How To Expand The Evolution 4 To A 48” Cut Length Using The Parts In A Second X-Frame

Disclaimer: The modifications to the Evolution 4, as shown below, are my best effort to insure the intended function, fit, and finish of a model Evolution 4 CNC router by BobsCNC©. BobsCNC© is not responsible for the accuracy and or support of these modifications.

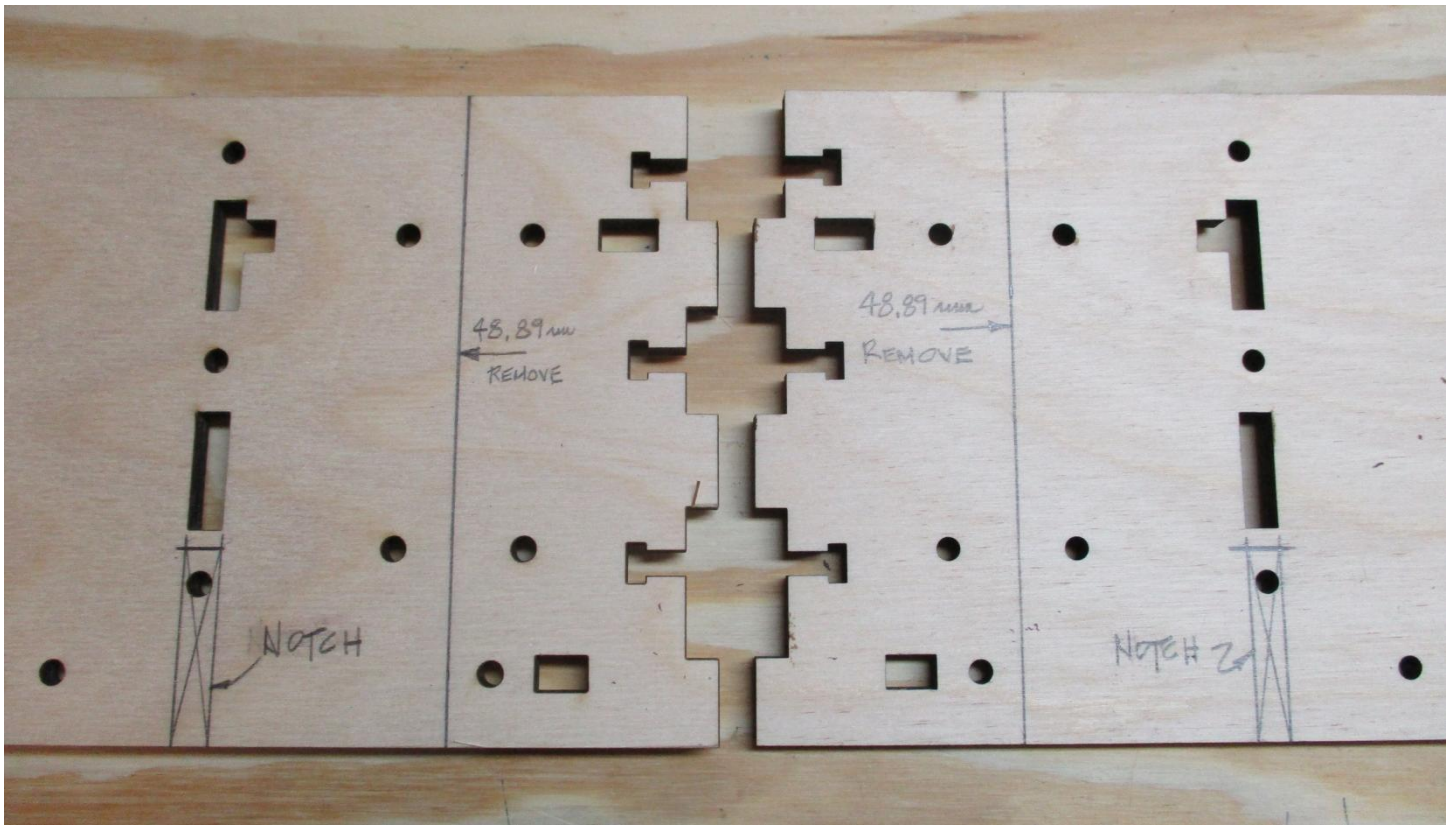
Parts required:

(12)	X1 Rail Supports
(4)	X2 Corner Braces
(10)	X4 Frame Mid Supports
(4)	X5 Frame Side Supports
(2)	X6 Frame End Supports
(2)	X7 Wire Harness Supports
(4)	X8 Frame Corner Supports
(112)	M4x16 Machine Screws and Nuts
(50)	M4x20 Flat Head Machine Screws and Nuts (optional)
(4)	5/16” dia x 57” hardened steel guide rods

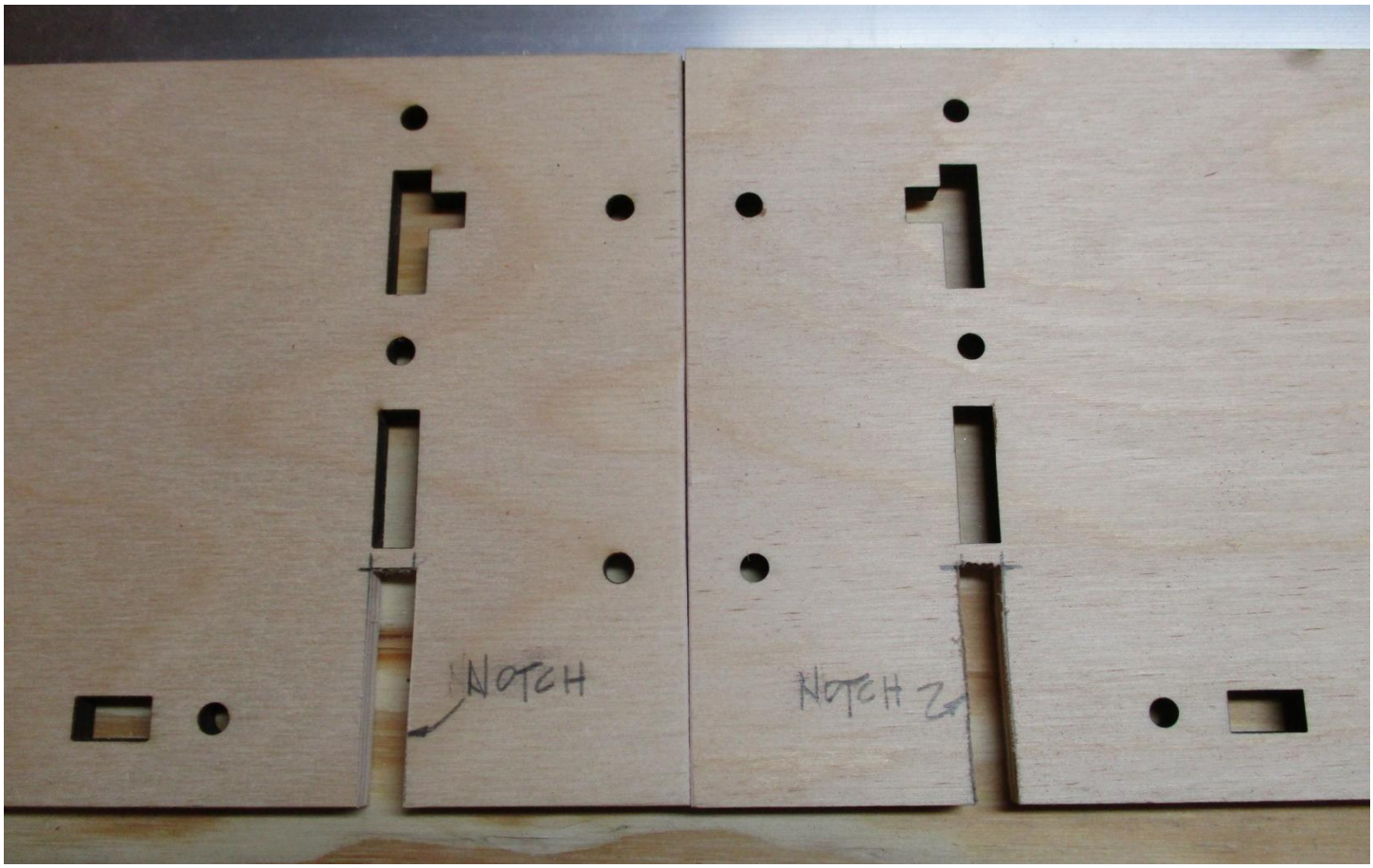
1. Purchase (4) 72” long x 5/16” (8 mm) guide rods: https://www.mcmaster.com/6628K245-6628K24/
   I recommend these because they are cold drawn, stress relieved, and hardened. In other words, they’ll last forever, and they’re straight.
2. Purchase longer belts:
   https://www.amazon.com/gp/product/B01E91K4N8/ref=oh_aui_detailpage_o08_s00?ie=UTF8&psc=1
3. Purchase a longer USB cable. I bought this one: https://www.bestbuy.com/site/insignia-10-usb-2-0-a-male-to-b-male-cable-black/5883001.p?skuId=5883001
4. And finally, you’ll have to make a larger spoil board. I made mine in one piece out of ½” MDF.

