Woodsmith PLANS

COMBINATION ROUTER TABLE



Shop Project

combination Router Table

A flip-up top adds a new angle to table routing. The result is a unique, two-in-one workstation for the ultimate in shaping and joinery.

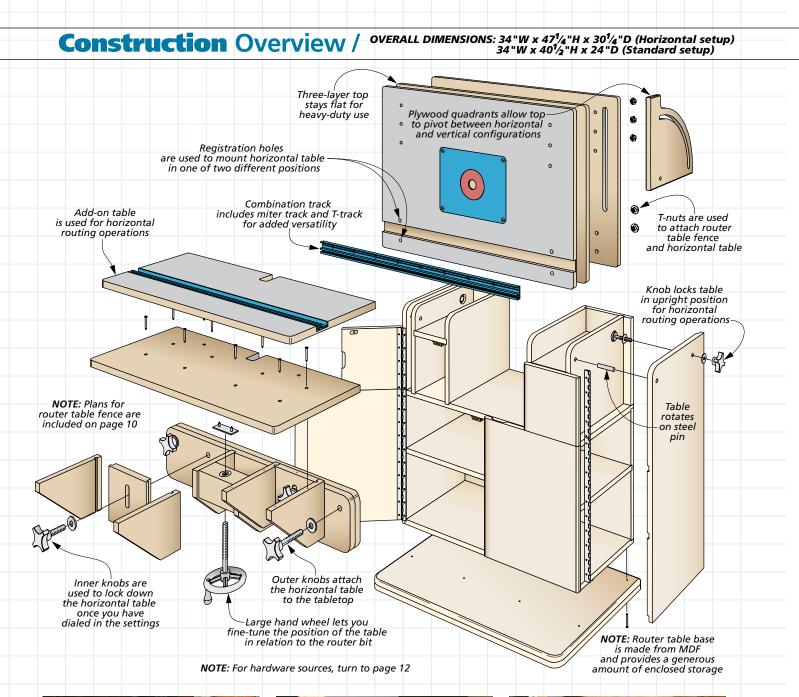
Installing a router upside down in a router table is a surefire way to upgrade any workshop. The versatility of a router table opens up new options for improving the fit and finish of your projects.

However that isn't the only way to get more from a router. A router mounted horizontally offers some big benefits for certain tasks, like creating raised panels and cutting mortises and tenons. Taking advantage of each configuration doesn't mean you need two separate tools. The top of this router table flips up to convert from a standard router table to a horizontal table in just a few seconds.

VERSATILE ACCESSORIES. To support the workpiece in the horizontal mode, you replace the fence with the adjustable table shown in the photo above. That's all you need for most shaping tasks.

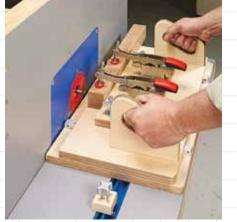
An add-on mortising jig makes setting up and cutting mortises a breeze, as shown in the middle photo on the next page. Both of these accessories stow away neatly in the storage space below the top.

Despite its size, building this router table is straightforward and breaks down into easy-to-manage components. You'll end up with a combination machine that expands the capabilities of your router.





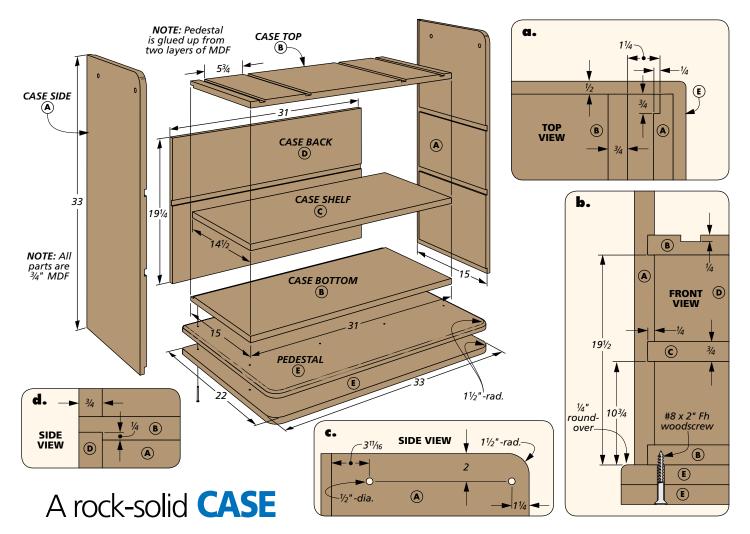
A large, thick table and a simple, adjustable fence tackle most router table tasks with ease.



The add-on mortising jig and stops make cutting smooth, accurate mortises a walk in the park.



