Genmitsu 5.5W Laser Fixed Focus Module Kit User Manual

Contents

Genmitsu

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Welcome

Dear customer,
Thank you for purchasing the SainSmart 5.5W laser fixed focus module.
This blue 5.5W diode laser with a wavelength of 445nm is specially designed for use with the SainSmart CNC milling/engraving machines type 3018-PROVer. However, it can also be used with a large number of other CNC machines.
The current version of this user manual can be found at **https://docs.sainsmart.com/**
You can also get help and support in our Facebook group
(SainSmart Genmitsu CNC Users Group, **https://www.facebook.com/groups/SainSmart.GenmitsuCNC**).
In addition, as always, competent SainSmart support is available to you at the e-mail address **support@sainsmart.com**.

Safety Instructions

Always exercise safety and caution when working with laser marking systems. Consider the listed recommendations to minimize risk.

- You must be at least 13 years old to operate the laser engraver.
- Direct exposure to the laser beam can cause severe burns and eye damage. Ensure that you are wearing proper laser safety goggles when working in the vicinity of the laser equipment.
- When you focus the laser do so only on the lowest power setting.
- Keep a fire extinguisher nearby since use of the laser may lead to an unexpected fire.
- Never leave an operating laser unattended.
- Fumes and smoke generated during the engraving/cutting process must be extracted from the room as some can be poisonous; make sure there is a ventilated system to the outdoors.
- Make sure the cutting area under the laser is metal or non-flammable.
- Ensure that the room or area you are operating the laser in is sufficiently labeled to prevent someone from

unknowingly walking into an active work area.

- Be sure to disconnect the power when cleaning, maintaining or servicing the laser equipment.
- DO NOT stare at the bright and intense light appearing during the engraving process. Doing so can cause serious eye damage.
- Never use the laser except for the purpose intended.

SainSmart does not accept any responsibility or liability for any use or misuse of the Laser.

