J TECH™ Photonics

Axiom Precision V6 4.2W Laser Kit by J Tech

Pro V6 machines with RichAuto Controller

Rev. 5/3/2024

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/@AxiomprecisionCNC

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 driver board 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.

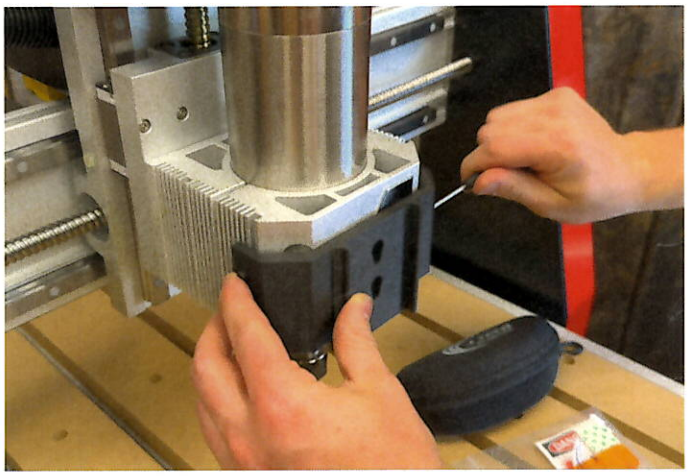
Verify the contents of the package:

- Axiom Custom High Current Driver Board w/ magnetic base
- Laser Shroud Housing and Spindle Mount
- Key switches
- 1 Pair of Safety Goggles
- Power Wall Adapter
- Laser harness cannon connectors
- Control board harness cannon connectors
- Sticky tape
- Cable tie

Installation

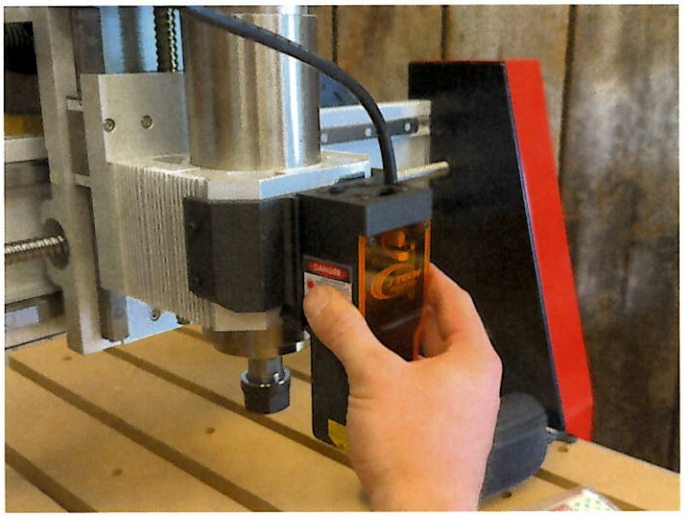
Step 1:

Attached the laser head mount as shown to the spindle assembly using the t slots in the aluminum spindle mount. This mount will remain attached to your machine even when the laser is not in use.



Step 2:

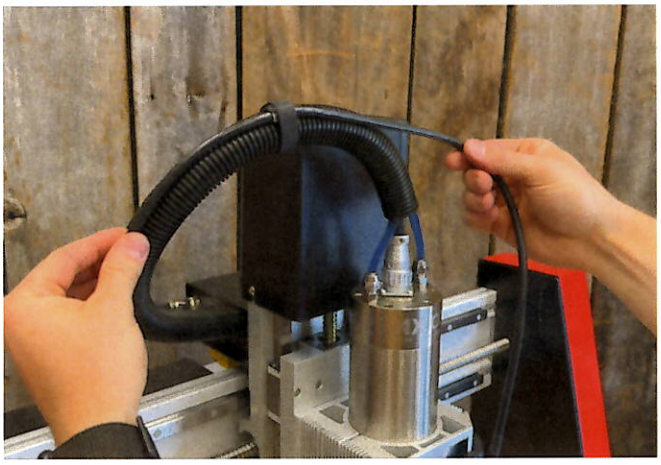
Attach the laser head to the spindle mount. When attached the laser shroud should extend pass the bottom of the spindles collet nut. Your spindle or laser mount may need to be adjusted to ensure proper clearance.

