How to assemble "The Three bedded Beast" or Splender _704x

Tools needed:

1. Basic tool kit provided by the Ender 3 kits
2. Small Machinist square
3. Metal saw
4. Tape measure or ruler
5. File, drill & bits & M4 tap
6. Propane torch
6. Torpedo level
7. Dial indicator (optional)

Parts needed:

1. 3, Base model Ender 3 kits (Ebay.com)
2. 2, 1000mm x 20x20 V slot rails (Openbuilds.com)
https://openbuildspartstore.com/v-slot-20x20-linear-rail/
3. 6' x 1/4" timing belt (Openbuilds.com)
https://openbuildspartstore.com/3gt-gt2-3m-timing-belt-by-the-foot/
4. X axis belt tensioner (Amazon.com)
https://www.amazon.com/dp/B08F995C62?ref=ppx_yo2ov_dt_b_product_details&th=1
5. 2, dual "Z" axis jumper wires (1 for X and 1 for Y) (Amazon.com)
https://www.amazon.com/dp/B0BBFXM4LB?psc=1&ref=ppx_yo2ov_dt_b_product_details
6. 3 sets, silicone spacers (spring replacements) (Amazon.com)
https://www.amazon.com/dp/B094J9CLPR?ref=ppx_yo2ov_dt_b_product_details&th=1
7. Set of 6, .8 nozzle set (Amazon.com)
https://www.amazon.com/dp/B08W4JMR4G?ref=ppx_yo2ov_dt_b_product_details&th=1
8. 2, 4'x 3/4" x 1/4" Aluminum U channel (McMastercarr.com)
https://www.mcmaster.com/catalog/129/4173/9001K736
9. 90* corner slot brackets with set screws (Amazon.com)
https://www.amazon.com/gp/product/B09G6LTG7W/ref=ppx_yo_dt_b_asin_title_o09_s00?ie=UTF8&psc=1
10. 12-16, small washers (spacers between U channel and heated bed) (hardware store)

11. 3.18 x 235 x 704mm (.125" x 9.25" x 27.75") Clear or frosted glass bed (Glass shop or hardware store)
12. Satin black spray paint (hardware store)
13. Creality silent stepper board 4.2.7 (Amazon)
https://www.amazon.com/dp/B07TMX9WFW?psc=1&ref=ppx_yo2ov_dt_b_product_details
14. zip ties (in lieu of crimping belt ends on X axis) (included in kits)

Instructions:

1. Assemble all 3 printers and make sure all the components are working properly.
2. Disassemble 2 of the printers so as to have access to the 40x40 cross-member that cradles the Y axis rail system on top and wiring harness underneath. Those 2 parts are the only parts that need cutting.
3. Measure 53mm from the right side of said parts and mark and cut. It's important to only cut on the right side as to not interfere with board housing and wiring harness area. You should be left with 2, 195mm parts.
Tip: I brought these parts to a local machine shop to be cut. They didn't even charge me because it only took 5 minutes.
3a. Decide where you want this to live and assemble frames using 4, 90* angle brackets at both unions (cut side to leg side of next frame, twice). It's crucial to square and level the frame at this point. This will not be a portable machine.

Photo Reference 1 – See full image on page 6

3b. Remove the belt and stepper from the center rail. We will not be using them.
3c. Strip the 2 leftward main boards down to power in and heated bed related wiring. Reinstall boards and rout wire harness through its cavity while carefully positioning beds out of the way. Do not stress the connection to the heated bed.
3d. Install vertical rails using 2 of the Z axis rails (2 lower mounting holes for Z stepper)
3e. Assemble Y rails and bed brackets. Move eccentric nuts to get the right amount of grip between wheels and rails. Carefully position the heated beds onto

the bracket and line up the holes. Insert all the bolts to insure fitment between beds. It should be a snug fit. Move them as 1, forward and back to ensure there's no binding. Adjust if necessary.
4. pull the 6 front bolts out but leave the 6 rear in place. Position one of the U channel extrusions, flat side up, between the bed and bracket and under said holes. align one end of the U channel to the left side of the left bed. Mark on the U channel the length to be cut (704mm) and mark where your front 6 holes are. Cut and drill the holes slightly over-sized for tolerances. I recommend taping the 2 parts together when drilling

Photo Reference 2 – See full image on page 6

4a. Assemble bracket, silicone spaces, U channel, small washers, bolts then adjustment wheels. It's a bit fiddly, especially around the power wire retainers. Snug adjusting wheels 4-5 turns at a time, working your way around until cinched in appropriately tight without deforming the U channel.