What is in the box

1 Laser Head and Control Module

2 Safety Goggles, adjustable (green)

3 Connecting Cable, 3-Wirex10cm
4 Connecting Cable, 2-Wirex10cm

5 Laser Alignment Spacer x 20mm

6 2 x T Nut, M3 x10mm

7 2 x Hexagon socket screw M3 x 6mm

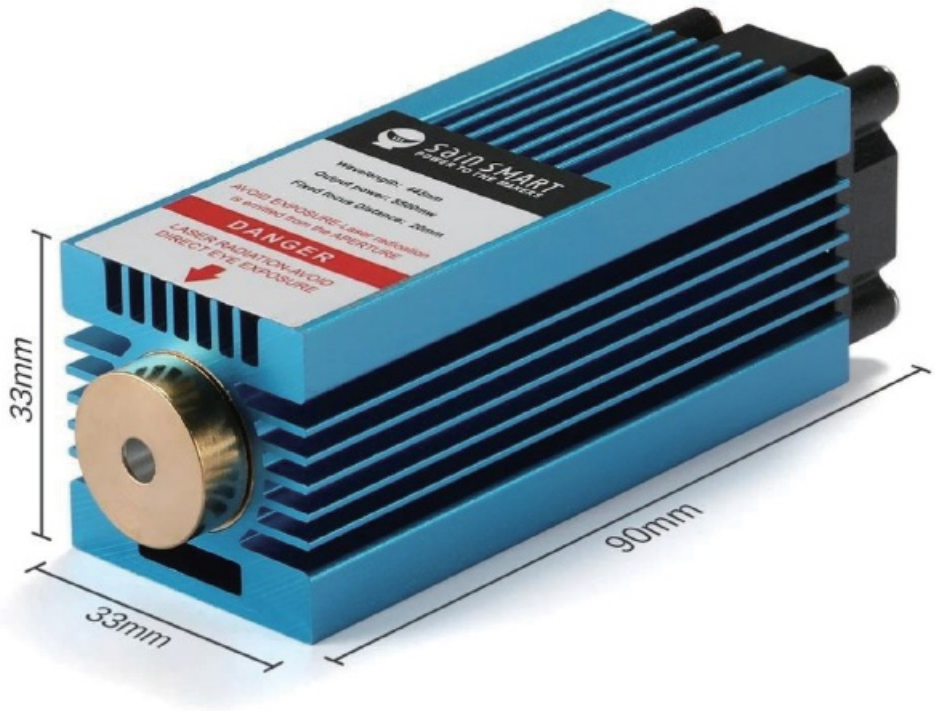
8 Power Supply, 12V DC / 5A

9 Power Cord

10 European Plug Adapter

Description of the individual components

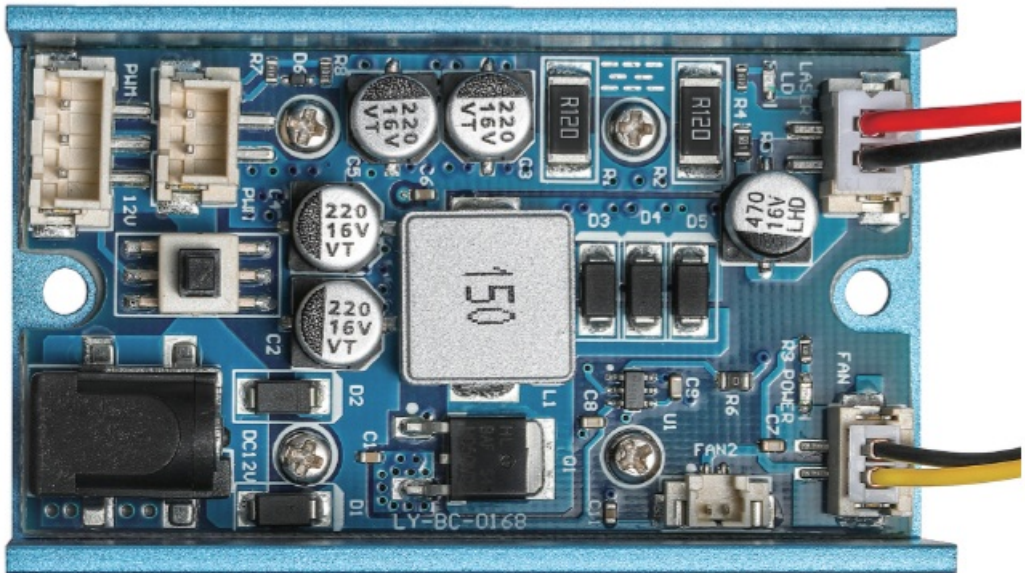
Laser Head



A 5.5W blue diode laser with a wavelength of 445nm. In order to ensure sufficient cooling, the laser is mounted in a heat sink, which is additionally equipped with a powerful yet quiet cooling fan. The laser has a fixed focus with a focal length of 20mm The Laser Head is connected to the laser control unit by cables of about 30cm length. The plugs which fit into the Laser Control Module are different to ensure correct connections to the cooling fan and the Laser Diode.

