Router Super Station

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Please use this set of plans as a guide only.

The intended audience for this guide is a moderate to highly experienced woodworker enthusiast. In this context, I do not provide detailed construction details such as how to cut a rabbet, because the assumption is that anyone considering this kind of project already possesses basic skills.

I encourage you to design your own cabinet, rather than making a copy of this one. You should think of this guide as a catalyst to get you started thinking about building your own system. In the end, I want you to put your name on the project, so please modify this design to meet your needs.

As a woodworking hobbyist, I have used several router tables over the years; including those $100 all-metal stands you see at the Home Improvement stores, as well as home-made tables such as those shown in figure 1. In every case I found shortcomings; they were either too small, did not have an adequate fencing system, or they just did not have the required rigidity. The aluminum tops were among the worst; sometimes they would vibrate wildly or scratch the work piece.

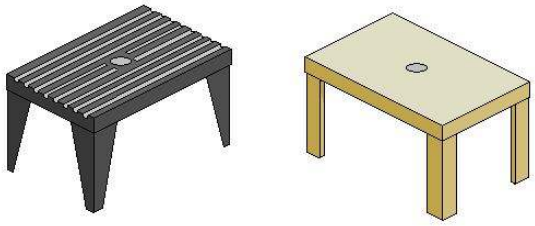


Figure 1

So my router table sat in the corner of my workshop, largely unused. Then one day, after watching Norm Abram (PBS: New Yankee Workshop) build his own router table one day; it got me to thinking; I need a new table.

What is a Super Station, and how does it differ from a regular router table? A router table as shown in figure 1 above might allow you to do some basic edge shaping, but a router system would do much more. Rather than just attaching a router to a board, there would be some thought to ensure all of the sub-parts complemented each other. A system should:

- Have a large and accurate flat top.
- Rock-solid rigid unit.
- Be powerful enough to swing the largest router bits.
- Include a high-end fencing system that would allow complex joinery.
- Support provision in the fencing system to machine all surfaces of a board.
- Include a high-end router lift for above-the-table bit changes and precision depth adjustment.
- Include a dust collection system.
- Organize and protect expensive router bits, tools, jigs, and other adapters typically used with routers.
- Provide basic electrical devices, such as a remote on/off switch.
- Provide a comfortable standing height.

This is not an inexpensive approach, and will cost multiples of a simple router table. But when put into perspective, the costs need to be balanced. For instance, when considering a $350 fencing system, you do not want to match it to a cheap router table top, because the accuracy you paid for in the fencing system would be lost on a cheap top. To ensure and maintain the fencing system accuracy, you need a top that is flat and true so that the fencing accuracy is maintained.

Please note that I am not endorsing any manufacturer or product.

When I show a particular item, my "brand endorsement" consists of simply using that particular product in the project.

I have no affiliation with any manufacturer. I made the choices simply because I liked the features of a product, it fit into my budget, or was easy to obtain. If I seem to favor a particular brand, it's only by coincidence. Competitive products may work equally as well, or better then my choices.

TOP CONSTRUCTION. Really, the first issue to be determined is whether to make or purchase a commercial top. There are many choices here; materials that are commonly used for tops are metal, plywood, Medium Density Fiberboard (MDF), Phenolic (i.e. Formica), or a combination of these materials in a lamination. I considered building my own top as is common with shop-built router systems. However, I reasoned that the router system would only be as good as the table is flat, which lead me to purchase a commercially made top.

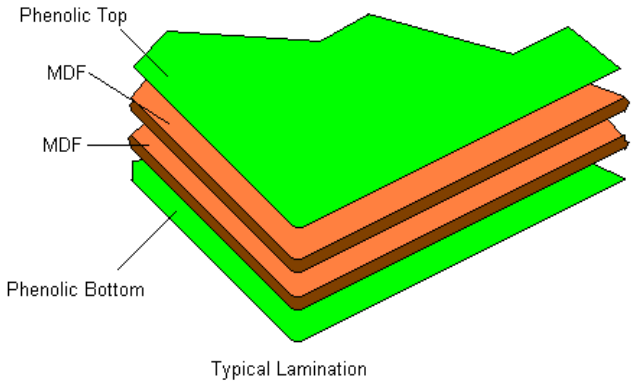


Figure 2

A good top is usually thicker than common ¾ sheet goods, and is typically laminated with two pieces of sheet goods to obtain the desired thickness. Laminating a sizeable top and keeping it flat may be a difficult task. A typical top lamination as shown in figure 2 would include two pieces of ½ to ¾ MDF with Phenolic on the top and bottom for protection. Other tops might be made of solid Phenolic, ¾ or thicker.

Looking at the big picture, I would have saved about $75 by laminating my own top. Compared with the total cost of the router system, saving $75 on a top that may or may not be flat didn't seem to justify the risk. I could end up with an expensive piece of junk. Since a flat top is the foundation of which everything else is built upon, any error here would be carried over to the router lift and fencing system.

There are many pre-made tops that are commercially available, and I liked one top in particular made by Woodpecker's Inc. It has a rather large 27 x 43-inch surface and an offset router opening, which met my needs for a large top. And the offset opening means I can easily an Incra style fencing system.

I was impressed that the top is constructed with a lamination of two 5/8in MDF slabs in a 50-ton press; along with a top and bottom of phenolic; then heat-treated for 4 hours. They even use specialized glue that ensures there are no thick spots or "clumps" in the top. Since I don't have a 50-ton press lying around the shop, I purchased a commercial top.

CABINET DESIGN. Since there is no standard size for a router top, the size of the cabinet is obviously going to be dependent on the size of the top. I sized the cabinet to 24 x 40, which means there will be a nice 1½ overhang on each edge. During the cabinet design phase, you must take into account any openings as well as any other obstructions in the table. You do not want to design your cabinet so that you bolt the corner braces to the top directly under a miter slot.

I quickly realized that the design I was developing would allow a storage bin under the router cabinet and 4 drawers to the side. This should provide a lot of storage space for the various little items that seem to be necessary when using a router.

The cabinet consists of rail-and-stile construction, as found in the typical kitchen cabinet. The construction method assumes that this is not the first project being attempted by the woodworker, and it does encourage the use of a pocket-hole jig for the face frame that novices may not be familiar with.

An experienced woodworker might want to use a pocket-hole system; maybe for the first time, or they may want to use a more traditional approach by using dowels, biscuits, or some other method of constructing the face frame.

I have always felt that you should learn something new with every project, so if the budget allows it, I would encourage using a pocket-hole system. The two most popular systems are those made by Kreg and CMT. See the reference section for a link to these devices.

ROUTER AND LIFT. Soon after determining the cabinet and top design, a router, and just as important – the router plate or lift must be determined. There may be some trade-off here as certain lifts may only fit specific routers, so the router and lift selection are somewhat related. The good news is that most plate and lift manufacturers make devices for the more popular routers.

Since this Super Station is going to be very versatile, you will likely be doing difficult and demanding operations on it. For this reason, consideration should be given to purchase at least a 3 horsepower router. A powerful router will allow using larger bits, such as 2" and 3" raised panel bits. When selecting the router, look for the one with the highest Amp rating, because the HP ratings on some routers are a bit misleading.

Two routers that come to mind are the Porter Cable 7518 and the Milwaukee 5625. These are both fixed based routers; are in excess of 3hp, and can be optionally purchased with just the motor rather than the base and accessories. Some lift mechanisms only require the motor, so if you choose this kind of lift, you can save a few dollars by purchasing just the motor.

Regardless of what router you chose, make absolutely sure that it is a variable speed model. It is dangerous to run a large diameter bit at the router's full speed. Many router bit manufacturers provide a recommended speed not to be exceeded.

I chose the Milwaukee 5625 fixed base router for my system. While not as popular as the Porter Cable 7518, it offered more variable speed settings, which I preferred. It also has an integrated "tachometer" that maintains the specified speed under all load conditions.

To plunge or not to plunge? While plunge routers are great for detail work, they are generally not the best choice for a table system, simply because they are rather hard to adjust the depth of cut when mounted upside down inside a cabinet. A fixed-base router, coupled with a lift might be a better choice. However, some plunge routers can also be fitted to a lifting mechanism, so it ends up being a personal choice – dependant on the router you wish to use.

Plate or Lift? A router plate is a flat piece of metal, phenolic, or other material that the router mounts on. This is a fixed system, and you bolt the router directly to the plate. When changing the bit or adjusting the height, you typically have to lift the plate off the table, or reach under the table to do so. The better plates have an adjustment to allow leveling of the plate to the table.

An alternative – albeit an expensive one – is a lift. A typical lift has a built-in cranking mechanism that allows the router height to be adjusted from above the table top, so bit changes do not require lifting the plate from the table. Some of these lifts are down right industrial strength, and should offer years of use. Lifts typically use a jackshaft of some sort. Some lifts may have two or more jackshafts linked with a chain to maintain alignment. Other lifts have motorized lifting mechanisms with digital readouts for precise settings. The selection is almost endless. The reference section includes listings for several lifting mechanisms.

There are other lifting methods available as well, such as an integrated lifting mechanism in some routers. For example, the Milwaukee 5625 router has such a system – but my personal experience is that it is prone to failure from sawdust intrusion, and you are better off purchasing a dedicated lift.

If you are purchasing a top rather than making your own, they are typically machined for a specific manufacturer's plate. However you may be able to purchase a top without a plate cutout, which will allow you to select a different manufacturer's plate or lift mechanism. Many plate and lift manufacturers offer a template to allow you to route your own cutout on the table with a pattern bit.

In keeping with the high-end Super Station idea, I decided to use a lift mechanism, and I chose Woodpecker's Inc UniLift-32 lift. I really liked the industrial grade toughness of this lift, and this particular one has 4 heavy-duty rods for the router to slide on, and two jackshafts connected via chain for the lifting mechanism.

The jackshafts for the Unilift can be ordered with either a 1/16 change in depth per revolution or 1/32 change in depth. I opted for the 1/32 model, but it does take awhile to crank the router depth.

The Unilift mechanism has pre-machined bolt patterns for many different routers, including the Milwaukee 5625. The advantage here is that if I ever change routers, I can keep the lift. The lift also can be purchased with a blank router plate that will allow you to mount virtually any router. The lift mechanism also includes a brake to prevent the jackshafts from changing position.

One feature of this plate I absolutely love are the twist-lock rings that come with this lift. A twist-lock ring is a device that fits over the router opening, with a small hole in the center to allow the bit to protrude from under the table. Obviously, due to the various diameters router bits have, a set of rings with differing hole diameters are desirable. By choosing the proper ring for the router bit, additional support for the work piece is provided. While most manufacturers make a few rings, the Unilift comes with 3 rings, and you can purchase several other sizes as well from the manufacturer.

Another necessary feature for a lift/plate is a starting pin. While most plates include either a pin in the kit – or at least a threaded hole for one, not all plates have this accessory. A starting pin is nothing more than a brass pin that is put into the plate a short distance from the router bit. The use of this pin is to provide a fulcrum point for stabilizing the wood during the initial contact with the spinning bit. This technique results in reduced bit "kickback", thereby resulting in a safer operation, and should always be used whenever possible.

Finally, you may also obtain "bent-wrenches" from several lift manufacturers. A bent-wrench assists in making bit changes above the table. So in reality, the good lifts are really a system, and can be outfitted with twist-lock rings, bent-wrenches, or other accessories. Only your pocketbook is the limiting factor.

Part I – Carcass Assembly

Face Frame Assembly

1

Now is the time to decide how large to make the router cage and optionally the switch plate – if you intend to use a remote switch. The reminder of the face frame will be sized around the router cage and switch plate.

When sizing the router cage, you will want to have the ability to get at least one hand in and behind the router so you can lock the base, adjust the speed, and so on. Otherwise, you may have to pull the router from the base each time you make these adjustments. One trick is to find several sizes of cardboard boxes, place the router in it, and try to adjust the speed, power switch, and other necessary adjustments for your router. This approach will quickly tell you what the ideal size your router cage should be. Your local grocery store can be an excellent source for free cardboard boxes. My cage ended up approximately 16" wide, 12" high, and 24" deep, which should offer plenty of room for just about any router.

2

Figure 3 shows the face frame dimensions I used. I used ¾ x 2" Oak for the face frame, using glue and a pocket-hole fastening system. If you have never used a pocket-hole system, it makes rapid work and quick alignment of the frame, however you can use biscuits, dowel pins, or simple butt joints – whatever you are comfortable with.

I cut the necessary grooves and rabbets before assembly, using a table saw with a dado blade. This eliminated the chance of cutting into a pocket-hole screw.