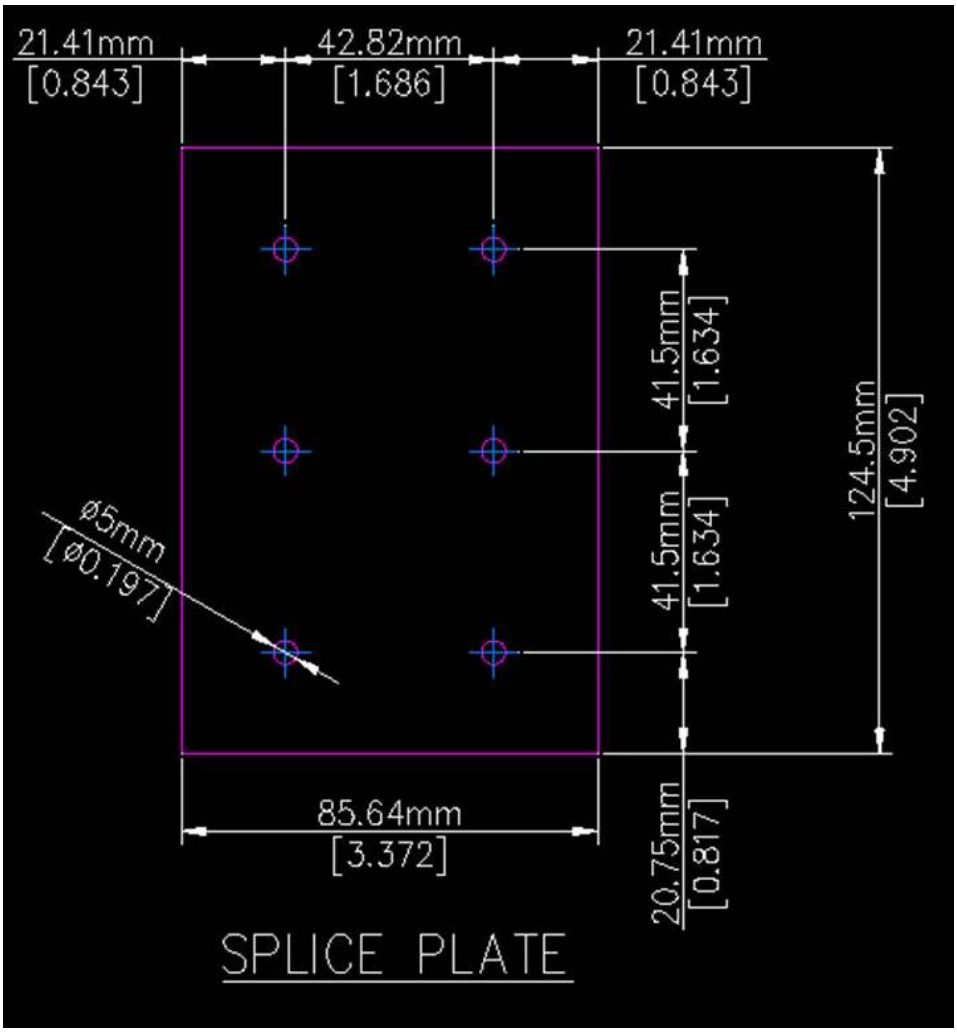
The assembly steps for the Z Spindle Mount, the Y Carriage, and the Y Gantry are the same as those in the Evolution 4 manual. Follow them exactly. With the exception of a few steps, the assembly of the X-Frame is the same as those in the manual.

To make the Evolution 4 capable of a nominal 24”x48” cut area here’s what to do:

