

OMIO CNC Router x8 (USB)- User Guide (Rev 1)





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What is the OMIO CNC Router x8 (USB)?

Specifications

- Working area
 - X = 565 mm (22.24")
 - Y = 770 mm (30.32")
 - Z = 85 mm (3.35") (Note: Up to 140 mm (5.51") if the Z-axis dust cover is removed)
- HG20 Linear Guide Rails
- Ball Screws
- Accuracy - 0.05 mm (0.002")
- Spindle
 - 2200 W
 - 24000 Max RPM
- ER20 Collet
- Max Rapid - 4000 mm/min (157 in/min)
- Power - 110V
- Overall Machine Size
 - L = 1120 mm (44.09")
 - W = 900 mm (35.4")
 - H = 690 mm (27.17")
- Weight - 90 kg (198 lbs)

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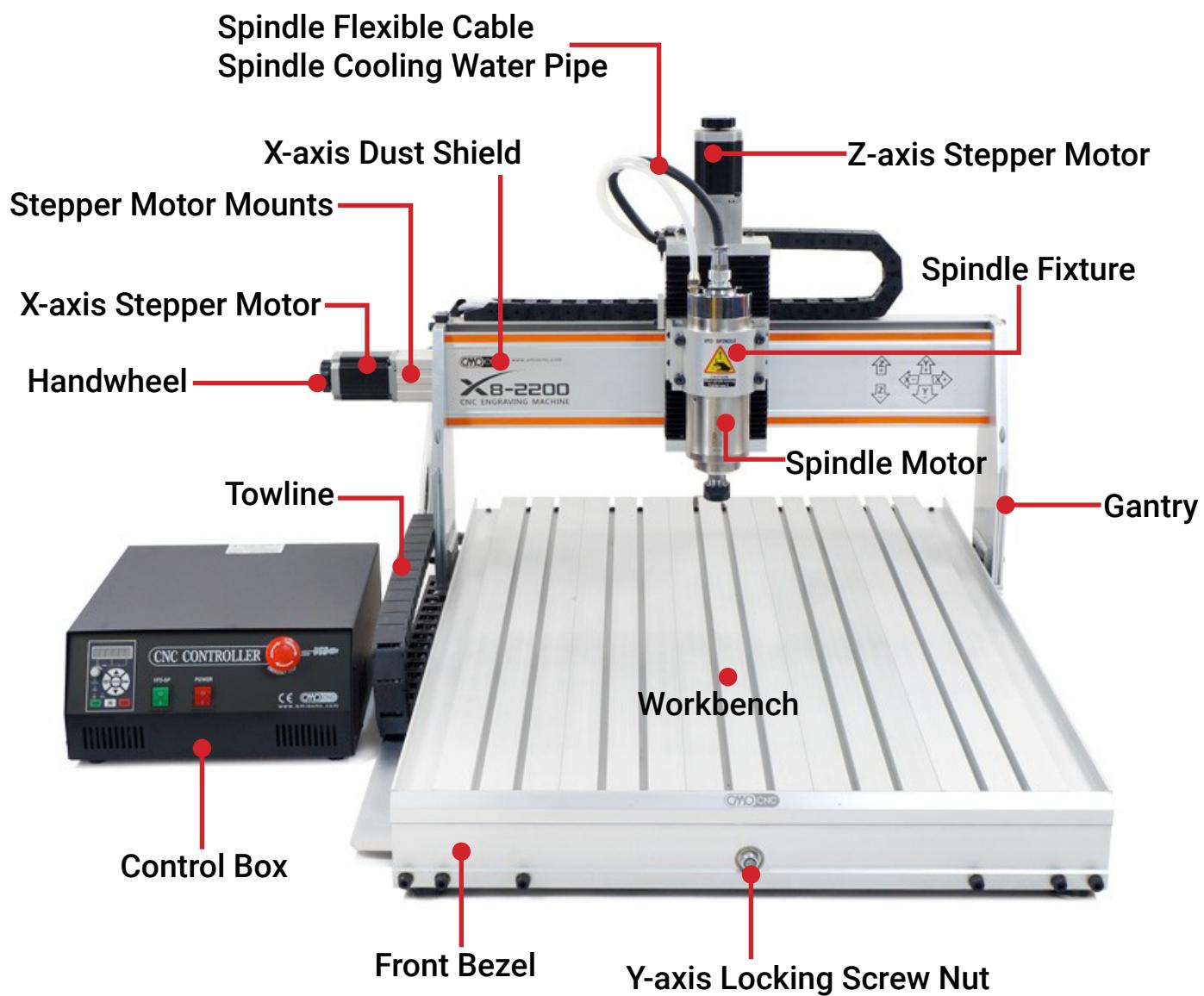
Recommended Tools

Picture	Name
	Crescent Wrench
	Allen Set (Metric)
	Phillips Screwdriver

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OMIO X8-2200L Router Overview



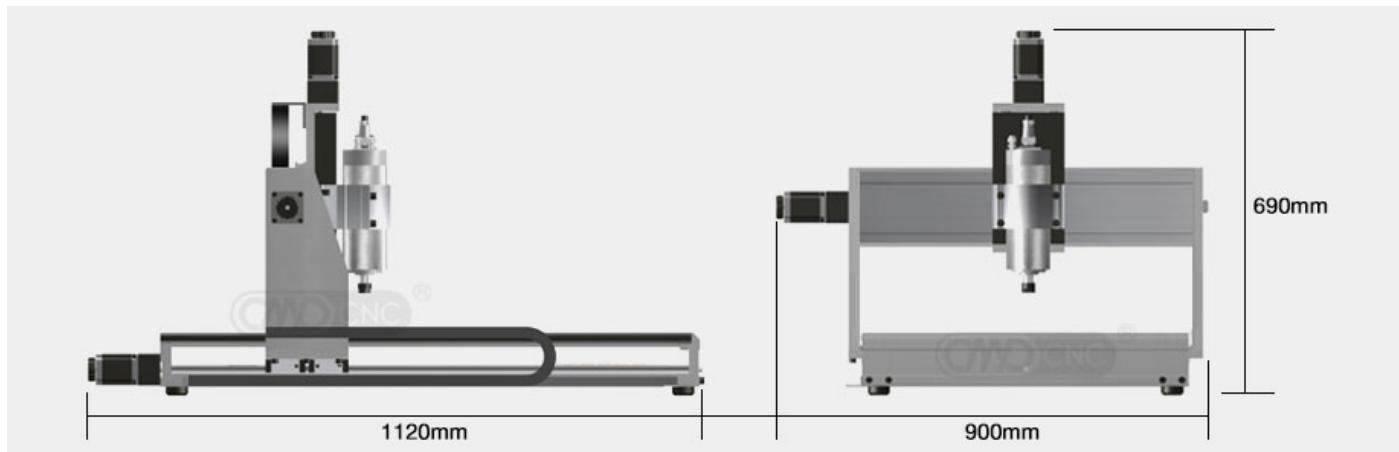
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OMIO X8-2200L Machinable Area



OMIO X8-2200L Overall Dimensions



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Kit Contents

Router Table



X/Z Axis Assembly



Angle Extrusion (3)



Spindle



Control Box



Machine Wiring



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Mounting Bolts and Spare Parts



Stepper Motor (X/Y/Z) (3)



Water Pump



Accessories Box



Wireless Controller



Auto Z Probe



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Collet Wrenches



Power Cable



USB Cable



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Assembly Instructions

Prepare a work table for the router. Ideally this will be the final location for the router. Once the router is fully assembled it is much harder to move and will require multiple people since it will weigh ~200 lbs. It is recommended to assemble on OMIO Router Stand (WCP-0342) or a sturdy work surface.

The machine will come packaged in two boxes.

Box 1 Contents:

- Router Base
- Stepper motors
- Angle Extrusion

Box 2 Contents:

- X/Z axis Assembly
- Spindle
- Wire Harness
- Control Box
- Accessories

Before assembling, unbox all components and verify they are all there.

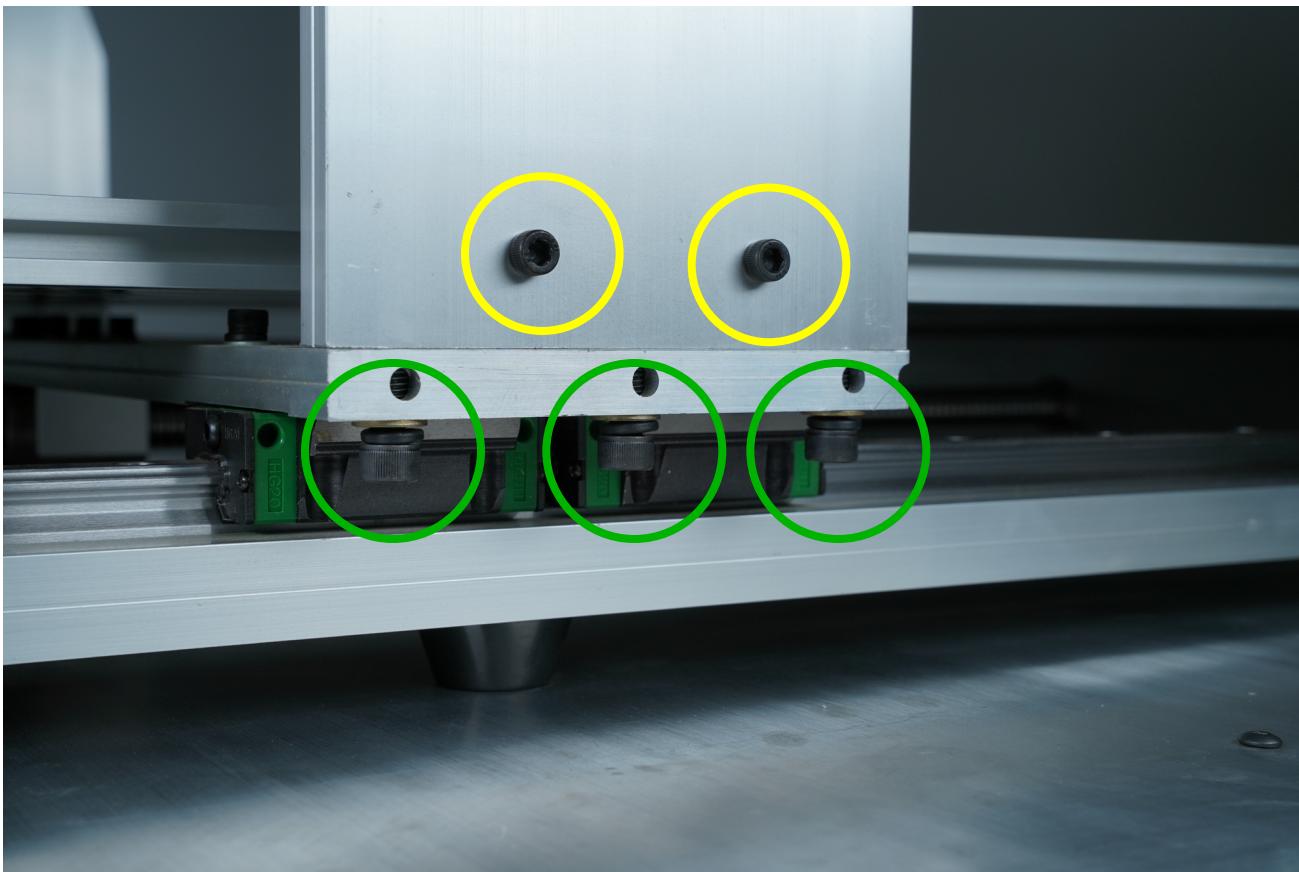
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Step 1

Place the X/Z-axis assembly on the supports for the X/Z-axis that are attached to the Y-axis. Be sure to have the Z-axis facing the front of the machine. Align the bolt holes and loosely thread in all three large SHCS with lock washers and bronze washers (circled in green below). Then repeat this for the smaller SHCS (circled in yellow below). This should be done on both sides of the machine.

Note: There are two different lengths of the smaller SHCS. The longer ones will be installed on the left side of the machine. These are used to mount the energy chain later.



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Step 2

Be sure that all holes line up before tightening. Tighten all bolts on both sides of machine.

Note: The bolts indicated in yellow in the previous step are also used to attach the mount to the energy chain. Leave left pair of these bolts loose as they will need to be removed in a future step.

