



YouCarve
Assembly Instructions
+
User Guide
+
Maintenance Guide



Safety precautions

Like any power tool, operating and using a CNC machine can be dangerous. Diligence must be applied when operating any machine. It is recommended to wear appropriate PPE such as eye protection and earmuffs for your own safety.

NEVER leave a powered machine unattended at any time!

In the event of an issue or if something doesn't seem right, it is recommended to immediately disconnect power to the machine and unplug it from the wall power outlet.

Contact our customer support team if you have any concerns about your machine.

Always ensure your machine is free and clear of any swarf, dust or other obstructions that may impact the motion of your machine. We highly recommend the use of a Dust shoe and vacuum system for keeping your machine clean and clear of swarf and dust.

Always ensure to follow the maintenance guide at the bottom of this manual after initial assembly and setup, then repeat periodically to ensure your machine always performs to its optimal capacity.

Table of Contents

<input type="checkbox"/>	Introduction	Page 4
<input type="checkbox"/>	Frame Assembly	Page 6
<input type="checkbox"/>	Wiring Assembly	Page 12
<input type="checkbox"/>	Squaring the Machine Frame	Page 17
<input type="checkbox"/>	Attaching the Spoil Board	Page 19
<input type="checkbox"/>	Attaching Your Router	Page 22
<input type="checkbox"/>	Attaching Your Controller	Page 23
	Nighthawk Scribe	Page 24
	Nighthawk	Page 25
<input type="checkbox"/>	Connecting to Your Controller	Page 28
<input type="checkbox"/>	Commissioning Checks	Page 29
<input type="checkbox"/>	Surfacing Your Spoil Board	Page 30
<input type="checkbox"/>	Running Your Jobs	Page 31
<input type="checkbox"/>	Getting Started with Your Laser	Page 36
<input type="checkbox"/>	Maintenance Guide	Page 39
<input type="checkbox"/>	Additional Resources	Page 46
<input type="checkbox"/>	Getting Help	Page 47

Introduction

Some key things with the YouCarve CNC

Machine settings

Our trained team preconfigure every aspect of your machine prior to it being sent to you. You do not need to change any settings in your controller and **DO NOT** load any profiles onto your machine within the Profiles tab of our Commander software.

By default, we set soft limits to the maximum travel limits of your X and Y axis. Whenever you first power on you **MUST** home your machine. If your controller is ever in an Alarm state, you can reset it by clicking the “Unlock” button in Commander. If this fails to clear, click the E-stop button in Commander then the unlock button.

Tramming your router

It is important to ensure your router and endmills are perfectly perpendicular to your bed, therefore it is highly recommended to tram your router. This process cannot be completed before shipping due to vibrations, bumps etc. during the shipping process.

Every YouCarve is fully assembled and tested by our team at time of manufacture then broken down into a small number of major components for shipping. As such your pre-assembled parts may differ very slightly from the pictures in this guide however the assembly process will be the same.

If you encounter any problems during assembly of your YouCarve machine, please contact us at [CNC3D.com.au](https://www.cnc3d.com.au)

Tools required

Metric Allen Key Set

Small Flat head screwdriver

8mm Spanner

10mm Spanner

Tape Measure

Kit Components



Extra components

710W Router

Endmills + Collet adapters

Laser + Mounting Hardware

Frame Assembly

Before starting assembly, you will need to know how to use the “Drop-in” style T-nuts. These nuts are designed to “drop-in” to the aluminium extrusion anywhere along its length and twist to lock in as the bolt is tightened.

When your machine is shipped to you, there are several bolts loosely attached to the frame parts in their intended positions, however even though they are loose, they are already too tight to lock in properly.

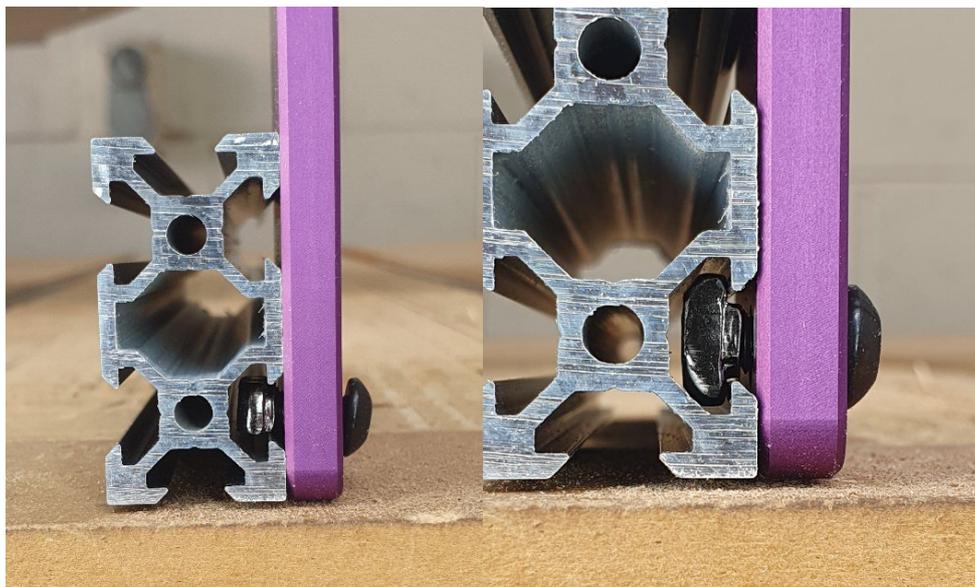
When it comes time to attach these parts using the drop-in t-nuts, you will need to loosen them off almost all the way, then slide them into the extrusion, and tighten them in place. As the bolt is tightened the t-nut will want to twist so that it locks into place.

If the t-nut is threaded onto the bolt too far before it’s inserted into the extrusion, it will not be able to twist and lock into place and will be tightened up to the plate instead of its intended position inside the channel and won’t provide any strength. See photos below for examples.



Pre-attached to Frame

Loosened, ready for assembly

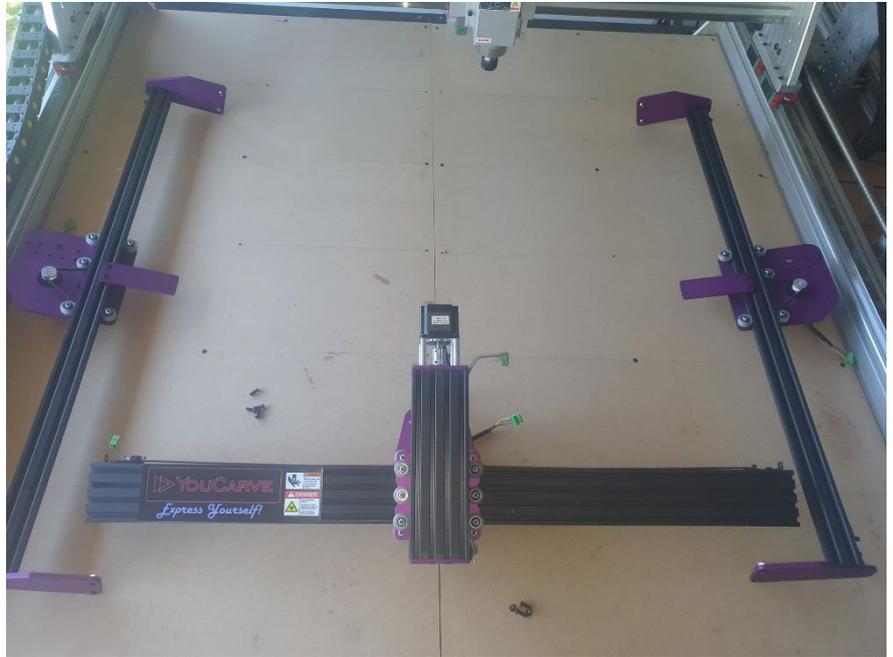


Inserted, ready to tighten

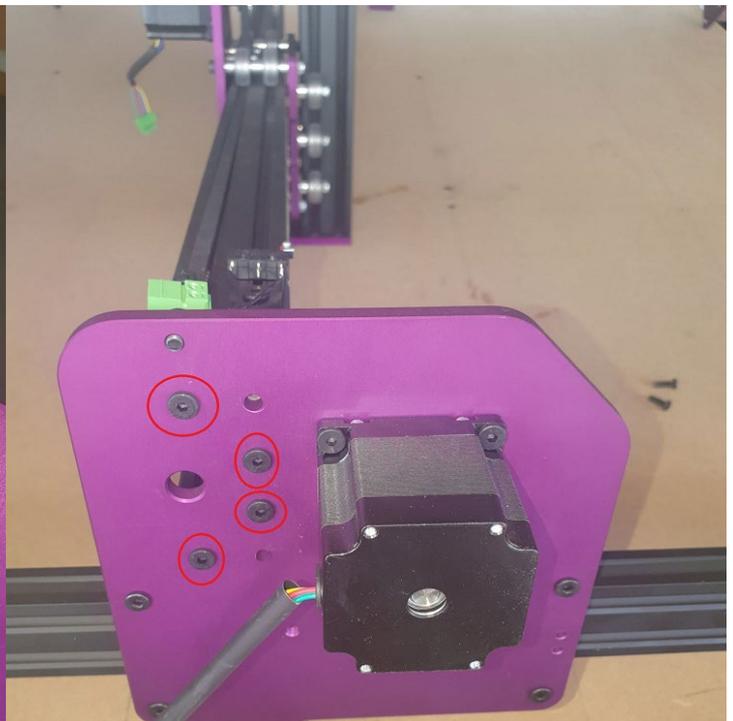
Correctly tightened and secured. T-nut has twisted and locked into channel

1. Remove the bolts that are loosely threaded in the end of the gantry extrusion and the bolts that are on the side plates (see photos) and attach the sides of the machine to gantry using the bolts making sure to keep the sloped sides to the front.

