BluLaser Getting Started

This document is intended to help get your BluLaser set up so you can complete your first engraving. The intention is NOT to get you proficient in using a laser (I am certainly not!), but to get you connected, setup and seeing some results. This is the Guide that I wish I had when I first tried to connect my laser 2 days ago, and is based on what I have learned in that time.

This Guide also won't teach you how to use any software proficiently, but it should help get you to the point where your laser is making marks on your work piece that look reasonably like you are expecting. The rest is up to you.

This Guide includes the following sections:

This Guide refers to some other resources which helped me get started:

Resource	Description
James Dean Designs – Setting up your laser	This is an excellent video that walks you through setting up your laser. This guide is based quite heavily on this video. It is 32 minutes long but well worth watching the whole thing in conjunction with reading this guide. https://youtu.be/YnFNFEdmPjU
LaserGRBL	Free laser engraving software that can be used to set up your BluLaser. It is "gSender for lasers" - it cannot be used for design, but it can move the laser, turn in on & off, and load & run GCode files. The software is free & can be downloaded from https://lasergrbl.com/download/
Lightburn	Fully featured software for lasers. This is excellent all-in-one software that includes both the design and driving of a laser – think of it like Easel for CNC routers but for lasers (and much better in my view). This guide will NOT use Lightburn, but it is mentioned here since it is likely that you will use once you have everything set up and working. Of course, feel free to use any software you like. ***I still recommend you use LaserGRBL for the setup process, and then you can move to Lightburn.*** It can be downloaded from here: https://lightburnsoftware.com/ You can use it free for month but after that you will need to buy a license (the cost is modest).

Unpacking your BluLaser

In the package you should have:

- The laser itself (a 7.5w blue diode laser)

- A mounting plate with two machine screws (attached to the laser)
- A buck (a black blob of shrink wrap with wires coming out from either end)
- A 12v power supply & mains cable
- A pair of safety glasses

Connecting your BluLaser to your Bluey or Turbo

I recommend removing any bit / endmill from your router / spindle whenever using the laser.

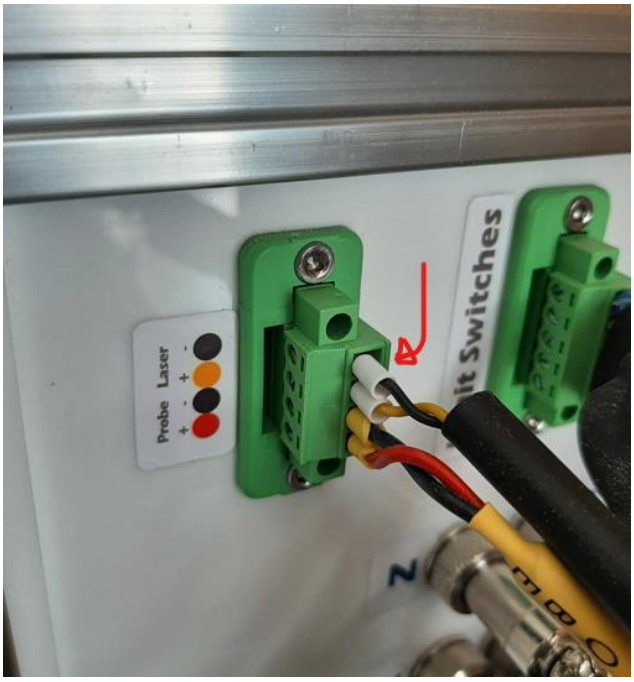
Remove the two machine screws from the mounting plate.

Attach the laser to your Z-axis, to the right of the router / spindle. The mounting plate fits behind the Z-axis plate and the machine screws go through the plate and screw into the tapped holes in the laser mounting plate. Tighten the screws using a 5mm hex / allen key – there is no need to over-tighten them.

Plug the cable that is attached to the laser to the green connector marked “LASER” – this should be in the wiring loom leading to the router / spindle.

At the control box there is another green connector labelled “LASER”. On the buck, locate the cable with 4 wires and plug this into the aforementioned green connector labelled “LASER”. The other end of the buck has another green connector with one yellow and one black wire - this should be plugged into the controller.

