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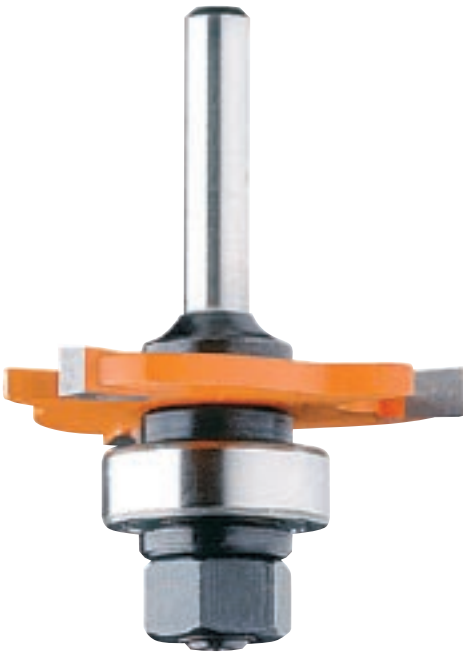

CMT Slot Cutter for Biscuiting

How to create great biscuit slots with your router table and the CMT Slot Cutter Bit. Start creating your open bar furniture

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There is nothing new about biscuit joinery. Biscuits are particularly useful when you are gluing together a number of boards to make a table top, or a writing desk top as I am doing now.

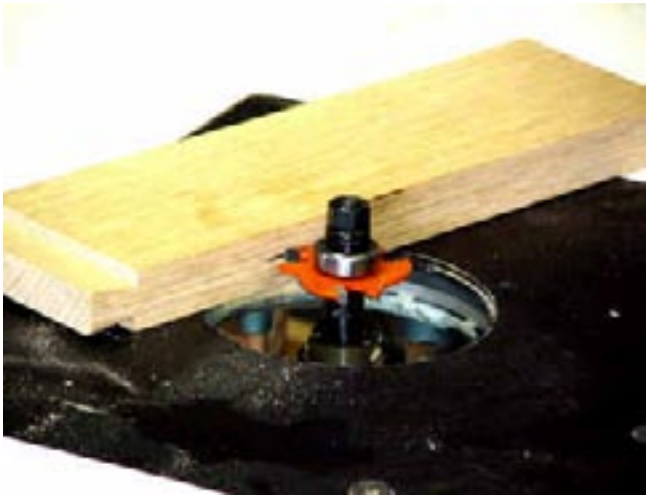
What is new for me is to use the router table to make the slots. I have two, top quality biscuit cutters and they work well, but it is up to me to have the tool aligned carefully with the board. Sometimes, that is where error creeps in.

It makes a lot more sense to lay the board flat, and move it into the router bit. I hadn't done it before, but I sure was pleased with my first results.

So this is where I started. I ordered a new slotting cutter. It is a 5/32" cutter that is recommended for biscuit cutting. As you can see, I have an auxiliary fence for the router fence, one that I made for another project.

Of course I am going to show you the bent wrench. I love all tools, but that one takes the prize in my shop.

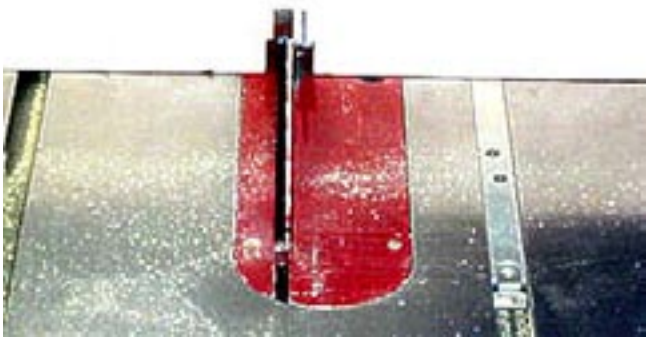
I have marked the sample board with a centerline. Since you are always going to be cutting from one side of the board, this mark isn't critical. I have brought the cutter up to that point.



On the fence, I mark lines where I need to cut out to allow for the shaft top.

Important: make the marks 3/4" apart so that the edges can be used as stop/start guidelines — more on that in a minute.

At the table saw, I cut between the lines, having set the blade to the height I had marked to allow for the slot cutter shaft.



The Incra fence provides a T-track for attaching supplemental fences, but I find it quicker to clamp the fence on, when the clamps won't interfere with the operation. I have centered the fence on the bit.

To cut the profile of the slotter in the fence, I turn the router on and very carefully and slowly move the fence into the router. Since the Incra fence is not locked, there is a little play that I use to my advantage. I carefully move the fence within the range of the play to widen the aperture ever so slightly.

I now have a “zero clearance” fence opening for this bit. In future biscuit cutting sessions, I will use this fence and set the bit height to match the opening.

I now set the fence depth by bringing the bearing flush with the front. This bearing is designed to match the depth needed for #20 biscuits. Rather than to change guide bearings for other size biscuits, I will adjust the fence using the Incra scale. For the most part, I use #20 biscuits.

It is time to make some slots. I am using the two boards that were sample pieces in the sliding dovetail mockup.

I simply mark a line across the two boards where I wish to place biscuits.

Remember, the markings should be on the bottom of the pieces, that way any board thickness differences will not show on the top.

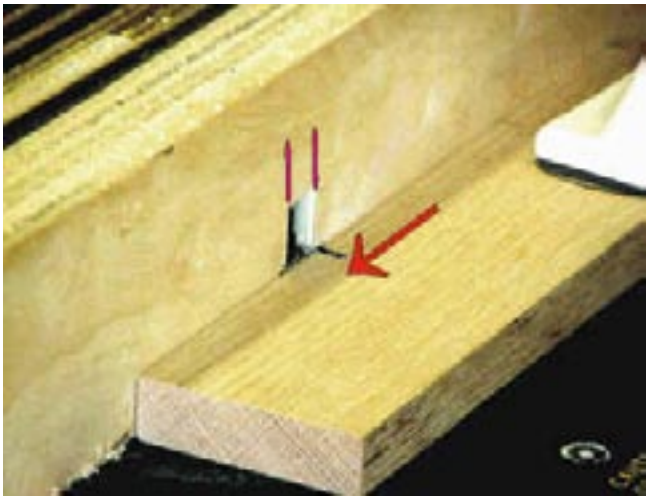
Now to start the cutting. First, remember to slow the speed of the router to the recommended speed for the bit width — in my case, I turned it down to 18,000 rpm.

To start the plunge cut, I used a push block in my right hand to firmly hold the piece to the table and the fence.

My left hand slowly guides the work piece into the bit until the piece is stopped by the fence.

With the piece flat against the fence I move it so that the pencil mark goes from the right side of the cut out to the left side.

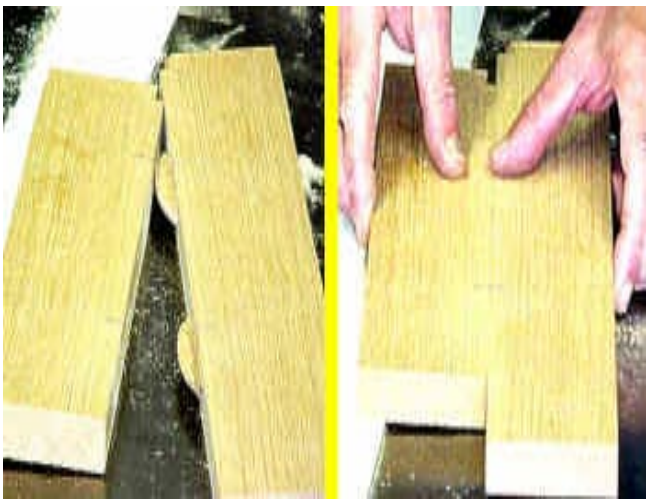
In operation, both hands are holding the piece flat to the table and fence, and the right hand, with the push block, is moving the work piece.



When the second mark is reached, my left hand moves the piece straight away from the cutter, while the right hand, with the push block, keeps the work piece from "getting away." http://www.woodshopdemos.com/ss-p1-40.jpg

The end results: biscuit joints that allow the wood to be aligned perfectly. This way makes a lot of sense since the boards' weight can rest on the router table.

There certainly will be times when I use my portable biscuit slot cutters, but I don't know when that will be.



Putting together the SuperStation has been fun, BUT, I have been itching to get into some real woodworking projects.

Well, the time is now! The SuperStation is all together and ready. I have been eyeing the Stickley Writing Desk. There are no plans to use, but the book does give some dimensions, and I can guesstimate the rest. In the cubbyhole section at the rear, I want to allow room for a laptop, and I will build in a modem/power connection — hopefully, invisible.