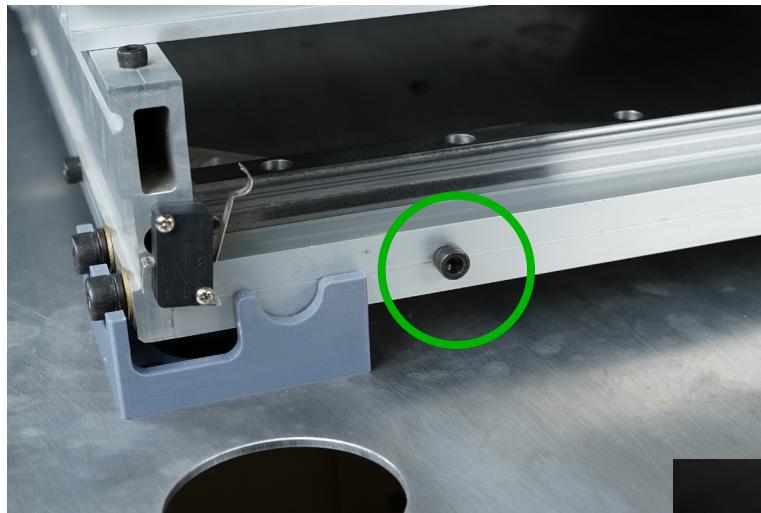
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Step 3

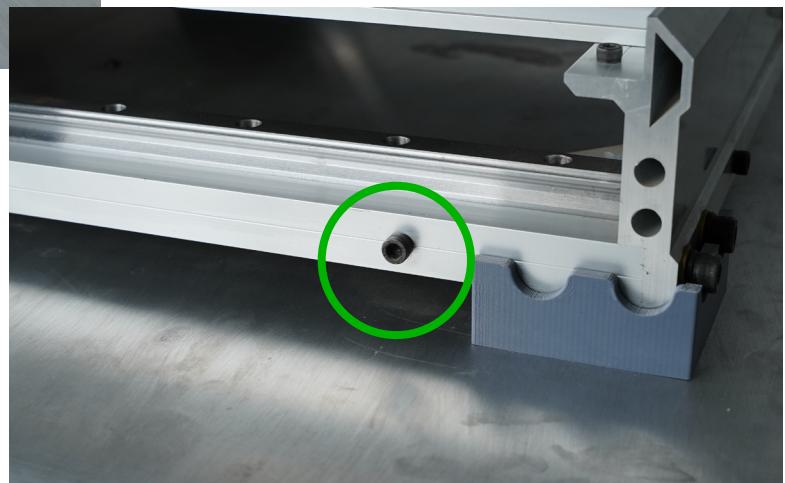
Remove the two pre-installed bolts from the left side of the machine.

Find the angle extrusion piece, energy chain support, with two pre-installed Phillips bolts. Attach this piece of angle extrusion to the frame of the machine using the two screws that were just removed. The holes in the extrusion should line up with the holes in the frame.



Front of Machine

Rear of Machine



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Step 4

Remove the two pre-installed bolts from one side of the machine.

Using the remaining angle extrusion pieces, attach one piece of angle extrusion to the frame of the machine with the vertical leg towards the outside of the machine using the two screws that were just removed. The holes in the extrusion should line up with the holes in the frame. Repeat this step on the other side of the machine as well.

These extrusion pieces act as covers for the linear guides and to help catch any chips or dust from the machine.



Front of Machine

Rear of Machine



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Step 5

After the previous two steps, the energy chain support and guards should be in place as seen in the image below.



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Step 6

Remove the two pre-installed bolts (circled in green) from the energy chain support. Align the holes in the end of the energy chain with these holes and then reinstall the bolts.

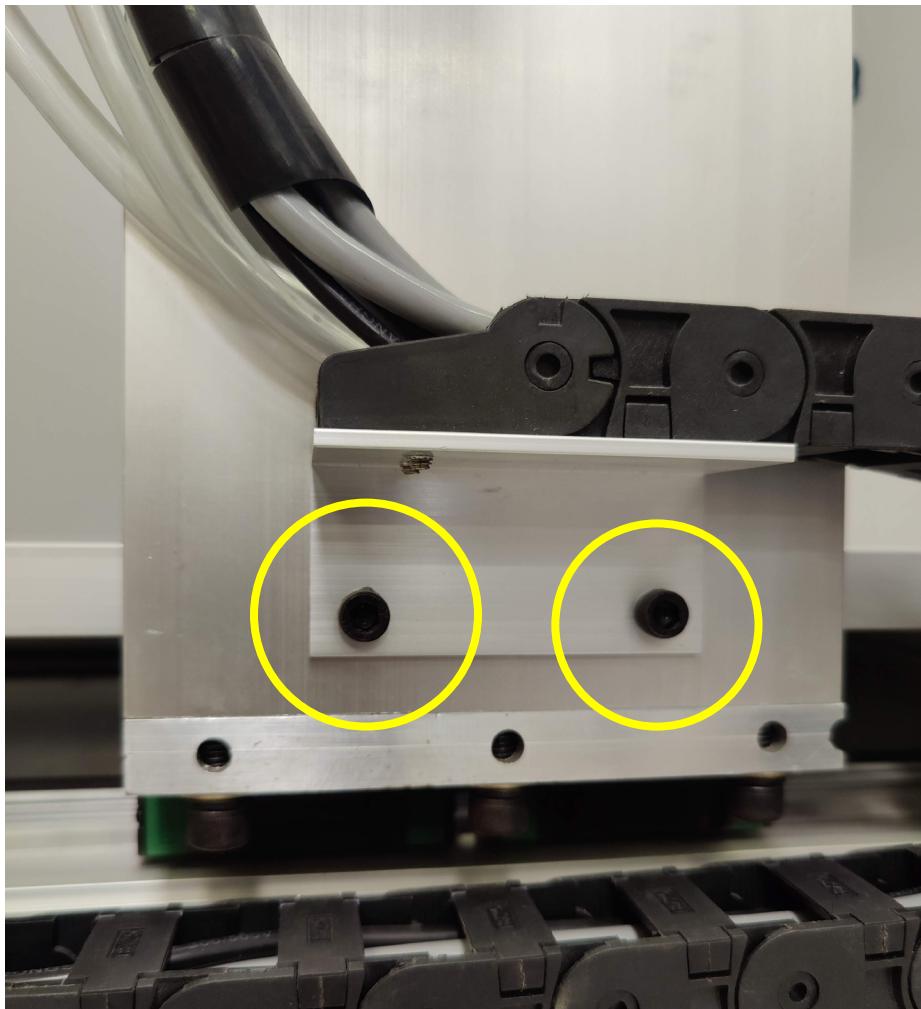
This end of the energy chain has the connectors that attach to the control box.





Step 7

Remove the bolts that were left loose in Step 2 (circled in yellow). These will now be used to mount the other end of the energy chain. The mount will already be attached to the energy chain. Align the mount with the holes and install the bolts. Tighten them fully as they no longer need to be removed.



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Step 8

Remove the single Phillips bolt (circled in green) from the top of the X-axis assembly. Align the hole in the energy chain mount with this hole and reinstall the bolt.



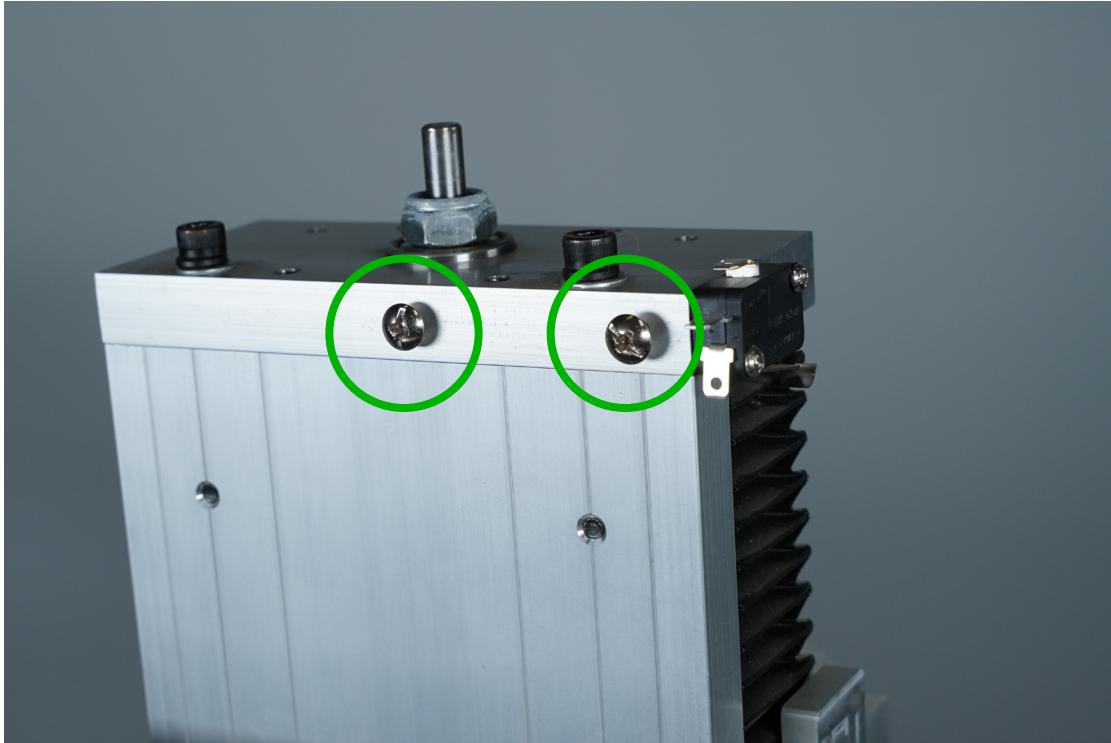
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Step 9

Remove the two bolts (circled in green) from the top of the Z-axis assembly. Align the metal mount for the energy chain with these holes and reinstall the bolts.

Note: Be sure to have the edge of the mount align with the outer edge of the Z-axis assembly ensuring the mount does not contact the limit switch.





Step 10

Install the stepper motor, motor spacer, and coupler. The bolts will be holding this group of parts together. These will all be grouped together in the box containing all the stepper motors. Align the bolts with the mounting holes and thread the bolts in. Get each bolt started before tightening all of them.

When choosing the clocking of the motor be sure that the wires from the motor will reach the connections on the machine. Connect the motor once it is bolted in place.

Note: This is the X-axis motor and the recommended orientation for the motor wires and spacer.

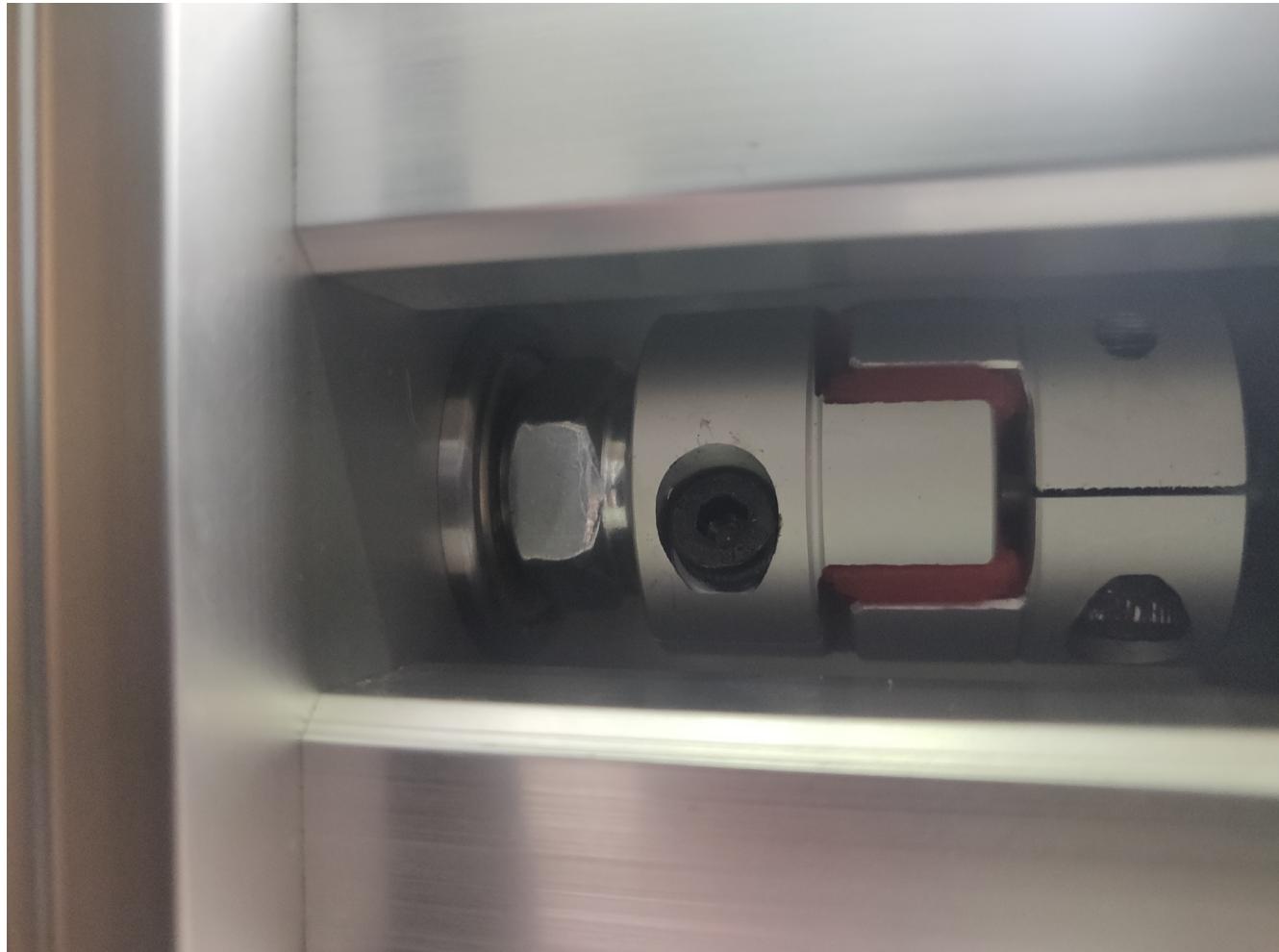




Step 11

Use the knob on the back side of the stepper motor to rotate the coupler until there is access to the clamping screw. Tighten this screw until rotating the knob also moves the axis. The screw may feel tight before it is fully clamped onto to rod. The screw on the motor side of the coupling may need to be tightened as well.

Note: If the axis appears to be slipping when cutting, try tightening these bolts on the axis that is having the issue.



