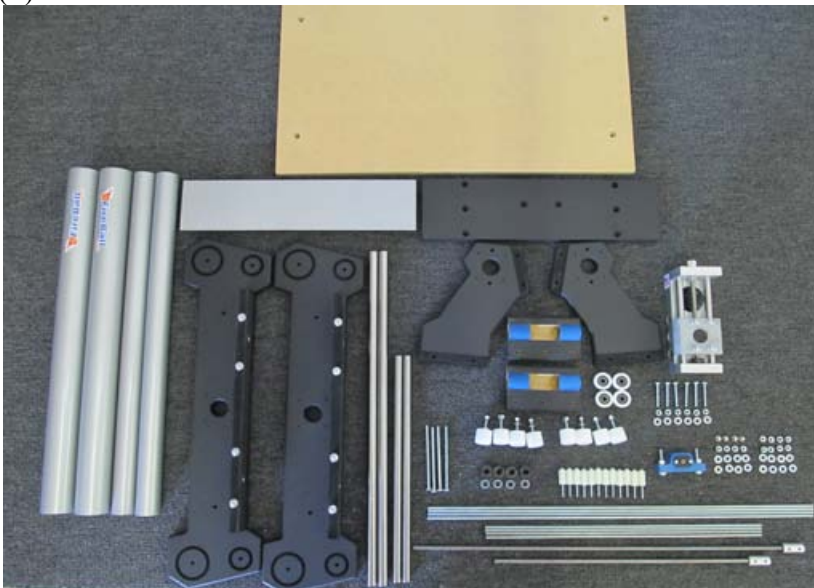


This manual will aid in the assembly of the FireBall V90 and FireBall X90. The assembly of both machines will be identical, unless specified.

### **Step #1**

Lay all parts out to verify quantities.

- (2) 2" x 25-1/4" PVC
- (2) 1-1/4" x 25-1/4" PVC
- (2) Base Ends
- (2) Gantry Uprights
- (1) Gantry Back
- (1) Gantry Bottom
- (1) Complete Z Axis with Drive Nut Installed and Tool Holder Mounting Bolts Installed
- (2) Gantry Slide Blocks
- (8) Rail End Bushings with Bolts Installed
- (4) Bearing Holders with Bearings Installed
- (1) Drive Nut Block with Drive Nut Installed and Hardware
- (2) 3/4" x 24" Linear Shafts
- (2) 3/4" x 16" Linear Shafts (***X90 will have (2) 23" Linear Shafts in place of 16" Shafts***)
- (12) Motor Mount Screws with Stand offs and Washers
- (4) Shaft Collar Clamps with Delrin Washers
- (6) 1/4-20x1-3/4" Machine Screws
- (30) #12 Flat Washers
- (24) 1/4-20 Hex Nuts
- (6) 1/4-20 Acorn Head Nuts
- (4) 1/4-20x19-1/4" Threaded Rod (***X90 will have (4) 1/4-20x25-7/8" Thread Rod in place of 19-1/4"***)
- (4) 1/4-20x27-1/4" Threaded Rod
- (1) Lead Screw 26" Long with Coupler Installed
- (1) Lead Screw 18" Long with Coupler Installed (***X90 will have (1) 24-3/4" in place of 18"***)
- (1) Spoil Board and Mounting Hardware (***MDF or Aluminum, see order for detail***)
- (3) Allen Wrenches



### Step #2

Lay the Based Ends out with the Table Support Bar facing up. Then take (4) of the Rail End bushings and install them into the holes as shown.



