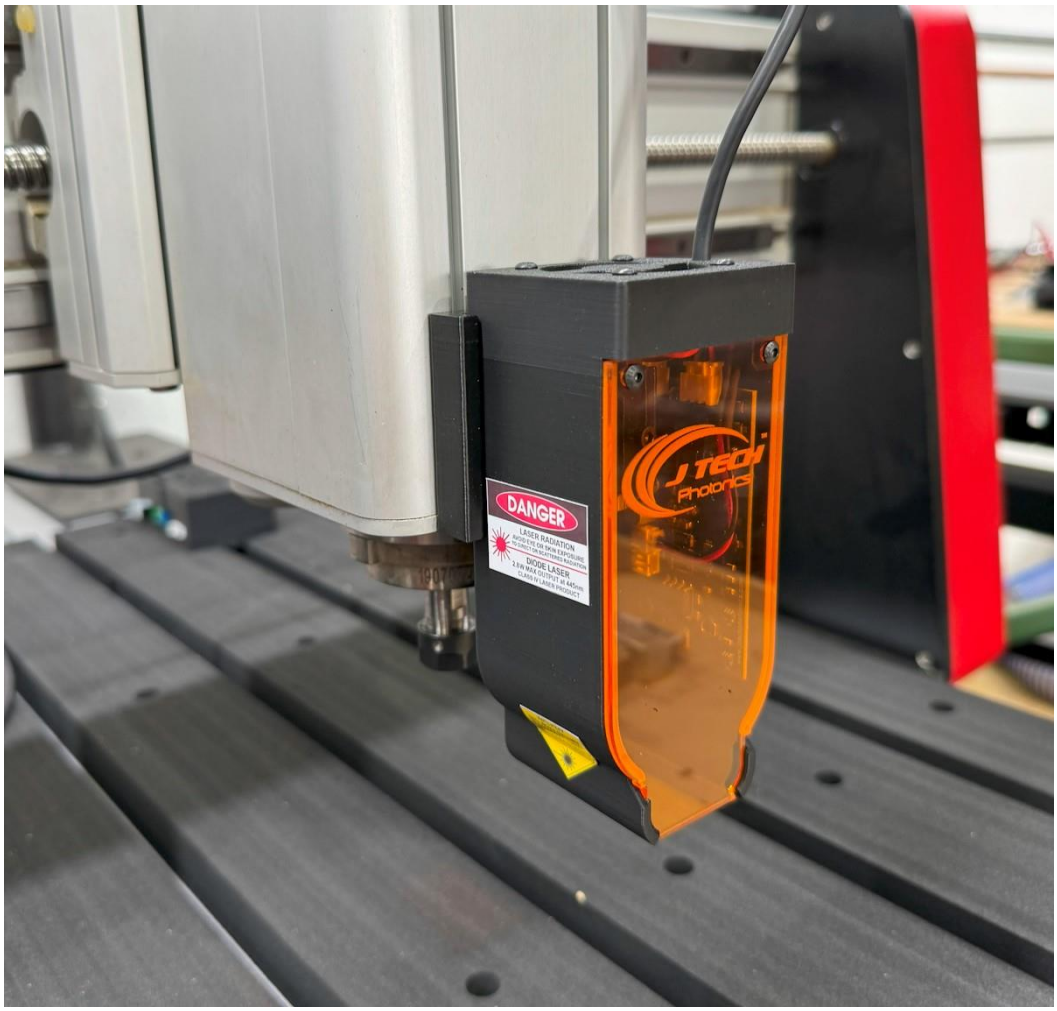


Axiom Precision Iconic 2.8W SI Laser Kit
By J Tech Photonics

Rev. 12/17/2024

GENERAL

This manual covers the installation of the Axiom Precision Laser Kit by J Tech Photonics.
Install videos for this and other accessories can be found by visiting the “Axiom Tool Group” YouTube channel at
https://www.youtube.com/channel/UCQ8U81z1iM_fvE92uGDFAuQ

SAFETY

WARNING!

- When connected the output of the laser can be up to several watts of power. Always use proper safety eyewear and laser safety protection. When operated incorrectly the laser can cause severe damage to eyes and health.
- Never leave the laser unattended when operating. Unexpected operation of the machine can leave the laser in an ON state which can lead to a potential fire.
- Never expose skin directly to laser radiation.
- Focused light will increase the safety hazard.

DISCLAIMER

- All statements of safety are only applied when laser upgrade kit is used in its intended purpose.
- You are legally responsible for any injury to anybody resulting from the use of or assembly of the laser kit or their finished products.
- You Accept this laser kit for integration into your own system and will be legally responsible from any and all LIABILITIES.

AXIOM TOOL GROUP, INC.

State of California Prop 65 Disclaimer

WARNING: This product can expose you to chemicals, including dust from wood, wood byproducts, and a variety of plastics, which are known to the state of California to cause cancer.

For more information, please go to:
www.p65warnings.ca.gov

UNPACKING

Inspect the shipping container for damage.