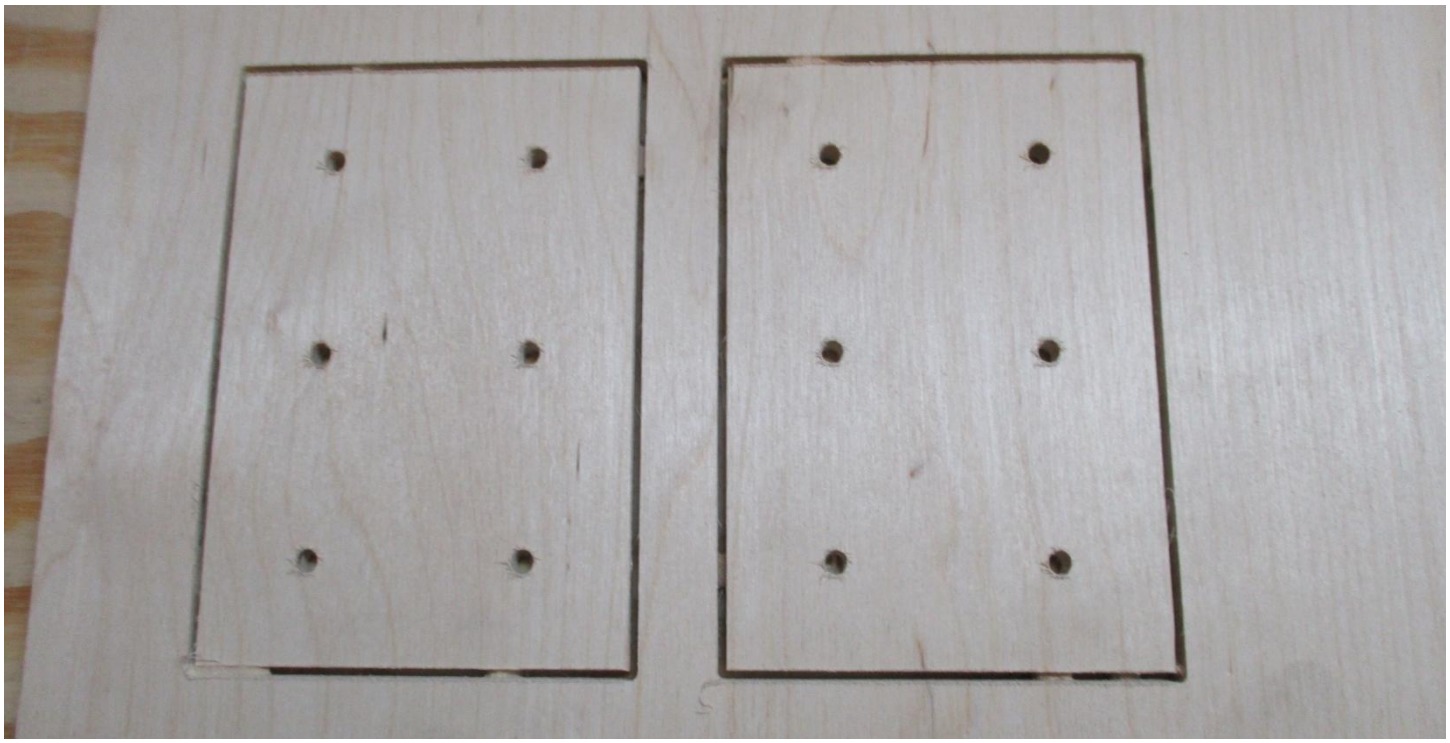


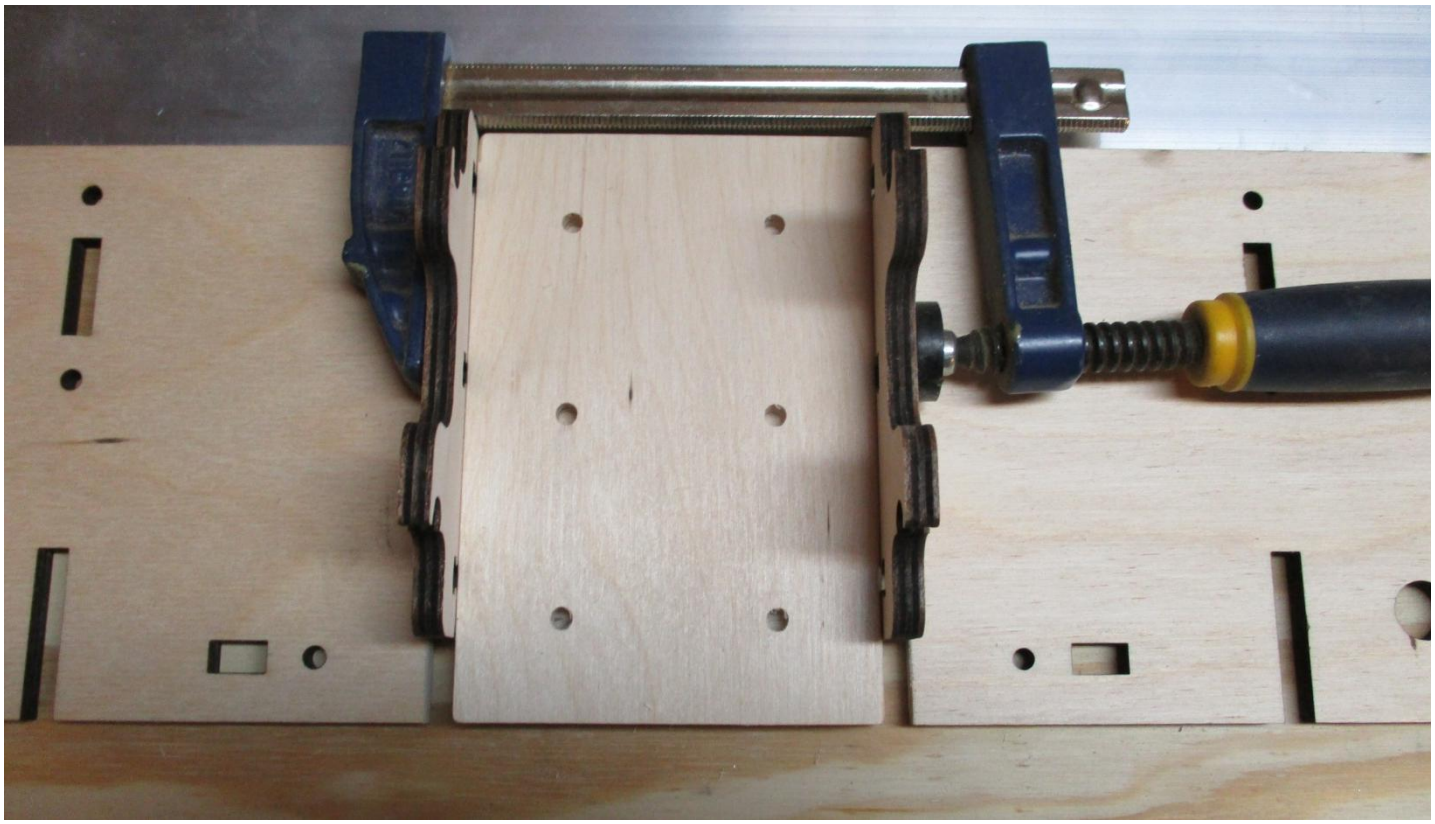
Remove 48.89 mm (1 15/16”) from the “middle” ends of (4) X5 Frame Side Supports …..for a total of 97.78mm (3 7/8”) Cut a notch to match the X4 Frame Mid Support as shown. **Do not drill the side frames just yet.**