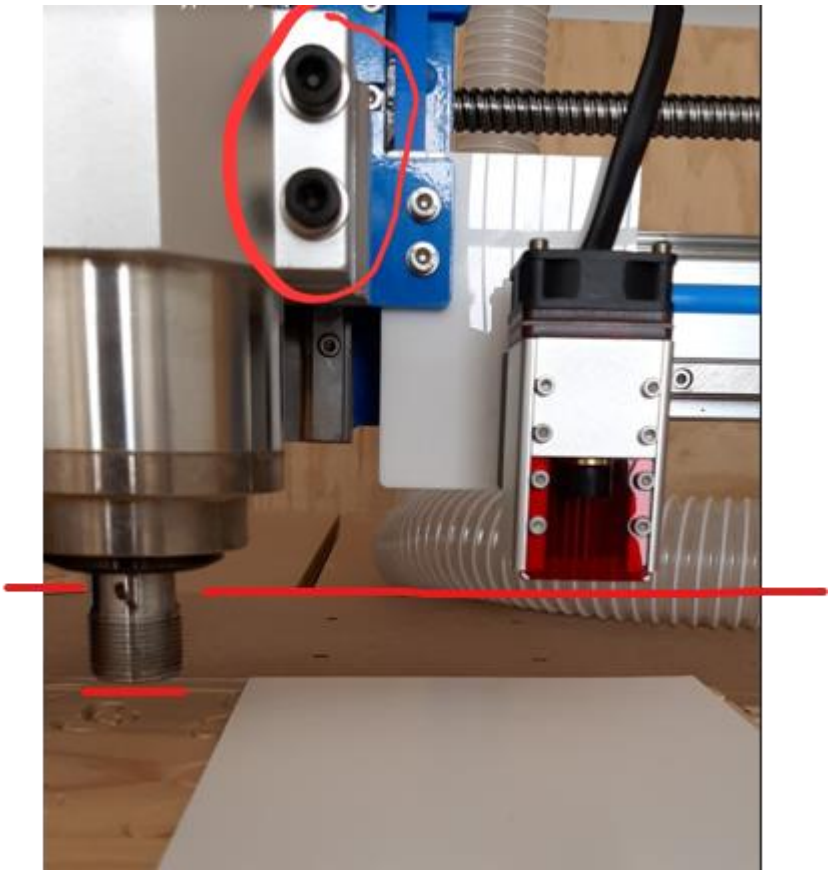
As I have a Z-probe I had to remove the black & yellow wires from the green connector and attach these to the existing green connector for the Z-probe (see picture below).



Plug the jack from the 12V power supply into the connector on the side of the buck.

Plug the mains power cable into the 12V power supply and connect to your mains supply. You should see a red light on the laser – if not, check your supply and your wiring.

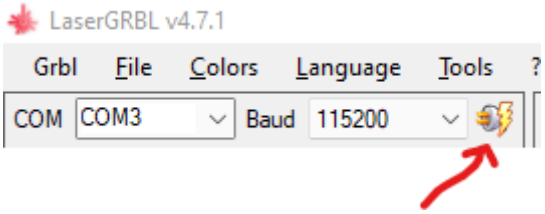
Note: my spindle extended past the bottom of my laser, so I had to move my spindle up in the clamp. You may need to do the same otherwise your spindle may hit your workpiece, clamps, or fences, etc.



Configuring your BluLaser before first use

I recommend you now watch James Dean Designs excellent video "Setting up your laser"(see the list of resources above). Watch the whole thing – it's invaluable. In his notes to the video he provides a link to some material from Graham Bland of Endurance Lasers ("A link to the files used and Graham Blands full guide") – these are used in his video so download it.