Verify the contents of the package:

- Axiom Custom Safety Interface Board with Laser/Spindle Switch
- Laser Shroud Housing and Spindle Mount
- Key switches
- 1 Pair of Safety Goggles
- Power Wall Adapter
- Extended cable assembly
- Red Electrical connector
- Sticky tape
- SI board plug in harness
- Magnetic zip tie mount

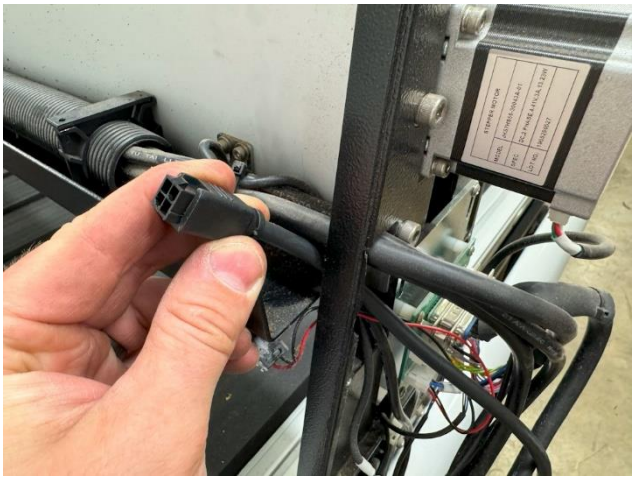
LASER HEAD INSTALLATION

Step 1

Remove the 5 cover screws on the left gantry leg.

Step 2

Feed the cable assembly through the opening on the backside of the gantry following the main cables.



Step 3

Once inside the gantry, the cable assembly will be able to feed through the hole found on the upper backside of the left gantry leg. The cable assembly will follow along the spindle and router power cables.

Step 4

The cables will run alongside the power cables for the router, or the black tube which contains the power cable for the spindle. Using the supplied zip ties, secure the laser extension cable along the upper wire shroud. The laser head will connect to the 4 pin connector. Make sure to check you ran the correct side of the cable through the machine to connect to the laser head.

Step 5

Feed the cable assembly beside the wire shroud under the machine. The laser extension cable will be running parallel with the power cables to the back of the machine, exiting to the rear of the machine. Pull the necessary amount of cable and zip tie it to the wire shroud, so that the connector can reach to the front of the machine.

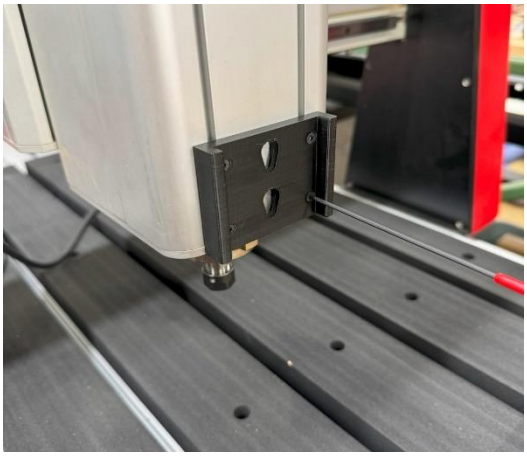
Step 6

The excess wire can be coiled up inside the gantry leg or coiled up next to the control box.

Step 7

The laser head assembly is two pieces and will mount directly in front of the spindle/router motor.

1. Laser Base Plate – This will go on the front of the spindle extrusion.
2. Magnetic Laser Shroud – This will attach to the laser base plate via magnets.



Base Plate Installation: The two T guide pins should fit snugly into the recessed T slots . It will be a tight connection so take your time in getting the base plate completely seated against the spindle extrusion. Once in place, the laser set screws can be snugged down. Make sure the small interlock switch is pressed down after attaching the laser head.

The laser shroud should line up with the base plate. The notches on the side will guiding it into position and it will lock into the screw keyholes by pressing it down.

If you want the laser tighter, then remove the laser and tighten the back screws to achieve a tighter fit into the key holes.

Once mounted, it should feel secure. If it can be moved with a simple touch, then check to make sure the laser shroud is positioned correctly in the keyholes and the cables are all free and clear of any binds. Do not operate until the laser is fully secure.

***** Note: The base plate may be left on the machine when the laser is not being used. It will not interfere with the dust boot or operation of the spindle. *****

Step 8

Use a zip tie to attach the included magnet to the laser head harness.
This will ensure that the wires are out of the way as the gantry moves during operation. Position the magnet so that it makes contact with the black metal cover on top of the machine. Use a Velcro strap to hold the laser wire in place and connect it to the end of the extension cable.

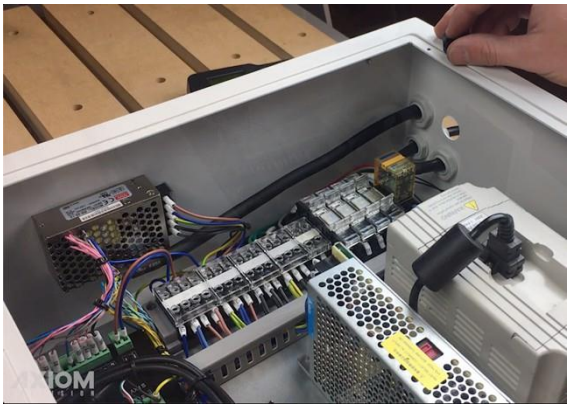
SAFETY INTERFACE BOARD INSTALLATION

Step 1

Remove the cover panel from the white control box, and locate the black insert cap, on the back of the box.