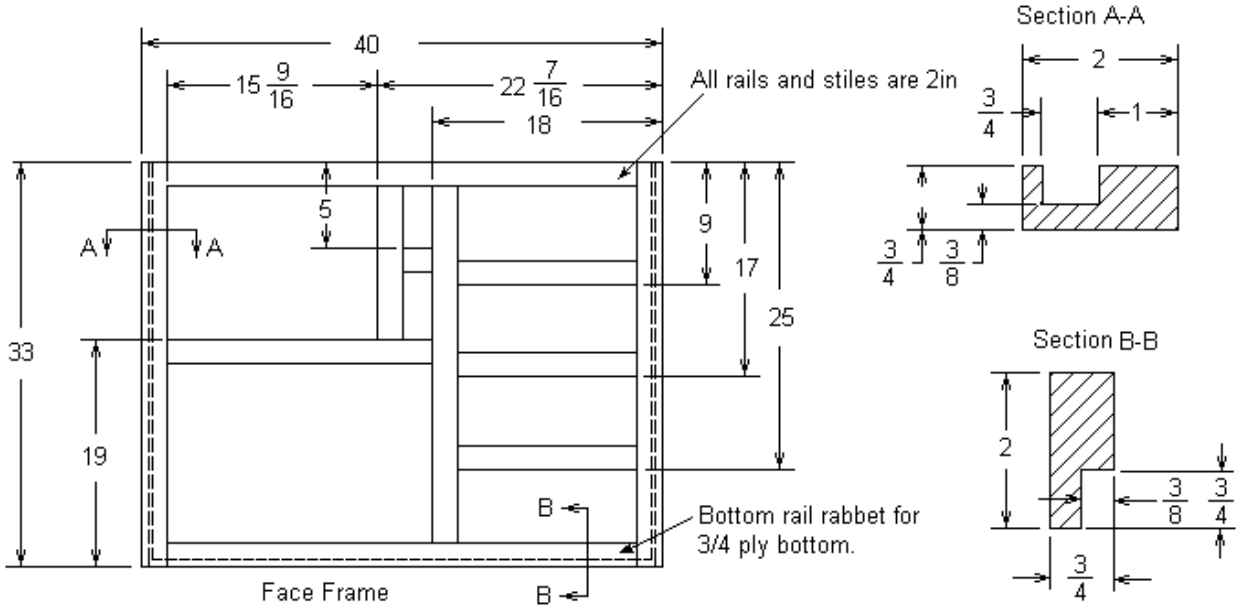


Figure 3

Rear Frame Assembly

3

The rear frame can be assembled with or without pocket-holes as shown in Figure 4. Due to the tight areas where the dados are cut, they could interfere with the pockets, so gluing and clamping should be sufficient here. The prototype used ¾ plywood throughout the frame construction. You can reduce this if you wish.

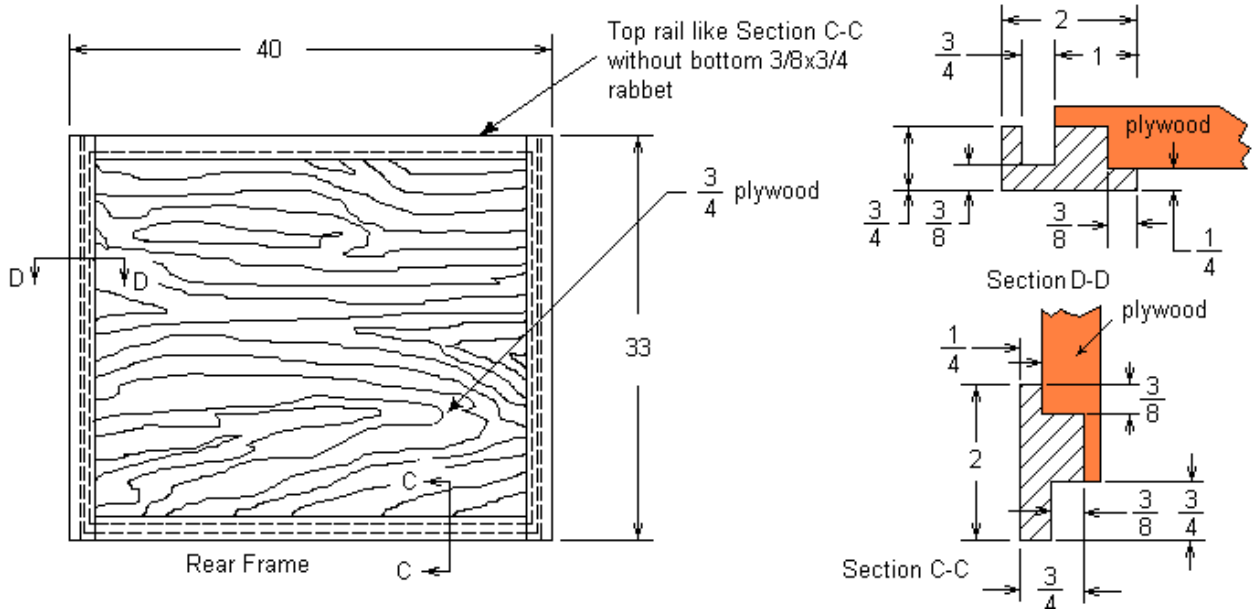


Figure 4

Side Frame Assembly

4

The side frames use 3/4 plywood in the prototype, and this should not be changed, unless you compensate for this with the drawer mounting rail widths. Otherwise, the drawer mounting rails may not be flush with the drawer openings. In reality the side frames should simply consist of a single piece of plywood, with the top and bottom trim strips attached to the OUTSIDE surfaces of the plywood AFTER the carcass has been assembled. These are for aesthetic value only.

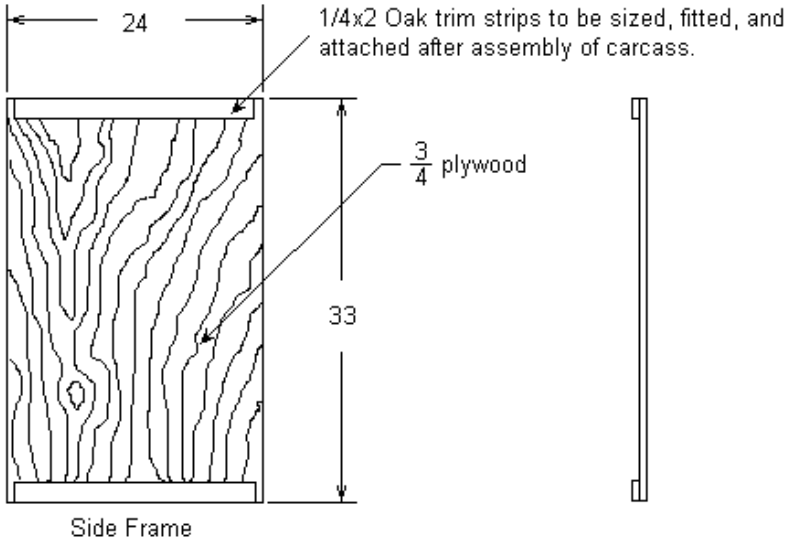


Figure 5

Assembling the Carcass.

5

The carcass is assembled with glue and clamps only. The side frames fit into the slots in both the face and rear frames. Next, a ¾ x ¾ cleat is glued to the inside of both side frames to assist in the attachment of the bottom as shown in Section E-E. You can consider attaching the cleats before or after assembly of the sides to the front and rear frames. The last step in the carcass assembly is to attach the ¾ bottom plywood base. The interior dimensions of the cabinet should be 38 ¼ x 22 ¾, if the frames were made in accordance to the drawings.

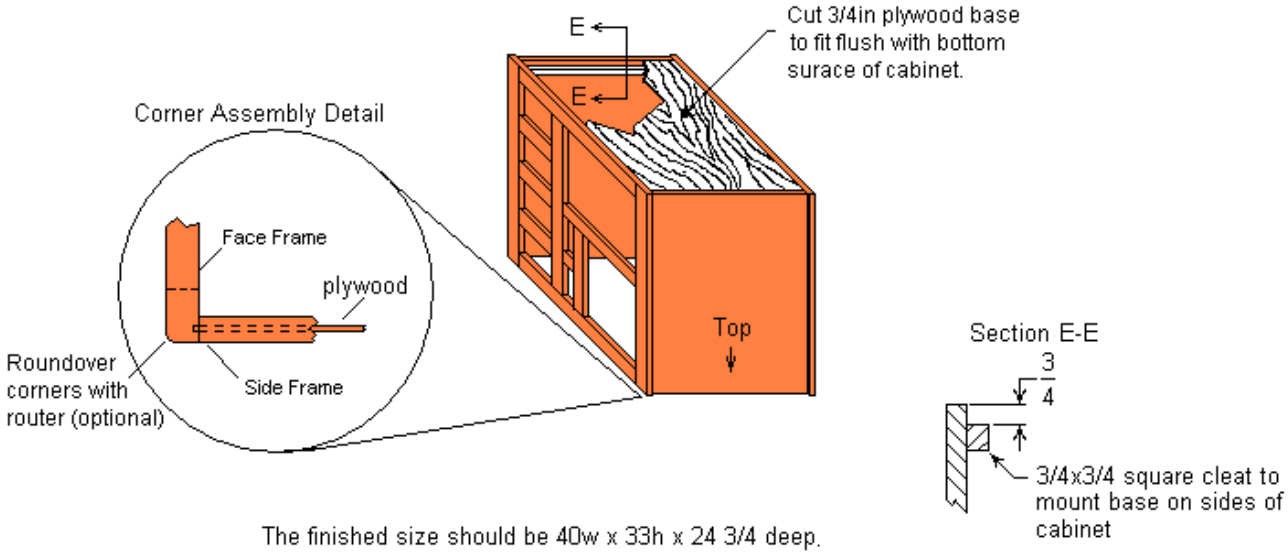


Figure 6

6

At this point, it's easiest to install the wheels as shown in Figure 7, for they can make the cabinet easier to move around. For the wheels, I used 4ea of model 36986; "3in swivel casters with brake", from Hartville Tool Company. I did try two fixed wheels

and two swivel wheels, but found that I had more movement control when all 4 of them swiveled. For safety's sake, buy wheels with heavy-duty brakes. You don't want the cabinet to slide around while you are feeding stock to the router.

Figure 7

Adding the Vertical Drawer Supports

7

The supports for the 4 corners are made from ¼ x 2" oak strips. If you change the thickness of the side panels, you will have to compensate here as well. You can use a less expensive wood in this area such as poplar if you wish. The two center strips are ½ x 2", and must be mounted on the ½ edge. This is necessary to provide the needed clearance for the horizontal strips that will be installed in the next steps to be flush with the drawer openings.

The rear strip must be solidly mounted. Use screws through the back of the plywood, as well as glue, and clamps; or if you have a pneumatic brad or pin nailer, you may whish to tack the ½ strips through the plywood. Due to their small size, nailing brads with a hammer could result in splitting of the support strips, and may not offer any rigidity, and is not recommended.

After the Vertical Supports are attached, you should have exactly ¾ of clearance from the inside edges of all drawer and door openings as shown in figure 8.

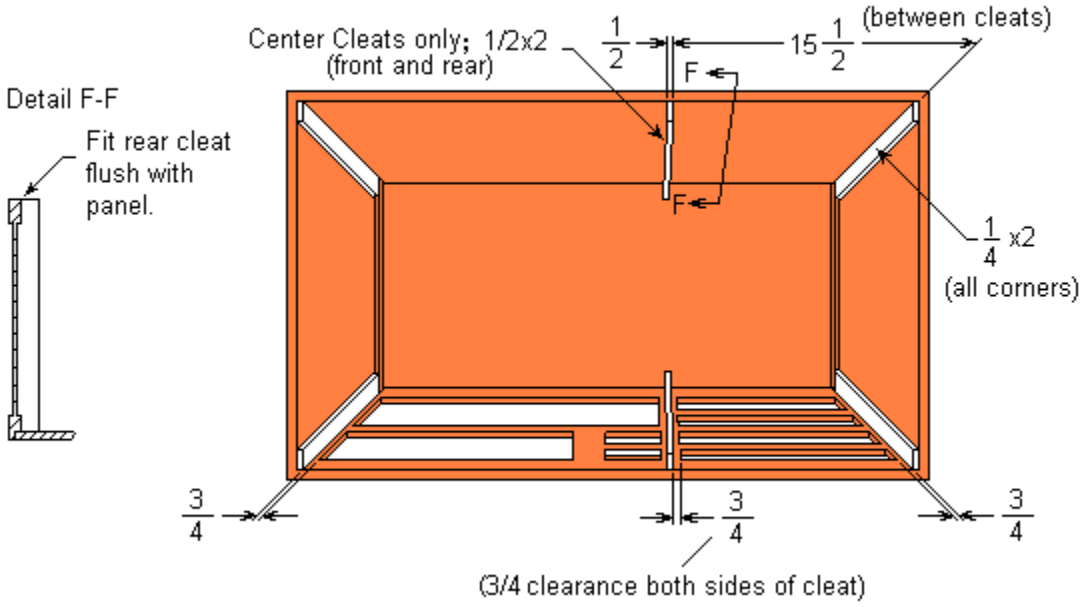


Figure 8

Adding the Horizontal Drawer Supports

8

There are 10 horizontal ¾ x 2" drawer supports that need to be installed at this time. The support bottoms and faces should be flush with the openings as shown in Figure 9. Fasten each drawer support with glue and/or screws at each intersection with a vertical drawer support.