There will be no plans, but I will give the dimensions of components as I go.

Several weeks ago, I picked up some real nice white oak. Here I am looking at the lay of the boards for the top. The top will be 36" X 23". This is Mission Style, so there are no bread board ends or edge shaping other than to round over slightly the sharp corners and edges.

In measuring, I find that I have room to cut away some of the white sections. I would like to have the tight grain be dominant.

I want to rip the table top boards down to size, so first I move the Incra TS III from the router table section to the table saw end. This takes about 7 seconds.

I lock the fence at the miter slot and make a quick check to see that the fence is square to the table. Can your finger detect a 3-thousandth's of an inch discrepancy? Probably not, but having checked this many times with my dial indicator, I find that double checking each time with a "feel" works. Fact is. the Incra TS III has been "dead on" ever since I first calibrated the system.

I am taking the ripping of this very dense white oak slowly. This is the first time that I have used the Exaktor Overarm Guard System. One thing I like right off the bat is its counterbalance mechanism. To a adjust to a board, you need only lower oo lift the guard. The dust collection seems to work well. Where I will really appreciate that is when I am cutting MDF and chipboard. Just think, no more will I be covered with all that nasty, coarse dust.

In addition to cutting a couple boards to gain better grain pattern, I trim all the boards of their rough sawn edges. Doing these cuts is really easy since the Incra TS III allows fine fence adjustment so easily.

The sawn boards are looking pretty good, but I will run all the edges through the router-table-jointer. This dense, white oak will be a good test.

I now shift the fence system to the router table . It takes about 7 seconds, too. It really is that fast to shift from one to the other — about the same time as I used to take to walk from one station to the other. Not bad.

I clamp in place the jointer fence that I made. Since I am adding this fence to the Incra TS-III saw fence, I have added a few spacer blocks to allow room for the bit.

With the router unplugged, I lock the shaft and use the bent wrench to tighten the collet on the trim bit.

I lock the 1” insert ring in place.

The hand crank gives me very quick height adjustment. I lower the bit to fit within the fence cutout. It is very nice to make height adjustments without having to work from under the table.

I bring the outfeed side of the fence to be level with the bearing of the trim bit. The Incra TS III’s micro-adjust knob makes precise adjustment very easy.

I run all the boards through the jointer. I have wedged a vacuum pick up between the fences. This type bit exhausts its dust behind the fence so a vacuum pick up is necessary in some form. I plan to make a fence that includes a dust collection port — coming soon.

The boards look good and tight.

My next step is to cut slots for biscuits. I mark each of the joining boards at four points along the length. Note that I have flipped the boards over. The bottom sides are up now. I want this side up when I cut the slots. That way the top side will be down and flat to the router table. If there is any discrepancy in thickness, the top, at least, should be nice and flat.

Earlier in the week, I had time to figure out how to use the router table for making biscuit joints. (If you haven't seen that page, click here.) Now is the time to use what I learned.

At the router table, I install the 5/32" slotting cutter. As with all the bits, I press the bit until it seats in the collet. Remember, I have placed two "O"-rings in the collet to serve as the spacer that is required.

I place the auxiliary fence on the table and set the router bit height to the opening. This fence opening was cut for centering the slot on 3/4" stock, so this should work fine for the table top.

The Rout-R-Lift height adjustment is very fine. Turning the crank one revolution raises or lowers the bit 0.05". This makes fine tuning the bit height a breeze.

With the bit in the opening, I know the fence is centered so I clamp it here. Note that I have added spacer blocks between the auxiliary fence and the Incra TS III fence. This allows for me to wedge a vacuum pick up in between the fences. As I said earlier, I plan to make an auxiliary fence that will connect directly to the dust collector.

I use a straight edge to align the cutter's bearing with the edge of the fence. Using the Incra TS III's micro-adjust knob (insert) is so much easier and more exact than "nudging with a hammer."

Even in this very dense oak, it takes no time to make perfect biscuit slots on all the edges. Remember, the bottom of the table is facing up. The table top is face down on the router table. That should give me perfect alignment on the top face even with boards that may differ slightly in thickness. We will soon see.

At my work table, I have set the top panels in order on two Bessey K clamps and am now starting to glue.

As I finish brushing the glue on the edges and the biscuits, I piece the boards together with hand pressure only at this point. The PVA glue has quite a long "open" time — approximately 15 to 20 minutes. That is plenty of time for this table top to be assembled.

I only want to clamp with enough pressure to get some squeeze out. The boards were so well fitted, that more pressure isn't necessary. Over-tightening will weaken a joint.

The top is glued up. Note that I have added a third clamp on the other side. These boards are very well aligned and are not cupping, so this third clamp isn't really necessary but is good to do as a matter of practice. It does make it possible to stand the assembly up while it dries.

With a damp cloth, I wash away the squeeze out. I can do this with out negatively effecting staining later on, since I will not be using a penetrating stain. I will discuss this more when I start the finishing process.

I will do the legs, with sliding dovetails, next week.

This picture says a whole lot. First, in the background, note that I have a Performax thickness sander that I would normally use for sanding the glued up desk top.

I chose, instead, to use a cabinet scraper because it gives a finer end finish. Secondly, the top was so flat, that little scraping was required. Lastly, I am trying to do this project sticking to the SuperStation. To use the Performax would be like Norm going to his $14,000 Timesaver wide belt sander – not really fair for the rest of us. So scraping I did. and I enjoyed every minute of it.

I cut the width of the desk top using the sliding table. I said last week, that this top does not get any edge treatment other that the slightest round over, which I will do later on.

Cutting the legs to length is a breeze, too. It helps to be using the fence stop – the table should stand level with four equal legs.

Last week, you will remember that I practiced making sliding dovetails. I use the practice cut-offs to help me determine the length that I should cut the sides. I have carefully set the blocks back 2" from both edges and am now measuring from dovetail to dovetail. This way, I don't have to measure and then calculate setbacks, socket depths and all. For me, this is a much safer way.

To the SuperStation. I start, by moving the Incra TS III to the router section. By the way, I am following the exact same procedure that I did when making the test cuts.

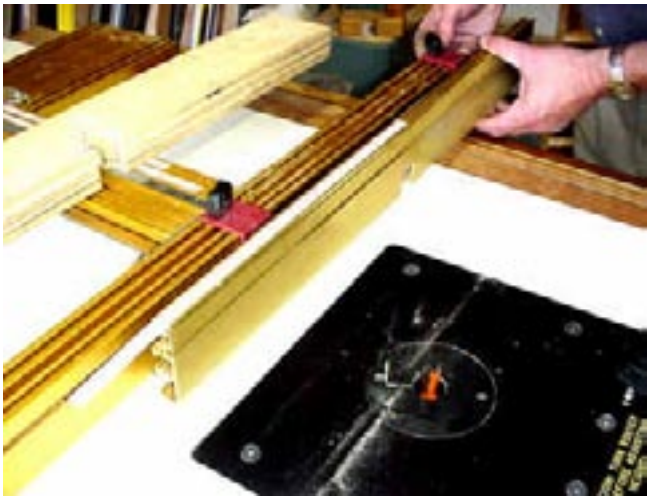
I will show much of the steps that I used today but not in the same detail as last week.

I am going to start by installing the 5/8" dovetail bit that I used last week. I won't make the dovetail cuts yet, but I want to use the bit to help me "zero" everything to where it was last week.

And, yes, just one picture using the bent wrench, my favorite tool.

I lock the insert plate in place.

I add the Incra router fence to the TS-III fence and center it over the bit.



I could have used the settings I came up with last week, but, instead, use my sample piece to set the fence to the correct distance and the bit to the right height.

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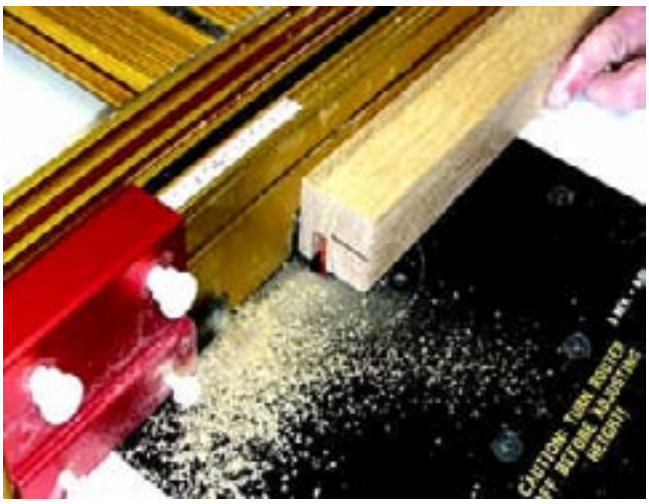
Before I go much further, I mark the insides of the legs. This decision is purely a matter of aesthetics, but I don't want to be cutting sliding dovetails on the wrong sides.

