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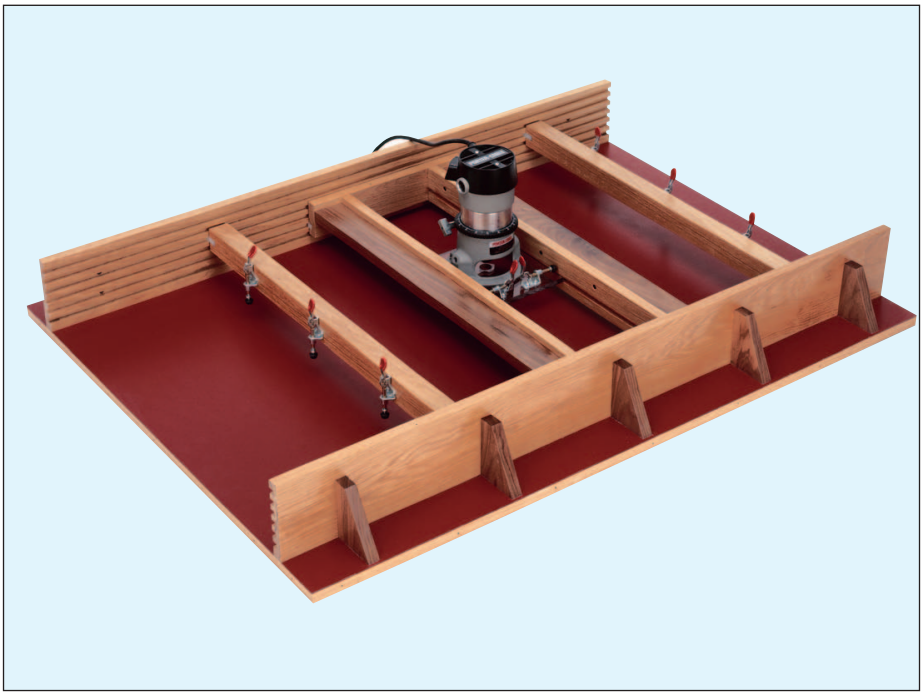
In this plan you will be getting:

- Step by Step construction instruction.
- A complete bill of materials.
- Exploded view and elevation drawings.
- How-to photos with instructive captions.
- Tips to help you complete the project and become a better woodworker.

Router Surfacing Jig



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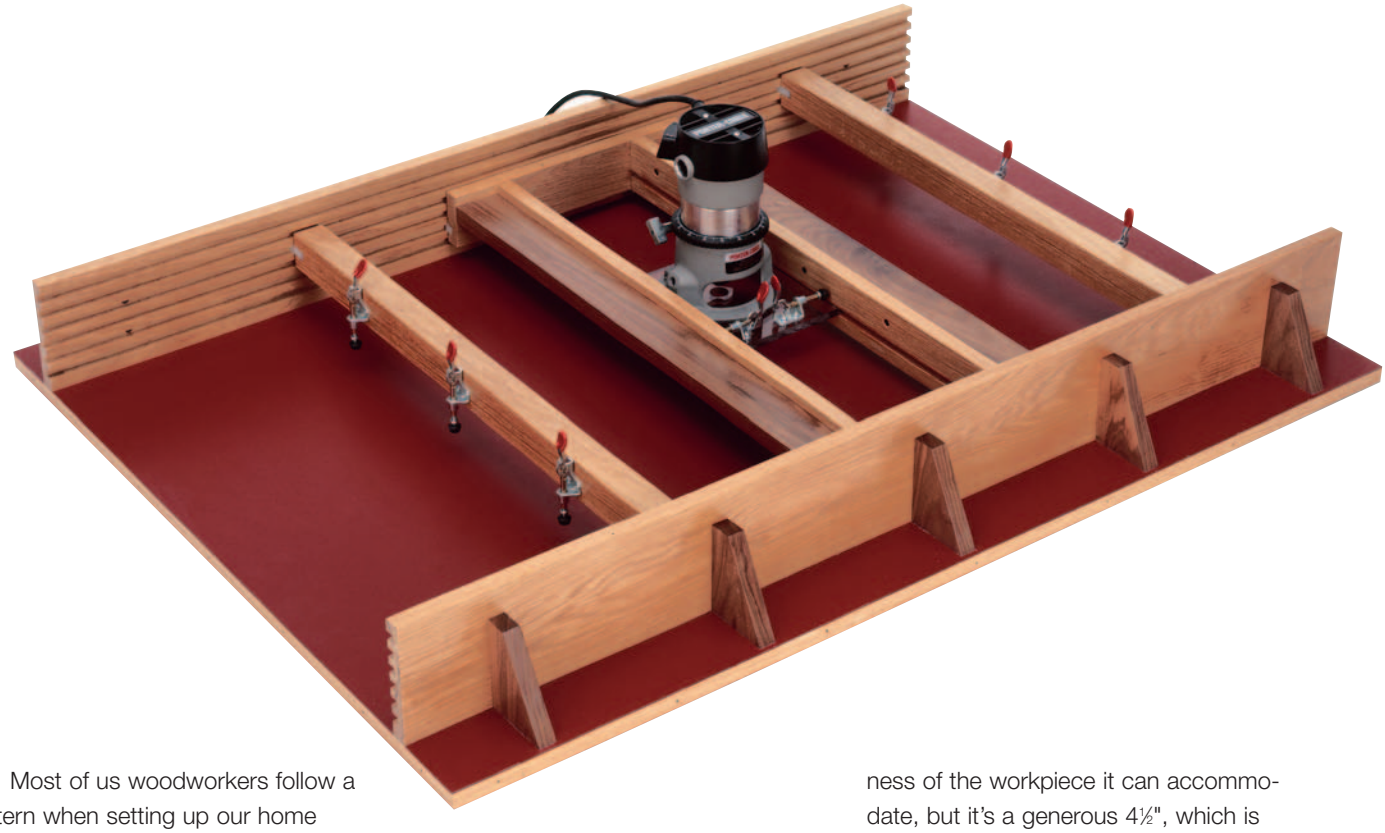
WJ094