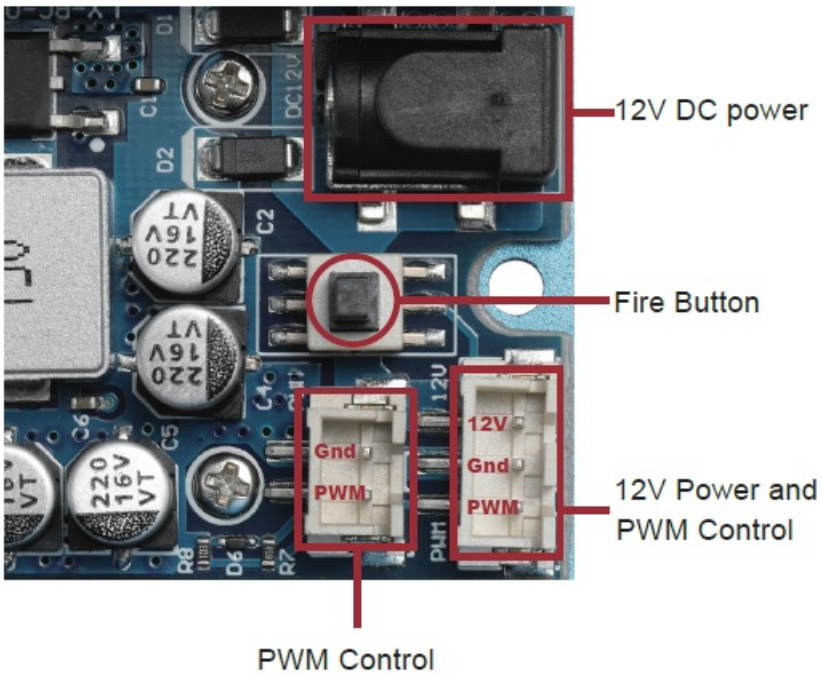
Laser Control Module

The Laser Control Module matching the Laser Head contains the necessary control electronics for processing the PWM signal applied to the input. This results in the laser being supplied with the required voltage at the right time. The Laser Control Module can be mounted to the 2020 aluminum profiles normally used on milling and engraving machines by means of the supplied T-nuts and M3 screws. A 2.5mm hexagon wrench is required for mounting those screws.



The right side of the Laser Control Module hosts the connections to the laser head. The sockets are different and match the plugs on the Laser Head wires so they can only be connected correctly. There is a Red Power LED on the board close to the connector marked PWM, it is on when power is supplied to the Laser Control Module.

On the other side of the Laser Control Module there are a number if connectors and a press switch.



- External 12V DC 5A power source.
- Fire / PWM Button, when in this is pressed in the laser is permanently on at 100%power, when out the laser power is controlled by the PWM signal.
  It should be out for normal operation!
- 2 pin connector for PWM Control signals.
- 3 Pin connector for PWM Control signals and 12V Power.

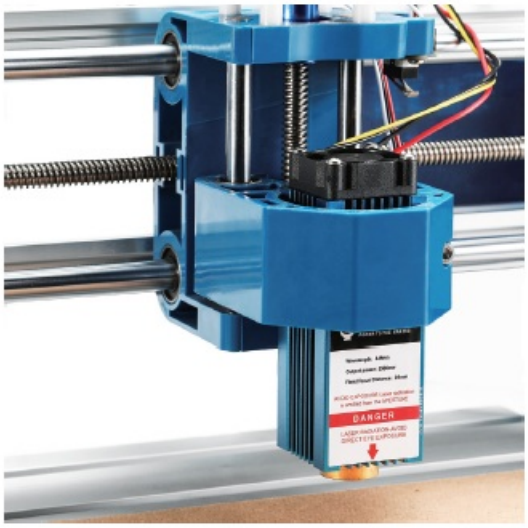
Please see later descriptions for connecting to your specific router for which ones to use.

Before switching on for the first time, make sure that the signals are connected to the correct pins.

Mounting the laser to a SainSmart 3018-PROVer

First disconnect the spindle motor by removing the motor connection from the router Main board. Then remove the spindle motor from the motor mount.
Do not operate your router with both, the laser and the spindle motor connected.

