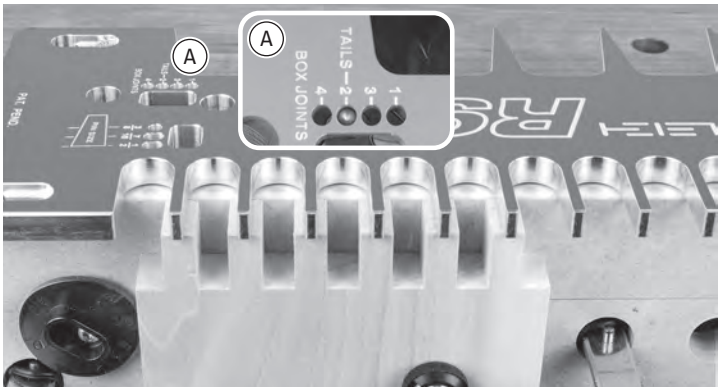
CHAPTER 7
Box Joint Procedures

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.

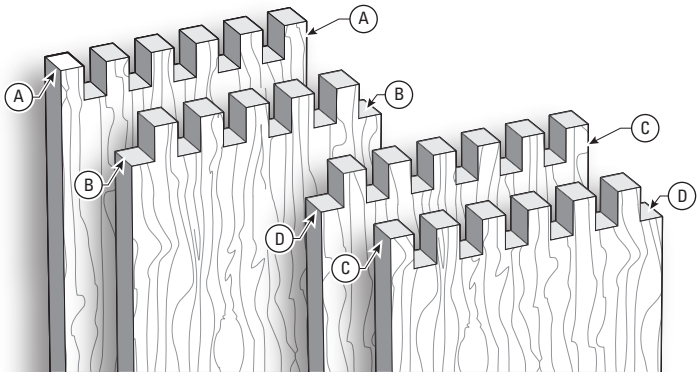
Note: These instructions show a 3/8"[9,5mm] straight router bit and 3/4"[19mm] thick boards. Any board thickness up to 1"[25,4mm] may be used for 3/8"[9,5mm] joints.

Concept of Operation

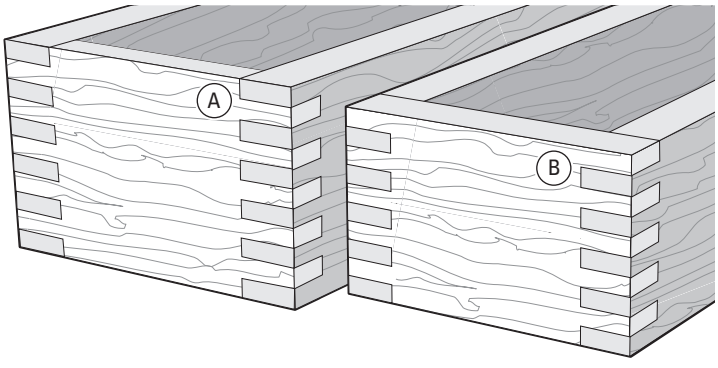
7-1 The template has positioning holes 1, 2, 3 or 4 Ⓐ that fit on the raised pin of the pin plates. Box joints are routed in two steps: the pin board, as shown, and...