Photo Reference 3 – See full image on page 7

5. Cut the 20x20 X axis rails. Top rail should be 800.1mm. Gantry rail to 814.4mm
5a. Using the original X rails, use as templates to drill holes in the appropriate spots at each end of each rail. Assemble as normal.
6. Prepare the second Z axis bracket by removing the brass nut and reserve. Grind the corner of the bent angle by about 1/2 way through. Heat the ground with a torch then bend over 180* and square. File and paint. Replace brass nut.
6a. Assemble lead screws and Z steppers as normal.

7. Using a leftover wire harness, carefully cut off the tape and zip ties to expose the cluster with X and E wires. Use this to extend the corresponding cluster. Clip and attach 1 wire at a time to be sure you're connecting the correct wires.

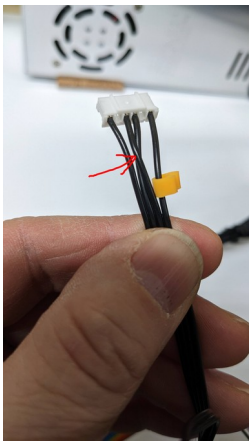

Photo Reference 4 – See full image on page 7

Tip. Notice how the center wires cross over so choose the proper wire to connect. "Uncross" the 2 wires at the plug end of the harness coming from the board to match properly to the corresponding wires in the extension harness. Twist them together to test, then Solder and heat shrink connections.

7a. Retrieve 1 set of the purchased Z axis jumper wire set. Relabel the Zs to Ys so as to not confuse yourself.

7b. Choose one of the longer end stop wires and relabel it to Z. This will replace the short wire that would normally be going from board to Z stop on left. The Z stop switch will now live on the right side of the machine. Reconfigure the Z endstop to work on the right side vertical rail and connect.

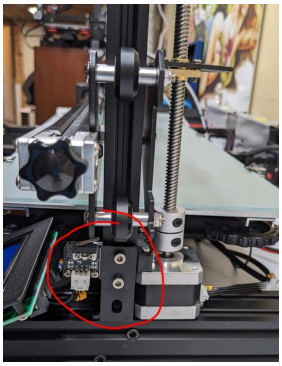

Photo Reference 5 – See full image on page 8

8. Main board swap. Carefully clip out the hot glue from connectors. Replace card and use new Z and Y stepper wires. Route longer X and E cluster under frame as to reach appropriate destination on left.

9. Assemble Z systems, gantry and top rail and all the wiring as normal. Affix one end of the belt to head bracket, fish it through and trim to fit. Secure using zip ties in lieu of brass crimps.
10. Install glass bed with kit provided clips. Check for true level and parallel with the gantry. Shim under feet if necessary. Also check the vertices for square.
11. Install screens. Left screens will be used for adjusting bed temp only.
12. Build your personal Marlin firmware changing, at minimum, "Printer name" and X axis value to 704. Flash to board.

Tramming the bed:

Tramming and leveling this bed is rather tricky due to obvious reasons. To help with this process, I disassembled a spare head unit, removing the bracket with wheels. I then removed the bottom wheel, threw away the nylon nut and replaced it with a conventional nut. I attached the dial indicator to the bracket. I then set the unit onto the gantry rail and installed the bottom wheel.

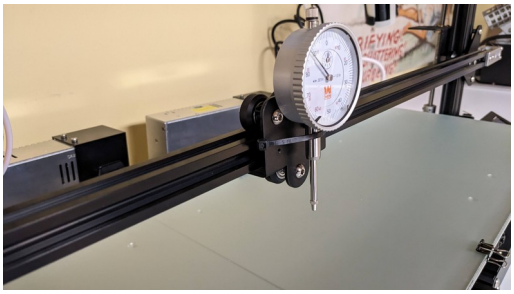

Photo Reference 6 – See full image on page 8

This unit will reduce the guesswork. Systematically move the unit around the bed, determining the high and low spots. Shim with washers between brackets and silicone spacers if needed. Adjust, move, adjust, shim, move, repeat. This will take a few times around to get it perfect.
Use torpedo level to be sure your bed and gantry rail are level and parallel. With the printer OFF, place a piece of paper on bed, under head. Manually turn the lead screws counter clockwise to lower the gantry until the nozzle just touches the paper. Again, be sure the gantry is level. Adjust Z endstop until it clicks and lock it in place. This step took me a few times to nail down. Once the Z height is set, move the head around the bed and make minor adjustments with the wheels as needed.
Now print some BIG stuff!
Feel free to reach out to me with questions. 9am to 5pm Eastern time USA
Good luck!

