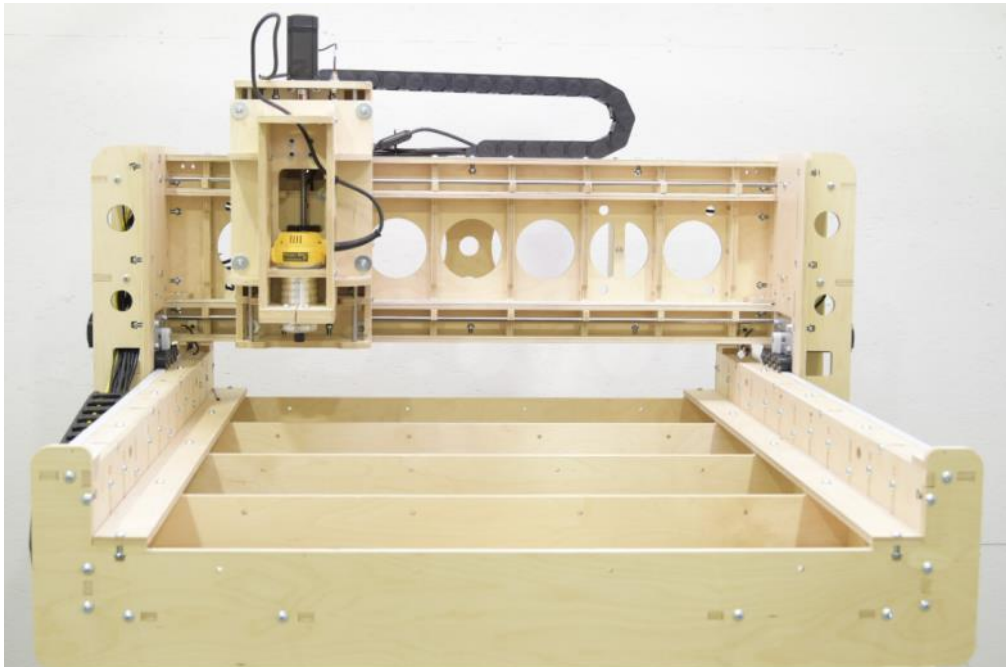


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**KLT33**

# Z Spindle and Y Carriage Assembly Manual

MANUAL 2 of 8




Version 2.3


Page 1


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# Look Safety Information and Hints.

	<p><b>DANGER</b> Indicates a serious risk of bodily harm, possible injury and death. This warning box is to be taken seriously. Any work must be carried out with extreme caution.</p>
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	<p><b>CAUTION</b> Indicates a possible risk of injury that can result from failure to follow this instruction.</p>
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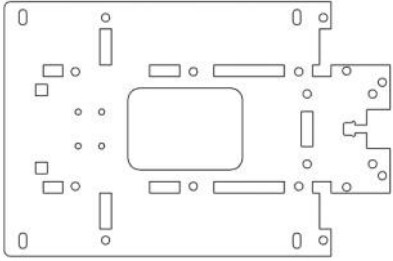
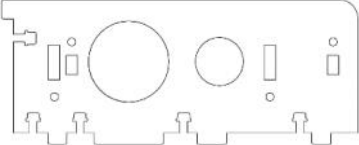

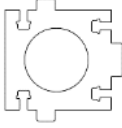
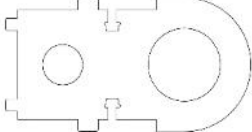
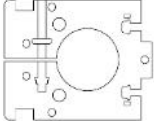
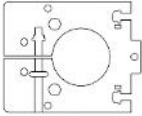
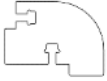
	<p><b>WARNING</b> Indicates the possible damage to the machine, it's components, or the work piece that can result from the failure to follow this warning.</p>
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 <p><b>HINT</b></p>	<p>Hints will provide needed information, shortcuts, and insights that will make assembly and machine operation easier and safer.</p>
--	---

**Please review each assembly manual before beginning to assemble the KL7 SERIES CNC Router.**



# Z Spindle Mount Assembly Instructions

## Z Spindle Mount Wood Components

Part #	Description	Qty	Photo
Z1	Frame Back Plate	1	
Z2	Frame Side Support	2	
Z3	Ball Screw Spacer	1	
Z4	Spindle Top Mount	1	
Z5	Frame Top Support	1	
Z6	Bottom Spindle Mount Upper	1	
Z7	Bottom Spindle Mount Lower	1	
Z8	Frame Support	4	

# Z Spindle Mount Assembly Instructions

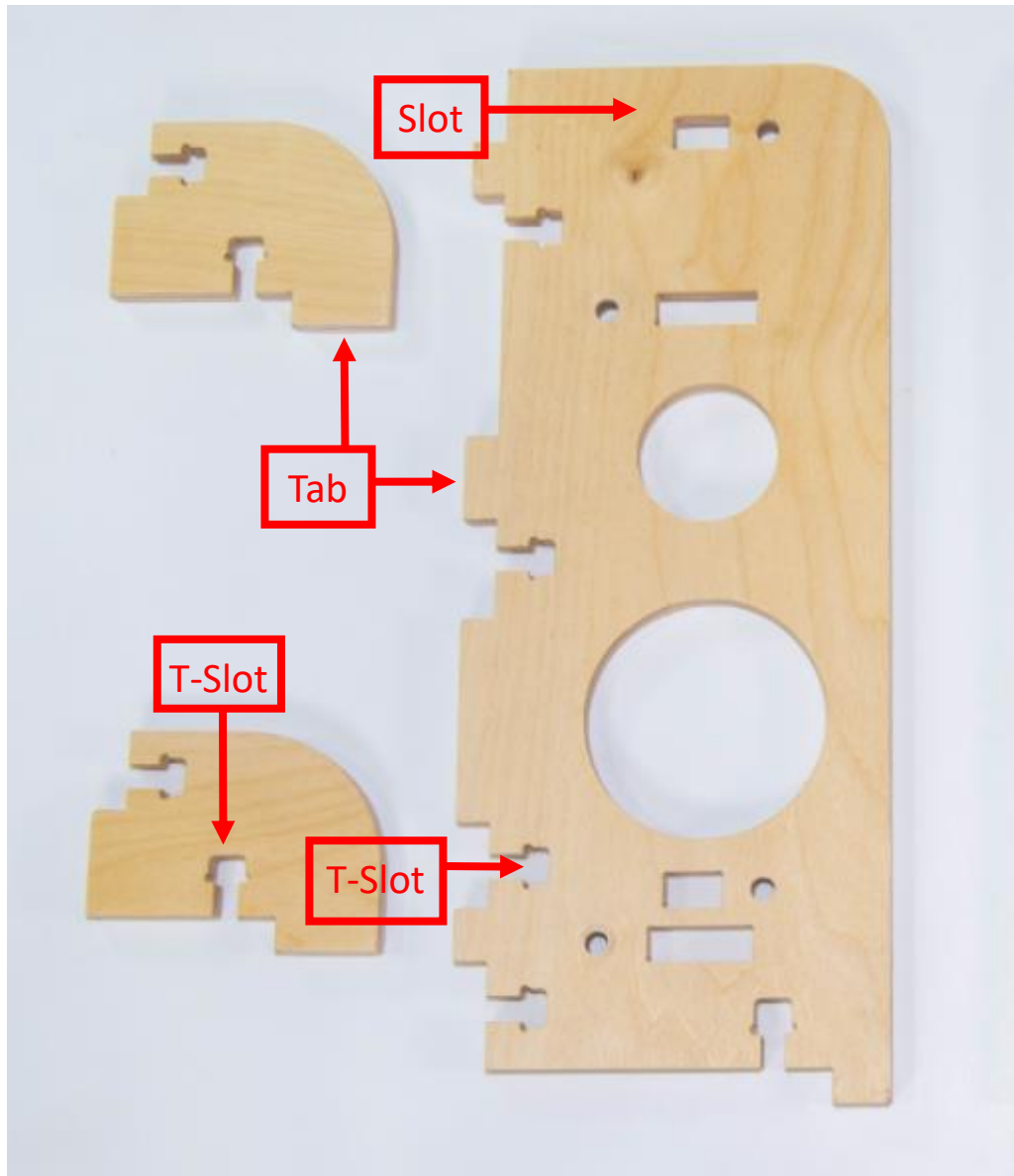
## Z Spindle Mount Hardware Components

Part #	Description	Qty	Photo
H24	SG25U bearings	4	
H8	5/16 Fender Washers	8	
H3	5/16 x 1 1/4 Machine Screw	29	
H2	5/16 x 1 3/4 Machine Screw	4	
H1	5/16 x 1 3/4 Hex Head Bolt	4	
H23	8-32 Set Screw	4	
H5	5/16 Nuts	30	
H6	5/16 Lock Nuts	6	



**HINT**

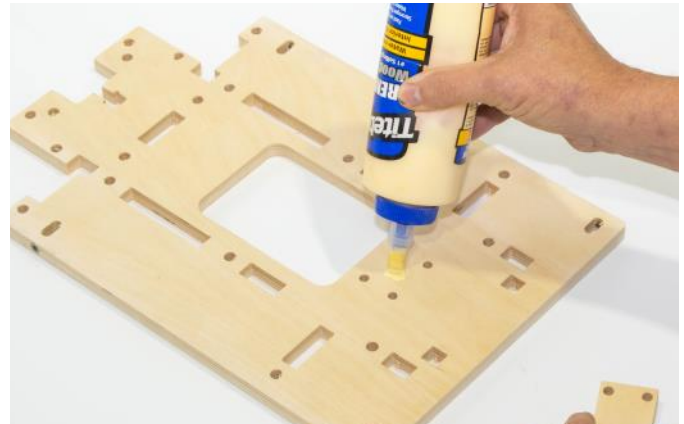
The KL7 SERIES CNC Router Kits incorporate tab and slot construction (see photo below). When the tabs and slots are fitted together, they must be secured with the appropriate Machine Screw and Nut. Nuts are to be placed in the T-Slots. The Screws and Nuts should be snug and then turned 1 to 1 1/2 turns to tighten. You must use Locktite 243 as a thread locker on all machined screws unless noted.