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 5/8	
8		1 9/16		3 3/32		
9	1 3/4		3 1/2		4 21/32	
10		1 15/16		3 7/8		
11	2 1/8		4 9/32		5 7/16	
12		2 5/16		4 21/32		6 7/32
13	2 17/32		5 1/16		7	
14		2 23/32		5 7/16		7 25/32
15	2 29/32		5 13/16		8 9/16	
16		3 3/32		6 7/32		
17	3 5/16		6 19/32		9 5/16	
18		3 1/2		7		
19	3 11/16		7 3/8		10 3/32	
20		3 7/8		7 25/32		10 7/8
21	4 1/16		8 5/32		11 21/32	
22		4 9/32		8 9/16		12 7/16
23	4 15/32		8 15/16		13 7/32	
24		4 21/32		9 5/16		14
25	4 27/32		9 23/32		14 25/32	
26		5 1/16		10 3/32		15 9/16
27	5 1/4		10 1/2		16 11/32	
28		5 7/16		10 7/8		17 3/32
29	5 5/8		11 9/32		17 7/8	
30		5 13/16		11 21/32		18 21/32
31	6 1/32		12 1/16		19 7/16	
32		6 7/32		12 7/16		20 7/32
33	6 13/32		12 27/32		21	
34		6 19/32		13 7/32		21 25/32
35	6 13/16		13 19/32		22 9/16	
36		7		14		23 11/32
37	7 3/16		14 3/8		24 1/8	
38		7 3/8		14 25/32		24 7/8
39	7 9/16		15 5/32		25 21/32	
40		7 25/32		15 9/16		26 7/16
41	7 31/32		15 15/16		27 7/32	
42		8 5/32		16 11/32		28
43	8 11/32		16 23/32			
44		8 9/16		17 3/32		
45	8 3/4		17 1/2			
46		8 15/16		17 7/8		
47	9 1/8		18 9/32			
48		9 5/16		18 21/32		
49	9 17/32		19 1/16			
50		9 23/32		19 7/16		
51	9 29/32		19 27/32			
52				20 7/32		
53			20 19/32			
54				21		
55			21 3/8			
56				21 25/32		
57			22 5/32			
58				22 9/16		
59			22 15/16			
60				23 11/32		
61			23 23/32			
62				24 1/8		
63			24 1/2			
64				24 7/8		
65			25 9/32			
66				25 21/32		
67			26 1/16			
68				26 7/16		
69			26 27/32			
70				27 7/32		
71			27 5/8			
72				28		

One Template Position

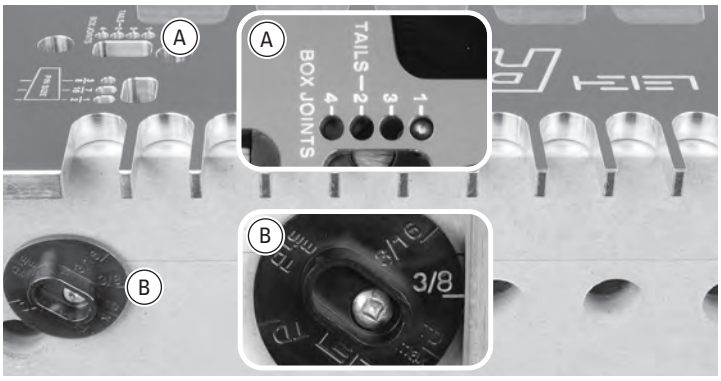
Two Template Positions

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

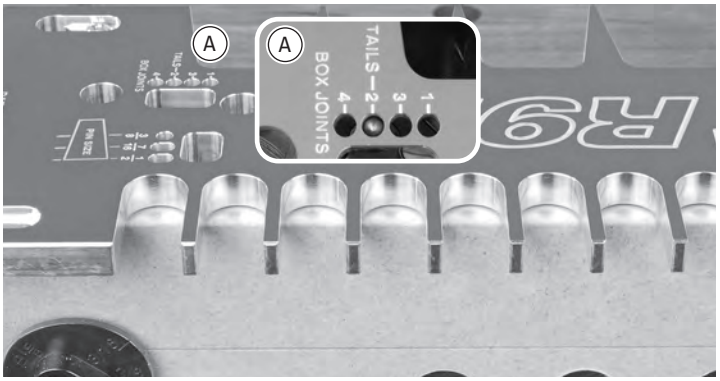
7-6 Use the e10 eBush (guide bushing) and a ⅜"[9,5mm] straight router bit. For 3/16"[4.75mm] and ¾"[19mm] box joints, see following sections. For straight bit options see page 4.



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.

