] bit and e10 eBush setting used for your successful 3/8"[9,5mm] joint fit.



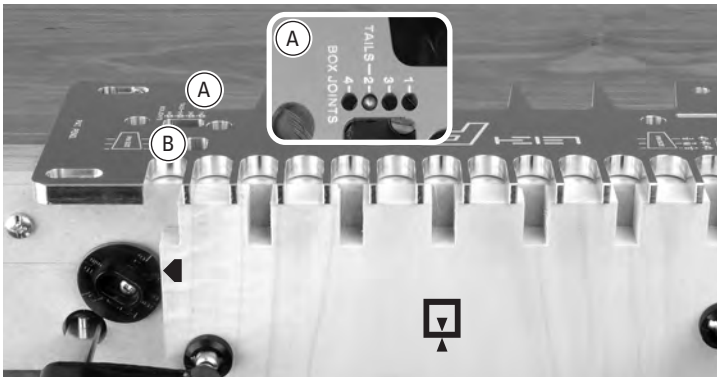
7-29 ⚠ For 3/4"[19mm] box joints you will be routing into alternating sockets. **Hint:** Mark a bold line at the 12 o'clock position on the router base Ⓐ. This will help to "steer" the router.



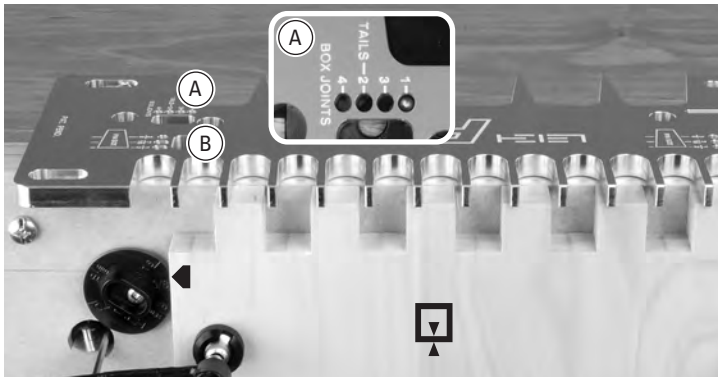
7-30 Set the template in pin position 1 Ⓐ and secure the pin plate latches. Clamp the pin board and rout in the third template opening Ⓑ and every other opening. Leave the board in place.



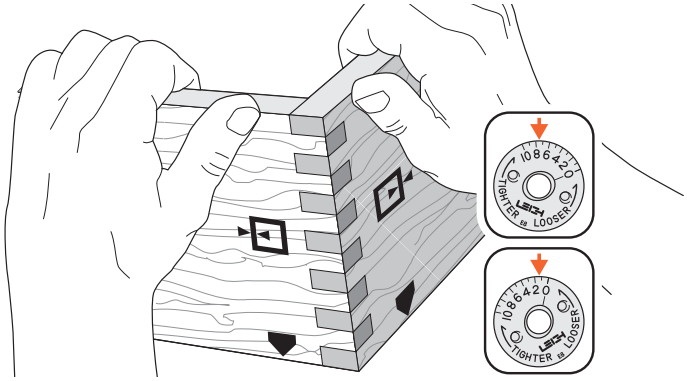
7-31 Move the template to pin position 2 Ⓐ and secure the pin plate latches. Rout in the second opening Ⓑ and in every other opening. Remove the board but leave the template in pin position 2 .



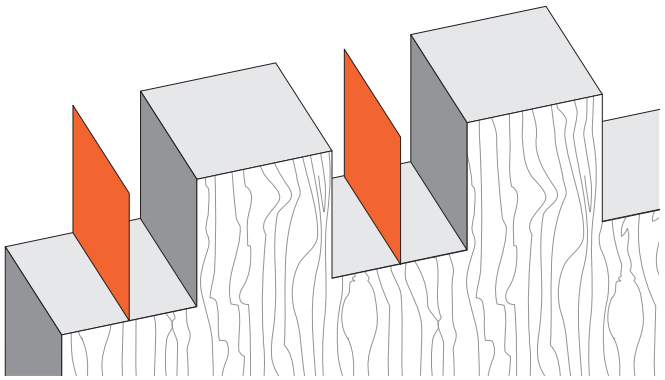
7-32 Clamp the socket board and rout in the first opening Ⓑ and every other opening.