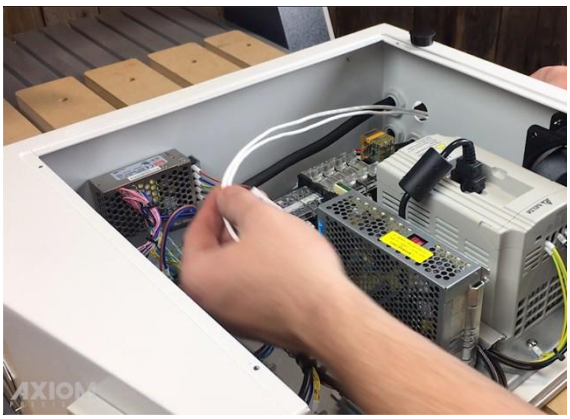
The red/black wires from the Laser control board will feed through this hole.

You may remove the black insert and drill a hole for the wires to feed through if desired. If the cap is not present, DO NOT drill through the box. Instead drill a hole into the cover thus, preventing any metal shavings from entering the box.



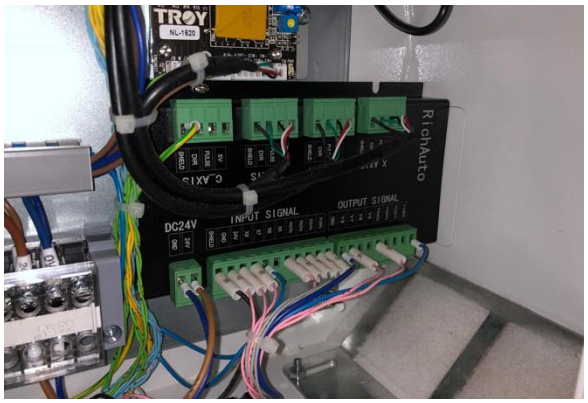
Step 2:

Insert the wires from the Laser control board into the white control box from the back side, through the insert.



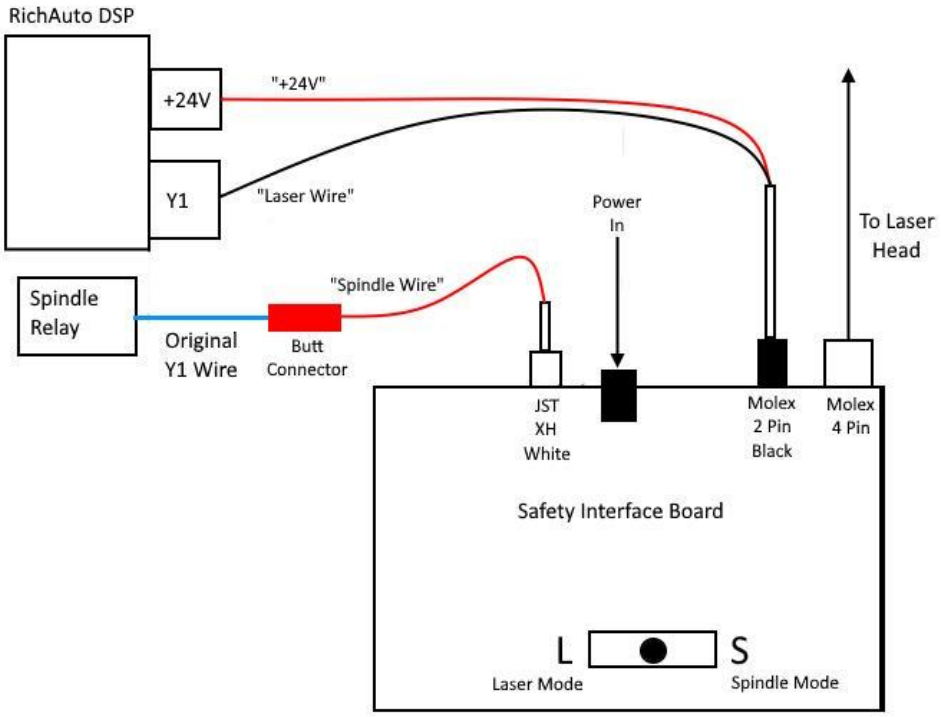
Step 3:

Locate the RichAuto DSP board inside the white control box pictured here.



RichAuto WIRING DIAGRAM

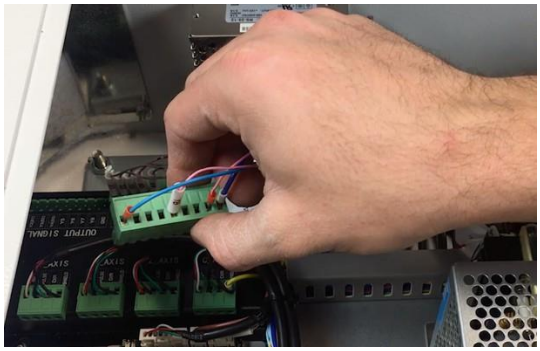
For the next steps, we will be wiring the laser to the RichAuto DSP control board. We will be using the following wiring diagram.