Router Surfacing Jig

Thickness planers are worth their weight in gold, but adding one to your shop doesn't come cheap. If your budget won't allow for a planer just yet, we have a solution. Our surfacing jig turns a router into a serviceable planer. The moveable sled will fit virtually any make or model of fixed-base router, and a pair of holddowns keep workpieces firmly planted while you work. This jig also doubles as a handy dado and groove cutter.



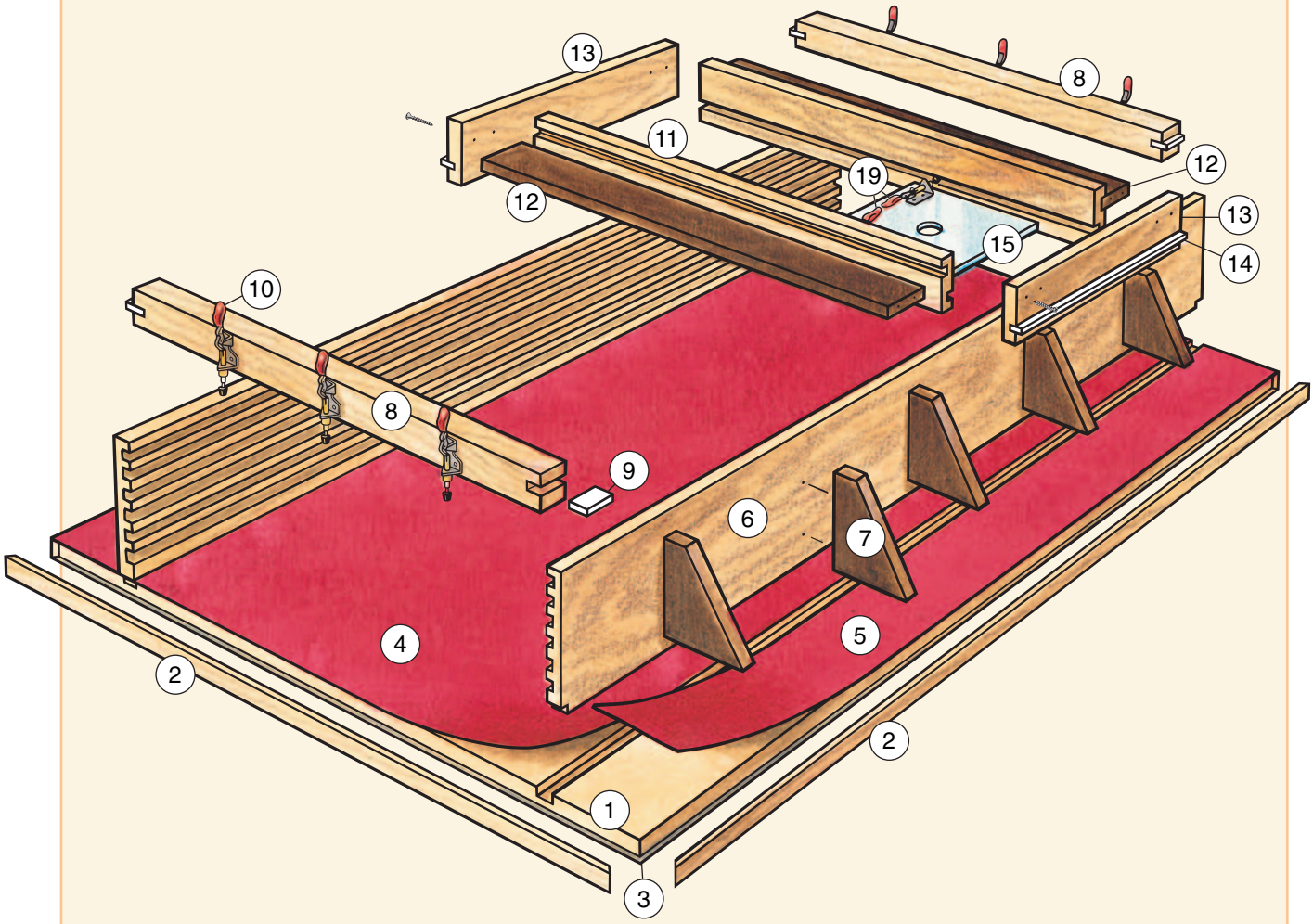
Most of us woodworkers follow a pattern when setting up our home shops. We start with a few hand tools and a drill, and pretty soon we have all the basics in place. Then we start dreaming of going to the next level—dust collection, pneumatic tools, and finally the ultimate shop machine—a thickness planer. The problem is that our skill level often grows a little more quickly than the number of tools we are able to afford. If you're ready for a thickness planer but aren't prepared for the financial outlay involved, this article presents a solution: the surfacing jig.

While this project started out with surfacing in mind, you'll find that there are a number of important routing operations that it can perform (see *Figures 1, 2* and *3*). It will handle panels up to 19" wide, with no restrictions on length. However, there is a limit to the thickness of the workpiece it can accommodate, but it's a generous 4½", which is adequate for almost any situation.