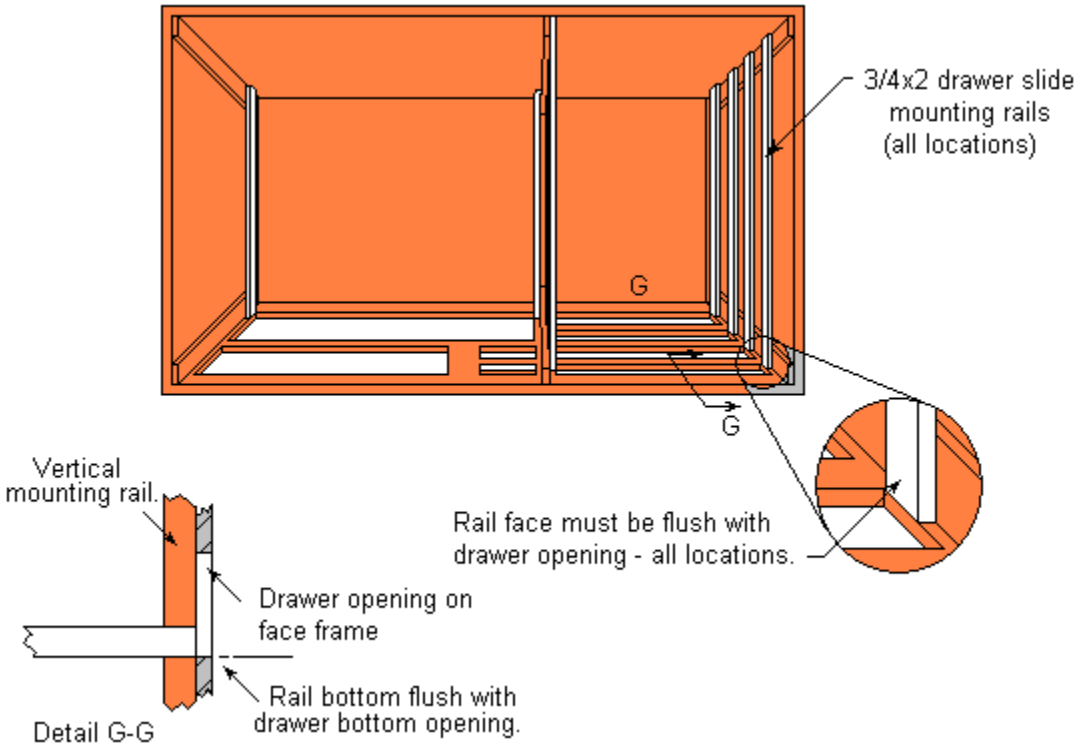


Figure 9

9

Consider installing the drawer slides at this point. The drawers do not need to be made yet, but installing the slides now will be easier, since there are fewer items blocking access to these areas. I used the "epoxy" style drawer slides. These are generic enough that you should be able to find them at any Home Improvement store. Follow the manufacturer's recommendation when mounting the slides. A screw in the front, rear, and two near the center of each slide should be sufficient. Four sets of rails go on the right guides, and one set at the bottom left side.

Figure 10

Router Dust Box Mounting Cleats

10

Install the mounting cleats as shown in Figure 11, allowing a ¼ plywood base to be flush with the top of the opening as shown in Detail H-H. The only critical measurement is to ensure there is enough width for mounting rails for the switch mechanism, should you use one. In the prototype, the width is 2 7/16. However, should your router plate location be different, or if you elect to forego the power switch, you will want to adjust these dimensions somewhat.

Glue or glue with pneumatic brad nails should be sufficient here.

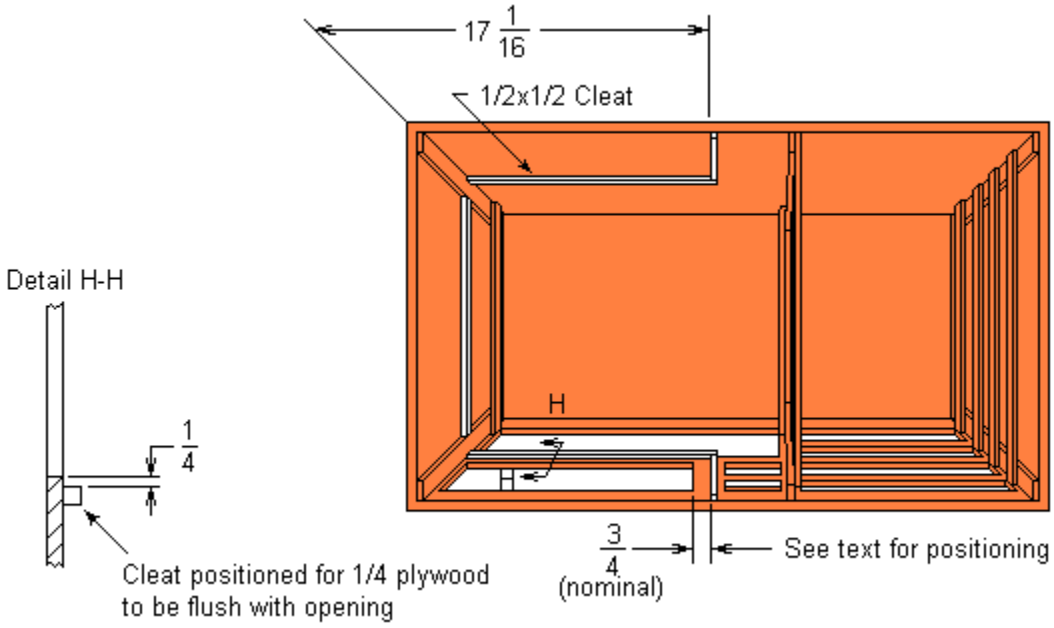


Figure 11

Router Dust Box

11

There are two ¼ plywood pieces to be installed for the dust box. Again, the exact dimensions are dictated by how you sized your box. Where the base and side interconnect, the prototype uses a ½ x ½ cleat mounted to the base as shown in Figure 12, Detail I-I. The side should be flush with the top of the cabinet. The components were simply glued and pneumatic nailed in place. When the glue is dry, consider putting a couple of coats of polyurethane around the inside of the box, then caulking all of the box seams to prevent sawdust from blowing into the drawer areas.

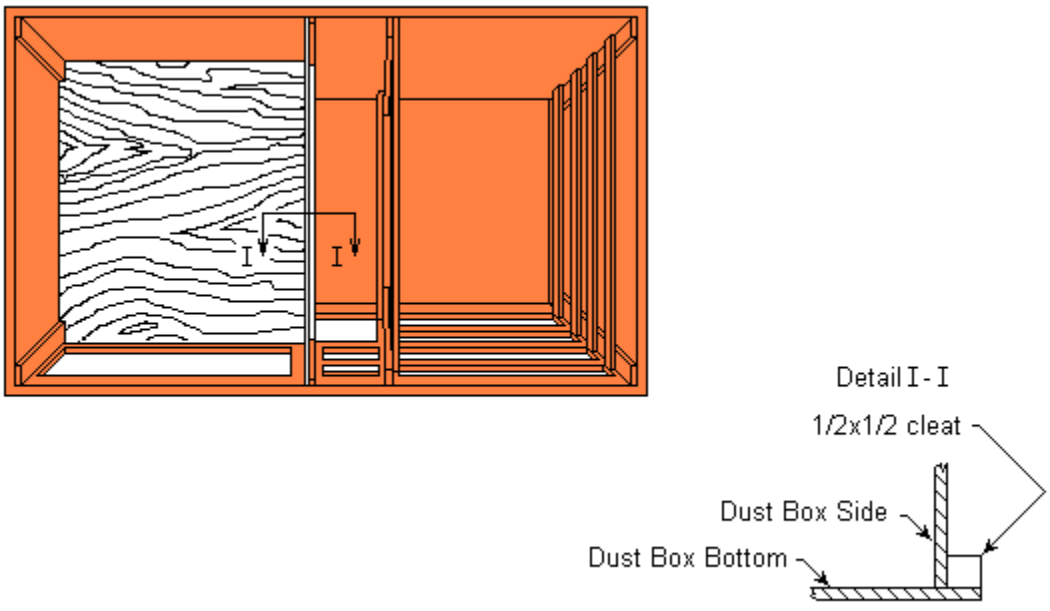


Figure 12

Power Switch Mounting Bracket

12

Now is the time to finalize the design of the power switch location as shown in Figure 13, assuming you decided to use one. The general location of the switch is shown here. Your options are to simply surface mount a switch or use an electrical outlet box. The switch I used has its own "electrical box".

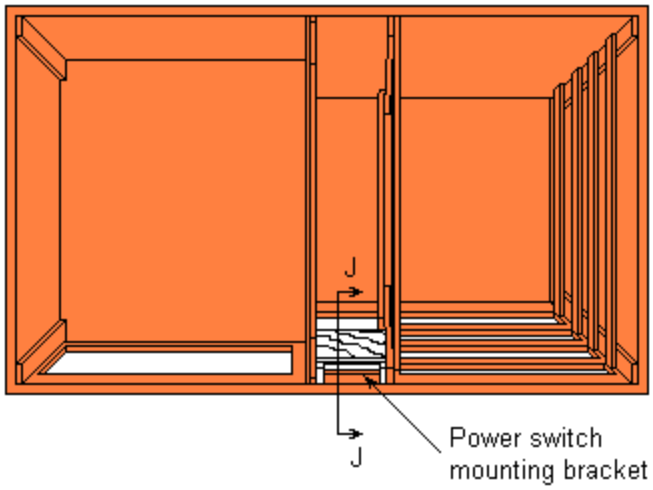


Figure 13

The prototype uses Rockler's model 63026 switch. The design of the switch is such that it mounts from the rear surface. By recessing a mounting plate, the switch has a pseudo-flush mounting look.

The switch bracket also has a lower slot that can be used for a second switch should it be desired to have a switch for a vacuum system or other accessory. I did not use this on the prototype since my intent was to use the shop's dust collection system. I therefore placed a label in that location as a handy reference to often-needed information.

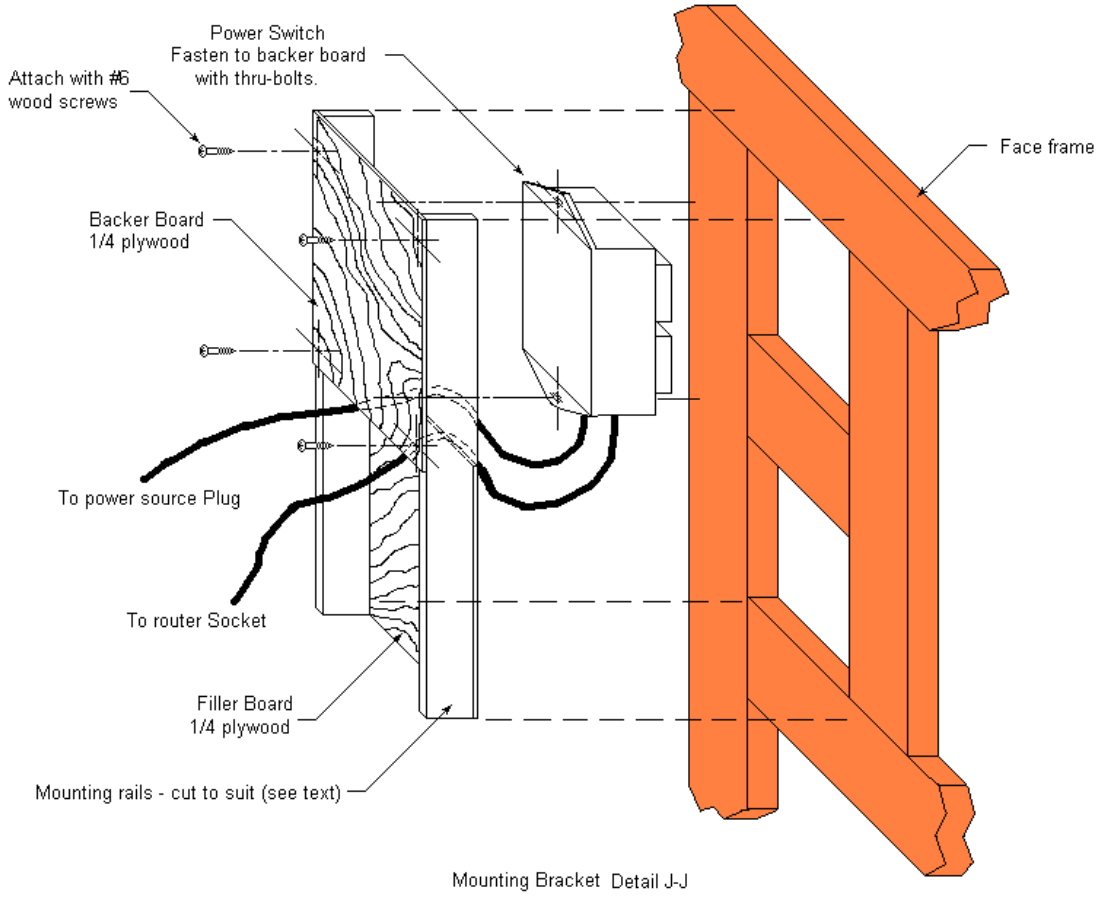


Figure 14

Dimensions are not shown here due to the variety of switches available for use. I have provided the conceptual design idea, and leave it to you to size the components to the switch you desire to use. The mounting rails are permanently glued to the rear of the face frame. This technique makes the "Filler Board", shown in Figure 14 -Detail J-J, a permanent installation as well. If a second switch is used below the power switch, replace the Filler Board with a "Backer Board", as done for the top switch. The Backer Board allows removal of the switch without disturbing the mounting rails.

Figure 15

The switch I used, shown in Figure 15, is fairly common, and used for many shop power tools. If you own any Jet tools, you probably have this kind of switch. It does not have a safety key, but Jet does offer a locking mechanism for this kind of switch. It's basically a rod that goes through the

START button with a padlock to secure it. This switch will also work with that mechanism if you wish to have a lock out feature.

Power Switch Cabinet Details

Figure 16 shows the backer board on which the switch mounts, as well as the use of wiring harness grommets. You can see how the backer board unscrews from the rear. To access this panel, it is necessary to remove the top.

Figure 16

Since the switch mount is a bit hard to visualize, I have added plenty of photos. In figure 17 you can see how the switch if pseudo flush-mount, with the actual mounting done on the backboard. Also you can see how the tight fit of the front-center horizontal shelf mount (figure 8) required a dado in the right switch mounting rail (figure 14).

Figure 17

You can also see that spacers were required in front of the backer board so that the front of the switch is at the proper location.

13

At this point, it's a good idea to think about how to vent the dust box. The prototype simply uses a 4in hose adapter, such as a PeachTree Woodworking model 05173, mounted to the rear of the cabinet at the lower-center of the dust box.