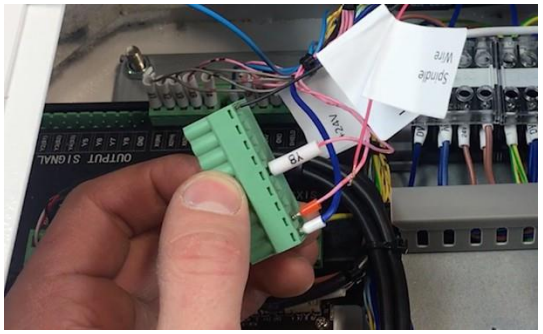
Step 13

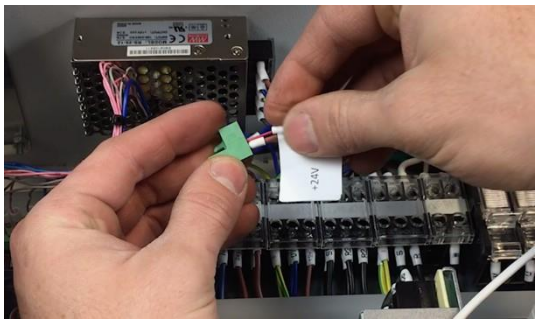
Find the blue wire name (Y1).

Wiggle and pull to remove the green terminal block. Then use a small flat head screwdriver to loosen the clamping screw on the (Y1) wire. Remove this blue wire. We will use it again in another step.



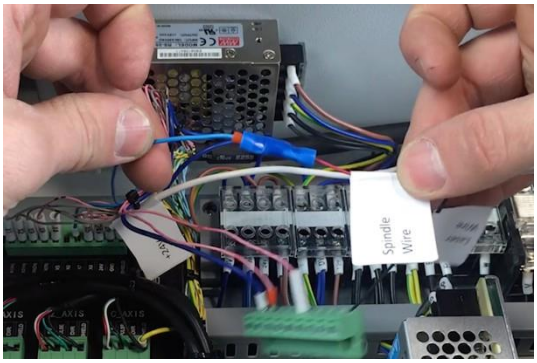
Insert the black lead (labeled “Laser Wire”) from Laser control board into the (Y1) or location and retighten the clamping screw. Be sure that the clamp is tight against the wire, and not on the insulation which will prevent proper signal.





Step 14

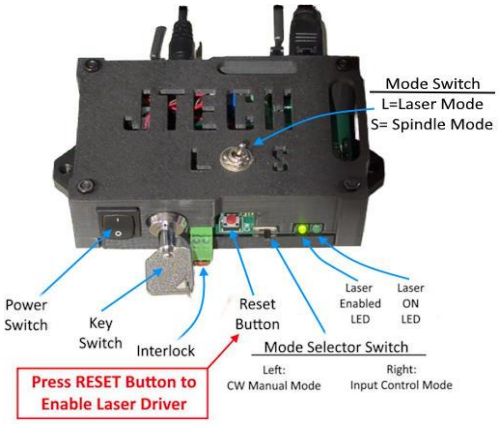
Next, pull the DC24V green terminal block from the DSP board. The RED wire from the laser, labeled “+24V” will need to be inserted into the block alongside the existing wire.



Step 15

The remaining red wire from the Laser control board switch (labeled “Spindle Wire”) will need to be connected to the original (Y1 wire) Use the provided electrical butt connector or a similar connector to join the two wires. Be sure to insulate the new connection if needed to prevent shorts. Electrical tape may be used to insulate the connection.

This connection will allow the toggle switch on top of the SI module to control the flow of power between the Spindle/Router and the laser. In the picture to the right, it is the “Mode Switch”. L is “laser mode” and g code activates the laser. S is “spindle mode” and g code activates the spindle.



Step 16

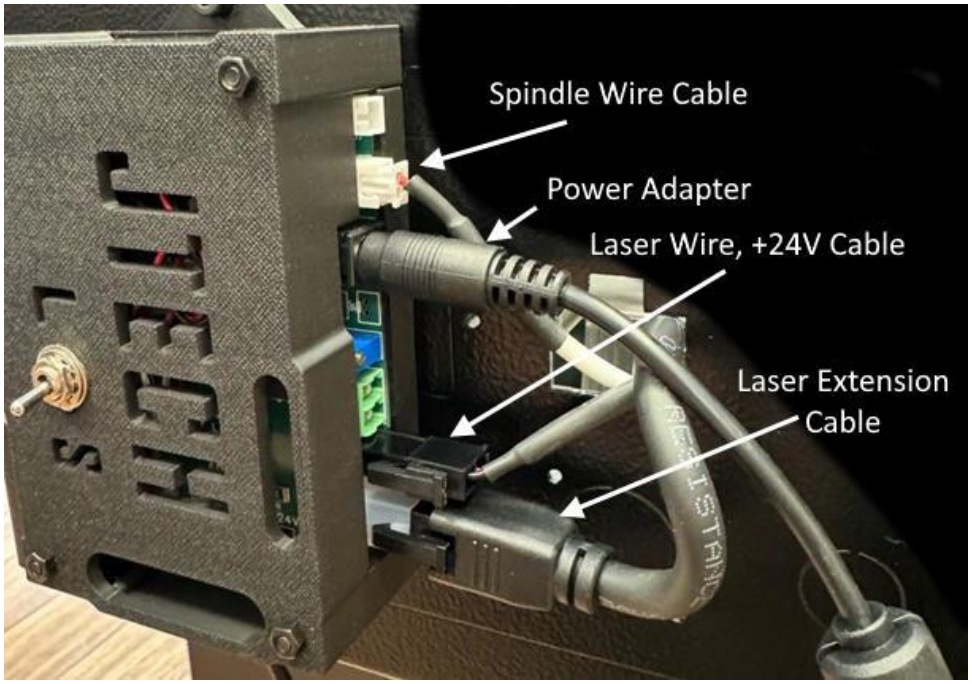
Reinstall the white control box cover and mount the laser board to the top of the white control box. Use the included double sided tape or the built in magnets to keep it secured in place.