One of the clever features of this jig has nothing to do with surfacing: Its size allows you to cut multiple dadoes across the grain of a workpiece. This means that you can build bookshelves and other cabinetry with little or no setup, and you can repeat cuts to your heart's content.

If you're intrigued by the possibilities and would like to build our surfacing

Jig Exploded View



MATERIAL LIST

		T x W x L
1	Base (1)	3/4" x 35" x 47"
2	Hardwood Trim (1)	1/4" x 3/4" x 168"
3	Laminate - Underside (1)	1/8" x 36" x 48"
4	Laminate - Top Center (1)	1/8" x 27½" x 48"
5	Laminate - Top Sides (2)	1/8" x 3½" x 48"
6	Base Runners (2)	3/4" x 5⅜" x 47½"
7	Stabilizers (10)	3/4" x 3" x 4"
8	Holddown Beams (2)	1¾" x 1½" x 27⅜"
9	Holddown Glides (4)	3/8" x 1" x 1½" UHMW
10	Holddown Clamps (6)	Small Push Clamps
11	Sled Runners (2)	3/4" x 2¾" x 25⅞"
12	Sled Braces (2)	3/4" x 2¾" x 25⅞"
13	Sled End Caps (2)*	3/4" x 2¾" x 13"
14	Sled Glides (2)*	3/8" x 3/4" x 13" UHMW
15	Polycarbonate Sled (1)*	3/8" x 7½" x 7½"
16	Router Housing Bolts (3)*	
17	Sled Clamp Bolts (6) and Nuts (6)	1/8" x 1"
18	Sled Clamp Lock Washers (6)	1/8"
19	Sled Clamps (2)	Small Push Clamps
20	Spacer Strips (2)	3/4" x 5½" x 47½"

Designed for a 5½" diameter router base: Adjust to fit your router's base.

Figure 1: *The original motivation for this jig was a means to surface uneven boards before final sanding. It became evident that the jig would also serve to plane material down to a desired thickness, as shown at left.*

Figure 2: *Cutting clean-edged dadoes across the grain of boards or plywood is easy. Just place the workpiece on the base, drop in a spacer, center the router on your cut, and the holddowns will keep both board and router sled in perfect alignment as you work.*

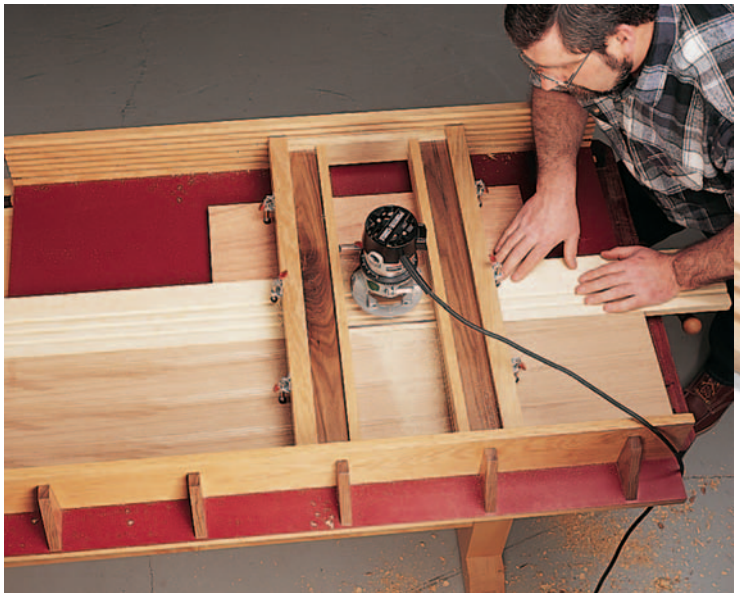


Figure 3: *Cutting grooves with the grain of the workpiece is just as easy as making dadoes across the grain. Use the holddowns to clamp the spacers and sled in place, and lock the router base in position on the sled. Then cut the grooves by running your workpiece between the spacers.*

jig, the first step is to cut all the parts to size according to the dimensions given in the *Material List* on page 41.

Milling the Base

The base (piece 1) is a piece of MDF—medium density fiberboard—which is readily available at any lumberyard, and the first milling operation is to create two grooves in it for the hardwood runners. If you do this on your table saw, make sure that you keep the same edge against the fence for both cuts: If you just flip it, the grooves won't be absolutely parallel. Cutting them with a router and a clamped-on fence makes even more sense, and it's a more comfortable way to handle this large panel.

Trim the base with 1/4"-thick strips of hardwood (pieces 2), mitering the corners. Install this trim with glue and 4d finish nails every 6", pre-drilling the hardwood so it doesn't split. Set and fill the nail holes, then sand everything flush before applying the plastic laminate.