Since the sides are the same width as in my test of last week, I use the sample block also to set the Incra Stop. Using a good sample, like this, does make things simpler and, hopefully, foolproof. Good wood is expensive. I don't want to make any errors at this point.

I have backed the fence off (that is why I set it to zero) and have installed a 3/8" straight bit. I will use that to cut most of the groove, before I use the dovetail bit to make the final cut. With the fence's zero point marked, I can move it back to change bits and, then, return it to the exactly right point without fear of error. To me, this is a real benefit to the Incra System — repeatable accuracy.

I cut the groove, with straight bit, making several shallow passes. I have used the Rout-R-Lift's hand crank to adjust the bit down from the final height. In doing this, I have counted the number of turns of the crank. I went down exactly 10 turns from the set height, and now I keep track of the turns as I raise the bit and make the passes. When I have added 10 turns, I know I have reached the right height.

Note that I am cutting only the one groove on each leg. I will complete this one and then reset the fence and do the other.



After I have cut the straight groove to depth, I switched to the dovetail bit and made one pass. Even in the dense oak, the dovetail bit cuts smoothly. It would have done nothing but burn if the straight bit hadn't done its work first.

There is no way to get around this two step method. The Rout-R-Lift and Incra System make the task very easy and accurate.

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So here I am making that final dovetail cut on the last of the four legs. Even with all the setting and resetting, this leg cutting operation took about 20 minutes. What I like best about it is that it is a safe way to cut the legs, and they came out perfectly.

Now it's time to cut the sides to fit.

I have ripped the sides, front and back to 3 1/2". The final measurement will be 3", but I wanted to allow for possible tearout when cutting the dovetail rabbets, and I want some extra width for cutting the front — more about this in a minute.

Here, I am marking the backs of each board. You can see at the right, there is one small knot which barely shows on the other side, so I will place it on the inside of the back. For the most part, this is very high quality wood with no bad spots to consider.

I purposely left the dovetail bit at the height that it was when I cut the dovetail grooves in the legs. Now, I am using a scrap of wood to adjust the fence to zero (the bit just brushes the block.) Once set, I move the fence exactly 1/8" on the scale. I will make the first rabbet on both sides with that setting. From my test run last week, the rabbet was a bit over 3/16" on each side. Making this rabbet in two passes will make the cut easier and will reduce the chance of tearout.

I use my shop made jig to hold the piece securely against the fence. I was hoping to do two pieces at a time, but the jig was narrow by about 1/2".

Fact is, doing all four pieces, both ends and both sides, took only about 5 minutes.

Then I adjusted the fence 1/16" and made the final cut. As in the test last week, it took a bit of nudging with the micro-adjust knob to get an exact fit. Once perfect, It took another 5 minutes to make all the cuts again

To make the rabbet cuts at the haunches, I was able to clamp all four pieces together. A couple of passes, and I was done.

Time to get back to the table saw and cut the pieces down to final widths. I do like the way the Incra TS III is easy to switch between stations — and the stops are very accurate. I have not had to recalibrate the fence to the blade since I first set up the system — that is good.

Before I go further, I will say that I did remove the blade guard so that you can see these cuts.

Earlier, I said that I would explain the cutting of the front. I want to have two side-by-side drawers in the front, so I will rip the bottom rail (1/2"), the 2" drawer section, and then the top rail (1/2"). Ripping and keeping the pieces in order allows the front piece to keep the original grain orientation. Remember, I cut the piece wider (3 1/2") to allow for the kerfs and a bit more.

Here I am cutting the bottom rail. I am using the pushstick that I made. It is exactly 1/2" wide and rides the T-tracks in the Incra TS III fence. I don't like narrow cuts, but this setup allows me to keep control over the stock all the way pass the blade.

Having set the fence to 2”, I start the ripping of the center drawer section. I will cross cut this piece a little later when it’s drawer making time.

My last cut is the rip of the top 1/2” piece. Part of what makes ripping safe, is to have a sharp and clean rip blade, a perfectly aligned fence, a polished table top and firm control of the stock all the way through the cut.

(Note: I will admit that what I am missing is a good splitter with anti-kickback palls. I will remedy that soon.)

Thanks to the accuracy of the Incra fence system, I end up with a front that is a total of 3” wide. The pyramid markings allow me to keep the pieces in the right order. By the way, you are right that you can barely see the cuts — that is a sign of a good ripping setup.

I reset the fence to 3” and cut the sides and back. Note that the dovetail haunch is against the fence. I don’t want to cut that off by mistake.

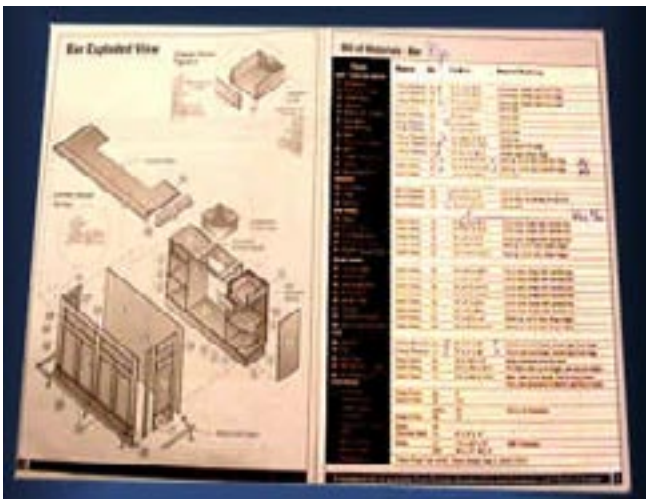
Well, that is where I will stop with this project for this week. But we did start another project - the Standing Bar — a fun project that uses the SuperStation and more.

In looking for another SuperStation project, my friend, Sal, said that a bar was on his wife's to do list, so I said "let's make one."

It didn't take me long to see that Rockler Hardware had plans for a very nice looking bar. Normally, I would draw plans from scratch, but this time I thought it would be interesting to see how it would be to work from a set of finished plans. After all, they only cost $20.00 or so — I should be able to make that up in time saved from having a complete set of plans, not to mention errors I might make from doing my own.

When I received the plans, I looked them over very carefully. Clearly they were professionally done, and the various charts and diagrams should make the building of the 2' X 6' bar much easier.

But one thing I missed right off the bat was any detailing of total panels and board feet of solid stock needed. And, to me, that is a real short coming. There are 90 pieces to cut. Each piece is exactly described...but you (or I) have to put each piece on a cut list and add it all up to order the right material. That was disappointing, but I got over it.

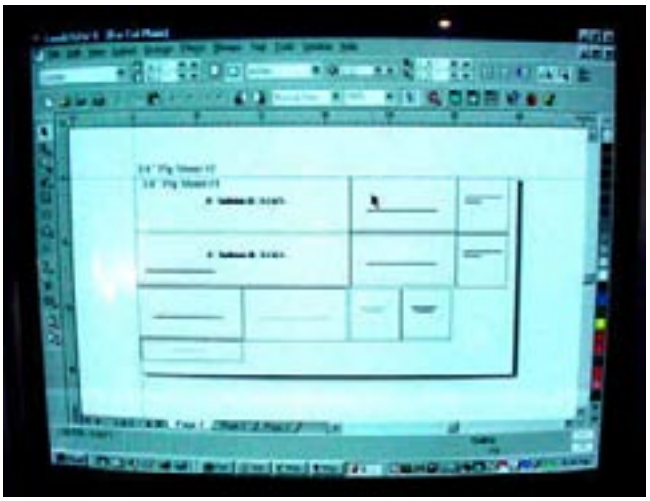


I started doing this wood breakout by doing what I usually do, sitting down and marking on a piece of yellow paper each and every part. For 90 pieces it took two hours and a lot of adding of numbers — an area where errors can creep in. [23 1/8 by 6 1/4 plus 17 1/2 by 8, etc...]

So I turned to my computer and the art program I use, Corel Draw. I started by laying out a page that was 48" by 96", the size of hardwood ply, of course. Then I took one part at a time and used the Plan's dimensions to create a block and then moved the block onto the page. I didn't have to add the pieces up as long as I didn't overlap the blocks.

I found that I would need 3 sheets of 3/4 ply...I had 3 pages of little blocks.