### Step #3

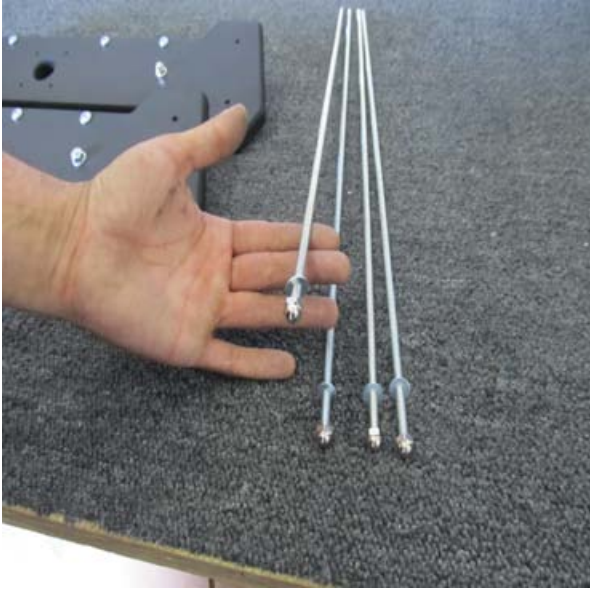
Flip the Base Ends over and fasten the Rail End Bushings as shown. This will require (4) #12 Washers, (2) 1/4-20 Hex Nuts, and (2) 1/4-20 Acorn Nuts. On one of the Base Ends use both Acorn Nuts and the other will use both Hex Nuts. Leave Nuts loose for later adjustments.





#### Step #4

Take the (4) 1/4-20 x 27-1/4" Threaded Rods and place a #12 washer at the end of each one. Then take a 1/4-20 Acorn Nut and thread it onto the end end the washer was placed.



#### Step #5

Take the Base End with the Acorn Nuts attached and feed the Threaded Rod through the the holes as shown.



### Step #6

Take the Base End with the Thread Rod and lay it flat with the Thread Rod facing up. Take the (4) PVC tubes and place them onto the Base End as shown. The PVC will sit in the pockets on the Base End.



### Step #7

Take the (2) 3/4" x 24" Linear Shafts and place them into the Rail End Bushings in the Base End with the PVC and Threaded Rod. Then take the (2) Gantry Slide Blocks and slide them over the rails with the blue bearings facing towards the table support bar. You will use one Gantry Slide per Linear Shaft.





### Step #8

Take the remaining Based End and install it over the Threaded Rod, PVC, and Linear Shafts.



### Step #9

Take (4) #12 Washers and (4) 1/4-20 Hex Nuts and fasten the Base End to the Threaded Rod that is exposed. Leave the nuts loose for future adjustment. At this point square the Base and tighten the Threaded Rod. Make any adjustments necessary to square the Base. Do not over tighten the Threaded Rod. Once this is finished the Base of the Machine is complete.



### **Step #10**

Take the (2) Gantry Uprights and lay them out with the pockets facing up. Take the remaining (4) Rail End Bushings and install them as shown.



### **Step #11**

Take the Gantry Uprights and flip them over. Then take (4) #12 Washers and (4) 1/4-20 Hex Nuts and fasten the Rail End Bushings to the Gantry Uprights. Leave them loose for future adjustments.





### **Step #12**

Flip the Gantry Uprights over so the Rail End Bushings are facing upwards. Then take the 3/4" x 16" Linear Shafts and install them into the Rail End Bushings of one of the Gantry Uprights. **(If you are assembling the X90 you will use the 23" long Linear Shafts and not the 16")**



### **Step #13**

Take the Z Axis and slide it onto the Gantry Upright with the Linear Rails. The front of the Z Axis will need to face towards the front of the Gantry Upright as shown.