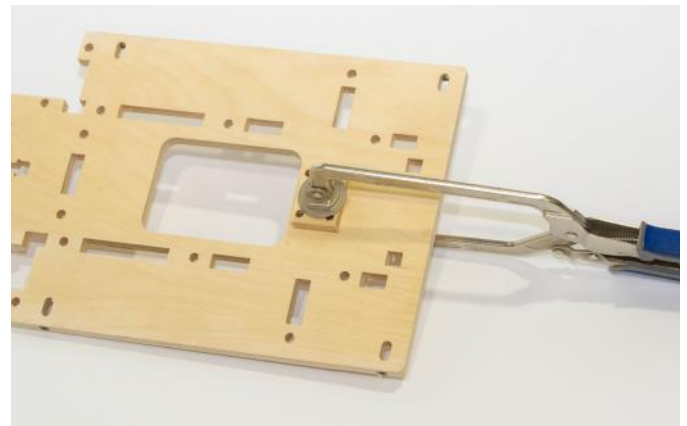
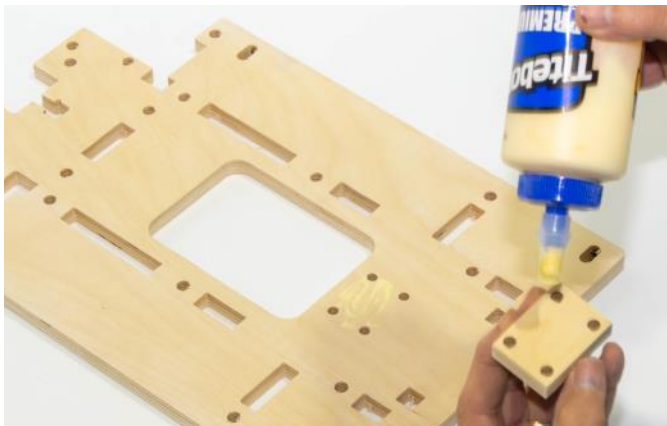
# Z Spindle Mount Assembly

## Step 1

Glue Z3 Ball Screw Spacer to Z1 Frame Back Plate using Titebond® Wood Glue or similar product.



Clamp the Spacer in place, making sure to align the four mounting holes. Clean off any excess glue from the edge of the block and from within the holes.



It doesn't matter which side of the Back Plate you glue the Mounting Block to. Just remember the side with the Mounting Block is now the back of the Z Frame Back Plate Assembly.



**HINT**

The KL7 SERIES CNC assembly process requires Loctite 232 as a thread locker on all Machine Screws unless noted.

We recommend threading the Machine Screw in one thread, then applying the Loctite, then tightening the screws. The Screws and Nuts should be snug and then turned 1 to 1 1/2 turns to tighten.

**Step 2** Insert the tabs of the Z8 Frame Supports into the slots in the Z2 Frame Side Supports and secure with four 5/16 x 1 1/4 Machine Screws and Nuts.



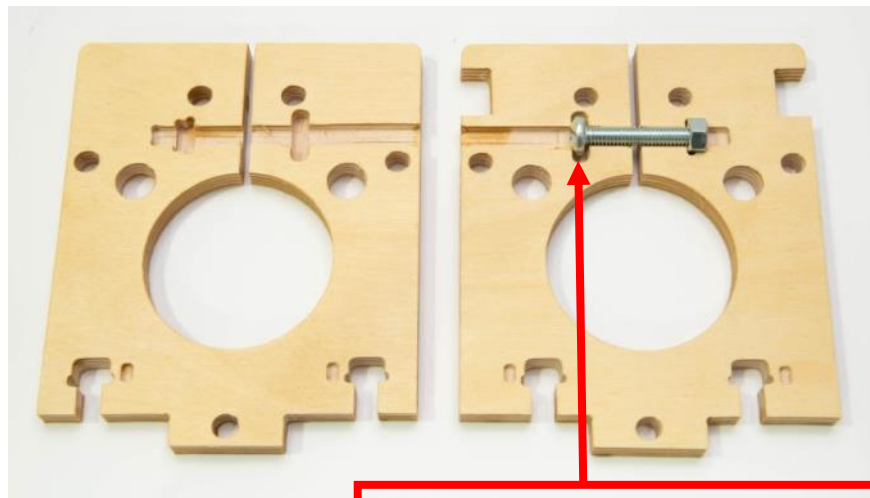
**NOTE: The parts are mirrored.**



**Step 3** Attach the Z5 Frame Top Support and Z4 Spindle Top Mount to the Frame Side Support Assemblies and secure with four 5/16 x 1 1/4 Machine Screws and Nuts.



**Step 4** Sandwich a 5/16 x 1 3/4 Machine Screw and Nut between the Z7 Bottom Spindle Clamp and the Z6 Top Spindle Clamp top as shown.



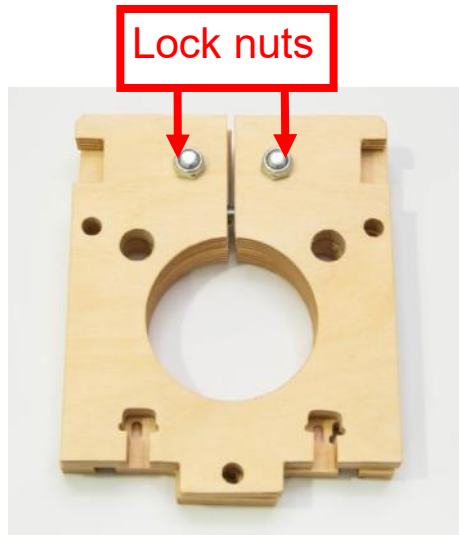
Phillips Screw Head on this side



**HINT**

When inserting the Machine Screw and Nut make sure the Phillips Screw Head is visible and accessible to loosen and tighten the Spindle Mount around the body of the Router.

**Step 5** Secure the Top and Bottom Clamps together with two 5/16 x 1 1/4 Machine Screws and Lock Nuts as shown below.



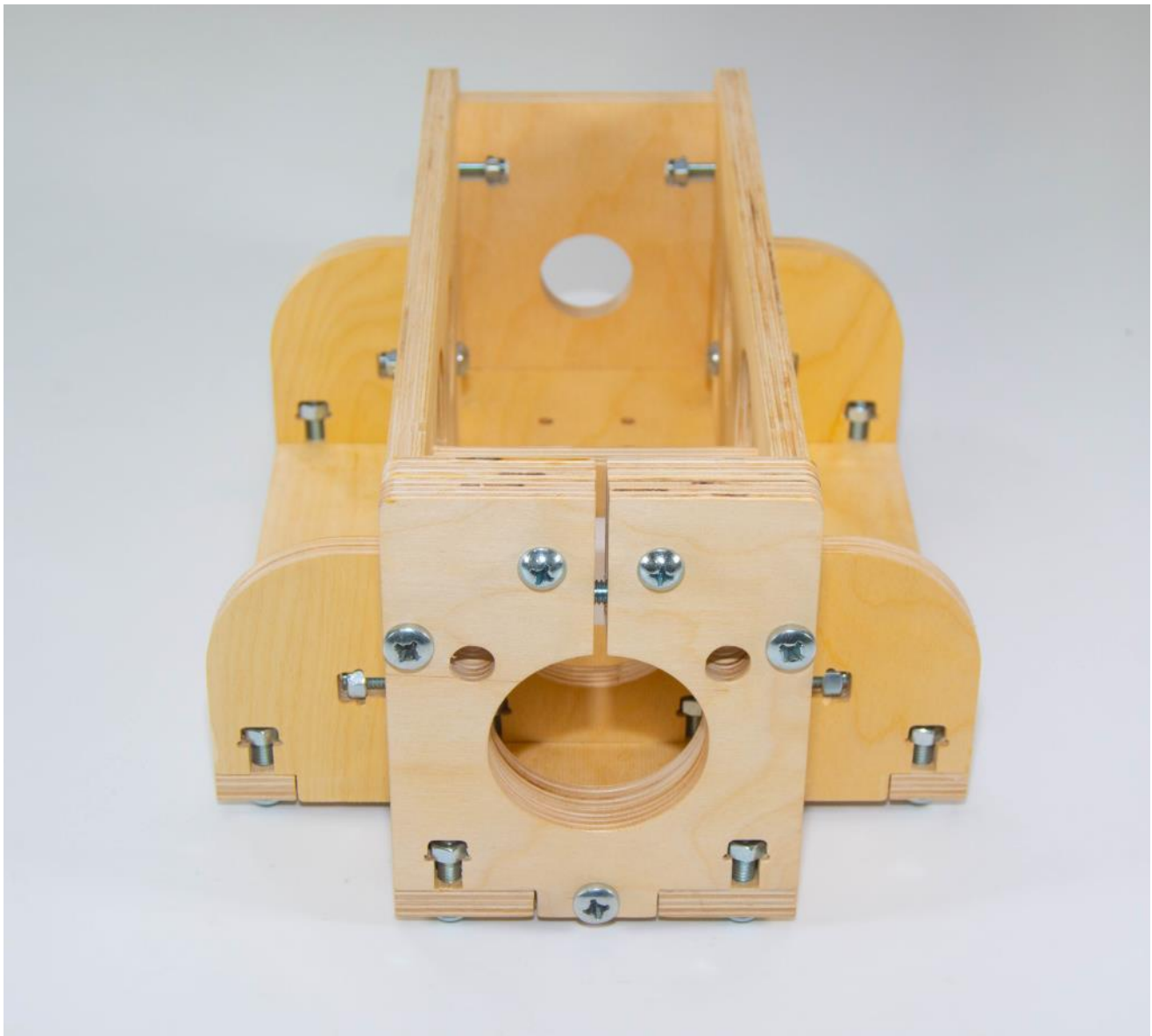
Lock nuts

## Step 6

Attach the Assembly to the to the Frame Back Plate Assembly and secure with fourteen 5/16 x 1 1/4 Machine Screws and Nuts.



**Step 7** Attach the assembled Spindle Clamp Assembly to the Z Assembly and secure with three 5/16 x 1 3/4 and four 5/16 x 1 1/4 Machine Screws and Nuts as shown.



## Step 8

Insert four 8-32 set screws into the four factory installed inserts with a 5/64 Allen Wrench on the edge of the plywood in line with the slotted holes as shown.



# Installing the Bearings

**Step 1** Install four SG25U Bearings with four 5/16 x 1 3/4 Hex Head Bolts, eight Fender Washers, and four 5/16 Lock Nuts to the Y Carriage Frame Assembly.