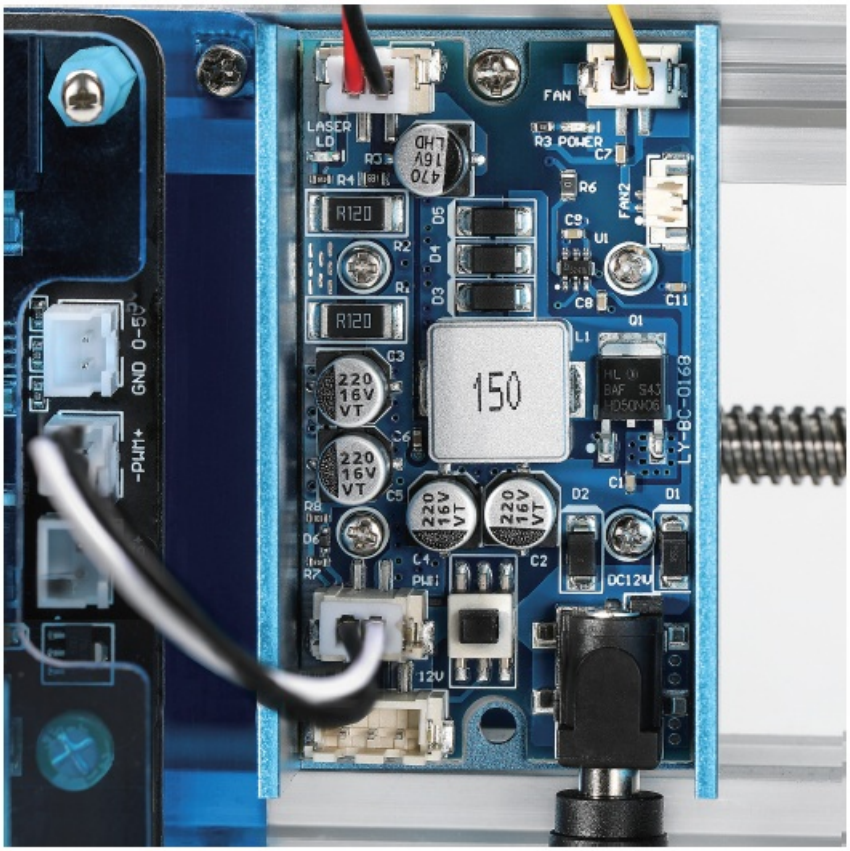
Move the motor mount towards its lowest height using Jog controls. Slide the Laser Head into the motor mount so that the corners are in the slots of the motor mount and the cooling fan of the Laser Head pointing upwards. Align the top of the heat sink with the top of the motor mount. Tighten the clamping screw on the motor mount, do not over tighten, it just needs to be secure.



Plug both connecting cables into the sockets of the Laser Control Module as described above.

Mount the Laser Control Module on the rear of the CNC machine on the aluminium profile to the right of the motherboard of the CNC machine using the M3 T-nuts and screws supplied. Make sure that the cables to the Laser Head can move freely so that the laser can move in all axes to the limits of its travel. Mounting the Module vertically using just a single screw can give freer cable movement.