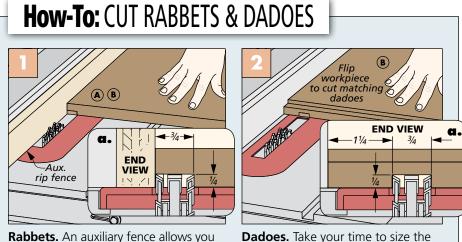
The storage area below holds the router table accessories or other gear you need to organize.



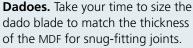
A router table that can be configured for horizontal or vertical use requires a surefooted stance both when routing and while making the transition from one mode to the other. That job falls mainly to the case and pedestal of the router table.

The case uses two approaches for creating stability. First, the overall structure of the case creates a wide footprint that provides a good balance no matter how the router table is set up. This large case also lets you sneak in some storage space for the accessories that are added later.

The choice of materials also plays a role in how well the case works. I used MDF here. And if you've ever lifted a sheet of



to position the fence alongside the dado blade without damaging the rip fence.



MDF, you know why it can make a case feel more solid. The mass of MDF offers a nice side benefit, as well. It helps dampen vibration from the router.

SIMPLE CONSTRUCTION. The drawing above shows how the case is assembled. Rabbets and dadoes join the parts together. But this isn't your typical square box case. The sides extend well above the top. This open space is used primarily for housing the parts that allow the tabletop to change positions.

Figures 1 and 2 highlight the methods for cutting rabbets and dadoes at the table saw. These details help anchor parts together and increase the glue surface for each joint. You put this setup to use in cutting the joints in the sides to accept the top, bottom, shelf, and back.

In addition, the top and bottom have a rabbet along the back to capture the case back. A set of dadoes in the top anchor two smaller assemblies shown on the next page. A groove in the back panel allows it to interlock with the shelf.

A FEW DETAILS. Before getting out the glue bottle and clamps, I drilled a couple of

holes in the sides that serve as the hinge and locking points for the tabletop. I also relieved the upper corner of the sides with a radius, as shown in detail 'c' on the previous page. This allows the top to pivot freely.

ADD A PEDESTAL. After assembling the case, you can move on to making the pedestal. It's made up of two layers of MDF and extends out in front of the case to improve balance, primarily when the table is set up for horizontal operations.

a.

CASE WRAP UP

The open, upper portion of the case is where you'll turn your attention to next. Here, you need to add two small assemblies next to the case sides, as shown in the drawing at right. These offer additional storage. The space between them will house the router.

FAMILIAR JOINERY. Here again, all the parts are joined with dadoes and rabbets. Keep in mind that you're making two mirror-image assemblies.

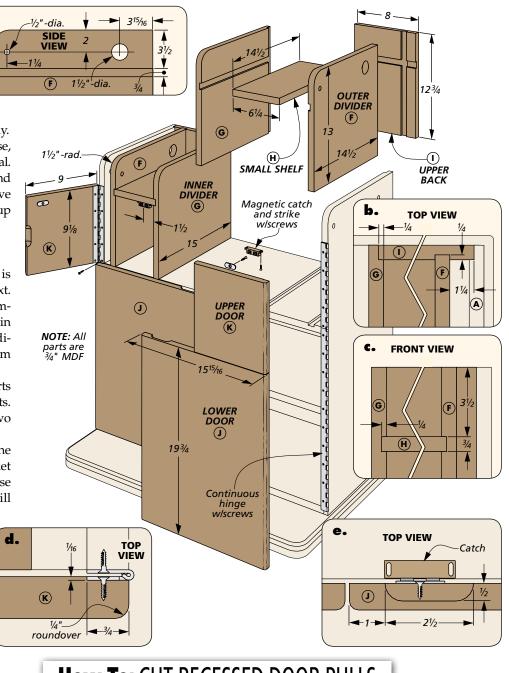
The dividers fit into the dadoes in the case top. This creates a narrow pocket between the outer divider and the case side, as shown in detail 'b.' This will

house a large, arc-shaped plywood panel added later that allows the tabletop to pivot and be locked in place. An overlapping back panel encloses the space.

DRILL SOME HOLES. The outer dividers have a pair of holes that line up with the holes in the case sides. I used the holes in the sides and a drill bit as guides for marking the locations in the dividers. Then I drilled the holes at the drill press. Take note in detail 'a' that the rear hole is larger to allow for better access to install

