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Custom Router Table



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Custom Router Table

There's no better fixture you can build or buy for your router than a router table. It turns your handheld router into a makeshift shaper and expands the range of joints and moldings you can make. There are easier paths to a router table than this one, but our design provides maximum versatility, convenience and storage space—all on wheels.



After reviewing numerous router table designs, we took the best features from each to create our customized version. Key concerns were accuracy, easy access, and tool and bit storage.

Next to a table saw, we consider a quality router table to be the next most important piece of shop equipment a woodworker can own. Aside from its joint-making and profiling capabilities, a router table can serve as a jointer if you don't have one. It also makes a hand-held router safer to use for milling small, narrow or odd-shaped workpieces.

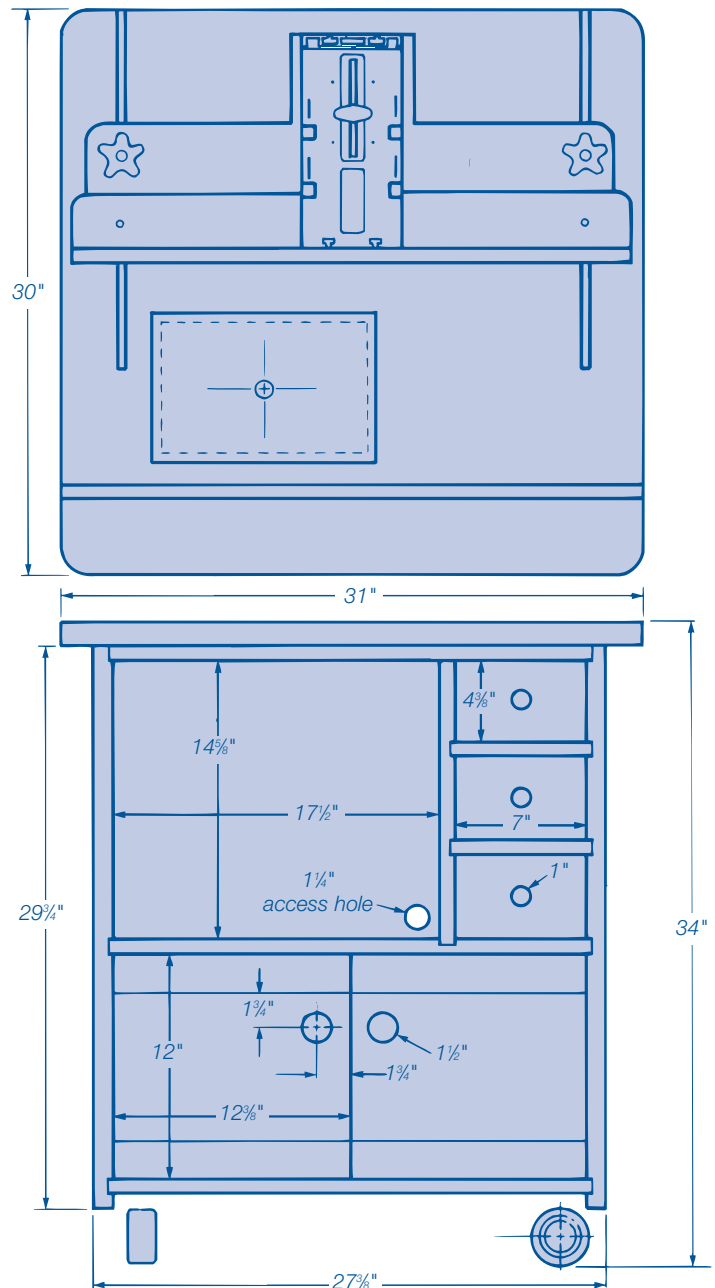
Designing a router table involves two challenging requirements, and our group of woodworking experts has come up with very good solutions. The first challenge is making the router easily accessible for exchanging bits or adjusting their height. On our cabinet the router can be removed through the table top for major alterations or adjusted from the front for raising and lowering the bits. The second hurdle is designing a fence that works for every possible routing operation. Our system begins with a conventional fence that adjusts quickly for general routing. With the addition of an Inkra jig attachment, the fence system offers precise, incremental adjustments for routing perfect dovetail joints, finger joints or flutes.

Several other minor considerations must also be met. In our shop, tools need to be mobile, so we put wheels on the router cabinet to get it out of the way when it's not needed. The drawers provide storage space for router bits and accessories, and the lower cupboard shelters power tools from all the dust in the shop. The addition of an electrical strip on the right side of the cabinet is a handy feature that provides