This is not the most ideal position to evacuate all of the dust. A better idea might be a so-called "table saw" dust adapter mounted to the bottom of the box, such as PeachTree's model 05325. This adapter requires a 12x12 square hole in the bottom of the dust box. I did not use this on the prototype because it would reduce the amount of space for storage under the box. Other alternatives you may wish to consider is direct mounting of a small shop-vac directly under the dust box. This is your project, design it as you would like.

Final Carcass Assembly Details

14

We can now begin to finalize the carcass assembly, put on the top, and get a working unit up and running. This is useful if you intend to install a fencing system and want to dovetail the drawers. Might as well obtain some experience in using the fencing system right away.

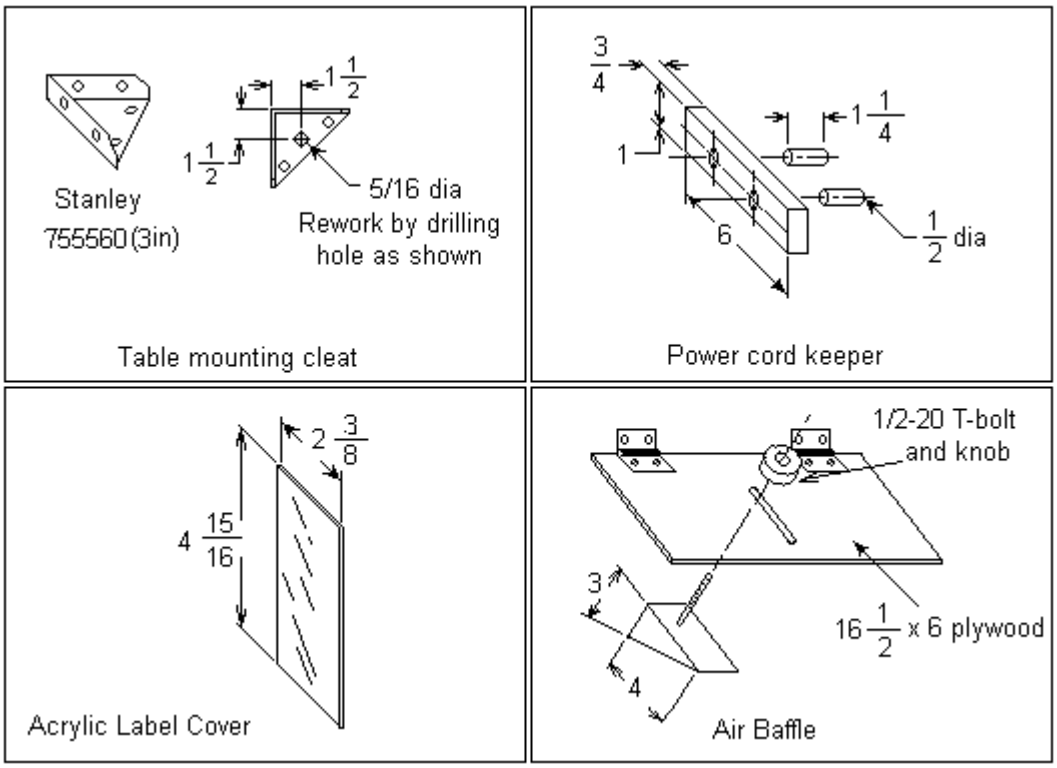


Figure 18

Begin this step by constructing the miscellaneous parts as shown in Figure 18 above. The only required items are the mounting cleats. Everything else can be considered optional. If you wish to

put a label in the lower switch opening, you might want to construct a cover for it. Finally the air baffle allows some adjustment of the shop vacuum. This may not be required if you elect to use a different method than used on the prototype.

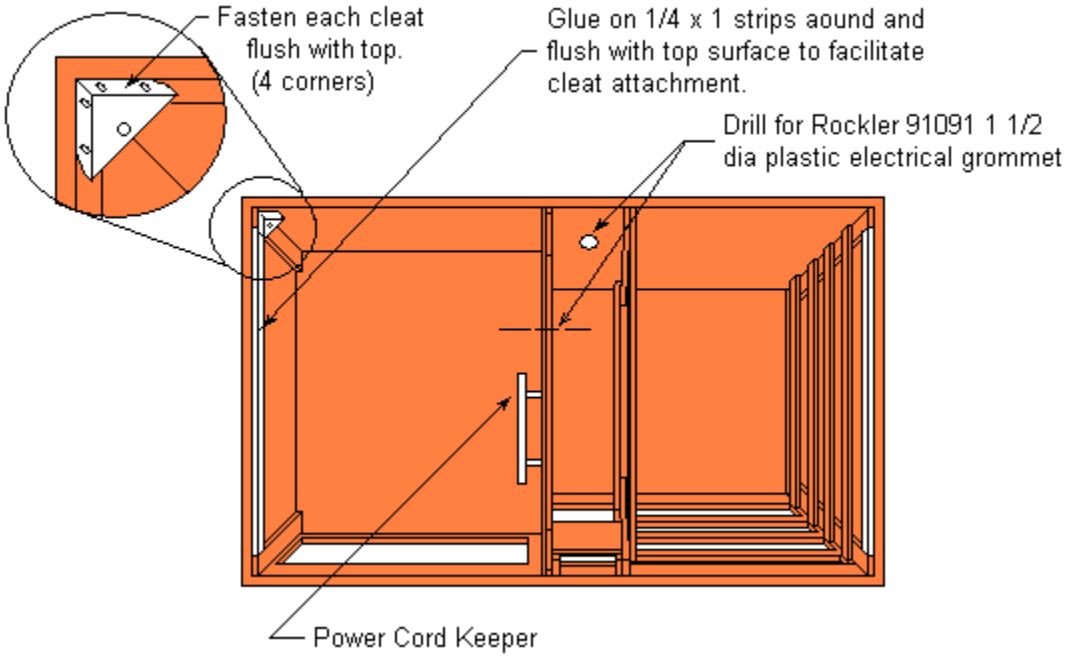


Figure 19

15

In this step, attach ¼ x 1" left and right wood strips as shown in Figure 19 to give the cleats a flush attachment point. Next attach the cleats with the hardware that came with them. The cleats should be oriented as shown, so that the mounting hole is about ½ in from the top of the cabinet.

Two holes are drilled for Rockler 91091 or equivalent plastic grommets. The power cord from the switch to wall outlet will go in the back hole, and the power connector for the router will go in the other side hole. At this time, attach the power cord keeper as well.

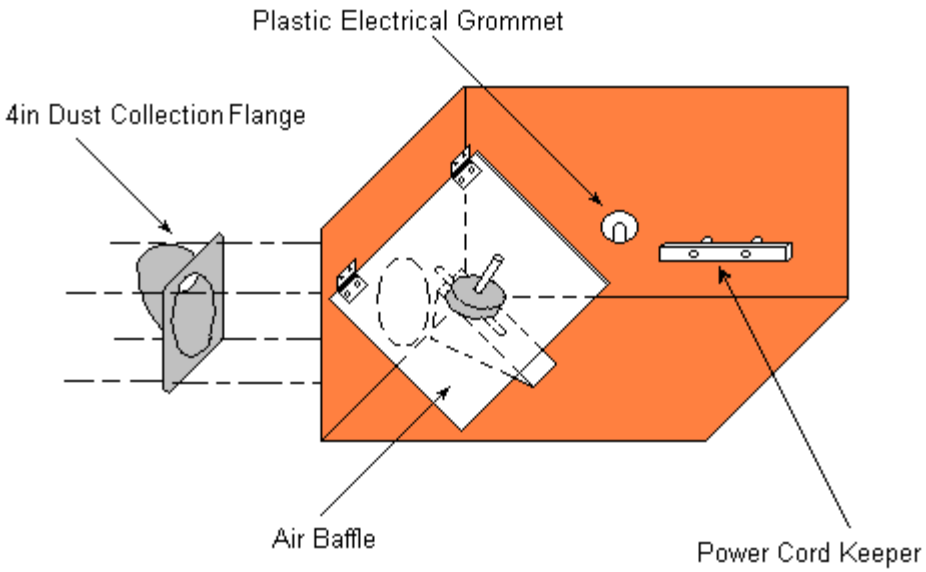


Figure 20

As shown in Figure 20 and 21, attach the Air Baffle top hinges to the rear of the dust box. The baffle allows adjustment of the air suction. This will be important should a Tee fitting to the fencing system be fitted to the dust collection hose, because it will allow adjustment of the fence-to-dust box air flow.

Figure 21

16

The final assembly of the carcass consists of attaching the dust collection components. After drilling a hole in the rear of the cabinet, attach a suitable dust collection flange to the rear as shown in Figure 22. You can also see the grommet for the power cord in this photo. The cord can be conveniently pushed through the grommet into the interior of the cabinet when the system is unplugged.

Figure 22

17

Since I am not using a second power switch, I made a template for the area below the switch as shown in Figure 23. This is simply a little addition that makes the system easier to use, doesn't take a lot of time to make, and gives that personalized touch. Feel free to make a template of your choice.

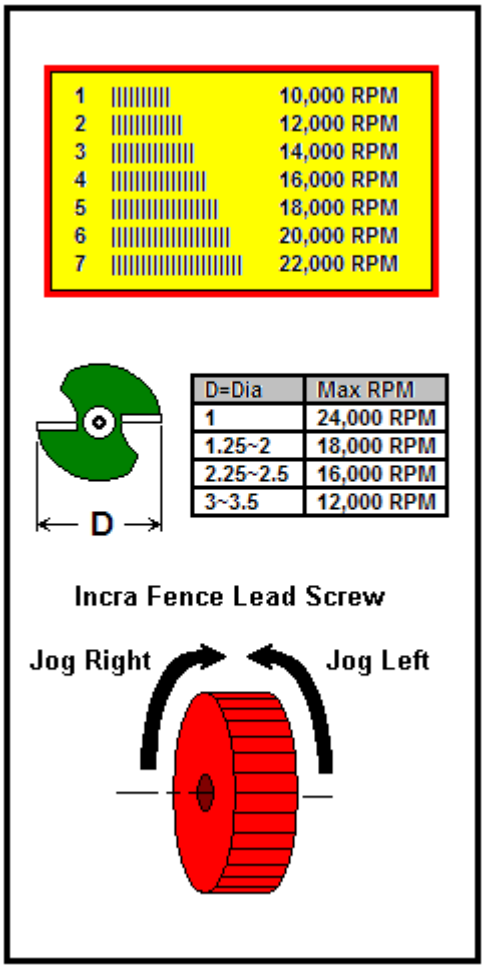


Figure 23

The idea here is to put useful information that is hard to remember on the plate, and then fasten the plate to the blank area below the switch. Of course, if you have used the blank area for a second switch, you can find an alternate location for something such as this. The hash marks showing the various RPM are shown on the router adjustment knob. So this reference allows me to determine what RPM each selection on the knob represents without having to find the owner's manual, which by-the-way, is usually the first thing I lose.

The Lead Screw is the mechanism on the fencing system. It's quite amazing how many times I end up turning the adjustment the wrong way – so this helps me remember which way I need to turn the adjustment.

I simply printed out the template on my color ink-jet printer, cut it to size, and then attach it to the cabinet using the acrylic label cover from Figure 16, and 4 screws.

Part II – Table Assembly

Top Assembly

18

As mentioned previously, the prototype uses a Woodpecker's Inc brand top. If you plan on making your own top, you should perform any required machining now. Verify the hole pattern by measuring the distances between the holes you drilled into the cleats in figure 18. Once the locations are confirmed, drill a 11/32 hole to accept a Hex Drive Insert. Even though the assumption is that the potential builder is an experienced woodworker, it does not hurt to offer the reminder that you should not drill completely through the top.

On the prototype, the table "floats" on the cabinet, which isolates vibration and I believe, reduces stress on the table top. In order to achieve this, as shown in Figure 24, use 1/4x1 closed-cell weather stripping between the cabinet and table underside. I used ¼-20 Socket Head Machine Screws, with washers – dipped in thread-lock compound. The screws are secured finger tight only, so that the table "floats" on the closed-cell foam. The thread-lock keeps the screws from backing out. I used closed-cell foam here because it offers more support than open-cell foam. The thread-lock keeps the screws from backing out.

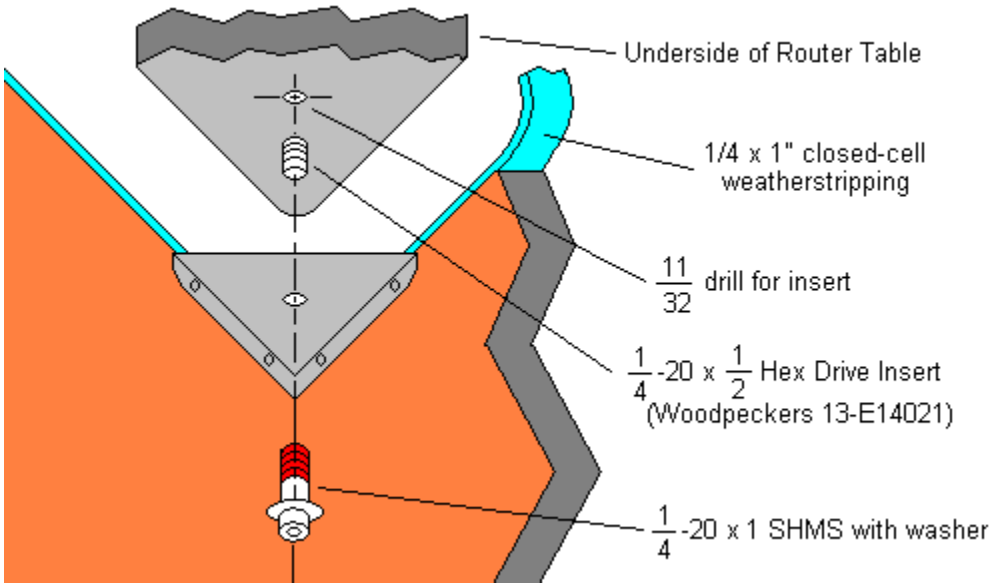


Figure 24

As an option, you can add auxiliary support posts as shown in figures 52 through 54. These will offer additional support, and will also reduce the risk that the cabinet top isn't absolutely flat. If the cabinet is not flat, it could warp the tabletop over time.