**CAUTION:** Make sure the hub of the bearing faces the washer. **IMPORTANT:** the hex head must be oriented so that the nut is visible when looking at the back of the carriage (see photo below).



**HINT**

## Bearing sequence:

Hex-head / Bearing / Fender Washer / Plywood / Fender Washer / Locknut.

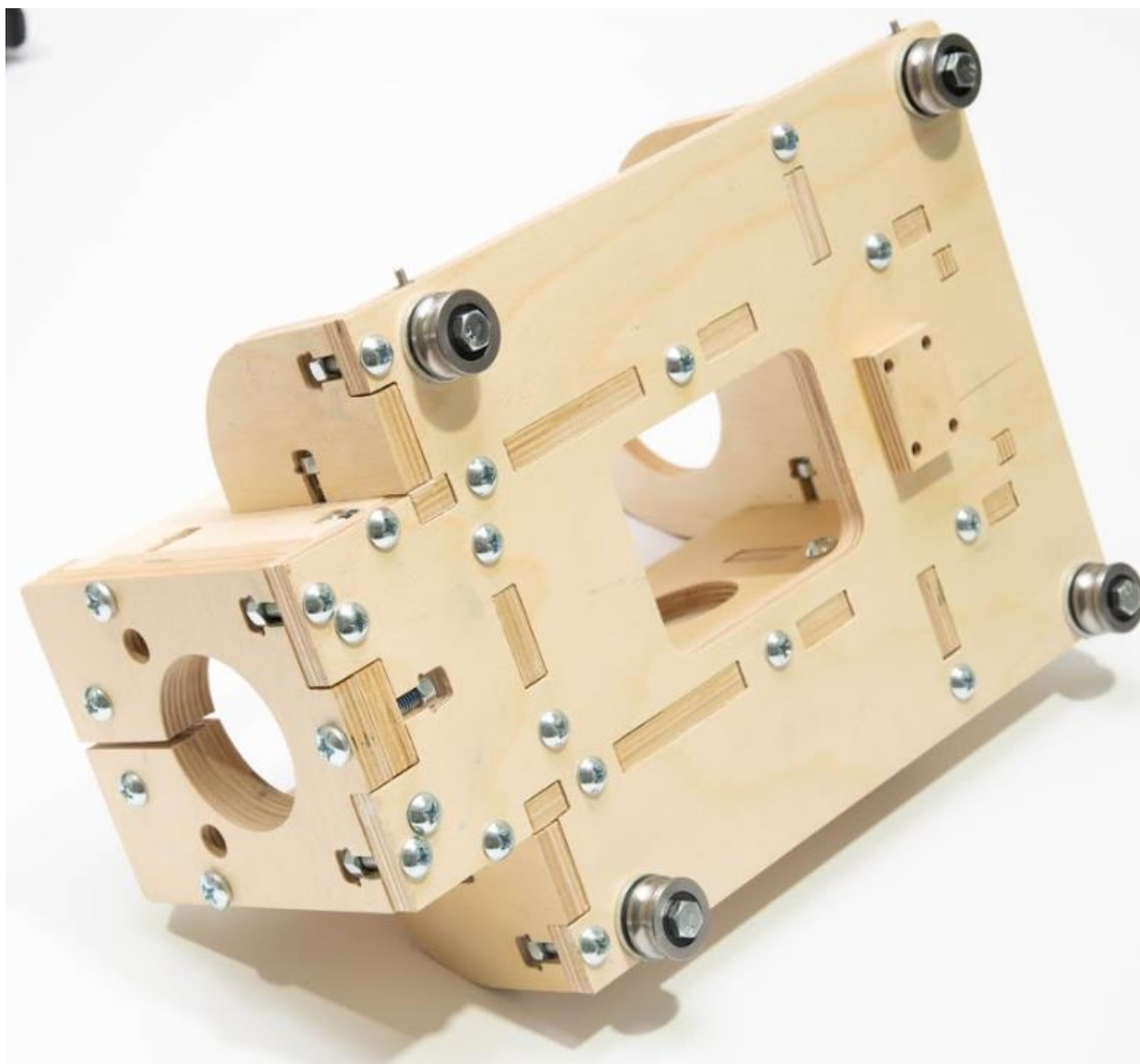


## Step 2 Install bearings as shown below.



**HINT**

All 4 of the Bearings are mounted in the elongated holes and need to be snug but able to slide in the slots. These will be tightened in a later step and are also used to Tram the Spindle.





**Front view**

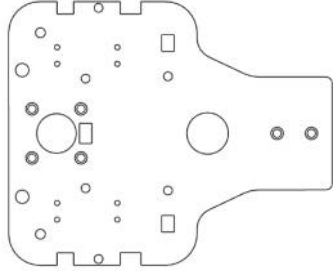
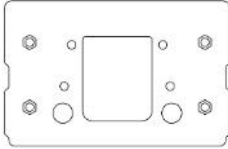
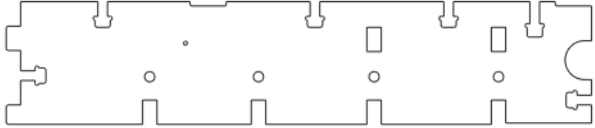


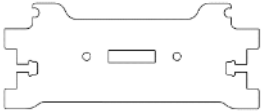
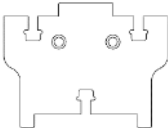
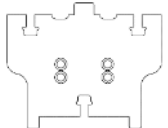
**Back view**



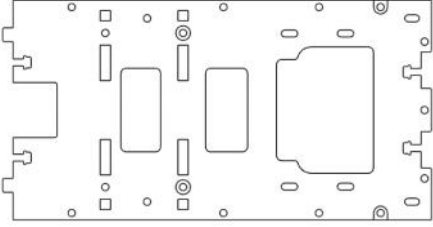



# Y Carriage Assembly Instructions

## Y Carriage Wood Components

Part #	Description	Qty	Photo
Y1	Carriage Top Mount	1	 A technical drawing of a rectangular plate with a complex shape, featuring several circular holes of different sizes and a protruding section on the right side.
Y2	Belt Drive Mount	1	 A technical drawing of a rectangular plate with a central rectangular cutout and several circular holes around the perimeter.
Y3	Carriage Side	2	 A technical drawing of a long, narrow rectangular plate with several rectangular slots and circular holes along its length.
Y4	Upper Rail Support	2	 A technical drawing of a rectangular plate with a central circular hole and several rectangular slots.
Y5	Carriage Bottom	1	 A technical drawing of a rectangular plate with a complex shape, featuring several circular holes and a protruding section on the right side.
Y6	Y Carriage Mid Rail Support	1	 A technical drawing of a rectangular plate with a central rectangular slot and several circular holes.
Y7	Lower Ball Screw Mount	1	 A technical drawing of a rectangular plate with a central circular hole and several rectangular slots.
Y8	Upper Ball Screw Mount	1	 A technical drawing of a rectangular plate with a central circular hole and several rectangular slots.

## Y Carriage Wood Components

Part #	Description	Qty	Photo
Y9	Frame Back Plate	1	
Y10	Rail Support	1	

## Y Carriage Hardware

Part #	Description	Qty	Photo
H24	SG25U Bearing	4	
H8	5/16 Fender Washer	12	
H1	5/16 X 1 3/4 Hex Head Bolt	4	
H3	5/16 x 1 1/4 Machine Screws	41	
H23	8-32 Set Screws	2	
H6	5/16 Lock Nuts	8	
H5	5/16 Nuts	37	
H22	10-24 Insert	12	
RZ	3/8" x 19" Z Rail	2	

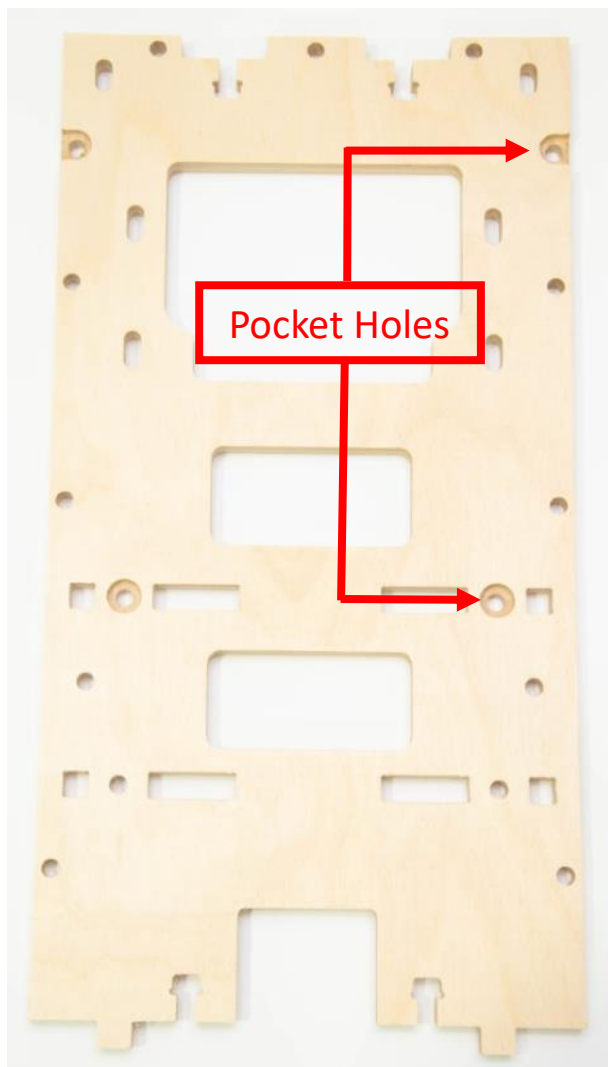
# Ball Screw Hardware

Part #	Description	Qty	Photo
B1	Upper Ball Screw Locking Nut	1	
B2	Upper Ball Screw Mount	1	
B3	Ball Screw with Nut	1	
B4	Ball Screw Nut Housing	1	
B5	Lower Ball Screw Mount	1	
H13	M4 x 16 Socket Head Machine Screws	6	
B6	Retainer Clip	1	
H11	10 – 24 x 1 ½ Socket Head Screws	6	
B7	Z Spider Coupler	1	

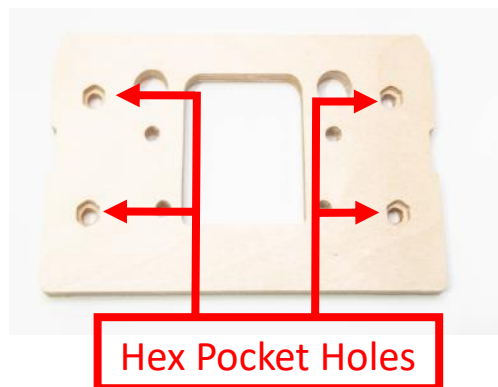
# Y Carriage Assembly

## Step 1

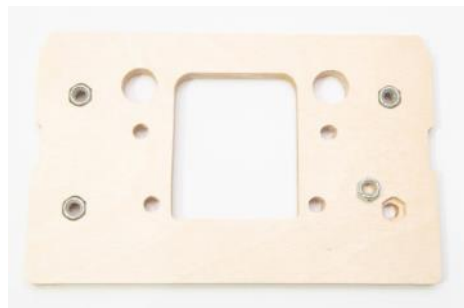
**NOTE:** The back side of the Y9 Frame Back Plate has pocket holes and is an important reference for orientation.