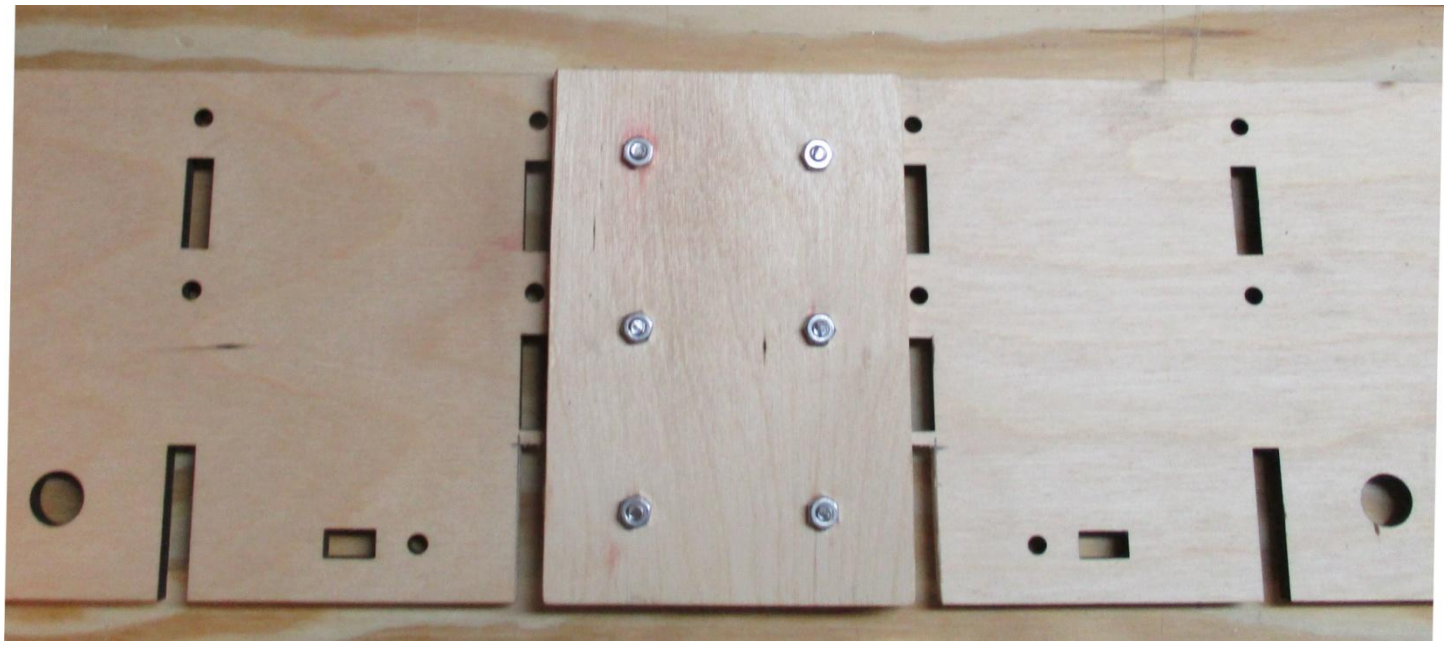


Make (2) Splice plates as shown out of 6mm Baltic Birch plywood (from BobsCNC)



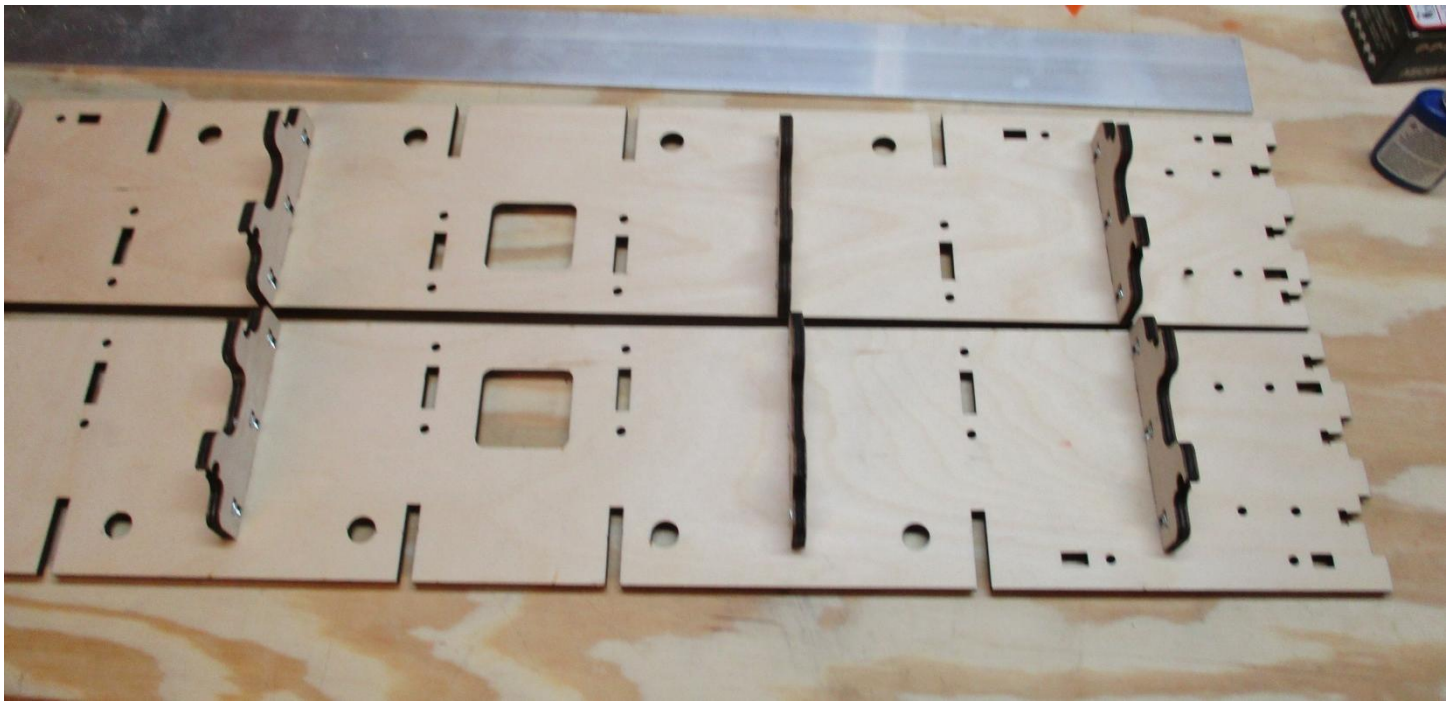


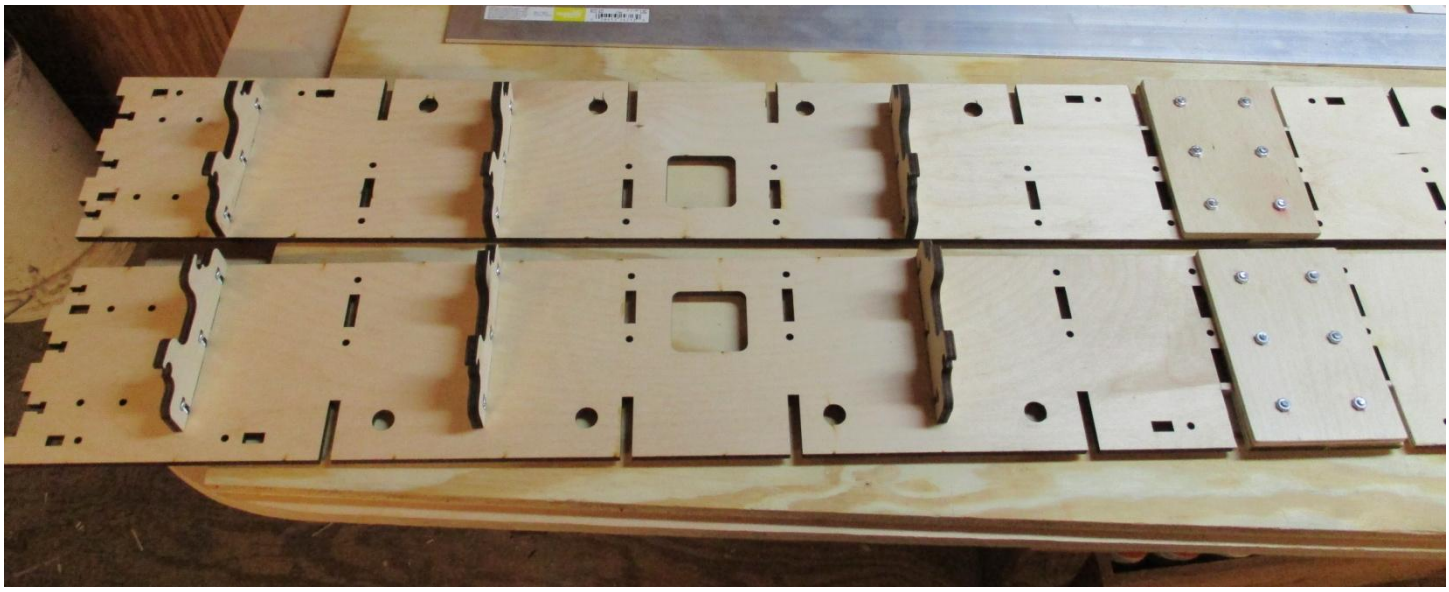
Secure (2) X1 Rail Supports with (4) M4x16 screws and nuts, and epoxy the drilled plywood plate between the rail supports. **Make sure the X5 frames are aligned exactly**. **Clamp securely**. I used Loctite 5 minute Epoxy**. Let it cure completely.** The X1's are temporary and used for alignment and fit. X4 Mid Supports will be added in their place**. Make sure you don't epoxy X1's to the frame sides or the splice plate.**