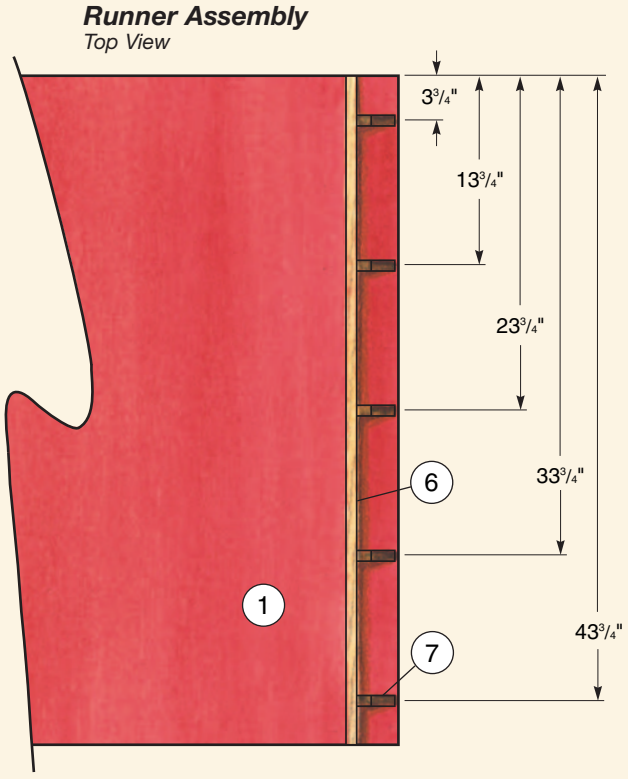
Working with Plastic Laminate

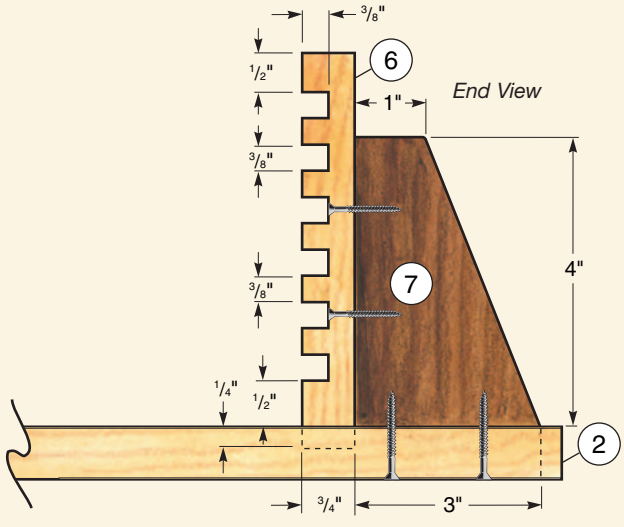
If you haven't applied plastic laminate before, installing it is just a series of very logical steps. Following the manufacturer's instructions, apply a coat of contact cement to the underside of the MDF base and the laminate (piece 3), and let them dry to the touch. The easiest way to apply contact adhesives is with a disposable notched trowel—they're very inexpensive and you can usually just discard them when the project is completed.

When the cement is dry, place dowels or thin sticks about every 6" along the surface to keep the two parts separate while you get the laminate lined up. You'll notice that the laminate is a little oversized to allow for trimming.

Starting from the center, remove

Technical Drawings





NOTE: *The ends of the runners (pieces 6) are notched to fit over the 1/4" trim*

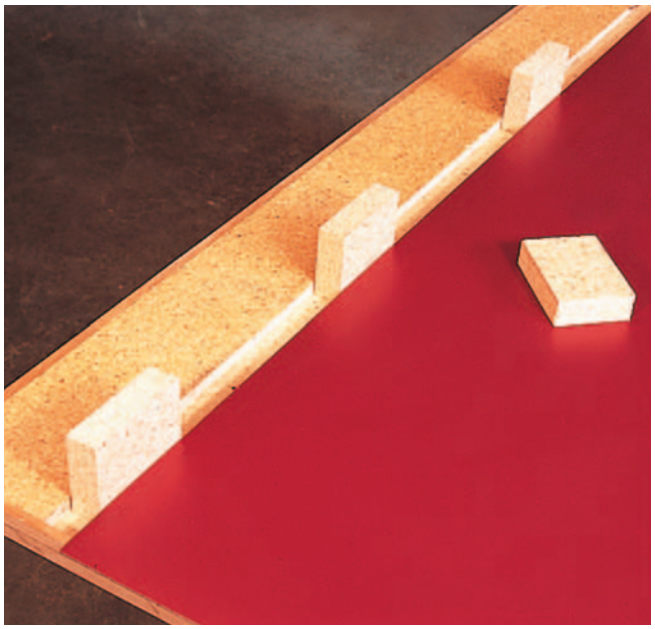


Figure 4: *Use 3/4"-thick scrap blocks to line up the laminate with the edges of the two grooves.*

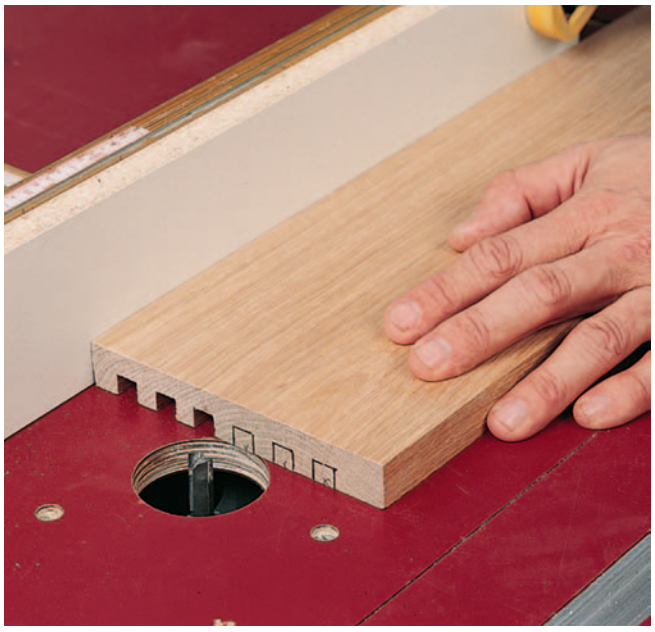


Figure 5: *Use your router table to machine the six parallel 3/8" x 3/8" grooves in the runners for the sled and holddowns.*

the dowels and press the plastic down onto the MDF. Keep working from the center out, and when the whole sheet is in place turn to a plastic or wooden roller to ensure good adhesion. Or you can use a baker's rolling pin—it provides a large area of contact and you can really apply pressure with those widely spaced handles.