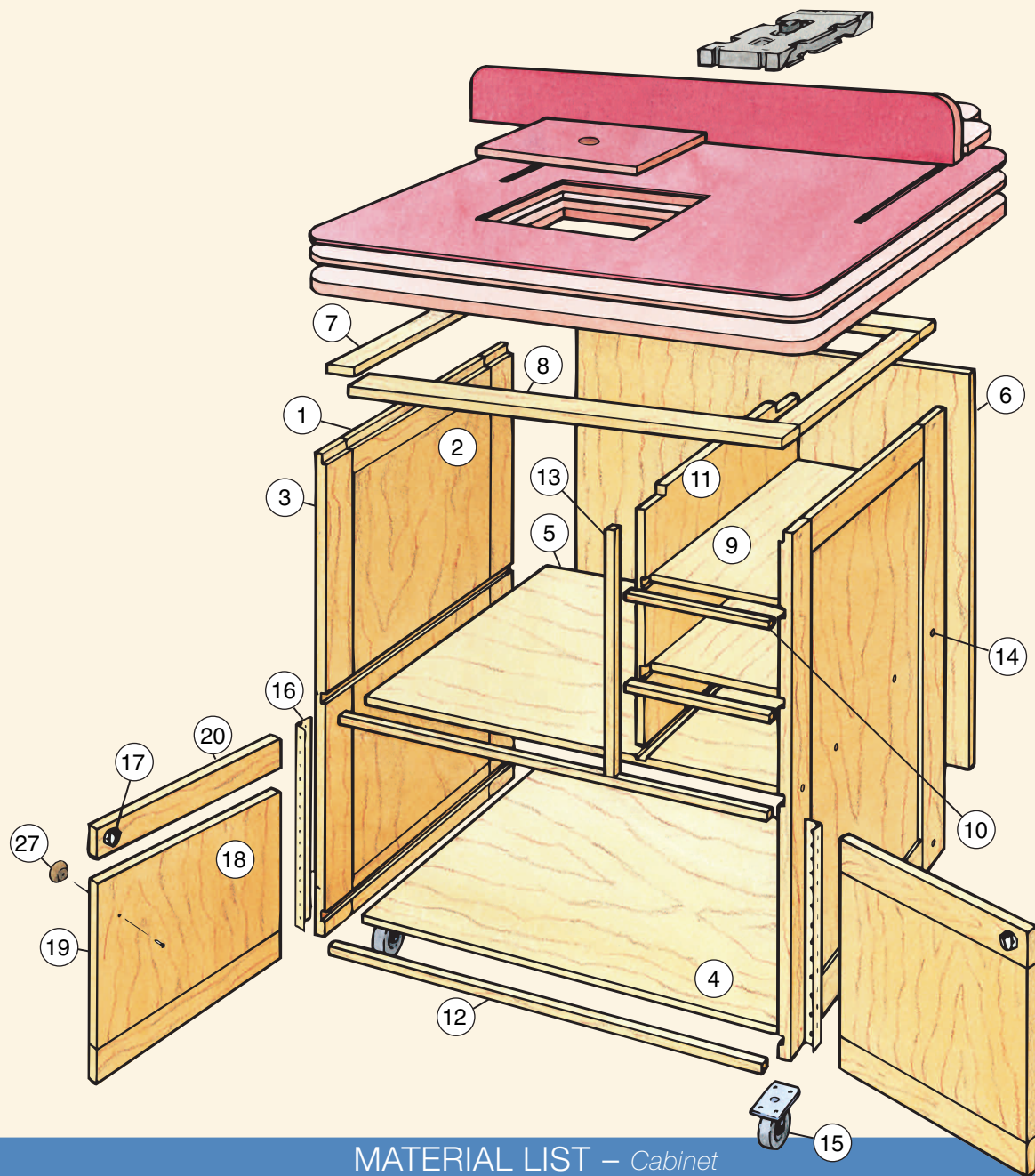
easy access to the on/off switch.

We built this router cabinet from white oak, using a half sheet of 3/4" plywood, 11 board feet of 1 1/8"-thick solid stock and 4 board feet of 3/4"-thick material. Making the top requires a half sheet of 1/2"-thick baltic birch plywood and another half sheet of 3/4"

baltic birch plywood. In addition to the lumber and plywood, we used a piece of plastic laminate to cover the router table surface for improved durability and a roll of oak iron-on edgbanding to cover the exposed plywood edges.