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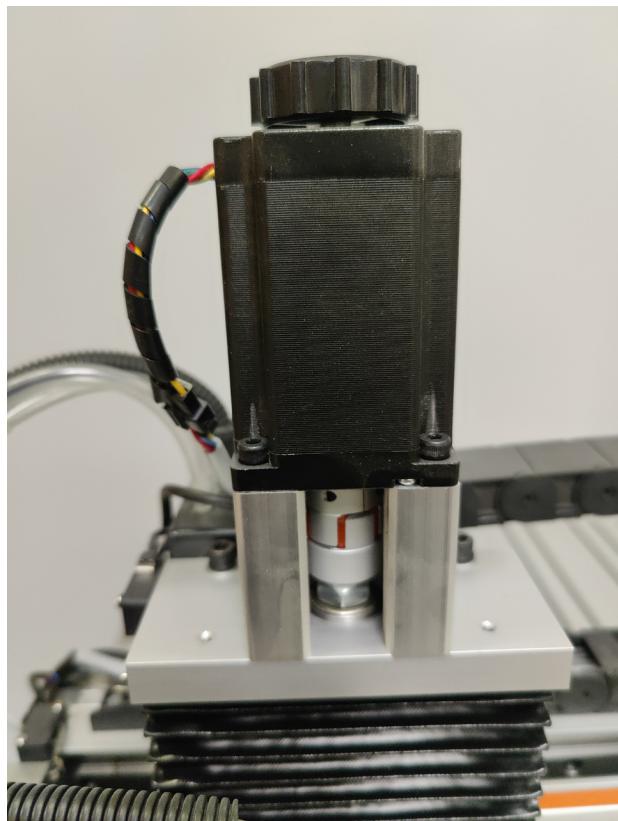
Step 12

Repeat steps 11 and 12 for the remaining two stepper motors.

Y-Axis



Z-Axis



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Step 13

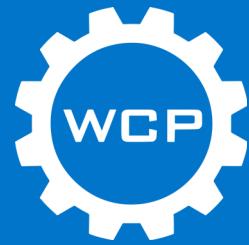
Loosen the two bolts (circled below in green) on the spindle clamp, allowing the spindle to slide in. Remove the spindle from its box and slide it into the clamp.

Slide the spindle in the clamp to the desired height and then tighten the two bolts to hold the spindle in place.

Note: The height of the spindle is up to the user, but it is recommended to be about 1.5-2" from the table top to the spindle nose. This can always be adjusted later if it is too low or high. Make the final adjustment once the machine is ready to use.



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Step 14

Remove the two nuts and rubber plugs from the water inlet and outlet at the top of the spindle.

The ports should look like the one circled in yellow when finished.



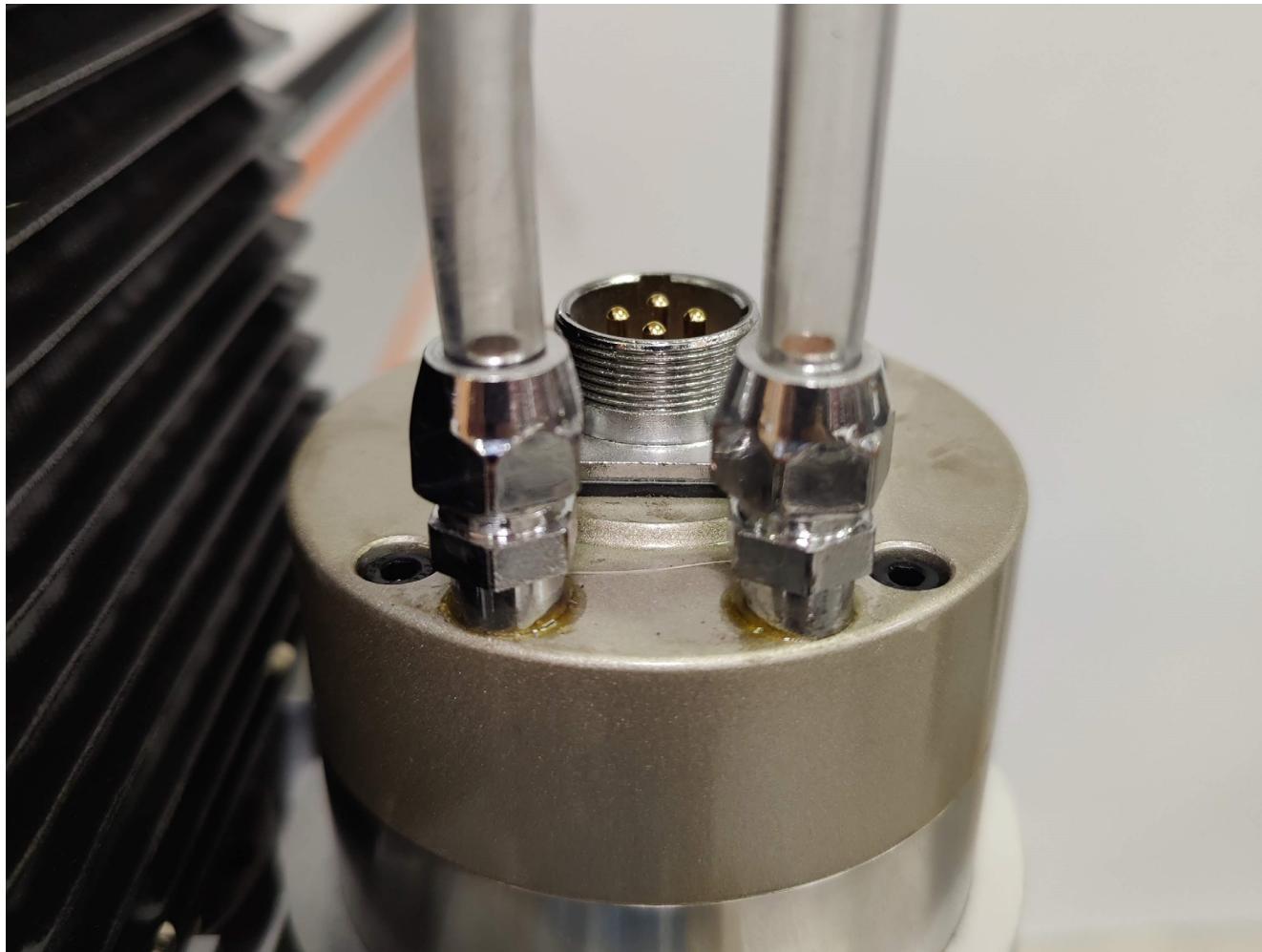
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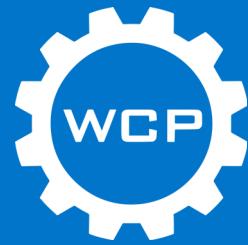
Step 15

Slide the nuts onto the rubber tubes that are ran through the energy chain. Push the rubber hoses onto the barbed fitting and slide the nuts down. Tighten the nuts to secure the hose to the spindle.

Note: It does not matter what hose goes to what port.

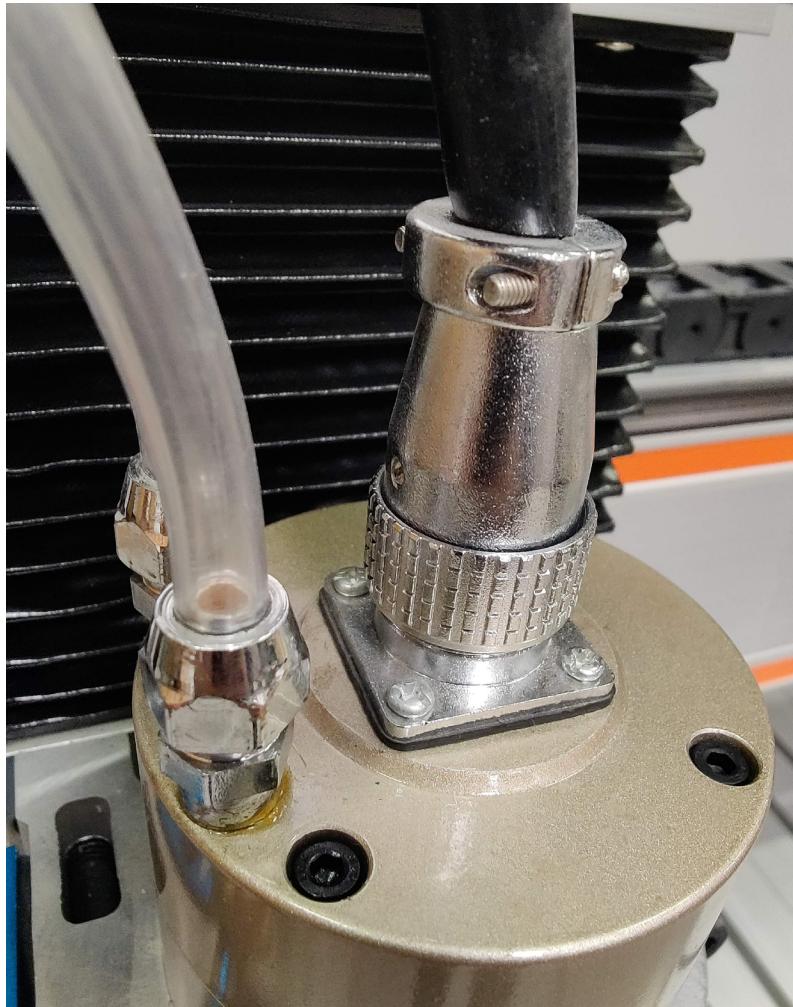


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Step 16

Plug in the wire for the spindle and use the attached nut to secure the wire. Only hand tighten this.



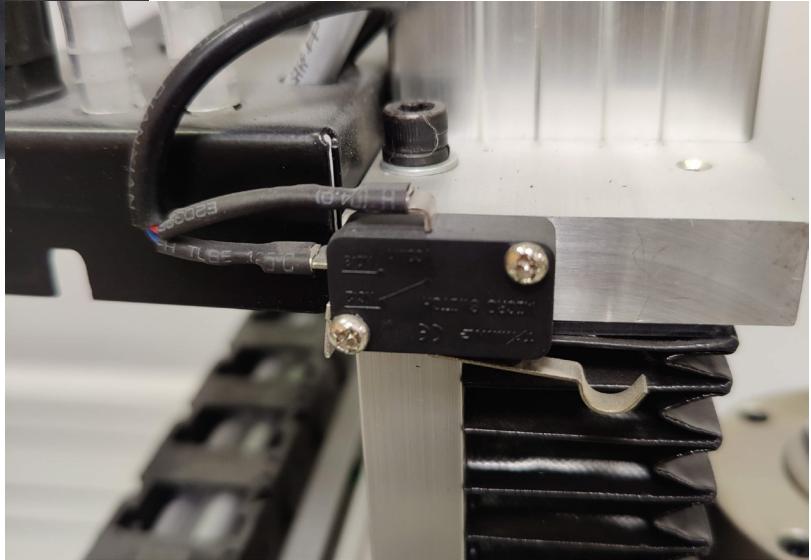
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Step 17

Run the Z-axis limit switch cable with two spade connectors through the hole (circled in green below).

Attach the cable to the limit switch as shown in the image below.

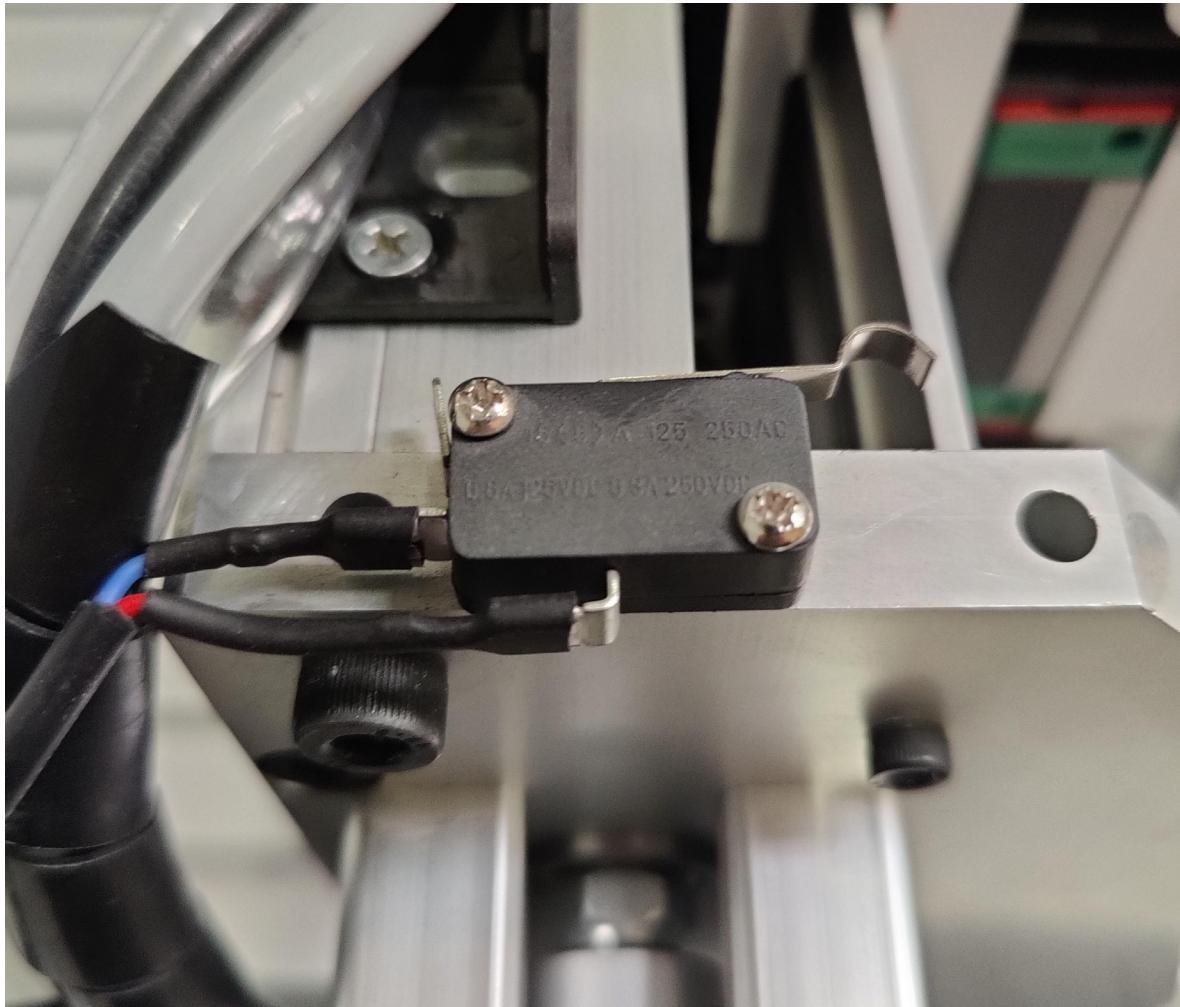


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Step 18

Find the cable for the X- axis limit switch. It will close to the limit switch and should be the only wire that reaches. Connect the wires as shown in the image below.

