SUPERJIG - CHAPTER 9

# Variably Spaced Half-Blind Dovetail Procedures

IMPORTANT! *The most commonly misunderstood aspect of routing half-blind dovetails is how the dovetail bit's depth of cut is used to adjust the joint fit, and how the angle of the bit affects that depth of cut. Review this chapter for a clear understanding of this concept.*

Note: Use the e7-Bush set at "10", or any round ^{7}/16"[11,1mm] bush (min. depth ^{1}/4" see page 67), and any one of the five bits listed on the next page may be used for half-blind dovetails. See Appendix II "Half Blind Bit Selection" for a full description on how to select an appropriate bit.
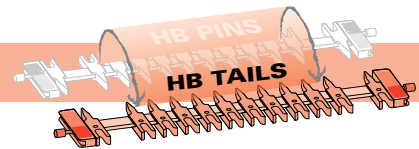
1 Start in
Half-Blind Dovetail Tails (HB TAILS) mode

Inches   **Millimeters**

Active Guide Surfaces
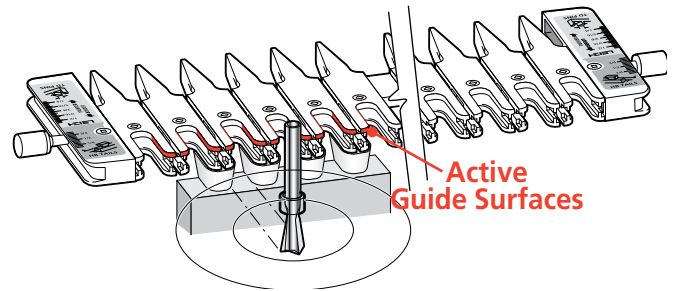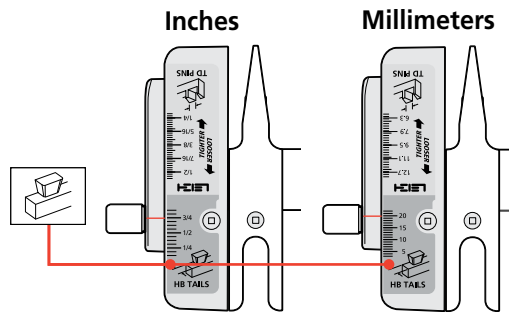
2 **ROTATE** the finger assembly toward you 180°
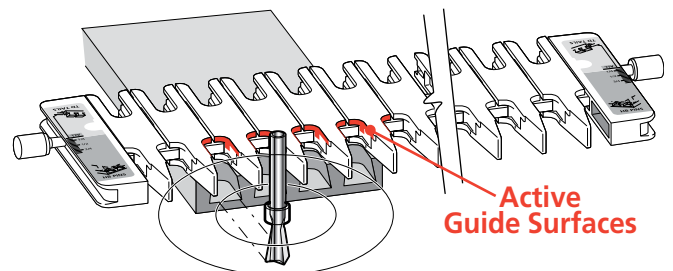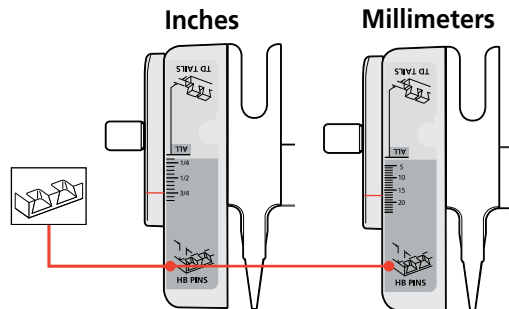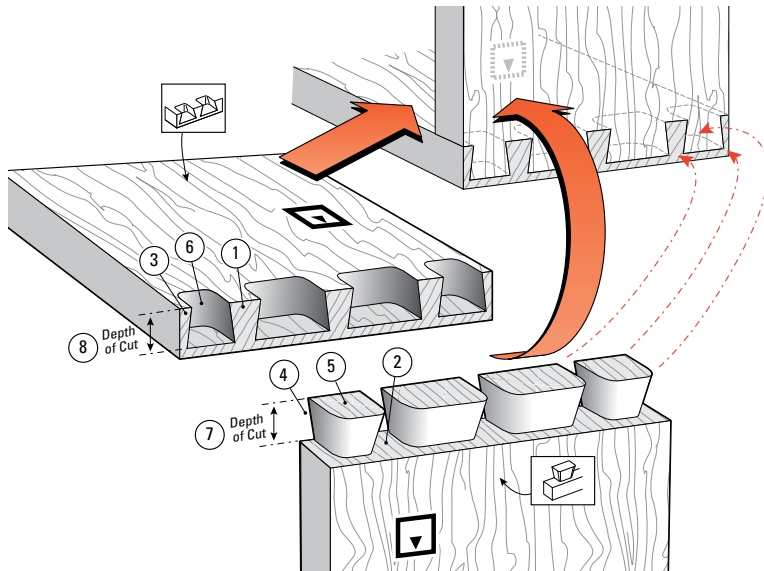