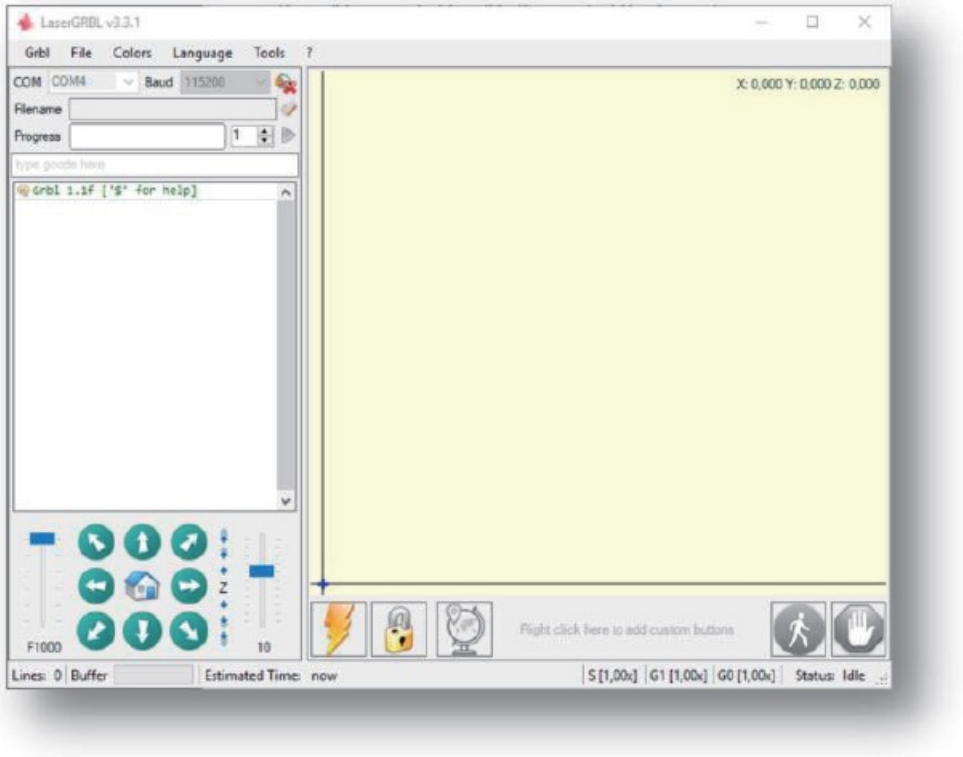
Connecting to a SainSmart 3018-PROVer



- Connecting the Laser Control Module to a SainSmart 3018-PROVer using the 2-pin cable for GND and PWM and the supplied external power supply for the Laser Control Module.
- As shown the Laser control module is mounted vertically with the power supply socket at the bottom.
- The two pin cable is connected to the middle socket of the router Main Board marked PWM.
- When power is supplied via the external power supply a Red LED near the FAN connector will light on the Laser Control Module board.

Installing LaserGRBL to use with 3018-PROVer

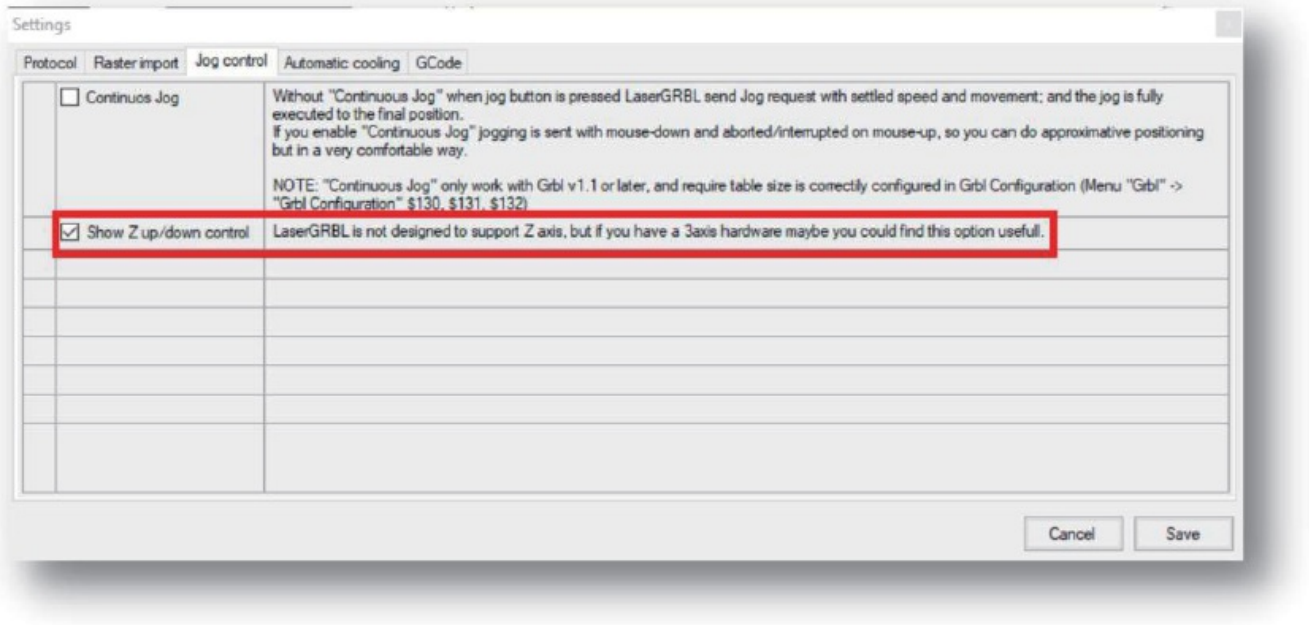
LaserGRBL is a free program which works with Grbl based routers fitted with a Laser and Laser Engravers. It will be used here to assist with setting up the Laser, though it is capable of both sending GCode and converting images to GCode for Laser Engraving It can be downloaded from **https://lasergrbl.com/download/**
After installation and connecting to the router the screen should look like this:



There are a couple of customizations to be made before proceeding.