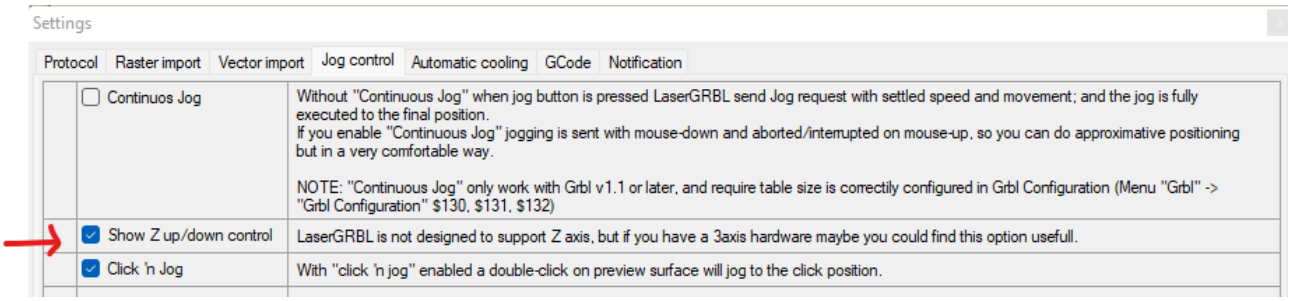
Now download LaserGRBL and install it (see the list of resources). Make sure your USB cable is plugged in and connect your laser using the lightning bolt icon.



If it doesn't connect, check your cabling and your COM port.

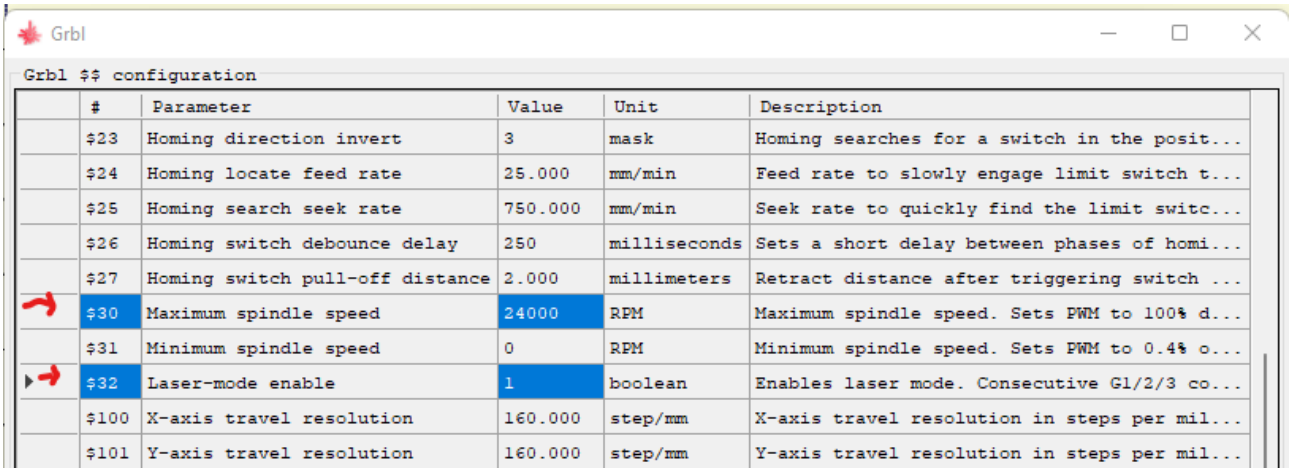
There are some important settings to change. James Dean mentions them so go back and check his video, however these three changes are vital:

Grbl / Settings / Jog Control / Show Z up/down control



Grbl / Grbl Configuration

- Set your $30 to the maximum spindle speed (mine is 24,000 RPM) – this influences then power of the laser when selecting 50%, 100%, etc.
- Set your #32 to 1 (this turns the laser off when traversing – make sure you set it back to 0 before going back to using your router).



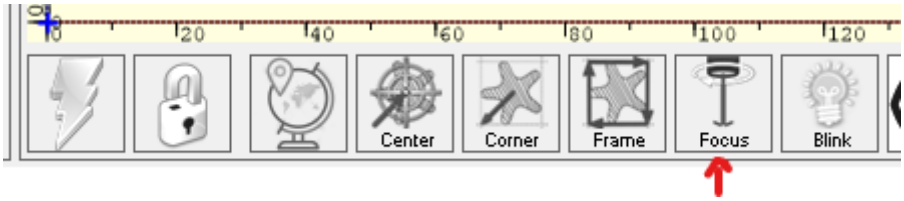
Now you are ready to begin setting up the laser.