**Orient the Y2 Belt Drive Mount with the Hex Pocket Holes facing up as shown.**

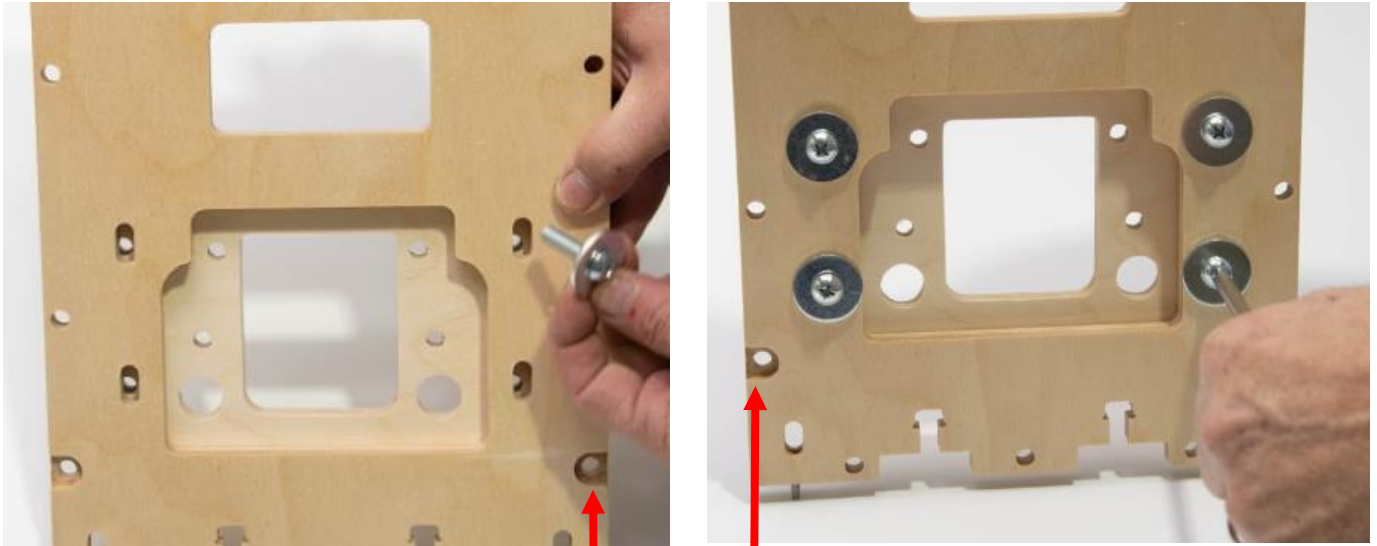


**Set four 5/16" lock nuts in the Hex Pocket Holes as shown. If needed, use a mallet to tap them in place.**



## Step 2

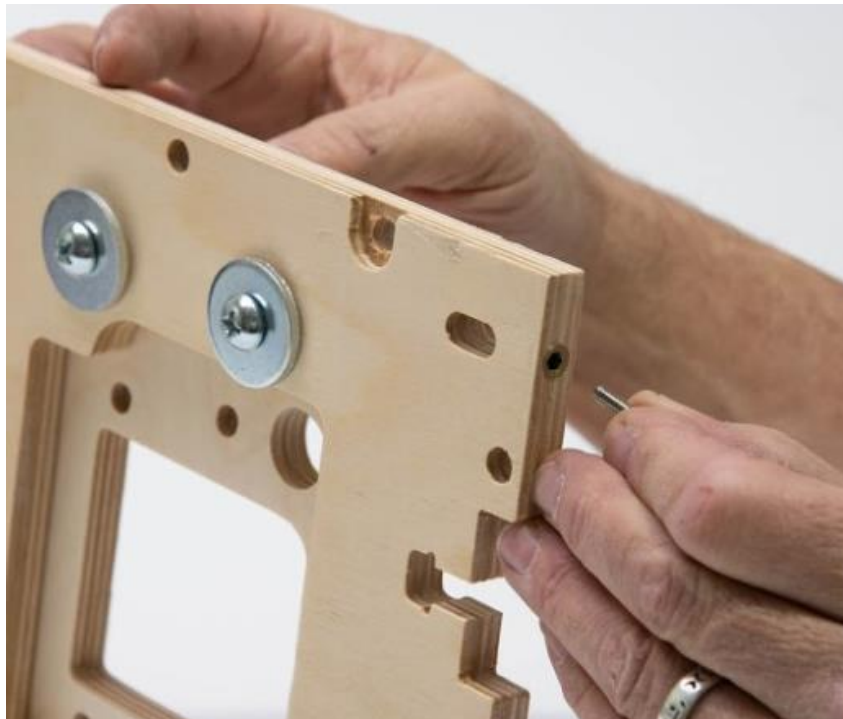
Attach the Y2 Belt Drive Mount to the Y9 Frame Back Plate using four 5/16 x 1 1/4 Machine Screws, Nuts, and Fender Washers as shown.



Pocket Holes

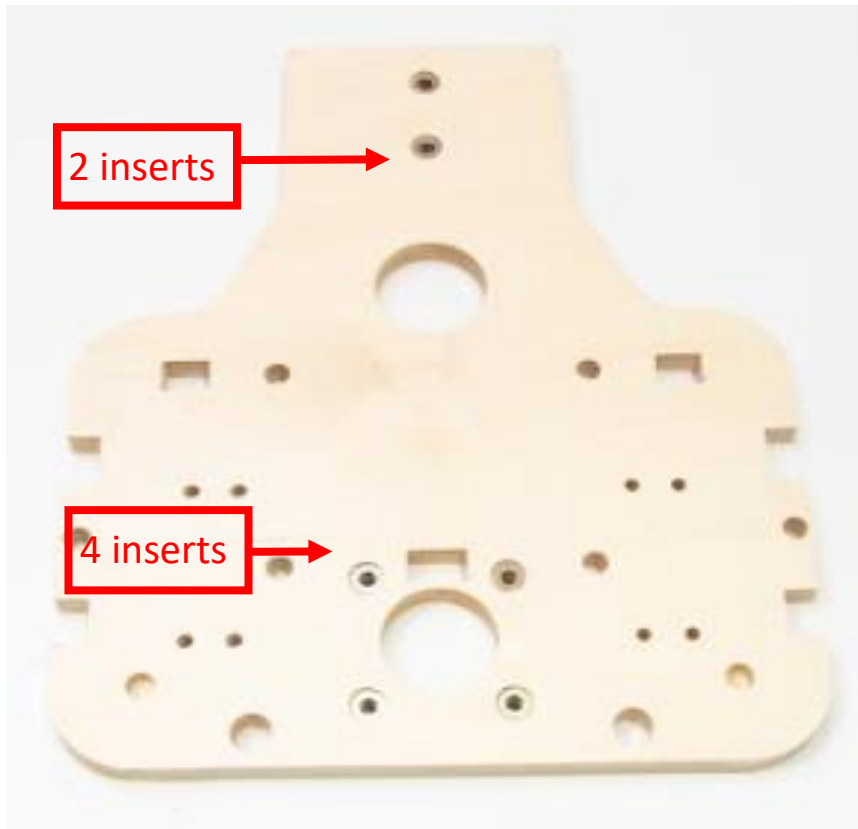
## Step 3

Thread the two 8-32 Set Screws into the Factory Installed Threaded Inserts as shown.



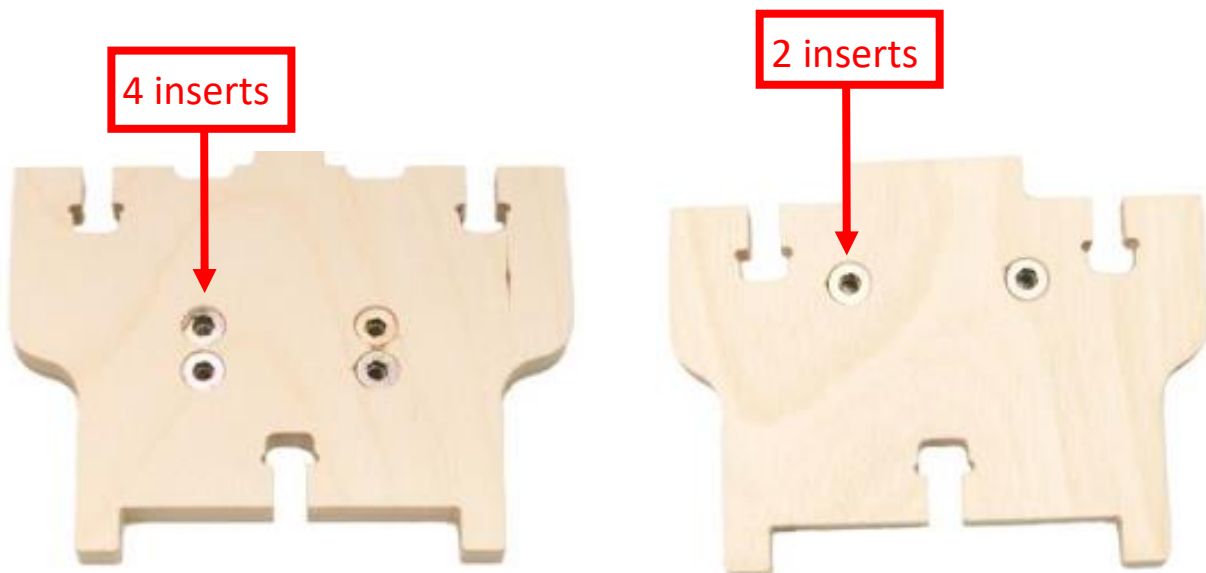
## Step 4

Install six 10-24 Threaded Inserts into the Y1 Carriage Top Mount .



