

N. 7520 Market St. Suite #1 Spokane, Wa. 99217 (509) 466-7702

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Improved Shark Pro Plus Table

Bill of Materials

- 2) 5/8" x 3/4" x 30" aluminum bars
- 1) 1/4" x 1" x 4" aluminum bar
- 15) 1" x 2" x 36" aluminum extrusions (80/20 #1020 series – available @ www.8020.net)
(These may be longer if you so desire)
- 58) 1/4" x 20 x 1 1/4" carriage bolts
- 8) 1/4" x 20 x 1 3/4" machine bolts (I reused the 4 that came off the original table)
- 4) #12 x 1" self tapping machine screws
- 66) 1/4" x 20 Nylock nuts

Tools:

- Miter saw with sharp carbide blade
- Drill press with drill press vise
- 19/64 drill bit
- 1/4" drill bit
- 7/16 open end wrench and 7/16 socket wrench
- Hand Drill
- Bench grinder
- Pliers

Table accessories

Hold down clamps for these extrusions are made by Woodpeckers HDCG-PIV but you will have to replace the machine bolt with a carriage bolt and grind the head slightly.

General Notes

When I started this project I assumed that everything would go together smoothly if I bored the holes for the extrusion bolts at $9/32''$ ($1/32$ over the bolt size). So I did that and found the bolts were binding big time and I could not get the bar on all of the bolts because the holes were just too small. I rebored at $19/32$ and was able to get all the bolts on the bar but now some of the bolt heads were binding in the extrusion slots. After careful study I determined that there was just not enough clearance for the bolt heads in the slots so I did some grinding on the heads. This worked well and I was able to free up all of the extrusions so they could all be easily moved for alignment. I have provided a drawing as part of this document to show more detail of what I did.

Boring

When you bore the holes for the aluminum bar, be as precise as you can with your layout marks. Do not bore holes for the extrusion #8 that is centered over the Y stepper motor. There is not enough room to get the nuts on the bolts. Accuracy here will get you better results when you assemble the table. Be sure to bore your holes on your marks and don't deviate away from center. Bore all 30 holes (28 on the front bar) through the $3/4''$ dimension and the 4 holes through the $5/8$ dimension on both bars.

Grinding the bolts

I found that the carriage bolts were not very tolerant. Some of them slipped into the extrusion slots and moved freely (although too tight) and some would not even fit at all. So I ground each one. Take a pair of pliers and capture the square area just under the head with the jaws of the pliers and grind about $1/16^{\text{th}}$ off the radius of the head parallel with the face of the square that your pliers are grasping. Then grind a little bit off the top of the bolt head where you just ground the edge. Also, on the side of the grinding wheel, remove the burr you have created that is on the under side of the head. Now do the same thing to the opposite side of the bolt. I tested each bolt in the extrusion to insure the head had plenty of clearance in the slot.

Table Assembly

I built my table upside down on top of my existing blue shark table. Cut all of the extrusions to length (you can make your table as long as you like, there is really no limit here). Lay all 15 extrusions side by side on the table and slide all 30 bolt heads into the slots so they are in a reasonably straight line about 2'' from the end of the extrusions (leave out the 2 bolts that go in the extrusion that is centered over the Y stepper). Now place the bar down on the bolts so that all 30 bolts are in the holes you bored. Then finger tighten 30 nylock nuts onto the bolts. Go to the other end of the extrusion and do the same thing. You may want to tighten the 4 corner bolts with a wrench so the whole thing doesn't come apart when you turn it over. Remove your existing shark table (4) $1/4 \times 1-3/4''$ machine bolts). Place your new table on the shark chassis and loosen the 4 nuts that you tightened. Slide your aluminum bars up to the black composite chassis sides on each end adjusting the overhang that you want. Chuck the $19/64$ drill bit in a hand drill and bore through your 8 holes into and through the black composite material. Install the 8 bolts with nylock nuts and tighten. The 4 inside bolts are tough to get to. You will have to

cluge up some kind of tool to get the bolt into and through the hole from under the table on these four but it can be done. Then you need to tape a stick to a wrench to get it under there to hold the bolt head while you tighten the nylock nuts. Next, align the extrusions by sliding them back and forth and tighten the nuts with the socket wrench. If any of the extrusion bolts are binding in their slots you will not be able to slide the extrusions back and forth for alignment. It is important that all 58 bolts move freely in the slots before you attempt to align them. That is why grinding was necessary. If you can find some precision bolts that fit freely in the slots you are good to go but I bought mine from a local fastener outfit and they were not uniform and tolerant.