The included wall adapter can now be plugged in to a 110 Volt Outlet and then connected to the SI SI module.

Connect the Spindle Wire cable to the small JST housing by the power input.

Connect the black Molex Mini Fit Jr. laser wire and +24V cable into black Molex Mini Fit Jr. connector the back of the SI module.

Connect the 4 pin black laser extension cable to the white 4 pin Molex Mini Fit Jr. connector on the back of the SI module.



Once the wiring has been completed, the excess cable can be pulled through the wire chain then coiled up inside the gantry arm and under the table.

RichAuto Controller Operation (Iconic)

Several configuration changes must be made to your controller pendant to allow the laser to operate properly. Please follow these steps closely to ensure your safety and correct operation of your new laser accessory.

The laser control board will allow the manipulation between the normal Router/Spindle operation and the laser accessory.

The Spindle Delay function will need to be deactivated, when using the Laser.

This function allows the program to pause briefly as the Router/Spindle reaches the correct RPM. Adjustment is needed to prevent the laser from turning on for the same duration and burning the material. To make these changes, please follow these steps:

Press MENU
Highlight MACHINE SETUP and press OK to select
Scroll down and select SPINDLE SETUP
Then select the SPINDLE DELAY
The default setting here is typically programmed to 4 seconds Highlight that setting and press DELETE
Enter 0 Seconds and press ENTER

Use the Stop/Cancel button to go back one screen at a time to return to the main coordinate screen.

INPORTANT - This setting will need to be returned to the Default 4000 Microseconds prior to resuming normal Router/Spindle operation.

The G-Code settings within the controller need to be verified for the correct function of the Laser On/Off process. To check these settings, please follow these steps:

Press MENU
Highlight AUTO PRO SETUP and press OK to select Scroll down and select GCODE SETUP
Scroll down to the SPINDLE
The setting here should be set to NTLLG
IF the setting is anything else:
Highlight that setting and press DELETE
Highlight NTLLG and press ENTER

Again use the Stop/Cancel button to go back one screen at a time to return to the main coordinate screen.

Important Post Processor Information:

With the purchase of the J Tech laser accessory, there will also be a new Post Processor that will need to be installed into the VCarve or Aspire software.

Attached to the original invoice/tracking information for your order is a download link for the required post processor to use within the VCarve or Aspire software.

Be sure when saving the your files to use with the correct post processor.
If you have not received this file, please contact Axiom Tool Group by calling 844-642-4902, or by email: support@axiomtoolgroup.com
Or simply download any of our available post processors by visiting: www.axiomprecision.com/post

Installing Post Processors (VCarve or Aspire)

To load these Post Processor files: (VCarve or Aspire)
Open the software, click File and select to Open "Application Data Folder".
Click and drag, or copy (Crtl+C) and paste (Crtl+V) the files into the PostP folder.
Once you have moved the file …if the software is currently running you will need to close and restart it before it will appear in the Post Processor list when saving your toolpath/s.

On initial startup of the laser system, you will need to perform the following steps.

1. On the front of the SI module controller, press the small red RESET button. This will reset the laser interlock.
2. Insert the key and turn it to the right.
3. Press the power switch to ON.

The laser fan will start to run and the left green LED will light up showing the laser is ready.

The mode selector switch should be switched to the right to accept signals from the controller.

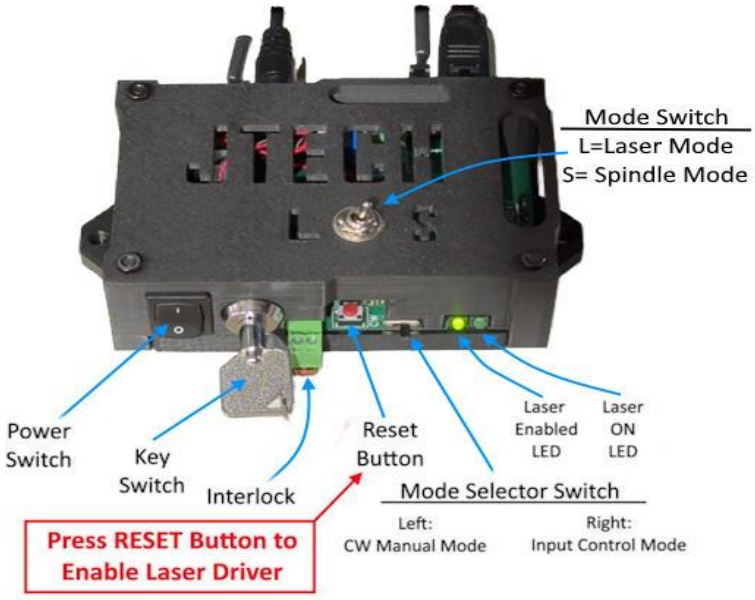
If you want to manually turn on the laser, turn the switch to CW manual mode on the left.