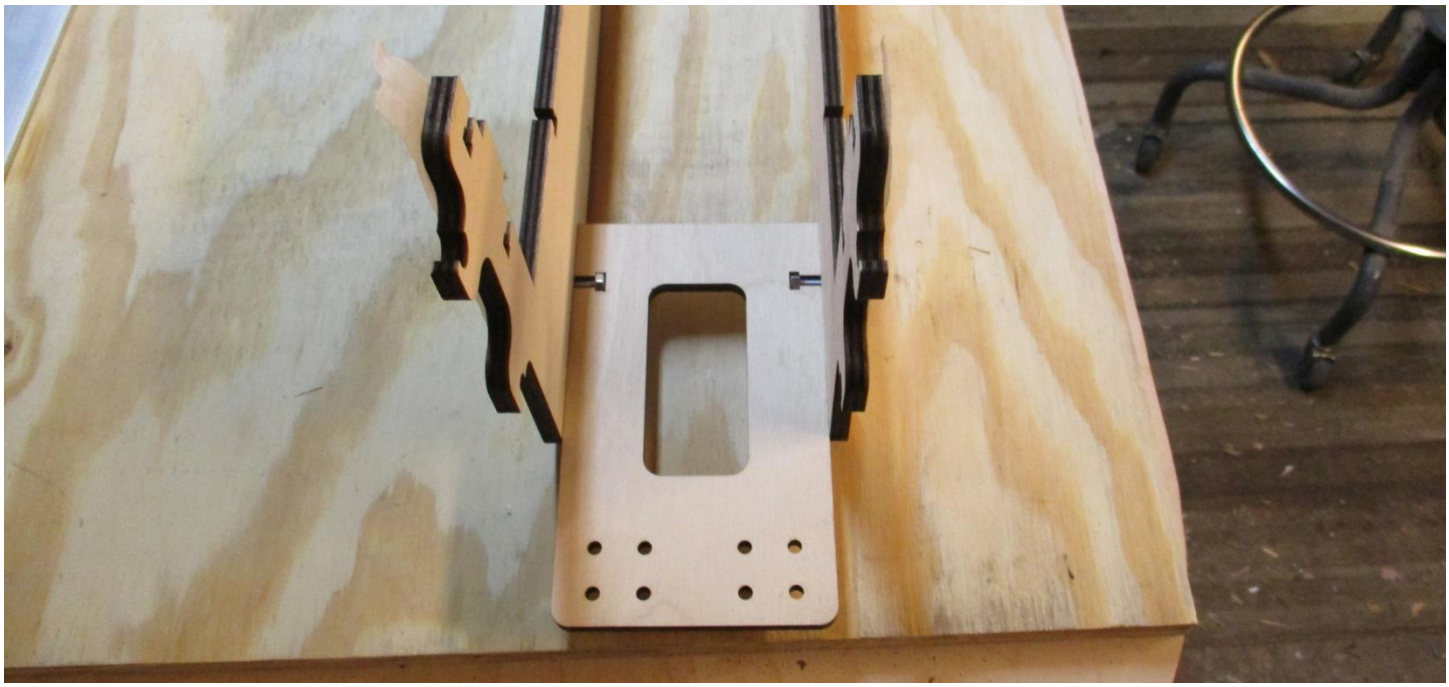
Drill the X-Frame side frames to match the splice plate and bolt together with (6) M4x16 screws and nuts. Tighten per the Evolution 4 assembly instructions (snug + 1 ½). Remember the Loctite Thread Lock

Now attach the (6) X1 rail supports as shown, per the Evolution 4 instruction manual.