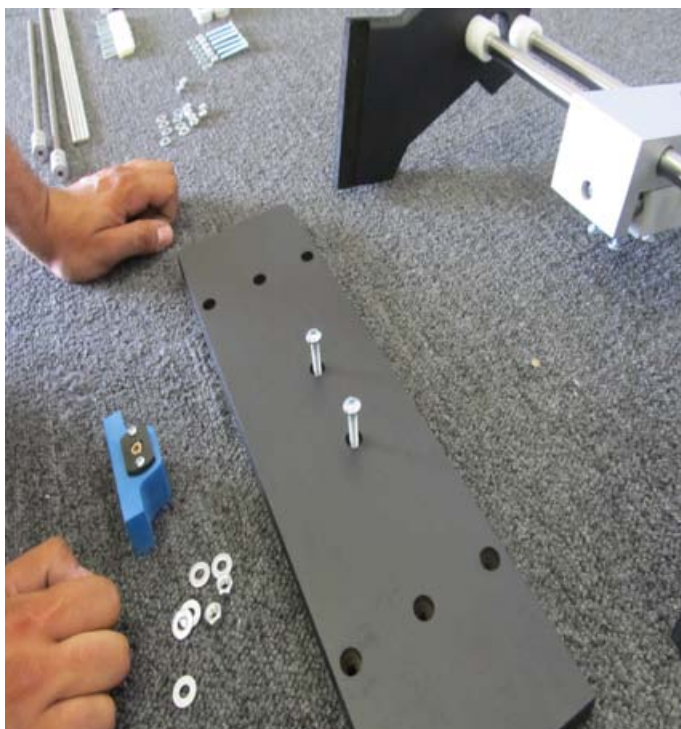
#### **Step #14**

Take the remaining Gantry Upright and install it onto the rails. Then lay the Gantry assembly face down as shown.



#### **Step #15**

Take the Gantry Bottom and place it flat with the grooves facing down. Take the drive nut block and remove the hardware (Bolts, Nuts, and Washers). Take the (2) bolts and insert them as shown.



### Step #16

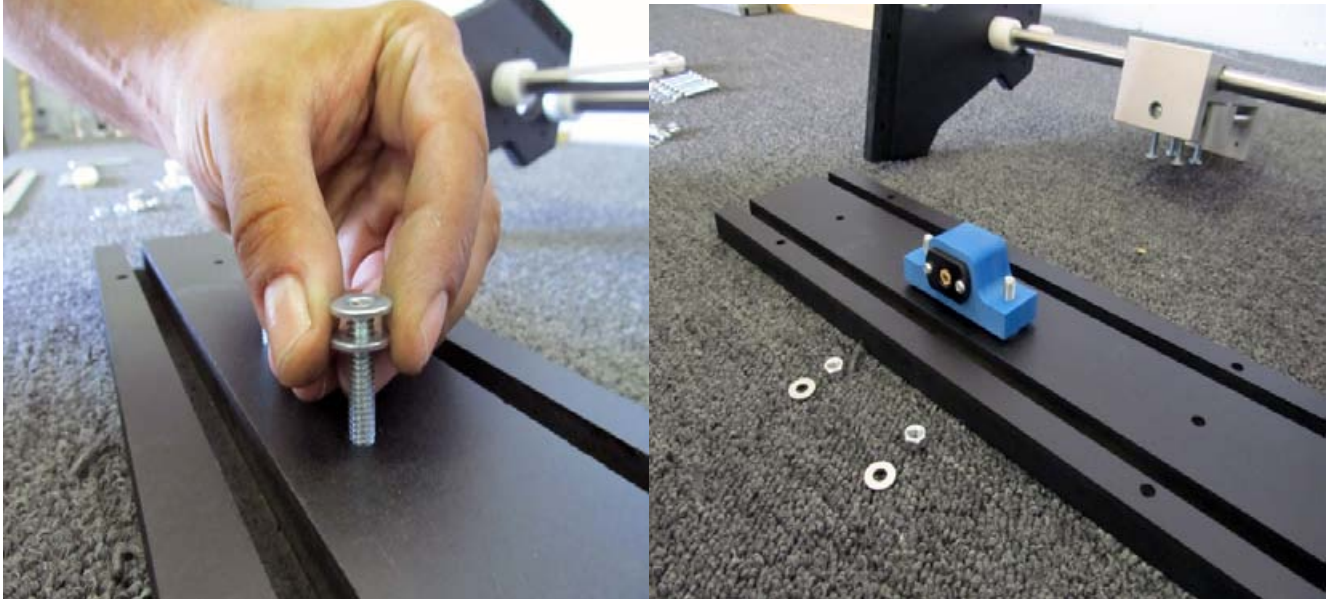
Flip the Gantry Bottom over so the bolts and grooves are facing up.