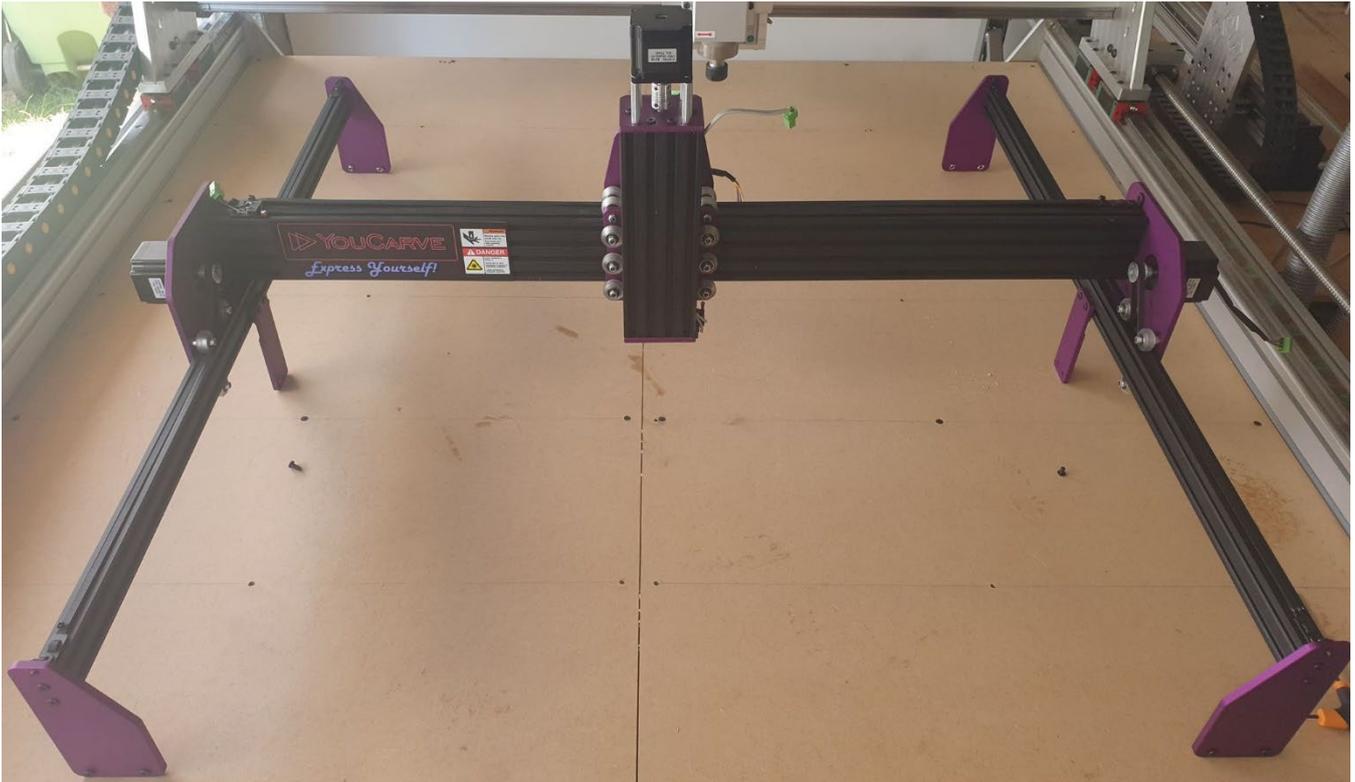
Your plates will look slightly different to these pictures however the bolt holes and assembly processes are the same!



Remove these bolts from both sides and put aside before assembling the gantry to side plates.



It should now look like this:

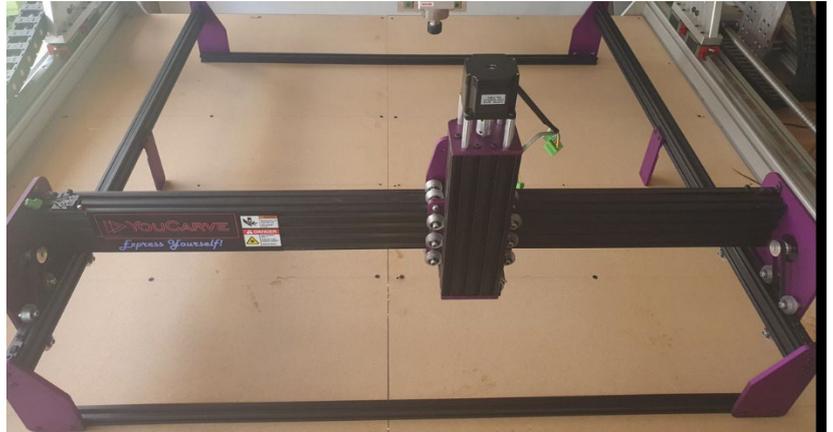


2. Now we are going to fasten the X axis belts and set tension. Firstly, loosen the T-nuts on the belt tensioners on both sides of the gantry. You will notice on the bolts we removed earlier that one side is shorter than the other. Starting on the shorter bolt side, insert the bolt so that it pulls the belt tensioner towards the side plate, once firmly secured, tighten the downward T-nut bolt into the gantry as per photo. Once you have secured the short bolt side, proceed to the other side and use the longer bolt that goes into the side plate to apply tension to your belt.

Please Note: You do not need to put too much force on this bolt, it is OK to have a gap between the belt tensioner and side plate only on this side.



3. Now we are going to set up the bottom of the machine. You will have 2 longer 2020 extrusions and 3 shorter extrusions with a right-angle bracket on the ends. Take the 2 longer pieces and slide them onto the front and rear plates and secure the T-nuts on the plates.



4. Insert the 3 shorter 2020 extrusions in the middle of the machine and secure to the middle supporting brackets using the attached T-nuts. For the middle extrusion, make it as close to the middle as possible. Repeat the process on the other side of the machine. Once both sides are on, secure the Angle brackets to front and rear and the machine. It is OK to have a gap between the crossing extrusions, we have designed the machine this way.



It should now look like this:

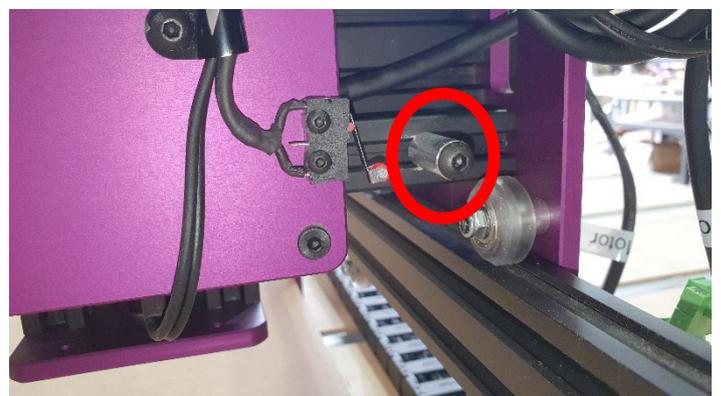


YouCarve V2: You will notice some 20mm spacers that have been attached to the machine frame, these have been strategically placed to contact your limit switches so they must stay attached. Please check to make sure the bolts are tight and secure.

Refer to the photos below to show the locations of these spacers.



Y-Limit (Left side of machine)



X-Limit (Left side on back of gantry)

This completes your frame assembly!

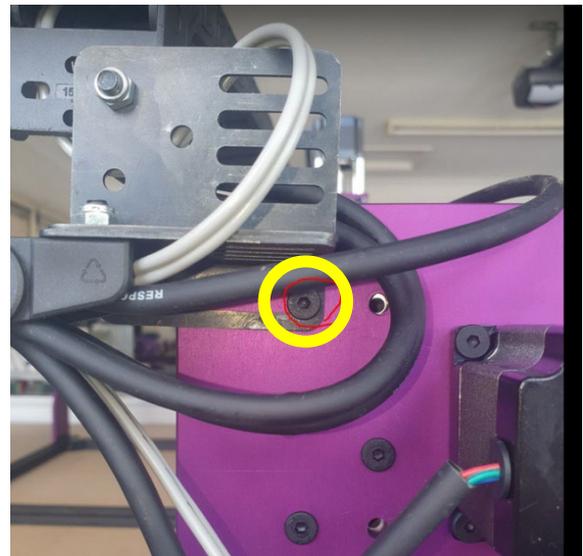
Wiring Assembly

1. Using the M5 bolts and the 20mm spacers, secure the Controller side of the wiring loom to the left-hand side of the frame approximately 300mm from the front of the machine.



2. Remove this bolt from the left-hand side plate to allow you to secure the middle of the wiring loom to the side plate. Insert the mounting bracket and re-tighten the bolt.

Note: Your cables will be black instead of the grey colour in these photos. This is due to a change in our suppliers, but assembly is the same.



3. Take the cables labelled Y2 Motor and Y2 Limit* and feed them through the slot on the left side plate. Run them all the way through inside the channel of the gantry extrusion so they come out of the slot on the right-side plate. Once they are out the other side, connect the green plugs together and tighten the outside screws to fasten them.



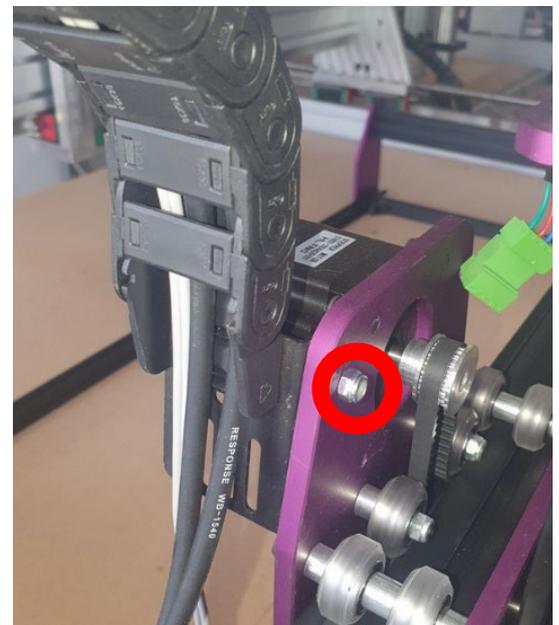
Left Side Plate (Y1)



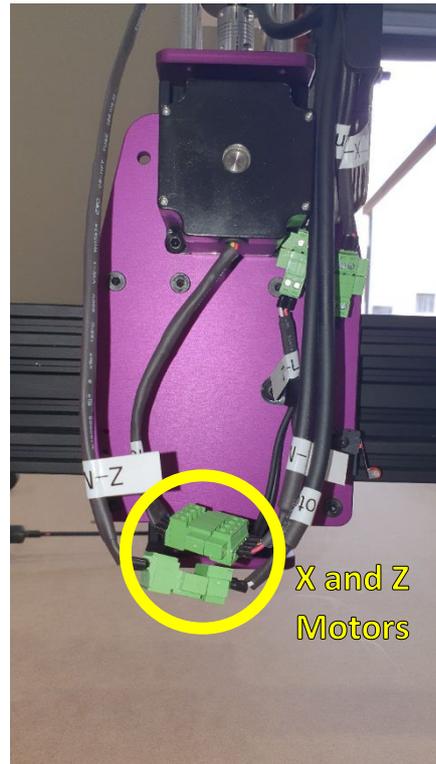
Right Side Plate (Y2) *

**Only users who purchased a Nighthawk controller will have the Y2 Limit cable and switch!*

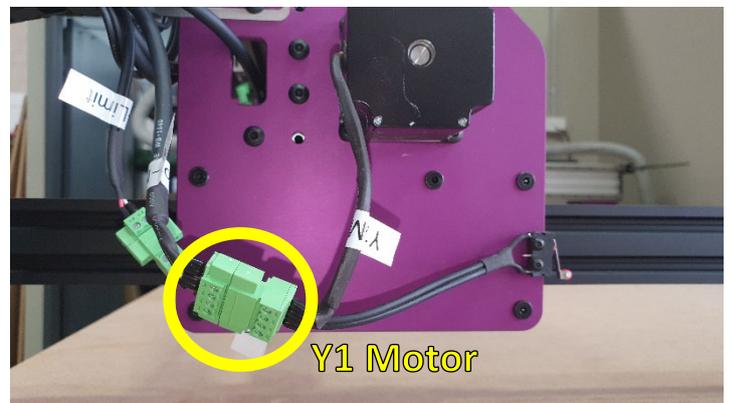
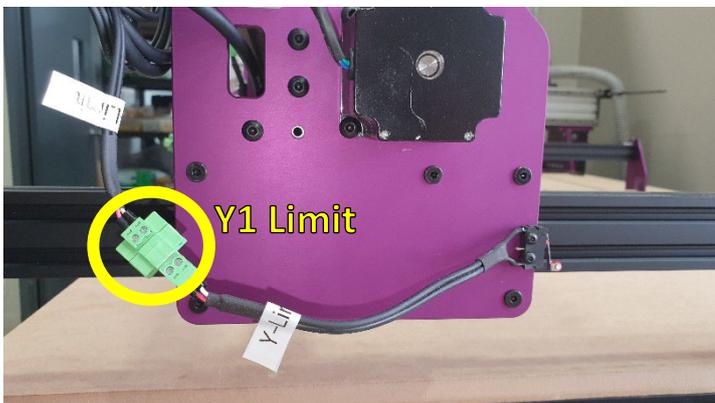
4. Attach the far end of the wiring loom to the bolt hole shown below in the photo by first removing the nut off the bolt on the mounting bracket.