Figure 25

Fence and Router Installation

19

I'll assume that you are going to use a fencing system, so the next step is to install it. If you intend on making dovetail joints for the drawers, might as well use the fencing system to make them.

I used an Incra Lead Screw (LS) system on the prototype as shown in Figure 26, although there are competitive models that will work as well. The Woodpecker's Inc top is pre-drilled for several Incra fencing system models, but if you are using a different fence or are making your own top, then simply drill the holes and mount the fencing system according to the manufacturer's instructions.

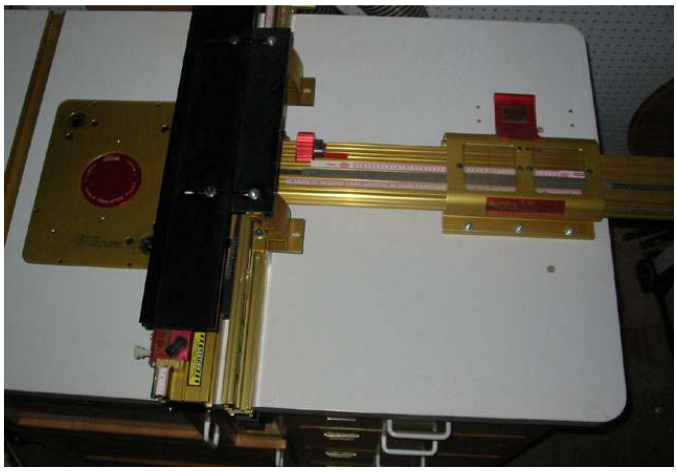


Figure 26

20

So now that you have your router and plate, attach the router according to the manufacturer's recommendation as shown in figure 27. Some routers have large handles, such as the Milwaukee 5625 that I chose. You may have to take the handles

off to get the router to fit through the table. Now that everything is assembled, put the router in the table, then attach the cord to the power switch and cord keeper as shown in figure 28.

Figure 27

Figure 28

Figure 29 shows all of the accessories for the Woodpecker's lift. The various twist-lock rings that are available are shown here, along with the spanner wrench to attach them, as well as the lift adjustment crank handle at the rear of the photo.

Figure 29

Other accessories include a bent-wrench, which is simply an offset wrench that allows you to tighten the collet from above the table, as shown in figure 30 and 31. Generally, you must buy a bent-wrench as an aftermarket accessory, and again Woodpecker's and other manufacturers have wrenches available for the more popular routers.

Is a bent-wrench absolutely necessary? No, but it is very convenient, and since I hope you will be using this table a lot, you will have a lot of frustration should you not obtain bent wrenches.

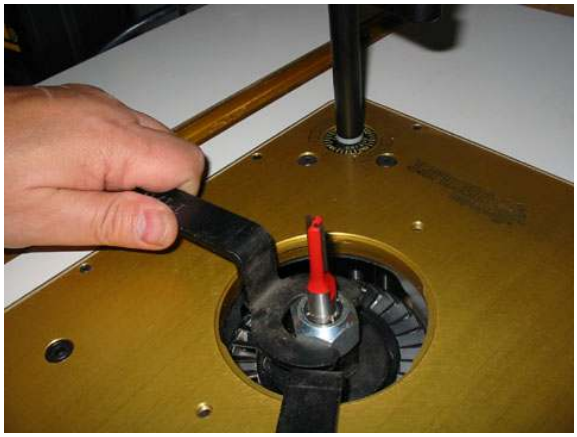


Figure 30

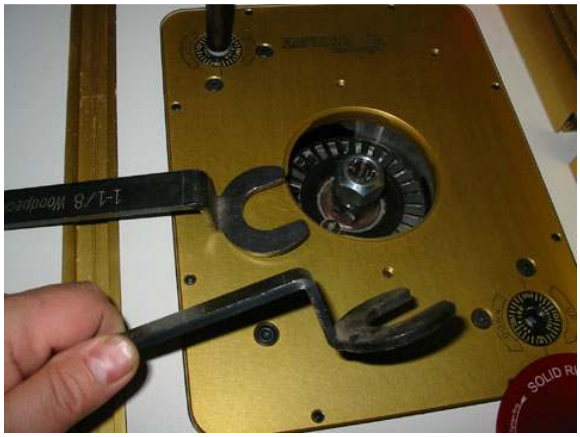


Figure 31

The alternative to the bent-wrench approach is to use a collet extension. However, I feel that the simple solution to the problem is the better.

Part III – Final Assembly

Doors

21

OK, I know you can't resist, so at this point, go ahead and try out your new router system. Just be aware that the front door is not on yet, so you will get sawdust all over the place. So let's build the front door as soon as possible.

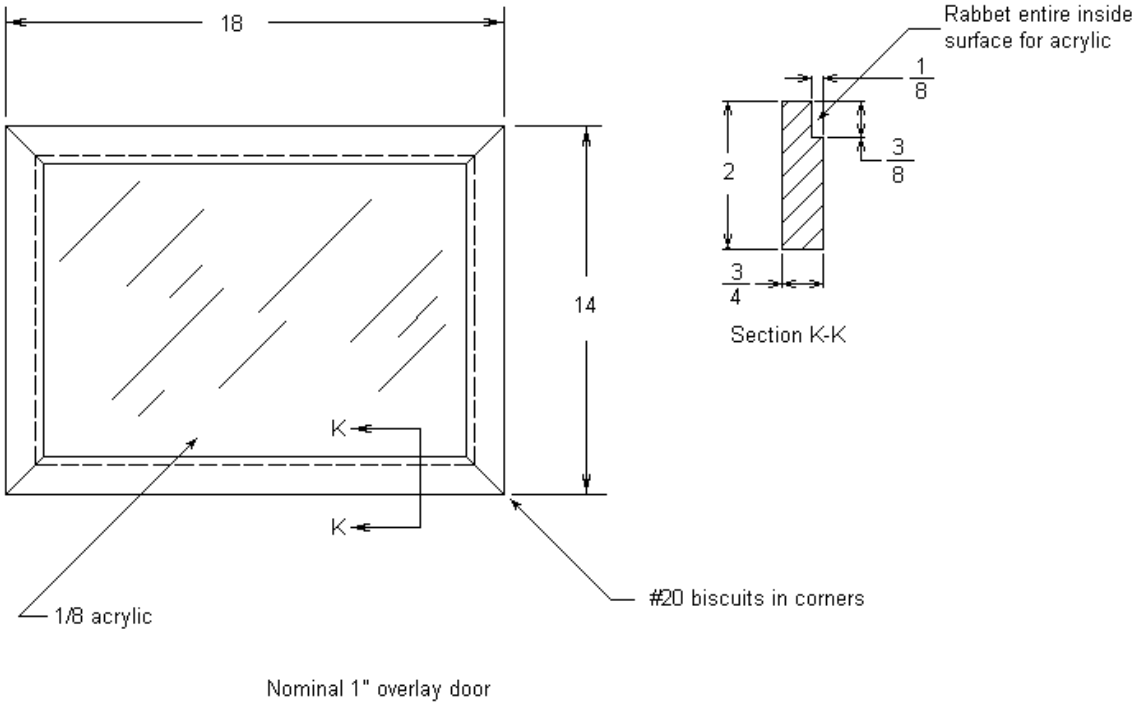


Figure 32

The doors are generally 1inch overlay, however, to make the doors "look right" required extending the length just a bit. You can experiment with different door sizes if you wish.

The doors are made with 45 degree miter joints, joined with #20 biscuits, however a rail-and-stile approach can also be used. Now that the fencing system is completed, you can use the raised-panel technique if you prefer.

After the door members were glued together, a 3/8 rabbet bit was ran around the inside perimeter to facilitate the acrylic panel. Here is a first good use of the router table. The door is finished with a couple of coats of polyurethane finish at this point.

While an acrylic window is not required, its fun to see sawdust get blown around in there. Sort of like a guy's equivalent of a front-loading washing machine.

The acrylic then is drilled and countersunk about every 2 inches or so for #6 hardware, fastened from the backside. Finally, the door gets a strip of 1/4in open-cell weather-stripping as shown in Figure 32. Open-cell foam is used here because of its compressibility will offer a tighter air fit. When the dust collector is running, the door is actually fairly difficult to open due to the air suction. This helps divert the air-flow to the hole-opening at twist-lock ring on the lift, which maximizes sawdust removal at the router bit.

22

The doors are attached via European style hinges. Look for a 1" or 1¼ in overlay face-frame hinge, and follow the manufacturer's directions on installing them. This typically requires drilling a 35mm hole in the backside of the doorframe. Simple jigs are available for this operation, such as those made by Rockler, and they would help here. Finally, a suitable door pull was installed on the opposite end.

Figure 33

23

The lower door in figure 34 is constructed in much the same way as the top door with the exception that a ¼ slot rather than a rabbet is cut for the insertion of a plywood front, nor does the lower door require weather stripping. However, I used weather stripping to make the door look aesthetically the same as the top door when closed. When you buy the weather stripping, there will probably be enough material to do both doors.

If you use euro-style hinges, they should be sufficiently spring loaded so that they remain closed – therefore, you should not need to install door latches. Like the upper door, the door is finished with a couple of coats of polyurethane finish before adding the weather stripping, hinges and door pull.

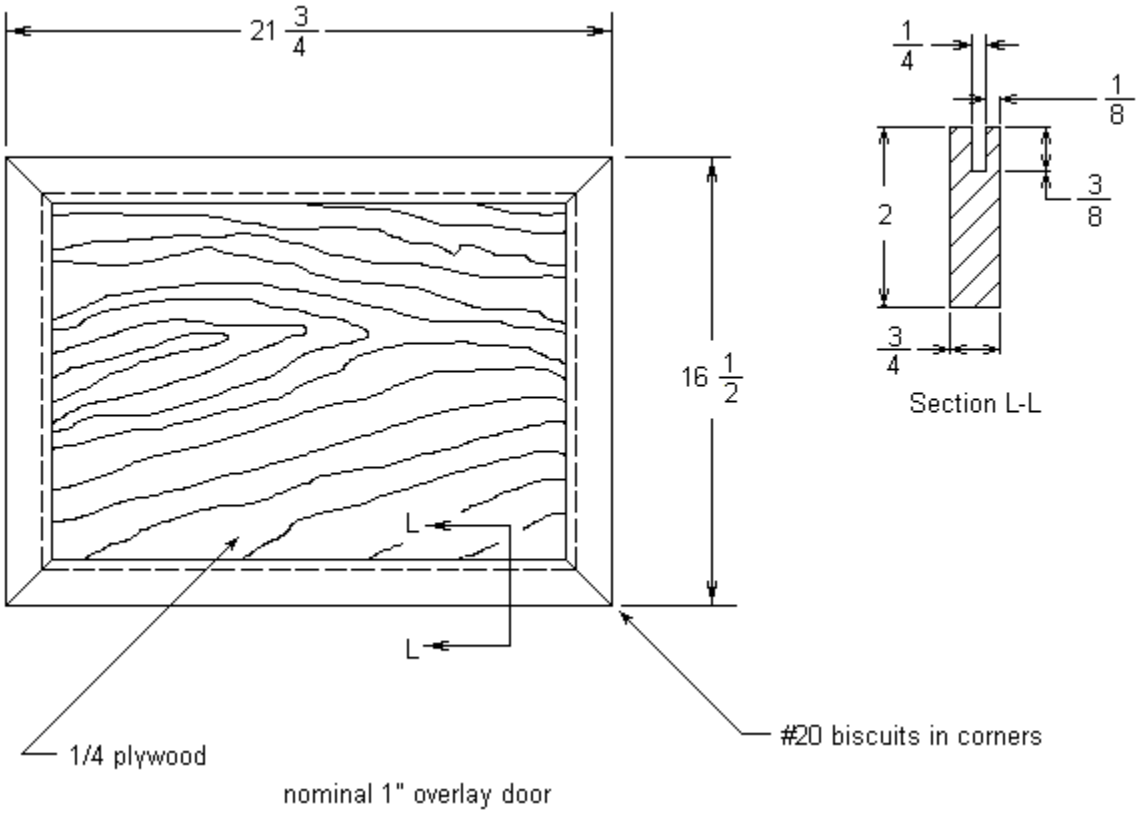


Figure 34

Drawer Construction

24

The prototype cabinet has 5 drawers; 4 on the right side, and one behind the lower door in the cabinet base. To recap, the height of the 4 drawer openings to the right are; 5”n for the top drawer, then 6”n for each of the lower three doors. The left drawer is 3”n high.

The left drawer is the easiest to construct, so that one will be tackled first. On the prototype, I used the Incra fencing system to create half-blind dovetails, and whether or not you wish to do something similar or use plain old butt-joints is up to you. For that reason, I’ll only show the assembled dimensions, and leave it to you to work out how you want to finish the corners. The epoxy rails require a ½ clearance on each side, which means the drawer width needs to be one inch less than the opening. This is pretty common, however, be sure the drawer slides you purchase are this way.