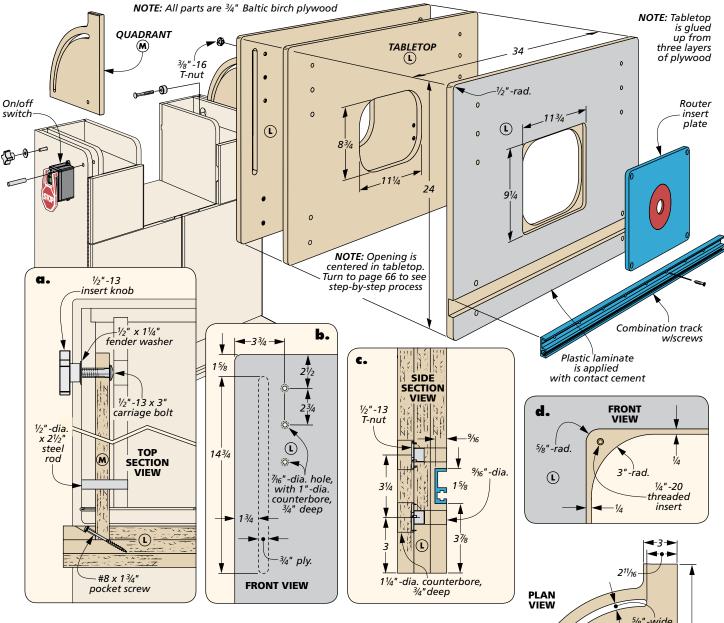
the table locking hardware later on. **ADD DOORS.** The storage areas are enclosed with simple slab doors. The hinge side of each door has a shallow rabbet to hold a continuous hinge. The box at right shows how to create low-profile pulls. Soften the outer edges using a roundover (details 'd' and 'e'). The doors are held closed with magnetic catches.

That wraps up the work on the case. Before moving on to the top, I painted the case after sealing the edges of the MDF and applying a coat of primer. You can find the color I used on page 12.



How-To: CUT RECESSED DOOR PULLS

Stopped Cove Cuts. Layout lines on the door define the size of the pull recess. While it may be tempting to rout the profile in a single pass, it's best to work down to final depth in two passes.



The flip-up **TOP**

A high-quality router table top should have a smooth, hard-wearing surface that's large and flat. And it never hurts to include a miter track. The top shown in the drawing above has all those features checked off the list.

However, the dual-purpose nature of this table requires a few other items. In the horizontal routing setup, the top becomes a vertical mounting surface for the router and an auxiliary table. So it needs to stand up to the changing loads. This top also needs a secure connection to the tilting mechanism for long-term reliability.

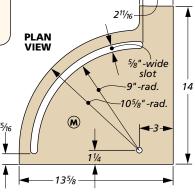
HEAVY-DUTY CONSTRUCTION. The starting point for meeting all those requirements is laminating the top from three layers of

Baltic birch plywood. To make the top, I cut one piece of plywood to final size and shape. Then, one at a time, I glued on two slightly oversize pieces of plywood and trimmed them with a handheld router and a flush-trim bit.

All it takes to make the top smooth and durable is to add a piece of plastic laminate. It's applied with contact cement and trimmed like the plywood, as shown in Figure 1 on the next page.

ALL IN THE DETAILS. With the top in hand, it's time to start adding details. The first is drilling several sets of counterbored holes from the bottom (back) face, as shown in details 'b' and 'c.' The holes hold T-nuts that are used to attach the router table fence and the horizontal table.

I want to point out that there are two different sizes of T-nuts used. So the



holes and counterbores are different, as well. Drill the counterbore for the T-nut first using a Forstner bit. Then use the center point to drill the through hole. It's a good idea to have solid backing below the table to prevent chipping the plastic laminate as the drill bit exits the hole.

VERSATILE MITER TRACK. Next up on the list of details is cutting a groove to hold a commercial miter track. The one I selected is a combination track that includes a miter

track and a T-track. The thing to keep in mind is that the track is wider than a dado blade. So you need to make the cut in multiple passes, as in Figure 2.

A LONG MORTISE. The top is connected to the table with a pair of curved plywood quadrants. For a solid connection, the quadrants fit into long mortises cut in the underside of the top. To determine the location of the mortises, center the top on the case and mark the top where it lines up with the pockets in the case.

Figure 3 shows a good method for making the mortises. A straightedge guides a hand-held plunge router. I used a plywood bit to ensure a good fit between the plywood and the mortise. The mortise is $\frac{3}{4}$ " deep, so you need to rout it in several shallow passes.

A ROUTER INSERT PLATE. Back on the top face of the router table, you need to create an opening for the router insert plate. This is a little different than a typical opening. Since the table is designed to tilt upright, the insert needs to be anchored to the top so it doesn't fall out.

The insert plate I used has countersunk holes in the corners. Machine screws and threaded inserts lock the insert plate in place, as shown in detail 'd' on the previous page. To create the opening, I used a pair of templates (Figure 4). The full process is detailed in Shop Notes on page 11.

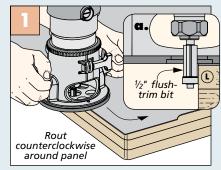
MAKING QUADRANTS. The work on the tabletop is complete at this point. So you can turn your attention to making the quadrants. These have a curved edge and a slot that's used to lock the tabletop in either working position. One edge of the quadrant is glued into the mortise in the underside of the tabletop.