5. Connect X and Z limit switches and motors and screw the connectors together using the outside screws on each connector. Refer to the labels to make sure you connect the correct plugs together or your machine will not move correctly.



6. Connect Y-Limit switch and Y1 Motor connectors on the Left side plate and screw the connectors together using the outside screws on each connector.



That's it for now!

You'll plug in your controller a little later, for now it needs to stay unplugged so you can easily push and pull your machine around without the stepper motor drivers interfering.

Squaring your machine

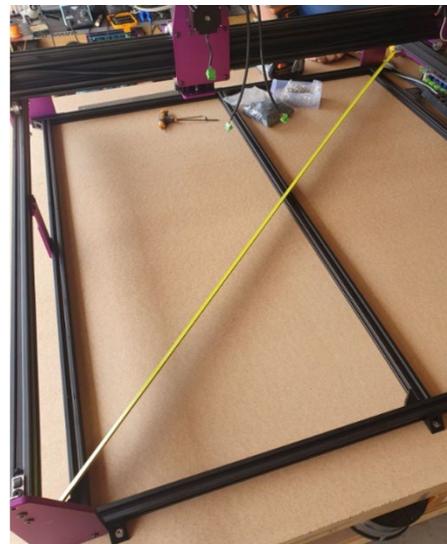
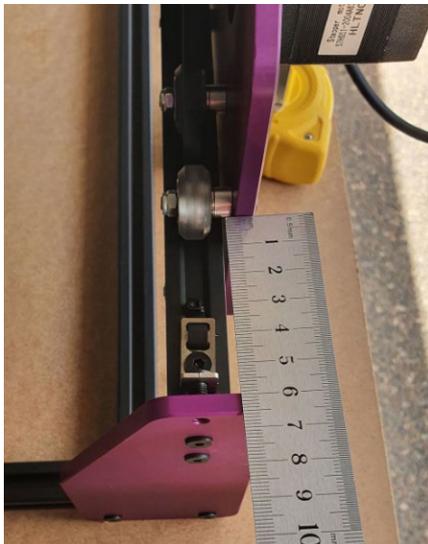
1. Make up all 6 of the frame securing kit fastening brackets by inserting an 8mm bolt through each bracket and loosely attach an M5 T-nut to the bolt on the square side of the bracket so all 8 look like this:



2. Fasten 3 of the angle brackets to the outside rear bottom support extrusion by sliding the T-nut into the extrusion and screwing/bolting it down into the work bench/table beneath it using bolts or screws (not provided). Make sure to evenly space them across the rear bottom rail for a consistent hold.



3. While the machine is powered off grab the Z axis from the front of the machine and carefully pull it towards you so that it is around 150-200mm from the front of the machine. Grab a ruler and measure one side of the machine from the side plate to the front plate and record the distance, then do the same for the other side of the machine. Hopefully your machine should be within 1mm on both sides. You can also check across the diagonal edges of your YouCarve V2 to square your machine. Compare both sides with a tape measure and adjust the frame until both sides are within 2mm of each other.



Squaring tips

If your machine is not within 1mm try loosening off the front and rear plates, bottom edge side extrusion angle bracket bolts and adjusting the machine until it is square. Once it is square re-tighten all bolts and re-check that it is square. If so, you are good to go!

If you have trouble doing this, contact us at [CNC3D.com.au](https://www.cnc3d.com.au)

Attaching your spoil board

Material type: MDF or FormPly

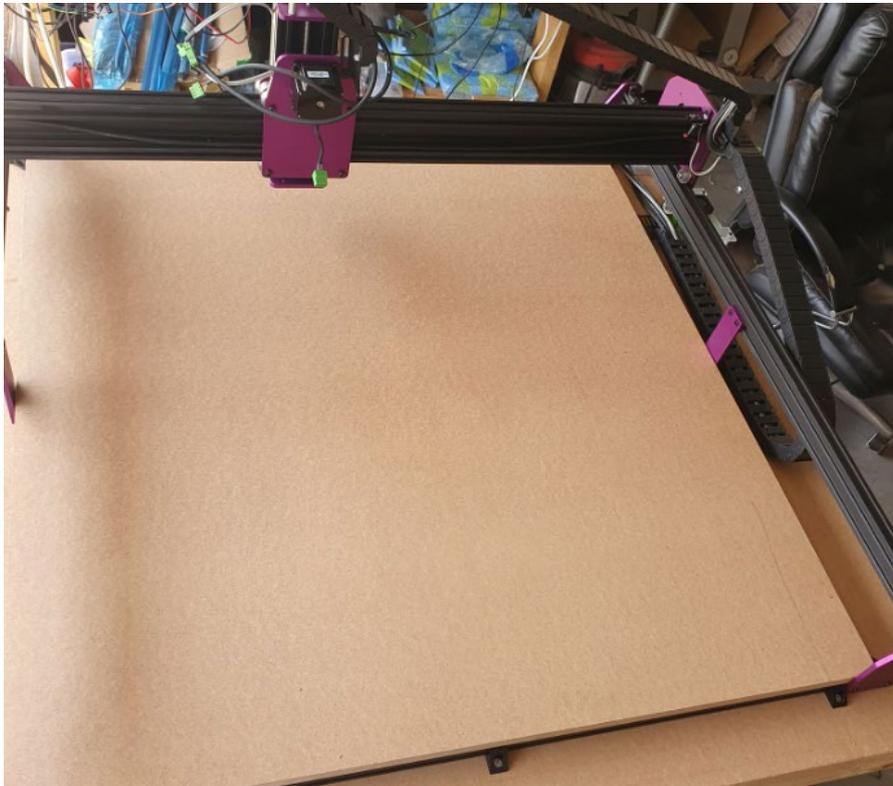
Recommended thickness: 16mm

Size: 998 x 936mm

Spoil boards can be sourced from your local hardware store. We recommend getting them to cut it precisely for you with the dimensions 998mm x 936mm.

1. Once you have your spoil board, place it on the top of the bottom extrusions so that it fits inside the machine frame.

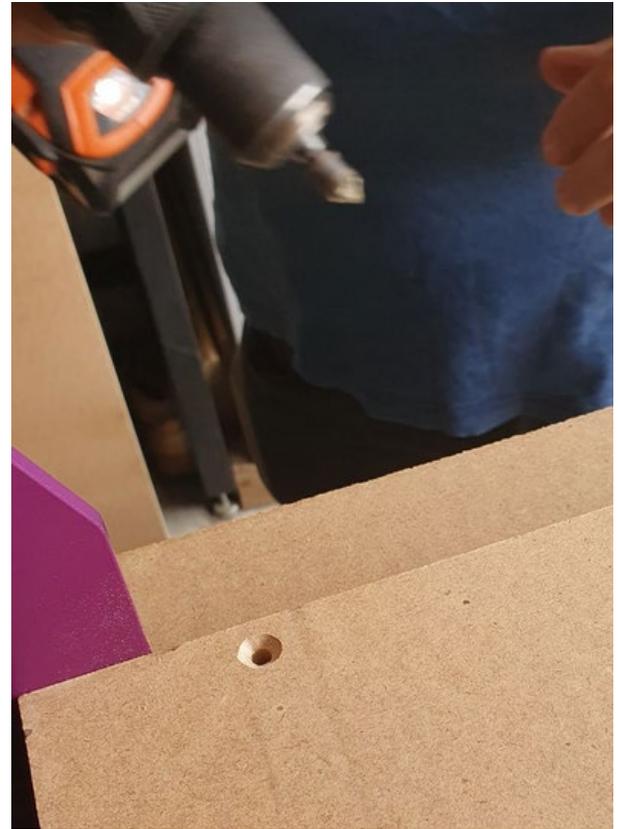
Note: it will only go in one way so if it doesn't fit in, try rotating it around 90° so that it fits.



2. Carefully measure 3 holes 10mm in from the front of the spoil board in front of where the frame securing kit brackets are located and carefully drill into the spoil board with a 5.5-6mm drill bit. Once you have drilled through the spoil board the drill bit should drop into the channel in the extrusion. If you notice you are drilling into the extrusion below, cease drilling immediately and have a look where your original hole was and adjust accordingly so that your drill hole is directly over the extrusion channel.

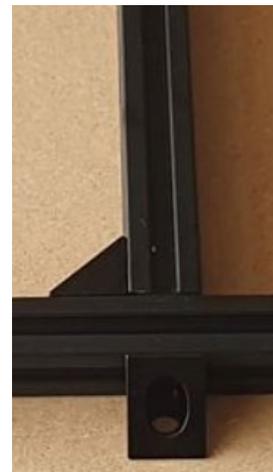
Note: Having multiple holes next to each other is not a problem. The spoil board is a consumable and having many holes will not affect its usefulness!

3. Once you have made your 3 holes, use a countersinking bit to recess the holes between 6mm and 8mm deep into the spoil board.
4. Repeat this process on both the front and rear of the machine so that there are 3 holes on the front and the back in the same position front to back.