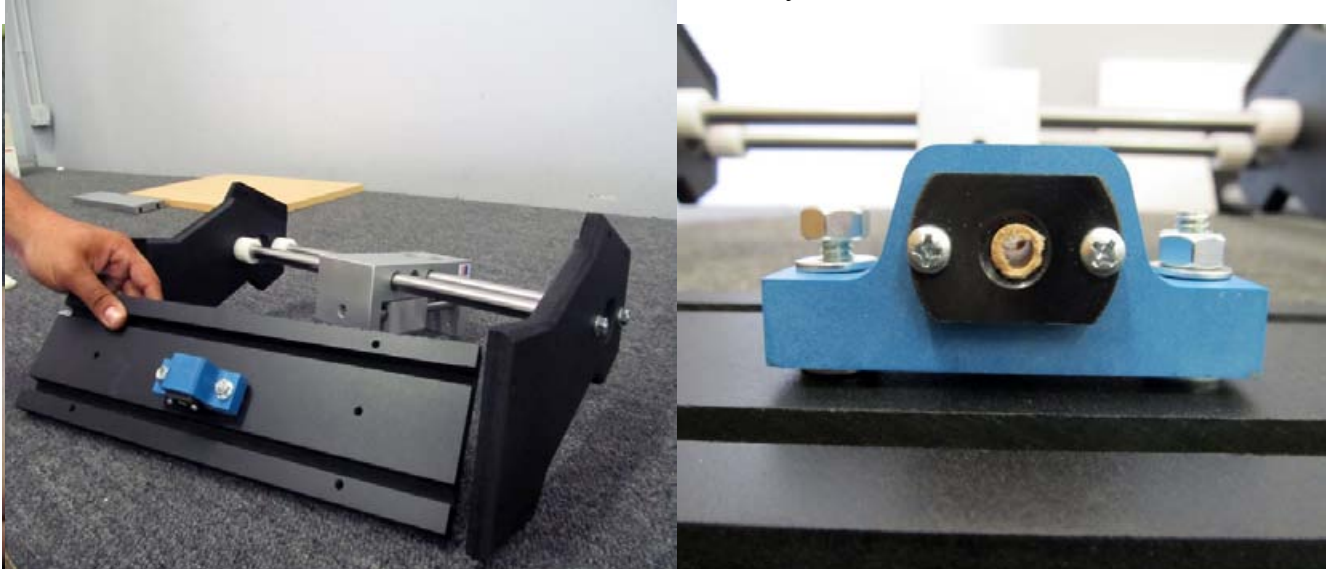
### **Step #17**

Take (4) #12 Washers and place (2) of them on each bolt. Then install the Gantry Drive Nut block with the Drive Nut facing the thin side of the Gantry Bottom. Then take the remaining (2) #12 Washers and (2) Hex Nuts place them as shown. Leave these loose for future adjustments.



### **Step #18**

Take the Gantry Bottom and place it into the Gantry Assembly as shown.



### Step #19

Take (2) 1/4-20 x 19-1/4" Threaded Rods and insert them into the proper holes. Then take (4) #12 Washers and (4) 1/4-20 Hex Nuts and thread them onto each end of the Threaded Rod and shown. (X90 will use 25-7/8" Threaded Rod in place of 19-1/4")



### Step #20

Take the Gantry Back and repeat Step #19 as shown. Once this is finished, then tighten the Threaded Rod and Square the Gantry. Make an adjustments necessary to square the Gantry. Once the Gantry is Square, then rotate the Linear Shafts until the Z axis slides side to side freely. Then tighten the Rail End Bushings. Do not over tighten the Thread rod or the Rail End Bushings.