Lay out the overall shape of the quadrant on a square plywood blank. Be sure to include the pivot hole, the curved slot, and the "ear" along one edge, as in the plan view on the previous page.

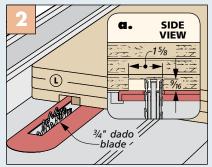
A jig saw makes quick work of cutting the quadrant to rough shape. Then I used a router with a simple hardboard trammel to clean up the edge, as shown in Figure 5. The trammel has a second pivot hole that's used to rout the slot.

After rounding over the outside edges (Figure 6), you can glue the quadrant in place. I used pocket screws to reinforce the joint, as in Figure 7. The tabletop is ready to be installed on the case using the hardware shown in detail 'a' on the previous page.

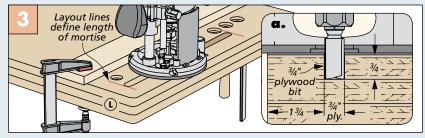
How-To: TABLETOP DETAILS

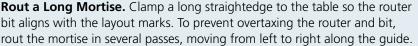


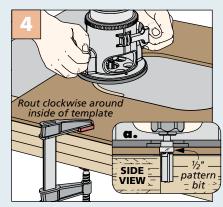
Trim It Flush. Applying an oversize piece of laminate is easier to line up. Trim it flush with a router.

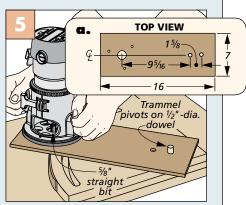


Cut a Track Groove. Fine-tune the rip fence to cut a groove that forms a snug fit with the miter track.



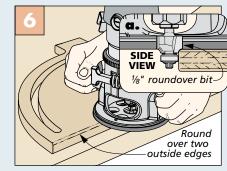






Two Templates. Turn to page 11 to see how templates guide a router to create a smooth, stepped opening.

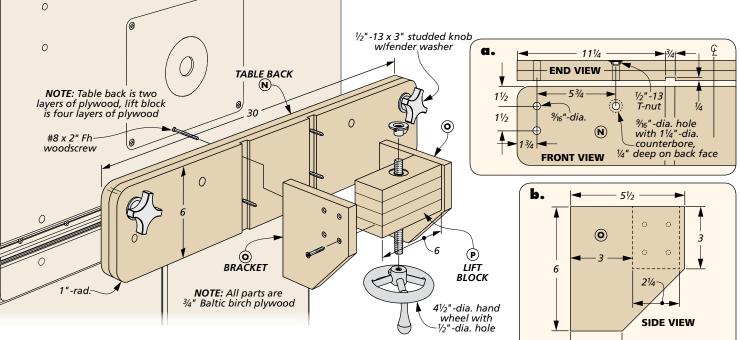
Make a Trammel. The two pivot holes in the trammel are used to shape the quadrant and cut the slot.



Ease the Edge. A slight roundover softens the edges of the quadrant and prevents splintering.

Glue and clamp quadrant into mortise, then drive pocket screws

Reinforcements. Pocket screws augment the glue joint where the quadrant connects to the tabletop.



Adjustable horizontal TABLE

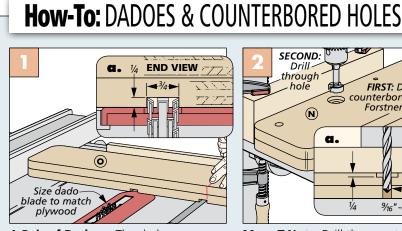
Completing the case and tabletop gives you a fairly standard router table. To take advantage of the flip-up top, there needs to be some kind of support for the workpiece. That's where you'll be focusing your attention next.

The horizontal table consists of two primary assemblies: a fixed back and an adjustable table. The back is used to mount the table to the vertical tabletop in one of two positions. This is done with the T-nuts that were installed earlier. A hand wheel lets you fine-tune the height of the table in relation to the router bit.

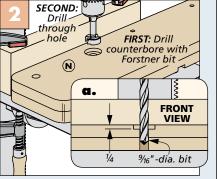
A SOLID BACK. The table back is made up of two layers of plywood. I softened the corners with a radius. Cut a pair of dadoes in the face to hold the hand

wheel assembly, as shown in Figure 1 below. The dadoes are sized to match the thickness of the Baltic birch plywood used throughout this part of the project. The back has two sets of holes drilled in it, as shown in detail 'a.' One is used with studded knobs to lock into the tabletop. The other set incorporates T-nuts, as you can see in the upper right drawing. These secure the table height once you have it dialed in.