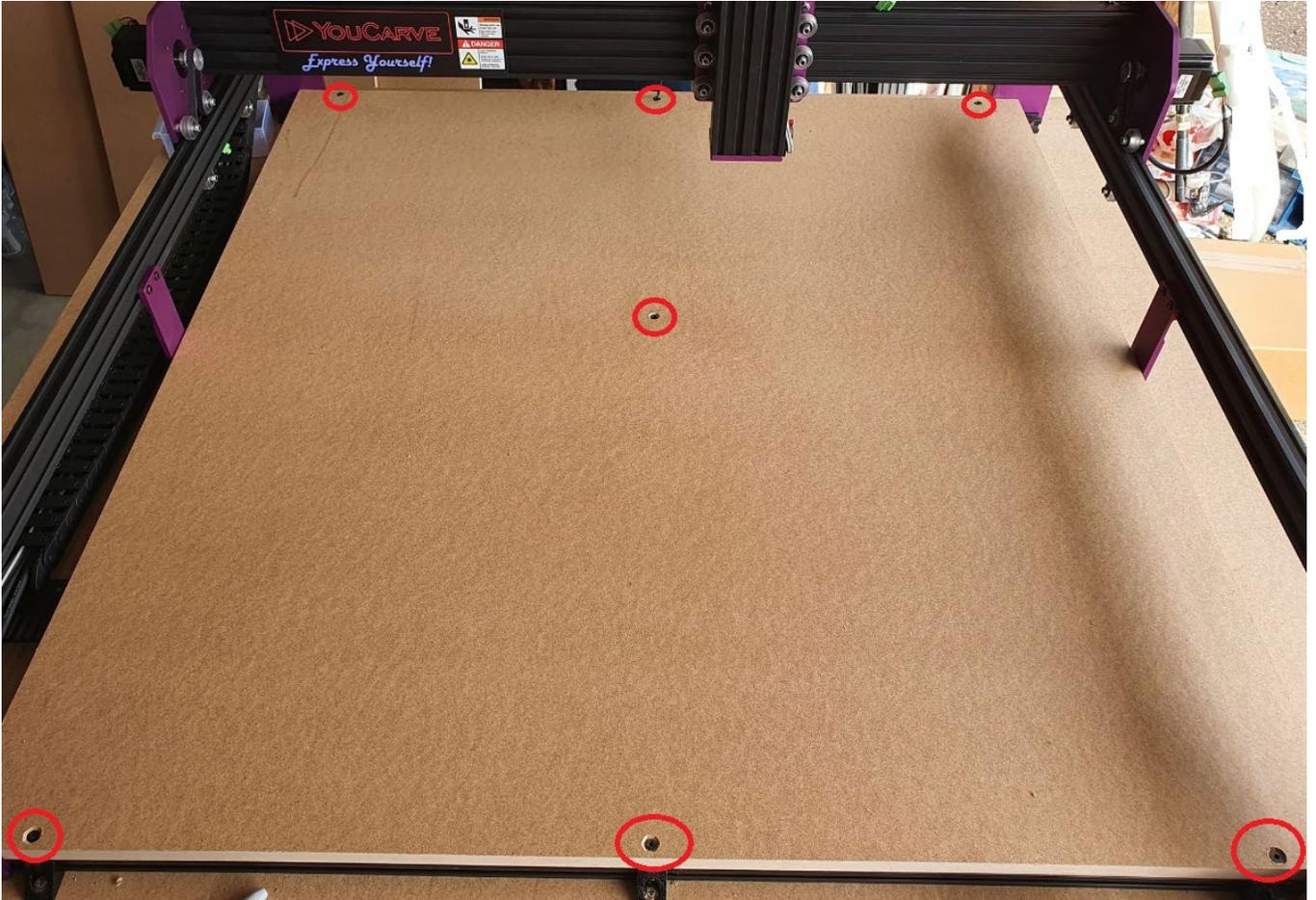


5. Pay attention to the location of the extrusion that is in the middle of the machine at the bottom and attempt to repeat the above process to drill and countersink one hole right in the middle of the machine. This one can be a little tricky, good news is you can keep drilling holes repeatedly until you get it right.

Pro Tip: If your front and rear centre fastening brackets are lined up with your middle extrusion you can use these as a reference guide and draw a line across the middle of the spoil board front to back to find the middle point of the extrusion and then drill into it. Hopefully, this should be right over the extrusion channel.



- Carefully remove the spoil board from the machine and insert an M5 16mm bolt into each hole that was drilled and countersunk (these are provided in the spoil board securing kit) from the top and attach an M5 drop-in T-nut to the bottom of the spoil board and then place the spoil board back into the machine and carefully move it around until the T-nuts fall into the channels. You will notice this is correct when the spoil board is flat top the extrusions without an air gap. Once this is done, fasten then bolts securely to tighten the spoil board to the base extrusions. Once this is done it should look like this:



Your spoil board assembly is now complete!

Attaching your router

Skip ahead to page 23 if you are NOT attaching a router to your machine



1. Unpack the router bracket assembly kit and attach the M5 8mm bolts through the angle brackets and attach an M5 drop-in T-nut to the rear of each one.



2. Loosely fasten the angle brackets towards the rear of the router in the outer edge mounting holes



3. Attach the router clamp to the front of the Z axis loosely and use a spirit level to get the router clamp relatively level then tighten all bolts to hold the clamp to the Z axis.



4. Loosen the front bolts on the router clamp and insert your trimmer. Ensure when fitting the router that the bottom of the collet nut sits just below the Z axis to ensure it is the lowest point. It is recommended to secure your router with the clamp as low as possible but if you are using a dust shoe make sure to leave an allowance for it.



5. There are a few options for running your router cable through your machine. One option and likely the simplest is to cable tie the power cable to the outside of the existing cable chains and feeding it off to the power point.

Alternatively, you can remove the links in the cable chain and feed the power cable through the cable chain itself, this can be a bit cumbersome but will be the tidiest installation. If you want to run it through the cable chains you can use a screwdriver to pry the bottom clips on the cable chain off and then insert your router power cable and reinsert the clips.

Here is an example of how to cable tie it to your existing cable chains:



Connecting your CNC Controller

There are currently 2 different Nighthawk controllers available with new YouCarve CNC machines: **Nighthawk** and **Nighthawk SCRIBE**

If you received your machine after October 2023 and did not add a Nighthawk to your order, you will have received a Nighthawk SCRIBE with your kit.

See the below photos for reference to determine which controller you have, as there are different installation instructions for each one.



Nighthawk SCRIBE
Continue to Next Page



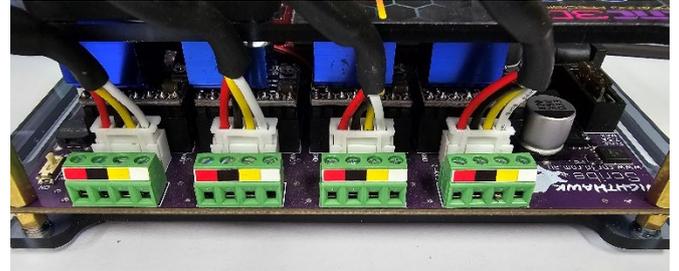
Nighthawk
Skip ahead to page 25

Nighthawk SCRIBE Controller

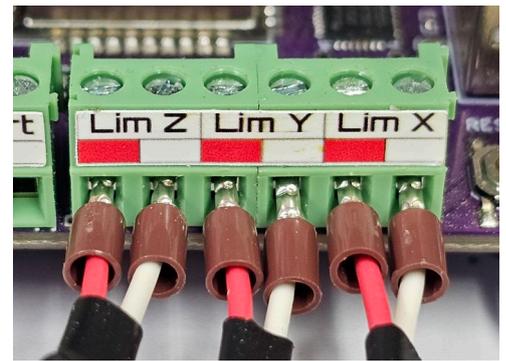
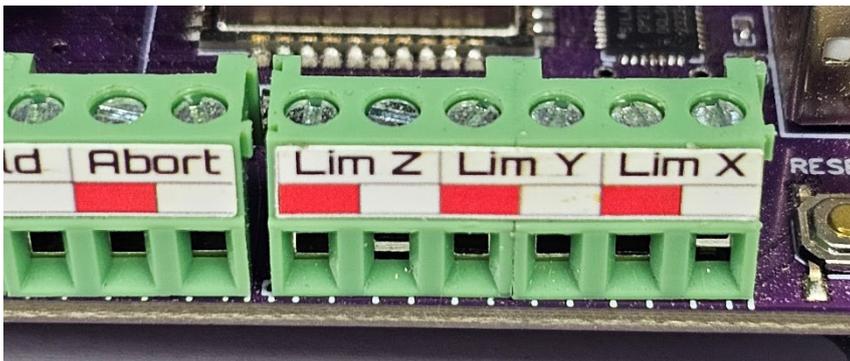
Connect your Motor wires to the Scribe controller. Each wire is labelled and will fit into its corresponding white plug. These will only go in one way! See pictures below as a reference.

You will need to remove the labels from the connectors before plugging in.

Pro Tip: Remove them one-at-a-time so you know where you're up to!

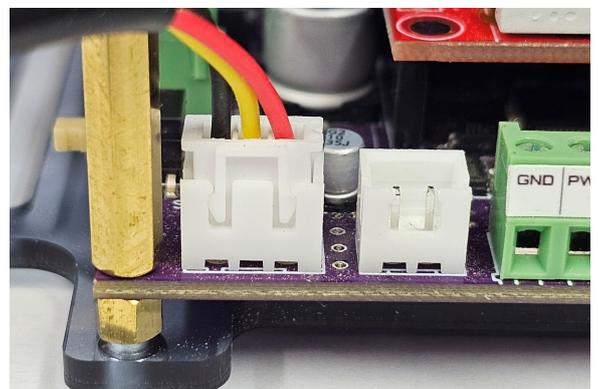
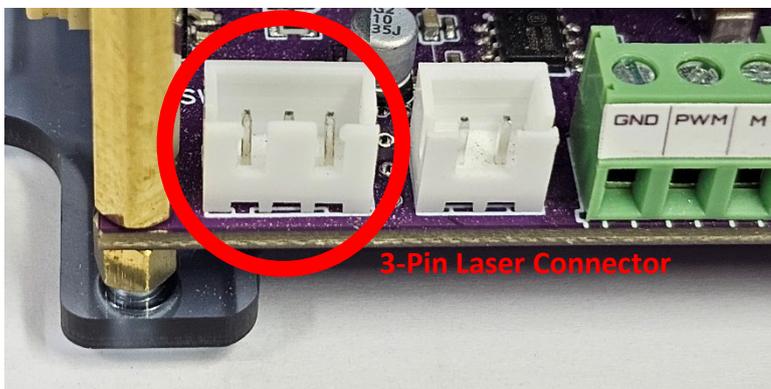


Connect your limit switch wires to the Scribe controller. Each wire is labelled to easily match them to the connector. Polarity isn't important however you can follow the red and white stickers for easier attachment. See pictures below as a reference.



Connect your laser wire to the Scribe controller. This wire is labelled to easily identify it. This will plug into the 3-pin laser connector on the Scribe. The connector will only go in one way! See picture below as a reference.

Note: You will receive a laser cable and connector even if you did not order a laser. This is for easy installation if you do decide to add a laser at a later date.