Note: The laser will only fire when it is pointed down towards the work surface.

For more information, visit our documentation page here:
https://jtechphotonics.com/?page_id=602

For troubleshooting information visit:

https://jtechphotonics.com/?page_id=8541



Setting origin:

You may find it easiest to loosely fit a V bit into the spindle, which will act as a pointer when setting the XY-0 (ORIGIN). The distance between the laser and the center of the bit is approximately 70mm. Lower the bit to the designated ORIGIN location and set the XY-0. Then use the controller to manually move Y+ (70.00mm) to position the laser over that same point. Press XY-0 again to set the ORIGIN for the laser.

NOTE: 70mm is an approximate offset distance. Which may vary laser to laser. To find the exact offset see the steps below under offset calibration.

Since this laser has a 4" focal length (measured from the body of the laser, not the lens) the gap between the material and the laser shroud should not exceed 1/8". Jog the shroud to the correct operating height, and depress Z-0 to set. You may use the included Z set up chip to help with this operation. Remember your Z origin should always be set to the top of your material in your initial design set up.

Finding your lasers offset

The offset from the center of the spindle to the center of the laser should be roughly 70mm. It is recommended that you find your lasers exact offset. After you have found your lasers offset take note and use those settings when setting up your laser. Use the following steps below to find your offset.

Begin by securing a scrap piece of material to your table. Attach the laser head and set it to the proper focal length above the material. Using the Spindle button on the controller quickly turn the laser on and off to allow it to just mark your material. Be sure not to jog the machine in the X or Y axis. After a visible mark has been made set this position to 0.0 for X&Y by pressing the XY-0 button on the controller. Remove the laser and insert a V bit into the spindle. With the V bit inserted jog the machine in either X or Y until the V bit is over the mark made by the laser. Now looking at your controller take note of the new numbers displayed. These will become your new offset setting. The numbers for the Y direction will display as -Y, but will need to be changed. When setting your offset you will want to change this to +Y for example if your controller reads Y -68.500 & X + 1.500 then the new offset will be set at Y +68.500 & X +1.500 when setting up your laser.

Tips for Laser operation:

Note: Vectric's Laser modular will not support the use of your J Tech laser.

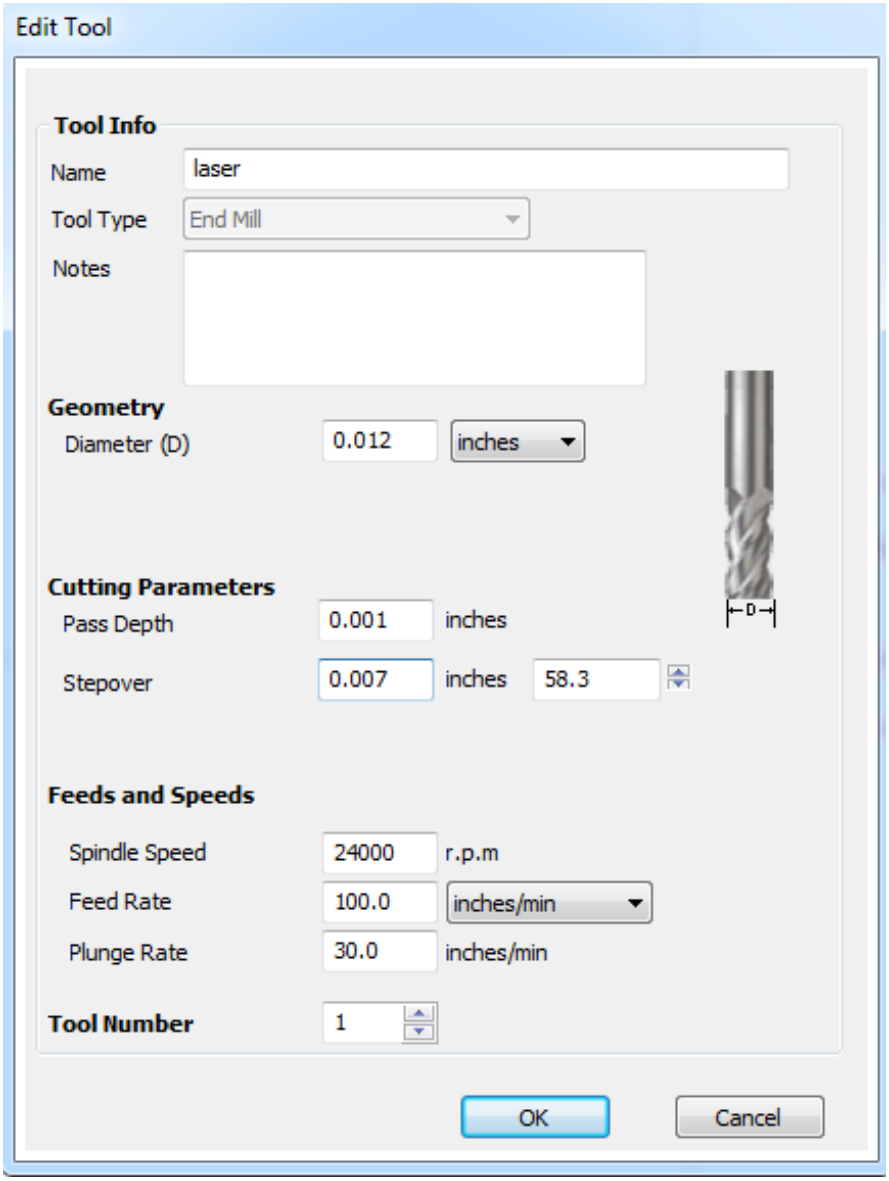
We recommended that you use the Quick Engrave tool path with the following settings:
Hatch Angle = 45deg, Fill option selected
Feed-rate = 70 inch per minute
Set the Laser shroud to approx. 1/8" from the surface of the material for optimal focal length. Beam diameter at optimal focal length = .012"