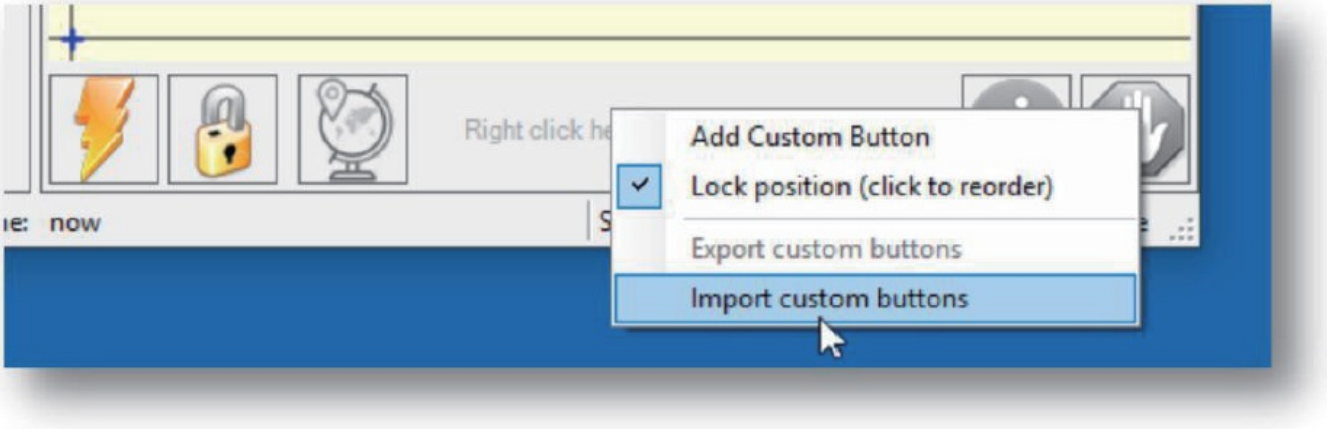
Enable Z axis Jog

Select ‘Grbl” → ‘Settings” and click on the ‘Jog Control” Tab. Make sure the ‘Show Z up/down control” box is ticked and save.



Add Custom buttons FIX URL

Download the file CustomButtons.gz from our SainSmart WIKI at the following URL: http://wiki.sainsmart.com/index.php/SainSmart_Blue_Laser_Kit. Right click on the text 'Right click here to add custom buttons' in the Buttons pane and select 'Import Custom buttons'. In the Open Window select the downloaded file and click Open. The dialog box of Import custom button will appear.



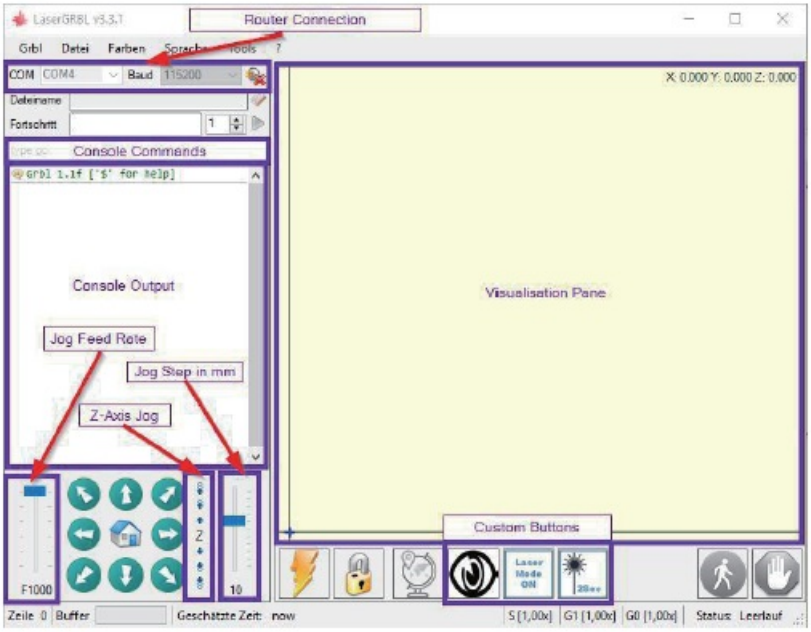
A short dialog is displayed for each of the three additional buttons. You can now select for each individual button contained in the archive file whether it should be imported or not. Select 'Yes' for each button.