HB PINS

HB TAILS

3 Now the Finger Assembly is in
Half-Blind Dovetail Pins (HB PINS) mode

MODE ICONS

Illustrations in this user guide include the correct *mode* icon for the current instruction. The icons are also used in the instruction text.
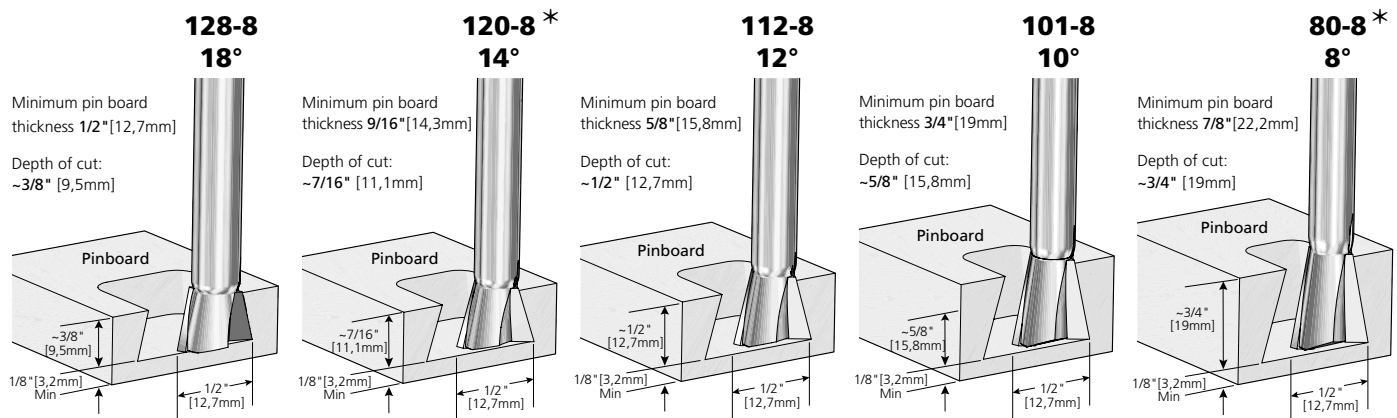
Inches   **Millimeters**

Active Guide Surfaces

9-1 Half-Blind Dovetail Terminology:

① Pins ⑤ Tails
② Pin sockets ⑥ Tail sockets
③ Half-pins ⑦ Depth of Cut (tails)
④ Half-pin sockets ⑧ Depth of Cut (pins)

The pins fit in the pin sockets. Joints almost always begin and end with a half-pin as shown.

9-2 Cutting Depth for Variably Spaced Half-Blind Dovetails

128-8 **18°**	**120-8** ✶ **14°**	**112-8** **12°**	**101-8** **10°**	**80-8** ✶ **8°**
Minimum pin board thickness **1/2"** [12,7mm]	Minimum pin board thickness **9/16"** [14,3mm]	Minimum pin board thickness **5/8"** [15,8mm]	Minimum pin board thickness **3/4"** [19mm]	Minimum pin board thickness **7/8"** [22,2mm]
Depth of cut: ~**3/8"** [9,5mm]	Depth of cut: ~**7/16"** [11,1mm]	Depth of cut: ~**1/2"** [12,7mm]	Depth of cut: ~**5/8"** [15,8mm]	Depth of cut: ~**3/4"** [19mm]

Pinboard — ~3/8" [9,5mm] — 1/8" [3,2mm] Min — 1/2" [12,7mm]
Pinboard — ~7/16" [11,1mm] — 1/8" [3,2mm] Min — 1/2" [12,7mm]
Pinboard — ~1/2" [12,7mm] — 1/8" [3,2mm] Min — 1/2" [12,7mm]
Pinboard — ~5/8" [15,8mm] — 1/8" [3,2mm] Min — 1/2" [12,7mm]
Pinboard — ~3/4" [19mm] — 1/8" [3,2mm] Min — 1/2" [12,7mm]

IMPORTANT: Add at least ⅛"[**3mm**] to the depth of cut for pin board thickness
NOTE: See the chart in Step 9-QR3 on page 36 for range of tail board thickness
✶ Included with jig. ~ Symbol for "approximately"

## ⚠ Important! Read This About HB Depth of Cut

Bit selection is critical. You need to select a specific dovetail bit for your half-blind dovetail project, depending on the pinboard (drawer front) thickness you are using.

- **Choose one of the five ½" [12,7mm] diameter dovetail bits shown above. Check bit selection in Appendix II.**

- **Depth of cut must be as specified for each of the five bits illustrated above.**

*Note: Leigh bits 101-8, 112-8 and 128-8 are optional.*

- **Raising the bit above its specified cutting depth will result in loose joints and may damage the jig, bit and/or guidebush. A lower setting will result in tighter joints that may not fit together.**

- **Small Depth of Cut adjustments will change joint fit tightness. *See why in Steps 9-3 to 9-5.***

- **Half-blind PINS and TAILS are routed with the same dovetail bit and must be at the same Depth of Cut.**

- **All half-blind dovetail bits work with the Leigh e7-Bush supplied with your Leigh jig or standard ⁷⁄₁₆"[11,1mm] outside diameter guidebush.**

- **A dovetail bit will produce only one specific cutting depth. Only 1/2" [12,7mm] cutting diameter bits can be used for half-blind dovetails.**
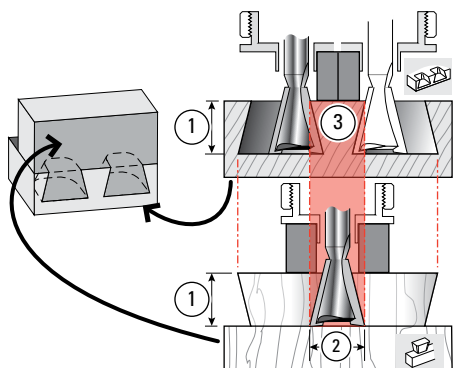
9-3 Joint Fit and Depth of Cut

Here's why the depth of cut ① changes the fit in half-blind dove-tails. Increasing or decreasing the depth of cut does not affect the pin socket width ②, but does affect the width of the pin ③ that goes into the socket ②.
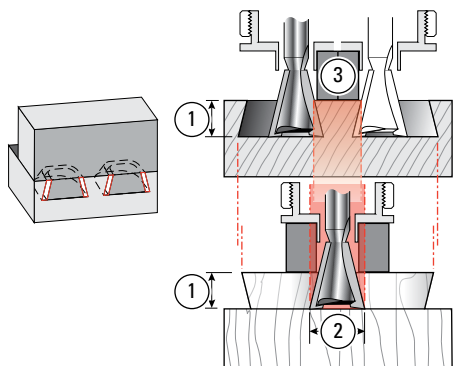
9-4 Note that decreasing the bit depth ① makes the pin ③ narrower while the pin socket ② stays the same width, producing a loose fit.