Router Table Exploded View

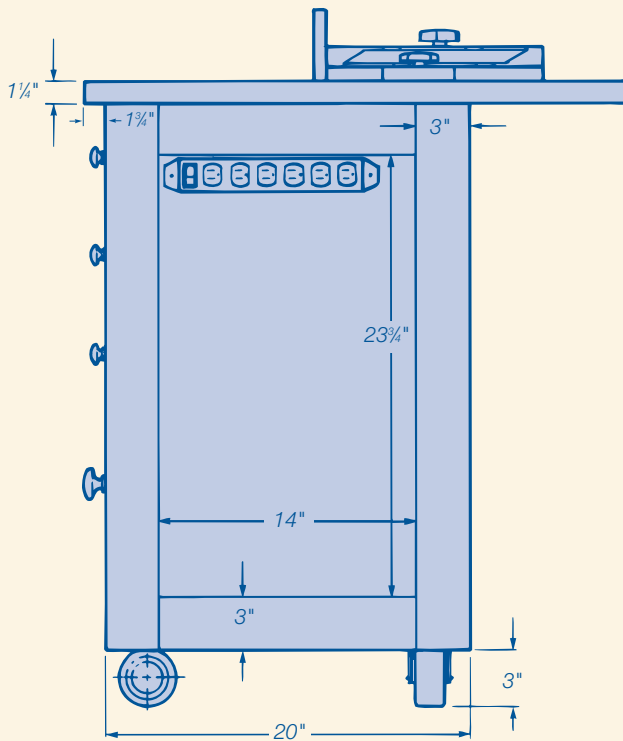


MATERIAL LIST – Cabinet

	T x W x L		T x W x L		
1	Side Wall Rails (4)	1 1/6" x 3" x 14"	10	Drawer Divider Banding (2)	3/4" x 3/4" x 7 1/2"
2	Side Wall Panels (2)*	3/4" x 14" x 2 3/4"	11	Upper Section Divider (1)*	3/4" x 19" x 15 5/8"
3	Side Wall Stiles (4)	1 1/6" x 3" x 29 3/4"	12	Shelf Banding (2)	3/4" x 3/4" x 25 3/4"
4	Bottom Shelf (1)*	3/4" x 19" x 25 3/4"	13	Upper Divider Banding (1)	3/4" x 3/4" x 15 3/4"
5	Center Shelf (1)*	3/4" x 19" x 25 3/4"	14	Walnut Plugs (24)	3/8" Diameter
6	Back Panel (1)*	1/4" x 25 3/4" x 29"	15	Casters (4)	2 Swiveling & 2 Fixed
7	Web Frame Rails (2)	3/4" x 2 1/2" x 14 3/4"	16	Piano Hinge (2)	1 1/4" x 12"
8	Web Frame Stiles (2)	3/4" x 2 1/2" x 25 3/4"	17	Door Catches (2)	White Plastic
9	Drawer Dividers (2)*	3/4" x 7 1/2" x 19"			

* Plywood

Technical Drawings



Building the Cabinet

Begin constructing the router table by making the frame and panel sides. You'll want to continually refer to the *Drawings* while building the router cabinet, as they detail all the parts and joint locations. The two side walls are made of 3/4" plywood surrounded by 1 1/8"-thick solid-oak frames. Cut the frame rails (pieces 1) and plywood panels (pieces 2) to size and rout one edge of the rails with a 1/4" roundover bit. Join the rails to the plywood with biscuits as shown in the *Figure 1*, next page. Now cut the stiles (pieces 3) to match the overall length of the panels. Hold the stiles up to the panels and mark the points where the frame pieces intersect, then rout the length of the edge between the marks with the roundover bit. Join the stiles to the panels with biscuits.

After the two side walls are constructed, lay them on their faces and

mark the dado and rabbet locations shown on page 32. The dados and rabbets are all 3/4" wide and 1/4" deep. In the left side wall, rout two dados—one for the bottom shelf (piece 4) joint and one for the center shelf (piece 5) joint—and rout a rabbet along the top inside edge for securing the web frame (pieces 7 and 8). The right side wall requires dados for the bottom shelf joint, the center shelf joint and the two drawer dividers (pieces 9) as well as the top rabbet. Use a straightedge jig such as the one shown in *Figure 2* to guide the router while cutting the dados and rabbets. Also, while the panels are still laying face down, rout a 3/8"-deep by 1/4"-wide rabbet along the back edge of each side wall for installing the back (piece 6) later.

The web frame, which secures the router table to the cabinet, is made of four pieces. Rip and crosscut the two

rails (pieces 7) and the two stiles (pieces 8) to size, then join the frame together using the biscuit joiner and your smallest size biscuits.

Rip 3/4"-thick plywood for the bottom shelf, the center shelf and the upper section divider (piece 11) all at the same time, then crosscut the pieces to length. Glue on the solid-wood banding (pieces 12 and 13). Now cut the two drawer dividers (pieces 9) to size and band their front edges with solid wood (pieces 10).

Next, rout the 3/4"-wide by 1/4"-deep dado in the center shelf for securing the upper section divider. The same size dados must also be routed into the upper section divider for the drawer dividers, as shown in *Figure 1*. Finish up on this piece by cutting notches out of the upper corners so that it fits around the web frame stiles.

All the shelf dado joints in the side walls are reinforced with screws. To accurately drill the pilot holes for these #8-2" wood screws, first dry-assemble the cabinet, then draw the three lines on the outside face of each side wall to indicate the center of each dado or rabbet. One hole is centered on each stile and two more are spaced on the panel. Drill 3/8"-diameter by 5/16"-deep counterbores for the plugs and follow the counterbores with a 5/32"-diameter bit for drilling the 2"-deep pilot holes.

One operation that you definitely should perform now rather than after the cabinet is assembled is drilling the pilot holes for the Blum drawer slides (pieces 28). Set the Blum slides 13/16" back from the front edge of the right side wall and the upper section divider to allow for the inset drawer fronts, and position the slides directly above each drawer divider dado. Use an awl to mark the screw locations and then drill the pilot holes with a 1/8"-diameter bit.