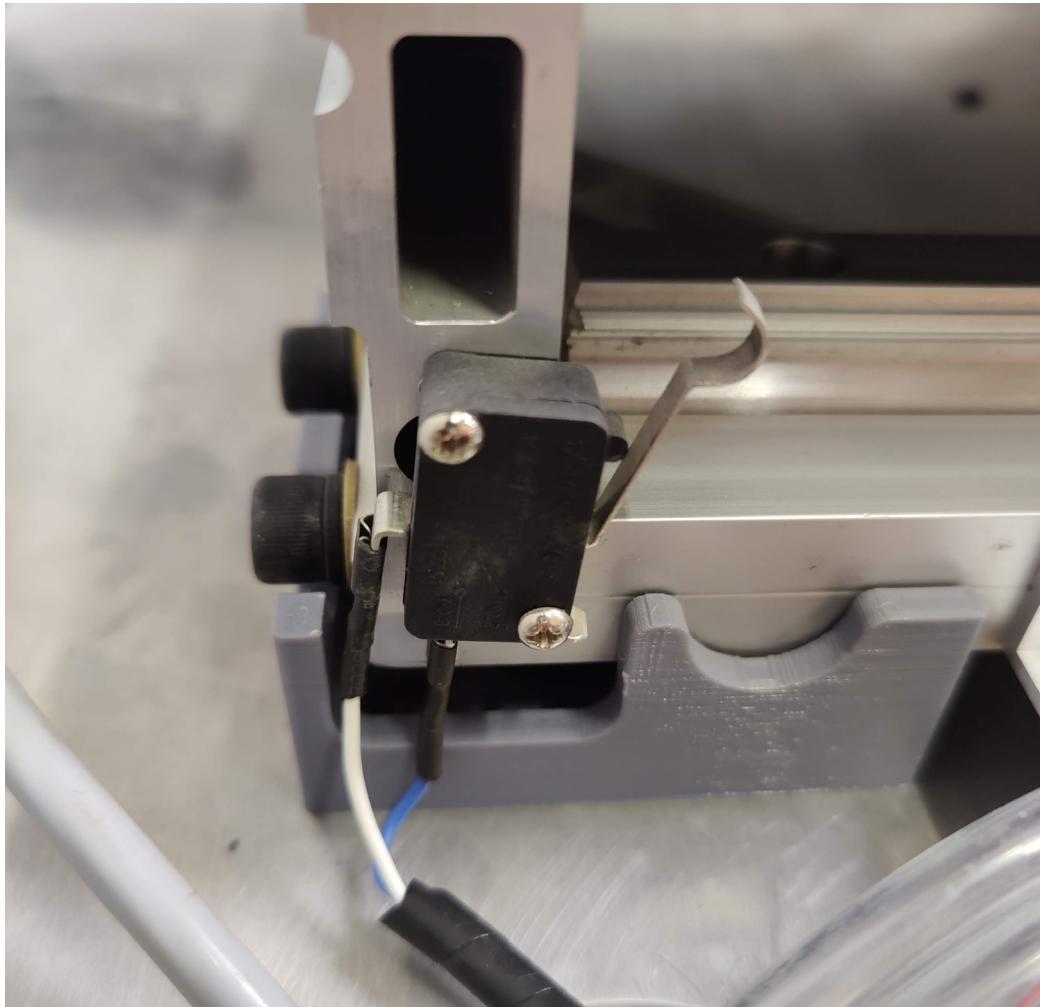


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Step 19

Find the cable for the Y-axis limit switch. It will be close to the limit switch and should be the only wire that reaches. Connect the wires as shown in the image below.



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Step 20

Connect the wires from the machine to the back of the control box. All wires will be labeled with the corresponding plug. Insert connector and then tighten the nut to secure.

Connect included power cable to the power input plug.

Connect included USB cable to the USB plug.

Note: If using the OMIO CNC Router Stand with the OMIO Router, completed this step after placing the machine and controller on the stand. The wires need to be ran through the hole in the top of the stand.



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Step 21

Connect one water line to provided water pump. Place the water pump in a 5 gallon bucket and secure the water return line to the side of the bucket. Fill bucket with water. Cover bucket with lid to prevent chips or other contaminants from entering the cooling system.

Distilled water is the recommended option.

Note: To prevent rusting or corrosion in the system, use a radiator additive mixed with the water at the manufacturer's recommended concentration. (ex. Motor Medic C1012)



Installing Mach3

Mach3 and all required settings can be downloaded here: [Mach3 Install](#)

The required software for the Wireless Handle can be downloaded here: [Wireless Handle](#)

The WCP Screen Set is under development and will be posted to the OMIO page when available.

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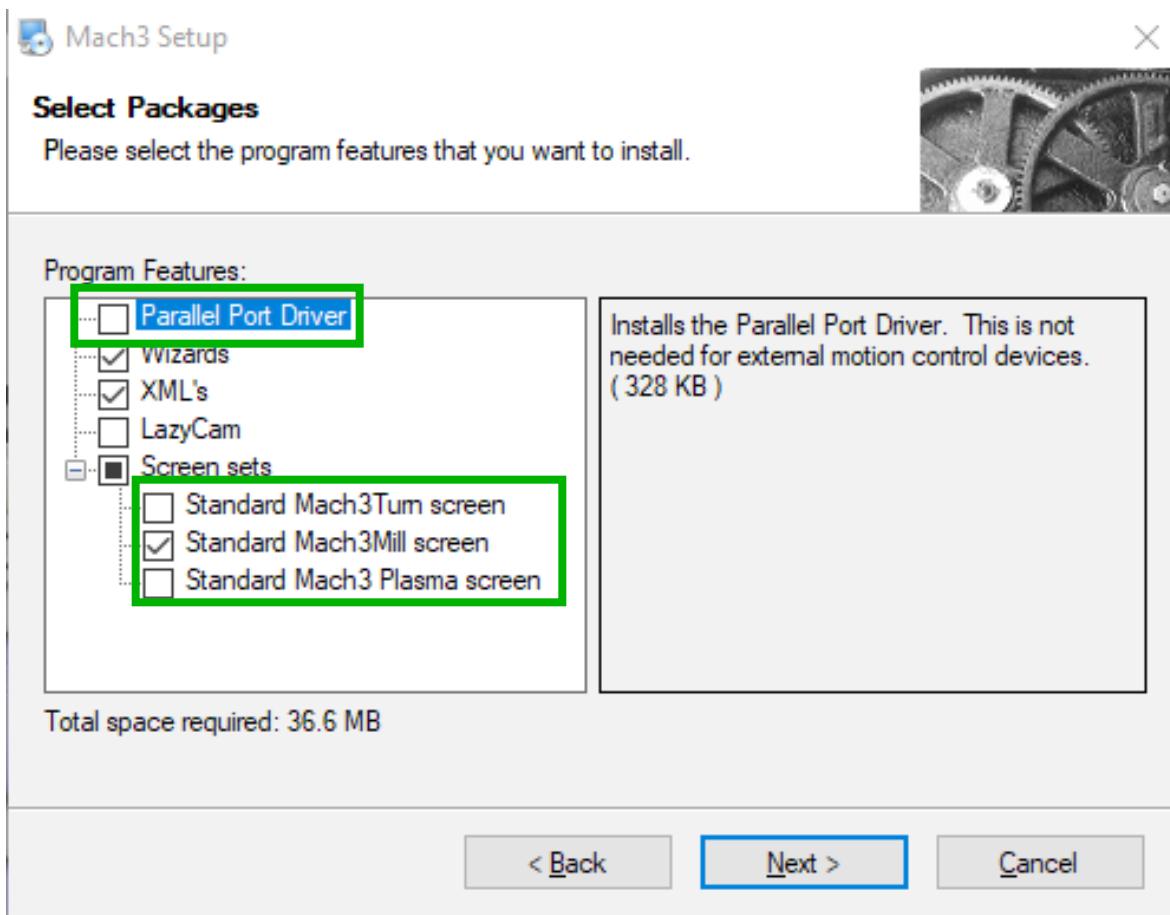
Step 1

Unzip the downloaded file and open the Mach3 folder. Run the Mach3 installer.

Follow the installation instructions until the “Select Packages” page. On this step, uncheck the “Parallel Port Driver” option.

Go to “Screen Sets” and uncheck the “Mach3Turn” and “Mach3Plasma” options.

Continue install process.



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Step 2

Restart computer.

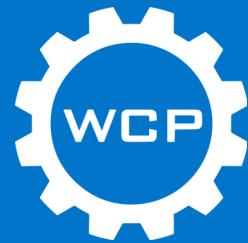
Step 3

Copy all contents of the “Settings” folder from the downloaded “Mach3 Set Up Folder”

Paste these into the default Mach3 directory (C:\Mach3\) and overwrite the original data.
These are all the necessary setting for the OMIO Router.

Restart computer and run Mach3.

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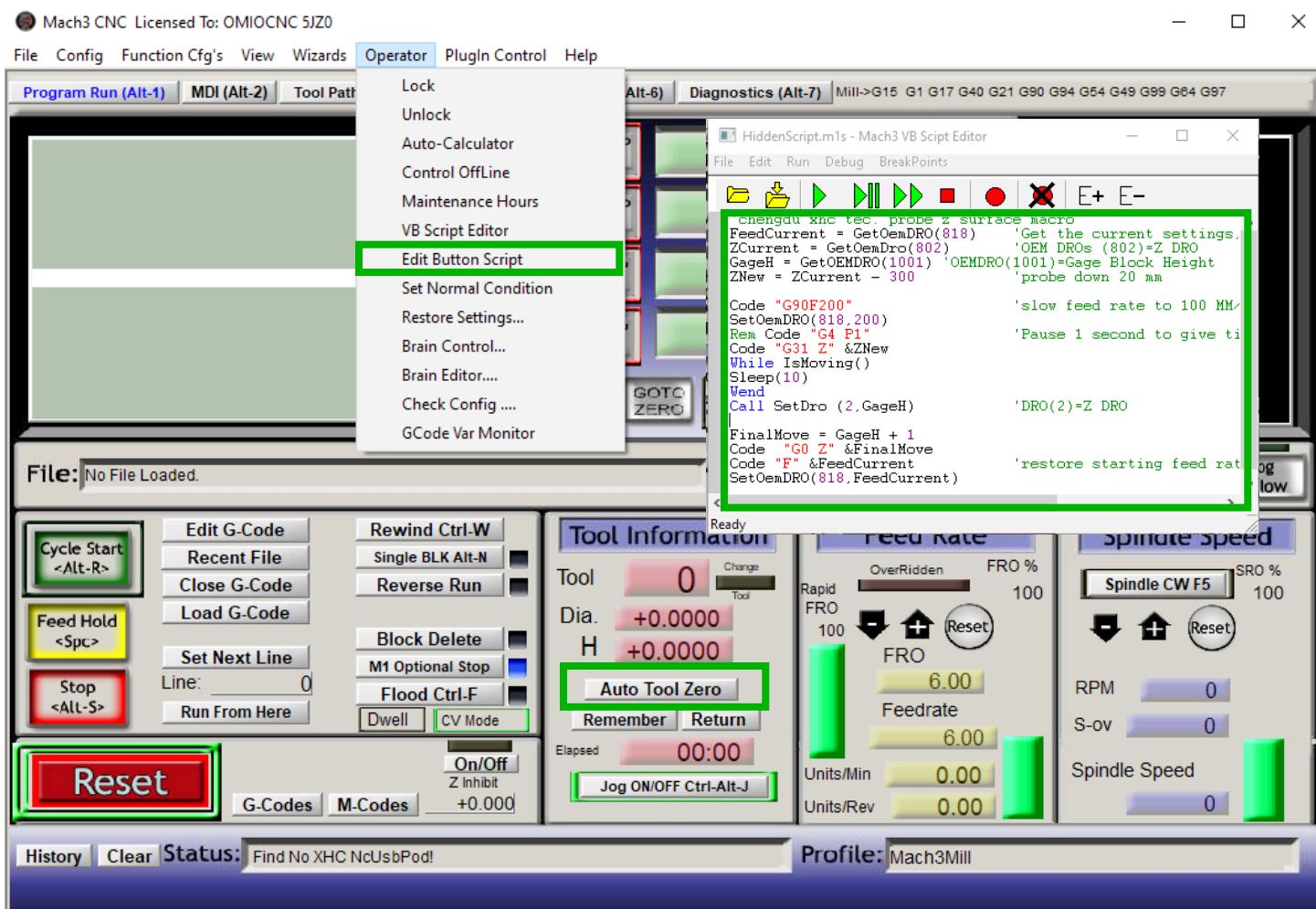
Step 4

Once Mach3 is loaded go to the top menu “Operator->Edit Button Script”.