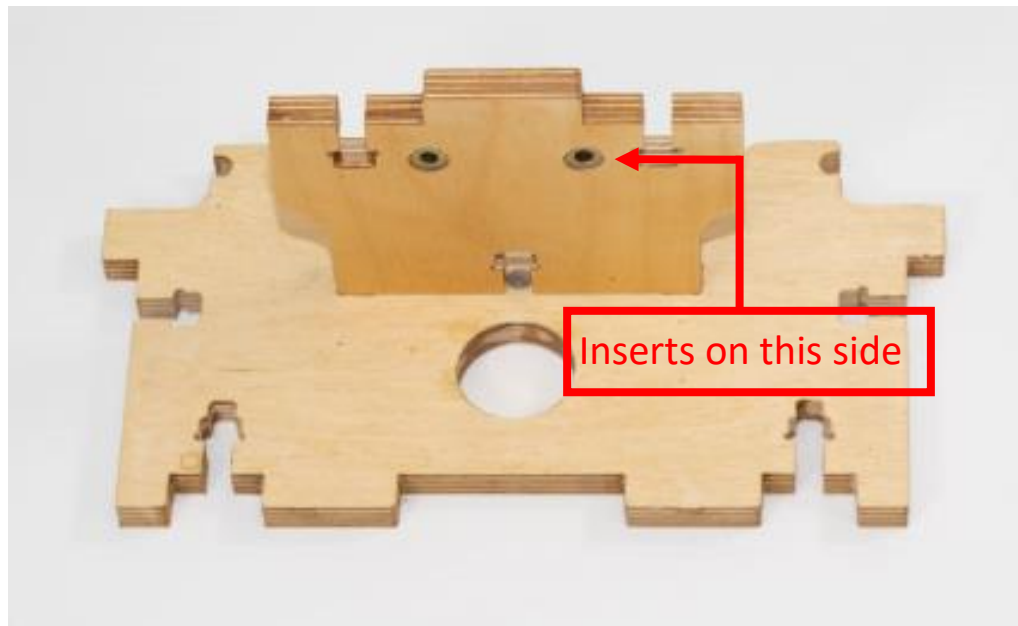
## Step 5

Install four 10-24 Threaded Inserts into the Y8 Upper Ball Screw Mount and install two 10-24 Threaded Inserts into the Y7 Lower Ball Screw Mount as shown.



## Step 6

Attach the Y7 Lower Ball Screw Mount to the Y4 Upper Rail Support. Ensure the Inserts are facing as shown. Secure with one 5/16 x 1 1/4 Machine Screw and Nut.



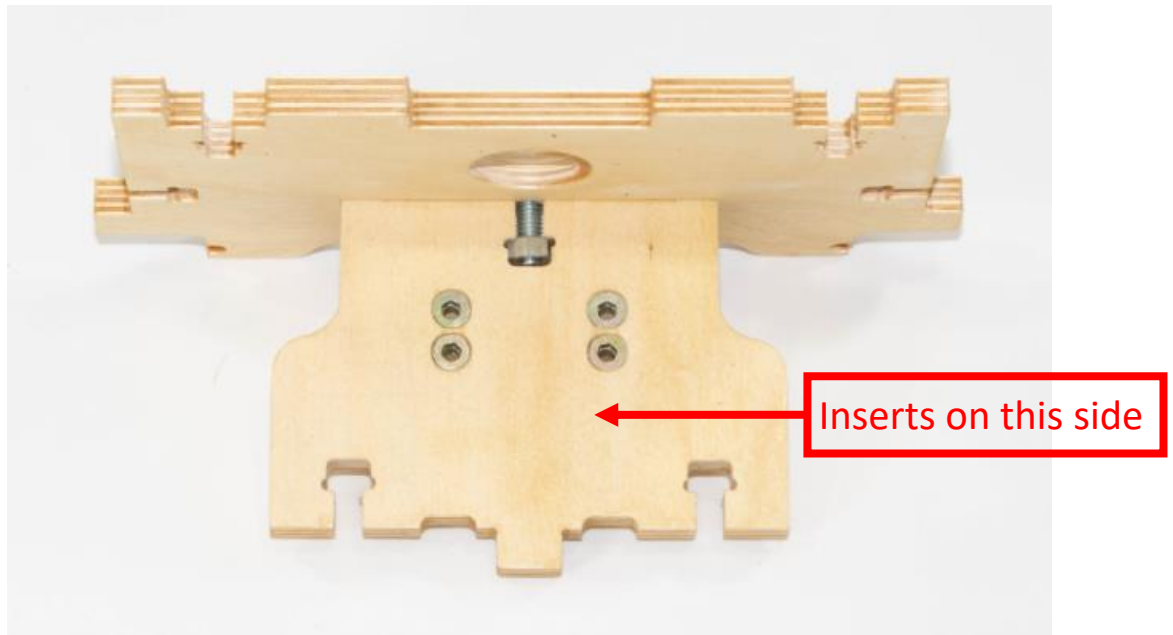
## Step 7

Attach the Y6 Mid Rail Carriage Support to the Upper Support Assembly and secure with two 5/16 x 1 1/4 Machine Screw and Nuts.



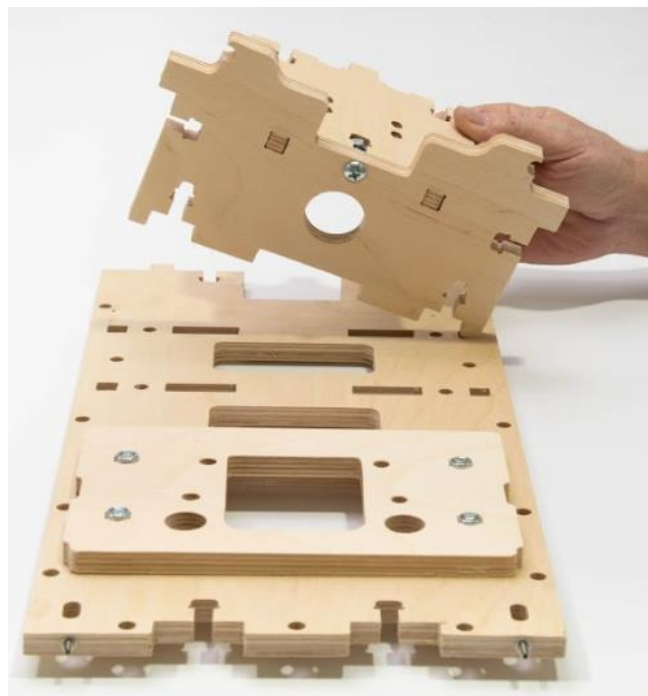
## Step 8

Attach the Y8 Upper Ball Screw Mount to Y4 Upper Rail Support with one 5/16 x 1 1/4 Machine Screw and Nut as shown. Ensure the Inserts are facing as shown.



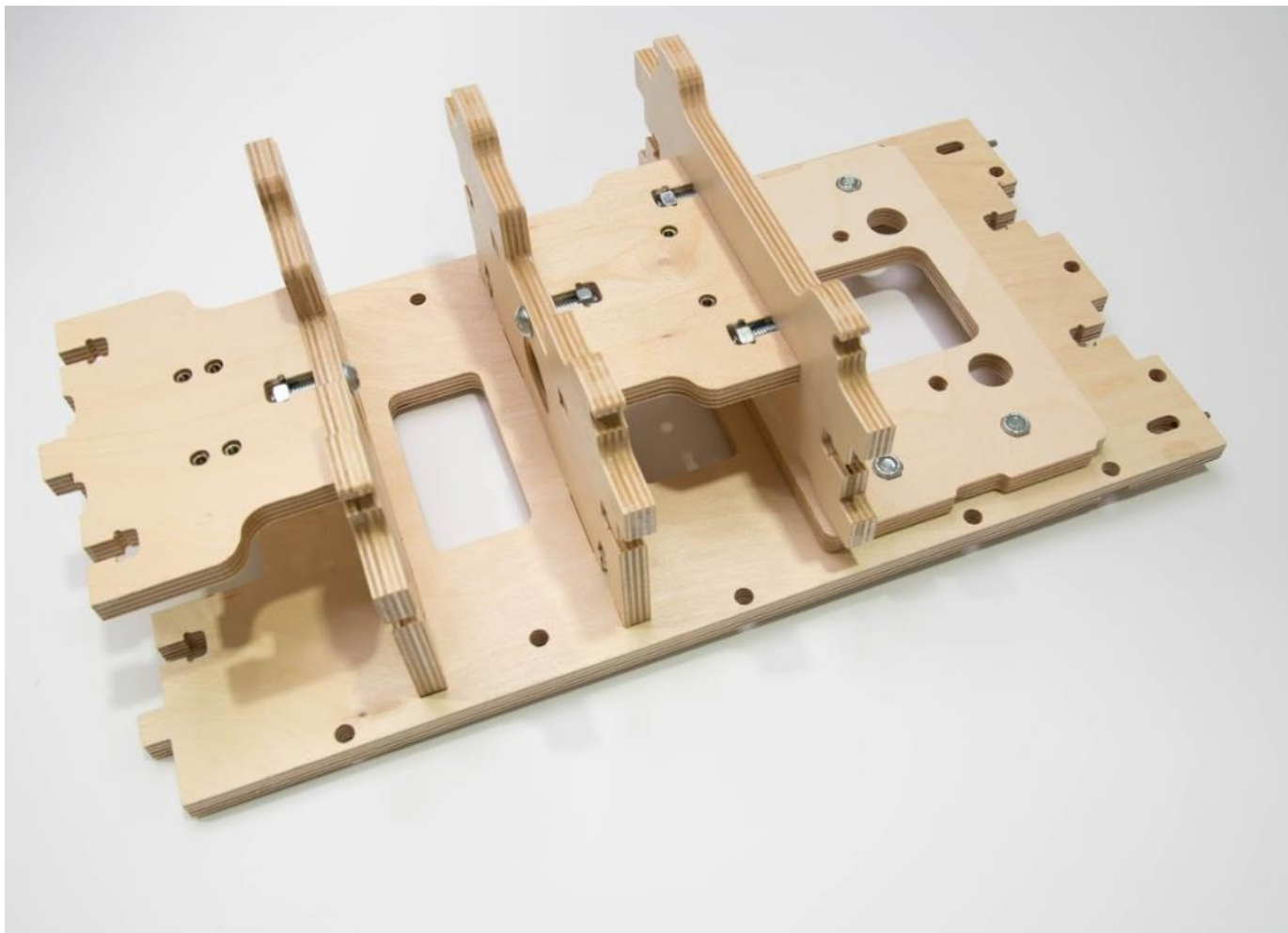
## Step 9

Attach Upper Ball Screw Mount Assembly to the Y Carriage Frame Assembly. Secure with two 5/16 x 1 1/4 Machine Screws and Nuts as shown.