I carefully specified in each block, the part number, description, and dimensions.



Printed out, these pages gave me a cutting plan for the panels. The draw program took about an hour to complete with a lot of that time spent double checking the numbers.

So here I am at the first panel and ready to start cutting.

I said that this was a project for the SuperStation — and it is. But very often, I find it is easier to make the first panel cuts with the panels resting on horses and using my trusty circular saw. I don't usually have an assistant to help me heft the whole panels onto the table saw, and I am limited in the maximum size my sliding table can handle — not a whole 4' X 8' panel.

Here, I am setting the depth of cut to just exceed the thickness of the 3/4" panel. You will note that I have the ply laying on top a 1" board of foam insulation material. This is a great way to keep the board raised above the horses. I cut slightly into the foam material but not the horses. The foam panels are used over and over and when they are really shot, they are discarded.

I clamp a straight edge onto my board where I want to make my first rip. I set it at the width I want plus 1 1/8", the distance from the edge of the saw to the blade.

There are some good straight edges that can handle the 96" length but I bought an 8' level that could serve double duty. I would stay away from the 8' straight edges that are two lengths clamped together in the middle. The one I had was never really straight...kind of defeated the idea of a straight edge. This works very well.

I try to keep my left hand on the straight edge as I proceed with the cut. If, for any reason, the straight edge doesn't lay flat to the panel, the saw can move under the straight edge and make a mess of the cut. This can happen where the panel isn't supported well and sags.

By the way, I find this 6" saw perfect for these panel cuts. It is easier to handle than my 7 1/4" unit. With a 40T carbide blade on it, it makes a great cut.

As I make each rip, I add a piece of blue masking tape and mark the part number from the Rockler Plan list and the dimensions. I will make the final cuts at the SuperStation.

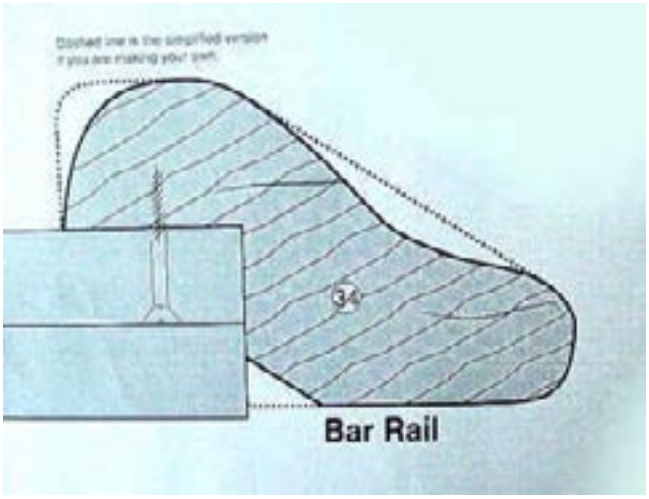
Let me discuss the issue of cutting twice. My portable saw makes a very good finished cut, but it isn't as good as the table saw. I usually cut these parts leaving about 1/4" so that I can make the final trim later. In addition, I add more waste to be cut off if the panel's edges are less than perfect.

At the SuperStation, I make the cross cuts.

And then make the final rip using the Incra TS III fence. While this may seem like an extra step at times, I feel that I can get the most precise dimensions of each and every part when I do it this way — unless, of course, I simply make an error in writing the dimension. I check and double check to reduce that possibility. After all, good hardwood stock is expensive.

Since there are so many parts (90), I cut one panel at a time. At this point, I have 11 parts dimensioned. 79 to go. So on to the rest of the plywood cuts.

This may seem like it is out of sequence, and it is, but for a good reason. On the top of the bar, there is a broad piece of molding with a very gentle curve. Rockler sells the Bar Rail in cherry but since this unit is of birch ply and poplar, I decided that ordering the cherry pieces would be unnecessarily expensive, and I could make a piece of molding that would be close.



When I was trying to figure out how to do the very slight cove cut, I read of a new product shown at IWF. CMT was showing a cove cutter for the table saw. A phone call later, and I had the prototype that they were using at the show and since I only have it for a few days, I have to get cracking on that molding now. It is going to be fun creating some jigs to help do this safely. This is definitely a serious cutter for the table saw.

The Plans say that the stock is 2 1/2" X 4 3/8" and that the short sides (2) are 24 1/4" and the long side is 71 5/8". So I got 3 14' lengths of 1" X 8" stock.

Like the large panels, I can't handle 14 footers in my shop, so I line them up together and cut them to more manageable lengths. I try not to do any cuts by eye. It is just as easy to use a guide.

At the table saw, with the rip blade installed, I cut all the lengths to a width of 5" — more than the width I need, but I will trim to the final width after I have glued up the 3 pieces.

Well, I got a start on the Bar unit. Next time, I will use the new cove cutter. Cutting cove on the table saw is a totally new experience. I will do some "homework" before I start this next week.

If you recall, the beauty of using the Rockler Bar plan was to be able to cut so many pieces by the plan descriptions. This should make the building of this bar easier.

That was the theory. I ran into one small mistake, and that mistake cost me about a day's worth of time. I will get to that in a minute, but let me start this week's tale.

The plans call for 10 raised panels. Six of these were wide and had to be glued up, so I started by cutting the boards to length. The flip stop on the Exaktor Sliding Table is a great assist.

I made use of a gorgeous, warm, sunny day to cut the long boards of poplar into lengths for the glued up panels. [Please pardon the camera; it was suffering from sun shock.]

At the router, I will do:

1) edge jointing before glue up;
2) cutting biscuit slots for glue up;
   and then after glue up, I will do:
3) shaping the raised panels; and
4) cutting the rails and stiles.

It always amazes me how much the router table can do, when setup properly.

I start by installing the straight bit for jointing the edges.

I use the Rout-R-Lift crank to lower the bit to fit in the fence opening. Note, that I am using the edge jointing fence I made several weeks back. The left, (outfeed), side has one layer of Formica to give a 1/16th elevation over the infeed side.

This fence will be clamped onto the new router fence/vacuum box I made

Now, with the front clamped to the fence assembly, I can use the Incra TS III's micro-adjustment knob to accurately set the fence to the guide bearing. This absolutely beats adjusting by the "hammer tap" technique.

I run the boards with the face side down. I could have added feather boards, but it was quite easy to just keep both hands on the board. The jointing went smoothly. I made one pass on each of the boards.

Look closely. You can't get a better fit than this. I flipped the boards over and marked across the joint in four places where I will make slots for biscuits.

To make the biscuit slots, I install the 5/32" slot cutter.

I lock an insert plate in position.

Having adjusted the height to center on the 3/4" board. I have cut the fence so that it fits the cutter but still allows for some height adjustment. When using these "zero-insert" fences, you must be sure that the bit turns smoothly in the opening before you turn the router on.

I can now cut the biscuit slots. Remember, the face side is down, flat against the table. To cut the slots, I move the pencil mark into the right side of the opening and then push the piece along the fence until I reach the left side. At that point, I ease the piece away from the cutter.

It's glue up time. Even with four panels to do, there is no rush. I am using yellow PVA glue and it has a 20 minute open time. I do want to take the time to get a thorough coat on the edge and the biscuits.

I make minor adjustment so that the lines match up and add some slight clamping pressure.

I am as guilty as many of you in over using a combination blade. Here, I am switching to a rip blade. It does make better ripping and is worth the time it takes to make the change.

I start ripping all the rail and stile pieces — and there are a lot of them — 16 to be exact. I rip them to the exact dimensions of the plans and add the blue tape with the part number.

Where there is repetitive cross cutting, I use the Exaktor's sliding table fence stop. There is no more accurate way than this — if you set it correctly.

I double check the cuts against the Rockler Plan. You can see that there are a quite few boards.

Now it's time to cut all the profiles on the rails and stiles.

The Rockler plans simply say to cut the rail and stile profiles, so I turn to my instruction sheet from Marc Sommerfeld to walk me through the steps.

Per his instructions, I will first make the cope end on each of the rails. This profiled end will allow the rails to fit the profile of the frame members.

I install the cope bit.

I lock an insert plate in position.

I adjust the height so that I have a very slight flat area at the bottom of the cutter. The illustration is from Marc's tutorial on using these bits. Note that the illustration shows the normal view, but the workpiece and cutter are upside down. The flat edge named "A" is what I using to set the cutter. By the way, the white area in the illustration is the profile of the bit. The tan represents the rail and stile profile that the cope will fit.

Having set the right height, I cut an access hole in the fence front using the saber saw and the method outlined in the fence making instructions.