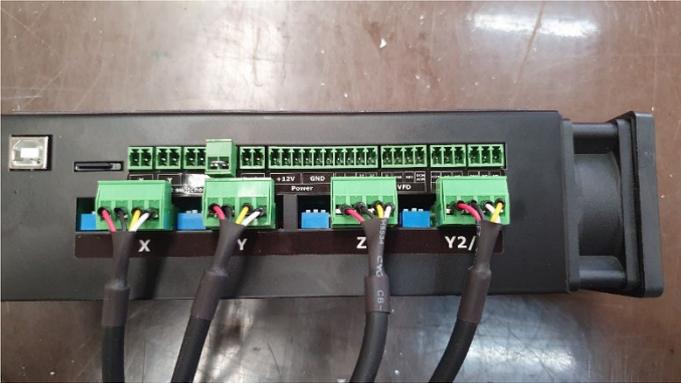
You can now skip ahead to page 27

Nighthawk CNC Controller

Connect your Motor wires to the Nighthawk Controller. Each wire is labelled and will fit into its corresponding plug on the Nighthawk Controller; See images below as a reference.

YouCarve V1 ONLY: The single plug on the line above the motors in the A limit slot should already be installed into the Nighthawk. If it is not it may have fallen out in the packaging. If you have not received one, please contact us at cnc3d.com.au.

YouCarve V2 ONLY: You will not have a green plug with a jumper, your Y2 Limit Switch cable will plug into the A-Limit slot instead.

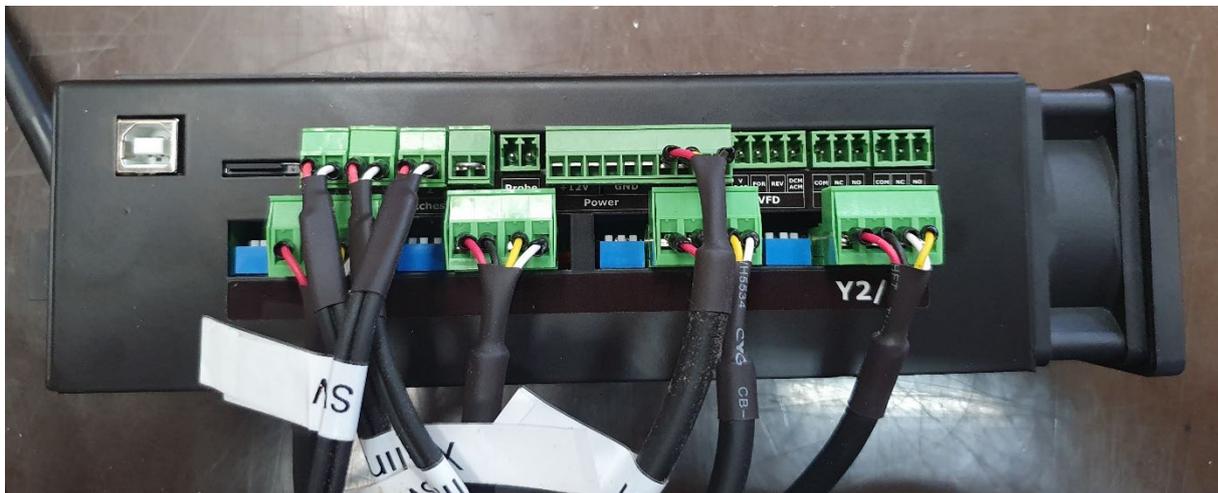


YouCarve V1



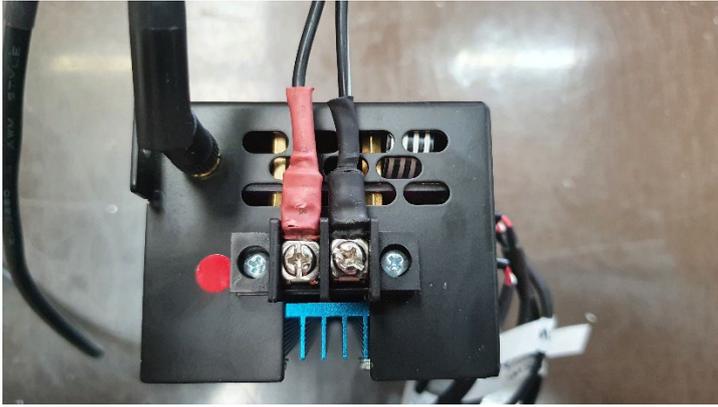
YouCarve V2

Connect up your limit switches and laser connector to the Nighthawk controller. **You will receive a laser cable and connector even if you did not order a laser. This is for easy installation if you do decide to add a laser at a later date.**



YouCarve V1 version shown – YouCarve V2 will not have the silver wire in the A-Limit Connector

Your Nighthawk controller should come with the power cable already connected, if it has not then now is the time to connect it. You will see one red wire and one black wire with fork terminals on the ends. The **red** is the **positive** and black is the negative. The **red** wire will connect to the screw terminal closest to the **red** dot on the case. See images below.



Your YouCarve frame and electronics are now assembled!

Your next step is to install the CNC3D Commander software, set up your controller and get your machine moving!

Head to [cnc3d.com.au/commander](https://www.cnc3d.com.au/commander) to download CNC3D Commander

Head to <https://www.cnc3d.com.au/scribe> to get to the Nighthawk Controller section of our website for the user manual as well as support links and downloads to make your Nighthawk talk to your computer.

Connecting to Your Controller

There are multiple options that you can use to connect to your controller – USB, WIFI and Bluetooth. *You will need to use the included USB cable to set up a wireless connection, then unplug it and put it away.*

Note: These connections are the same whether you have a Nighthawk or a Nighthawk SCRIBE

USB (Not Recommended Outside of Initial Setup)

Your first instinct may be to use USB however this is the **least reliable way** to control and run your machine and it is heavily discouraged! While it's running the router will create lots of Electromagnetic Interference (EMI) and electrical noise which can cause the USB connection to drop out resulting in random job stoppages or irregular machine behaviour.

WiFi (Best Option)

The best possible way to run your YouCarve is via WiFi and connecting the machine to an existing WiFi network such as a house or factory network.

The next preferable option is WiFi – Direct Access Point Mode which allows you to connect directly to the Nighthawk instead of connecting the Nighthawk to an existing network. This will be the best option if there is no network in the area where your YouCarve is located or if you are using a mesh network/WiFi range extenders as the Nighthawk cannot connect to these networks. This works the same as connecting to a network, but the drawback is that the computer running the machine will not have access to the internet while running the machine.

Bluetooth (Backup Option)

The third option is connecting to the Nighthawk via Bluetooth from a compatible PC or Laptop (not a smartphone!)

Bluetooth works the same as USB without the physical cable so it will eliminate the risk of EMI and unpredictable machine behaviour.

For more information about Nighthawk connections including detailed instructions, refer to your controller's manual which is available in the "Help" section of our Commander software.

Check out this video to learn how to set up each of these connections through our Commander software

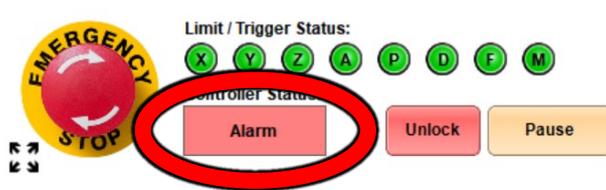
<https://www.youtube.com/watch?v=k07Qwe4IduU>

"CNC Tech-Tip: Setting up WIFI" on the CNC3D YouTube Channel

Commissioning Checks

Before continuing through this manual, make sure you have set up your preferred connection method in the step above as you will be using it from now on!

Once powered on and connected to Commander, you will see a flashing Alarm icon in the bottom-left of the screen. This is entirely normal, and you will see it every time you power the machine on; it simply means the machine hasn't been homed yet.



Alarm will flash every time you turn on the machine

Homing Cycle

Homing is the process the machine uses to find out where it is in physical space, and it will need to be done ***every time you power on the machine.***

To tell the machine to home, click the 'Home Machine' button in Commander. When pressed, the cutting head will move to the Top-Front-Left corner of the machine and trigger the limit switches.

If something doesn't seem right with the machine while it is moving, immediately press the E-stop button via our Commander software.

Gantry Squaring

Regardless of which model YouCarve you have, it is a good idea to check the squareness of your gantry after the initial homing cycle.

Refer to Page 40 of this manual for instruction on how to measure gantry squareness and correct it if needed.

Surfacing your spoil board

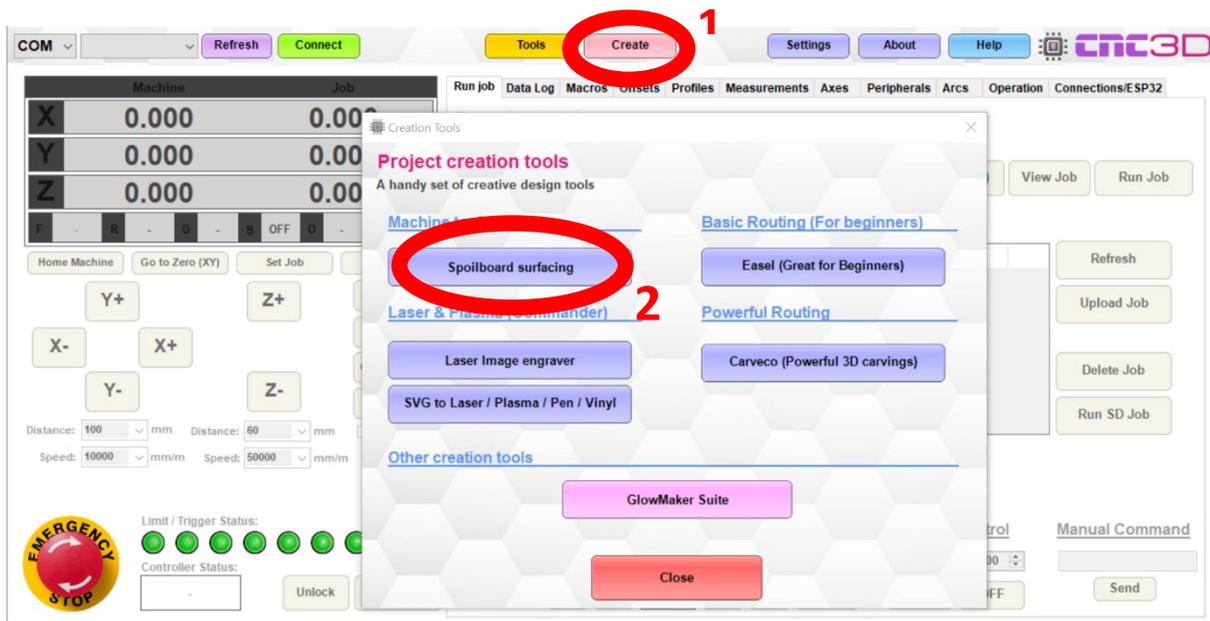
It is highly recommended to surface the top of your spoil board. Surfacing the entire working area means that your tool will always be perpendicular to your cutting tool.

Please Note: If you are installing T-tracks on top of an MDF bed, install the tracks and the slats between them before surfacing the top layer. The MDF bed should remain flat and smooth for your T-tracks to rest on.