The LaserGRBL window should now look like this. The three added buttons are arranged from left to right and contain the following functions:


Tun on laser at low power (S100), press again to turn off.

Set for Laser mode ($32=1)

Turn on the laser at low power (S100) for 2 seconds, then turn it off again (useful when setting an origin position)

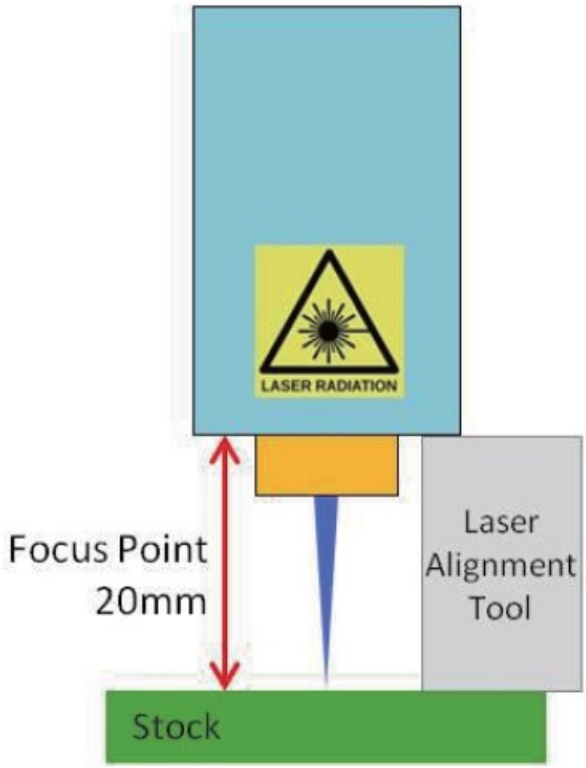


NOTE: The laser power is set by 'S100' in the custom button commands but this is dependent on the Maximum spindle speed ($30) set on the router If your maximum spindle speed has been changed you may need to adjust the laser power by editing the buttons to change the S100 value. When the Laser is on the power should be set so you can see the dot the laser beam makes while wearing the Laser Goggles, normally the S value should be 10% of the $30 setting.

Use LaserGRBL to set the laser height

To cut or engrave efficiently we want the laser beam to be tightly focused into the smallest possible point at the top of the stock. Although the focus point of the Laser is fixed the height of the laser above the stock needs to be set correctly. Do not forget to wear the Safety Goggles.

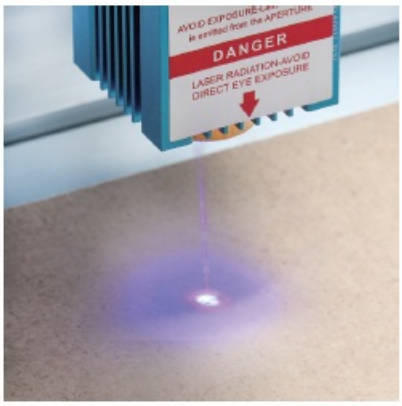
- Place the Laser Alignment tool on the top of the stock at the side of the Laser, not underneath.
- Using the Z-axis jog buttons move the Laser up and down until the Laser alignment tool will just slide underneath the heatsink. (hover over the Z jog buttons in LaserGrbl to see how far each will move the Laser) until the heat sink will just slides between the bottom of the heatsink and the stock.
- Set the zero point at this position by clicking the globe icon.