Loose End Extrusion Cap

You will have left out bolts 15 & 16 (counting from the left) on the stepper end of the machine. Extrusion #8 is above the stepper and this end is not anchored. Take the 1/4" x 1" x 4" aluminum bar and bore 4) 1/4" holes 1/2" in from each end and 1" apart and centered down the length. Use the #12 self tapping 1" screws and anchor extrusion #8 to both 6 & 7 by installing the screws as shown in the photo. Holes for this are already provided by the manufacturer. If you need to slide a hold down device into this area you can do it from the other end of the table and slide them all the way across the table to the stepper end.

Leveling The Table

Now the table needs to be leveled. Not gravity level like with a conventional spirit level but parallel to the gantry type level. To do this chuck an end mill and loosen slightly your 8 bolts that anchor the aluminum bars to the chassis. By using a block of wood you can jog the router around and see where you high spot is. Tighten the corner nut at the high corner. Then carefully bring all the other corners up to that height using the end of the bit and the block tightening the corner nuts as you go. When you are satisfied that you have the table parallel to the gantry travel, the tighten the 4 inner nuts. This will set you X and Y gantry travel parallel with the table surface. You may need to enlarge the chassis holes. If you are not able to get the table level. I used tapered plastic masonry shims to keep everything honest while I was tightening my bolts and left them in to prevent any future movement.