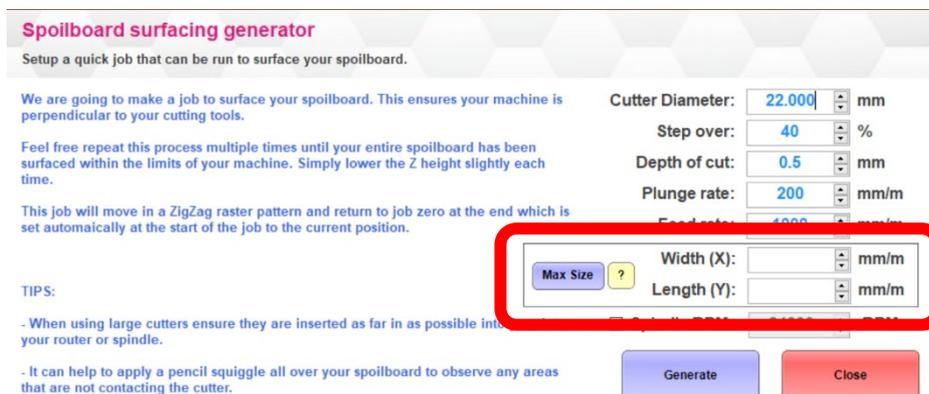
To do this, follow the steps below for making a rectangle the size of your actual working area.

The example photos below show one of our QueenBee CNC machines, however the process is exactly the same for your YouCarve!

First, connect to your Nighthawk controller and home the machine to clear the alarm. Next step is to open the Create window and select Spoilboard Surfacing.



In the Spoilboard Surfacing Generator window that has opened, there is a highlighted box with a Max Size button. When you click this button, it will insert a number into Width (X) and Length (Y). These numbers are mathematically calculated based on numbers that are saved on your Nighthawk controller and will be unique to your machine. You should not need to make any more adjustments to any of these settings.



When all your numbers have been entered, click Generate and save the file that it creates then close the Spoilboard Surfacing Generator and the Create window.

Running the Job

To do this you will need to home your machine. Once homed, loosen off your collet nut on your router and insert the ¼ Inch (6.35mm) collet and 22mm surfacing bit provided with your YouCarve (Router Option Only). Please ensure the surfacing bit is inserted quite high into the collet but not all the way in. Once in, tighten the collet nut up.

Pro Tip: Extreme force is not required to tighten your collet nut. Just make sure it is secure. Tightening it too much can damage the collet or cutter or make it impossible to remove to change the tool!

If you ordered one, attach your dust shoe and vacuum hose at this time as well.

Use a marker or pencil to squiggle some lines all over your spoil board. This will allow you to tell if the surface has been machined or not. See photo below of areas that were missed on our first pass trying to surface the spoil board.



Using the jogging buttons in Commander, put a piece of scrap paper under the surfacing bit and lower the Z down until it is just touching the paper. Ensure to reduce your downward travel distance as you get closer to the surface to ensure the machine does not crash into the spoil board.

	Machine	Job
X	0.000	0.000
Y	0.000	0.000
Z	0.000	0.000

Feed: 0 mm/m Speed: 0 Buffer: 0%

Home Machine Go to Zero (XY) Set Job Zero Job

Y+ Z+ My Buttons

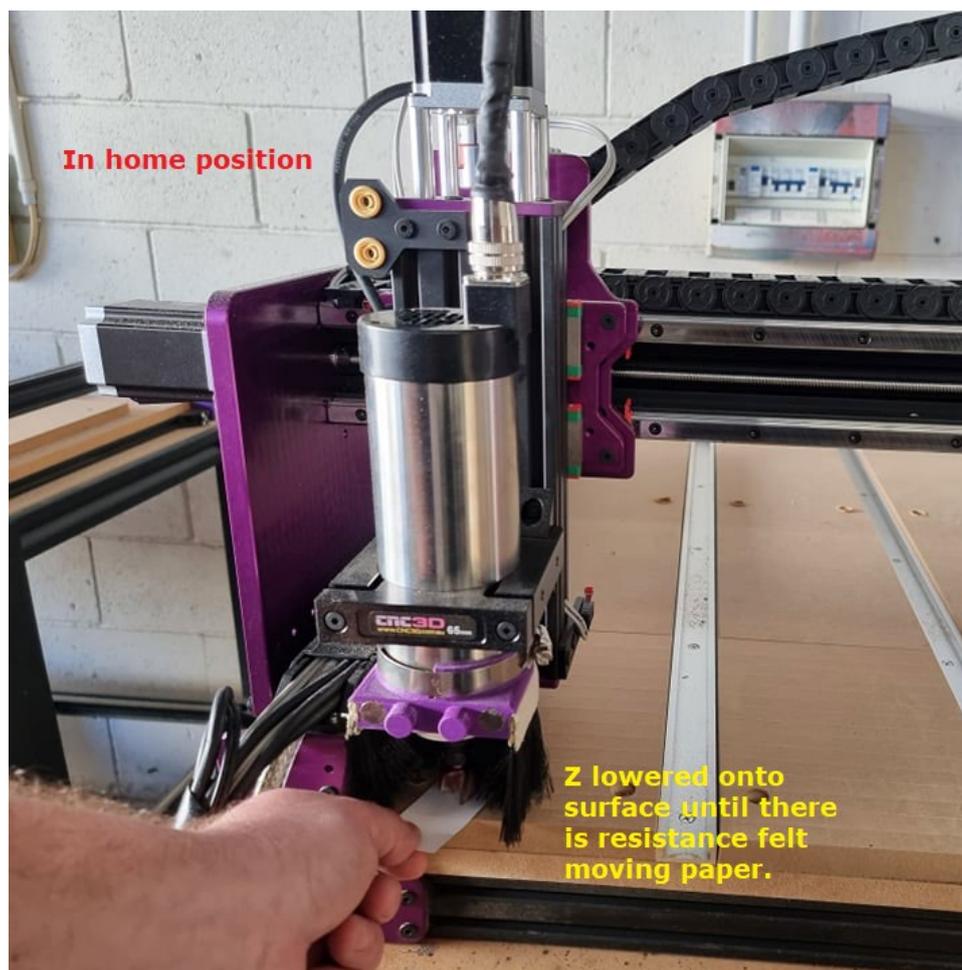
X- X+ **Lowers Z** Probing

Y- **Z-** Coolant Flood

Distance: 100 mm Distance: 100 mm **Distance**

Speed: 100 mm/m Speed: 10 mm/m

Once you feel resistance when moving the paper around you can remove the paper and discard it.



From here it is now time to upload the job and get it started!

There are two different methods depending on how you are connected to your Nighthawk. If you are connected via WiFi then please skip ahead to page 34.

Connecting to your Nighthawk via USB (Not Recommended) or Bluetooth

Back in our Commander software, Click the “Zero job” button then click on Load Job and select the file you saved out of the surfacing wizard. Once loaded, turn on your router and wait until it is up to speed. Once at speed, turn on your vacuum extraction (if attached) and hit the ‘Run Job’ button. See sequence here:

The screenshot shows the CNC3D Commander software interface. The top menu bar includes 'Run job', 'Data Log', 'Macros', 'Offsets', 'Profiles', 'Measurements', 'Axes', 'Peripherals', 'Cornering', 'Operation', and 'Connections'. The main panel is titled 'Run a G-code job' and contains the following instructions:

1. Load a G-code file from your PC (Not recommended on Bluetooth or Wifi)
2. Run a job stored on the SD card storage of your Nighthawk CNC / ESP32 Controller
3. Turn on spindle
4. Turn on vacuum
5. Run Job

The 'Load Job' and 'Run Job' buttons are highlighted with red boxes. The left sidebar shows machine status (X, Y, Z axes at 0.000), a 'Zero Job' button, and an emergency stop button. The bottom section contains 'Immediate Overrides' for Feed Rate and Spindle, and 'Spindle Control' with ON/OFF buttons.

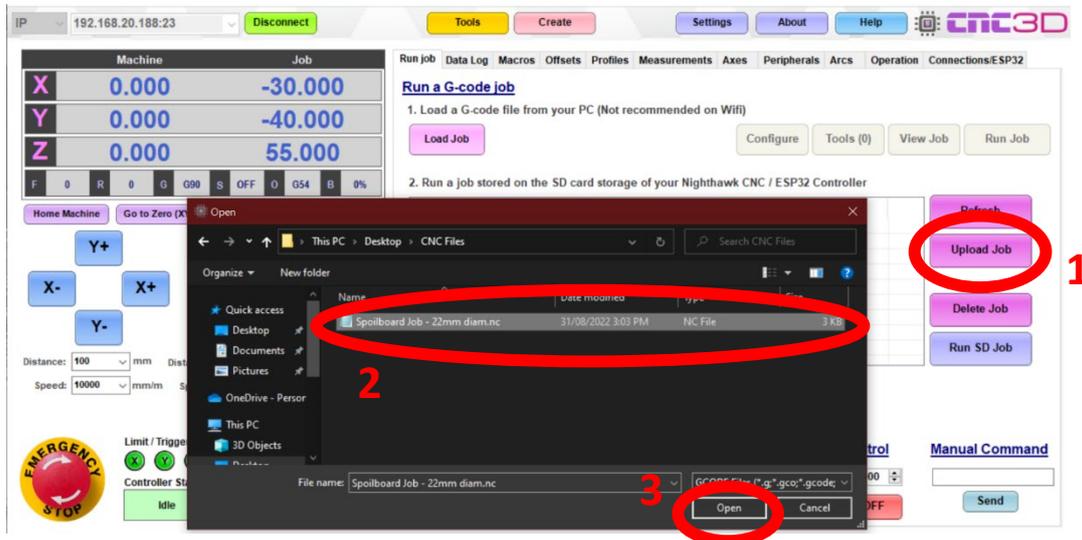
This will start the process of surfacing your spoil board. It may take a long time to complete this process. If something doesn't seem right, immediately hit the E-stop button on your Nighthawk or via our Commander software.

Please Note: Using the E-stop on your controller or via our Commander software will only stop your machine moving but will not stop your router, you will need to turn the router off manually!

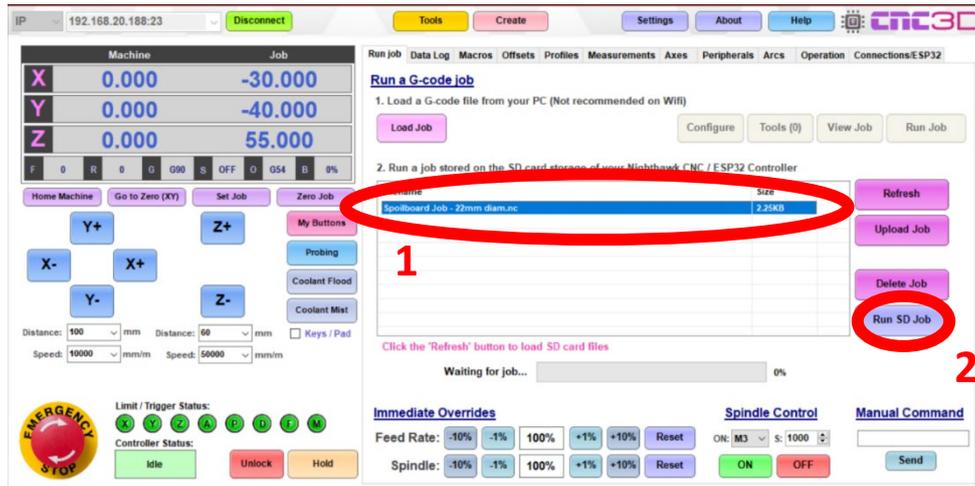
Once the job is complete check to see if all the squiggles on the bed have been machined off. If not, repeat the process again 1mm lower than last time until the entire area is surfaced.