With the fence in position, I use the Incra TS III micro-adjust feature to make the fence exactly even with the bearing of the router bit. There is no better way to do this alignment.

I am ready to make the cuts.

I cut the cope ends of all the rail and stile pieces that will be fit into rail profiles. My right hand controls the cut by keeping the push sled against the fence. I have attached a new piece of MDF to the push sled so that the sled could serve as a backer board. This minimizes tearout of the cross grain of the rails.

My left hand uses a push pad to keep the workpiece flat on the table and against the fence. This cutting went very smoothly and safely.

Now I install the rail profile (stick) bit. All that I need to do is to insert it fully so that the bit bottoms out on the O-rings in the router collet. The height adjustment shouldn't be required.

The rails and stiles get profiles cut on one or both sides depending on where they fit in the final assembly. Again, I use the push block to keep the piece firm n the table and against the fence.

The SuperStation is really proving to be a very handy one-stop-does-it-all place.

Here comes the exciting part — fitting it all together. And here also comes the part which I mentioned at the start of this story — a major goof. I think the goof is in the Plans.

The rail and stile assembly didn't fit exactly right. It took lots of measurements and checking to determine that all the parts were exactly dimensioned per the plan.

The error came in the difference of the rail and stile profiles. In adding up the Rockler Plan dimensions, it became apparent that they allowed 1/2" for the rail/stile profiles. The CMT set allows 7/16". You wouldn't think that this would make a big difference, but the 1/16" "error" adds up. Look closely, and you can see the gap...too much for wood filler and way too much to be proud of.

So whose fault is it? The Plan's for not stating somewhere that their rail/style profile set was 1/2". Or mine, for not adding up the dimensions before cutting. What do you think?

The only solution was to start in one corner and trim each and every piece to fit the assembly. Of course, after each length was trimmed, I had to re-run a new cope end.

Needless to say, my view of using Plans to make projects easy, took on a new bias. Here, I am not threatening my trusty sidekick — never! Just shouting for joy after hours of finicky correction.

With the frame fitted but not glued, I lay the panels in their position. I trimmed each panel down a hair to fit in the opening and to have 1/8" space to float in the groove.

It is time to cut the raised panel shape on the panels.

The CMT raised panel cutters are two cutters in one. The large cutter cuts the front face of the panel, and the smaller cutter profiles the back side. This gives you a perfect tenon on the panel to fit into the groove.

This bit comes with a final diameter bearing which is installed which can be replaced with the large bearing for making the first cut. Rather than to use it, I will use the fence to make a number of progressive cuts.

This is one big bit and even on this relatively soft poplar, I feel more comfortable taking a number of passes. I also end up with a better finished profile.

I adjust the height using a piece of the cope profile. The tongue of the panel should be the same as the tongue of the cope. This makes setting this cutter very quick and positive. And, yes, I will run a sample.

I have installed my fence for this bit and am making the first pass on a sample board. As always, I cut the end grain and then the side. This first pass is a shallow pass. I will move the fence slightly and making another pass in order to test the sample.

The sample is in the groove and I have rested a straight edge over the corner. It is close but definitely there is a gap. What would you do? Would you let it go and cut all the panels?

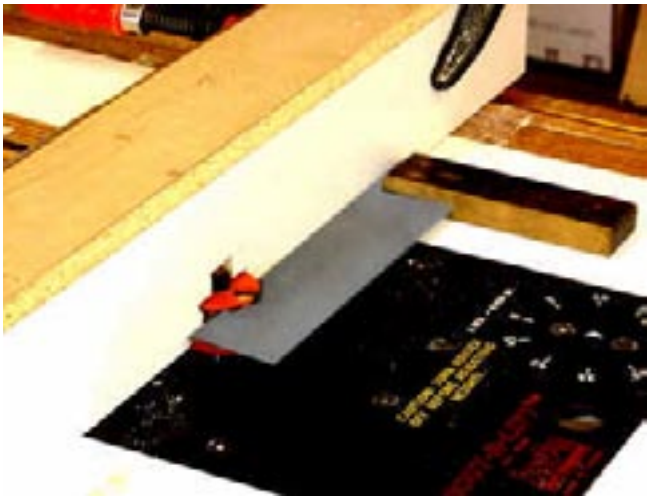
My answer is “no”. First, that kind of error isn’t acceptable, second, it is easy to correct. That is why I did the test.

I use a thickness gauge to measure the gap. The measurement was 0.01”.

Here’s the fun part. Since the Rout-R-Lift gives you .05” per complete turn of the handcrank, I just have to lower the router by 1/5 of a turn. I am using an Allen wrench rather than the crank that comes with the unit, since the wrench serves other purposes.

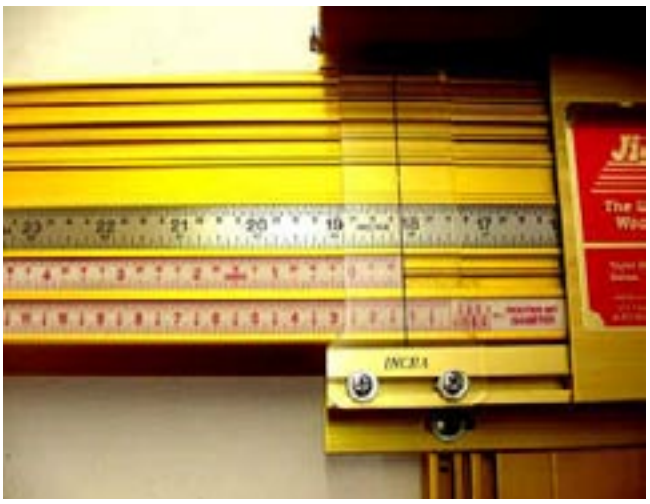
Before I actually run all the panels, I want to set the Incra TS III scale to help me adjust the fence through the several passes.

I start by moving the fence until the guide bearing is flush. This is the final cut position.



I am using the center scale. Since the scale has 1/2" to the right of "0" and the panel bit has 9/16" of movement between the first and final cuts, I set the scale at the end point.

I want the last cut to be 1/16", so I make the first and second cuts at 1/4" each each. Using this scale really simplifies this operation.



In the excitement of wanting to shape the panels, I almost forgot to do the final sanding of both sides. It is easy to do it now. To do it after the edges are shaped will round over the crisp profiles.

Well, I am making the final pass. Even for the 6 panels, it didn't take that long. By taking small passes, the cuts were easy and safe.

All the panels for the front section are done. They look very good. Making the last pass with a 1/16" move of the fence gives a very smooth final cut.

I finally feel like I have made some progress. Here the panels are just sitting on top the frame. Before I move to assembling everything, I am going to stain the panel edges. So that is where we will pick up this story next week.

Well, it was the end of a long day but I wanted to get a coat of stain on the edges of the panels. In case you have never done panel construction before, you really must stain at least the edge of the panels before assembly. That way, when the panels shift, raw wood won't show. In this case, I am only going to stain the edges. I plan to spray stain the whole assembly later. I have a brand new spray stain product that I will use.

I start the assembly of the front panel by breaking apart all the pieces but keeping them in their respective positions. I add glue to the first stile.

A slight tap with my mallet coaxes the piece into position.

I slide the panel into position. The panels will not be glued. They are meant to float in the channel to allow for seasonal shifts of the wood.

As each piece is glued and fitted, I add a couple of 3/4" brads. I am working from the back of the assembly. The brads will help hold the structure until I am done and can add clamps.

I started with the left and bottom components absolutely square and clamped to the work table, so I know the completed assembly is square. I check just to be sure. It was.

I now can move it out of the way and start the case part of the project.

It looks like having pre-cut all the pieces will make the assembly of the case unit go very quickly. It did. There were no "surprises."

As I laid out the pieces and looked at the drawing, I realized that I would have made the construction different. The case uses simple butt joints. I would have preferred to use rabbets and dados. I think this will be strong enough but any woodworker who is able to do the raised panels for the outside, would surely want to use dado construction on the interior. A small rant on my part. Of course, having precut all the pieces, I couldn't dado now, so glue and nail away.

Well, doing just nailed butt joints started to bother me, so for the insert shelves I decided to add a bit more strength by using my Kreg Jig and drilling some pocket holes.

With a speed square clamped in place to give me alignment, I screw the shelf into position. The screws will be visible but this view is from the underneath. The pocket holes definitely helped pull the case together. If I had thought of it earlier, I would have used them on all the joints.

This time, it was my error. The plans clearly said to add wood edging tape to the panels. It would have been easier before assembly, but the portable iron works fine.