**Decreasing the bit depth (i.e. raise the bit into the router) produces a looser fit.**
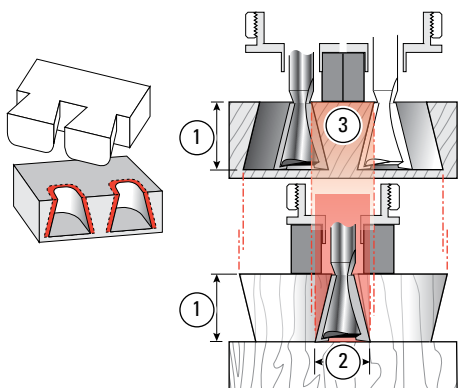
9-5 Increasing the bit depth ① makes the pin ③ larger while the pin socket ② stays the same width, producing too tight a fit. **Increasing the bit depth (i.e. lower the bit) produces a tighter fit.**
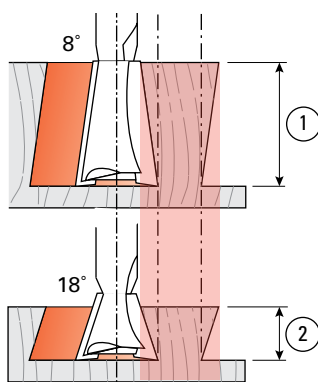
9-6 Bit Angle and Depth of Cut Half-blind pins and tails are routed with the same dovetail bit, the **same** guidebush, and the **same** depth of cut. A different depth of cut requires a differ-ent angled bit. Leigh offers five different angled dovetail bits for a range of cut depths. A lesser angle, say 8˚, for a deeper cut ①; a greater angle, say 18˚, for a shallower cut ②.
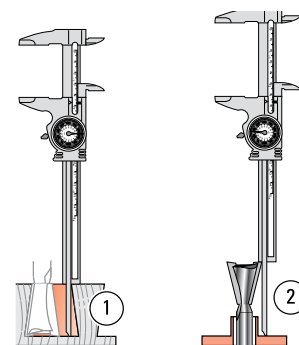
9-7 Cumulative plus/minus tolerances in routers, bits and guidebushes, make it impossible to state exact bit depth for first-time precision fit. All dovetail jigs require trial and error tests to attain fine fitting joints. The good news; we give a starting depth for each bit. Test and measure the successful 'Best fit' depth of cut ① or bit projection ②. Record for future first-time fits.
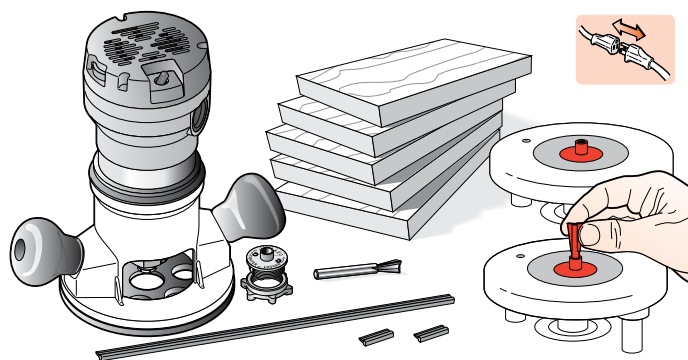
9-8 Routing a Test Joint Use the **e**7-Bush or a ⁷⁄₁₆"[11,1mm] diameter bush (min. depth ¼" *see page 67*) and No.120-8 ½"[12,7mm] 14° dovetail bit. (80-series bits cut too deep for ¾"[20mm] boards, see HB bits, Appendix II). Select several pieces of ¾"x5 ½"[20x140mm] x about 8"[200mm], and the plastic bridge. *Note: Half-blind pin boards must be minimum ½"[13mm] thick to clamp. Thinner boards; see 9-21.*
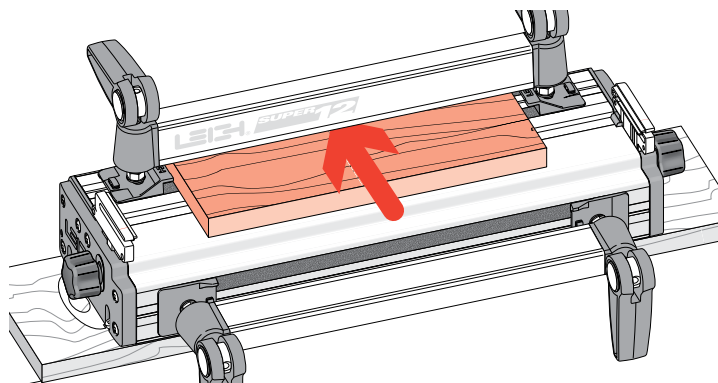

9-9   Clamp the spacer board in the rear clamp.
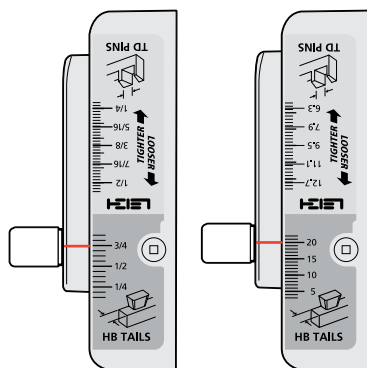
9-10   Mount the finger assembly on the support brackets in the ✎HB TAILS mode, **flat on the spacer board**, scales set on the thickness of the tail board (¾"[20mm] in this instance).
The ✎HB TAILS scale is always set at the tail board thickness. Max tailboard thickness is 1" however max scale setting is 3/4".
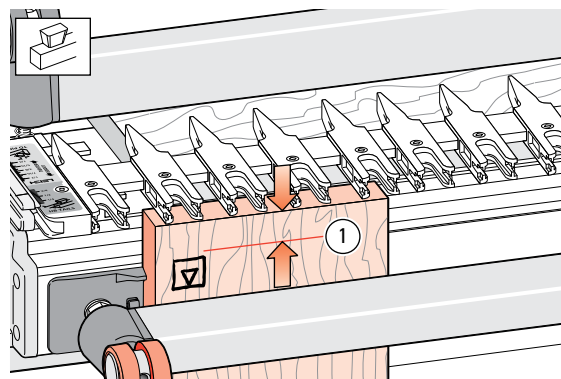