When engraving, set feed rate to 50-125ipm (Inch Per Minute) When cutting, set feed rate to 5-10ipm (1/8" thick material at most)

It is required that a new tool is created within the tooling library and labeled as Laser. A standard End Mill is ideal with a diameter of 0.012" and a pass depth of 0.001"
Stepover can vary, to allow lighter or darker fill and can be adjusted within the Quick Engrave tool-path. During testing a 75% step over was used with great results* (See image on next page)

Additional setup recommendations and support are available at https://jtechphotonics.com or be sure to Subscribe to the Axiom YouTube channel for setup and training videos.


Toolpaths
Quick Engrave
Tool: laser
Select ...
Edit ...
Depth / Pressure
0.0
inches
Outline
Fill
Stepover
0.0
inches
Offset
Hatch
Hatch Angle
45.0
degrees
Cross Hatch
Use Nose Cone
Tool Depth
0.02
inches
Number of Passes
1
Safe Z
0.2 inches
Home Position
X:0.00 Y:0.00 Z:0.80
Vector Selection:
Manual
Selector ...
Name:
Quick Engrave 2
Calculate
Add side to toolpath name
Post Processor
Axiom HHC LaserV2(mm) (*.mmg)
Output direct to machine
Driver:
Save Toolpath(s) ...
Close

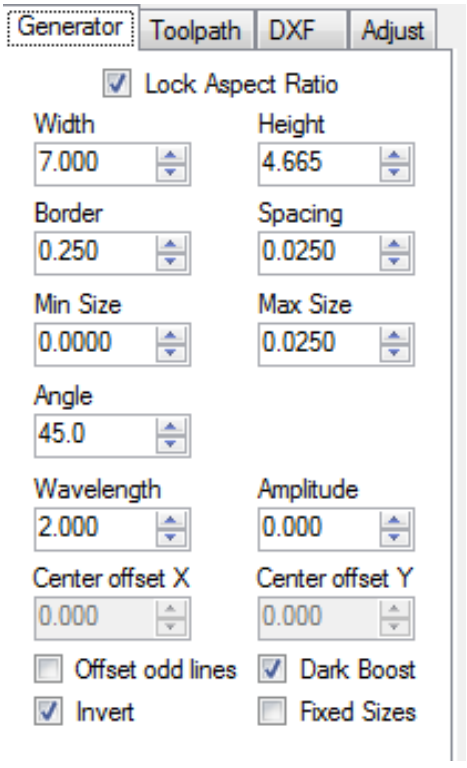

Edit Tool
Tool Info
Name
laser
Tool Type
End Mill
Notes
Geometry
Diameter (D)
0.012
inches
D
Cutting Parameters
Pass Depth
0.001
inches
Stepover
0.007
inches
58.3
Feeds and Speeds
Spindle Speed
24000
r.p.m
Feed Rate
100.0
inches/min
Plunge Rate
30.0
inches/min
Tool Number
1
OK
Cancel

Half-toned Images

Using half-toned images will allow you to create etched photos on a variety of different materials. Use the provided link to download the free half-toner software. Remember, different materials will burn at different rates, so setting will vary depending on the material being used.

Start by downloading the free Half-toner software from the link below.
http://jasondorie.com/page_cnc.html

Click on Download Halftoner V1.7 to download the software. After the download has completed you can open the software and click the Load image button to import an image. Use the settings listed below as a starting point then adjust them till you get the desired look for your image.



After your half-toned image has been created save it using the DXF tab. Note: Saving your files as a .png will help to reduce the calculation time in the Vectric software and this will provide a more accurate vector creation.

Import your image into the Vectric software and use the bitmap tracing tool to create the vectors. After your vectors have been created you can use the quick engrave toolpath with your laser tool selected to create your toolpaths.

Be sure to visit our YouTube channel to watch the full video tutorial on using this technique.