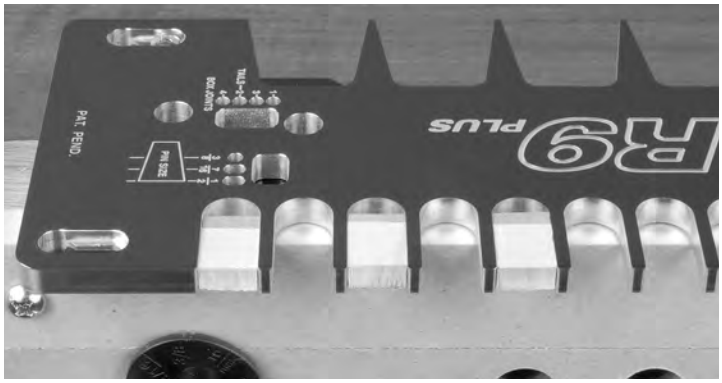
7-33 Move the template to pin position 1 Ⓐ and rout in the second and every other opening Ⓑ.



7-34 Test for fit, keeping the marked edges together. If required, adjust the eBush for a looser or tighter fit and rout a new pin board and a new socket board.

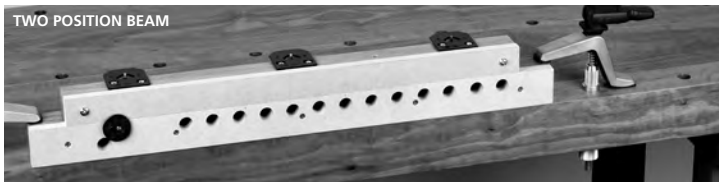


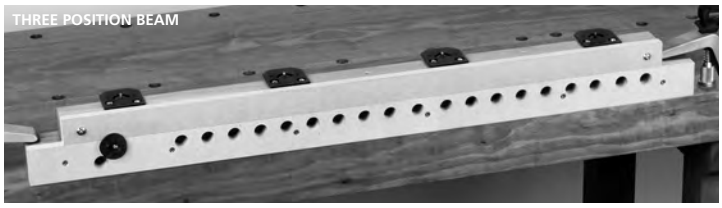
7-35 Theoretically, there will be nothing left in the sockets where the bit has passed by twice. However, routing tolerances can leave a very thin "wall". This can be quickly removed with a chisel and/or sandpaper.



7-36 Hint: Here is a foolproof way to avoid routing in the "wrong" template openings. Cut some ¼"[6mm] thick wood strips, slightly narrower than the comb openings. Wrap with sufficient masking tape to create a snug friction-fit in the template openings you don't want to rout Ⓐ. ■