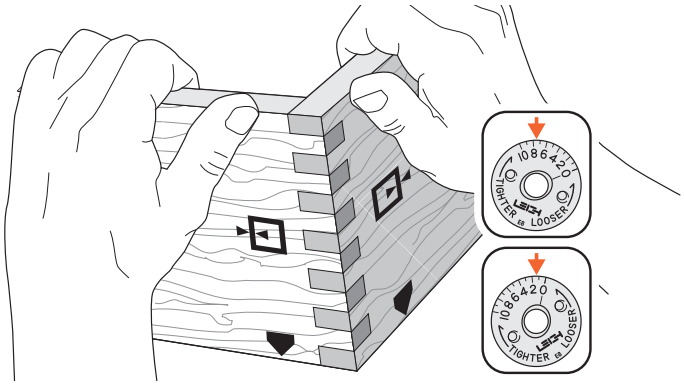
7-9 Rout in all of the openings of the pin board, making sure the eBush contacts all guide surfaces, then remove the board.



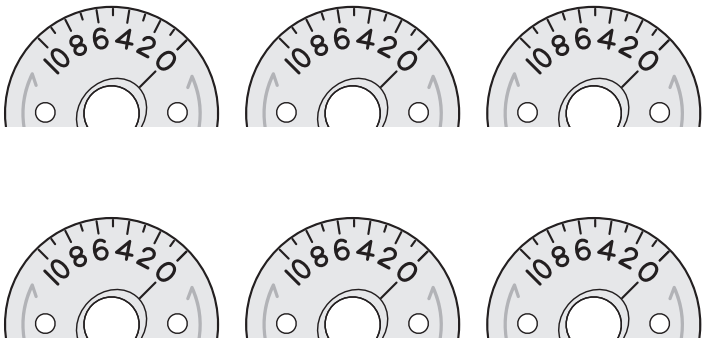
7-10 Unlock and move the template to pin position 2 Ⓐ and secure the template latches.

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

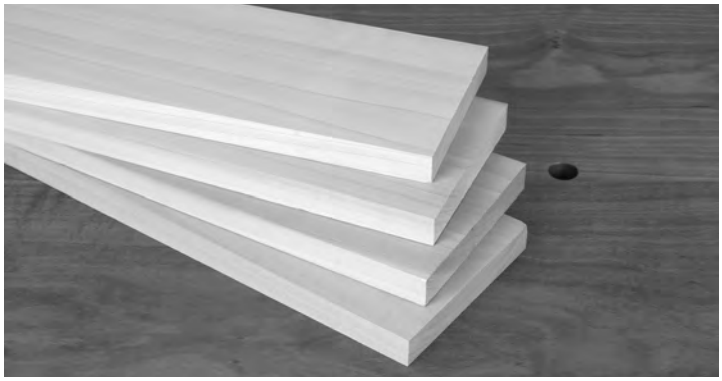
7-12 Rout all of the sockets. Remove socket board.



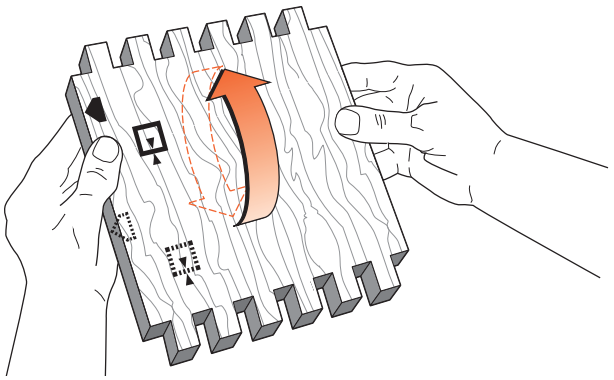
7-13 Test for fit, keeping the marked edges together. If required, adjust the eBush for a looser or tighter fit, and rout a new pin board and a new socket board.