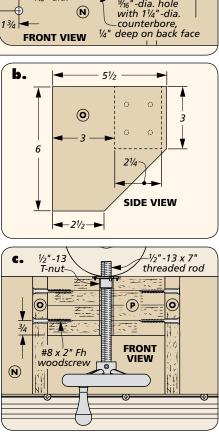
HAND WHEEL ASSEMBLY. Attached to the table back is the hand wheel assembly. This includes two brackets and a lift block. The brackets are cut from square blanks that have the lower corners beveled, as shown in detail 'b.' Besides lightening the look of the brackets, this



A Pair of Dadoes. The dadoes are centered on the overall length of the table back. The rip fence acts as a stop.



More T-Nuts. Drill the counterbore so that the head of the T-nut is just slightly below the surface.



detail provides greater access to operate the hand wheel. The brackets are glued into the dadoes in the table back and flush with the top edge. Screws driven in from behind further strengthen the joint (main drawing above).

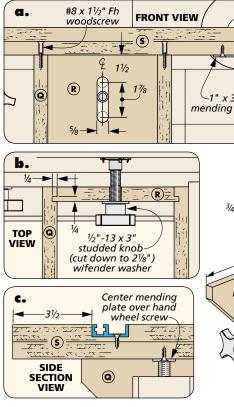
Sandwiched between the brackets is the lift block (detail 'c'). It's glued up from four layers of plywood. Size the block so that it's a snug fit between the brackets.

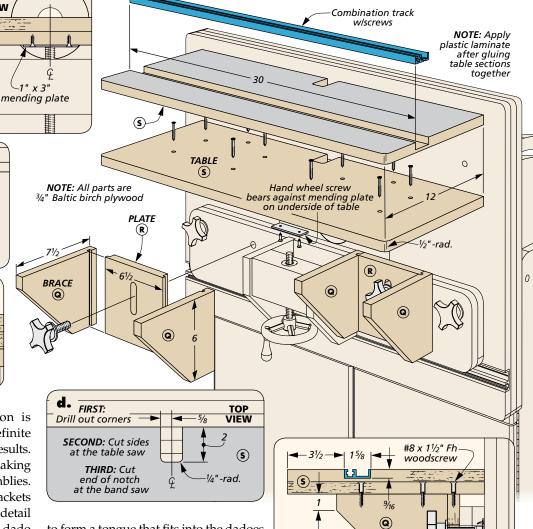
At the drill press, drill a counterbore for a T-nut and then the through hole to accommodate the threaded rod for the hand wheel. This is shown in detail 'c.' I drove long screws through the brackets and into the block for a solid connection.

The hand wheel is attached to a length of threaded rod using a set screw. Thread the rod into the T-nut in the lift block.

ADJUSTABLE TABLE

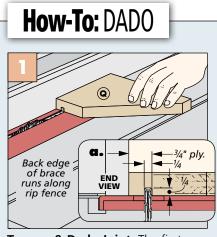
The second part of the horizontal table is the adjustable portion, as shown on the next page. Here you have a double thickness table and two sets of braces with plates that join the table to the





back assembly. The construction is straightforward, but there's a definite order to the process to get the best results.

MAKE THE BRACE & PLATE. I began by making the two brace and plate sub-assemblies. The braces are similar to the brackets you just made (main drawing and detail 'e'). The difference is a tongue and dado joint that runs along the back edge, as illustrated in the drawing below. Locate the dado so that the back face of the mating plate is flush with the end of the brace, as you can see in detail 'b' above. Cut a rabbet along each side of the plate



Tongue & Dado Joint. The first step is cutting the dado. Then size the mating tongue for a snug fit.

to form a tongue that fits into the dadoes in the braces. The other detail that you need to add is a centered slot, as shown in detail 'a.' This accepts a studded knob and washer. The knob threads into the T-nut in the table back.

NOW THE TABLE. A common theme with this project is creating strength by doubling up the thickness of critical components. And the top of the horizontal table is no exception. But I did things a little differently here. The table is screwed to the braces, but I didn't want the screws to show through the top face.

To do this, I cut the lower layer of the table to final size and shape, including the router bit notch, as shown in detail 'd.' Attach this layer to the braces with screws, as shown in the details 'a' and 'e.'

You know the routine by now: Once the first layer is in place, the second layer can go on. Like before, start with a slightly oversized piece. Cut a notch for the bit and use that to align the second layer over the first while you glue the upper layer of plywood in place. Trim the second layer of plywood flush, then add the plastic laminate just as you did on the tabletop. (You'll have to remove the table from the tabletop to trim the edges flush.) Be sure to trim around the inside of the router bit notch, as well.