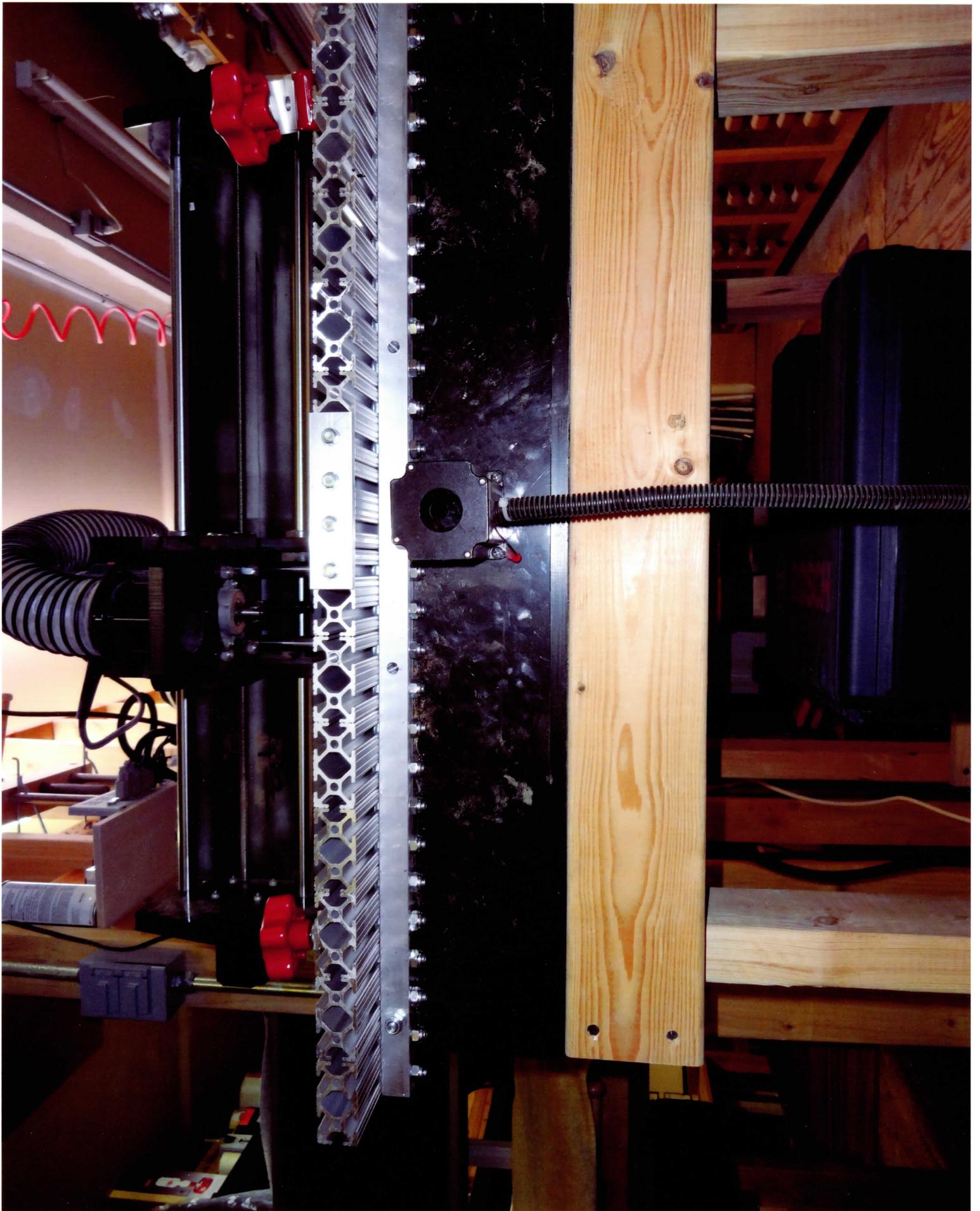
Hold Down Clamps

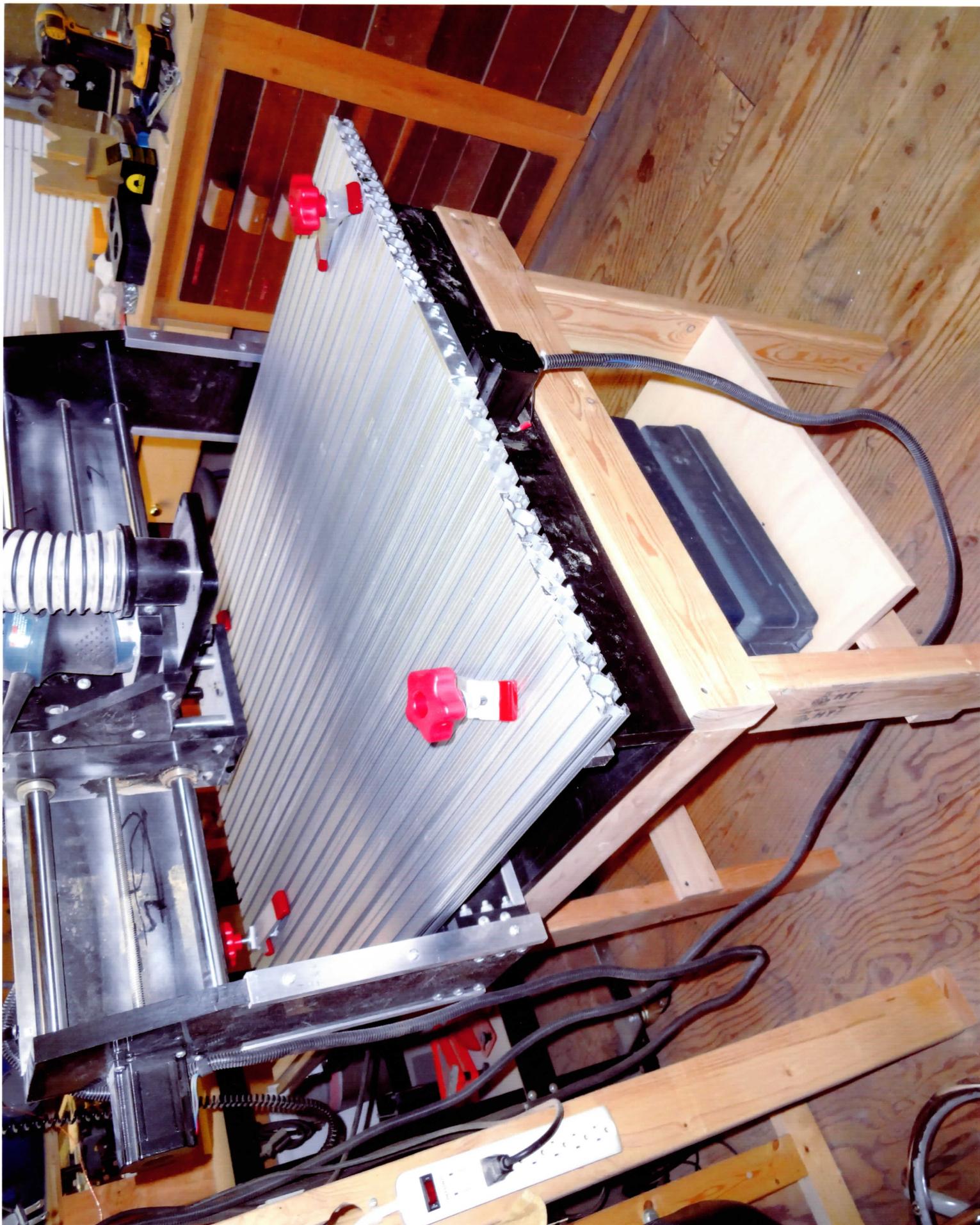
The Woodpecker hold down clamps have machine bolts packaged with them. These will need to be replaced with carriage bolts and ground as described earlier. I have bolts of various lengths so I can clamp different thicknesses of material and keep the bolt ends as low as possible to avoid contact with the router bit and carriage assembly.

The Rockler clamps and stops are all set up with 5/16ths bolts and machining that only fits in their extrusions.

Note: I hope this document is helpful to all who want to upgrade their Shark table. There are surely other ways to build and install this kind of table on your machine. What I offer here is the way I did it. Any comments are welcome.

Wayne @ Wayne's Woodworks
Wwoodworks.com
WWoodworks@earthlink.net
Spokane, WA. USA (509) 466-7702







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