Use the jogging buttons to move the laser over a suitable workpiece – a reasonably flat piece of timber or even a bit of cardboard will do. This should be self-explanatory, but the Up and Down arrows move the laser backwards and forwards, & the Right and Left arrows move the laser right and left.

Before you do the next step, put on your safety glasses. Also open a window to let fumes out and close the door so that family members, children, pets, etc. can't come in and go blind.

Now it's time to see if the laser fires. If you missed the **red** bit above, read it now.

Click the Focus button on the tool bar which should turn the laser on at a low power setting.

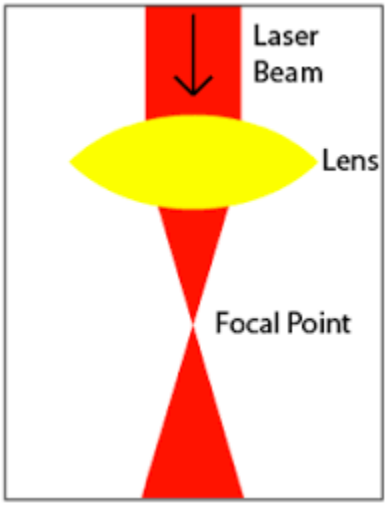


You should see a dot or a short line of blue light (it shouldn't appear blue because you should be wearing your safety glasses). Don't stare at it – just notice that it is there then click Focus again to turn the laser off.

Once you are able to turn the laser on & off you can move on to focusing.

Focusing the beam

The laser shoots a beam of light to a fine point (the focal point):



In order to get the crispest burns, the laser needs to be adjusted so that the focal point is at the surface of the work piece. If it is too close or two far, it will probably still burn but you won't get crisp lines.

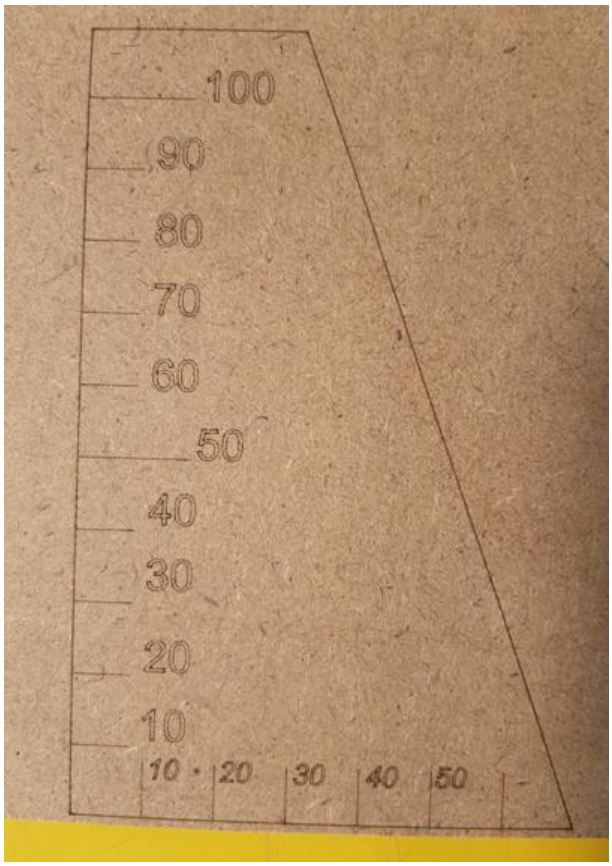
I positioned my laser so that the bottom was about 30mm from the work piece. The focal point of the laser (where the beam is at its sharpest) then needs to be adjusted using the black focussing wheel.

Wearing your safety glasses. turn on the laser at low power (using the Focus button). Adjust the focus using the focusing wheel until you see a very fine dot. Adjusting the wheel changes the laser light from a short line to a tiny dot (less than a millimetre), then to a short line. Go for the dot.

Turn the laser off as soon as it isn't required. Only then should you remove your safety glasses.

Now the laser is focused, you can measure the distance from the work piece to the bottom of the laser (or to a piece of blue tape on the side of the laser). This is the Z-height to use each time you are going to do an

engraving. In his video James Dean suggests making a little block the right height – I used my laser to make something a little different using a small piece of 6mm MDF:



Once I've cut it down, I will mark on this where the bottom of my laser is (32mm), but this may also come in handy when using my CNC router.