Then click the “Auto Tool Zero” button and a text editing window will open.

Delete the text already there.

Open the Probe.txt file from the downloaded Mach3 Set Up Folder and copy all the file contents. Paste them into the open text editing window in Mach3 and save. Close the window.





Initial Power On and Testing

This will be a general test for the machine to ensure that everything is connected correctly.

Please ensure that the computer, control box, and OMIO are all connected.

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Step 1

Do not power on the machine yet. Turn the knob on the back of each stepper motor. They should be turned easily and the respective axis should move as these are turned.

Turn the “POWER” switch on the machine on. The motors should be self locked now. Once again try to turn the knob on each stepper. This should be much harder to turn now and not easily moved.

This means that the steppers are connected to the controller and are able to be controlled.

Step 2

Ensure the USB cable is connected to the computer and the controller. Run Mach3. If the “RESET” button is flashing, click this button to allow Mach3 to control the OMIO.



Step 3

The arrow keys should now be able to move the machine. Be careful moving the machine at this point. There are still some checks to be done.

- X-/X+ controlled by Left/Right Arrow
- Y-/Y+ controlled by Down/Up Arrow
- Z-/Z+ controlled by Page Down/Page Up

Pressing the tab key on the keyboard will bring up the manual jog controls in Mach3. Jog the machine using this option as well to ensure everything is moving as expected.

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Step 4

If the machine is not jogging in the direction that is expected, this can be changed in the setting of Mach3.

Go to Config -> Ports and Pins -> Motor Outputs. Look at the column "Dir LowActive" to change the direction of an axis. Click the check mark or X to change the direction. The mark should flip between the two options.

Engine Configuration... Ports & Pins

Port Setup and Axis Selection Motor Outputs Input Signals Output Signals Encoder MPG's Spindle Setup Mill Options

Signal	Enabled	Step Pin#	Dir Pin#	Dir LowActive	Step Low A...	Step Po
X Axis	<input checked="" type="checkbox"/>	2	3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1
Y Axis	<input checked="" type="checkbox"/>	4	5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1
Z Axis	<input checked="" type="checkbox"/>	6	7	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1
A Axis	<input checked="" type="checkbox"/>	8	9	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1
B Axis	<input checked="" type="checkbox"/>	0	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0
C Axis	<input checked="" type="checkbox"/>	0	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0

OK Cancel Apply

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Step 5

Before continuing to operate the machine, verify that the limit switches are registering in the control software. This needs to be done so that when the machine homes or reaches the end of travel, the machine does not over travel and damage itself.

This is easiest to do with two people. One person will press the limit switches on the machine and the other will check Mach3 to see if they registered.

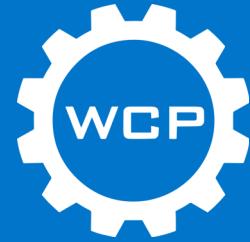
Go to the “Diagnostics” page in Mach3 by clicking on the button or pressing “Alt-7”. Press the limit switch on the machine and the corresponding light should change in Mach3.

- X Limit Switch = M1Home
- Y Limit Switch = M2Home
- Z Limit Switch = M3Home

Go back to the “Program Run” page. Click the “REF ALL HOME” button next to the DRO in the middle of the screen. The machine will home itself now.

A screenshot of the Mach3 software interface. The top menu bar includes 'Program Run (Alt-1)', 'MDI (Alt-2)', 'Tool Path (Alt-4)', 'Offsets (Alt-5)', 'Settings (Alt-6)', 'Diagnostics (Alt-7)', and various G-code options. The main window shows 'Current Position' and 'Machine Coord' tables. On the left, there's a toolbar with buttons like 'Zero All', 'Edit', 'Spindle Toggle', 'Flood Toggle', 'Mist Toggle', 'Dwell Active', 'Run', 'Tool Request', and a cycle start/stop section. The 'Diagnostics' tab is active, showing 'Port 1 Pins current State' with a grid of green lights, 'Input Signals current State' with a list of limit switch inputs (EJogX+, EJogY+, etc.), and 'Output Signals current State' with a list of enable outputs (Enable 1, Enable 2, etc.). A red box highlights the 'Pulse Frequency external' section under Input Signals. The bottom status bar shows 'Device Error Triggered.' and 'Mach3Mill'.

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Step 6

Verify that the probe is functioning properly and is connect to the machine buy checking the digitize port on the diagnostics page.

Plug the probe into the probe port on the front of the controller. Touch the clamp on the probe to the probe pad. The digitize light should turn on and then turn off when no longer touching the pad.

Port 1 Pins current State
EJogX++
EJogX-
Input 1
Input 2
Input 3
Input 4
LimitOV
Torch On
Emergency

Output Signals current State
Enable 1
Enable 5
Output 1
Output 5
Enable 2
Enable 6
Output 2
Output 6
Enable 3
Enable 4
Output 3
Output 4
Digitize

Program Run (Alt-1) MDI (Alt-2) Tool Path (Alt-4) Offsets (Alt-5) Settings (Alt-6) **Diagnostics (Alt-7)** Mill>G15 G80 G17 G40 G21 G90 G94 G54 G49 G99 G84 G97
Zero All Current Position Machine Coord WorkOffset G92 Offset Tool Offset abs max x,y,z
Ref X X Pos -191.4281 = +0.0000 - +191.4281 = +0.0000 - +0.0000 +0.0000
Ref Y Y Pos +722.0156 = +0.0000 - -722.0156 = +0.0000 - +0.0000 +0.0000
Ref Z Z Pos +88.7829 = +0.0000 - -88.7829 = +0.0000 - +0.0000 +0.0000
Ref A A Pos +0.0000 = +0.0000 - +0.0000 = +0.0000 - +0.0000 Min +0.0000
Ref B B Pos +0.0000 = +0.0000 - +0.0000 = +0.0000 - +0.0000 +0.0000
Ref C C Pos +0.0000 = +0.0000 - +0.0000 = +0.0000 - +0.0000 +0.0000 +0.0000
Edit Spindle Toggle
Flood Toggle
Mist Toggle
Dwell Active
Run
Tool Request
Cycle Start
FeedHold
Rewind
Stop
Single
Regen Jog Follow Display
ToolPath on/off
Reset G-Codes M-Codes
History Clear ReConfiguration Estop.
Mach3Mill

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Step 7

Be sure to have the water pump connected to the machine and the bucket filled.

Turn on the pump and the water should begin to circulate through the spindle. Check for any leaks and tighten fittings as needed. Water should be flowing back into the bucket from the return water line.

Step 8

Turn the "VFD" switch on.

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Step 9

Safety Note: Before turning the spindle on either remove the collet and collet nut or insert an end mill and tighten the collet. DO NOT tighten an empty collet or turn the spindle on with a loose collet.

Go to the “MDI” page. In the input box type “M03 S5000” and press enter. This will turn the spindle on to 5000 RPMs. Next type in “S12000” and press enter. The spindle speed should increase. Type in “M05” and press enter. This will stop the spindle.

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Wireless Remote

The OMIO CNC Router comes with a wireless remote that will control some functions of the machine. The remote is useful for setting up a job and for monitoring the machine while in operation. The location of the computer for the machine may not be in the easiest location to accomplish these tasks.



	Reset		Continuous
	Cycle Start/ Feedhold		1mm Steps
	Stop		0.1mm Steps
	Go to Zero		Return to Program Start
	Spindle ON/OFF		Home Machine
X+	Y+	Z+	A+
X-	Y-	Z-	A-
zero X	zero Y	zero Z	zero A
	Increase Feedrate		Decrease Feedrate
	Increase Spindle Speed		Decrease Spindle Speed
	Auto Z Set		Go to Z Safe Height



Connecting Remote

Install two AAA batteries into the remote.

Copy the "ShuttlePro.dll" file into the "PlugIns" folder in the Mach installation directory.

Restart Mach3.

Insert the USB receiver into the computer running Mach3. Press the "RESET" button on the wireless remote. The leftmost LED on the remote should be on. The remote should now be able to control the machine. If "RESET" in Mach3 is still blinking, press the "RESET" button on the controller again.



Basic Operation

The following section will cover the basic operation and controls of the OMIO CNC Router.

Topics covered:

- Jogging Axis (X/Y/Z)
- Setting Zero - X/Y
- Setting Zero - Z (Manually)
- Setting Zero - Z (Auto)

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Jogging Axis (X/Y/Z)

With Mach3 open, the axis' can be jogged using the arrow keys for X/Y and page up/down for Z.

Pressing the Tab key will also bring up the jog controls in Mach 3. This will let you select continuous or step mode and set the step size. This is useful for setting the origin for a job.

Additionally the wireless remote can be used to jog the machine in both continuous and step mode.

Mach3 Jog Controls



Wireless Remote



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Setting Zero - X/Y

When low precision location of the X/Y zero is needed, simply jog the machine to the location over the material where the X/Y zero will be located. Once in the correct location, press the "Zero X" and "Zero Y" buttons in Mach3 or on the wireless remote. For most situations this is more than precise enough.

If more precision is needed, then an edge finder will need to be used. Once the edge has been found, press the "Zero X" and "Zero Y" buttons again.

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Setting Zero - Z (Manually)

The Z zero for the program should be set at the bottom or top of the material. Before zeroing the Z, this must be known and match the work coordinate location in the CAM software. Also have the end mill that will be used in the program installed and tightened in the collet.

Manually setting the Z zero is generally precise enough, if using a spoil board, for basic operations such as cutting through plate material. Jog the machine over the location where the Z zero will be set. Now jog the machine to be about 1/8th above the surface. Set the machine into step mode of .01". Lower the Z slowly and stop before the material. Set the step value to .001". Slowly spin the spindle by hand in reverse while slowly stepping down. When the end mill catches and stops spinning, stop stepping down in Z. This is Z zero. Press "Zero Z" in Mach3 or on the wireless remote.

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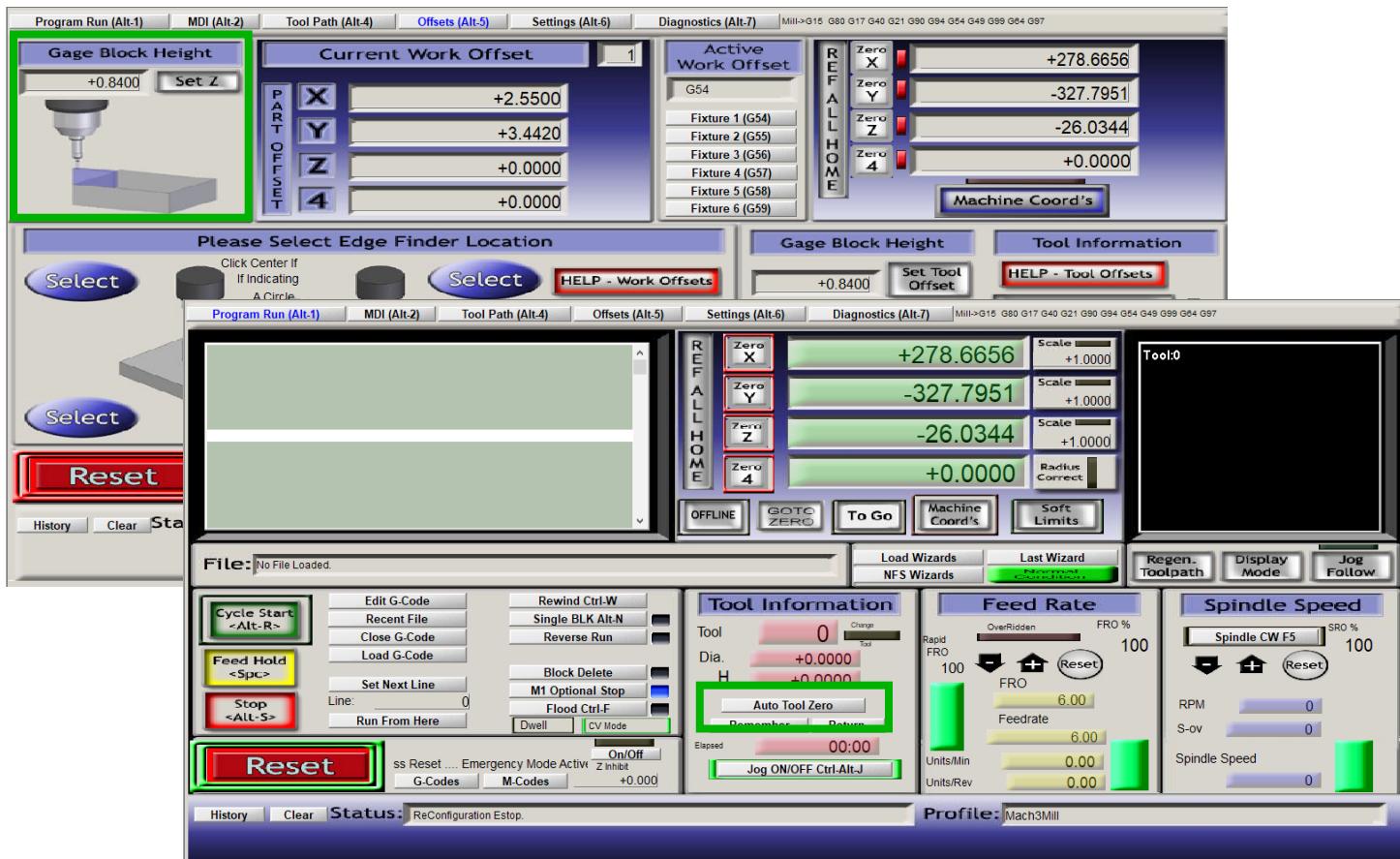


Setting Zero - Z (Auto)

Measure the thickness of the tool probe pad. Type this number into the "Gage Block Height" input field under the "Offsets" menu.