9-11   Measure and mark a line on the inside face of the tail board ① to the bit's depth of cut as in 9-2. Clamp this test tail board in the left front clamp, against the side stop with the top edge flush under the guidefingers, and the inside face ▣ of the drawer side away from the jig.
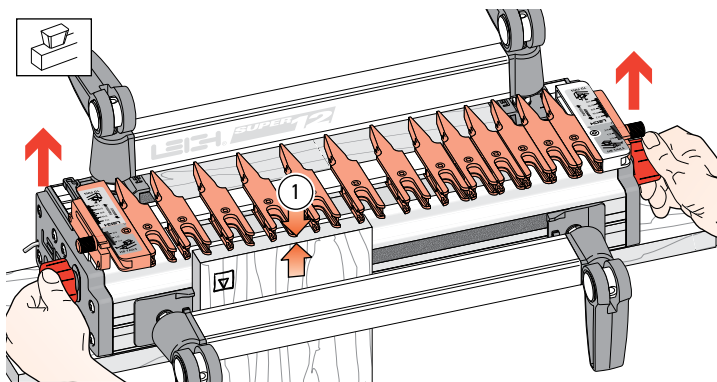

9-12   Unlock and raise the finger assembly support brackets slightly so that the finger assembly is about ¹⁄₁₆"[2mm] ① above the boards. This will allow easy movement of the guidefingers.
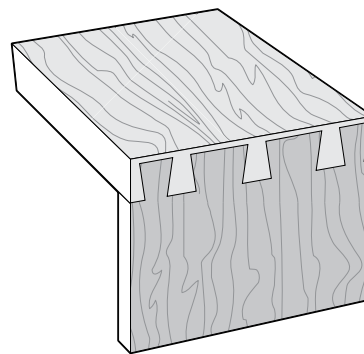
9-13   The following joint design is suggested for this trial. It has a typical and traditional even layout of pins, with half-pins at each edge. The Leigh jig, however, allows for an infinite variety of joint designs, and boards of different thicknesses can be joined to each other as shown in this illustration. Before attempting joints of asymmetrical design, see chapter 12.
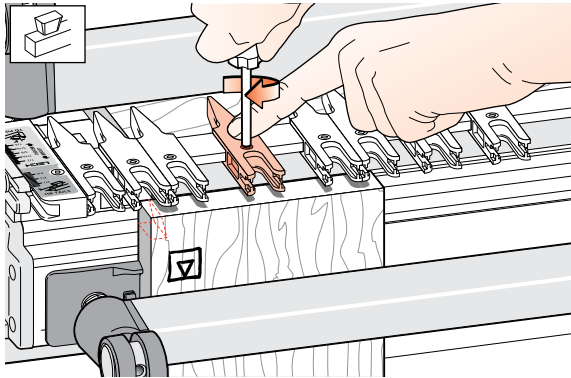
9-14 Ignoring the extreme outer guidefinger next to the scale (which just supports the router), loosen enough of the adjacent guides to give the required pin socket layout. The half-pin guidefinger position illustrated will give a half-pin socket profile like that shown (dotted lines).
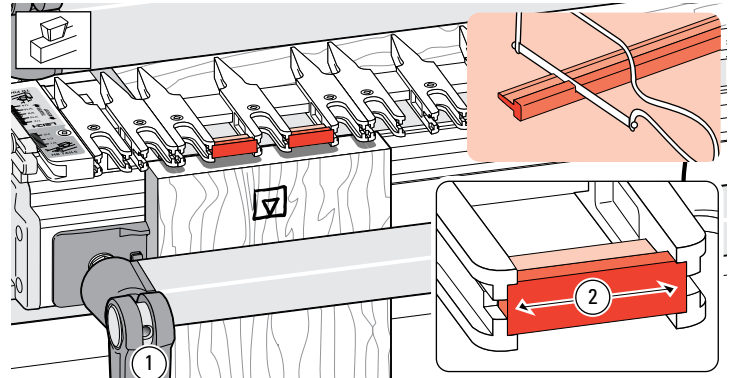
9-15 If the gaps between the guidefinger tails are wider than about ⅛"[3mm], mark off and cut some pieces of bridge extrusion ① to fit into the slots in the ends of the guidefinger tails. Cut the pieces a "bare" ⅛"[3mm] more than the distance between the fingers ②. They are a firm friction fit.
After completing a project, save the bridge pieces for future use.
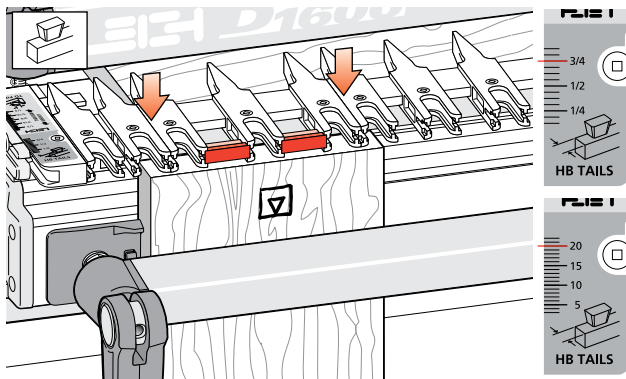
9-16 Remember to tighten any loose guidefingers. **Lower the finger assembly back onto the spacer board and workpiece. It must touch the workpiece or the depth of cut will vary and the joint won't fit.** The scale should be set on the tailboard thickness, in this case ¾"[20mm].
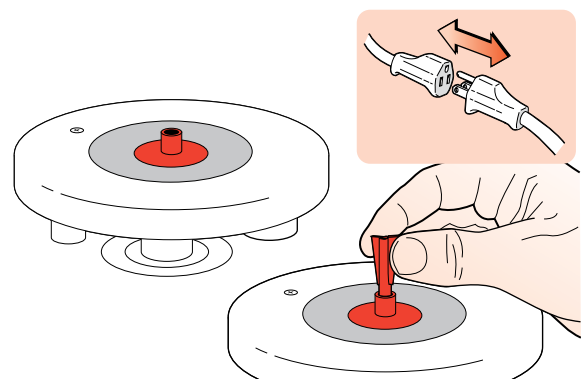
9-17 Attach the provided **e7-Bush** or a ⁷⁄₁₆"[11,1mm] diameter bush securely to the router. No guidebush adjustment is required with half-blind dovetails.
Fit the selected dovetail bit to the router.