Wide Boards

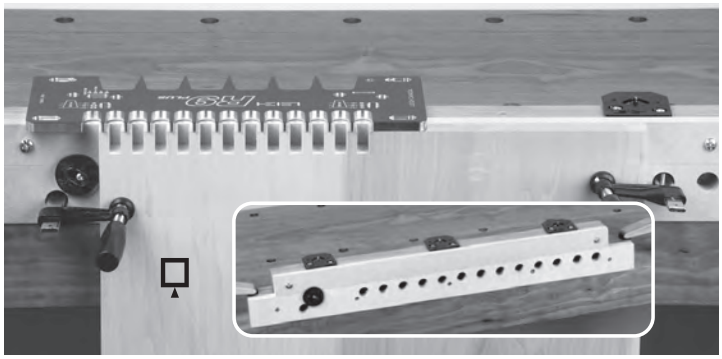




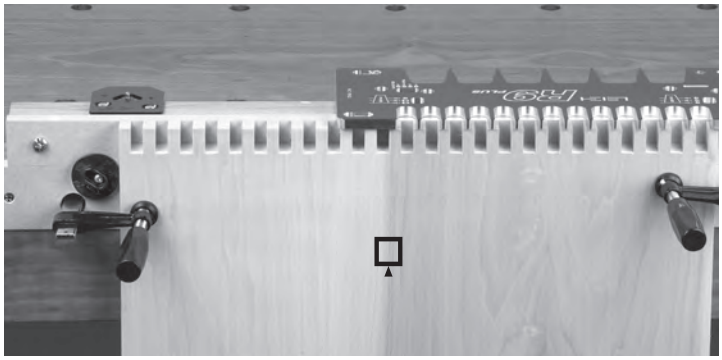
7-37 ***Routing boards of any width is simple with the R9PLUS.*** The unique pin plate positioning holes on the template, and the pin plates mounted on the beam, accurately index the template each time it is "stepped over".

Each template position will allow 9"[229mm] of joint pattern, therefore, on a one position beam (1 template) the maximum board width will be 9"[229mm]. A two position beam (2 templates) will accommodate boards up to 18"[457mm]. Increasing the beam length to three template positions will allow dovetails or box joints on boards up to 27"[688mm]. There is no limit to the length of a beam.

A one position beam is 20"[508mm] in length. Each additional template position requires 10"[254mm] of beam length.



7-38 This beam has two template positions. Position the template on the sidestop end of the beam (operator's left side), secure the pin plate latches and clamp the board against the sidestop. Rout the first half of the joint.



7-39 Leave the board clamped on the beam, release the pin plate latches and shift the beam to the next position. Secure the pin plate latches. Now rout the second half of the joint. ■

Appendix

Customer Support
R9PLUS Beam Drawing

Customer Support

Our Commitment to You *Leigh Industries takes pride in its commitment to providing excellence in customer service and support. This user guide is designed to provide you with the answers to any questions you have. However, if you require assistance, please feel free to contact our technical support staff or a distributor listed below.*

Manufacturer: Canada/USA

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1615 Industrial Ave.
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Fax: 604 464-7404
Customer Service: leigh@leighjigs.com
Tech Support: help@leighjigs.com
Web Site: www.leighjigs.com

NOTE: Email can be useful, but technical queries usually raise queries from us. A phone call is the quickest and and most convenient way to get queries answered; either directly to Leigh (toll-free in North America) or to your national distributor. ***–Thanks!***