Position the probe pad on the surface that will be Z zero. Jog the tool over the probe pad and position it about 0.75" or less above the surface of the probe pad. Plug one end of the probe cable into the "Probe" port on the front of the machine. Attach the alligator clip to the end mill in the machine. In Mach3 press the "Auto Tool Zero" on the "Program Run" page. The machine will move down and touch the probe pad to set the Z zero.

Warning: Be sure to check that the tool probe is connected properly by going to the diagnostic page and touching the probe clamp to the probe base. The digitize light should turn on when this happens. If not, DO NOT use the probe as the machine will not stop when the tool touches the probe.





Running a Program

Before loading a program into Mach3, the gcode needs to be generated. Use the CAM software of choice to make the program and then post the code using the generic Mach3 post processor.

Recommended CAM programs to use are HSMworks, which is a part of Fusion360 or can be added to Solidworks, or Vetric VCarve. Any other CAM software with a Mach3 post processor will work as well.

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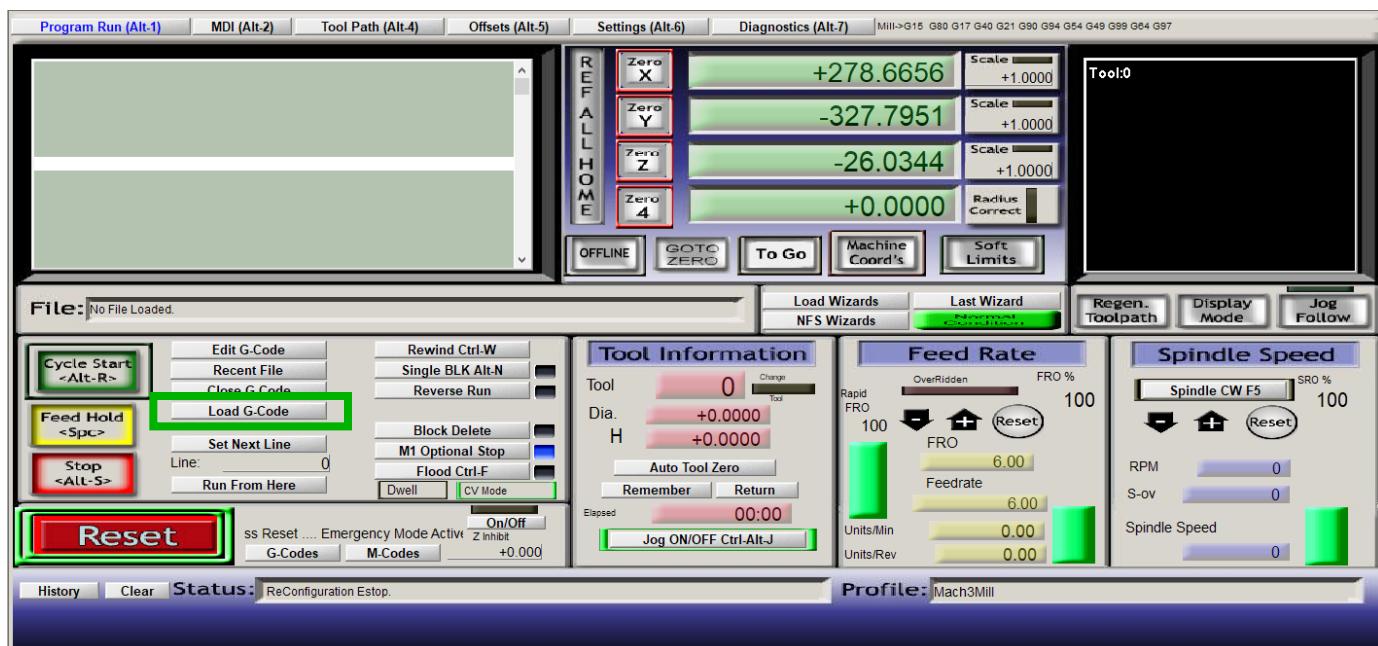
Step 1

Save gcode file to a known folder.

Open Mach3 and have the machine powered on.

Click File -> Load G-code or click the “Load G-code” button on the “Program Run” menu.

File Explorer will open and select the desired file. Click Open.



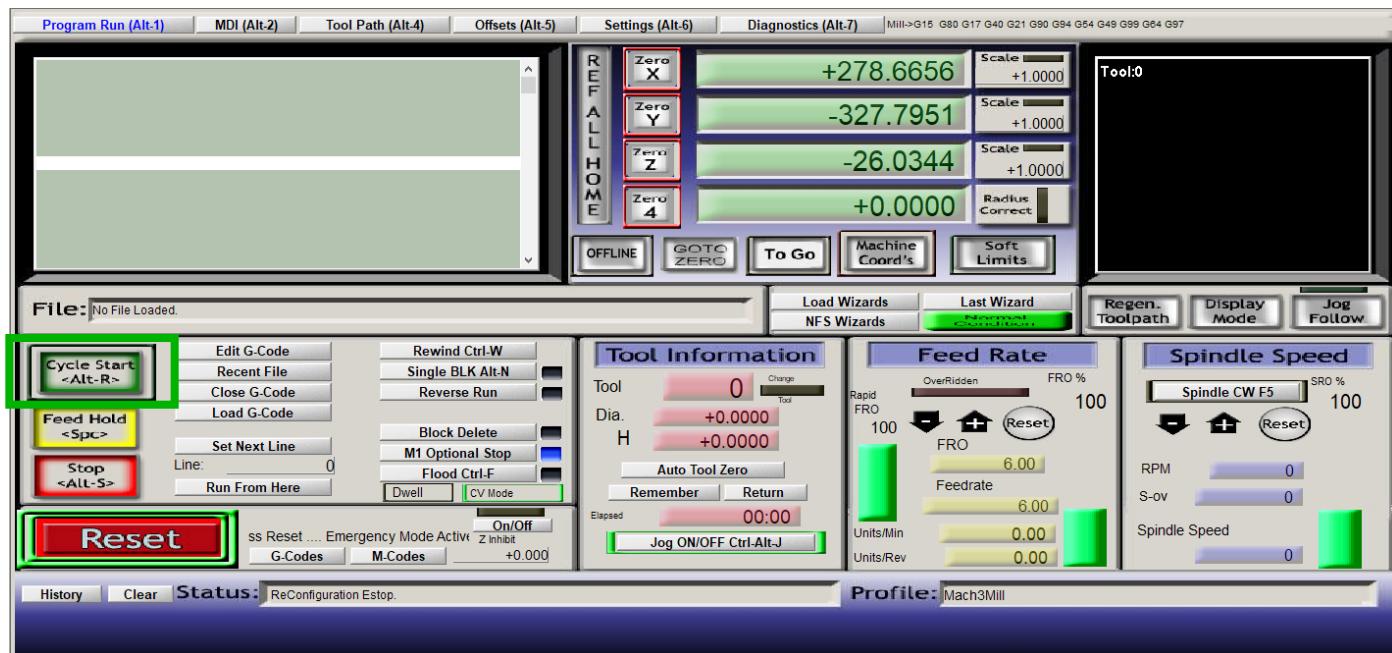
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Step 2

Zero all axis' to set the origin for the program.

Click "Cycle Start" on the "Program Run" menu. The spindle should turn on and the machine will start to execute the program.



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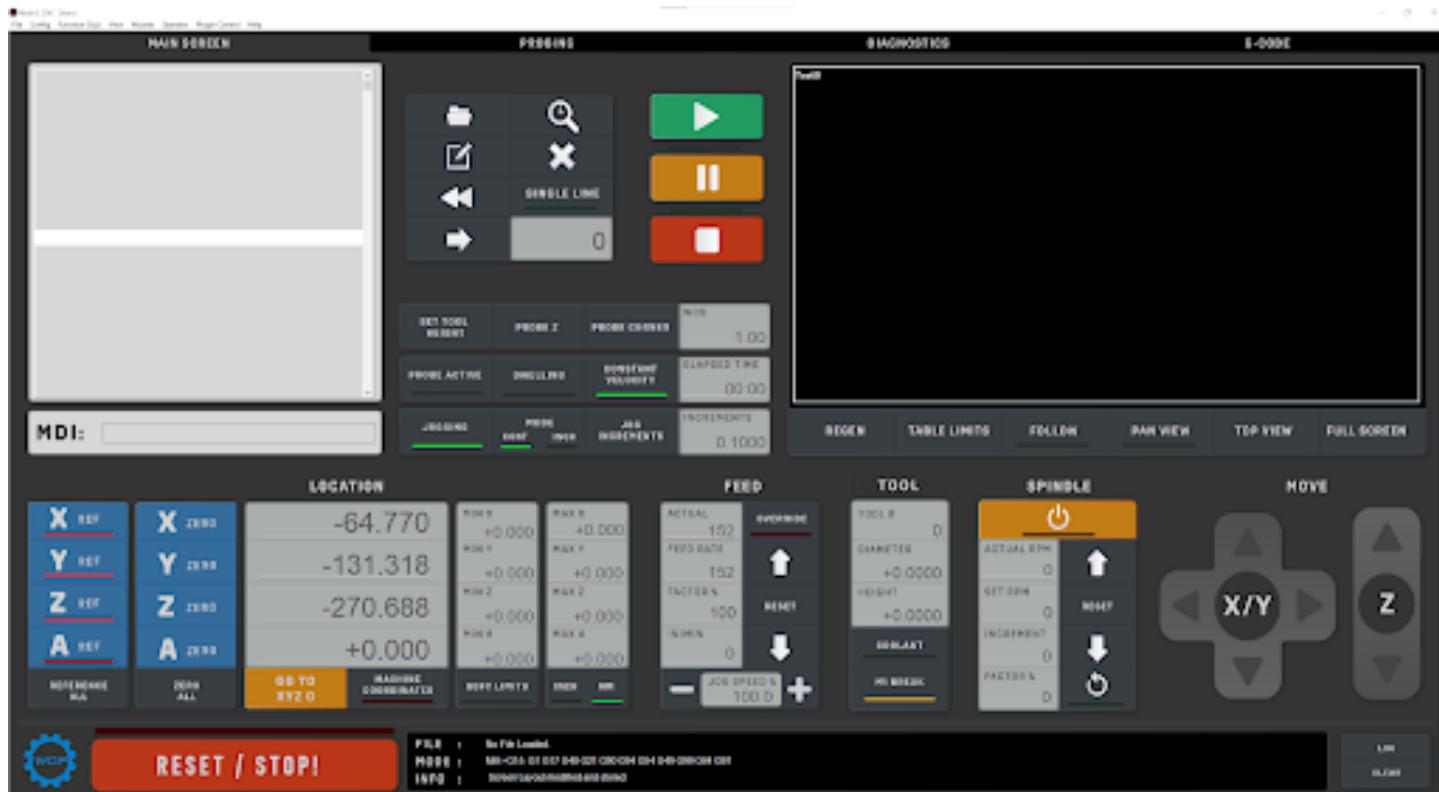


WCP Mach3 Screen Set

Custom Mach3 screen set for operating the OMIO CNC Router. Simplified to just what you need.

Since the interface has been simplified, if there are any buttons or settings that need to be accessed, switch back to the original Mach3 interface to access these.

Contact support@wcpproducts.com for any bugs or issues that occur. If there is a feature that you think should be added to this interface contact us and we will look into it.



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Installing WCP Screen Set

The WCP screen set will come preinstalled with the Mach3 download from the OMIO product page but will need to be loaded. The default screen will be the default Mach3 screen. If a copy of Mach3 is already installed and you would like to add the WCP screen set, then follow the directions below.

Download the WCP screen set files from the OMIO CNC Router product page.

Open the folder. Copy the “WCP Bitmap” folder into the “Bitmaps” folder in the Mach3 directory. Then copy the “WCP Interface” file into the Mach3 directory.