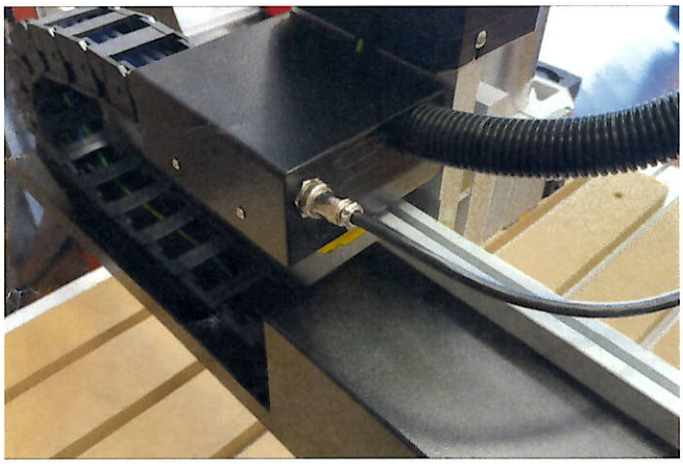


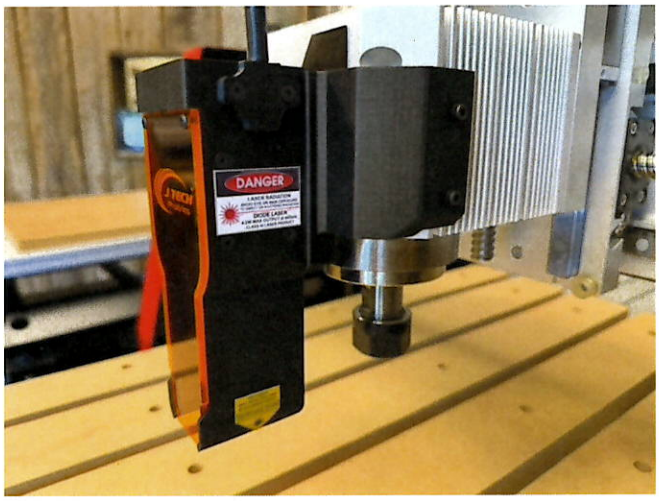
Step 3:

Plug the laser head into the female 8 pin connector on the back of the spindle assembly.

Attach the supplied Velcro tie to the laser head wire and use it to secure the wire to the spindle harness when attached. (See images below)

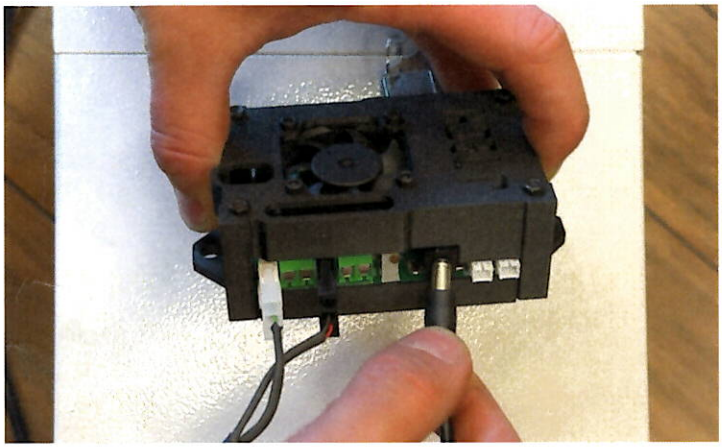


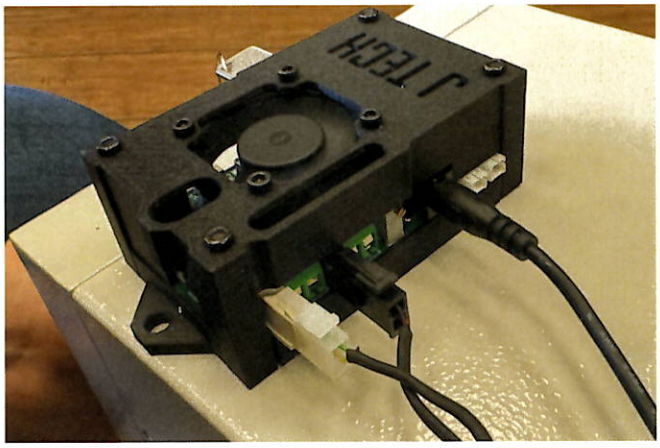




Step 4:

The laser control board will mount to the top of the white control tower magnetically. (The included Double-sided tape can also be used if preferred). Plug the two Molex connectors on the control board harness into the color coded female connectors on the rear of the control board. This is also a good time to attach the power cable supplied with the 110V inverter.





Step 5:

The other end of the control board harness plugs directly into the back of the white control towner.

Step 9:

The supplied machine harness will plug directly into the female 8 pin connector on the back of the control box. The other end of the cable will connected to the rear of the machine in the designated laser port. (Only connect this harness to the port labeled Laser)

B18 RichAuto Controller Operations (V6) Machines

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 changes are required: 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 your files to use with the correct post processor. "Axiom HHC Laser B18 V6 (mm) (*.mmg)"
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.

Laser Start Up

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

1. On the front of the laser driver 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 driver and laser fans will start to run, and the left green LED will light up showing the laser is ready.