I did get the edge bander off the wall to do the doors, drawer fronts and shelves. If you do a lot of panel work, this type unit can be useful. For most home shops, the portable iron works great.

I add the 1/4" ply back to the case. I used this process to "pull" the case into square. Stapling it around the edges will hopefully keep it square.

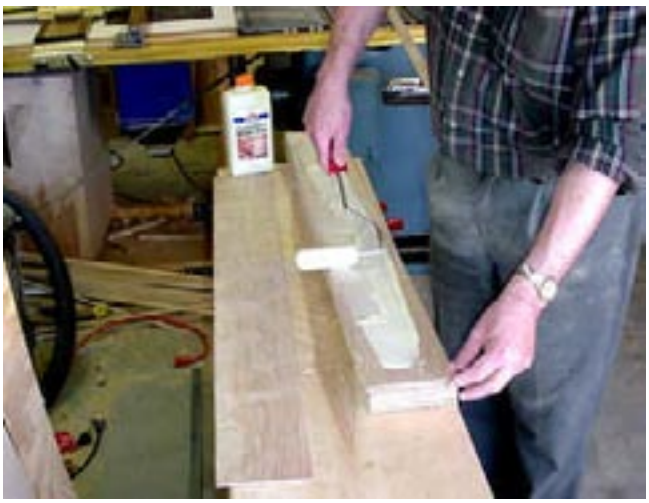
The case is coming along fine. I have placed shelf standards in each of the lower sections. The Plans call for cutting the top and inserting a dry sink in place. We opted to forego the sink, and I have added a middle shelf.

I have flipped the case over so that I can add the 4" bases assembly. Only the front will be visible so the butt construction is OK. I decided to add pocket holes so that the base could be attached better.

My Kreg Jig and base is always ready to go, which makes it real easy to add pocket holes whenever I need them. They will work very well here.

I have applied carpenter's glue to the edges and now fasten the base pieces to the case. You can also see that the ends are pocket holed so that I can fasten them to the front and back. I am sure this beats the plan's method of simply nailing in place.

The plan calls for 1/2" Baltic birch for the drawer sides. I do not have any at the moment, so I am gluing together 1/4" plywood. Since the 1/4" ply is really a shade less that 1/4", I am going to laminate 3 pieces together. They add up to 5/8" which will make a good drawer side.

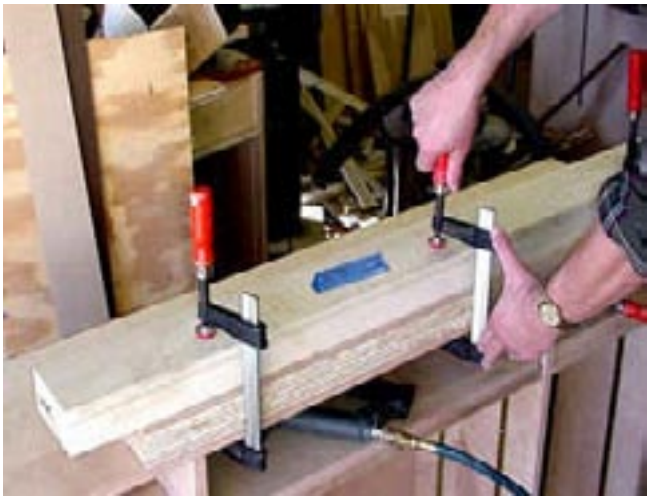


I am using 5/8" brads shot in at an angle to hold the 3 pieces in position while I clamp the stack. I actually have 3 layers of 3 in this stack. I purposely made the pieces wider by 1/2" so that I can trim them down to size.

I have added the heavy bar rail board to the stack to serve as a caul and have clamped the drawer side boards to set up over night.

Next time, I will make the drawers. The plan calls for simple rabbeted corners. I think I can do better than that. What do you think I will do: 1) use a locking drawer bit; 2) use pocket holes; 3) use the Incra for dovetails; or 4) use the Kaitie Jig for dovetails? I will give you one hint. I want the drawers to be pretty and strong.

Stop back next week and see.



The drawer stock I made from 3 layers of 1/4" ply has set, and I can now rip them to dimensions called for in the plan.

I can't go by the plan dimensions for depth because I am going to be doing 1/2 blind dovetails and, more importantly, I will be using slides that require 1/2" clearance on both sides. If you have ever installed slides, you know that a drawer that works well has to have exact clearance. The best way, I know, is to use the 1" width of the adjustable square to check the clearance. If it is over slightly, I can shim the slide. If it is under, there is no easy cure.

Having cut all the drawer stock, I move the Incra TS III to the router position.

Of course, I am going to be making half blind dovetails using the Incra system. Of all the drawer joints that are available to me, I think the Incra System is fastest. It can make great dovetails — even in plywood.

I attached the Incra routing fence. Even though I made a shop fence with vacuum pickup, I must use this fence since the vertical fixture rides on it. I simply position it so that it is centered over the bit.

The Incra Handbook can be overwhelming with all the templates, but it is really quite simple. I first run through the templates looking for the dovetail size that will work on my board. Then, I check to see if I have the dovetail bit that is used for that template. With the template selected, I can proceed with setting up the system.

When I built the router storage cabinet for the SuperStation, one of the smartest things I did was to customize the top drawers to hold the 50 templates. I am looking for the DOVN template, and it is right where it should be. (If only I could say the same for everything in the shop.)

I install the template in the Incra slide carriage.

I use the bent wrench to install the right dovetail bit. It is great to be able to change bits from on top the router. (I will admit that I had to take the router up and out to change speeds. The downdraft chamber precludes making those changes from below.)

I have placed a piece of scrap wood over the bit and am using an Allen wrench to lower the bit height. I want to “zero” the bit.

Having zeroed the bit height, I can turn the crank clockwise exactly 7 and 1/2 turns. This will accurately set the bit height to the 3/8” (.375”) that is called for in the template details. There is no more accurate way than this to set bit height.

I lock an insert plate in place.

I am ready to make the dovetails. I first mark the center of a scrap piece of wood. It is a scrap that is the exact same width as the drawer sides.

By the way, Incra has a centering scale that is easy to use. I fall back on this method, since I am familiar with it and know it works.

I now center the piece so that my center mark lines up with the center of the bit. All the dovetail bits have a small hole in the end. This is used in the manufacturing process and comes in very handy when centering by eye.

With the piece centered, I bring the fence over and lock it in place.

With the fence locked at the center point, I route one cut; turn the board around and make the cut again. If the centering process is off a bit, the cut will be widened by the amount of the error.

I can see that the center is off a wee bit, so I use the Incra micro-adjust feature to center the bit exactly in the hole.

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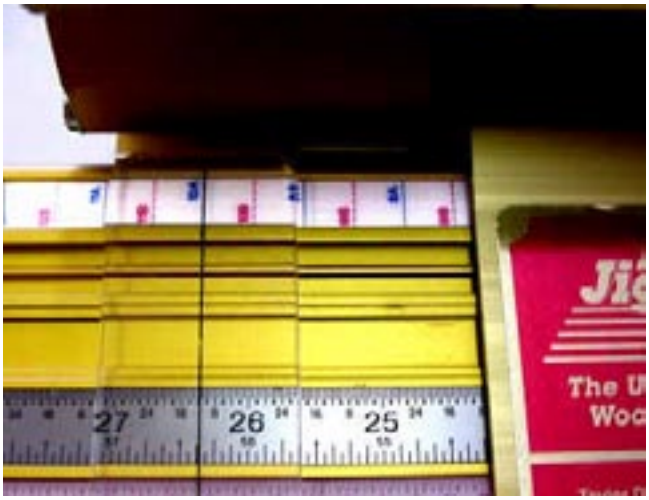

Now this step is not an Incra step but one I developed for making great dovetails in plywood and other woods that want to tearout. I am using a tenon marker to make a slight cut at the dovetail height. I do this on all the sides.

The first step in actually cutting the dovetails is to rabbet the back of the side pieces. I have adjusted the fence so that 1/2 of the dovetail bit is revealed. That will be the depth of this cut. A push sled makes the cut accurate and safe.

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All the dovetails are made and fit well, so I move the Incra TS III back to the table saw position. It is time to cut the dados for the bottom ply.