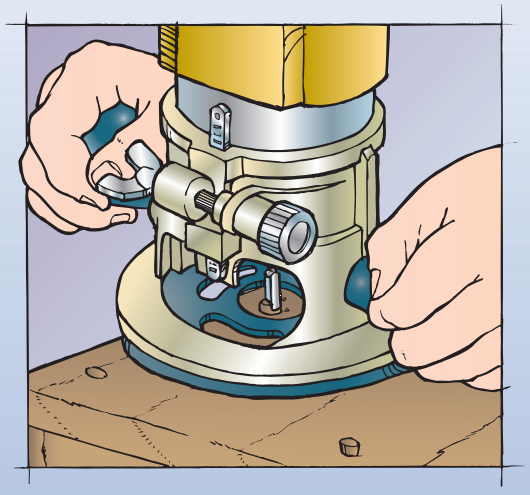
Trim the laminate with a flush-trimming bit installed in your portable router, then use some 280-grit sandpaper to break the trimmed edges. Make sure you don't scratch the laminate in the process. Then turn the base over and work on the top surface.

Begin by drilling 1/8"-diameter holes every 6" along the bottom of each groove. These are pilot holes for the screws that hold the two hardwood runners in place, and drilling them now from the top side ensures that they're lined up properly when you drive the screws in from the bottom later on.

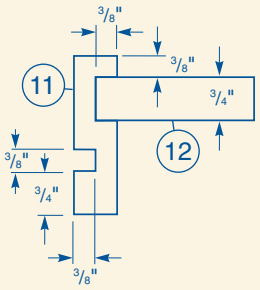
QuickTip

Plugging Holes in Premium Wood

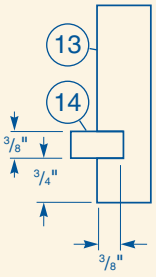
To shave wood plugs absolutely flush, cut five pieces of paper to fit in the opening in your router base. Stack the paper and adjust a flat bit's height so it barely touches the top paper. Now run the router across the plug. If the bit still needs to come down, remove a couple of papers and repeat the adjustment until the plug is barely above the surface. Finish with a light sanding.



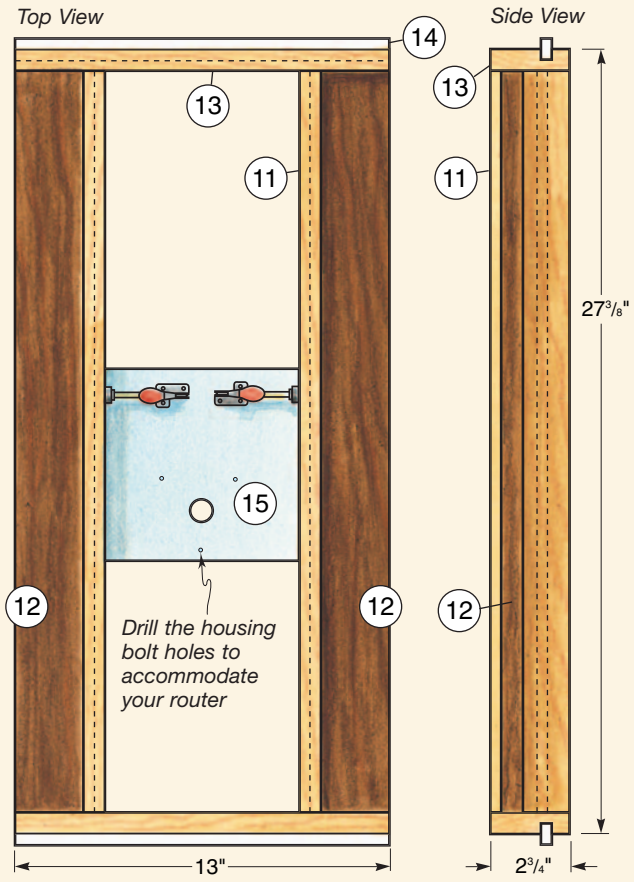
Technical Drawings



NOTE: *Don't glue the end caps (pieces 13) to the brace, so you can remove the router base if necessary*



Router Sled



With that done, you can apply the laminate to the top surface in the same way as the underside, with one exception: The top laminate is installed as three separate sheets (pieces 4 and 5) to fit the areas between the two top grooves. Use small blocks of 3/4"-thick scrap (see *Figure 4*) to line up the edges of the laminate with the edges of the two grooves. When everything is in place, use your dowels, roller and flush-trim bit to complete the installation. Trim off any overhanging laminate with a router and piloted flush-trim bit.

Making the Hardwood Runners

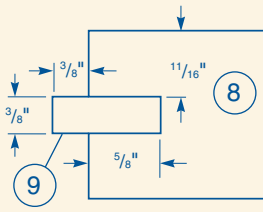
These two runners (pieces 6) provide a stable parallel track for the router when making long cuts. To lay out the six grooves, refer to the *Technical Drawings* on page 49. Transfer this pattern to the end of your workpieces, then mill them on your router table, taking several passes (see *Figure 5*).