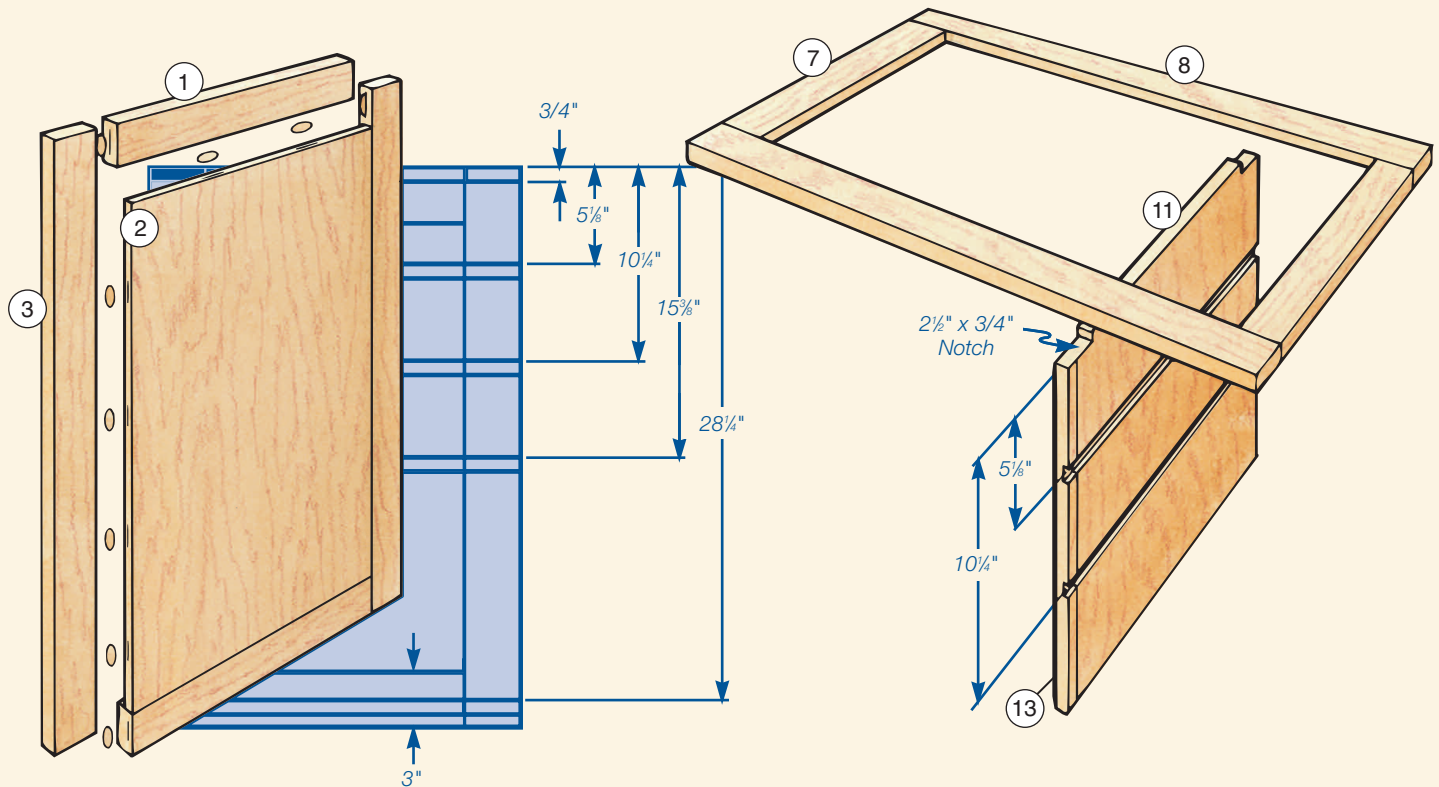


Figure 1: Side view (left) and top web frame with upper section divider (right).

Disassemble the cabinet and spread glue in the side wall dadoes for the bottom shelf and the center shelf. Pull these four pieces together once again and drive the sixteen screws into place. Now spread more glue in the center shelf dado, the two dadoes in the upper section divider and in the two remaining dadoes in the right side wall. Slip the upper section divider into the center shelf dado, then set the lower drawer divider in place, followed by the upper drawer divider, and slowly pull the assembly together.

Wrap up the carcass assembly by applying glue to the rabbets on the side walls and drop in the web frame, slipping it over the upper section divider.

Fasten the walls to the web frame with #8-2" screws, and drill countersunk 5/32" pilot holes through the web frame into the upper section divider. Secure the joints with #8-2" screws. Lastly, glue walnut plugs (pieces 14) into the counterbored holes in the side walls, and sand them flush when the glue dries.