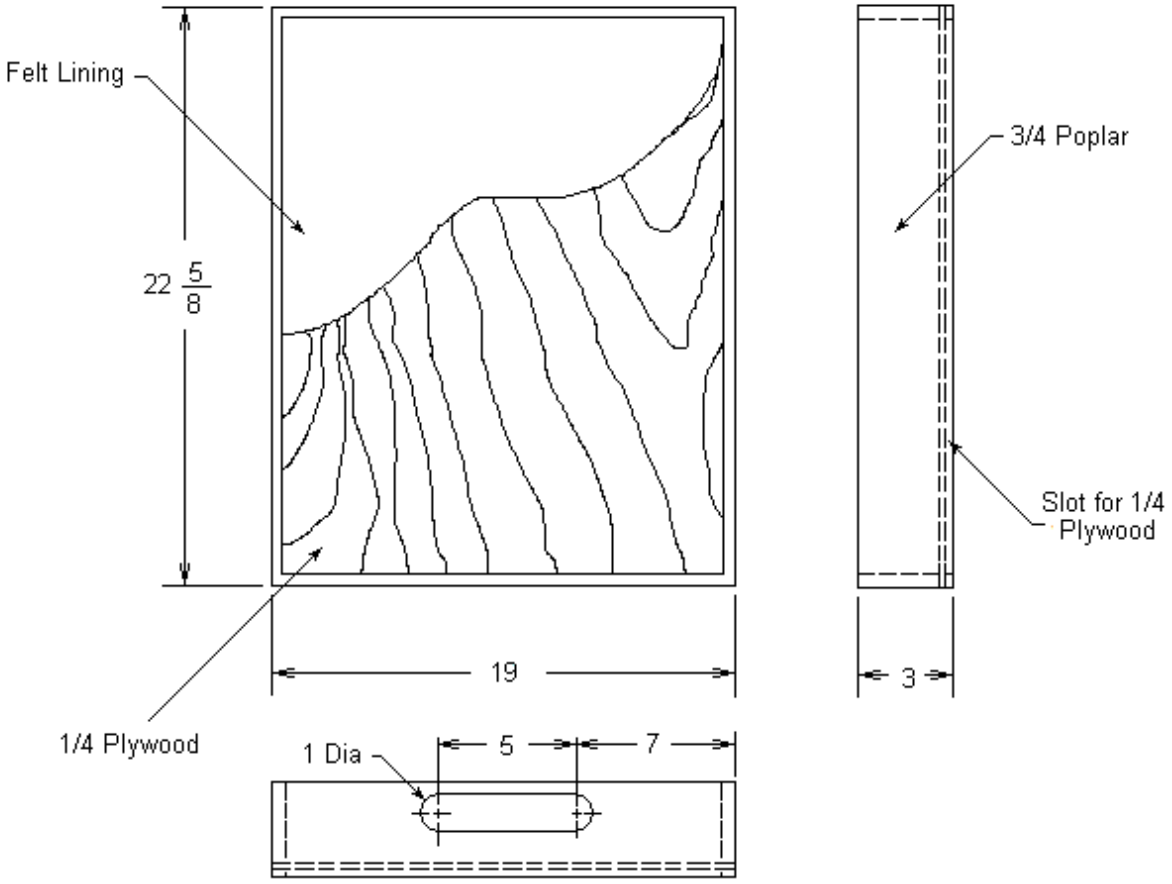


Figure 35

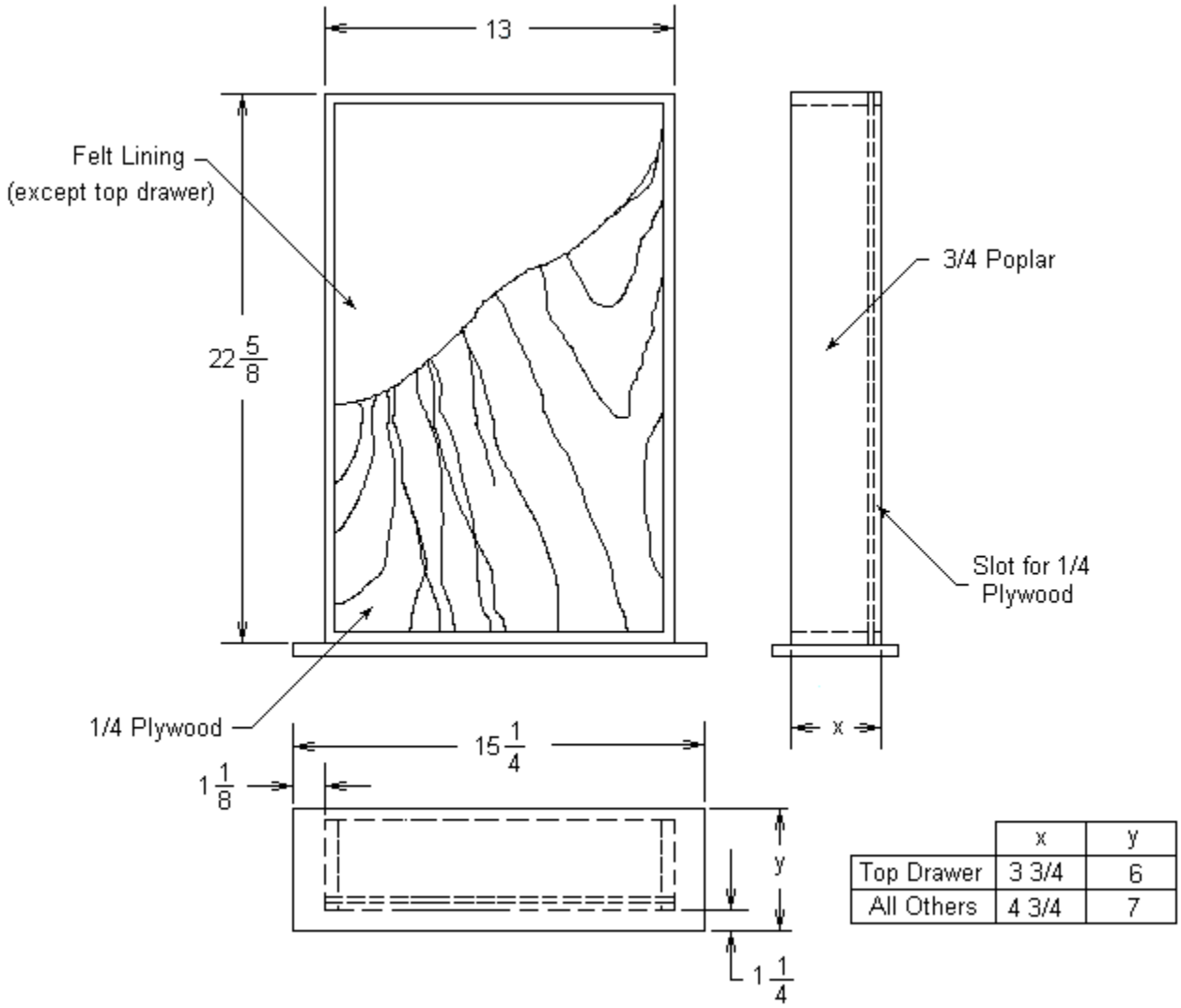
Each drawer is finished with a couple of coats of polyurethane finish at this point. Then, all drawers except for the top drawer are felt-lined with green felt. I think this just provides a nice touch, and it does keep loose parts from sliding around a bit when you open the drawer.

As shown in figure 36, the drawer in the main cabinet has room for the bulky parts of the Incra LS Super System fence, as well as for a couple of portable routers.

Figure 36

25

The right-side drawers in figure 37 are pretty much identical to each other, except the height of the top drawer is just a bit less. This is quite common in the kitchen cabinet-making industry, and if you have one low drawer, it should always go to the top. This works out fine because the top drawer is going to house the router bits and it doesn't need to be quite as high.



	x	y
Top Drawer	3 3/4	6
All Others	4 3/4	7

Figure 37

As you can see in figure 38, I dovetailed the drawer joints. Also note that the rail is set back about 7/8 of an inch from the rear surface of the front. You may have to experiment with this offset a bit to get the drawers to slide just the way you want them.

Figure 38

Part IV – Finishing Touches

Drawer Detail

26

Now that everything is just about done, I like to pay some attention to the details, especially in the drawers. I like to have a spot for everything, and that includes the twist-lock rings, tools, and the various parts that get attached and detached from the Incra LS Super System fence.

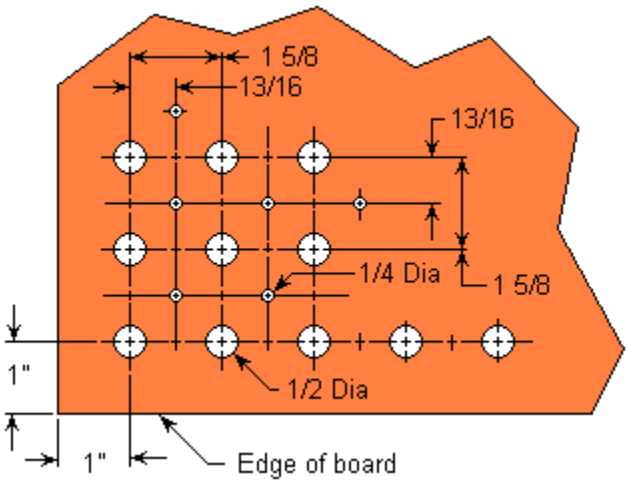


Figure 39

For the top drawer, I use it for router bits that are not in a set. As shown in figure 39, the ½" bored holes are 1 5/8 on center, made into a square pattern, with the perimeter holes 1" from the side of the drawer. ¼" bored holes are dispersed between the ½ holes to allow storage of both sizes. The bottoms are left over ¾ plywood from the cabinet base, glued to the drawer bottom.

Figure 40

I finished the bit holder boards with polyurethane before drilling to ensure the bits would fit properly. I drilled the holes most of way through the ¾ plywood, but left enough in the bottom to keep the bit from falling through. While you might think the upper holder board was clever, it was actually due to not having quite enough left over plywood for a single piece. I edged the top plywood piece with a small piece of solid oak to hide the raw plywood edge.

The drawer has storage for 84 ½ shank bits, and 60 ¼ shank bits. It will take awhile for me to fill all those holes with bits!

27

This is the drawer that was fun to make. Assemble all of your tools and piece-parts and come up with a design that will hold everything. All of the items are ¼ oak, glued and pneumatic brad-nailed through the drawer bottom. The organization of this drawer is what really personalizes the project, but one risk is if you significantly change the router or other goodies from your initial design, you might have to rebuild this drawer. The collets are held in place by setting them on top of a ½ or ¼ dowel, as appropriate.

Figure 41

The items found in this drawer include:

- Joint templates and rulers used for the Incra LS system held under a box with clear acrylic windows.
- Both ¼ and ½ collets for all of the routers in the shop – both in the table and hand-held.
- Bent-wrenches for adjusting the router in the table.
- Router lift rings (the red aluminum discs).
- Various tools, lifting and spanner wrench, and adjustment blocks.

28

The third drawer has no dividers so that router sets can be stored here. Also stored in this bin is a “recipe-box” holding all of those little instruction cards that come with the router bits.

Figure 42

29

The bottom drawer contains some of the Incra LS Super System add-on parts. With a 6” deep drawer, the drawers provide enough storage for these components.

Figure 43

Other Ideas

30

The upper fence for the Incra LS Super System found a home - hidden between drawer units. I created a little cleat to secure the fence for storage. You can also see from this photo how excess wire from the power switch simply drops between the dust box and drawer mounts.

Figure 44

31

As a final touch, I created labels from my computer and printed them on card-stock. This helps identify the contents of the drawer, and enforces organization as well.

Figure 45

32

After the final assembly stage, I finished the entire outside of the cabinet with a couple of coats of polyurethane finish.

The cabinets can also be fitted with locks if desired. There are several hundred dollars worth of router bits in the top drawer alone. Any good woodworking supply house can supply locks that are keyed alike so that you do not need a fistful of keys to open the drawers.

Part V - Options

Dust Collection

An integrated Dust Collector can be constructed in the lower cabinet. The idea here is to take a shop vacuum, such as Shop-Vac, and rework the unit into a box that replaces the drawer. Not all vacuums may adapt to this use, and reworking a vacuum in this fashion will likely void the warranty. However, it is an elegant method of integrating a Dust Collector into a self-contained system.