Notch the ends of the runners to fit over the 1/4" trim you already installed on the base—hold the piece on edge against your table saw's miter gauge and nibble the waste away. Clamp the runners in place and then turn the entire base upside down (you'll need a helper), to install 1¼" sheetrock screws in the pilot holes you drilled earlier to secure the runners. Countersink the screw heads and pre-drill the hardwood runners before driving the screws home. Don't glue them in as you may have to replace them if they ever start wearing out.

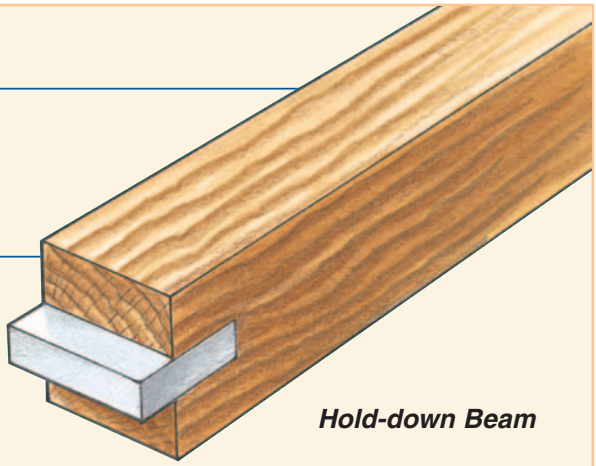
Reinforcing the Runners

To keep the runners perpendicular to the base, make and install the ten hardwood stabilizers (pieces 7). The

Technical Drawings



Locate the UHMW white plastic glides according to the dimensions in the elevation *above.*



Hold-down Beam

pattern for these is included in the *Drawings*. Cut the stabilizers on your bandsaw, then clamp them in a bench vise to belt-sand them to final size. Mark their locations (see *Technical Drawings*) on the base, then screw them in place from the bottom with 1⅝" sheetrock screws, countersinking and pre-drilling as you go. To secure them to the runners, use 1¼"-long screws. Drill countersinks in the bottoms of the runners' grooves with a 3/8" Forstner bit, just deep enough to ensure that the screw heads are below the surface. Then use a 1/8" bit to pre-drill the runners, and continue with a 5/64" bit to extend the pilot hole into the stabilizers. Drive the screws home, then move on to the holddowns.

Assembling the Holddowns

A stable workpiece is essential for quality work, not to mention safety. The holddown system on this jig works wonderfully for long boards and plywood panels.

Make the two beams for the holddowns (pieces 8) from solid hardwood with straight grain. With the beams cut to size, form grooves across each end (see the *Elevation Drawings* for dimensions) to hold the UHMW plastic glides (pieces 9). You can cut these grooves on your table saw with a tenoning jig, or use a high auxiliary fence and your miter gauge to nibble away the waste. Epoxy the two glides in place and when they're dry, belt-sand the plastic flush. Then use your table saw's miter gauge to trim the glides for a nice snug fit in the runners' grooves.

Screw the push clamps (pieces 10) in place next—see the *Technical Drawings* for locations—and then set the holddowns aside and work on making the router sled.

Building the Router Sled

You've already cut all the parts for the sled to size, so now you can go to your router table and mill a 3/8"-wide groove down the inside of each of the sled runners (pieces 11) at the locations given in the *Drawings*. Then turn each piece over and cut a 3/4"-wide groove on the outside face. Glue and screw a brace (piece 12) into each of the wider grooves, making sure that the ends are absolutely flush.

The sled end caps (pieces 13) are also grooved (see *Figure 6*) for the sled glides (pieces 14). Epoxy these glides in place just like you did the ones on the holddowns, then trim them to size when dry.

Make the polycarbonate router base (piece 15) next, cutting it to size and then drilling for the bolts (pieces 16) that attach it to the router housing. Use bolts, nuts and washers (pieces 17 and 18) to secure the two push clamps (pieces 19) that lock the router base in position on the sled. Screw the end caps to the sled runners, countersinking and pre-drilling for the 2"-long screws. Don't glue the end caps in place—you may have to replace the router base at some future time.

If you use a fixed-base router with this jig, we recommend purchasing a second router base housing and leaving it permanently attached to the jig. It will make using the jig much more convenient. Depending on your router model, you may have to remove the two knobs on the base housing so the sled won't get too wide.

Finishing and Using the Jig

Danish oil is a good finish for shop jigs, and wax is the best lubricant for the sled and base runner slots. To use the jig, clamp it to your workbench and drop in a spacer (piece 20) as needed to line up the workpiece with the router bit. See page 42 for more details on general set-up and use. For surfacing operations, make the cuts in a series of light, skimming passes to keep from overloading the router and bit. Use a wide, carbide-tipped straight bit for this work. Since the router is captured in the jig, feed direction doesn't really matter. When you're done, hang the jig on your shop wall, using the holddowns to secure the sled in place.