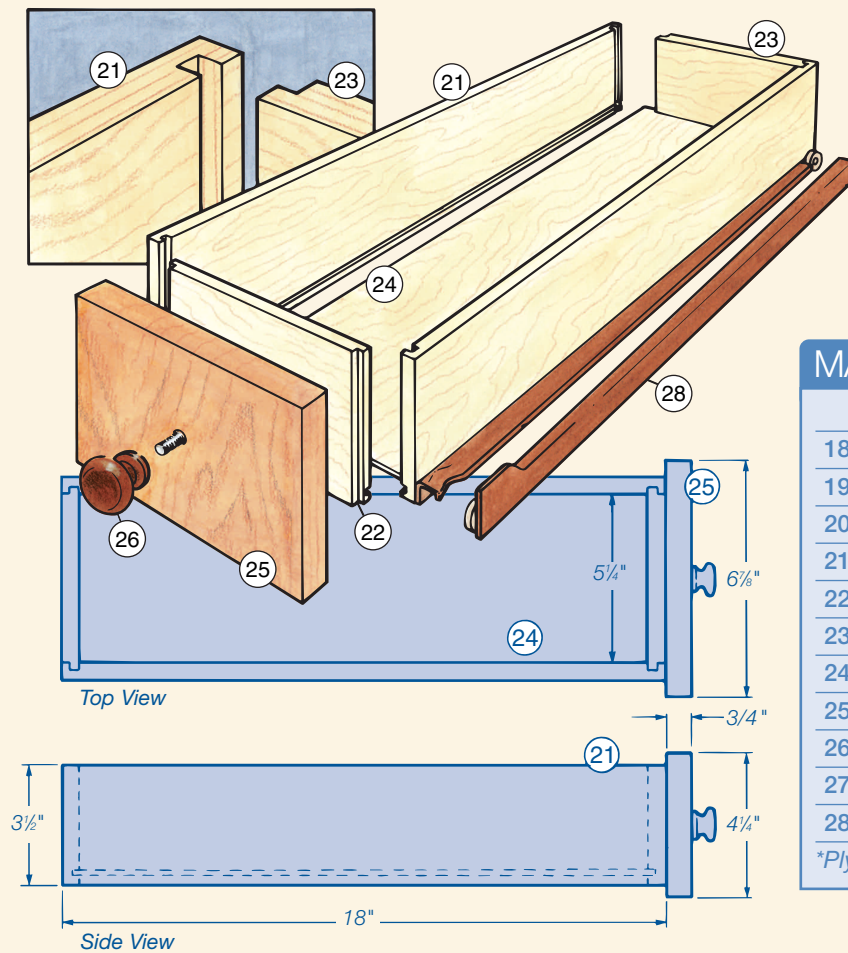
Making Drawers and Doors

The cabinet doors are made from 3/4" plywood (pieces 18) banded on their vertical edges with 3/4" by 1/2" banding (pieces 19) and trimmed on the top and bottom edges with rails (pieces 20). Regularly refer to the *Exploded Views* of the doors and drawers throughout this section of the project.

Cut the plywood pieces to size, then glue on the banding strips. Now cut the rails and join them to the plywood with biscuits.

The drawers are made with a simple, durable joint. Cut the 1/2"-thick plywood drawer sides (pieces 21), fronts (pieces 22) and backs (pieces 23) to the sizes shown in the *Material List*. Next, install a dado blade in the table saw and set it to cut 1/4"-wide by 1/4"-deep grooves. Clamp a spacer block onto the table saw's rip fence and, using a miter gauge, pass the drawer sides over the blade to cut dadoes 1/4" from the each end.

Move the rip fence to align the edge of the spacer block with the dado



MATERIAL LIST – Doors & Drawers

	T x W x L
18 Door Panels (2)*	3/4" x 11 3/8" x 9"
19 Door Banding (4)	3/4" x 1/2" x 9"
20 Door Rails (4)	3/4" x 2" x 12 3/8"
21 Drawer Sides (6)*	1/2" x 3 1/2" x 18"
22 Drawer Fronts (3)*	1/2" x 3 1/2" x 5 1/2"
23 Drawer Backs (3)*	1/2" x 3 1/2" x 5 1/2"
24 Drawer Bottoms (3)*	1/4" x 5 1/2" x 17 1/2"
25 Drawer Faces (3)	3/4" x 4 1/4" x 6 7/8"
26 Drawer Knobs (3)	1" Dia.
27 Door Knobs (3)	1/2" Dia.
28 Drawer Slides (3)	18" (Blum)

*Plywood

blade and make the 1/4"-wide by 1/4"-thick tongues at the ends of the front and back pieces to fit into the dadoes in the drawer sides. Readjust the blade to cut a 7/32" dado and move the rip fence 1/4" away from the blade (remove the spacer block). Cut a dado on the inside face of all the drawer pieces for holding the bottoms in place. Cut the drawer bottoms (pieces 24) to size and dry-assemble the three units. Once the fit is satisfactory, glue the drawer parts together and sand them thoroughly.

The drawer faces (pieces 25) are made from solid oak and are cut to fit the drawer openings with a 1/16" gap all around. Cut this stock and attach it to the drawer fronts from the inside with a couple of #8-1" screws. With the drawers and the doors completed, drill the holes for attaching the knobs (pieces 26 and 27). You'll need to counterbore the drawer fronts to allow the knob screws to bridge the combined thickness of the front and face. Mount the doors to the cabinet with surface-mounted piano hinges (piece 16) and



Figure 2: To make this straightedge jig, fasten a straight, narrow board to an oversized piece of hardboard, then rout the edge of the jig with the router and bit you intend to use for the dado. Next, align and clamp the edge of the jig with the layout line and rout the dado.

screw the door's roller catches (pieces 17) in place. As usual, the back panel (piece 6) is the last piece to make for the cabinet. Cut this out of 1/4" plywood, but don't nail it onto the cabinet until after the top is attached.

Building the Table Top

The table top is made with two layers of plywood, which accommodate the two tracks for the fence system and give the table as much vibration resistance and stiffness as possible. The top of the table is covered in plastic laminate, providing a slick surface to slide the stock over and making it easy to clear off wood chips and dust. While building the table top, continually refer to the *Exploded View Drawing* on the next page, as it lays out all the details for constructing the top and the fence.

The first step in constructing the table is to cut a piece for the top (piece 29) to the shape shown in the *Top View* from 1/2"-thick baltic birch plywood, and make another piece in the same shape from 3/4" baltic birch plywood for the sub-top (piece 30). Clamp the two pieces together and sand all the edges smooth. Use a jigsaw to cut 1 1/2" corner radiuses, and sand the four corners smooth.