### Step #21

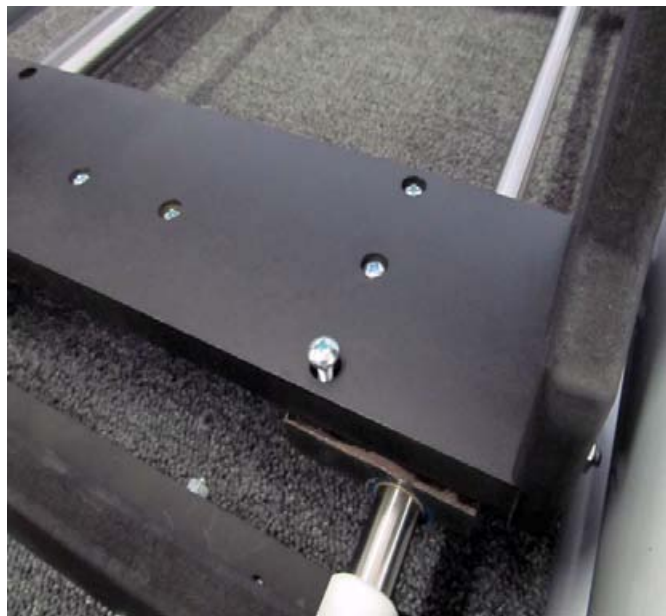
Take the Gantry Assembly and roll it onto the the Base Assembly as shown.

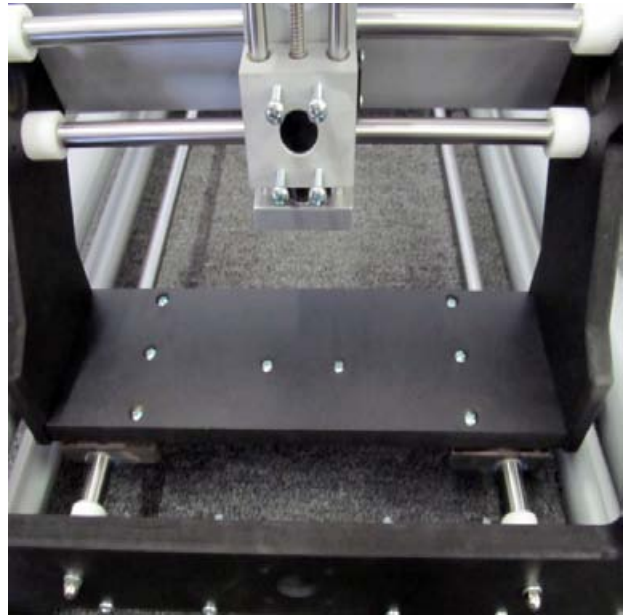


### Step #22

Take (6) 1/4-20 x 1-3/4" Machine Screws and insert them as shown.

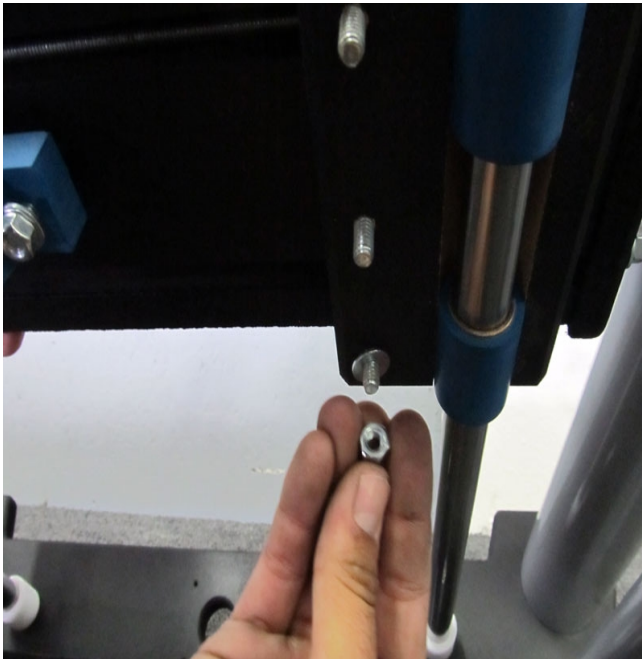






### Step #23

Take (6) #12 Washers and (6) 1/4-20 Hex Nuts and install them as shown.