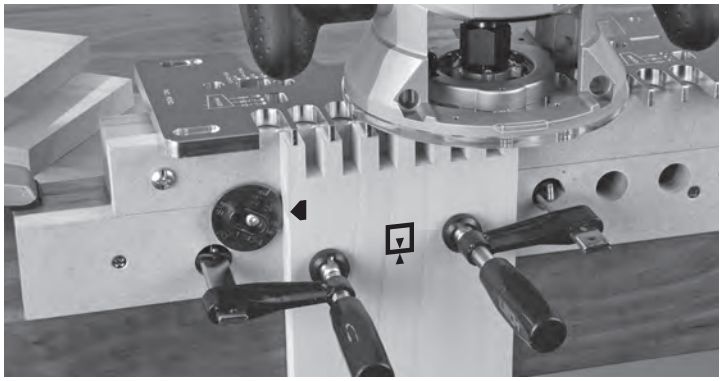
7-14 Record the eBush setting here for a quick setup the next time you use this bit/guide bushing combination.



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.

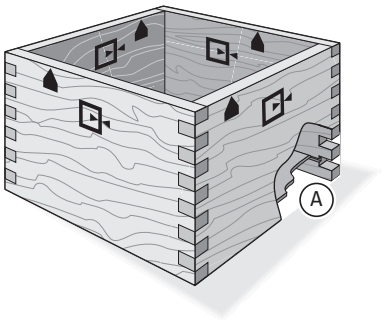


7-16 All square box joint boards (for boxes) are clamped alternately face in and face out, always with the same side edge against the sidestop.



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

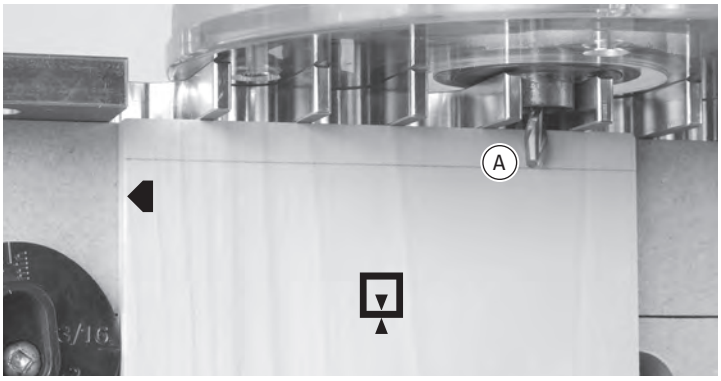
7-18 Rout both ends of Boards 2 and 4 in pin position 2. Keep the same edges to the sidestop.



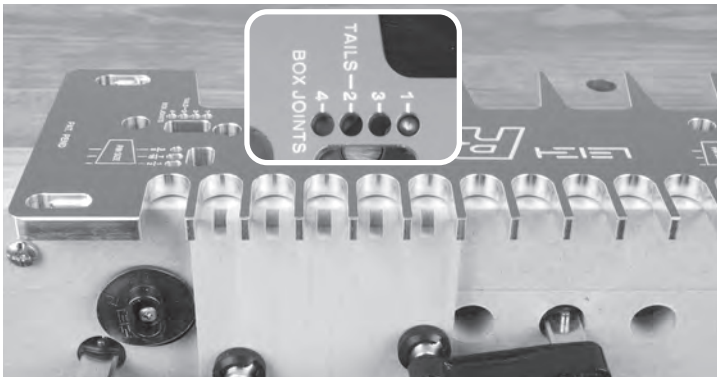
7-19 Keeping the marked sidestop edges of all boards toward the top (or bottom) of the box, select the preferred outside faces before marking and routing the grooves Ⓐ for the box bottom. Box joint corners need clamping from both directions, or use strap clamps and blocks.

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

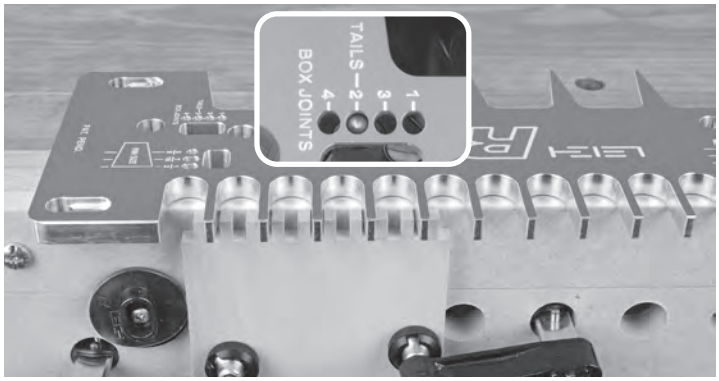
7-20 ***You should be thoroughly familiar with the 3/8"[9,5mm] joint procedure before routing 3/16"[4,75mm] joints.*** Set the sidestop on the 3/16"[4,75mm] mark.