Photo Reference 1

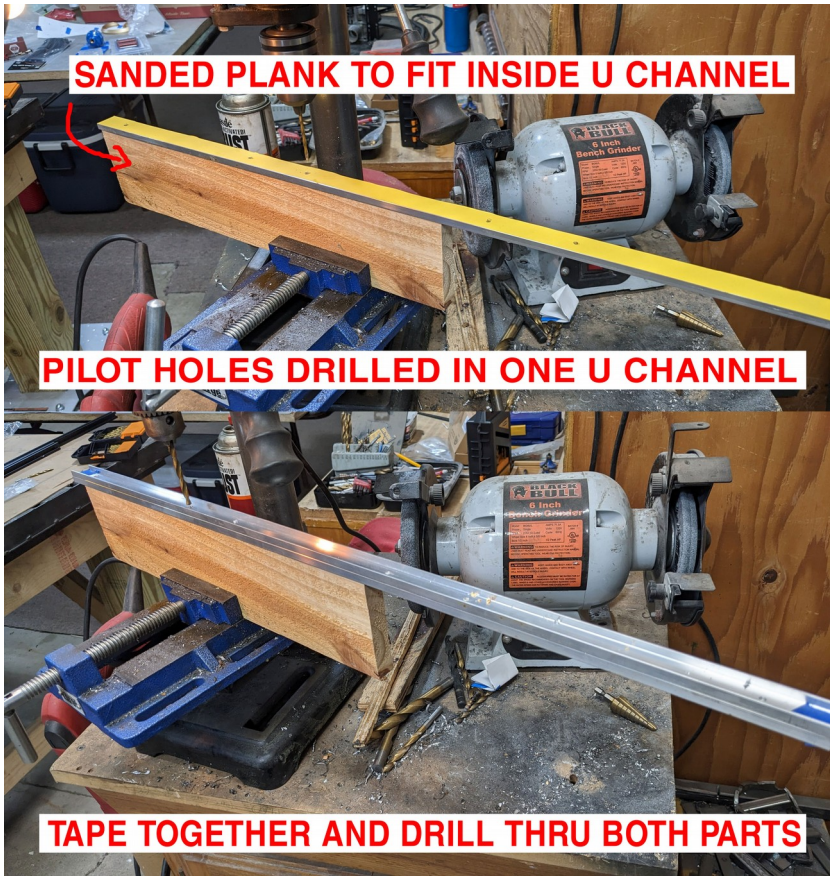

Photo Reference 2

Photo Reference 3

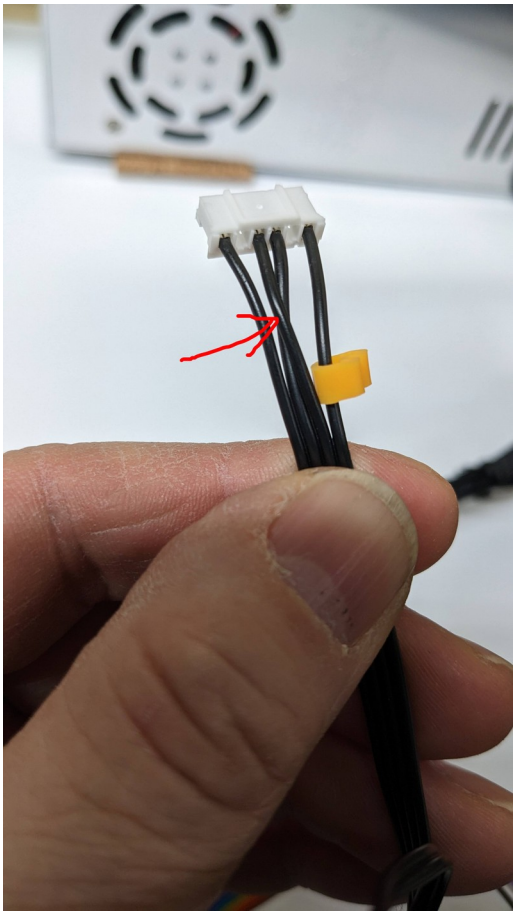

Photo Reference 4