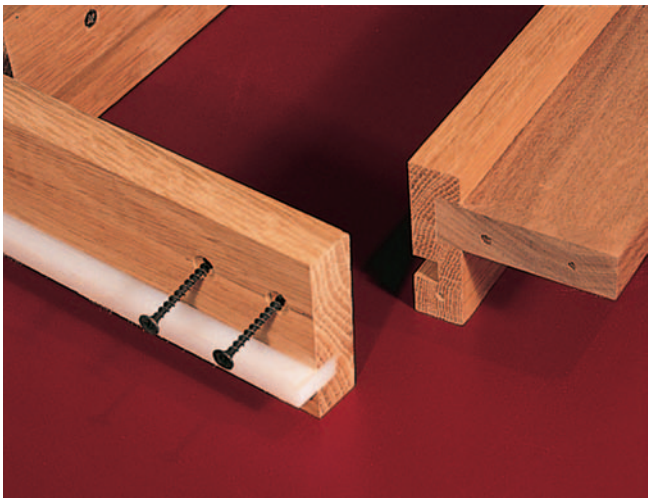
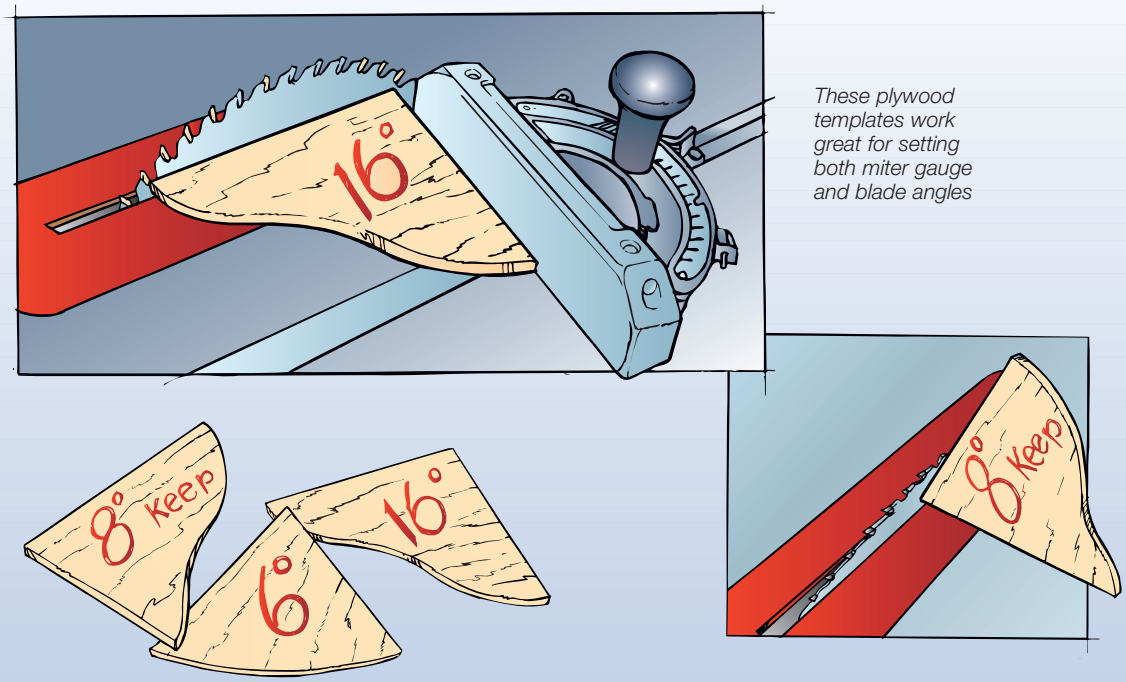


Figure 6: *The router sled rides on plastic glides made from UHMW, a self-lubricating material.*

QuickTip



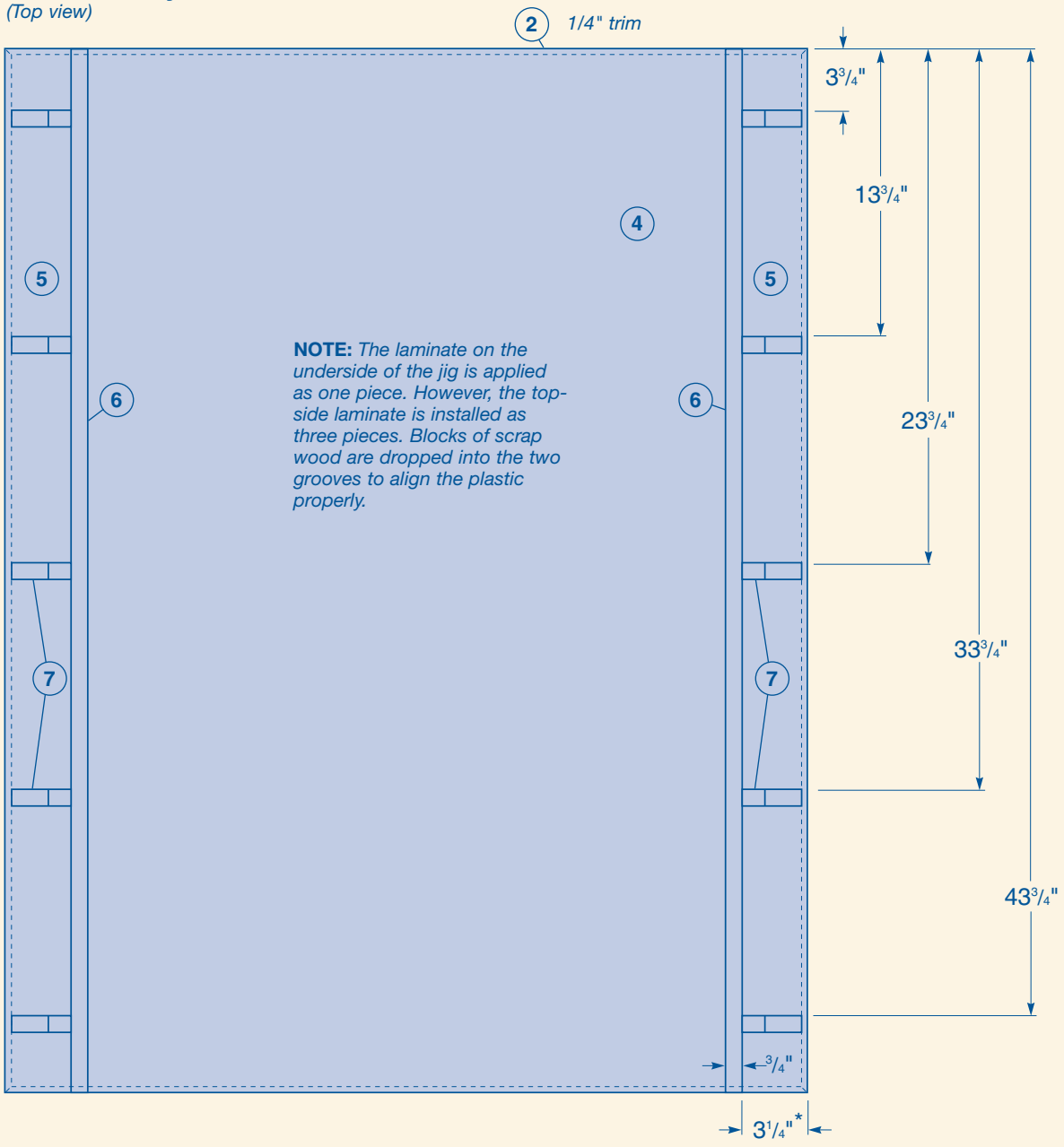
These plywood templates work great for setting both miter gauge and blade angles