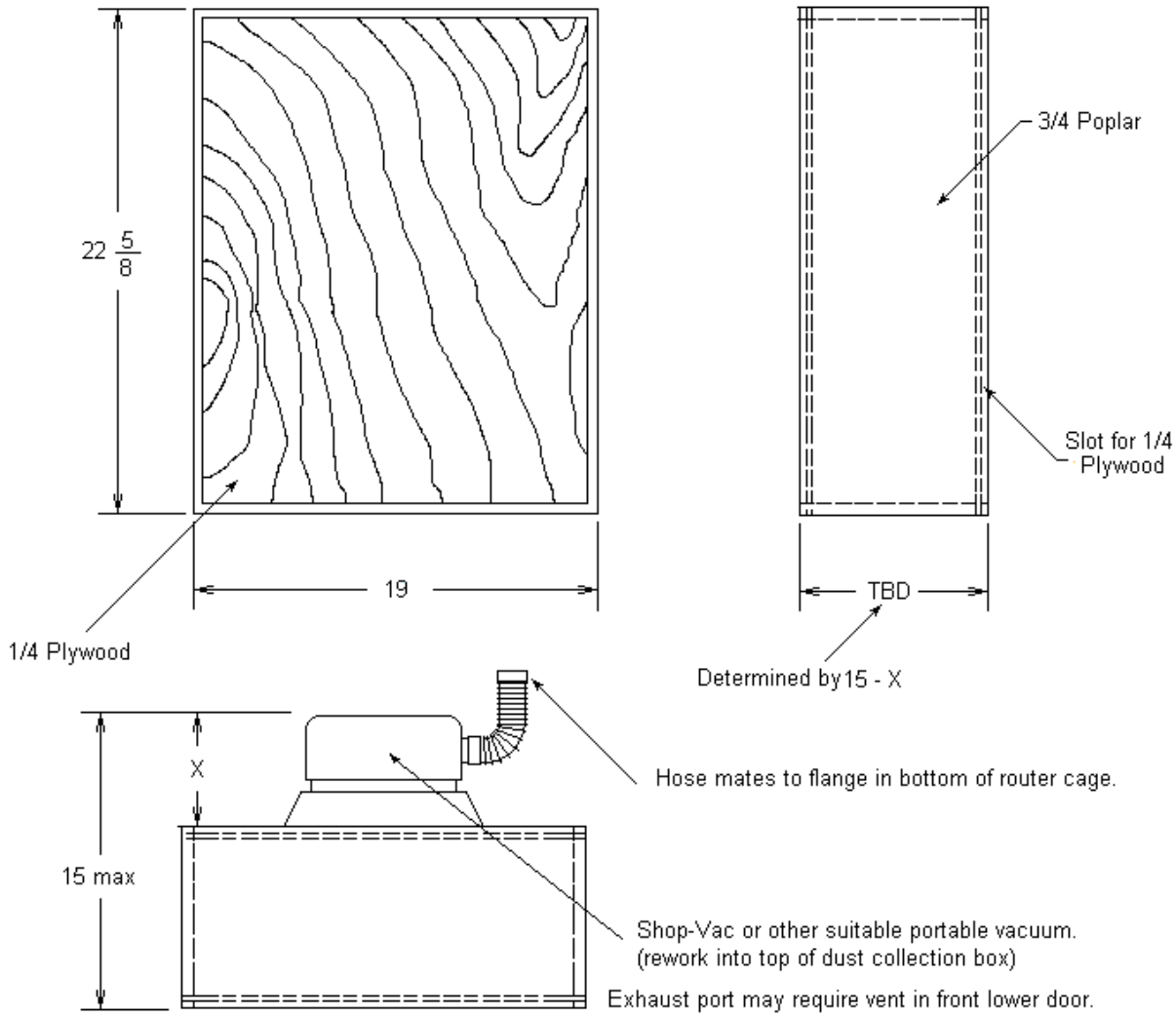


Figure 46

A second option is to fashion a plenum behind the main cabinet that provides a “tee” connection via 2½ dia. blast gate to facilitate routing of suction hose to the fencing system. The blast gate has a trap door that can be opened and closed to meter the amount of suction to the fence. Coupled with the air baffle as shown in Figure 20, a balance of suction can be maintained between the router cage and fencing system. The advantage of this system is the addition of fence air without loss of storage space in the cabinet.

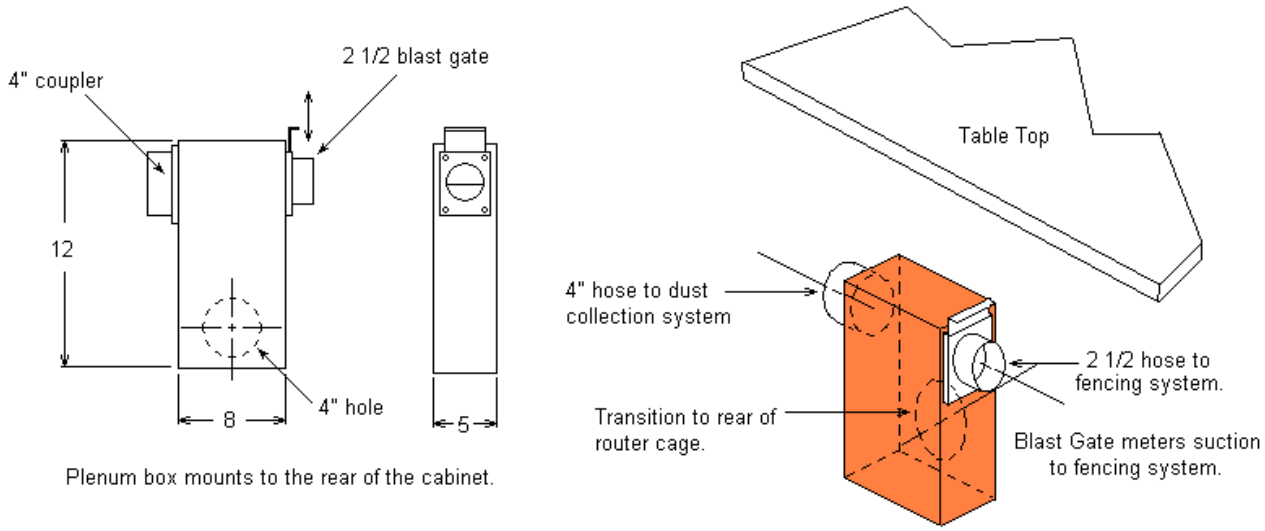


Figure 47

A slight modification of the plenum fencing air system is to provide a larger collector pan under the router cage. This is accomplished with a table-saw style of collector, and designing the plenum to route under the router cage.

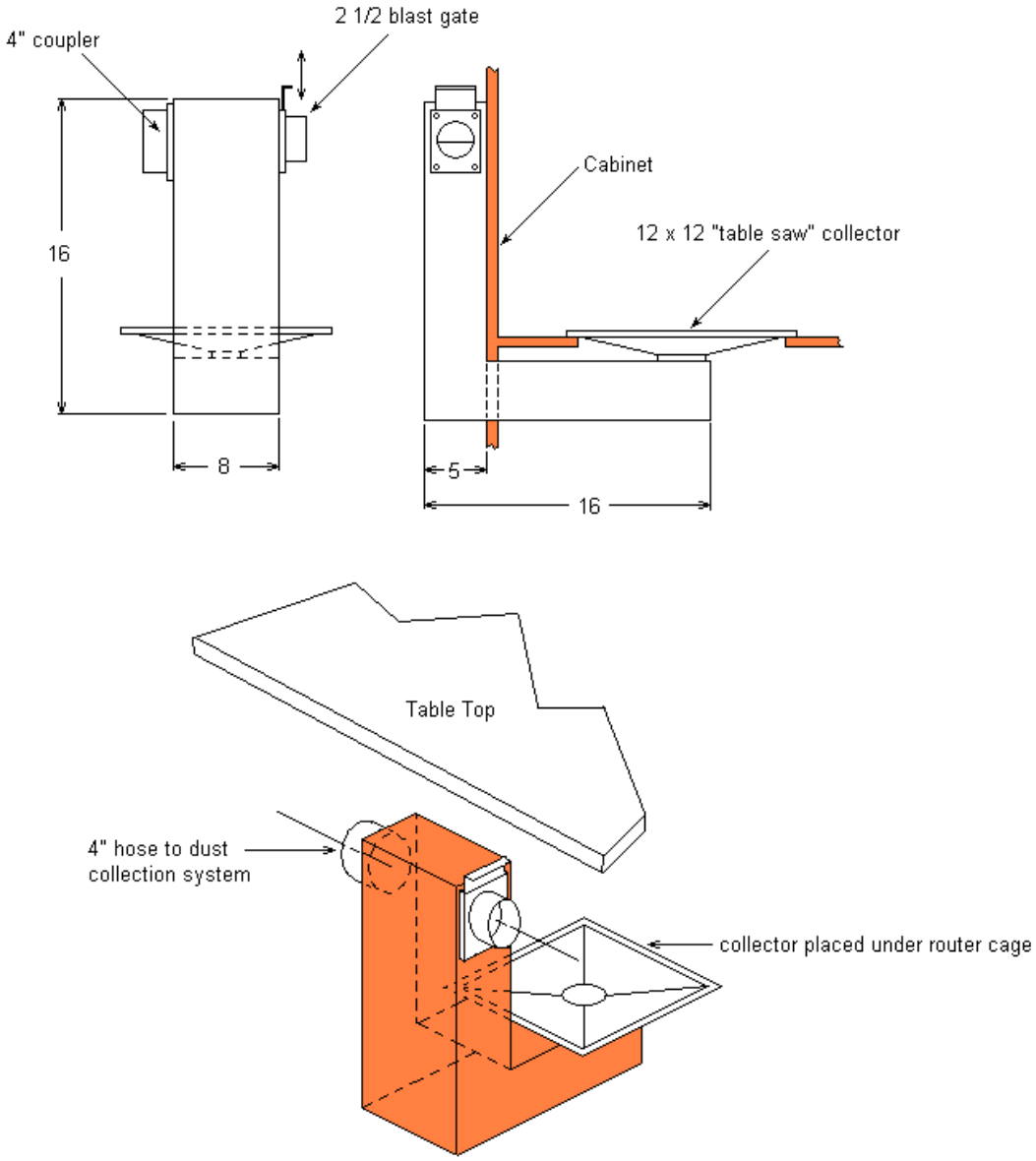


Figure 48

Zero Clearance Sacrificial Fence

Another nifty option is a sacrificial fence made of UHMW (Ultra High Molecular Weight) plastic, which is a high-tech, self-lubricating plastic that lets work pieces slide almost effortlessly. If you chose a good fencing system, it will allow the attachment of such a sacrificial fence, but obviously, the exact dimensions and mounting is dependant on the fencing system. The drawing shown here will work with an Incra LS and LS Super System.

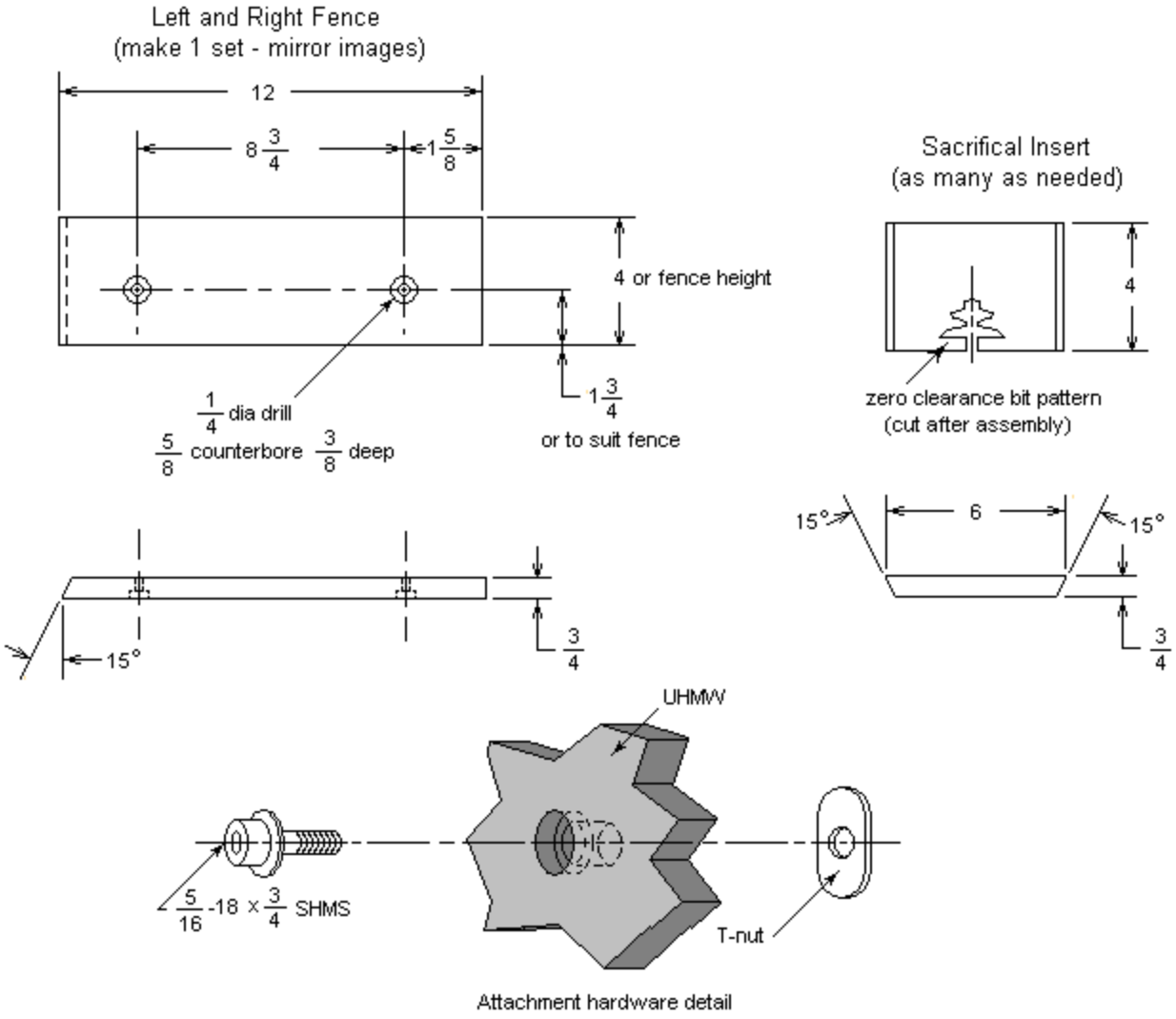


Figure 49

I made the UHMW fence a bit tall (4") because I wanted the extra support. However, if you wish to use the stop block that comes with the Incra LS Super System, you will want to make the UHMW fence the same height as the Incra fence.

Once you have the parts cutout, insert 5/16-18 x ¾ socket head machine screws, washers, and captive T-nuts into the counter-bored holes.