Take the clamps off the plywood and set the top aside for the moment. Chuck a 3/4" mortising bit in the router and attach an edge guide. Now, rout 7/16"-deep fence adjustment tracks in the sub-top, following the positions shown in the *Drawing*. Once the grooves are routed, lay out the rectangular insert area as shown in the *Drawing* and drill a 1/2"-diameter hole at the inside of each corner. Use a jigsaw to cut out the insert area, then sand the edge of the hole smooth. Drill the pilot holes for the 1/4" threaded inserts at both ends of the opening as

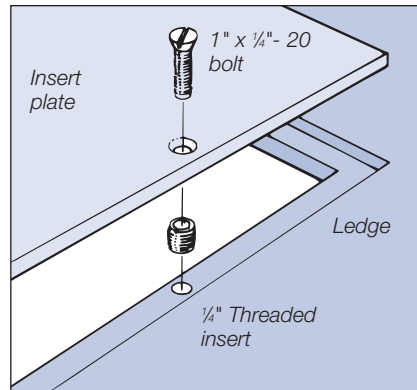


Figure 3: Use 1/4"-20 threaded inserts and 1"-long bolts to hold the interchangeable insert plates in place.

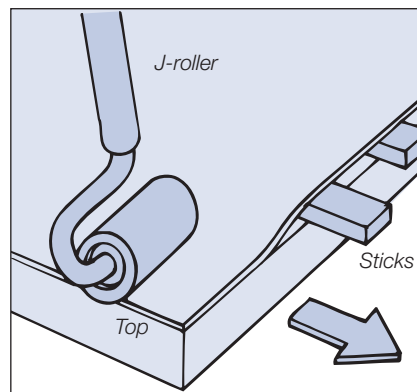


Figure 4: Position the laminate, then remove the sticks one at a time, rolling the laminate down as you go.

shown in *Figure 3*.

Before gluing the two top pieces together, cut the rectangular insert area out of the top piece of baltic birch plywood. You'll notice that the hole in the top is larger than the hole in the sub-top. The difference in the two holes creates a sturdy ledge to support the insert plates and the router.

Liberal spread glue over the sub-top, keeping it at least 1/2" back from the fence adjustment track dados, and lay the top onto the sub-top. Clamp the two pieces together, making sure the edges line up perfectly, and let the glue dry overnight. The next day, clean up

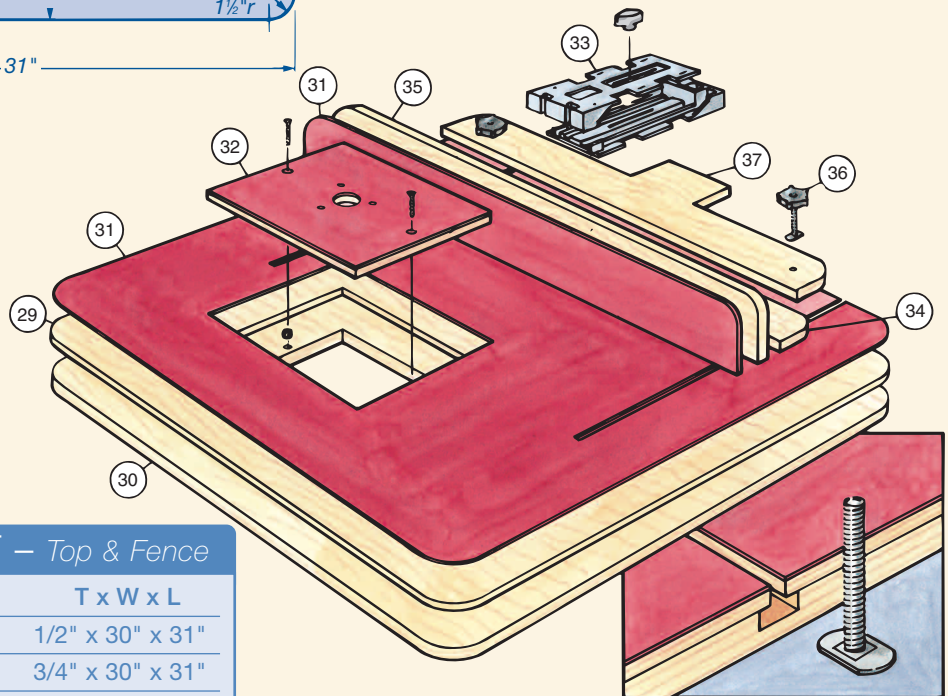
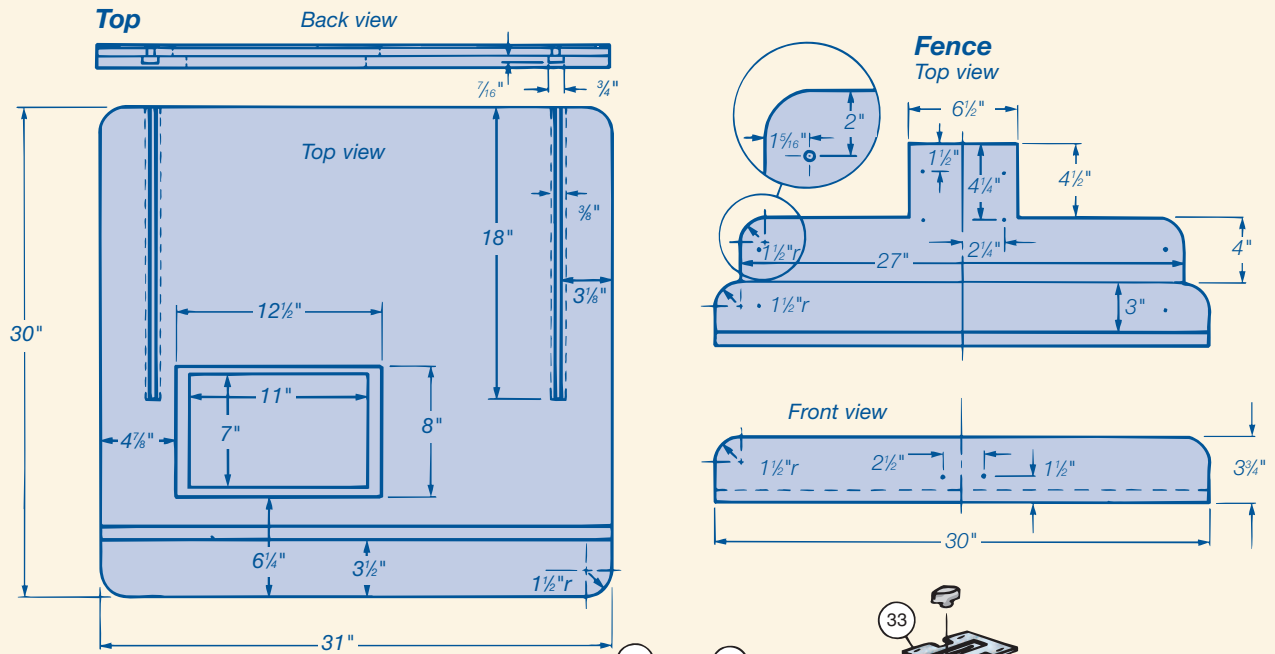
any glue squeeze-out and apply iron-on veneer edging to the table's edges.