REMEMBER SAFETY!
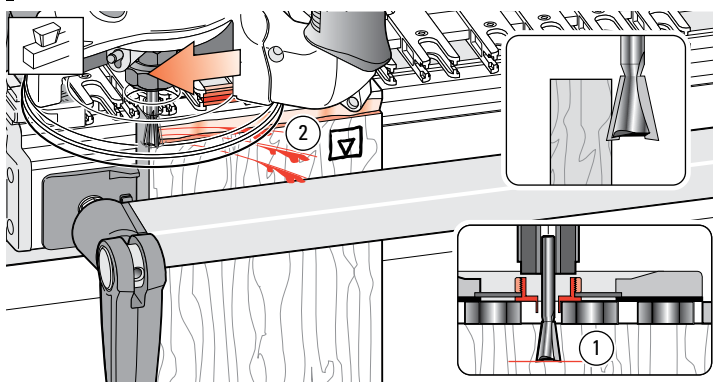
9-18 Adjust the bit height until the bit tip is level with marked line ①. For the first light cut move the router from right to left. **Make sure you control it firmly, because it is driven in this direction by the bit. Only the tip of the bit should be cutting on the first cut ②.** This *back* or *climb* routing leaves a very clean shoulder in side grain.
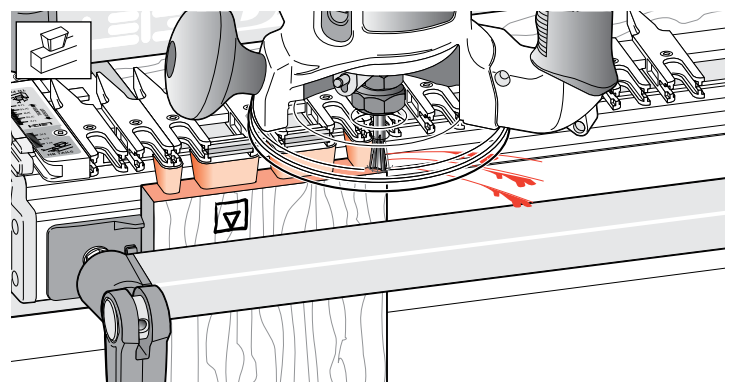
9-19 Now rout in and out from left to right following the guides and bridge pieces to rout out the pin sockets, leaving the tails. *See Hints and Tips 15-11.* Remove the tail board.
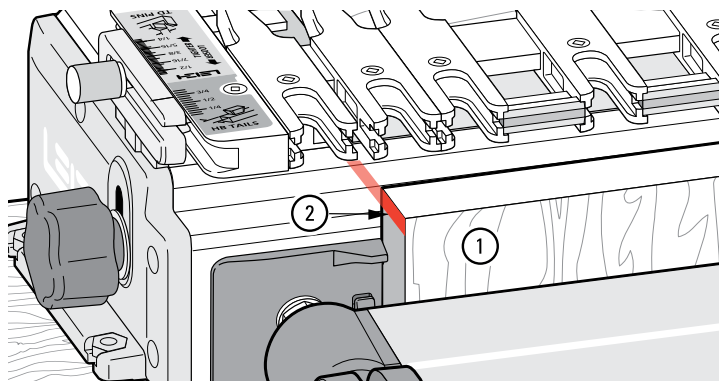
9-20 Clamp a scrap board ① in the front of the jig so that the top edge of the scrap board projects above the top face of the jig by about ⅛"[3mm] ②. This will keep the scrap piece below the path of the bit when routing the pin board.
Remove the spacer board from the rear clamp.
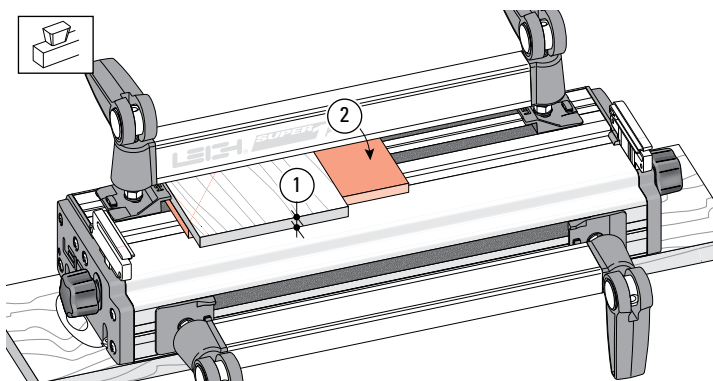
**9-21 If you're mounting Thin Pin Boards:**
Minimum recommended pin board thickness is ½"[13mm]. Remember, No.128-8 bits rout at ⅜"[9,5mm] deep. If you rout a pin board less than minimum thickness ①, you need to pack the board up from the jig body. We suggest a piece of ¼" to ⅜"[6 to 9mm] plywood for this purpose ②.
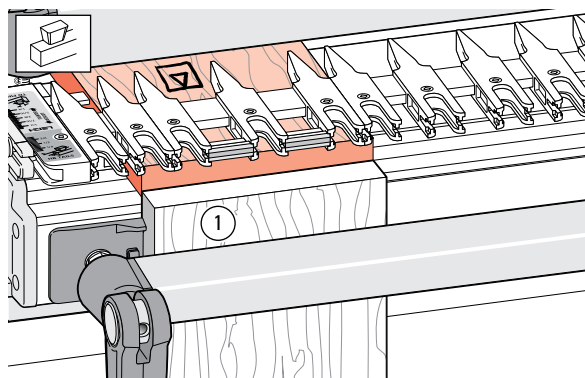