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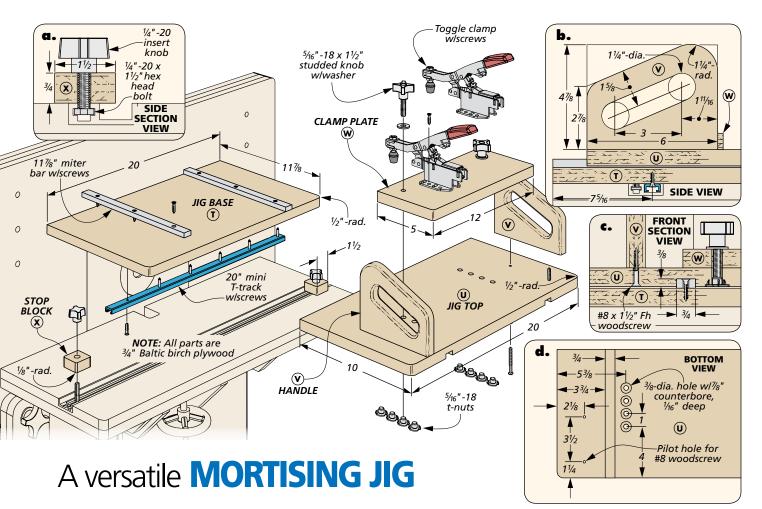
(N)

SIDE VIEW

e.

Complete the work on the top of the horizontal table by taking a trip over to the table saw. Here, you cut a groove to accept the same combination track that's installed in the main tabletop. You can find the location for the groove in detail 'e.'

There's one final bit of hardware to add to the table before reattaching it to the router table. And that's to attach a mending plate to the bottom face. This serves as the bearing surface for the hand wheel screw (main drawing and detail 'c').



Routing mortises is an ideal operation for a horizontal router. In this configuration, you have much better visibility of the bit. What you need, though, is a way to secure and guide the workpiece while making the cut. The solution is the jig shown here.

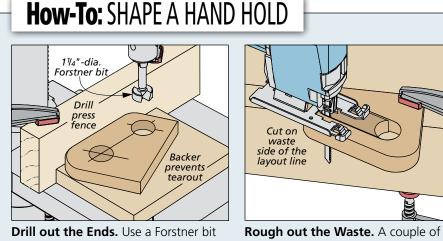
The workpiece is clamped to the jig with stout toggle clamps. Runners in the base and top of the jig constrain

in the drill press to create a smooth

radius at each end of the hand hold.

the motion in and out and side to side. Stops installed in the table help make it easy to rout consistent mortises. And two large handles give you better control and keep your hands well clear of the bit.

THE BASE FIRST. The base is a piece of plywood. On the bottom face, a length of mini T-track serves as a runner, as shown in detail 'b.' What's important here is that it gets installed parallel to the edge of



quick jig saw cuts remove most of the waste between the holes.

the base. This is what guides the jig side to side down the length of a mortise.

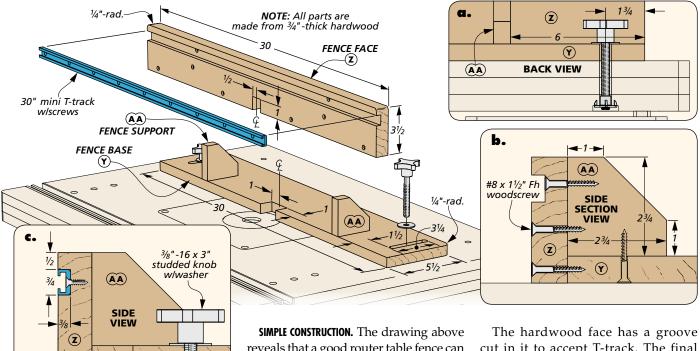
On the top face of the base are a pair of runners that I cut from a commercial miter bar, as you can see in detail 'c.' These mate with dadoes cut in the bottom face of the mortising jig top. The bars control the in and out motion of the jig when cutting a mortise to its final depth.

ADD THE TOP. In addition to the dadoes I just mentioned, the jig top has four sets of T-nuts installed in the bottom face. The T-nuts are anchor points for the tog-gle clamp assembly.

In detail 'b,' you can see the dimensions for the handles that are screwed to the jig top. You create the hand holds by drilling out the ends with a Forstner bit (box at left). After cutting away most of the waste with a jig saw, smooth and straighten the edges with files and a little hand sanding.

The toggle clamps are fixed to an adjustable plate. Depending on the size of your workpiece, you can locate the plate in one of four locations on the top using studded knobs and washers (detail 'c').

The last thing to do is make a pair of square stop blocks. These lock into the



T-track in the horizontal table with hex bolts, washers, and knobs, as shown in detail 'a' on the previous page.

 (\mathbf{Y})

ROUTER TABLE FENCE

The focus so far has been on making the horizontal routing configuration. But in order to use the standard setup, you'll need a solid, sturdy fence.