If you are connected to your Nighthawk via WiFi (Direct or Existing Network)

Back in our Commander software, Click the “Zero Job” button. Next, click on the “Upload Job” button, navigate to the location of the job file you just saved and select the correct job file, then click “Open”, this will save the job to the SD card in the Nighthawk Controller. When the upload is successful there will be a popup box to confirm, which you can click OK on to close.



You're now ready to run the job! Attach your vacuum hose to the dust shoe, turn on the extraction system, turn on your router and wait until it is up to speed. From there, all you need to do is highlight the spoil board job in the list and click “Run SD Job”



This will start the process of surfacing your spoil board. It may take a long time to complete. If something doesn't seem right, immediately hit the E-stop button on your Nighthawk or via our Commander software.

Please Note: Using the E-stop on your controller or via our Commander software will only stop your machine moving but will not stop your router. You will need to turn the router off manually!

You may need to turn the controller off and back on after using the E-stop button in Commander or on top of the controller. The E-stop causes the controller to reset as it's the fastest way to stop machine motion.

Once the job is complete check to see if all the squiggles on the bed have been machined off. If not, repeat the process again 1mm lower than last time until the entire area is surfaced.

SOME GREAT NEWS!

The process you have just followed is how every job will be run!

You will be running all future jobs like this.

Saving this handy spoil board job will make it easy next time you want to freshen up your surface OR after you replace your spoil board.

Getting Started With Your Laser

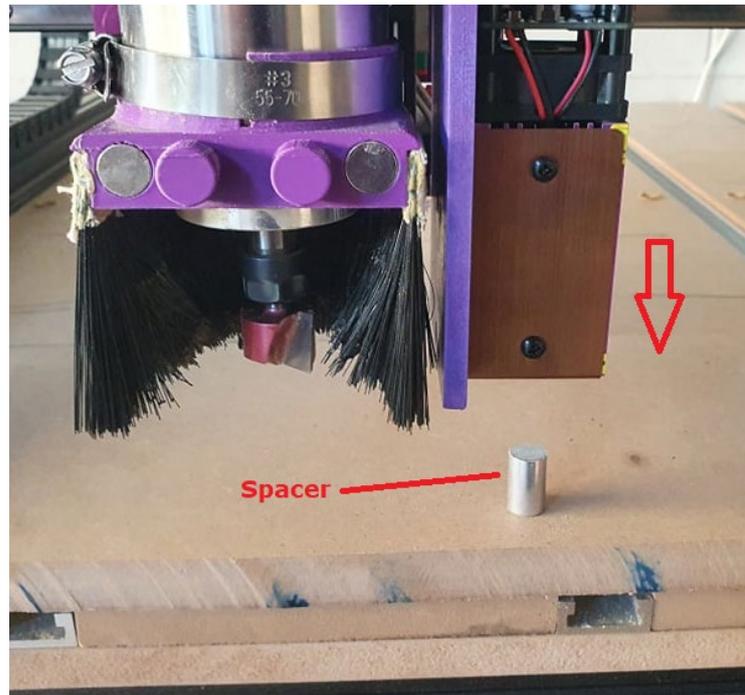
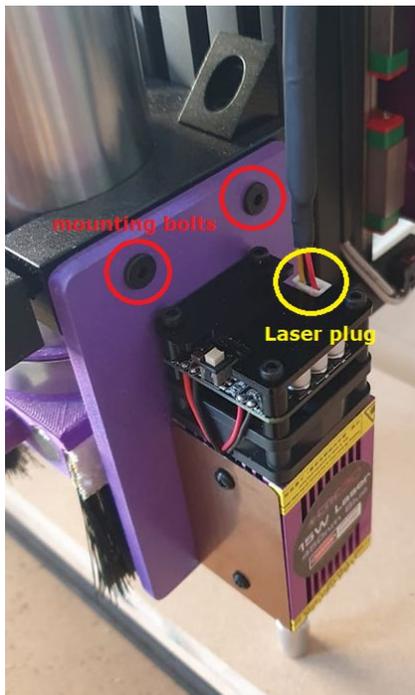
LASER SAFETY WARNING!



Always ensure you are wearing laser safety goggles and other appropriate PPE when using any high-powered lasers. Please ensure the laser is pointing away from people and sensitive materials.

Remember when plugging in or unplugging any wiring INCLUDING the white laser connector, it is vital to ensure the machine is NOT turned on. So called “hot-swapping” can cause irreparable damage to the laser or the Nighthawk Controller!

1. Raise your Z-axis high enough so that you can fit the laser to the side of the Right-hand side of your router bracket. Use the 2 bolts provided to secure it to the bracket. We always recommend fitting it to the right-hand side so you can still safely home when the laser is attached. **POWER OFF YOUR MACHINE** then connect the white laser plug to the top of the laser.
2. Once firmly attached you can power up the machine and connect to it in Commander remembering that you will need to re-home it before being able to jog any axis. Use the alloy spacer provided with your laser to set the correct focal point of the laser. To do this, position the spacer under the laser head and carefully lower your Z axis until the brass laser head is just clearing the alloy spacer. Take care not to damage the laser by crashing into the spacer!



We recommend following our video guide here for using your laser:

<https://www.youtube.com/watch?v=8Syf86xmeZs&t>

"Setting up and using a Laser on GRBL" on the CNC3D YouTube Channel

Pro Tip: Always remove your laser when cutting with your router and never leave your machine unattended when the laser is running. Ensure you have adequate extraction to your work area as laser can produce harmful fumes when operating.

You have now completed your machine assembly and installed your router. It's time to start making things!



For more information or if you encounter any problems during setup, reach out to our friendly support team at [CNC3D.com.au](https://www.cnc3d.com.au) or via phone at +617 5522 0619

You can also join the conversation by going to our [Facebook Group!](#)

Maintenance Guide

Maintaining your YouCarve CNC is crucial to keep it working as intended and to ensure it is cutting accurately.

Our CNC3D Commander control program will remind you every 3 months to perform maintenance on your machine.

Maintenance is very simple and will follow a lot of the same procedures you would have done to assemble the machine in the first place.

You will need:

2mm Allen key

2.5mm Allen key

3mm Allen key

8mm spanner

10mm spanner

Small flat-blade screwdriver

1. Check ALL the nuts and bolts on your machine.

Visit all the nuts and bolts on your machine. Test each bolt and tighten them if they are loose. This EXCLUDES the bolts on belt tensioners and the locking collars on the Z axis leadscrew. Please see the next section below regarding belt tensioning and Z axis lead screw adjustments.

It is important to ensure your machine frame stays square when making any bolt adjustments. Please refer to the machine squaring guide in the instructions above for doing this.

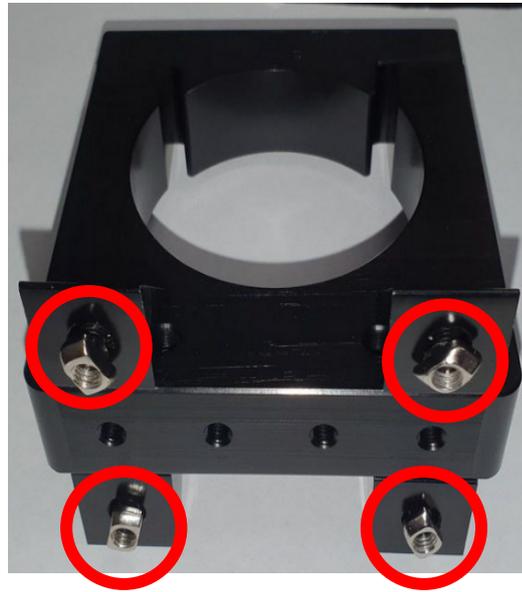
Pro Tip: When tightening any Allen key bolts it is recommended to use a solid Allen key end not any ball end side of an Allen key or you run the risk of stripping the bolt heads.

2: Check tightness of bolts on the router mount

These bolts are the most likely to loosen off over time as they are exposed to a lot of vibration and stress from the router running and cutting into your materials.

Using your 3mm Allen key simply check and tighten if needed the 2 bolts that go through the front of the router mount as well as all 8 of the bolts in the black angle brackets that hold the router mount to the Z-axis.

See photos on next page for example.



3: Check to make sure your gantry is square.

It is important to ensure your machine frame stays square. Using a set of callipers or a ruler, make sure both sides of the machine are an equal distance from the front.

To do this, home the machine, then measure from the gantry riser plate to the front plate. Repeat the same process on the other side of the machine and record the results.

If one side is more than 1mm out from the other side, you need to manually turn the motor on one side of the machine until it is within 1mm of the other side. Make sure to only turn the motor from the motor coupler, never the ballscrew. *You will likely need to power off the machine to allow you to turn the motor by hand.*

It's recommended to only adjust the right side (Y2) and use the left side (Y1) as the reference.

You can look at repeating this simple process daily or every 1-2 weeks. The more frequently it is performed, the better your machine will operate.

Nighthawk SCRIBE

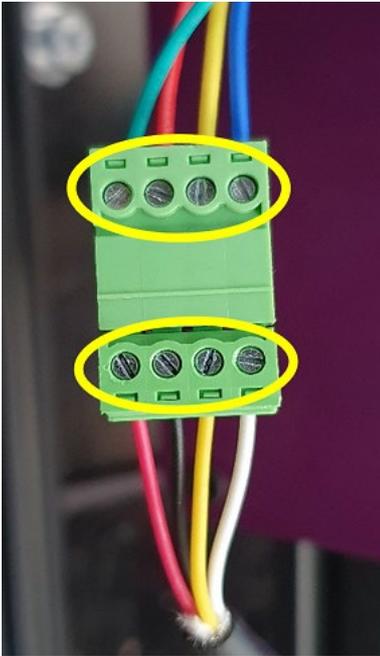
YouCarve machines received after October 2023 or fitted with a Nighthawk SCRIBE are single axis homing, it is recommended to occasionally check your gantry squareness after homing and making some slight adjustments to the position of your limit switches if your gantry is not completely square. Ideally, a squareness of less than 1mm is recommended.

Nighthawk

3-axis YouCarve machines received after January 2023 and fitted with a Nighthawk controller are set up for dual axis homing from the factory, though it is recommended to occasionally check your gantry squareness after homing and making some slight adjustments to the position of your limit switches if needed. Ideally, a squareness of less than 1mm is recommended.