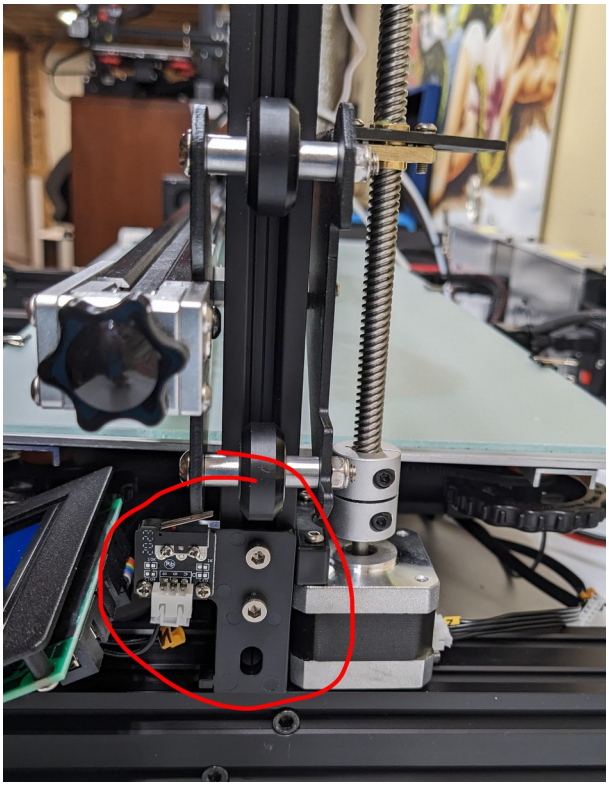

Photo Reference 5

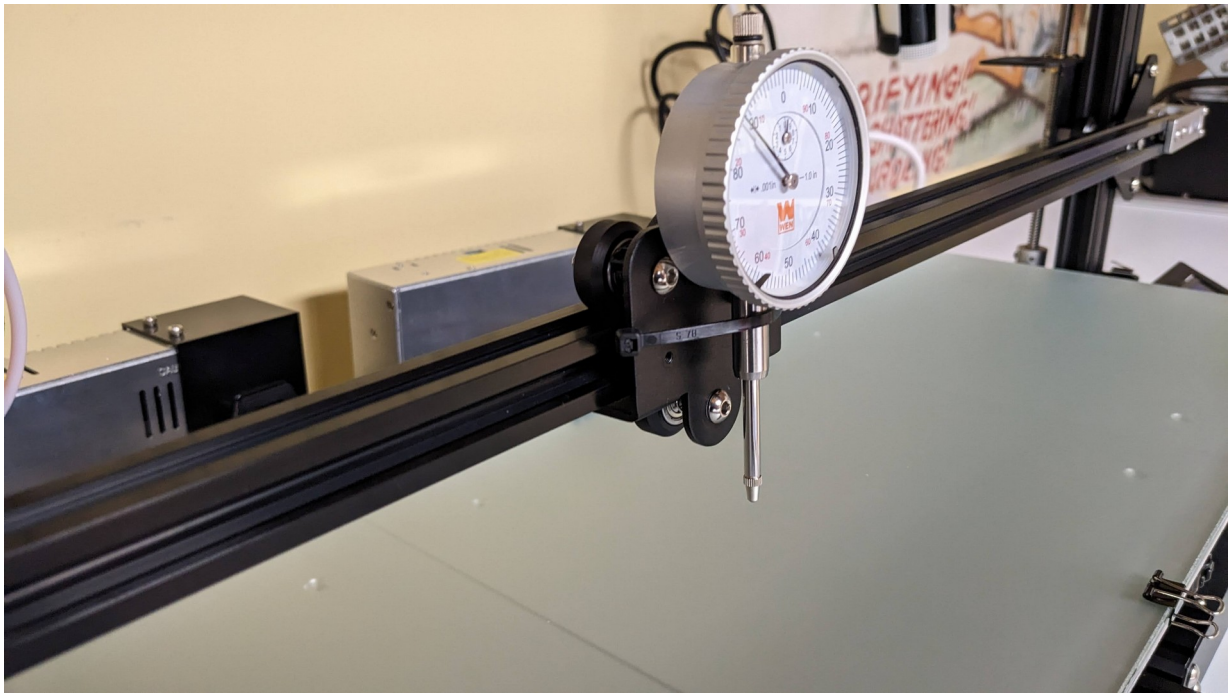

Photo Reference 6

https://www.youtube.com/watch?v=mVBYg6ej8ZU – A video showing the first print!