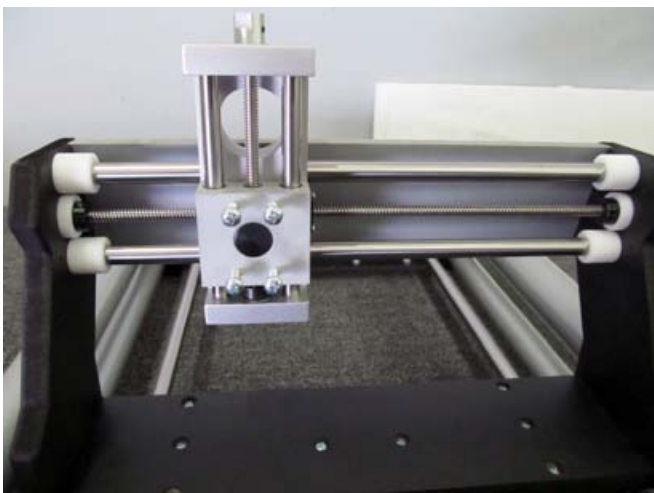
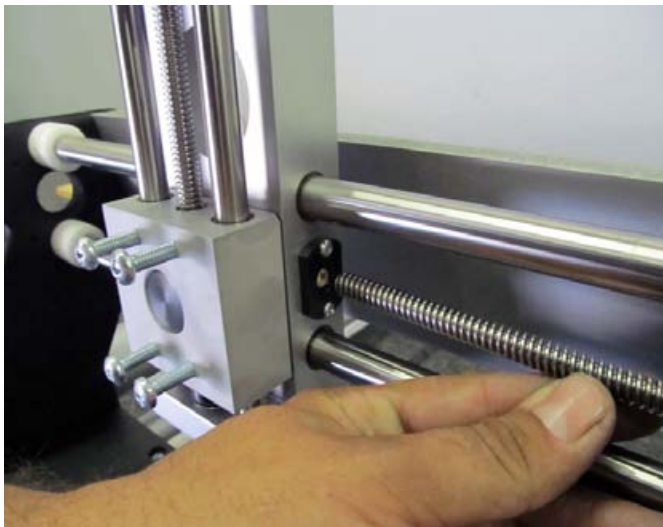
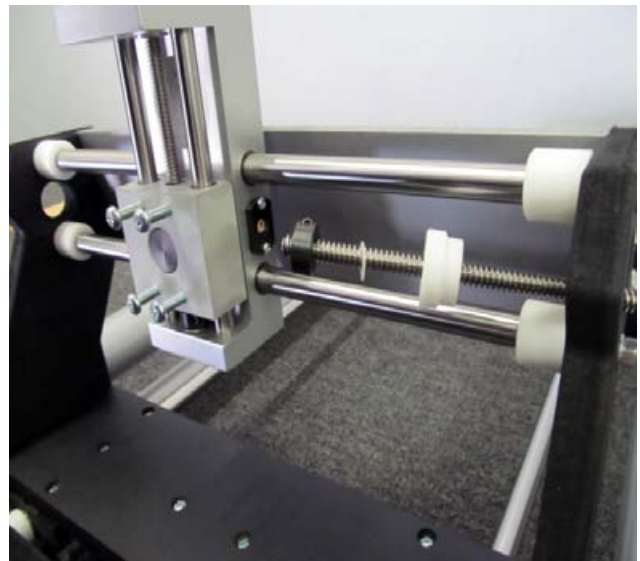
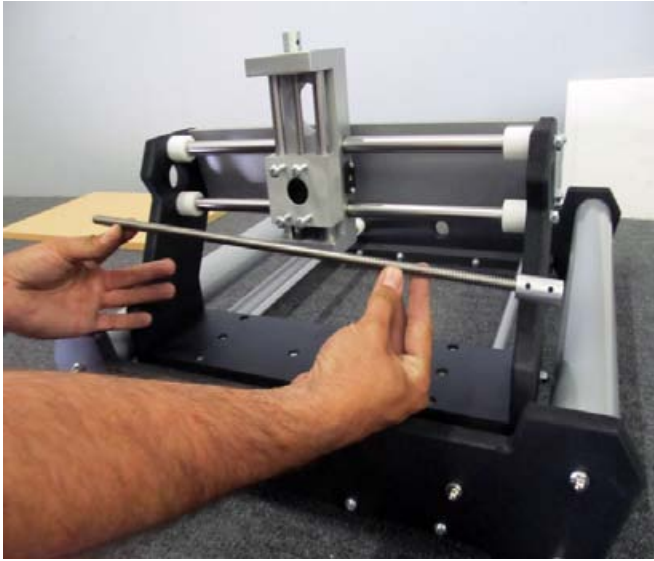