9-22 Flush Drawers Place a test pin board in the left rear clamp against the side stop, its front end edge flush to the vertical board, the inside face ▣ of the drawer front away from the jig body. The pin board is now positioned with the edge to be routed flush with the jig's front face, correctly registered for the scale readings. **For rabbeted drawer fronts, see Chapter 11.**
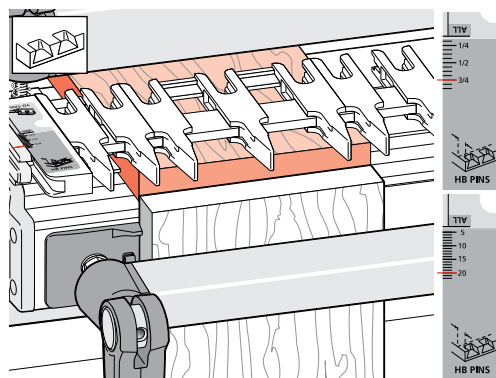

9-23 Rotate the finger assembly to 🔲🔲 HB PINS mode. Set the HB pins scale *equal to tail board thickness* (i.e., same setting as tails: this example, ¾"[20mm]). **HB pins and HB tail scales are always set to tail board thickness. Make sure the finger assembly is flush and level on the pin board.** The guidefingers must touch the pin board or depth of cut will vary, causing poor joint fit.
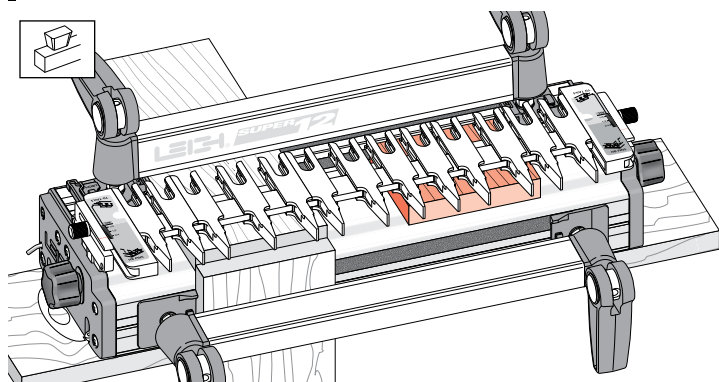

9-24 If you have difficulty leveling the finger assembly on a narrow workpiece, place a board the same thickness as the pin board under the other end of the finger assembly, **but not in the rear clamp.**
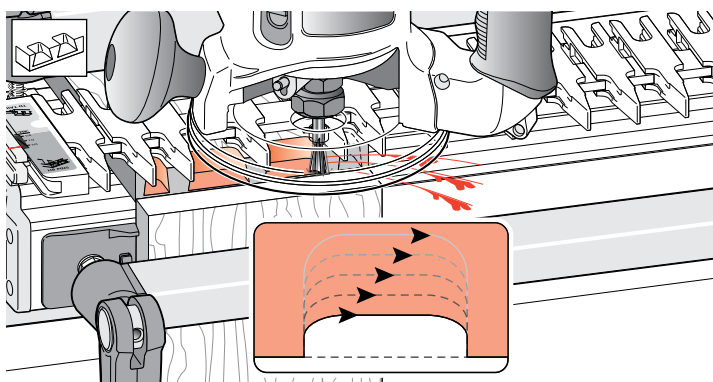

9-25 ⚠ Rout out the waste between the pins. Rout each space from **left to right. Do not back-rout on end grain. If the bit enters on the right side of the opening there will be a very strong pull to the left, so…** rout each opening in at least three or four passes, left to right.
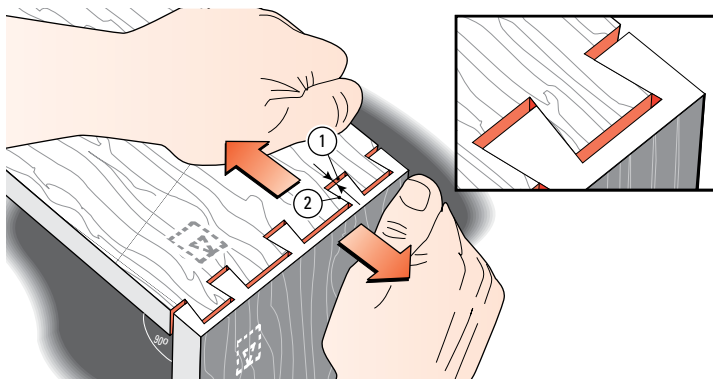
9-26 Remove the pin board and test for fit. If the joint is loose, as shown here, you need to **increase the bit cutting depth** by the same amount as the gap at the bottom of the pins ① (when the pins are pulled against the socket sides ②). If the joint is too tight, **decrease the bit cutting depth** slightly. Test again. Boards cannot be routed twice with a dovetail bit, Use two fresh board ends for each test.
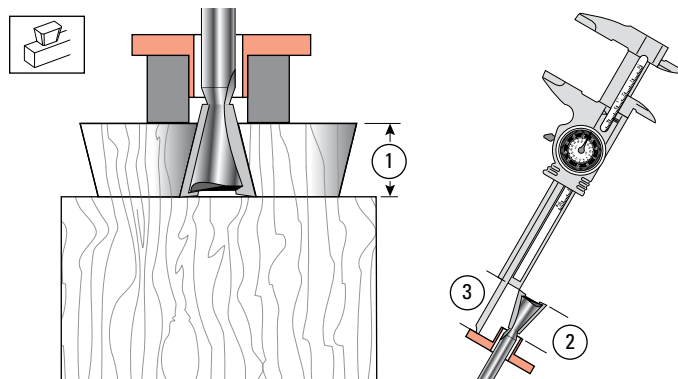