As shown in figure 50, slide the right and left hand pieces into the fencing system, with the T-nuts sliding through the T-slots in the fencing system. The bevel sides should face towards the center. If you are using the Incra LS Super System position the outer metal fences far enough apart so that the router bit does not touch the fence.

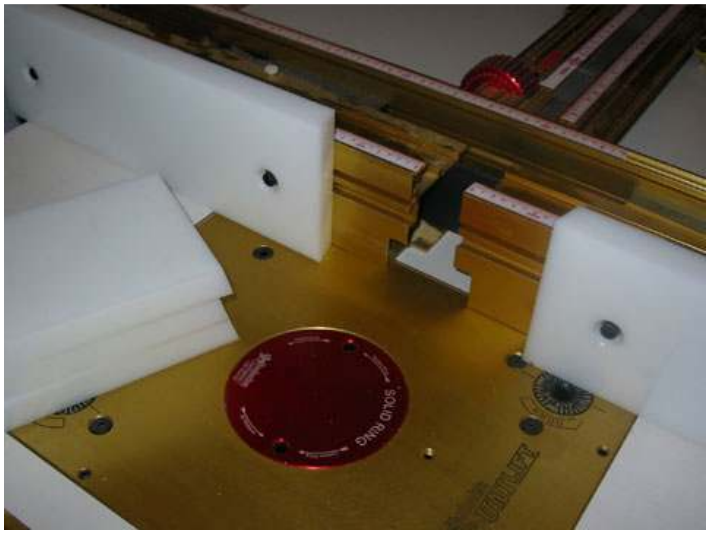


Figure 50

As shown in figure 51, slide the sacrificial insert into the 15 degree grooves in the fencing system. Once the insert is bottomed out, tighten the cap screws on the fence to lock the insert into place. You may have to push on the fence sides to obtain a snug fit.

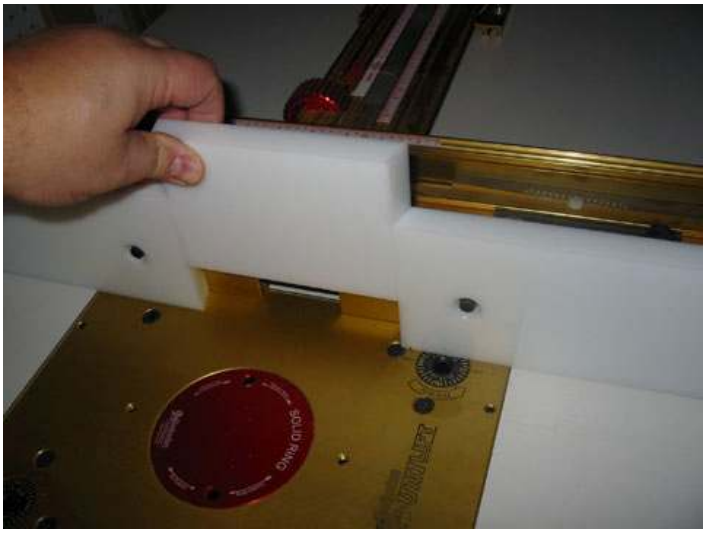


Figure 51

As shown in figure 52, the UHMW sacrificial fence is now ready to use. In practice you would use one insert for each router bit you want to use with this setup. With the router bit in the router, and adjusted to the proper height, turn the router on, then slowly advance the fencing system until the router bit goes all the way through the sacrificial insert. Obviously, you have to be careful not to go as far as to contact the metal fence behind the UHMW.

Once you have made the cut, turn off the router, then back off the fence until the bit is removing the proper amount of material. Now you have a zero clearance insert that can be used anytime you need to use this bit.

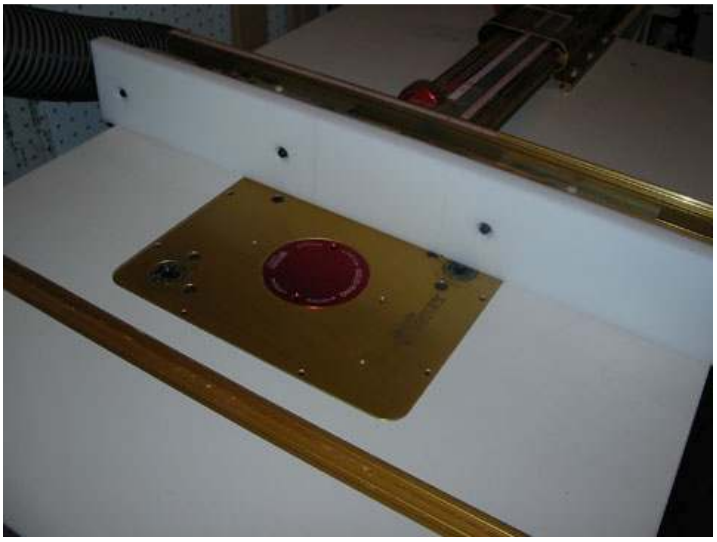


Figure 52

Many woodworking supply houses, such as Peachtree Woodworking offer ¾ x 4" x 4' UMHW for making these kinds of fences.

Table Alignment

Over time, I have found that the table "flatness" can change. This may be due to the nature of the table floating over the cabinet, coupled with the downward weight of the router, may not be sufficiently supporting the table top.

For this reason, optional support posts under the tabletop around the router can provide additional support. As shown in Figure 53, they are made from UHMW.

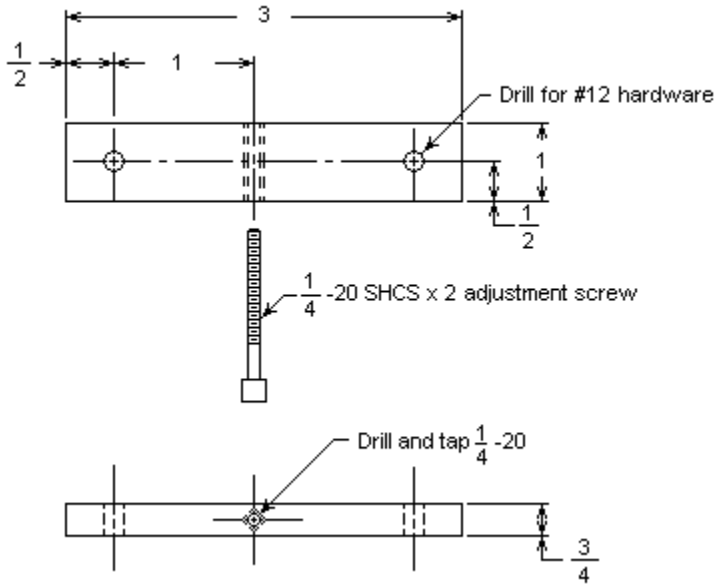


Figure 53

The quantity required is dependant on the degree of support needed, but you may wish to use several around the perimeter of the top. One every 12 inches or so around the cabinet perimeter would provide excellent support.

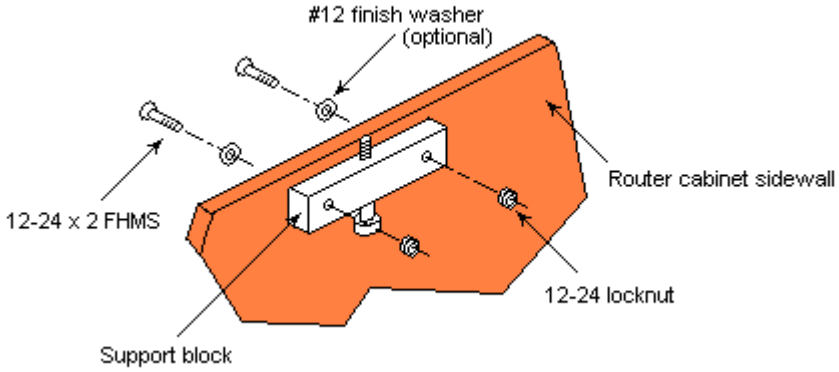


Figure 54

While I have shown thru-bolting the support blocks to the side of the cabinet, the blocks could also be attached from the inside surfaces with flat-head wood screws as shown below:

Figure 55

Which method you use is to your preference. If you find the blocks sagging with this method, you can always thru-bolt them at a later date.

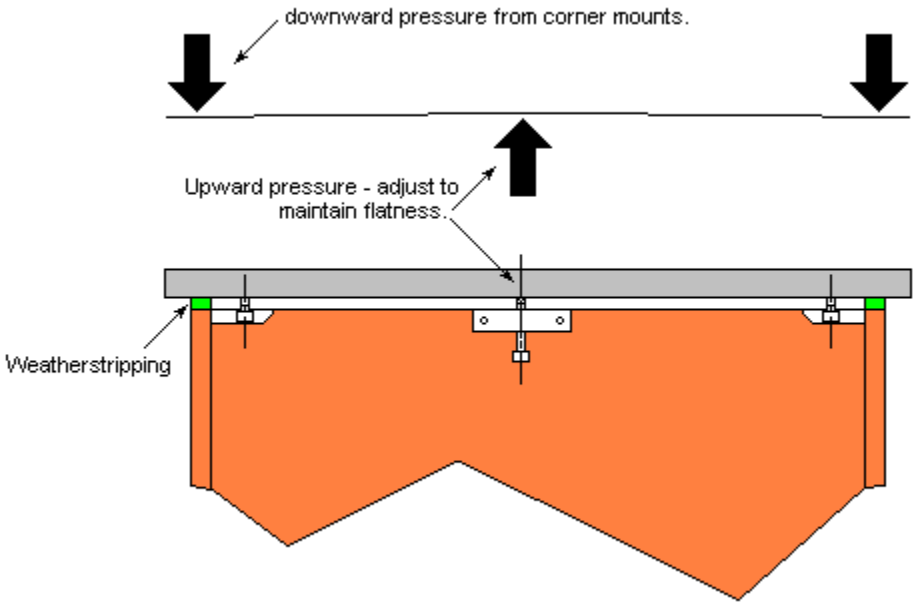


Figure 56

The idea here is to provide a method of maintaining flatness by countering the downward weight of the router and lift.

Part VI - References

Parts List

Incidental items, such as nails, biscuits, and so forth are considered incidental shop supplies and are not included in this parts list.

Description	Source	Item
¼ Oak plywood	Locally purchased	1ea 4'x 4'
¾ Oak hardwood	Locally purchased	20 board ft
¾ Oak plywood	Locally purchased	1ea 8' x 4' and 1ea 4'x 4'
¾ Poplar hardwood	Locally purchased	5 board ft
35mm Hinge 1¼ Overlay	Belwith	P5129-14
Acrylic Mounting Screws	Locally purchased	#6 FHWS
Acrylic Panel	Locally purchased	24" x 24"
Bent Wrench	Woodpecker's Inc	WR118
Door/Drawer Pulls	Belwith	PW396-24
Drawer Labels	Rockler	27953
Drawer Slides 22in	Belwith	P1750/22-W
Electric Power Switch	Rockler	63026
Feed-through Grommets	Rockler	91091
Fencing System	Incra	LS 17" Super System
Lift System	Woodpecker's Inc	UniLift (ULIFT32)
Router	Milwaukee	5625-20
Sacrificial Fence Mounting	Locally purchased	5/16-18 x ¾ SHMS & washers
Sacrificial Fence T-Nuts	Woodpecker's Inc	13M-020 (5/16-18)
Sacrificial fence UHMW	Peachtree Woodworking Supply	¾ x 4" x 48"
Table Top	Woodpecker's Inc	RT2743O
Top Mounting Bolts	Locally purchased	¼-20 x 1 SMHS & washers
Top Mounting Brackets	Stanley	755560 3" heavy duty
Top Mounting Inserts	Woodpecker's Inc	13E-14201 ¼-20 x ½ HDIN
Twist-Ring Set	Woodpecker's Inc	TLRSet
Vacuum Flange	PeachTree Woodworking Supply	05173
Weather-stripping, closed cell	Locally purchased	1" wide
Weather-stripping, open cell	Locally purchased	¼ " wide
Wheels	Hartville	36986

HDIN = Hex Drive Insert Nut
UHMW = Ultra High Molecular Weight plastic.
FHWS = Flat Head Wood Screw
SHMS = Socket Head Machine Screws.
All items are typical: Purchase items or equivalents as required.

On-Line Resources

This is by no means a complete list of possible resources, but it does offer a good cross-section of products and options that are available for this project. Where possible, I indicated the manufacturer rather than dealer.

Source	Router Lifts	Tables	Routers	Fences	Hardware	Other	On-Line URL
Belwith Hardware					✓		www.belwith.com
Bench Dog Tools	✓	✓		✓			www.benchdog.com
Bosch Tools			✓				www.boschtools.com
CMT Pocket-Pro System						✓	www.cmtusa.com
DeWalt Tools			✓				www.dewalt.com
Hartville Tool Co.	✓	✓		✓	✓		www.hartvilletool.com
Hitachi Tools			✓				www.hitachipowertools.com
Incra (Taylor Design Grp)	✓			✓			www.incra.biz
Jessem Tool Company	✓	✓		✓			www.jessem.com
Kreg Pocket Hole System						✓	www.kregtool.com
Makita Tools			✓				www.makita.com
Milwaukee Tools			✓				www.milwauketool.com
Peachtree Woodworker's Supply					✓	✓	www.ptreeusa.com
Porter-Cable			✓				www.porter-cable.com
Rockler	✓	✓		✓	✓		www.rockler.com
Stanley Hardware					✓		www.stanleyhardware.com
WoodHaven Products	✓	✓		✓			www.woodhaven.com
Woodpecker's Inc	✓	✓		✓	✓		www.woodpeck.com