Materials & Supplies

Α	Case Sides (2)	³ ⁄4 MDF - 15 x 33	١
В	Case Top/Bottom (2)	³ ⁄ ₄ MDF - 15 x 31	۱ ا
С	Case Shelf (1)	³ / ₄ MDF - 14 ¹ / ₂ x 31)
D	Case Back (1)	³ / ₄ MDF - 19 ¹ / ₄ x 31	١
Е	Pedestal (1)	1 ¹ / ₂ MDF - 22 x 33	z
F	Outer Dividers (2)	⁻ ³ ⁄ ₄ MDF - 13 x 14 ¹ ⁄ ₂	ļ
G	Inner Dividers (2)	³ ⁄ ₄ MDF - 13 x 15	•
н	Small Shelves (2)	³ / ₄ MDF - 6 ¹ / ₄ x 14 ¹ / ₂	•
Т	Upper Backs (2)	³ ⁄4 MDF - 8 x 12 ³ ⁄4	•
J	Lower Doors (2) $\frac{3}{4}$	MDF - 15 ¹⁵ / ₁₆ x 19 ³ / ₄	
Κ	Upper Doors (2)	³ ⁄4 MDF - 9 x 9 ¹ ⁄8	
L	Tabletop (1)	2¼ ply 24 x 34	
Μ	Quadrants (2)	<i>³⁄</i> ₄ ply 14 x 13⁵⁄ ₈	
Ν	Table Back (1)	1½ ply 6 x 30	
0	Brackets (2)	³ ⁄ ₄ ply 6 x 5 ¹ ⁄ ₂	
Ρ	Lift Block (1)	3 ply 2¼ x 6	•
Q	Braces (4)	³ / ₄ ply 6 x 7 ¹ / ₂	•
R	Plates (1)	³ / ₄ ply 6 x 6 ¹ / ₂	•
S	Horizontal Tables (2)	<i>³∕</i> ₄ ply 12 x 30	
т	Mortise Jig Base (1)	³ ⁄ ₄ ply 11 ⁷ ⁄ ₈ x 20	
U	Mortise Jig Top (1)	³ ⁄ ₄ ply 10 x 20	•

reveals that a good router table fence can be simply built. This one is an L-shaped assembly consisting of a base and face beefed up with some supports.

The base is a length of hardwood with a centered notch to allow a router bit to be recessed inside. Near each end of the base is a short slot that's used to adjust the position of the fence in use. The fence is attached to the table with washers and studded knobs that thread into the T-nuts along the back of the tabletop, as shown in details 'a' and 'c.'

cut in it to accept T-track. The final parts to make are the supports, as in detail 'b.' Once they're cut to shape, the fence can be assembled with glue and screws. The key is keeping the fence face square to the base as the parts come together.

That wraps up the project, and the router table is ready for use. Be sure to locate the router table in a prominent place in your workshop. With all the practical features it has, it's bound to see a lot of use for years to come.

33	V	Handles (2)	<i>³∕₄</i> ply.	-4 ⁷ / ₈ x6 •		
31	W	Clamp Plate (1)	<i>3/</i> 4 ply	5 x 12 •		
31	Х	Stop Blocks (2)	<i>³∕₄</i> ply ′	$1^{1}/_{2} \times 1^{1}/_{2}$ •		
31	Υ	Fence Base (1)	<i>3/</i> 4 х	• 5 ¹ / ₂ - 30		
33	Ζ	Fence Face (1)	<i>3/</i> 4 х	· 3 ¹ / ₂ - 30 •		
1 ¹ /2	AA	Fence Supports (2)	<i>3/</i> 4 Х .	2 ³ / ₄ - 2 ³ / ₄ •		
15	٠	(4) Magnetic Catches		•		
1 ¹ /2	٠	(2) ¹ / ₂ "-13 x 3" Carria	age Bolts	•		
23/4	٠	(2) 1 ¹ / ₂ " x 36" Continuous Hinges •				
) ³ /4	٠	(6) ¹ / ₂ " x 1 ¹ / ₄ " Fender Washers				
) ¹ /8	٠	(14) #8 x 2 " Fh Wood	dscrews	•		
34	٠	(2) 1/2 "x 21/2" Steel R	ods	•		
3 ⁵ /8	٠	(2) 1/2"-13 Insert Kno	bs	•		
30	٠	(1) Power Tool Switch	ı	•		
51/2	٠	(6) ¹ / ₂ "-13 T-Nuts		•		
x 6	٠	(6) 3/8"-16 T-Nuts		•		
¹ / ₂	٠	(2) 36 " Combination	Tracks			
51/2	٠	(1) Router Insert Plate	5	ALSO NEEDED:		
30	٠	(4) 1/4"-20 Fh Machin	e Screws	Two 49" x 97" Two 60" x 60"		
20	٠	(4) $\frac{1}{4}$ "-20 Threaded Inserts 2.5 bd. ft. of $\frac{3}{4}$				
20	•	(8) #8 x 1 ³ / ₄ " Pocket	Screws			