4: Check all green connectors and wiring terminals

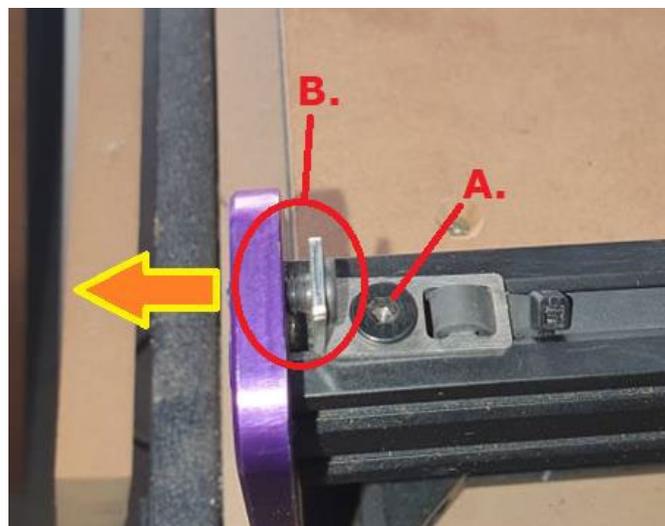
Check every green connector and its screw terminals with a screwdriver and ensure they are tight and secure. Give each wire a tug to ensure they are secure and do not pull out of the connector. Your machine may have either type of connector in these photos.



5: Check and set your belt tension

Adjusting your belts is critical to the performance of your machine and it may be required to adjust your belt tension a few times before the belts eventually settle at their maximum stretch.

We have left a gap at the front on both sides of the Y axis and on the left-hand side for the X axis for adjustment. To adjust your tension, loosen the bolt that goes downward into the extrusion (A) and then you can apply tension using the bolt that goes into the plate (B) to tensions the belts.
See photo below for reference.



How to tell if your belt tension is correct?

Move your machine to one side of the axis you are adjusting. Place your finger on the belt somewhere near the middle of the machine so it presses into the channel and quickly lift your finger. If the belt springs back to its initial position without wobbling your tension is fine. If you notice the belt wobbles once it returns to its normal position, you need to adjust your belt tension until it immediately springs back to its normal position without wobbling.

Make small adjustments at a time and repeat the finger test until it returns as it should.

Ensure to check all belts on your machine, 2 belts for Y axis and 1 belt for X axis.



6: Check Z-axis leadscrew for tension

Unlike the X and Y axis which are belt driven, there is an 8mm leadscrew that controls your Z axis motion up and down. It is held captive on the Z axis by 2 locking collars and 2 radial bearings with 8mm shims in between (One on each end). The Z motor is coupled directly to the leadscrew via a coupler.

Try grabbing your Z axis with your hands and try to move it up and down. If it feels like it's slipping and rocks up and down, then you may need to tighten your locking collars and reposition them.



Z axis NOT rocking up and down?

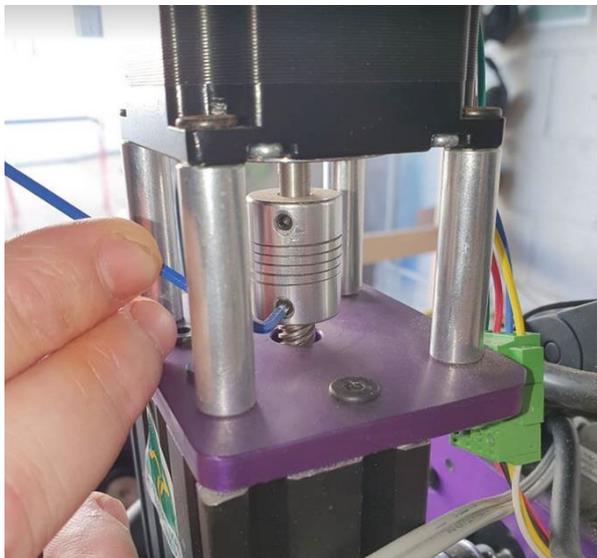
Awesome! It's likely your Z axis is fine, and you can skip the adjustment step below but it's still a good idea to check the locking collars and motor coupler are secure using your 2.5mm Allen key.

The Z axis IS rocking up and down?

If you DO have play in your Z axis, then we need to resecure the locking collars. To do this, we need to make sure first that the motor coupler is secured to both the motor shaft and the lead screw.

Step 1: Using a 2.5mm Allen key, tighten the grub screws on the motor coupler.

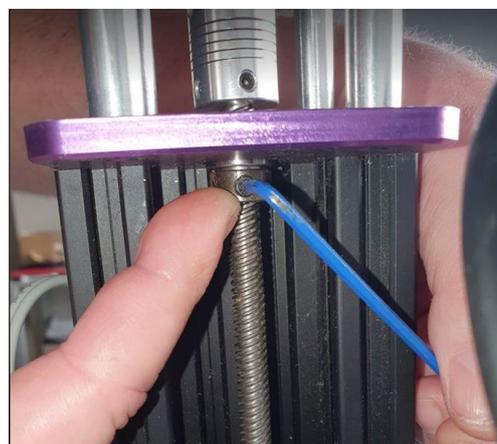
Please Note: you may have more than one grub screw on each side of the coupler, make sure both are tight and ideally ensure the flat section of your motor shaft is directly under one of the grub screws.



Step 2: With the motor coupler tight loosen the locking collar on the bottom of your Z axis and use your finger to put downward pressure on it before locking it in place securely using an Allen key. Once the bottom is tight repeat the process on the top locking collar but force the locking collar upwards towards the motor with your finger. This should put compression on the bearing and shim. The bearings on both top and bottom MUST sit in the recess in the plates to secure the leadscrew correctly.



Securing the bottom locking collar



Securing the top locking collar

This will secure your Z axis so that it doesn't rock.

7: Check your wheels are correctly tensioned.

The YouCarve V2 uses polycarbonate wheels that run in the extrusion channel to control the motion of the machine. It is important to make sure you have the right amount of tension on the wheels to ensure everything runs smoothly.

Wheel tension is controlled via the use of eccentric spacers. Eccentric spacers have an off-centre hole for adjusting how much pressure they apply onto the extrusion.

How to check for the right wheel tension?

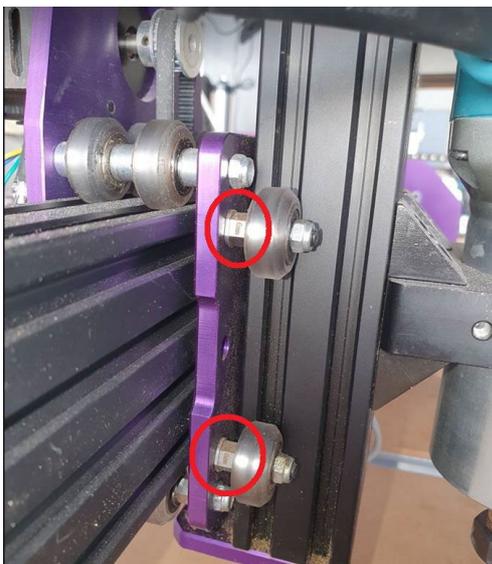
Put your finger on a wheel and try slipping it under your finger. With a small amount of pressure, you should be able to slip the wheel on the extrusion like so:



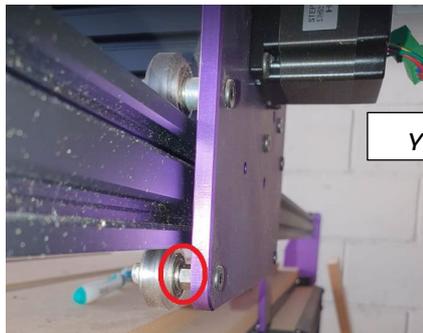
Keep in mind, with a router fitted it can put some forces on the front of the X and Z axis, this can make some wheels feel tighter than others. It's OK for the wheels to have more resistance than others in this case. You can try taking the load off the router by supporting its weight with one hand while testing the wheels with the other.

To adjust your wheel tension, use an 8mm or 10mm spanner and rotate the eccentric nuts so that it applies pressure until the wheels slip on the extrusion with only a small amount of force.

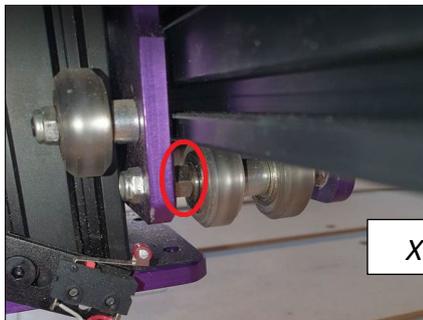
See below for the locations of the eccentric spacers on each axis.



Z axis eccentric spacers



Y axis eccentric



X axis eccentric

It is important to check both sides of each axis for an eccentric spacer and adjust them until the wheel tension is just right. This isn't an extremely precise thing to do but it needs to be within a good range.

You have now completed maintenance on your YouCarve!

Please ensure to follow this maintenance guide when prompted by CNC3D Commander software, if something isn't quite right such as your Z depth being inconsistent, or if your machine isn't cutting perfect circles.

If you have any queries or concerns regarding how to maintain your machine, please reach out to our friendly support team for more info.

Our support team can be contacted via email at solutions@cnc3d.com.au or via our website CNC3D.com.au

Additional Resources

Below is a list of other resources we recommend for further information on your machine use, specific guides/manuals for parts or general tips and tricks for your machine or software usage.

Nighthawk SCRIBE Information

User Manual/USB Driver

<https://www.cnc3d.com.au/scribe>

Nighthawk Information

User Manual / USB Driver

<https://www.cnc3d.com.au/nhc>

CNC3D Commander

Download / Information / Guides

[cnc3d.com.au/commander](https://www.cnc3d.com.au/commander)

CNC3D TV

“How-To” Videos / Video Guides

[cnc3d.com.au/cnc3dtv](https://www.cnc3d.com.au/cnc3dtv)
[youtube.com/@cnc3d](https://www.youtube.com/@cnc3d)

Post Processors

For Common CAD/CAM Software

[cnc3d.com.au/postp](https://www.cnc3d.com.au/postp)

Tool Libraries

Tool Lists for Common CAD/CAM Software

[cnc3d.com.au/tool-libraries](https://www.cnc3d.com.au/tool-libraries)

Facebook User Group

Show Off and Chat!

[facebook.com/groups/cnc3dplayground](https://www.facebook.com/groups/cnc3dplayground)

Support FAQ

Common Questions and Answers

[cnc3d.com.au/forum/support-faqs](https://www.cnc3d.com.au/forum/support-faqs)

Getting Help

We have set up an FAQ page to answer the most common support questions we get asked. If you have a support question this is the best place to start as your question may have already been answered!

Visit our Support FAQ Forum!

cnc3d.com.au/forum/support-faqs

Reach out to our friendly Support team

Phone: +617 5522 0619 (9am-5pm AEST)

Email: solutions@cnc3d.com.au

Website: <https://www.cnc3d.com.au> OR via our Chat.

Facebook: <https://www.facebook.com/cnc3dau>

Our FB Community: <https://www.facebook.com/groups/cnc3dplayground>

We are always looking for feedback! If you have any suggestions regarding how we can re-word our manuals or support pages to make them easier to understand please let us know using the links above!