9-27 Keep the test tail board that fits well, and mark it with the number of the bit you used to rout it. For quick set-up next time, clamp this tail board in the jig as a *depth-of-cut gauge* ① to show how far to lower the bit. Better yet, measure the bit projection from the end of the guidebush ② or guidebush flange ③ and record this for fast set-ups in future.
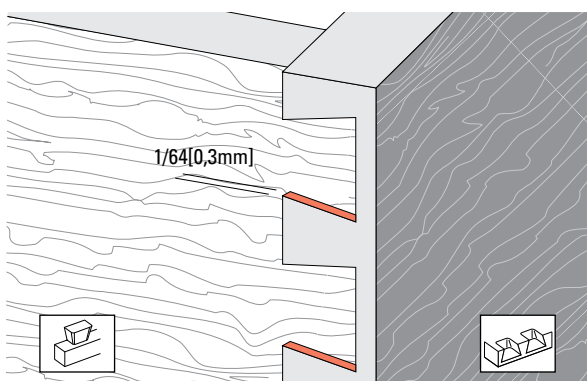

1/64[0,3mm]

9-28 When you have the proper tightness of fit, check the flushness. The tails should be under flush to the pins by *no more than 1/64"[0,3mm] to allow for cleanup (exaggerated here).* Any concentricity errors in the collet and guidebush on different routers will affect this tolerance.
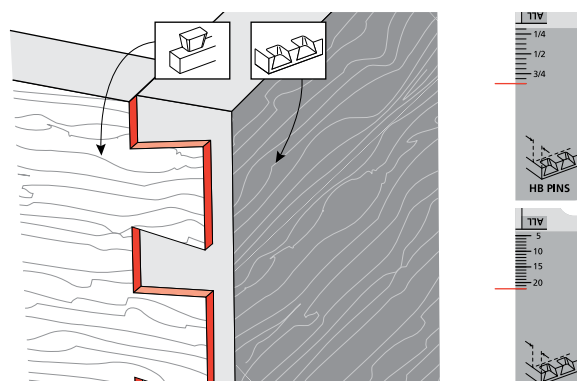

9-29 If the tails stand out from the pins, set the ⟨HB PINS⟩ scale **away from the operator** by the amount required.


1/64"[0,3mm]
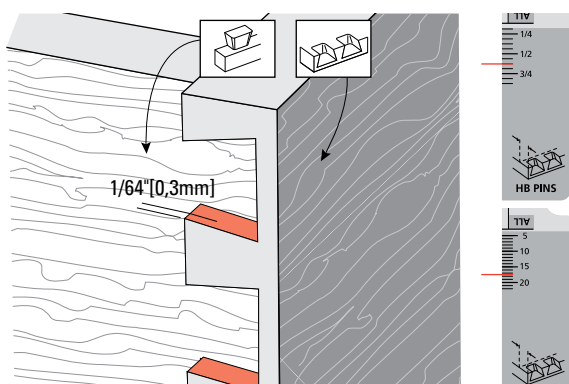
9-30 If the tails fit in too far past the pins ends, set the ⟨HB PINS⟩ scale **toward the operator** by the amount required. These adjustments for "flushness" are made only in the ⟨HB PINS⟩ mode.
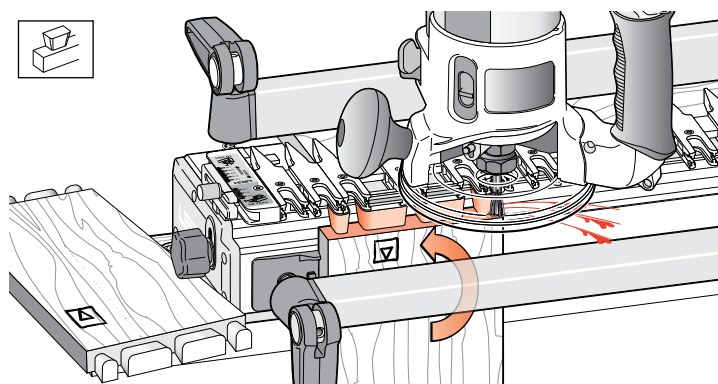
9-31 To make a box, rout all four ends of the tail boards, keeping the inside face ⊡ of the tail boards away from the jig.
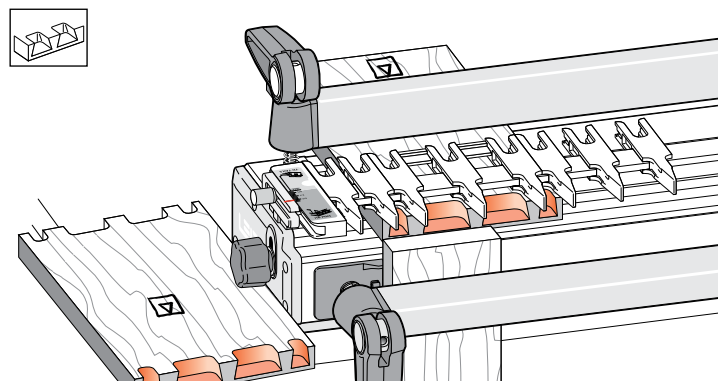
9-32 Rout all four ends of the pin boards keeping the inside face ▣ of the boards away from the jig.