- (2) 48" Mini Tracks
- (2) 3/8"-16 x 3" Studded Knobs
- (2) ³/₈" x 1" Fender Washers
- (36) #8 x 1¹/₂" Fh Woodscrews
- (1) 1 " x 3 " Mending Plate
- (2) #6 x $\frac{1}{2}$ " Fh Woodscrews
- (4) 1/2"-13 x 3" Studded Knobs
- (1) ¹/₂" x 4¹/₂" Hand Wheel
- (2) 1/2"-13 x 7" Threaded Rod
- (2) Toggle Clamps
- (2) 5/16"-18 x 11/2" Studded Knobs
- (2) 5/16" Washers
- (1) 3/8" x 3/4" 30" Miter Bar
- (8) 5/16"-18 T-Nuts
- (2) 1/4"-20 x 13/4" Hex Bolts
- (2) 1/4"-20 Insert Knobs

sheets of ³⁄4" MDF sheets of ³⁄4" Baltic birch plywood "-thick hard maple (Parts Y, Z, and AA)

Shop Notes

Insert Plate Opening

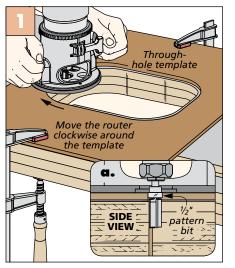
Creating an opening for a router insert plate is usually a pretty straightforward task. However, the opening for this insert plate requires threaded inserts to secure the insert while the table is flipped upright for horizontal routing. The solution for making it comes in the form of using two templates and three router bits.

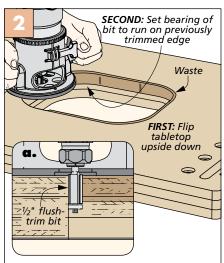
The opening in one of the templates is sized to match the insert plate. The other template is sized for the smaller opening. The dimensions for the openings are found on page 5. I used the template with the smaller through opening to trace the opening on the tabletop and cut out most of the waste with a jig saw.

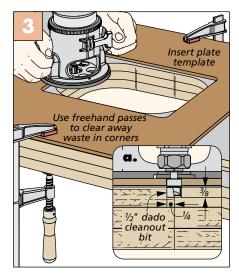
SMALL OPENING. Turning the rough cutout into a smooth, even opening starts with using a pattern bit to trim the edge of the opening flush with the template (Fig. 1).

My pattern bit wasn't long enough to trim all three layers of the tabletop. To complete the job, I flipped the tabletop upsidedown and used a flush-trim bit. The bearing on this bit follows along the smooth edge that was just created, as in Figure 2. **INSERT PLATE OPENING.** Now you're ready to make the larger recess to house the insert plate. Remove the first template and install the second template centered over the opening. Since this recess is shallow, you need to use a dado cleaout bit, which has a short cutting length so the bearing can follow the template.

The router bit depth should match the thickness of the router insert plate, as shown in Figure 3. In the corners, you need to make a few back-and-forth passes to clear out the remaining waste.







MAIL ORDER SOURCES

Woodsmith Store 800-444-7527

Benjamin Moore 855-724-6802 benjaminmoore.com

> Kreg 800-447-8638 kregtool.com

> Lee Valley 800-871-8158 leevalley.com

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McMaster-Carr 630-833-0300 mcmaster.com

Nevamar 877-726-6526 nevamar.com

Rockler 800-279-4441 rockler.com

Project Sources

• McMaster-Carr

Wiciviasiei-Call
1/2"-13 Insert Knob6042K81
¹ ⁄ ₂ "-13 T-Nuts 90975A033
3/8"-16 Studded Knob 62215K56
Mending Plate1030A4
1/2"-13 Studded Knob 62215K58
4 ¹ / ₂ " <i>Hand Wheel</i> 6033K71
5/16 " -18 Studded Knob . 62215K53
¼ ″ -20 Insert Knob 6042K77
Rockler
<i>Magnetic Catch</i> 1009262
Power Tool Switch 20915
Dust Collection Port 21528
Kreg Tool
Combo Trak KMS7448
Router Plate PRS3038

 Kouter Futte
 FK55038

 Mini T-Track.
 KMS7509

 Jig & Fixture Bar
 KMS7303

 • Lee Valley
 Toggle Clamp

 Toggle Clamp
 17F72.02

• Nevamar

Lam. (Maritime Gray) S6027

The case of the router table was painted with *Benjamin Moore's* Calm Cream (Eggshell Finish).

Manufacturers and retailers will periodically redesign or discontinue some of their items. So you'll want to gather all the hardware, supplies, and tools you need before you get started. It's easy to adjust dimensions or drill different-sized holes to suit your hardware.