Gauges for Setting Up Saw Angles

Rather than look for a protractor or T-bevel, or trust the arrow indicators on your miter and bevel gauges, make a set of setup gauges for quick and reliable reference. 1/4" plywood works fine for this purpose. Keep them close to your table saw and miter saw for setting up angles as well as cutting pentagons, hexagons, octagons and even segmented bowls.

Base Assembly

(Top view)

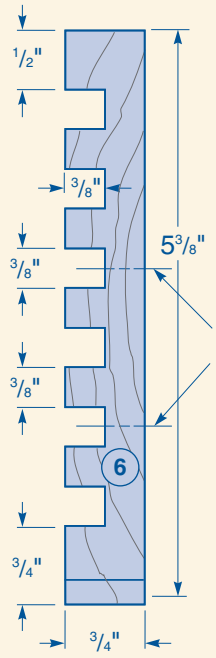


NOTE: *The laminate on the underside of the jig is applied as one piece. However, the top-side laminate is installed as three pieces. Blocks of scrap wood are dropped into the two grooves to align the plastic properly.*

If you cut these grooves on the table saw, make sure you keep the same edge against the fence for both cuts in order to ensure the grooves are parallel.

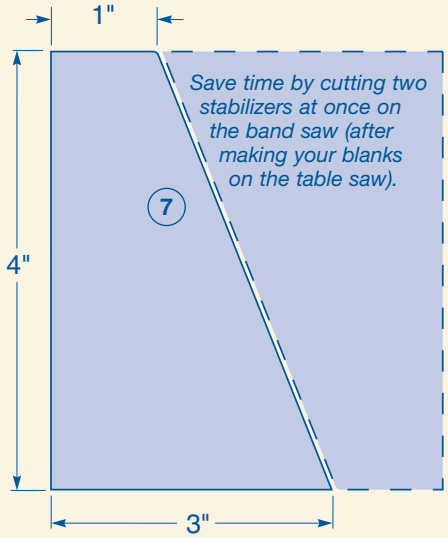
**Make the groove 3" in from edge of the MDF, then apply 1/4" hardwood trim to protect the laminated edge.*

Base Runner
(End view)



Countersink and pre-drill to secure the base runner to the stabilizer.

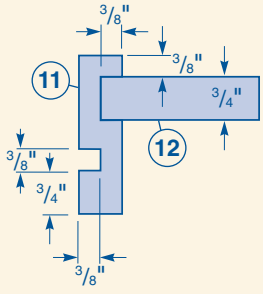
Stabilizer
(Side view)



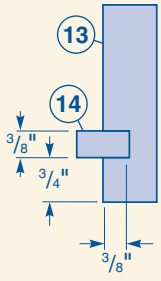
Save time by cutting two stabilizers at once on the band saw (after making your blanks on the table saw).

The stabilizers are screwed to the base from the bottom with 1⅝" sheetrock screws, countersunk and pre-drilled.

Sled Runner & Brace
(End view)

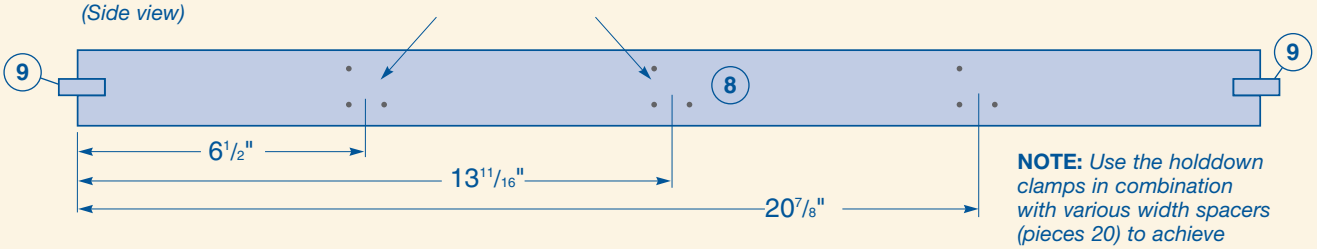


Sled End Cap & Guides
(End view)



Holddown Beam
(Side view)

Suggested clamp locations (3 screws per clamp).



NOTE: *Use the holddown clamps in combination with various width spacers (pieces 20) to achieve unlimited holddown options.*