*Your machine should now be to the following point. At this point slide the Gantry forward and backwards while rotating the Linear Shafts until the gantry slides freely. Tighten the Base Assembly Rail End bushings to lock this position. Also tighten the (6) bolts for the Gantry Bottom. Do not over tighten the Rail End bushings.*





Take (1) 16" Lead Screw (24-3/4" if Assembling X90), (4) Bearing Holders, (4) Delrin Washers, and (4) Shaft Collars Clamps and assembly the Lead Screw section as shown. Tighten the set screw on the collar clamps after assembled. Make sure there is no play in the Lead Screw and the screw turns freely.



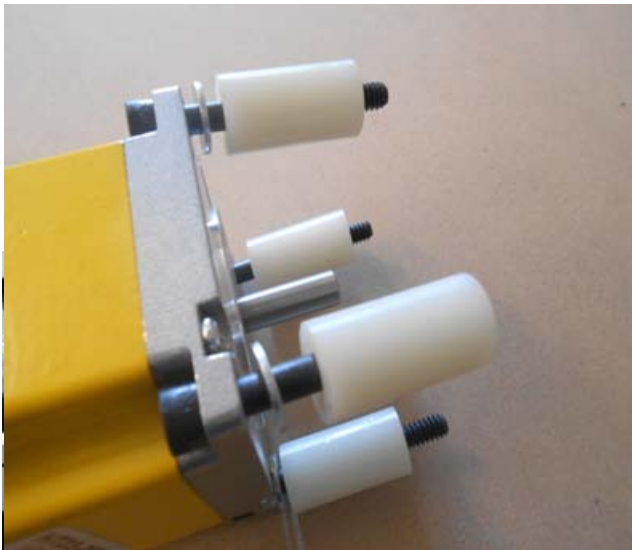
### Step #25

Take the remaining Lead Screw and repeat Step #24 for assembly of the Base Lead screw section. Once this is done and the clamps are tight. Make sure the screw turns freely, then tighten the Gantry Drive Block down from Step #17. Once this is done recheck to make sure the screw turns freely. Adjust if necessary.



### Step #26

Install Motors using the supplied Motor Mounting Hardware (12) 10-24 x 2" Socket Cap Screws (12) #8 Washers (12) Nylon Stand offs.. Remember to grind/file a flat on the motor shaft and align the flat with the set screw on the aluminum coupler. Once the motors are tightened to the Machine then you will tighten the set screw in the coupler to the motor shaft. The image below shows where the Motor Mounting Hardware attaches.



Step #27

Install the Spoil Board. You will use the (4) 1/4-20 x 4" Machine Screws. If you have the Aluminum Spoil Board please refer to the Aluminum Spoil Board Assembly Instructions on our Website.



You have now fully assembled your machine. Time to make some chip and ENJOY!!