Cover the surface of the top with plastic laminate, which is easy material to work with if you take your time and position it carefully. Cut a piece of laminate (piece 31) about one inch larger than the top all the way around and lay it upside down on your workbench. Clean the plywood and the bottom of the laminate thoroughly, removing sawdust or particles of any kind. Apply an even coat of non-flammable contact cement to both surfaces and let it dry, which usually takes about 20 minutes. After the first coat is dry, apply a second coat and let it dry. Now lay about eight narrow sticks across the table top and set the laminate on top of the sticks (see *Figure 4*). The sticks enable you to situate the laminate on the table before the two pieces meet and permanently bond.

Begin removing the stickers at one end of the top and press the laminate against the surface of the plywood. Use a J-roller to press the laminate down once the surfaces are making contact, but avoid rolling the unsupported insert plate area to prevent cracking the laminate. Once you've applied pressure to all points on the table's surface, trim any laminate overhanging the top with your router and a piloted flush-cutting bit. Also, drill a 1/2" starter hole through the laminate near one inside corner of the insert plate area, then run the router around the rectangular opening to uncover the hole.

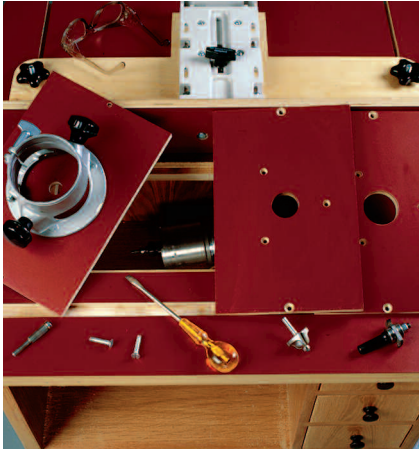
The insert plates are laminated on both sides, making them thicker than the top by 1/16". As a result, the insert area's ledge must be lowered for the top surface to be even. Chuck a piloted straight bit in your router and, following the upper edge of the insert area, lower the ledge on the sub-top by 1/16".

Table Top Exploded View



MATERIAL LIST – Top & Fence

	T x W x L
29 Top (1)*	1/2" x 30" x 31"
30 Sub-Top (1)*	3/4" x 30" x 31"
31 Plastic Laminate (1)	1/16" x 48" x 48"
32 Insert Plates (3)*	1/2" x 8" x 12 1/2"
33 Inkra Jig (1)	
34 Fence Base (1)*	3/4" x 3" x 30"
35 Fence Front (1)*	3/4" x 4" x 30"
36 Clamping Knobs (2)	3/8" Threaded
37 Inkra Jig Platform (1)*	3/4" x 8 1/2" x 27"



Our router table is full of convenient features that make it a more efficient shop tool. Ample storage space in the drawers and cupboard provides room for routers, bits and other accessories; the interchangeable insert plates accommodate a wide range of router bit sizes; and the fence system adjusts mechanically or the old-fashioned way—with a quick tap of the hand at one end.

Square up each corner of the insert area where the router bit couldn't reach and ease all the laminate edges on the top with a mill file. Install the threaded inserts in the pilot holes at both ends of the insert plate area.

Now put a 3/8" straight bit in your router and rout the fence adjustment tracks into the top (see *Top View Drawing*, page 35). Use an edge guide attachment on your router base to follow the top's side edges, routing the slot through the entire 1/2"-thick plywood, centered on the 3/4" adjustment track in the sub-top.