**Step 10** Attach Lower Ball Screw Mount Assembly to the Y Carriage Frame Assembly. Secure with two 5/16 x 1 1/4 Machine Screws and Nuts as shown.



# Installing the Bearings

**Step 1** Install four SG25U Bearings with four 5/16 x 1 3/4 Hex Head Bolts, eight Fender Washers, and four 5/16 Lock Nuts to the Y Carriage Frame Assembly.



## CAUTION:

Make sure the hub of the bearing faces the washer. **IMPORTANT:** the hex head must be oriented so that the nut is visible when looking at the back of the carriage (see photo below).



Hub



**HINT**

## Bearing sequence:

Hex-head / Bearing / Fender Washer / Plywood / Fender Washer / Locknut.

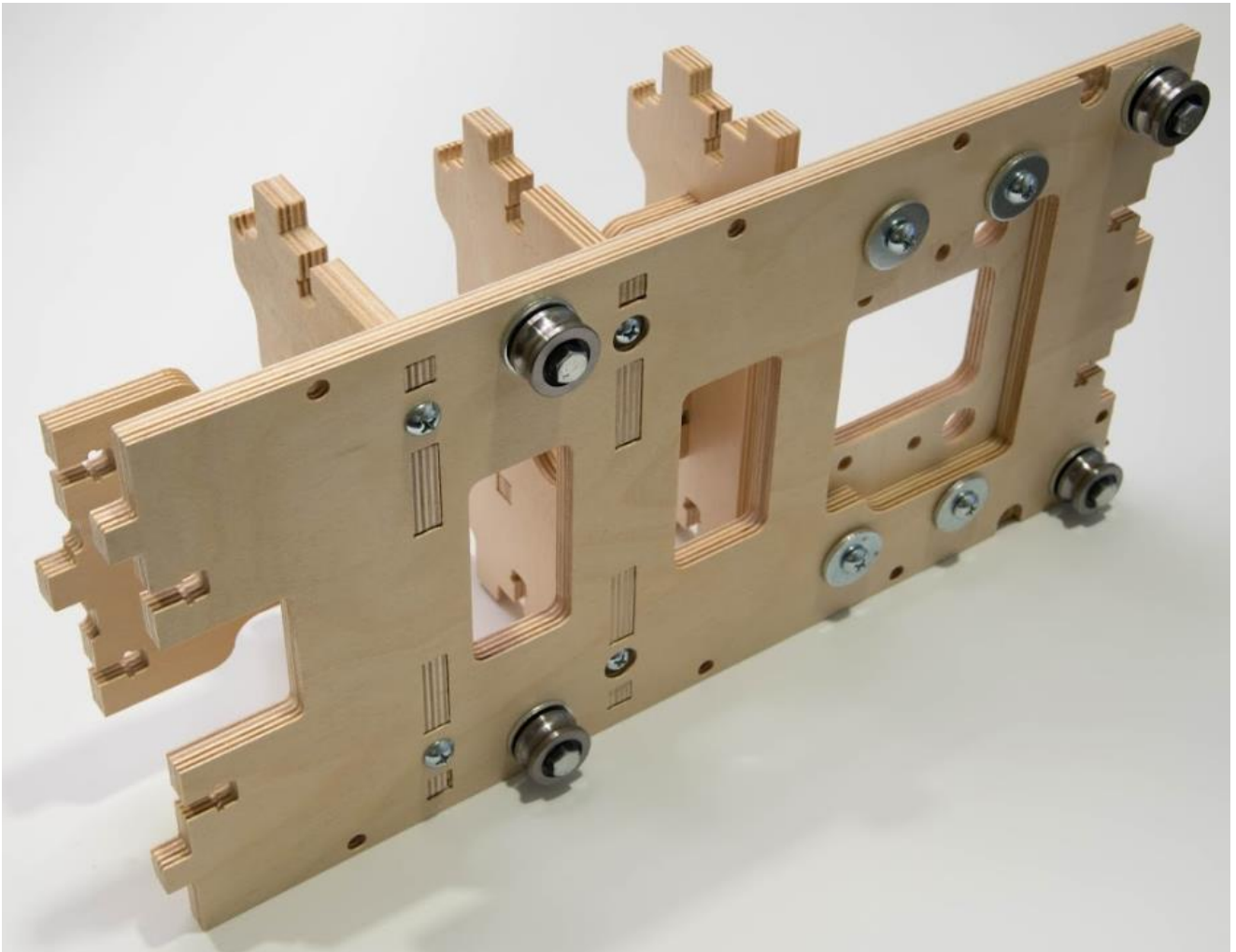




**HINT**

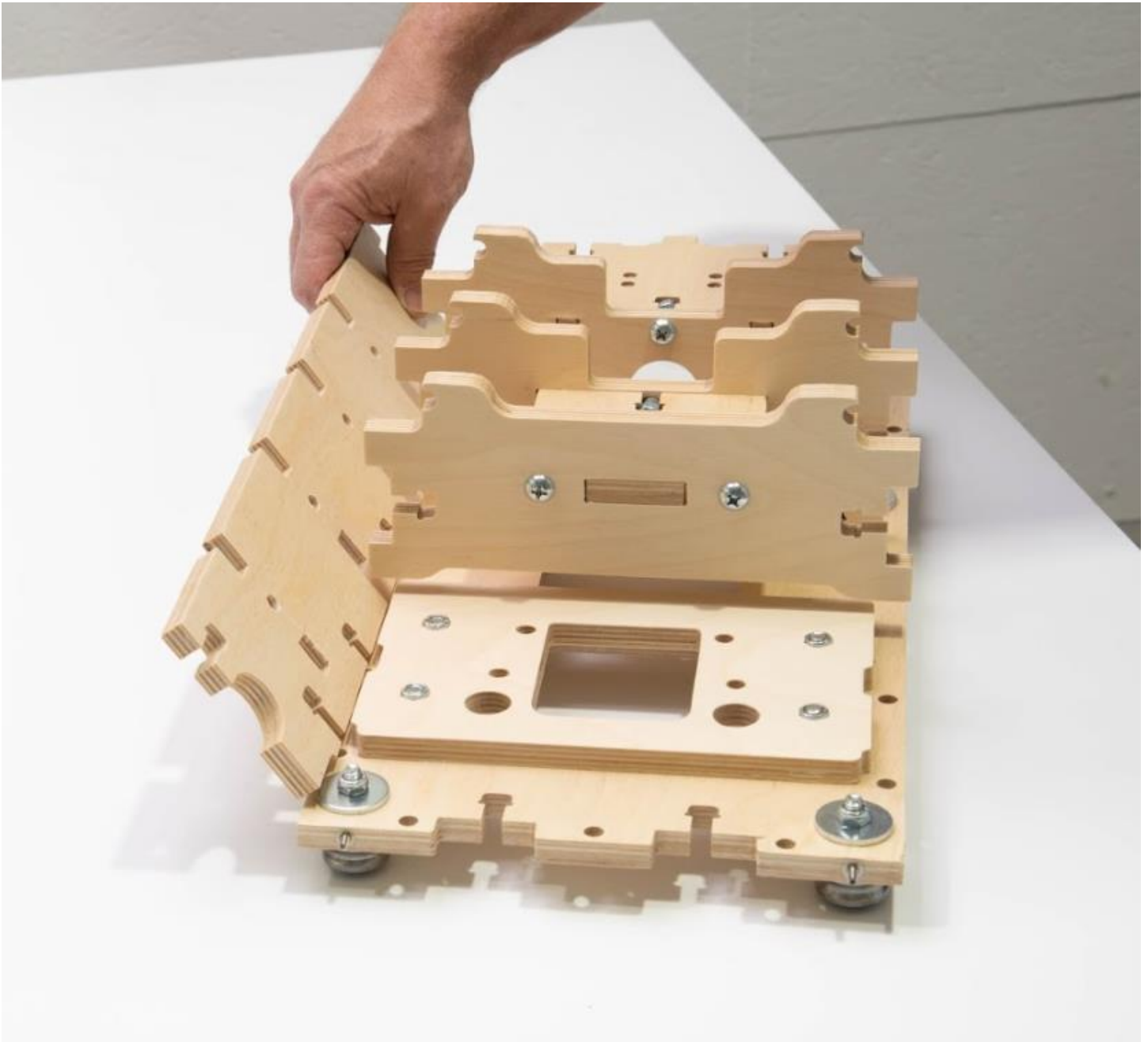
**Tighten the Nuts for the two Bearings in the round holes.**

**The Bearings mounted in the elongated holes need to be snug but able to slide in the slots. These Bearings will be tightened in a later step when mounting the Assembly.**