Distributors

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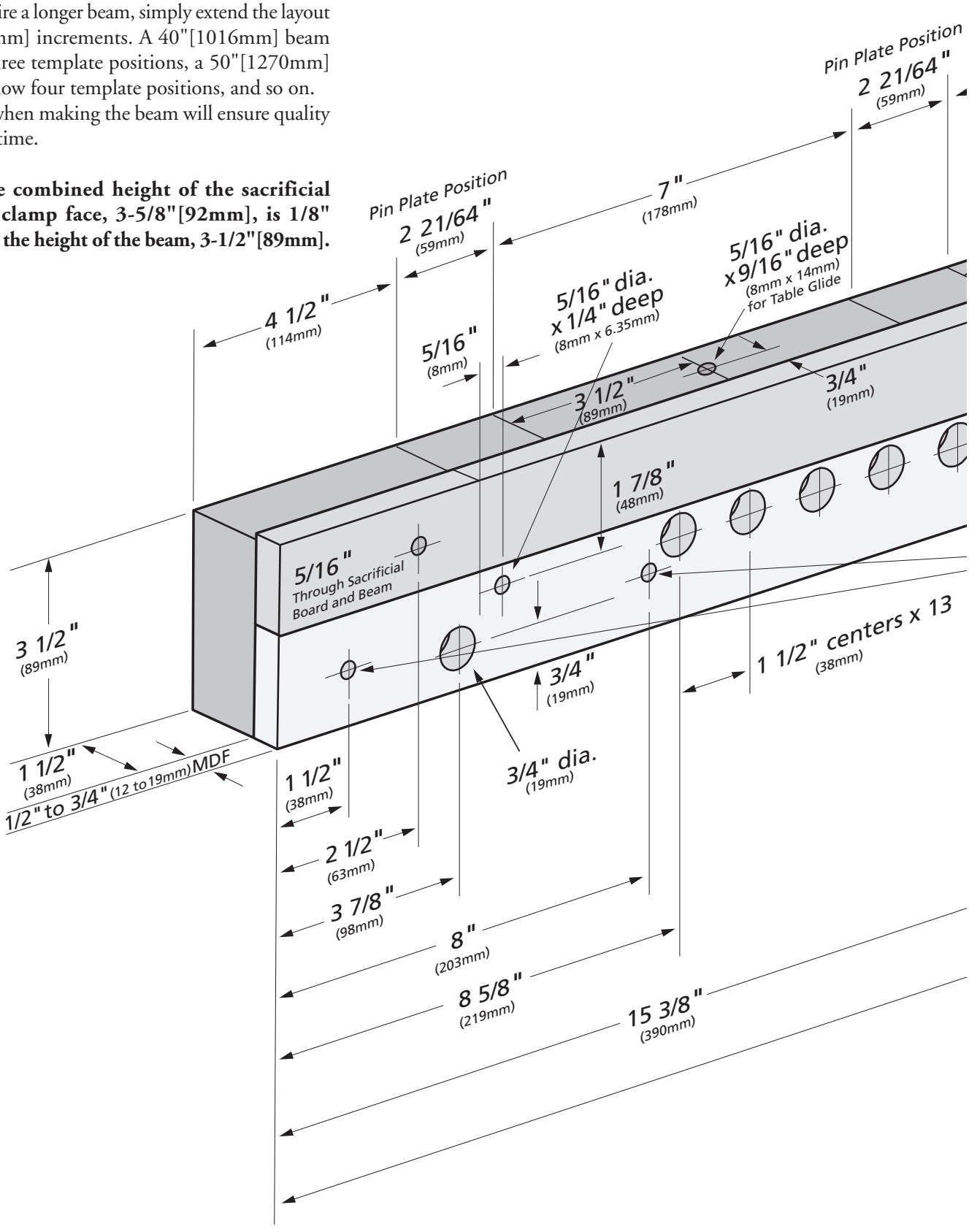
R9PLUS Beam Drawing