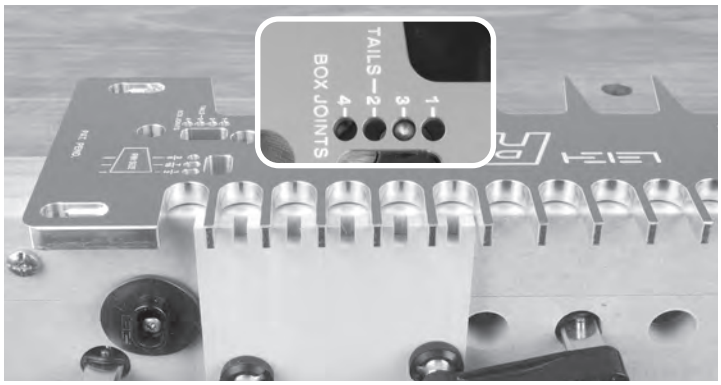
7-21 Clamp the socket board against the sidestop and flush under the template. Install a 3/16"[4,75mm] router bit and set the router bit depth to suit the mating board as before Ⓐ.



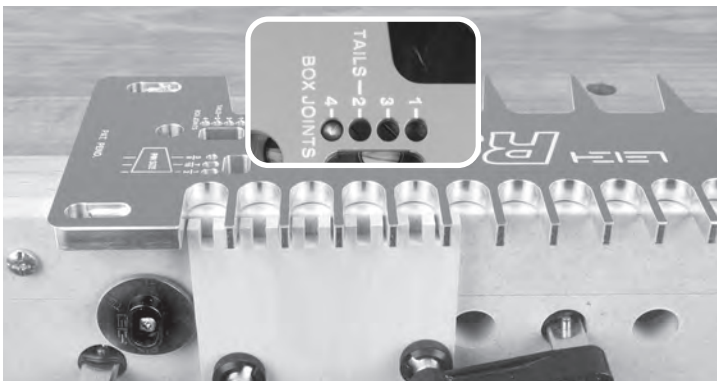
7-22 Set the template in pin position 1, lock it and rout in all openings — but don't remove the board. Note: Nothing will be routed in the first socket of the template.



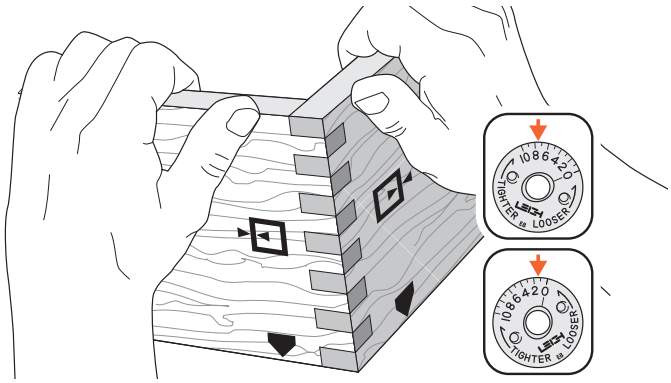
7-23 Move the template across to pin position 2 and lock. Rout the rest of the sockets.



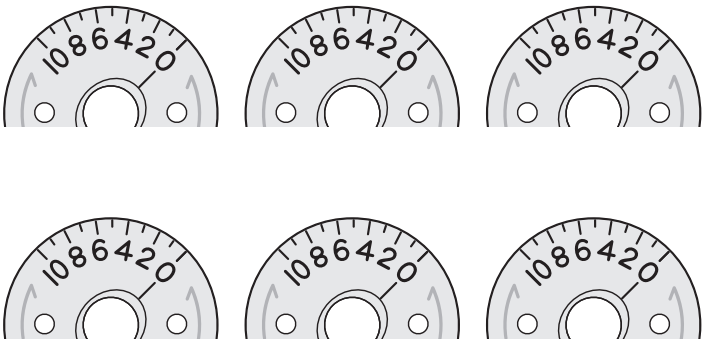
7-24 Remove the socket board and clamp in the pin board. Move template to pin position 3 and rout in all of the openings — but don't remove the board.