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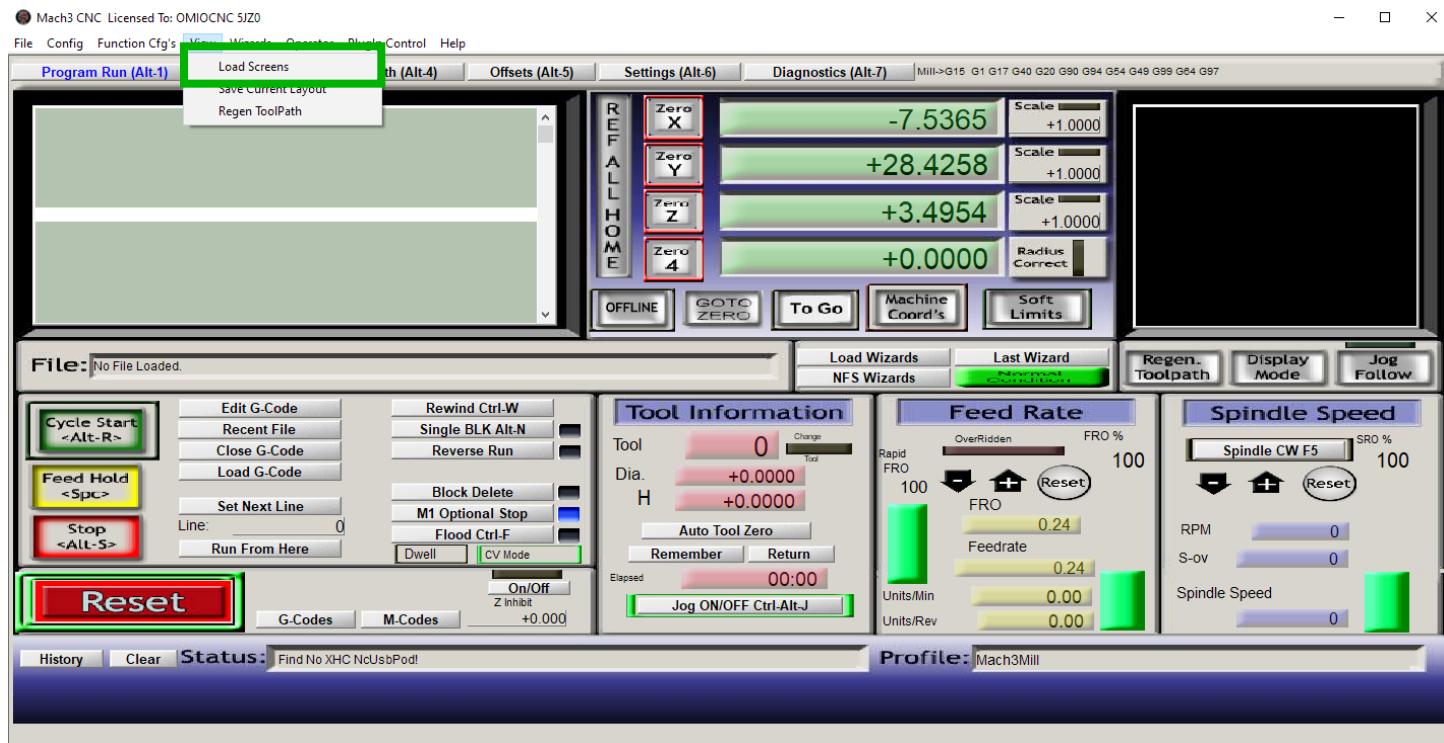


Loading Screen Sets

The default screen will be the default Mach3 screen. Use these steps to load a custom Mach3 screen, such as the WCP screen set.

Click View -> Load Screens. Locate the "WCP Interface.set" file in the Mach3 directory and open it. The WCP screen set should be loaded now.

This same process can be used to load any screen set or for switching back to the default screen set.

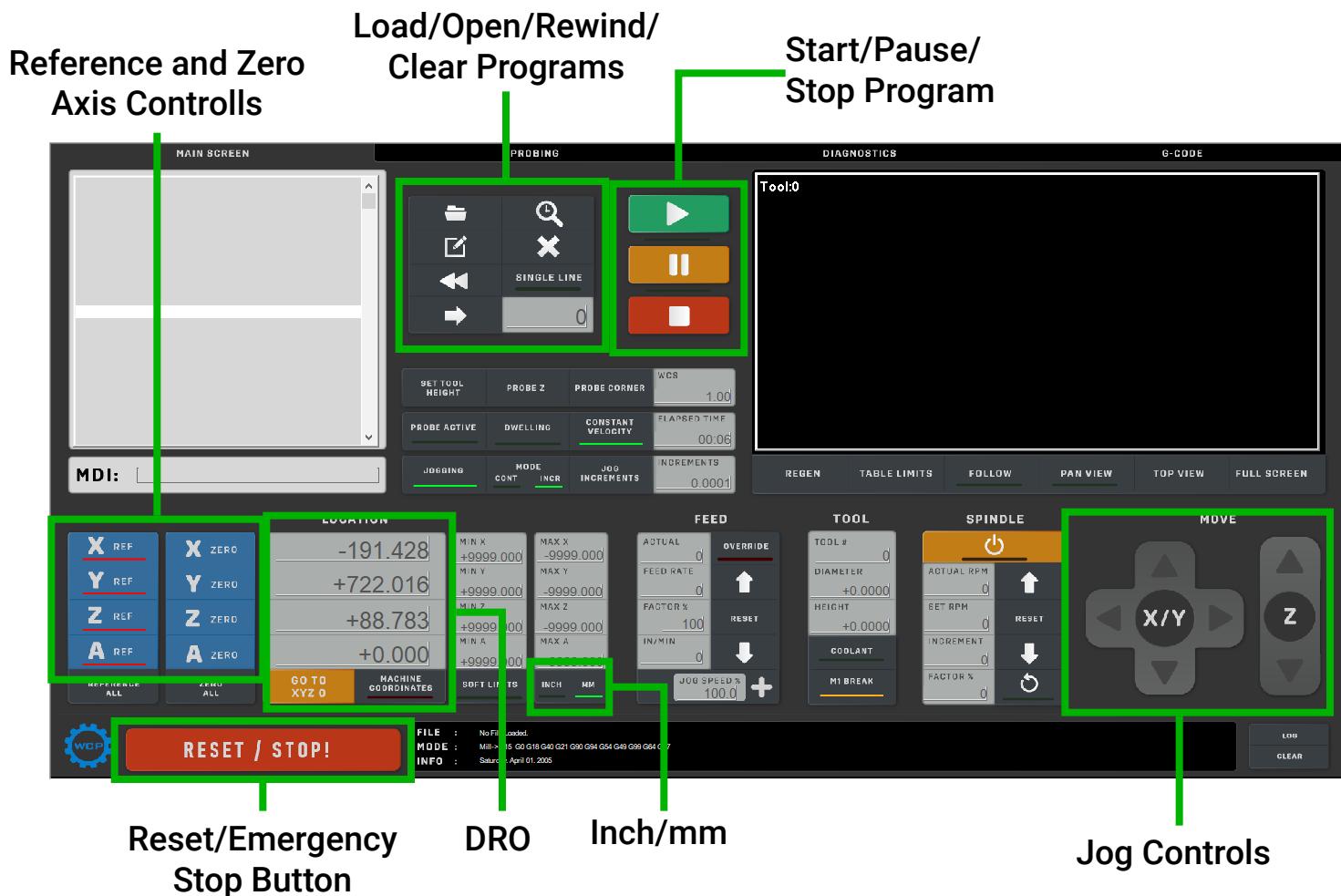


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Basic Layout - Main Screen

The “Main Screen” page contains all the basic functions that are needed to run programs on the OMIO CNC Router.



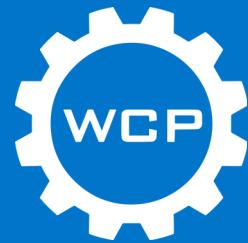
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Basic Layout - Probing

The “Probing” page contains the basic controls and input boxes for various probing programs. There is also basic controls and information displayed here.





Setting Zero - Z (Auto)

Measure the thickness of the tool probe pad. Insert this number into the “Gage Height” input field under the “Probing” page. Also enter the “Search Depth” that the tool will be moving down in order to find the probe pad. Enter a value larger than the actual distance that the tool is above the pad. Enter a desired retract value or leave as default.

Position the probe pad on the surface that will be Z zero. Position the end mill such that the height from the end mill to the probe pad is less than the search depth. Connect all probe wires as described on [Page 51](#). Press the “Probe Z” button when everything is connected properly.

The tool will move down and touch the probe pad once. The tool will up and then back down to touch the probe pad again. The values are compared to verify the surface was accurately touched.

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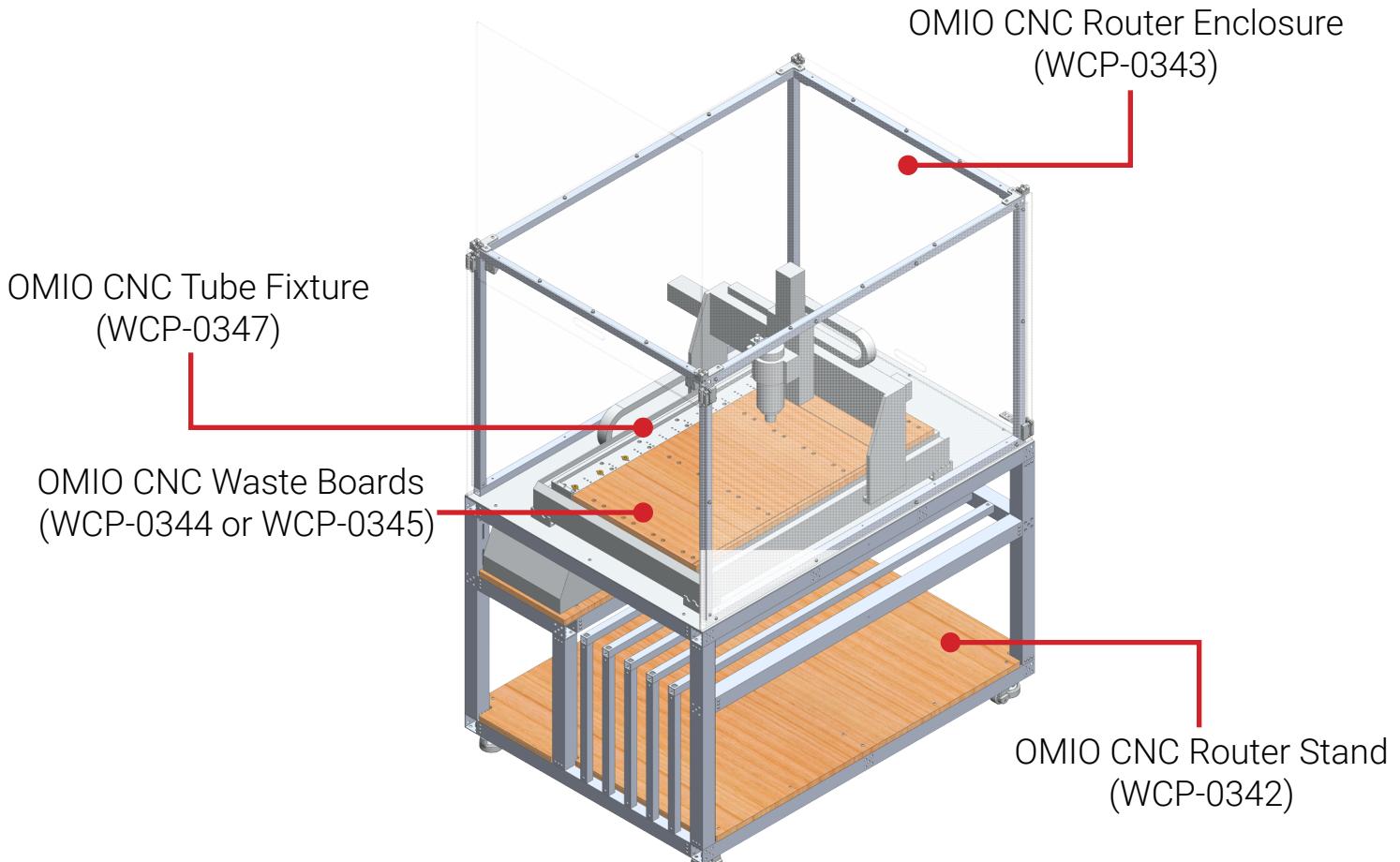


Accessories

The OMIO router is a great machine on its own and offers the end user many options to customize it to their liking. The following pages will include some accessories that may be useful in helping complete some projects.

Accessories Offered:

- OMIO CNC Router Stand (WCP-0342)
- OMIO CNC Router Enclosure (WCP-0343)
- OMIO CNC Waste Boards (WCP-0344 or WCP-0345)
- OMIO CNC Mister (WCP-0346)
- OMIO CNC Tube Fixture (WCP-0347)
- OMIO CNC Nut Strip (WCP-0348)
- OMIO CNC Tube Fixture Clamps (5-Pack) (WCP-0372)



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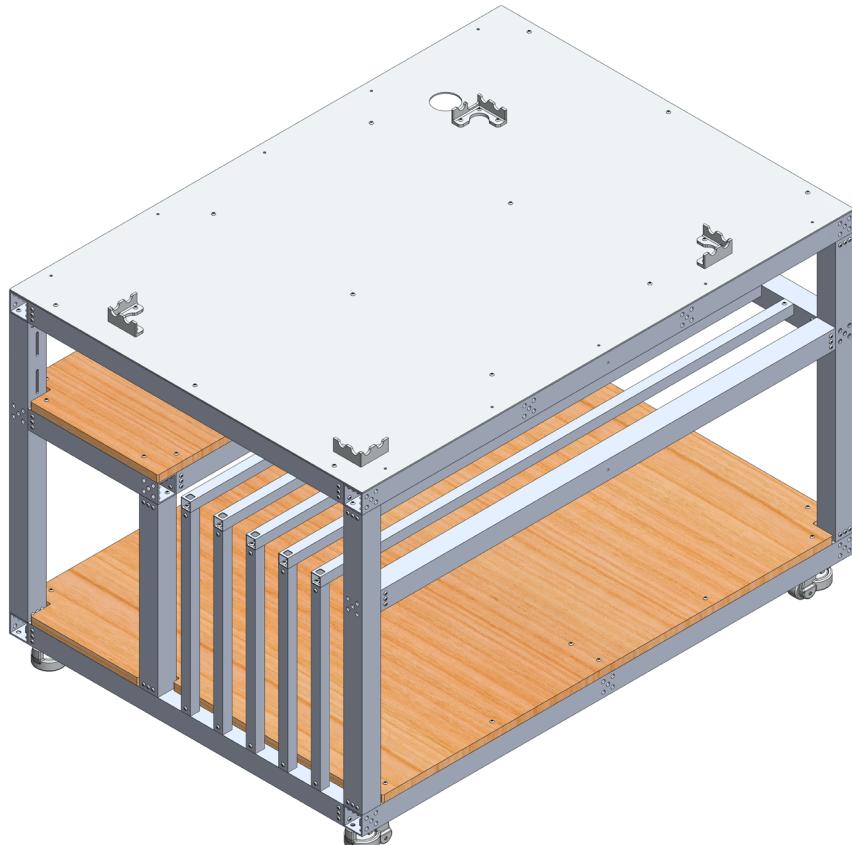


OMIO CNC Router Stand (Mobile Cart) - WCP-0342

Sturdy mobile table for the OMIO CNC Router to sit on and be operated from. The cart holds the computer or laptop used to control the router as well as the control box. The cart is large enough to accommodate an enclosure, if desired. Everything needed to operate the OMIO is contained in one mobile unit.