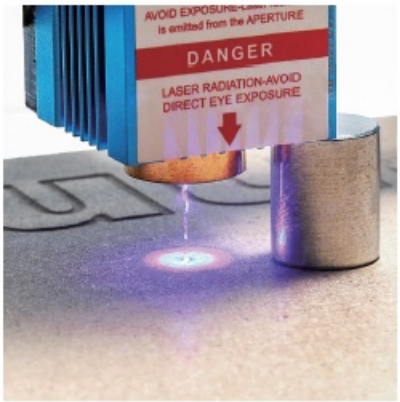
If using very thin stock place a flat material underneath it to bring the top of the stock higher and in the range of the Laser.
If using a thick stock it is possible to slacken the bolt clamping the laser in the motor mount and slide it upwards to give more clearance.

If desired test the focus of the laser by placing something which will not burn of a known thickness on top of stock underneath the laser. Now using the Z axis Jog controls jog up by the thickness of the item placed on the stock.

Click the Laser Fire button to turn the Laser On



No focused



Focused

If necessary use the Z-axis Jog controls to move the Laser up and down to achieve the smallest possible laser dot.
Then click the Laser Fire button once more to turn the Laser Off and using the Z-axis Jog controls jog down by the thickness of the item placed on the stock and set the Z axis Zero point.

Use the Laser on a Grbl-based router

When using a Laser in a Grbl based router such as the 3018-PROVer there is an important mode setting in Grbl to

tell it that it is using a Laser rather than a rotating spindle. This is $32 – Laser Mode.
When using a Laser set the value to 1, when you remove the Laser and replace it with the spindle, motor set it back to 0 by sending a $32=0 command from your spindle control software.

Clicking the custom button ‘Laser Mode On’ will set the Laser Mode on. This is permanently stored on the 3018-PROVer motherboard until it is specifically changed.

The major effect of setting Laser mode on is that the router will turn off the laser when it is making positional moves. If not set this can result in unwanted lines on your engraving as the Laser is positioned to the next cutting point. A secondary effect is that it can reduce any over burn where the movement slows to allow a change of direction.

Use with Non-SainSmart CNC machines

Please refer to the manual of your CNC router for assembly instructions. Pay attention to the required cable lengths and the pin-out of the supply lines to the Laser Head and the Laser Control Module.
Due to its various options (2-pin PWM, 3-pin PWM including power, separate DC power jack) this laser module kit is suitable not only for the SainSmart 3018-PROVer but also for a variety of other CNC routers.
However, SainSmart can not guarantee proper function with all 3rd party CNC router control boards.

Power

The Laser control module requires 12VDC capable of supplying 3A. This can be provided either from the Router Mainboard using the 12V connection on the 3-pin connection OR by the included external power supply. Do not connect both at the same time or the boards could be damaged.

PWM-Signal

This laser uses a standard PWM (0 to +5V) signal for control. The Laser is on when the PWM Signal is +5V and is off when the signal is 0V. The PWM signal and ground can be connected by either the 2 pin connector or the 3 pin connector.
The provided cables may not be suitable for all connections, ensure that the correct pins on your router main board are connected to the matching pins on the Laser Control Module.

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Documents / Resources

	**Genmitsu 5.5W Laser Fixed Focus Module Kit** [pdf] User Manual 5.5W Laser Fixed Focus Module Kit, 5.5W Laser Module Kit, Fixed Focus Module Kit, Focus Module Kit, Module Kit, 5.5W Laser Fixed Focus Module Kit, 5.5W Laser Module Kit, Fixed Focus Module Kit, Focus Module Kit, Module Kit

References

- SainSmart | Desktop CNC, 3D Printing & DIY Tools | Power to the Makers – SainSmart.com
- SainSmart Resource Center
- Download – LaserGRBL