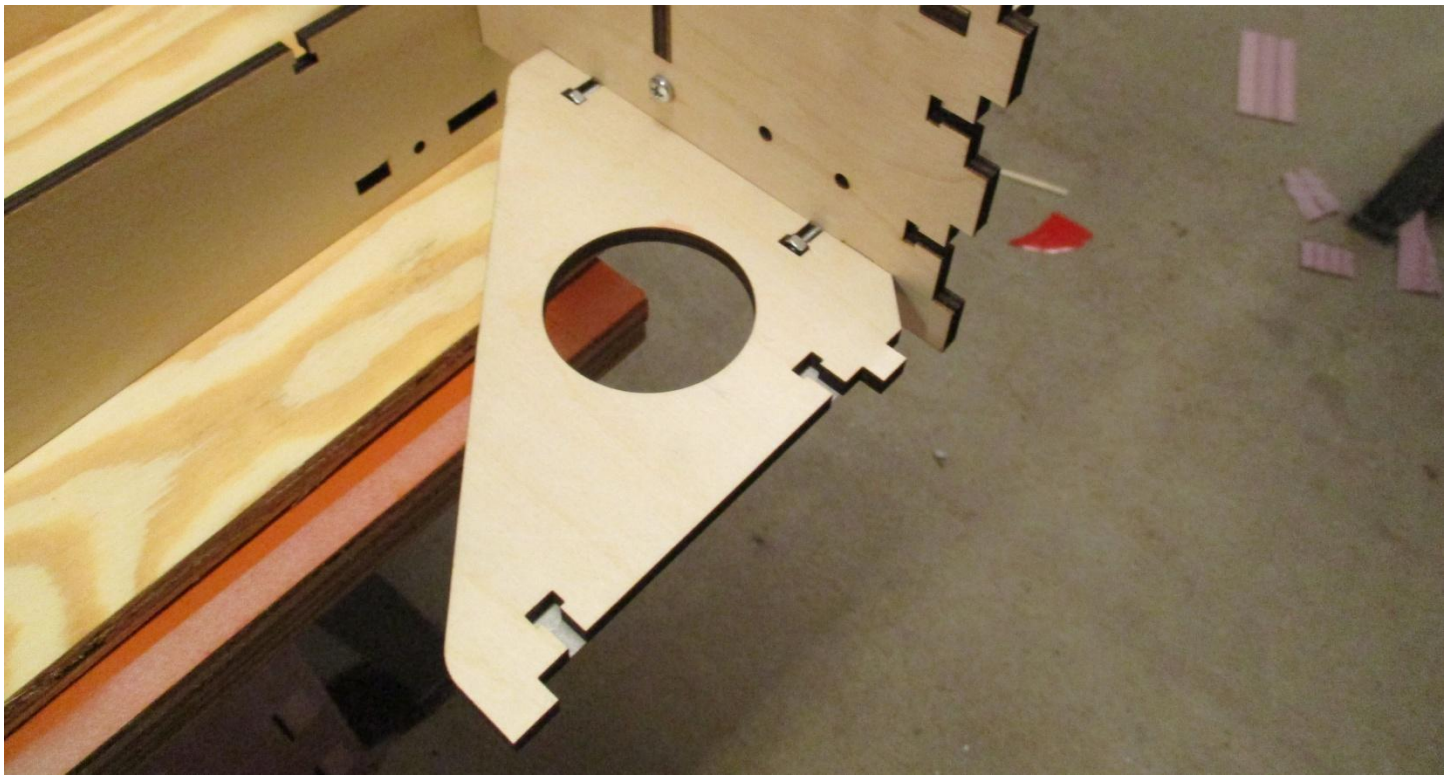


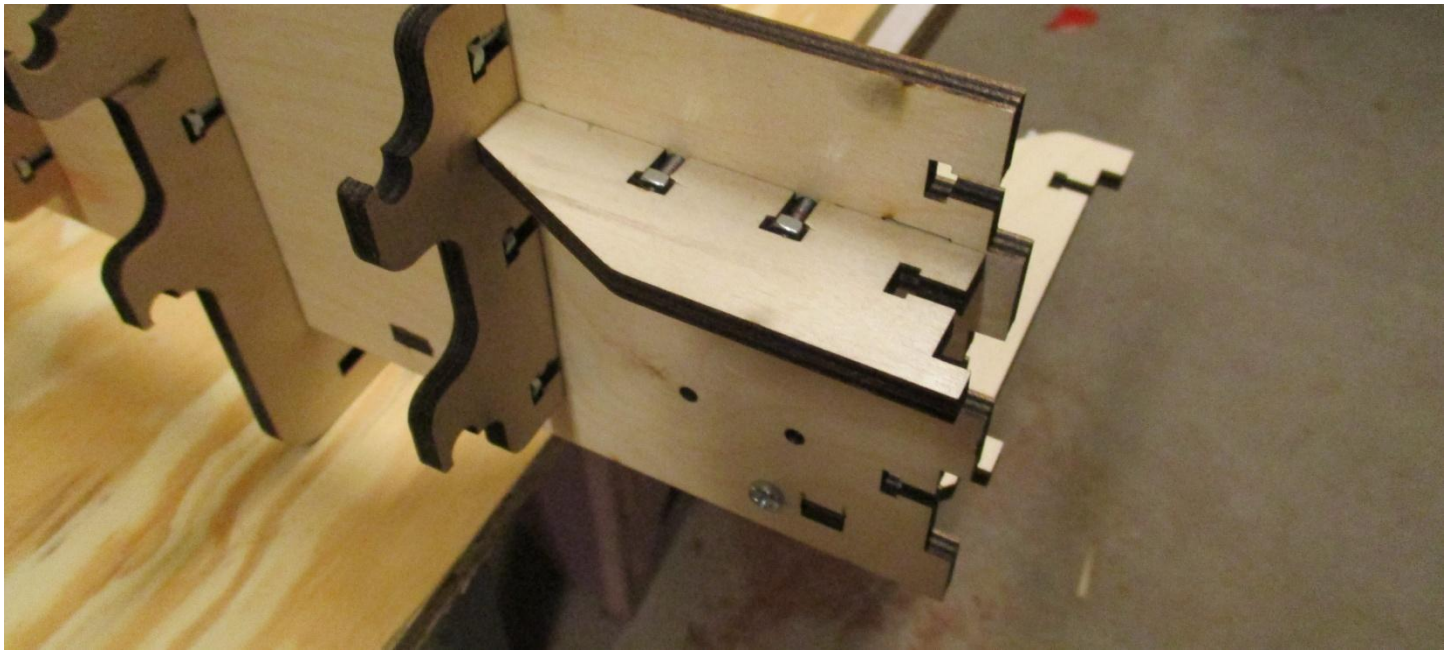


Assemble (2) X4 Mid Supports and (2) X7 Wire Harness supports as shown:



Locate and secure the lower (4) X8 Frame Corner Supports and the (4) upper X2 Frame Corner Braces as shown. Make sure the orientation matches what's shown in the manual.