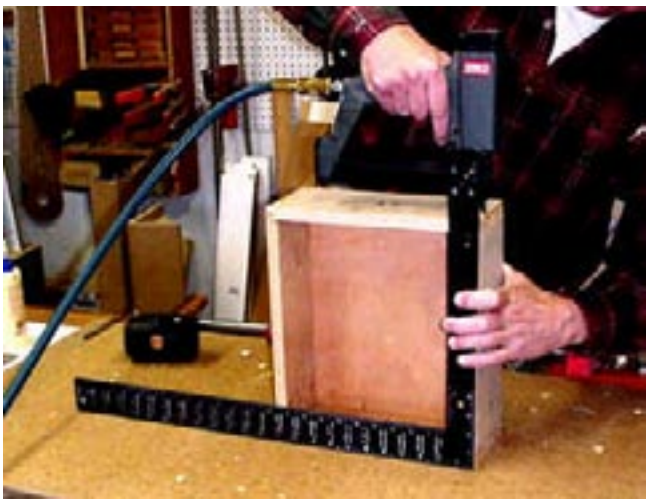
I have installed my stacked dado cutters with just the two outside blades. That gives me a 1/4" groove which is plenty for the 1/4" plywood I will be using. This ply actually is slightly thinner so the bottom will float nicely.

I dry fit one drawer so that I can measure for the bottom. I want to allow for the dado, but not make it too tight.

The Exaktor sliding table makes it easy to get square, accurate cuts.

I brush carpenter's glue into the dovetail surface. It is a great joint for glue surface, so I take time to brush it thoroughly over the pins.

I check for square and use the brad nailer to pin the joints. The brads won't show since the drawers get a false front added later. With the joint pinned, no clamping is necessary.



I check for square and use the brad nailer to pin the joints. The brads won't show since the drawers get a false front added later. With the joint pinned, no clamping is necessary.

Well, I found another problem with the plans. As you may have noticed in the last picture, the drawer height is close to the height of the opening. Slides require at least 3/4" clearance for the drawer to be added or removed. I usually allow a full inch. So, back to the table saw to trim off the difference.

I couldn't find 12" ball bearing slides that I would normally use, so I mounted these inexpensive slides. They should work fine.

I decided to use wood pulls for the drawers. Here, I am lining up my jig with the centerline of the drawer front.

I have installed a 3/4" mortising bit and a 1" guide bushing. This is the bit/guide combination that I used when I created the template. I set the depth stop to allow for a depth of cut of 3/8".

It takes two seconds to make the cut.

Because the cut is enclosed, there is no room for the wood chips to escape. It is necessary to vacuum after the first cut and then make a final pass.

The wooden drawer pull fits snugly in the mortise. I use carpenter's glue and then shoot one small brad where my index finger is. The brad holds the pull in place while the glue dries.

I have positioned the drawer fronts by eye and am using a couple of spring clamps to hold them in place.

I use two screws to attach the fronts from inside the drawer.

The drawer fronts are looking good, so it is time to hang the two doors.

I am using European style hardware that requires a 35mm hole. The hinges came with a template which I use to locate the hole. I have set the depth stop to give me the right depth.

I use the square to keep the hinge aligned as I add the two mounting screws.

I use the hinge's other template to mark the position for the screws of the adapter plate.

I screw the plate in position.

These hinges are easy to use. Now that the hardware is mounted, the two pieces fit together well. A simple push, and the door hinge locks in place.

Rather than to use the paper template for the bottom hinge, I install the adapter plate on the hinge. Then, holding the door, I can screw the plate in position.

You are right. I had already mounted the fronts to the drawer, but I removed them so that the door could be mounted a bit higher. Here, I am using a piece of 1/4" plywood to serve as a spacer to remount the drawer fronts.

I have added the panels to the case. A clamp holds them in place.

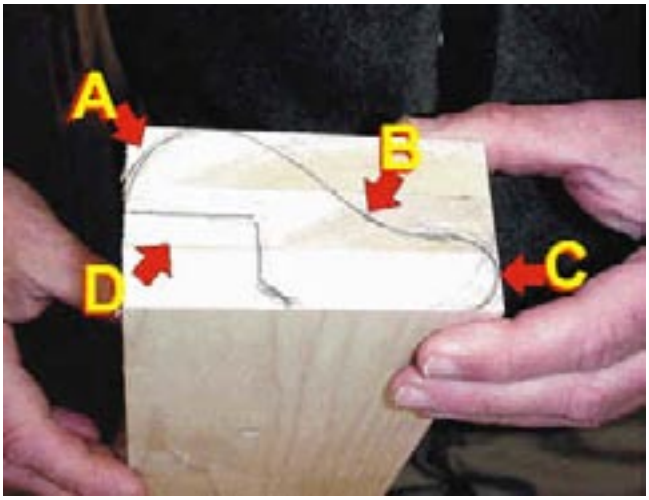
From the inside, I use a couple of screws per panel to fasten the panels to the case. This unit is very heavy, so it will be easier to disassemble and move. The final arrangement will be in three parts: 1) the case, 2) the outside panels, and 3) the top assembly.

I haven't done the top yet, but it promises to be very heavy, as well. I will do that next and will put it on line next week. The Bar is looking good. Next week, I should be able to finish it.

It is time to shape the bar rail. As I explained at the very beginning, I am making this bar of poplar. This is cheaper than doing in cherry as was suggested by the Plans. Rockler offers a very beautiful bar rail in cherry, but at a cost of almost $300. I thought I could make one of poplar for less. The plans offer an alternate shape – just a simple angle cut, but I wanted the nice gentle curve that you find in bars (not a first hand knowledge, of course.)

Well, here is the shape that I have pencilled on the glued up poplar. It is 4 1/2" wide. I have used the CMT catalog to help me figure out the bits to cut certain shapes. The "A" cut I can do with their 1" radius Ovolo bit. The "C" shape I can do with rounding over bits. The "D" cut is a simple dado that I will do on the table saw.

It is the "B" cut, a real gentle slope, that puzzled me until I read that CMT introduced a new cove cutter at this year's IWF Show in Atlanta. A call to CMT headquarters, and before I knew it, the prototype was on loan to me.



Here it is — the CMT Cove Cutter. It is suppose to be available in November with a price that is yet to be announced.

It is one beautiful piece of metal with 6 extremely sharp, round cutters brazed in perfect balance on the 6" diameter wheel.

I held it in place over the sketched end and decided that the workpiece will have to be fed at an angle — which angle will have to take some trial and error.

CMT included a thick spacer in the package with a warning that it must be used between the arbor and the cutter. This moves the cutters away from the inside of the arbor area.

It does have a solid, powerful look when mounted. I was waiting with anticipation as to how it would sound spinning at the table saw's full RPM. In fact, it sounded just as you would expect a perfectly balanced, but heavy, wheel to sound. It definitely purred with authority.

Clearly the table saw fence was not going to be used. It takes about 3 seconds to remove the whole Incra TS III off the table.

The Exaktor Sliding Table has a great fence that I was able to slide way into the table saw area. It also allowed me to set any angle up to about 50o. About 35o looked like a good place to start the cuts.

Having never used this cutter before, I expected that I would have to make a number of cuts — removing a small bit on each pass. I found that one crank of the blade height adjustment wheel gave me about 3/8" of height, and that was about as much as I wanted to take off in each pass.

Well, this is a few seconds into the first cut. I have positioned a Grip-Tite magnetic hold-down to keep the workpiece against the fence.

By the way, I cut the zero clearance plate with this cove cutter at 0o. I could have used the dado insert, but I thought that a custom insert would work better. It did.

The second board is almost 7 feet long. While it tested my space, the handling of the long board was quite easy. The CMT Cove Cutter runs so smoothly that all you have to do is to keep feeding the board.

As I removed more of the lower edge of the board, the low hold of the Grip-Tite seemed less and less stable. Here I am adding a stack of boards that are mounted to an Incra miter slide. This assembly is part of a jig I am making for re-sawing at the table saw — more on that next week. But the stack was ideal to just keep the workpiece tracking against the fence. I am using the T-wrench to lock the slide in that position. At the other end, I add a clamp for safety sake.

everal passes later, you can see that the heavy block assembly becomes more and more important.

At the end of this pass, I can see that I have removed a lot of the wood and have a nice curve, but not the one I want. I will increase the angle and move the fence slightly to make the next cut.

I swiveled the fence on the sliding table to about 50o, but at that point, I couldn't move the table forward enough to be in range. I clamped 6 boards in place to locate the workpiece in the right position. I have moved the "big block" to hold it in place.

Now, as I write this, I forgot that I could have moved the entire sliding table forward very easily. Then the real fence would have been ideally placed. I will do that next time.

There was no need to match the sketch exactly, but I think I came pretty close. Now, I am holding the Ovolo bit that will give a very graceful rounding to the other corner. Of course, the rail, as you see it, is upside down.

I install the Ovolo bit using the bent wrench to allow me to work from above the table. I have set the router speed to its slowest, since this bit is quite wide.