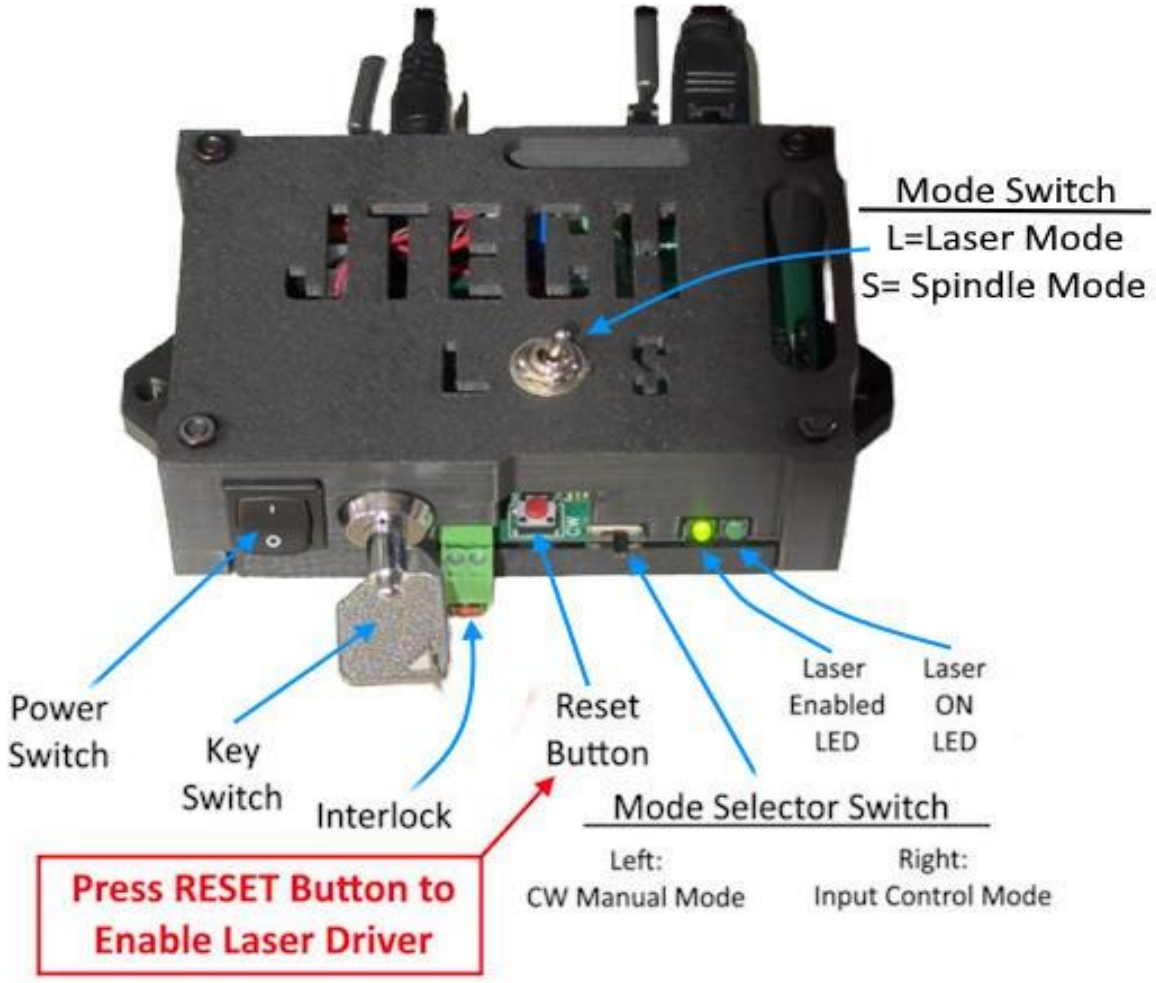
YouTube Tutorial link: https://www.youtube.com/watch?v=1qu6l7clWP4

Troubleshooting FAQ

My black SI module box does not turn on – Make sure the green interlock plug is secure in the front of the SI module and the power cable is connected and plugged in with the LED on the power brick on. Press the RED RESET switch on the SI module. It should turn on the SI module with the laser fan running and one green LED on the left on.

My laser is always on. I can't get it to control with a file – Make sure the small black switch on the front is turned to the RIGHT. If it is to the left, it will be in "manual" CW mode and always be on. It needs to be in "input control mode" from the picture above.

My laser is on the mount and pointed down, and my reset button is pressed, but the laser still won't turn on - Make sure your power adapter is pushed in all the way and is not loose. Also, make sure your laser is seated on the magnet base plate and is pointed down. Check your connections to the black SI module and verify the cables are connected fully. Make sure the green interlock plug with the red wire is secure as well.



Contact Us:

For software related inquiries, training videos, software updates, free projects and more…visit Vectric Ltd directly at:

http://support.vectric.com

Having trouble setting up your laser? Contact Axiom Support at:

support@axiomtoolgroup.com

Need Assistance with your laser? Reach out the J Tech Team at:

support@axiomtoolgroup.com

customerservice@jtechphotonics.com

Stay up to date with the latest Axiom news, product information, tutorial videos, customer projects and more.