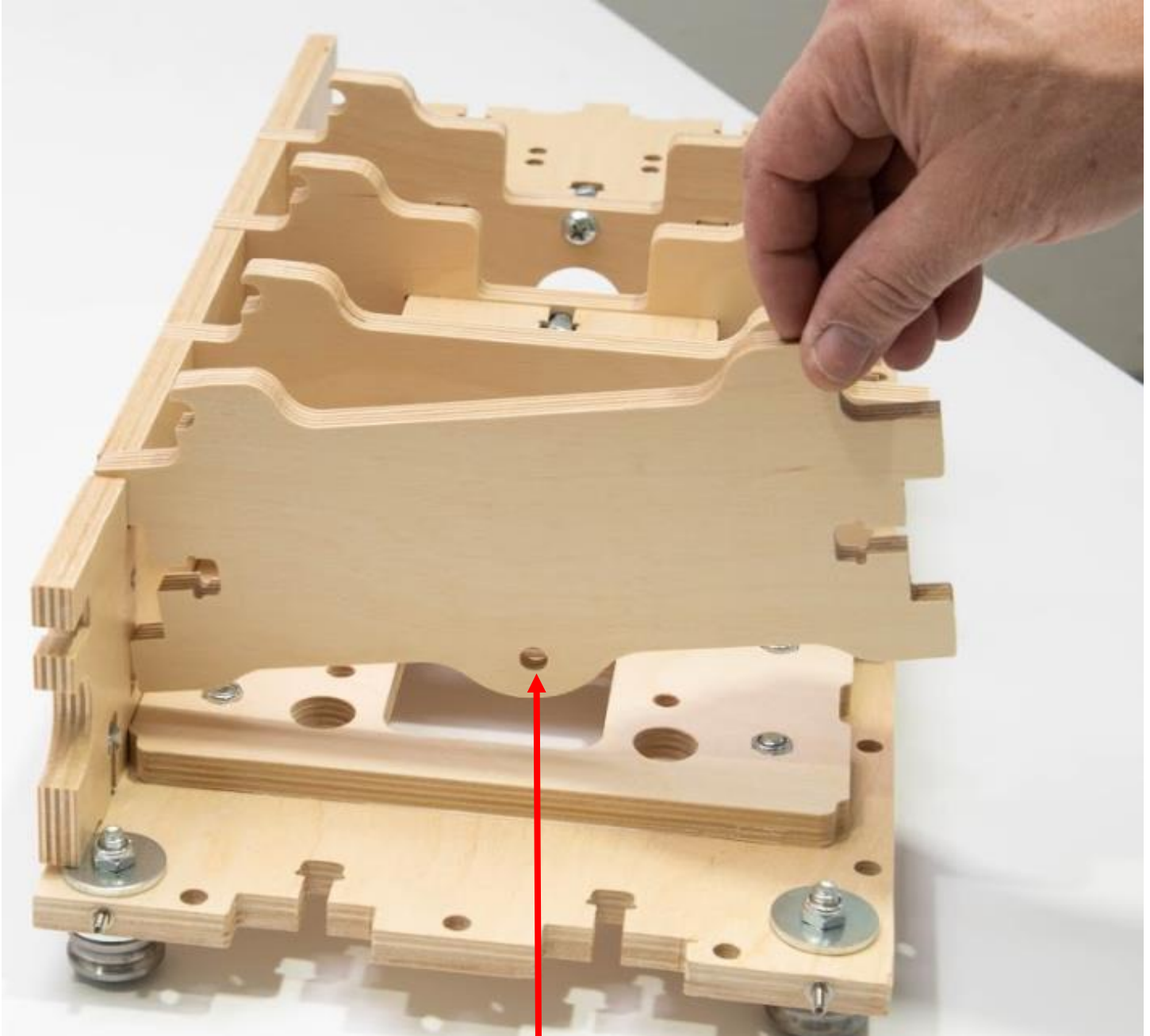
# Y Carriage Assembly—continued

**Step 1** Position one of the Y3 Carriage Sides to the Back Frame Assembly.  
Secure with seven 5/16 x 1 1/4 Machine Screws & Nuts.



## Step 2

Install the Y10 Rail Support as show. The hex pocket cut on the centerline of Y10 should be facing up (not visible in the picture).



Hex pocket cut other side

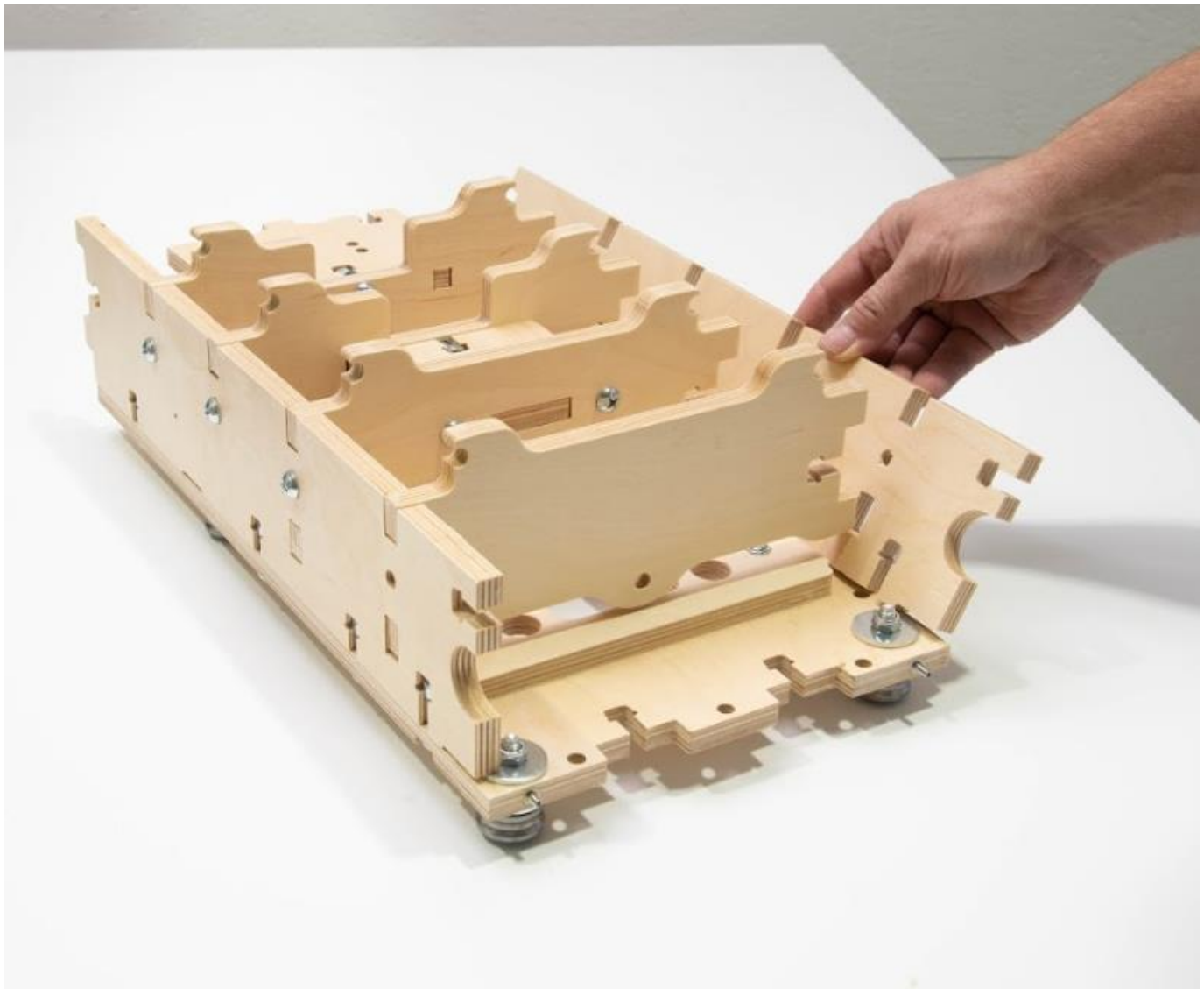
## Step 3

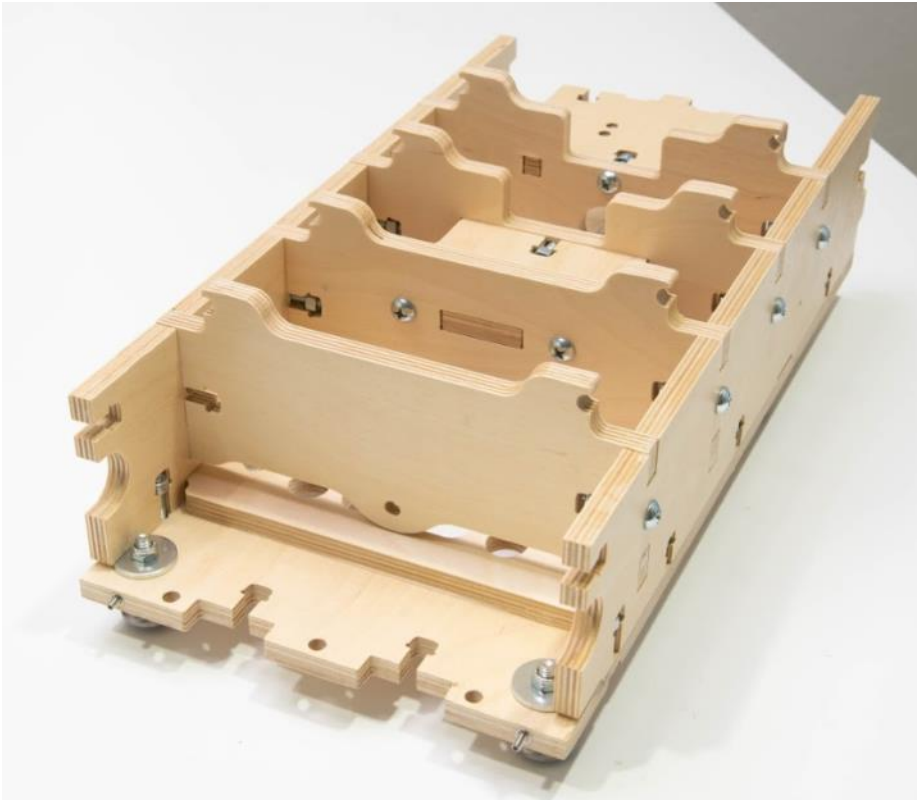
Position the second Y3 Carriage Side to the Y Carriage Frame Assembly. Secure with nine 5/16 x 1 1/4 Machine Screws and Nuts.