I use the Rout-R-Lift's height adjustment to bring the bit so that the end of the cutter just touches the square.

I clamp my shop-made router fence to the Incra TS-III fence. I am using an insert that was cut for another bit but allows enough clearance for the Ovolo bit.

There is no pattern bearing on this bit so I bring the fence up to allow the greatest curve cut.

To keep the stock from tipping, I clamped the tall vertical fence in place on the outside. It is tight enough to keep the workpiece square without binding. It worked.

I originally had planned to use rounding over bits for the other edge. Unfortunately, I would have to invert the workpiece to edge the top, and the curve precludes that.

I was lucky to have a multi-profile bit that could cut top and bottom in one cut. It isn't exactly the rounding over cut I was looking for, but it works well and gives a clean edge.

The only thing left to do is to cut the rabbet that will allow the bar rail to be fastened securely to the bar top. I am using my stacked dado cutters on the table saw. There is a lot of material to remove, so I make several progressive passes.

While there were many cuts and setups here, it took about 2 hours to cut all the bar rail. I think it made a lot of sense.

I would be lying if I said that the finished molding was ready to mount and stain. In fact, it required about an hour of sanding. The cove cutter part was smooth as could be. The sanding was mainly required for the transitions from the cove to the Ovolo and rounding over cuts. A glue bottle wrapped in sandpaper makes a great pad for smoothing this transition.

This is the finished bar rail. You can see the different right edge — the one cut with the multi-profile bit. It looks like it was meant for the piece.

At this point I have smoothed out the shapes and finished sanding. Next, I will miter the corners and fit it to the bar top.

The bar top is double thickness 3/4" ply with a cut-out where the sink would be placed. While we opted not to install a sink, we did want to have the cut out so that the "bartender" could have access to a work area.

The plans call for the inset to be 11 3/4" from the edge. You can see that I have made the rip cut to my lines. I apologize for not having a picture of that cut. It was made at the table saw with the fence set at that width. With the saw turned on, I elevated the blade to penetrate the board and made the desired rip. Then, I lowered the blade and turned off the saw.

Now I am using my small circular saw to cut the cross cuts to the marks I have drawn.

I use my saber saw with a fine blade to make the radius cut.

I use a drum sander in my drill to smooth out the radius. While I am making the heavy top of double thickness 3/4" ply, I work first on the top piece. Once this is right, I will use it as a template to route the lower piece.

By the way, Porter Cable has just come out with a portable orbital spindle sander — now that would really work well here. Maybe it can be a Christmas present to me.

I have clamped the lower, rough cut board on top of the finished board. With the pattern bearing riding on the lower board, I route the upper board to match exactly.

Now, I have inverted the whole stack and have spread carpenter's glue in between the two layers. I am using 1 1/4" narrow crown staples, tacked from the underside, to secure the two boards. This is one heavy top that isn't going to ever feel "flimsy." [Note, I am shooting obliquely since I do not want any of the staples to penetrate the top surface. They are 1/4" shorter than the thickness, but I do not want to take any chances at this point.]

I use the small edging iron to apply 1 1/2" width white oak veneer tape.

As I have said before, it is very important to press the hot veneer into the edge as the tape cools. Here I am using a veneer roller, but a block of wood or head of a wood mallet works just as well.

This little edge veneer trimmer works very well on the straight edges. When it came to the curved sections, I used a sharp blade in a utility knife. The trick is to let the veneer cool totally before trying to trim it. I also, prefer to trim the veneer proud, so that I can finish the job with a block plane. If you try to trim it flush, you can catch the grain and have tearout. It is better to go cautiously slow at this point.

A few light passes with a very sharp (scary sharp*) block plane, makes the veneered edge transparent. The edge closest to the camera is the side. This two board edge will be covered by the bar rail.

[* Note: scary sharp is a method of sharpening blades and flattening plane soles using very fine sandpaper - to 2000 grit. I first tried it on this inexpensive Stanley block plane and have been amazed at what a different tool it is. I will cover the scary sharp method sometime in the future.]

ell, the edging is done. When Sal, who has been helping and taking pictures, says: “it looks like a solid piece of heavy oak”, I knew that it was a good edging job. He has a very critical eye.

Edge veneering is easy, but only if you do not try to rush it. Trust me on this. I have rushed it in the past, and it always takes longer in the long run.

Well, I am ready to cut the bar rail stock that I shaped last time. That’s next.

The bar top is thick and heavy...and that is with out the rails. I am using the biscuit cutter to cut grooves around the case. These will allow top clips to be used as hold downs.

Here is a hold-down. The lip fits into the biscuit slot, and then it is screwed to the top. If the biscuit slots are cut a little lower (1/16th or so), the screw will pull down the top.

Well, after I had fastened all the clips, I looked at it and decided to add angle iron sections for added safety.

The hold down clips probably would work, but two things caused me to want to beef up the anchoring of the top. First, the top is cantilevered over the front edge. Second, there may be kids (of all ages) leaning on the bar rail. I would not want the top to see-saw.

I wanted the angle iron not to show when secured. I have cut 8" sections of this heavy gauge 1" stock. I am drilling holes for screws.

I filed over the ends so that the cut edges wouldn't catch little hands — or big ones, for that matter.

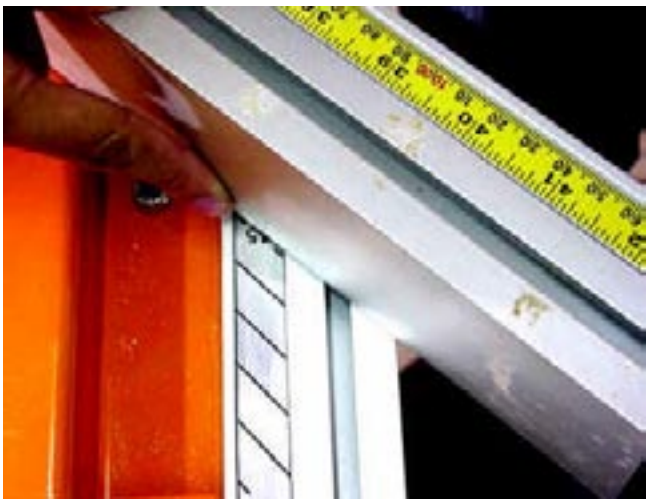
I screw the angle sections in place with the top off. This is much easier than trying to get a screwdriver in the tiny height under the bar top. The side screws are easier to do.

It is clearly time to add the bar rails.

I first make one 45o cut on one end of the long bar rail stock. This will be fitted to the front section.

I can make this cut on the table saw. One of the great things about the new Exaktor sliding table is the accuracy it can give you in making miter cuts.

You can see that the degree markers are so clearly etched and so spaced as to give you tremendous accuracy — assuming the table is aligned properly...and it is. The actual cut couldn't be easier.



I fit the first cut to the bar top. So far, so good. I line up the inner corner of the bar rail with the edge of the bar top. I have added 1/16th of an inch for better fitting. I have quite a large rabbet in the rail so a little over won't hurt. It is much better than any amount under.

All I could say is “darn.” Well actually, it was “damn.” I couldn’t use the sliding table saw for the other angle, since I couldn’t flip the stock and have it lay level. Nor, could I use the miter fence in the other direction.

So my fall back position was to use the Hitachi Sliding Miter Saw. Thankfully, it just allows a full cut in the stock.

I haven’t shown this Hitachi saw at work much, but I use it a lot and keep it tightly aligned. I did double check for square, before I made the first cut.

I may have wanted to cut all the miters on the table saw, but being able to switch from 45o on one side to 45o on the other, and have them accurate, is very nice. The miter saw saved the day for me.

With the sections cut, I spread glue over the rabbeted section of the bar rail and clamped the rail in position.

I am drilling for the 2 1/2” screws that I will screw through the bar top into the rail.

It was nice to have the bar rail fit so well. Cutting miters is one of my weakest points. I have a way of doing them backwards, or just not have them fit well. I had no extra bar rail stock to allow for mistakes this time.

I had done about an hour of sanding to the bar rail stock after I had shaped it. Here I am giving the rail a final sanding. In addition to the carpenter's glue used in the rabbet, I mixed small quantities of quick cure epoxy and used that between the mitered corners. I thought that would have better holding power — end grain to end grain.

Well, this completes the bar project, except for the finishing. I will take some step-by-step pictures of that process. I am planning to stain it dark to make the poplar look like dark cherry.

This has been a fun project, and it has been nice working from a complete set of plans. I did learn at least one thing — double check the plans. Just because it is printed, does not mean that it is right.