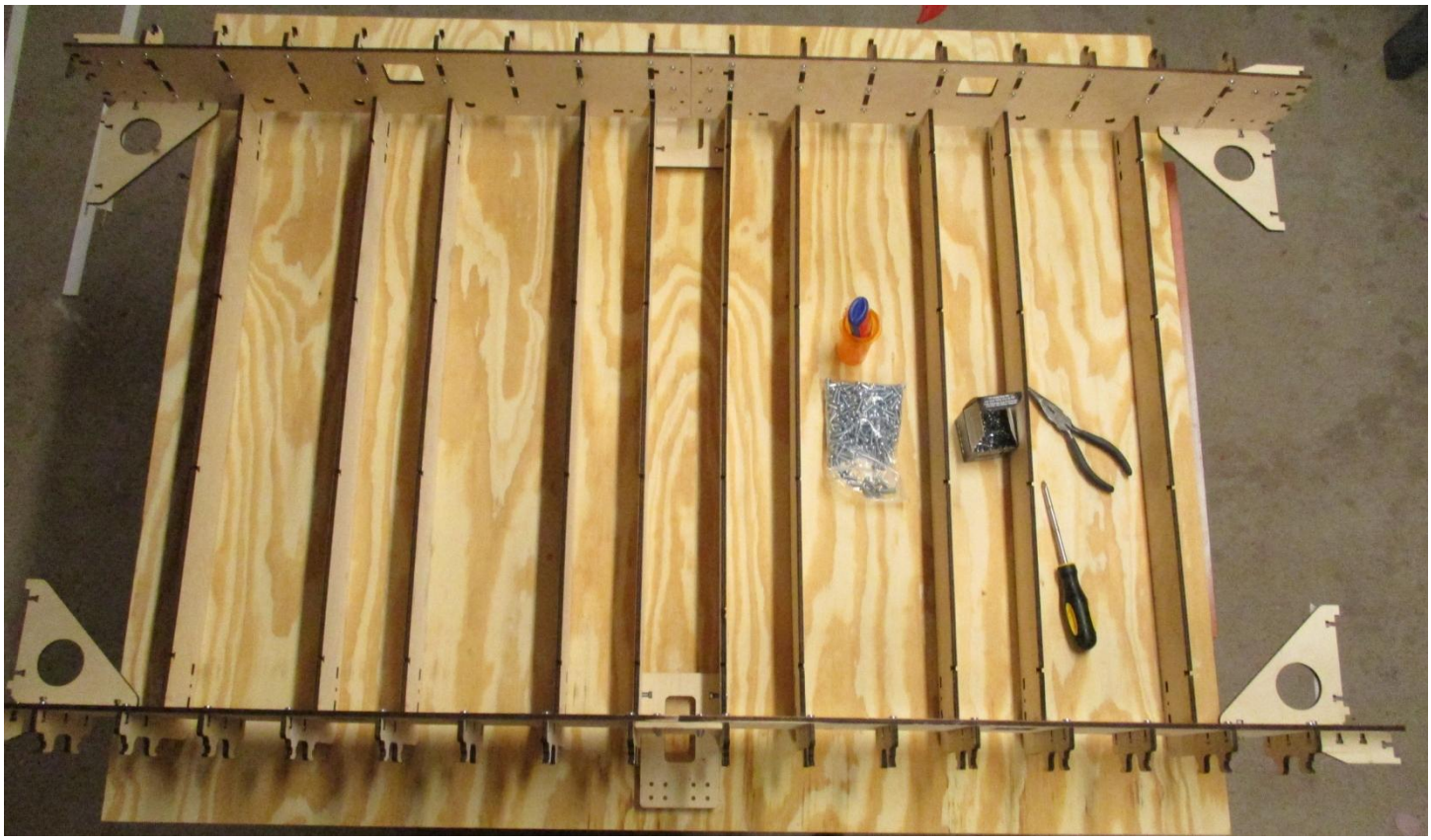




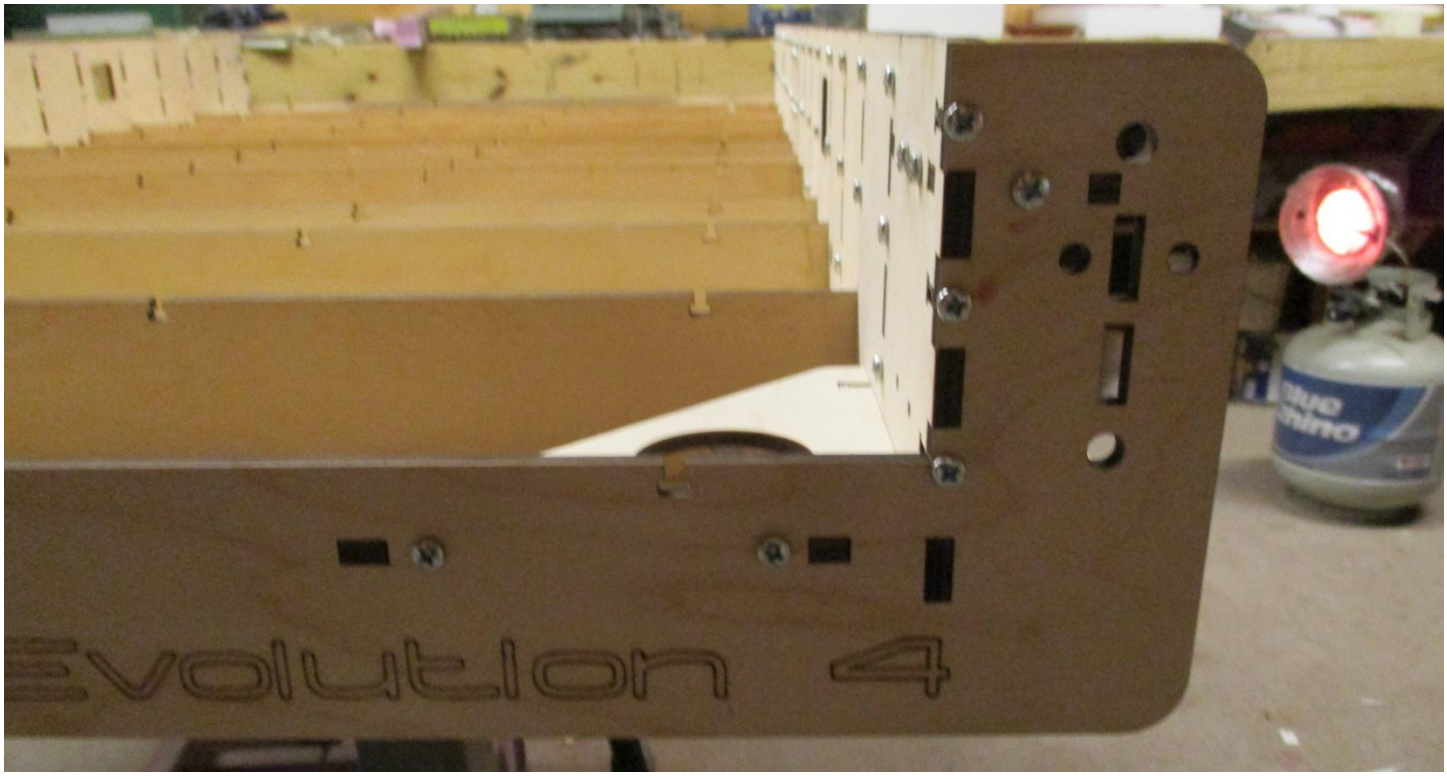
Now, let’s assemble the X-frame

Take one extended X5 Side Frame and turn it over so that the notches for the X4 Mid Frames are pointing up
Starting in the middle, locate and assemble the X4 Mid Frame/X7 Wire Harness and secure it with (4) M4x16 screws and nuts. Then locate and secure (8) more X4 Mid frames to the extended X5 Side Frames, starting in the middle and working your way out to the ends, alternating to each side of the X4/X7 Mid Frame.

Now, turn the frame back over and GENTLY coax the other X5 Extended Side frame down onto the Mid Frames, aligning the tabs and slots. Secure each X4 Mid Frame to the X5 Side Frames with (2) M4x16 screws and nuts, starting with the X4 Mid Frame/X7 Wire Harness assembly , and again, working your way out to each end, alternating to each side of the middle frame. Make sure the Side frames are oriented correctly.



Locate, align, and attach the X6 Frame End Supports per the manual.