Features:

- Overall Dimensions: 53”L x 38”W x 35.5”H
- 2” x 2” aluminum tubing construction
- Casters with leveling pads
- Material Storage (6 sections) fits 2’ x 4’ sheet
- Monitor arm mounting holes
- Storage space for other accessories and tools
- OMIO CNC Router Enclose (WCP-0343) bolts directly to cart





OMIO CNC Router Enclosure (Base) - WCP-0343

The enclosure is designed to contain the chips made from cutting metal or other materials. This enclosure also keeps the operator and others around the machine safe from possible harm. Since the machine is fully enclosed the noise produced will be reduced.

Features:

- Designed to fit on the OMIO CNC Router Stand (WCP-0342)
- Fits 2' x 4' sheet completely within enclosure
- Door on front and back for easy access to all parts of machine
 - Slides up to reduce foot print size
 - Magnets to hold door up





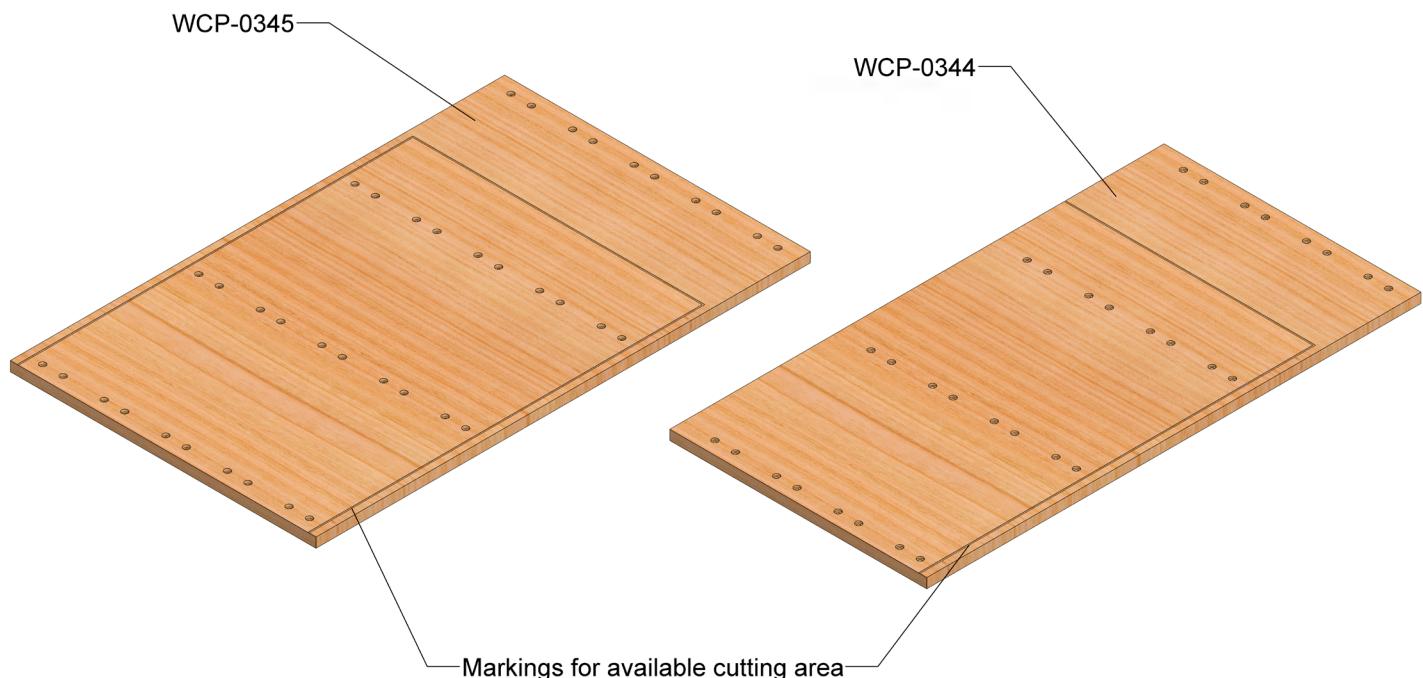
OMIO CNC Waste Boards - WCP-0344 and WCP-0345

Spoil boards are used to hold down sheet material and have the benefit of being able to fully cut through the sheet into the spoil board with worrying about damaging the machine bed. Both spoil boards offered in MDF.

There are two sizes available: a full sized one and a partial size one to accommodate the tube jig.

Overall Dimensions:

- WCP-0345: 23.5" x 38" x .75"
- WCP-0344: 19.75" x 38" x .75"



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OMIO CNC Mister (LocLine) - WCP-0346

Cutting aluminum requires some form of cutting fluid and air as a means to remove the cut chips and keep the end mill lubricated. This mister has mounting holes available or it can be attached to the side of the spindle with double sided tape, as seen below.

Features:

- 12" LocLine
- Adjustment for coolant and air flow with locking nut
- Push to connect air and coolant line fittings
- Coolant flow can be turned off while keeping the air flow on





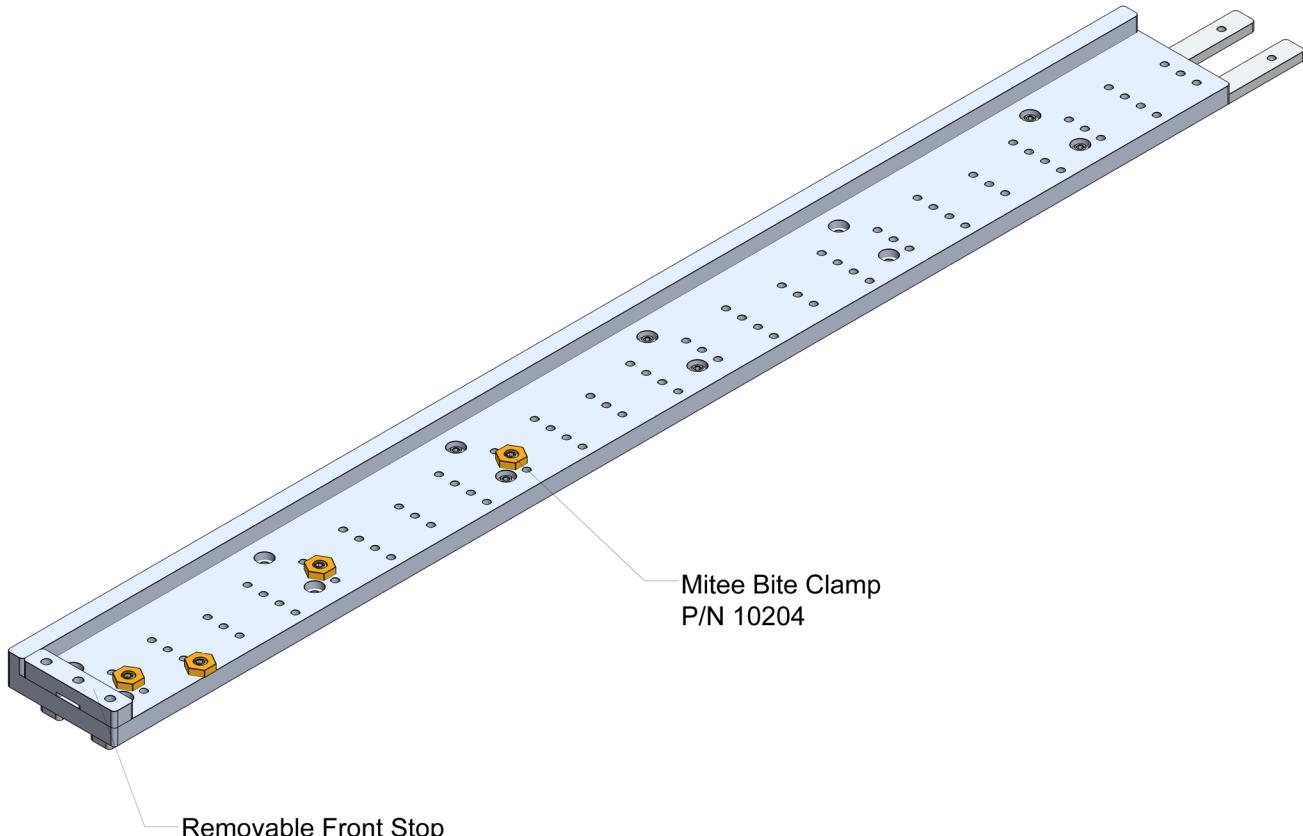
OMIO CNC Tube Fixture - WCP-0347

This fixture is designed to provide a quick and easy way to run tubing on the OMIO CNC Router. It accommodates the common rectangle or square tubing sizes used in FRC.

If more clamps are desired, those can be purchased here: OMIO CNC Tube Fixture Clamps (5-Pack) (WCP-0372).

Features:

- Removable front stop to pass longer tubing through for more operations
- Uses Mitee Bite clamps (P/N 10204)
- Evenly spaced clamping locations along length of fixture
- Built in bolt locations for bolting to T slot
- Supported tubing sizes: 0.75", 1", 1.25", 1.5", 1.75", 2", and 2.25"



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Collets and End Mills

Collets and end mills are needed for every project on the OMIO CNC Router. WCP offers three common sized end mills that are useful to FRC teams. A collet set can also be purchased to cover the common sized end mills that can be used with the OMIO.

End Mills Offered:

- 1 Flute Square End Mill (4mm, Uncoated Carbide) - WCP-0053
- 1 Flute Square End Mill (5mm, Uncoated Carbide) - WCP-0054
- 1 Flute Square End Mill (6mm, Uncoated Carbide) - WCP-0055

Collet Set Sizes:

- ER20
 - 1/8", 1/4", 1/2", 4mm, 5mm, 6mm, 7mm, 8mm, 10mm, 12mm





Recommendations

The following pages include some recommendations for common router operations that may be useful to first time users.



Work Holding - Sheet Material

Sheet material, such as aluminum and plastic, is simple to hold down in the OMIO CNC Router. When cutting sheet material a spoil board is highly recommended to be used. This allows for the material to be attached to the wood board and to be cut fully through and not damage the machine bed.

All that is required to hold down sheet material is a few screws around the area that will be cut. For extra security, add screws in to the part that is to be machined before the perimeter of the part is machined. This will prevent the part from popping up when it is fully machined.

Work Holding - Tubes

Cutting tubing on the OMIO CNC Router is a good way to get precision holes if a CNC mill is not available.

For holding tubing on the router, a set of small machine vises or the OMIO CNC Tube Fixture are the recommended way. The tube fixture makes this process easier since it is one piece and does not require aligning multiple vises.

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Cutting Feeds and Speeds

Below are some recommended feeds and speeds to start with. These are just a general idea of where to start. Material type, end mills, and work holding all play a factor in the feeds and speeds that will be run. These are a good starting point for figuring out the right ones for the job. Start at the low end of the recommendations and then work up to the desired speeds.

Running on the lower end will improve tool life and on the higher end will result in shorter run times. It is also recommended to add a ramp at the beginning of a cut rather than plunging directly into the material. If that is not an option, then plunge at the lower end of the recommendations.

Note: The below recommendations are for slotting in aluminum with appropriate coolant and air to clear chips. These values could be doubled or tripled for softer materials such as plastic or wood.

End Mill Size	RPM	Feed/Tooth (inches)	Feed Rate (IPM)	Depth per Pass
4 mm	24,000	.002" - .004"	50 - 100	~0.06"
5 mm	20,000 - 24,000	.003" - .005"	60 - 120	~0.09"
6 mm	20,000 - 24,000	.003" - .006"	60 - 140	~0.125"



FAQ

Q: Can the OMIO CNC Router cut aluminum?

A: Yes, with the right end mill and feeds and speeds the OMIO CNC Router is able to cut aluminum.

Q: Does the water pump need to be on all the time?

A: The water pump needs to be on whenever the spindle is running. If the pump is not on there is a chance that the spindle may be damaged. It is best practice to leave the pump on when the machine is being used.

Trouble Shooting

Issue: Part is not coming out to the right dimensions. One direction is correct but the other is not, such as oblong holes that should be round.

Possible Solution:

- This could be caused by the coupler for that axis slipping on the shaft. Tighten the screw that clamps onto the shaft and try again.

Issue: Mach3 does not control the machine.

Possible Solutions:

1. Check that the machine is powered on and all cables for the stepper motors are connected.
2. Restart Mach3.
3. Check that USB cable is plugged in at the computer and the controller.
4. USB cable needs to be plugged into a 2.0 port, not a 3.0 port.

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Revision Table

Revision Date	Revision #	Description
12/17/2020	1.0	First revision created.
3/10/2021	1.1	Some part names and numbers changed.
3/26/2021	1.2	Added machine dimensions and machinable area images.
9/2/2021	1.3	Updated Mach3 download links.