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



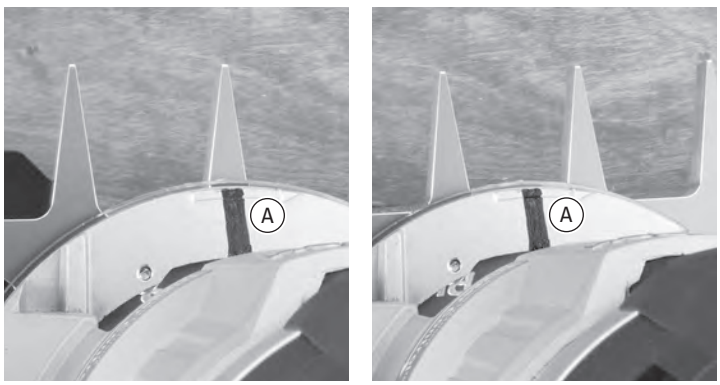
7-26 Test for fit, keeping the marked edges together. If required, adjust the eBush for a looser or tighter fit and rout a new pin board and a new socket board.



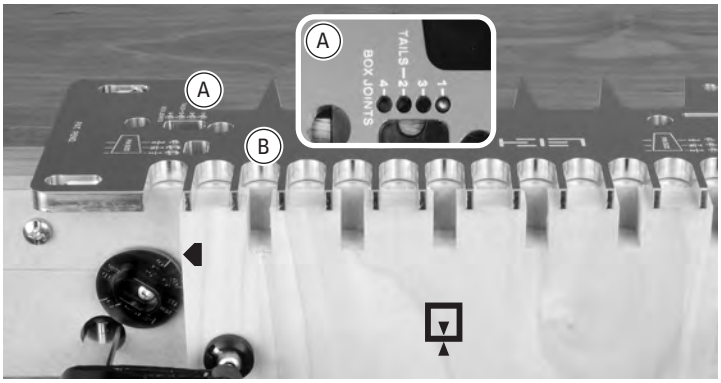
7-27 Record the eBush setting here for a quick setup the next time you use this bit/eBush combination. ■

3/4"[19mm] Box Joints

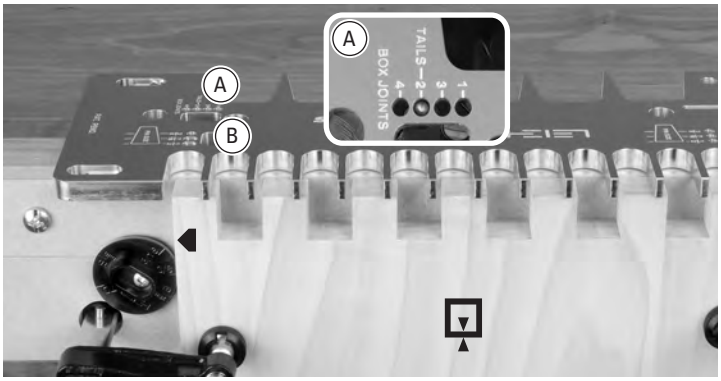
7-28 ***You should be thoroughly familiar with the 3/8"[9,5mm] joint procedure before routing 3/4"[19mm] joints.*** Set the sidestop on the 3/8"[9,5mm] mark and use the same 3/8"[9,5mm] bit and e10 eBush setting used for your successful 3/8"[9,5mm] joint fit.