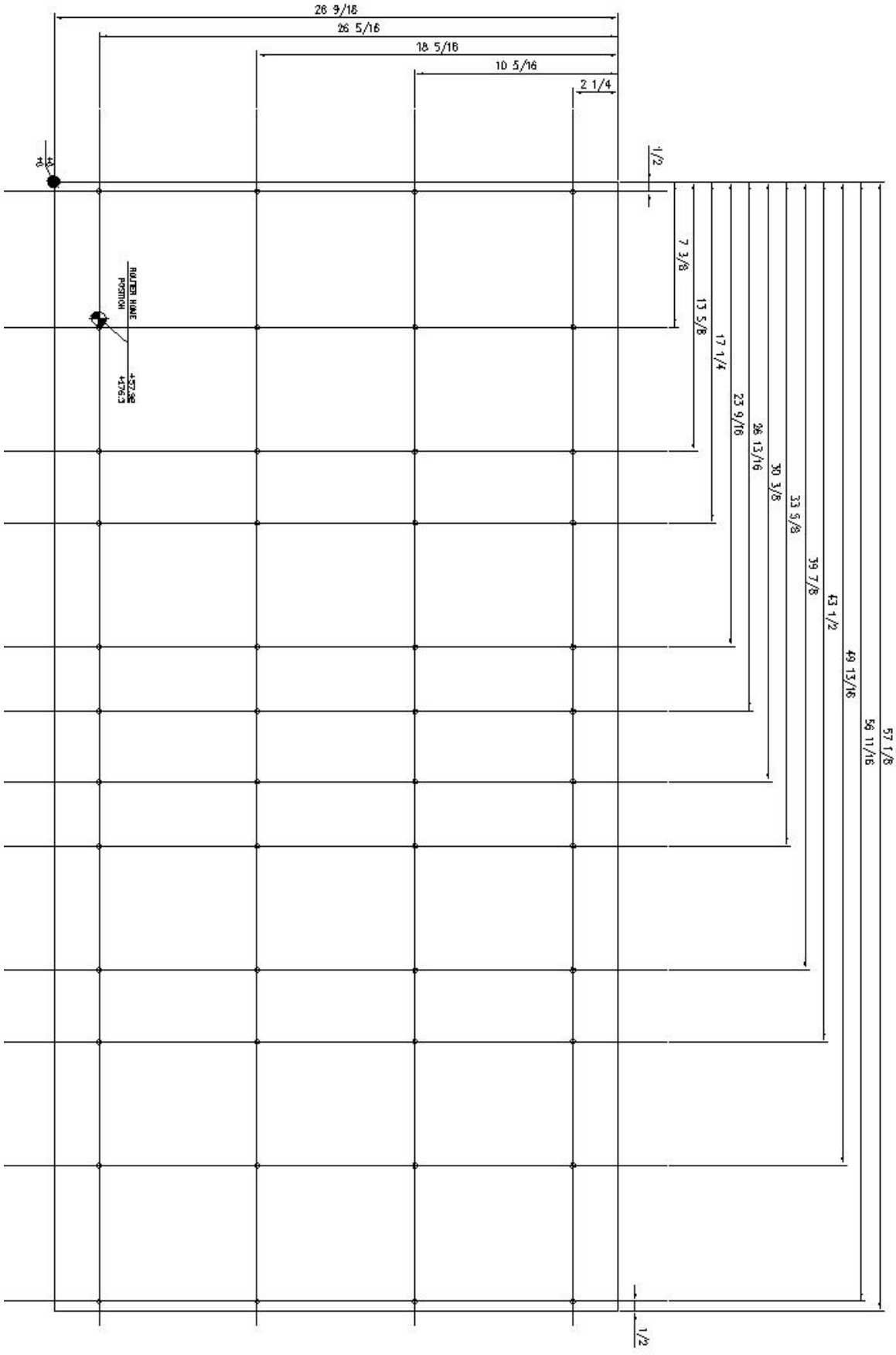


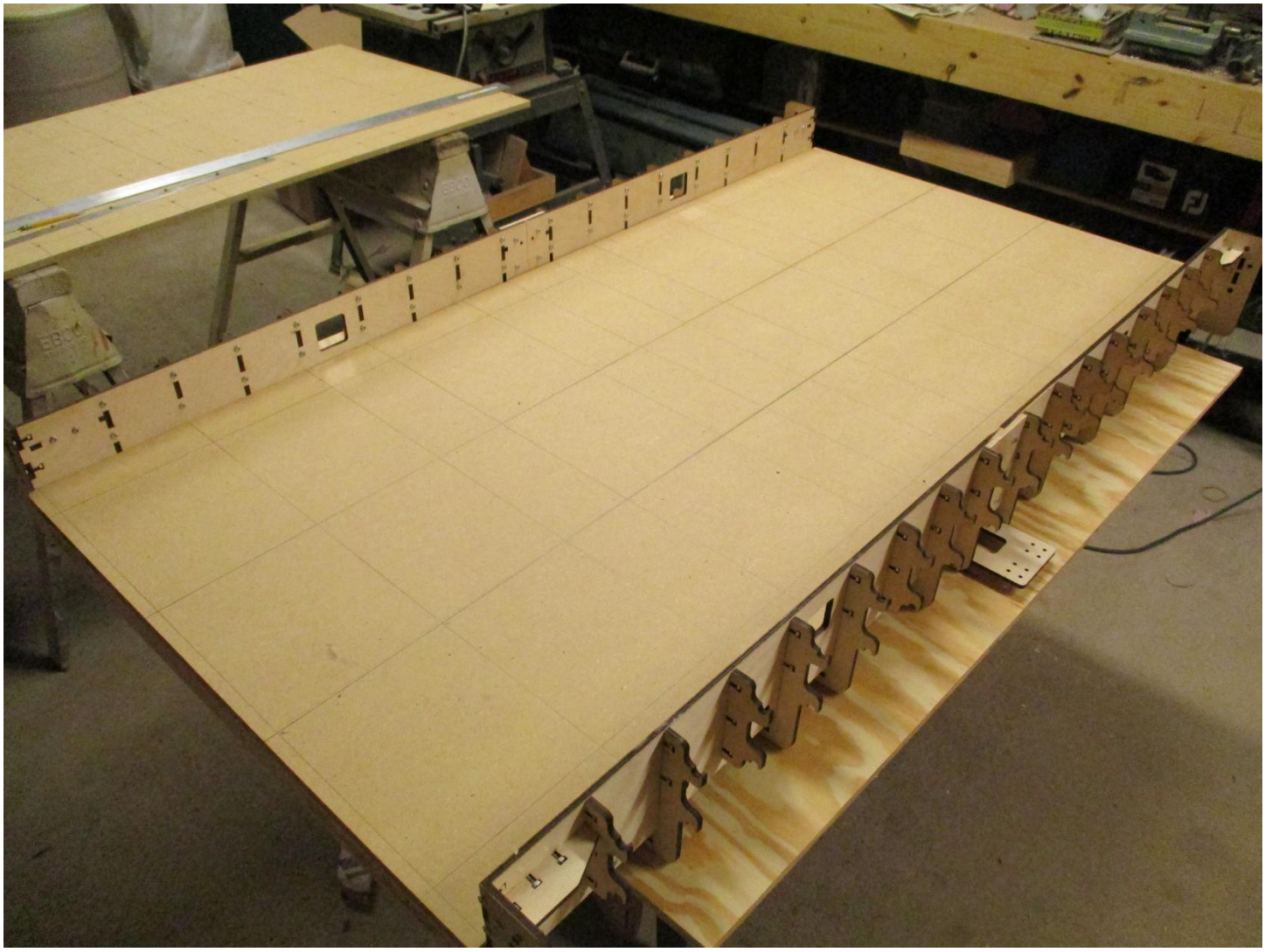
Frame assembly complete.

Now comes the hard part…….the spoil board

I chose to make a 1/2” thick, one piece spoil board because I’ll mount a vacuum table to the top of it. **Spoil board is 1/2”x28.5”X 57.25” MDF**, drilled to match the M4 nut recesses in the Frame Mid Supports (X4) and the Frame End Supports (X6). I don’t possess the tools to counter bore, and since I’m going to build a combination vacuum/T-nut table, I’m going to countersink the spoil board mounting holes to accept M4x20 flat head machine screws. And since I have to drill and countersink by hand, I bought this drill guide from Harbor Freight ($20) .. anything is better than depending on these old eyes.

Drill and countersink (48) 5mm (3/16”) holes for M4x20 flat head machine screws. I used a 3/16” dia brad point bit with countersink.





After locating the drilling centers, slide the spoil board into the frame and **CHECK THE ALIGNMENT AND THE HOLE CENTERS.**

Since I'm using flat head machine screws, I drilled and countersunk all the holes, and then screwed the spoil board in place. You may have to coax some of the Mid Frames into alignment due to the nature of plywood. A quick release clamp works well.

If you going to use the 1/4-20 threaded inserts for hold downs, this would be the time to locate and add them.

The last major step is to cut the guide rods to length. Mine will be 57.00 "

That's really all there is to it….in a nutshell, I cut 3 7/8" inches out of the middle of 2 X-Frames (1 15/16 from each frame), made (2) plywood splice plates, cut and drilled a new spoil board, purchased longer guide rods and belts…….and bolted it together.

One more thing: I had to add about 12"-14" to the power supply wiring……don't forget to tin the ends of the wires

Follow the rest of the assembly/installation/startup instructions…….

The last thing you'll have to do is tell the machine how big it is. That's done in Universal G-Code Sender Platform:
$130=1220
$131=610