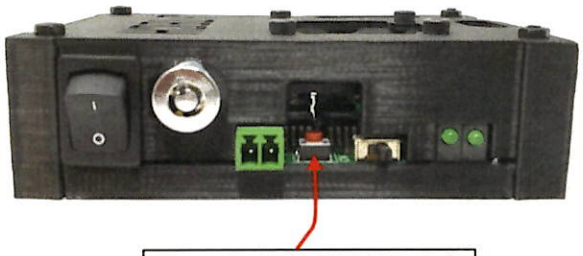
The mode selector switch should be switched to the right to accept signals from the controller.

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

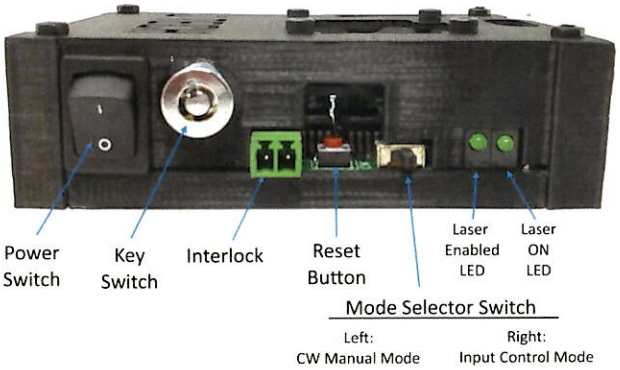
For more information, visit our documentation page here: https://jtechphotonics.com/?page_id=602

For troubleshooting information visit:

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



Front View



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 80mm. Lower the bit to the designated ORIGIN location and set the XY-0. Then use the controller to manually move Y+ (80.00mm) to position the laser over that same point. Press XY-0 again to set the ORIGIN for the laser.

NOTE: 80mm 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 80mm. 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 the 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 -78.500 & X + 1.500 then the new offset will be set at Y +78.500 & X +1.500 when setting up your laser.

YouTube Link: https://www.youtube.com/watch?v=4EqTtRmCJ2w&t=14s

Tips for Laser operation:

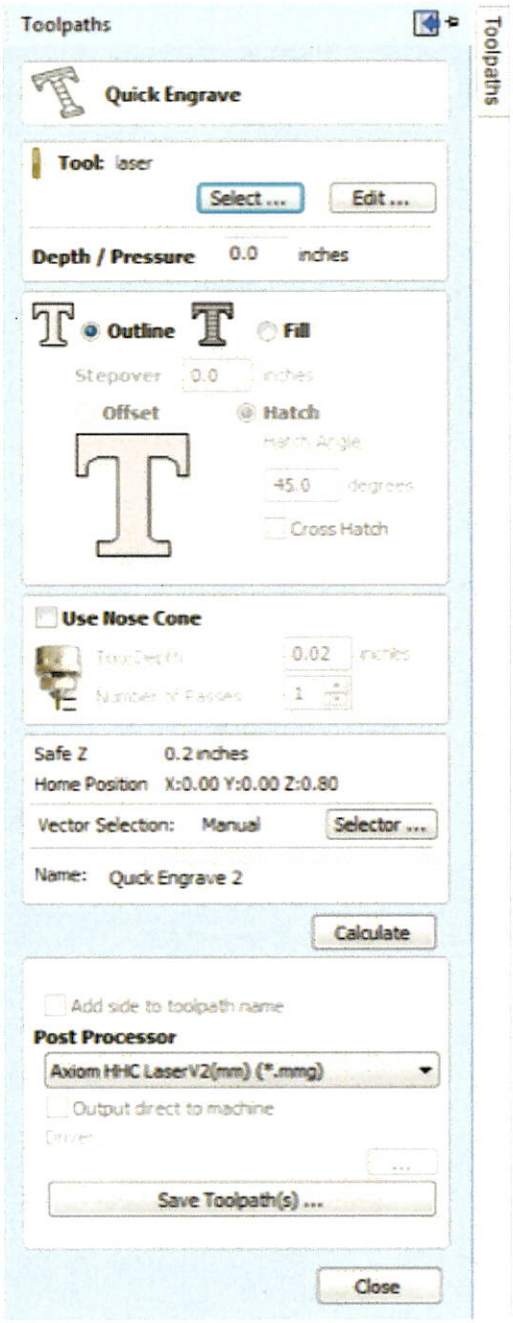
Note: Vectric's Laser modular will not support the use of your J Tech laser.