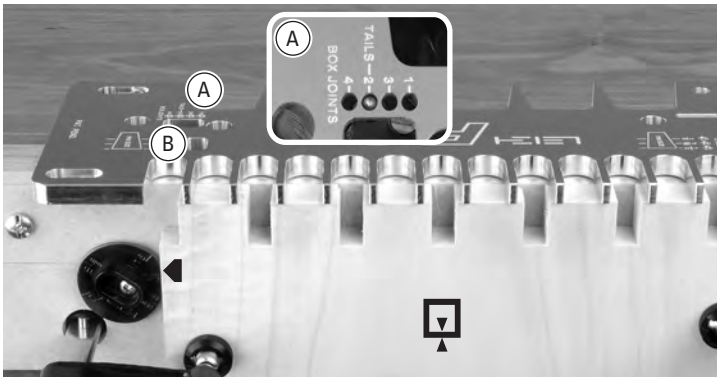
7-29 ⚠ For 3/4"[19mm] box joints you will be routing into alternating sockets. **Hint:** Mark a bold line at the 12 o'clock position on the router base Ⓐ. This will help to "steer" the router.



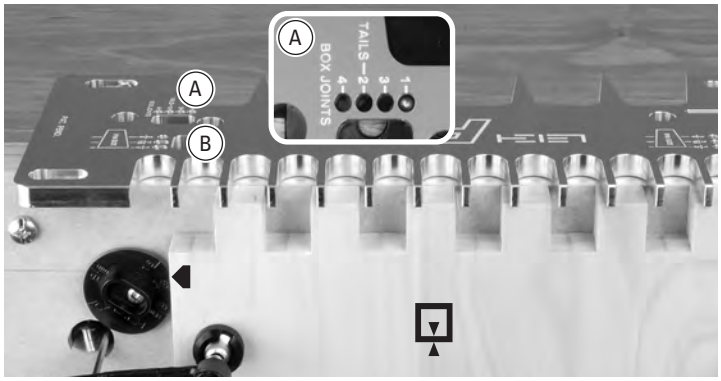
7-30 Set the template in pin position 1 Ⓐ and secure the pin plate latches. Clamp the pin board and rout in the third template opening Ⓑ and every other opening. Leave the board in place.



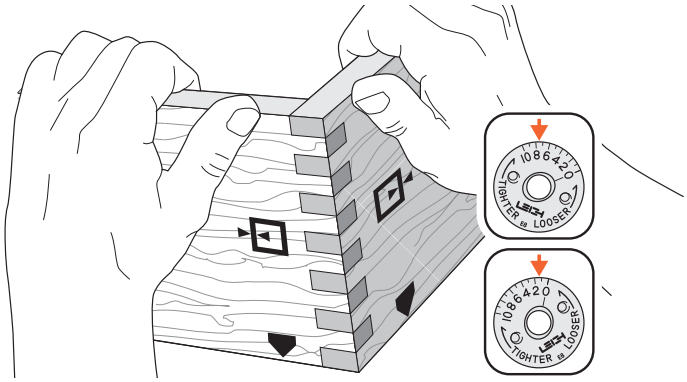
7-31 Move the template to pin position 2 Ⓐ and secure the pin plate latches. Rout in the second opening Ⓑ and in every other opening. Remove the board but leave the template in pin position 2 .



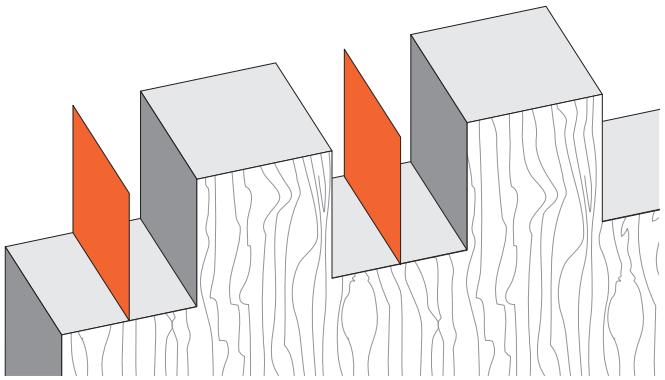
7-32 Clamp the socket board and rout in the first opening Ⓑ and every other opening.