*Note: When making drawers you may prefer to use through dovetails on the rear corners.*
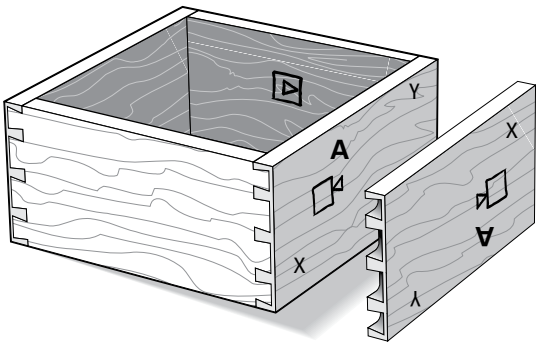
9-33 Assemble the box. As with through dovetails, it doesn't matter which edge of any of the boards are at the top or bottom, the box will still fit together e.g. pin board "A" can be up either way.
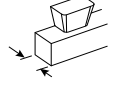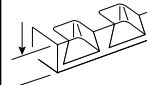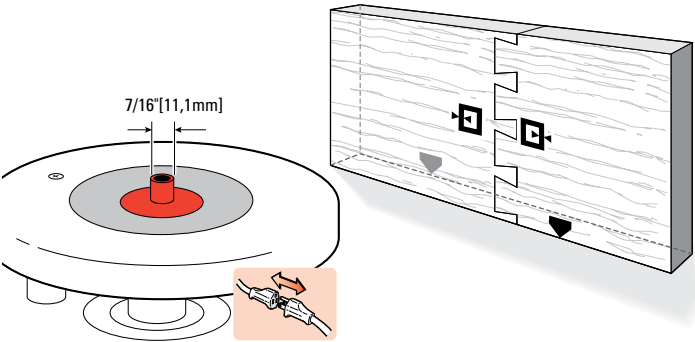
QUICK REFERENCE REMINDERS
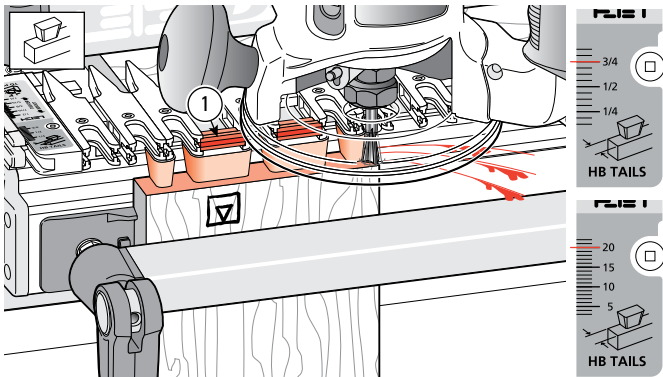
9-QR1 Half-blind (HB) tails: Drawer sides (tailboards) are clamped vertically in the jig. The inside face ▣ of the drawer side goes away from the jig body. The finger assembly is in the ⬡ HB TAILS mode, set to the thickness of the drawer side. Use bridge pieces where required ①.
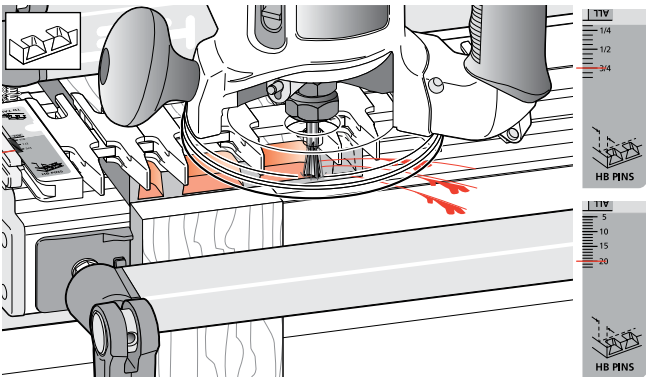
9-QR2 Half-blind (HB) pins: Drawer fronts (pinboards) are cut with the board clamped horizontally in the jig. The inside face ▣ of the drawer front faces away from the jig body. The finger assembly is in the ⬡ HB PINS mode, and again **set on the thickness of the drawer side** (but adjusted for a flush fit, see 9-28 to 9-31).

9-QR3 Quick Reference Table

Thickness of Tail Board	**Thickness of Pin Board**	**Depth of Cut**	**Dovetail Bit**	**Guidebush Diameter**
up to 1"[26]	$7/8$" -1" [22]	~ $3/4$" [19]	No.80-8	
up to 1"[26]	$3/4$" -up [20]	~ $5/8$" [16]	No.101-8	e7-Bush
up to 1"[26]	$5/8$" -up [16]	~ $1/2$" [13]	No.112-8	or
up to 1"[26]	$9/16$" -up [14]	~ $7/16$" [11]	No.120-8	$7/16$" [11,1]
up to 1"[26]	$1/2$" -up[12]	~ $3/8$" [9]	No.128-8	guidebush

7/16"[11,1mm]

9-QR4 On the Leigh Superjig, all half-blind dovetails are routed using the **e7-Bush** or a $7/16$"[11,1mm] diameter (min. depth $1/4$" *see page 67*) bush. **Instructions for end-on-end dovetails** are in the Support menu at leightools.com/technical-bulletins— Scroll down and click on SuperJigs / D1600 and select End-on-End Dovetails. ■