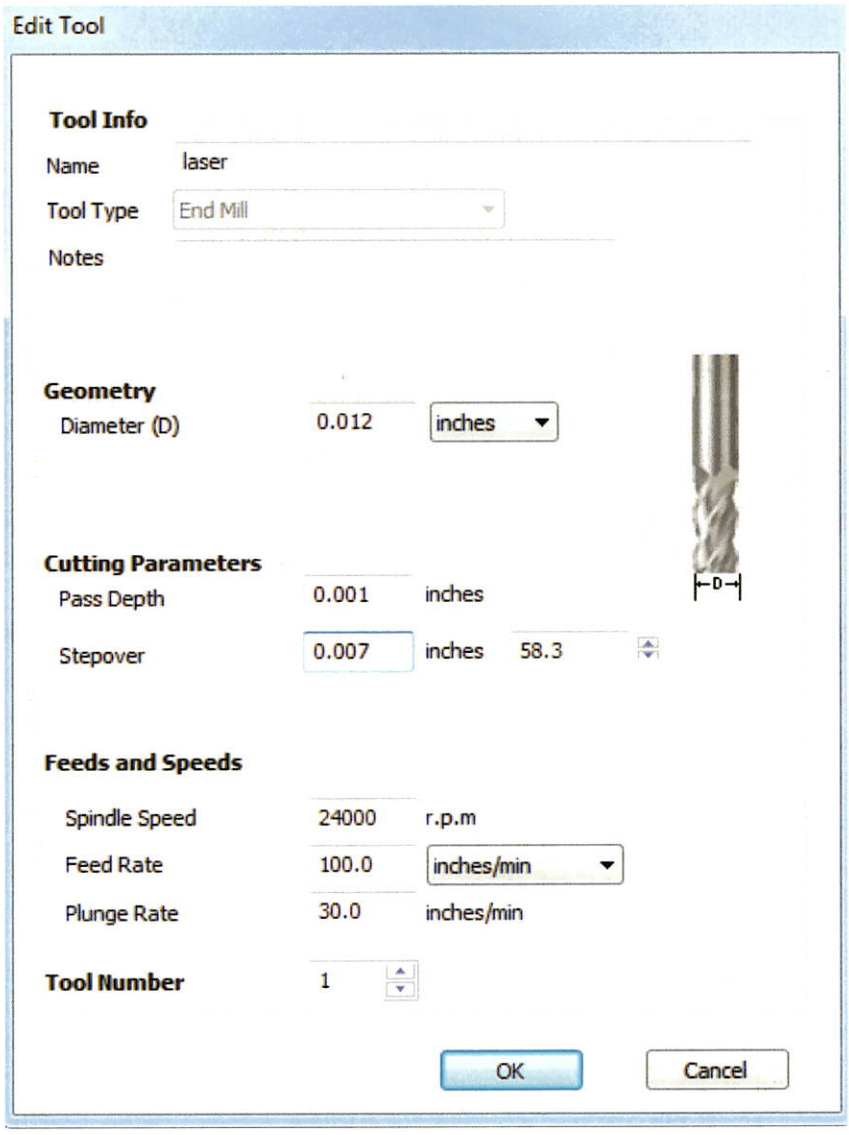
We recommended that you use the Quick Engrave tool path with the following settings:
Hatch Angle = 45deg, Fill option selected
Feed-rate = 100 inch per minute
Set the Laser shroud to approx. 1/8" from the surface of the material for optimal focal length. Beam diameter at optimal focal length = .012"

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 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
Toolpaths


Edit Tool
Tool Info
Name laser
Tool Type End Mill
Notes
Geometry
Diameter (D) 0.012 inches
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

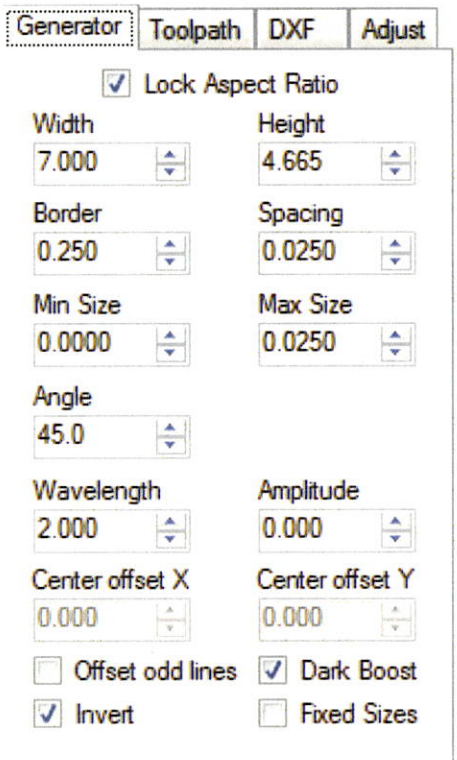
Half-toned Images

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 laser driver box does not turn on – Make sure the laser shroud is fully seated on the magnetic plate and the interlock switch is fully depressed. Press the RED RESET switch on the laser driver. It should turn on the laser driver with both fans running and one green LED on the left lit.

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 interlock switch is depressed, 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 seating on the magnet base plate and the interlock switch is depressed on the laser. Check your connections to the black laser driver and verify the cables are connected fully.

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.