**HINT**

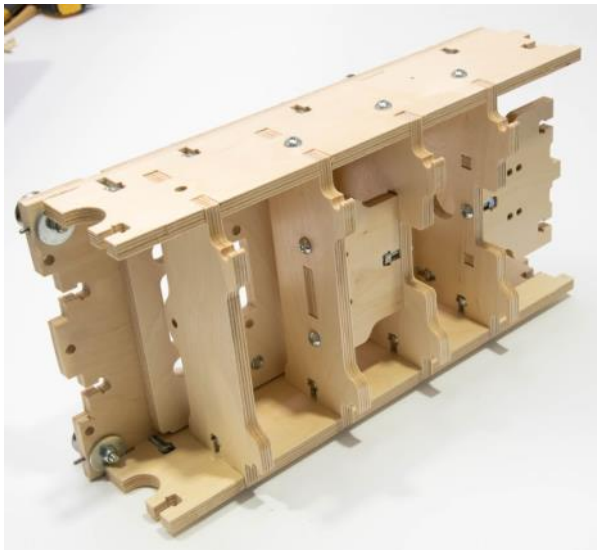
Slide the notches of the Carriage Sides around the tabs of the Rail supports. Carefully squeeze the Side Support flush against the Back Frame, and secure with Machine Screws and Nuts.



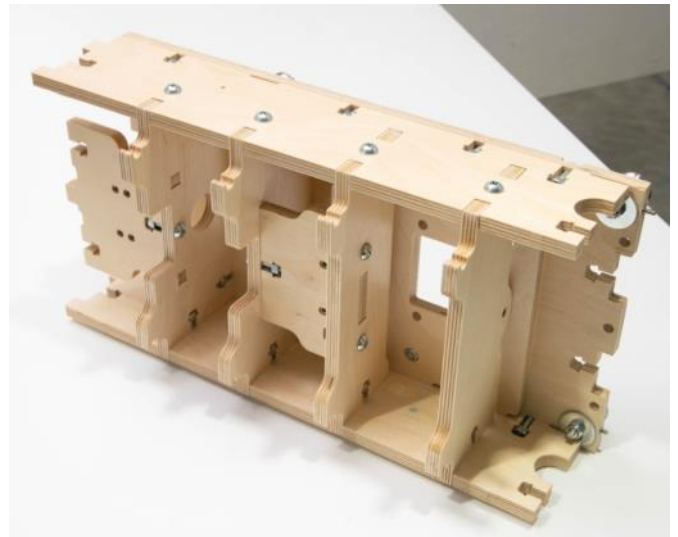


**Bottom view**

**Left Side**



**Right Side**



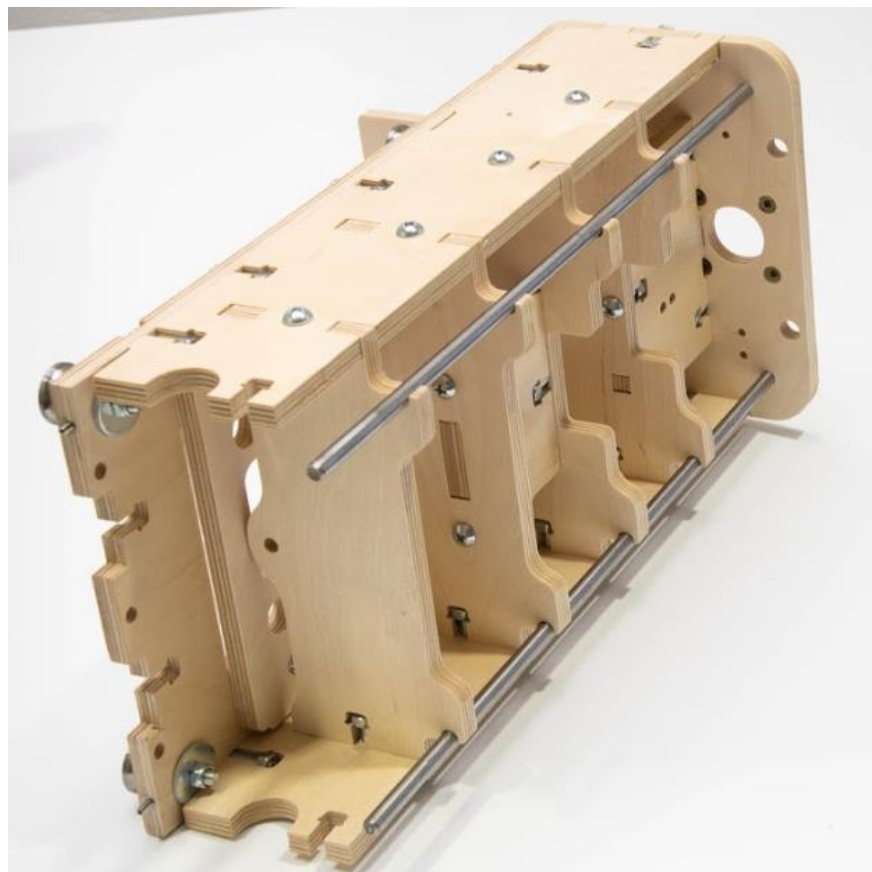
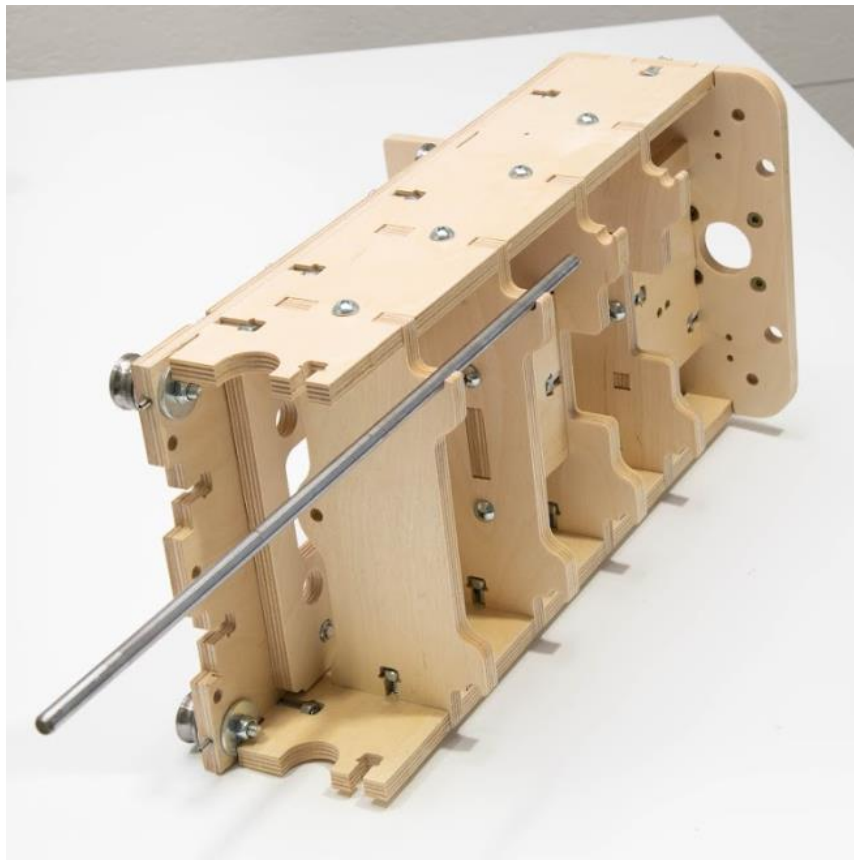
## Step 4

Attach the Y1 Carriage Top Mount to the Y Carriage Frame Assembly. Secure with six 5/16 x 1 1/4 Machine Screws and Nuts per side.





**Step 5** Carefully insert each of the two 3/8 inch Z Rails into the Rail Supports.



**Step 6** Install Y5 Carriage Bottom making sure the rails fit securely in the rail pockets and fasten with seven 5/16 x 1 1/4 Machine Screws and Nuts.



**Front View**



**Back View**



# Ball Screw Assembly and Installation

## Step 1

Insert the Ball Nut Housing onto the Ball Nut as shown.



## Step 2

Secure the Ball Screw Housing onto the Ball Nut with six M4 x 16 Socket Head Machine Screws.



## Step 3

Slide the Ball Screw Assembly into the Upper Ball Screw Mount and secure with the Upper Ball Screw Locking Nut. Tighten Set Screw to secure the Nut with a 2mm Allen wrench as shown.



## Step 4

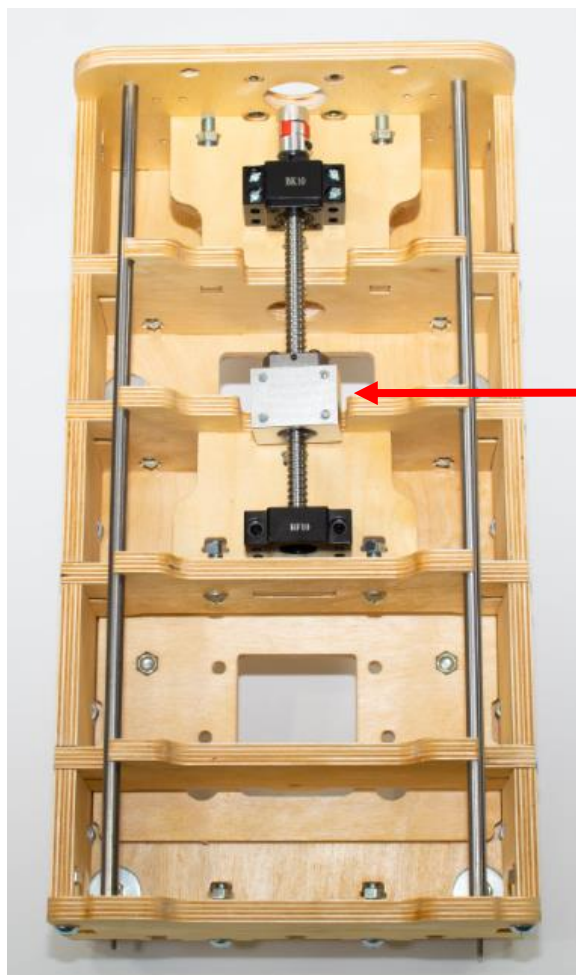
Slide the Ball Screw Assembly into the Lower Ball Screw Mount and secure with the Retainer Clip.



**Step 5** Slide the Z Spider Coupler onto the Upper Ball Screw and secure by tightening the Coupler Set Screw.



**Step 6** Set the Z Screw Assembly into the Y Carriage Assembly as shown in the photo below and secure in place with six 10-24 x 1 1/2 Socket Head Screws.



**Be sure that the mounting holes on the front of the Ball Screw Nut Assembly are visible before securing the assembly in place.**

## Y Carriage Assembly with Ball Screw Assembly