Rout the miter gauge slot, using a straightedge guide as you did for the dadoes on the side walls. We use our Delta Unisaw's miter gauge for the router table, so we cut the slot to match. You should likewise size your miter gauge slot to fit your tablesaw's equipment.

Before moving on to construct the fence, laminate both sides of some extra 1/2" plywood to make three insert plates (pieces 32). Don't try to get by with laminating only one side of the plywood, as this will cause an unbalanced

moisture exchange between the laminated side and the uncovered surface, resulting in warped insert plates. Cut the laminated plywood to fit the insert hole snugly, then mark the center of each insert, at which point you should drill a one-inch hole in the first insert, a 1½" hole in the second, and a 2" hole in the third. Be sure to ease all laminate edges with a mill file, otherwise it easily cuts up your hands. When operating the router table, choose the most appropriate insert for the bit you intend to use, and make more inserts with different hole sizes if you need them. Drill 1/4" pilot holes at either end of the inserts for securing the plates to the table. Countersink the holes so the head of the bolt sits below the laminate surface and screw one of the plates into place with 1"-long, 1/4"-20 bolts.

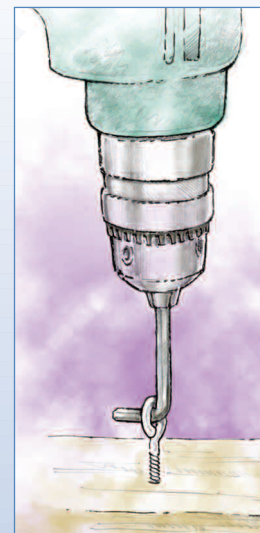
Building the Fence

The heart of the fence system is an Inkra jig (piece 33), which excels at making incremental adjustments for repetitive cuts. This is a great device, but it isn't always needed for general router work, so we made it easy to

remove. When the jig is disconnected the fence can move freely over greater distances.

Begin constructing the fence by making the main L-bracket from 3/4" plywood, first cutting the base (piece 34) and then the fence front (piece 35). Cut the back corners of the base to a 3" diameter as shown in the *Fence Drawing* on page 35. Laminate the fence front and drill the series of countersunk holes for screwing the front to the base. There's no need to laminate the back side of the fence front as it is restrained from warping by the base connection. Also, drill the counterbored

QuickTip



Power-Driving Screw Eyes

Instead of twisting screw eyes in by hand, drill a pilot hole, insert the short leg of an Allen wrench in the eye of the screw, and chuck the other end in your drill. Set the clutch at its lowest torque and use a slow speed to drive the screw home.

bolt holes to secure the Inkra jig to the front. Screw the front to the base and drill a hole at each end of the base to install the clamping knobs (pieces 36) and T-bolts.

We made the two adjustment track T-bolts from standard hardware store stock. Take two 3/8" inside diameter fender washers and file the hole to fit around the square nut area of a 3/8"-diameter by 2½"-long carriage bolt. Use five-minute epoxy to permanently glue the washers onto the bolt. Now use a hacksaw to cut two sides of the washers flush with the head of the carriage bolt and file or grind these edges smooth. Insert the T-bolts into the fence adjustment tracks, set the fence assembly onto the bolts and thread the clamping knobs into place.

The Inkra jig platform (piece 37) is made from 3/4" plywood and has two 3/8"-diameter holes for securing the platform to the router table tracks. The other four holes shown in the *Drawing* hold the jig to the platform and need to be countersunk. Drill the 1/4"-diameter holes and countersink each one on the underside of the platform. Insert 1/4"-diameter flathead bolts through the platform, and set the Inkra jig onto the bolts. Secure the assembly with four hex nuts.

To mount the Inkra jig, first undo the clamping knobs from the T-bolts and remove the fence. Now set the Inkra jig platform onto the T-bolts and thread on the clamping knobs. Butt the fence into the front of the Inkra jig and insert two 1/4"-diameter by 1½"-long flathead bolts through the fence front's holes and into the Inkra jigs' mounting slots. Thread the hex nuts on firmly. Move the fence into position and tighten the clamping knobs. Now release the Inkra jig knob to maneuver the fence into position.



Completing the Final Details

Set the router table top on the cabinet and square the two pieces to each other. Now drill a number of 5/32" holes up through the web frame into the top for #8-1½" screws, making sure to stay clear of the tracks. Countersink these pilot holes and secure the cabinet to the top.

Disassemble all the parts of the router cabinet and the table and apply a durable finish to all the wood surfaces. Once the finishing is dry, drill four 1/4" holes in each corner of the bottom shelf for the carriage bolts that mount the casters (pieces 15) under the cabinet. Install the swiveling casters near the back edge of the cabinet and the stationary casters along the front edge. We mounted an electrical outlet strip to the outside right wall and drilled a 1"

access hole in the back panel for the router's cord. Put all the doors and drawers into the cabinet and nail on the back panel. Mount your router housing to an insert plate, then install the router motor in the housing. Now set the assembly into the insert hole in the table and secure the plate.

Constructing the router table takes thirty hours and costs about \$350 in materials, depending on the wood you choose. There really isn't a particularly difficult technique or assembly involved in building this project, but pay close attention to the layout measurements. Following the small details will make your router table more accurate and result in greater returns for your time and investment.