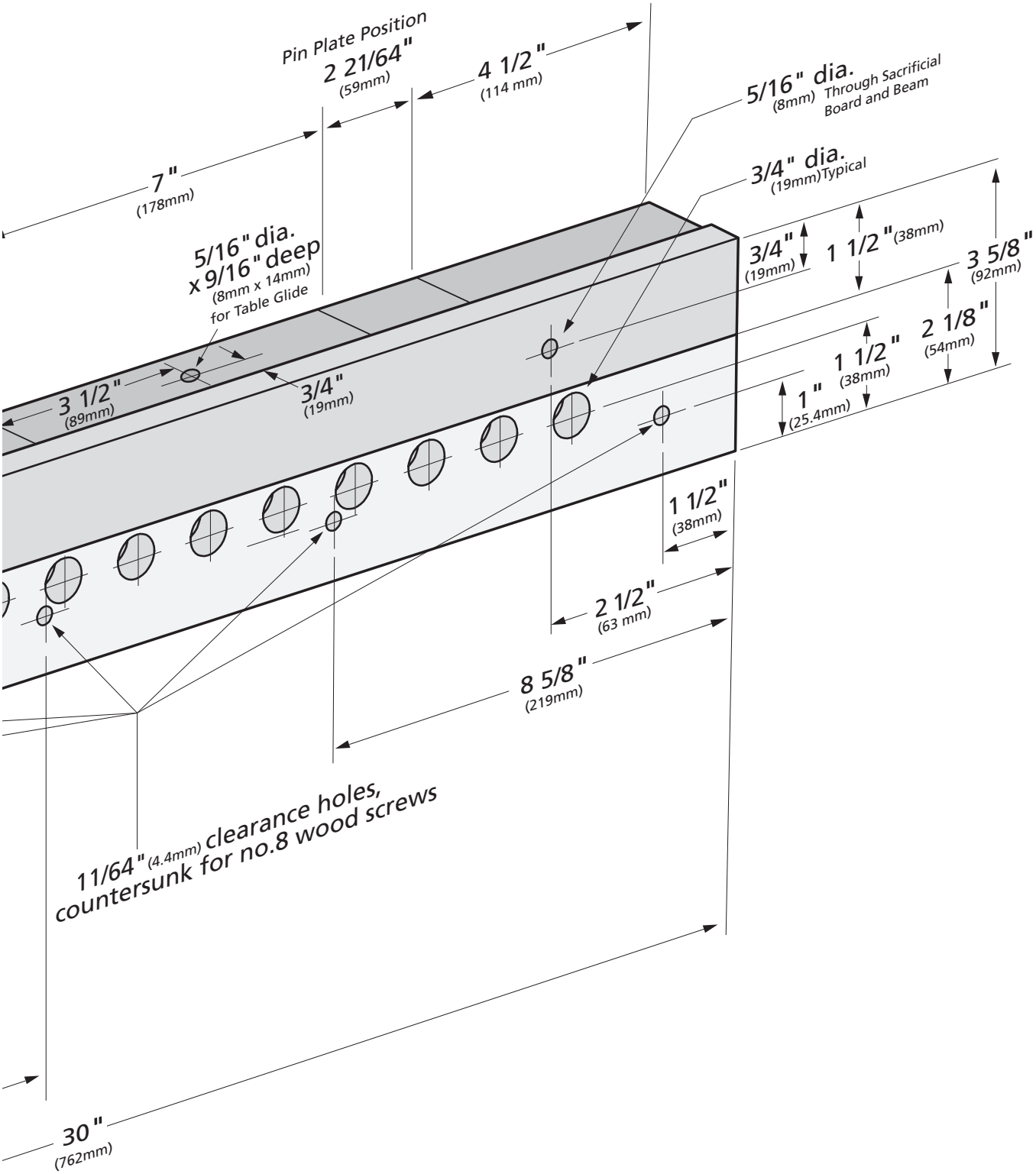
This drawing includes all dimensional and layout information required to make a two template position 30"[762mm] beam. Please use this drawing along with the detailed instructions in Chapter 1. **Note:** The top of the beam must be 90° to the face of the beam.

If you require a longer beam, simply extend the layout in 10"[254mm] increments. A 40"[1016mm] beam will allow three template positions, a 50"[1270mm] beam will allow four template positions, and so on.

Accuracy when making the beam will ensure quality joints every time.

Note: The combined height of the sacrificial board and clamp face, 3-5/8"[92mm], is 1/8" greater than the height of the beam, 3-1/2"[89mm].




Pin Plate Position
2 21/64"
(59mm)
4 1/2"
(114 mm)
7"
(178mm)
5/16" dia.
(8mm) Through Sacrificial Board and Beam
3/4" dia.
(19mm)Typical
5/16" dia.
x 9/16" deep
(8mm x 14mm)
for Table Glide
3/4"
(19mm)
1 1/2" (38mm)
3 5/8"
(92mm)
2 1/8"
(54mm)
1 1/2"
(38mm)
1"
(25.4mm)
3 1/2"
(89mm)
3/4"
(19mm)
1 1/2"
(38mm)
2 1/2"
(63 mm)
8 5/8"
(219mm)
11/64" (4.4mm) clearance holes,
countersunk for no.8 wood screws
30"
(762mm)