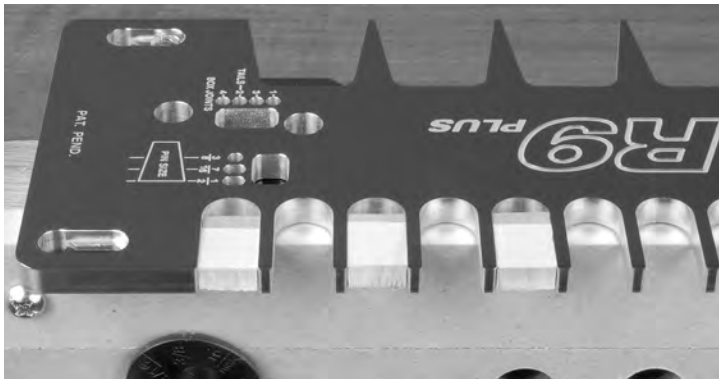
7-33 Move the template to pin position 1 Ⓐ and rout in the second and every other opening Ⓑ.



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.

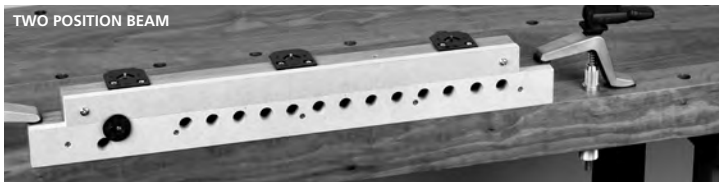


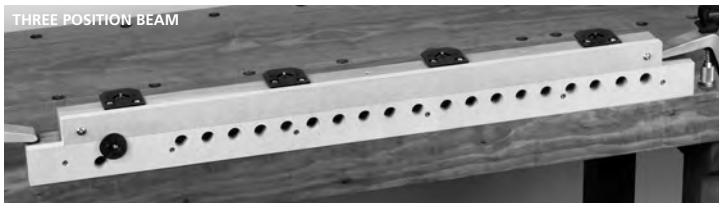
7-35 Theoretically, there will be nothing left in the sockets where the bit has passed by twice. However, routing tolerances can leave a very thin "wall". This can be quickly removed with a chisel and/or sandpaper.



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

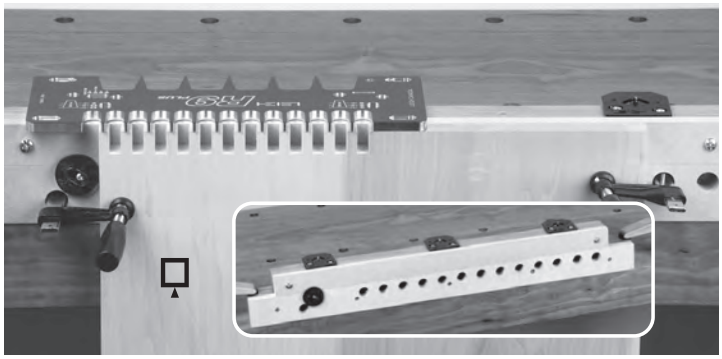




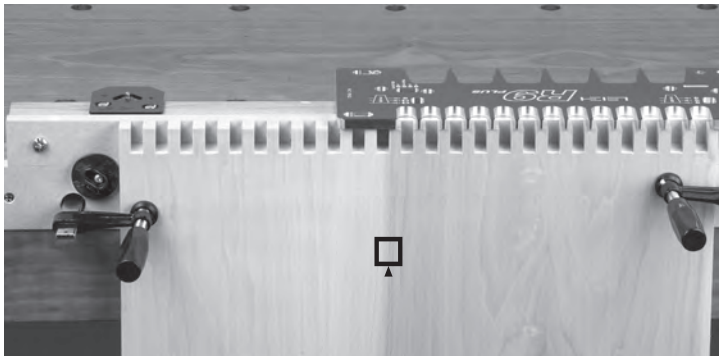
7-37 Routing boards of any width is simple with the R9PLUS. The unique pin plate positioning holes on the template, and the pin plates mounted on the beam, accurately index the template each time it is "stepped over".

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. ■