Running focus & power tests

James Dean uses a number of GCode files that he uses to test the focus and power settings. He provides a link to these in the notes to his video, so go and download them.

I used the following files – watch his video to see how they are used:

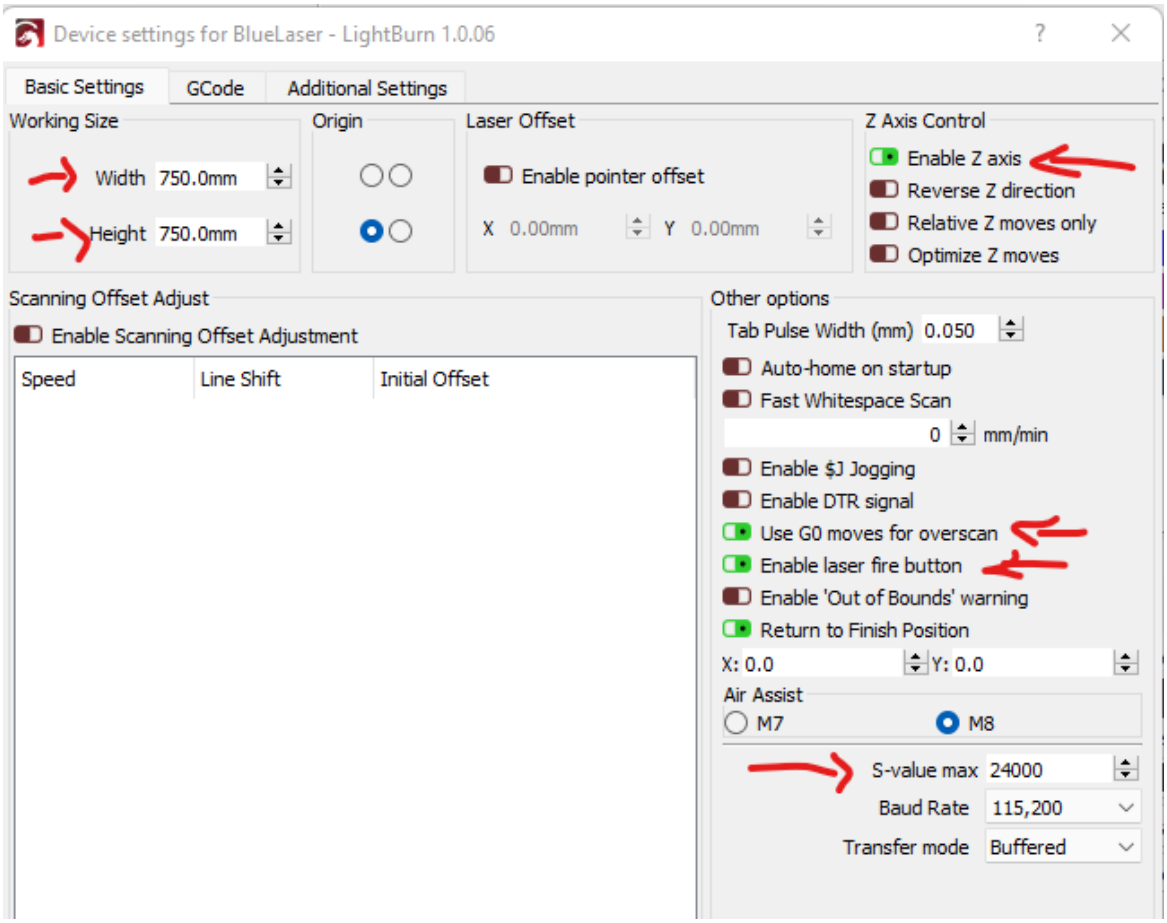
- LaserFocusTest.nc - tests the focusing
- xxMMs LINE AND FILL.nc - shows the results of various powers (%) at various travel speeds

The speed test files can be used to find the optimal speed & power (%) combinations for the darkness that you require. You should play with these and others in the set of test files to see what suits your laser and your choice of material.

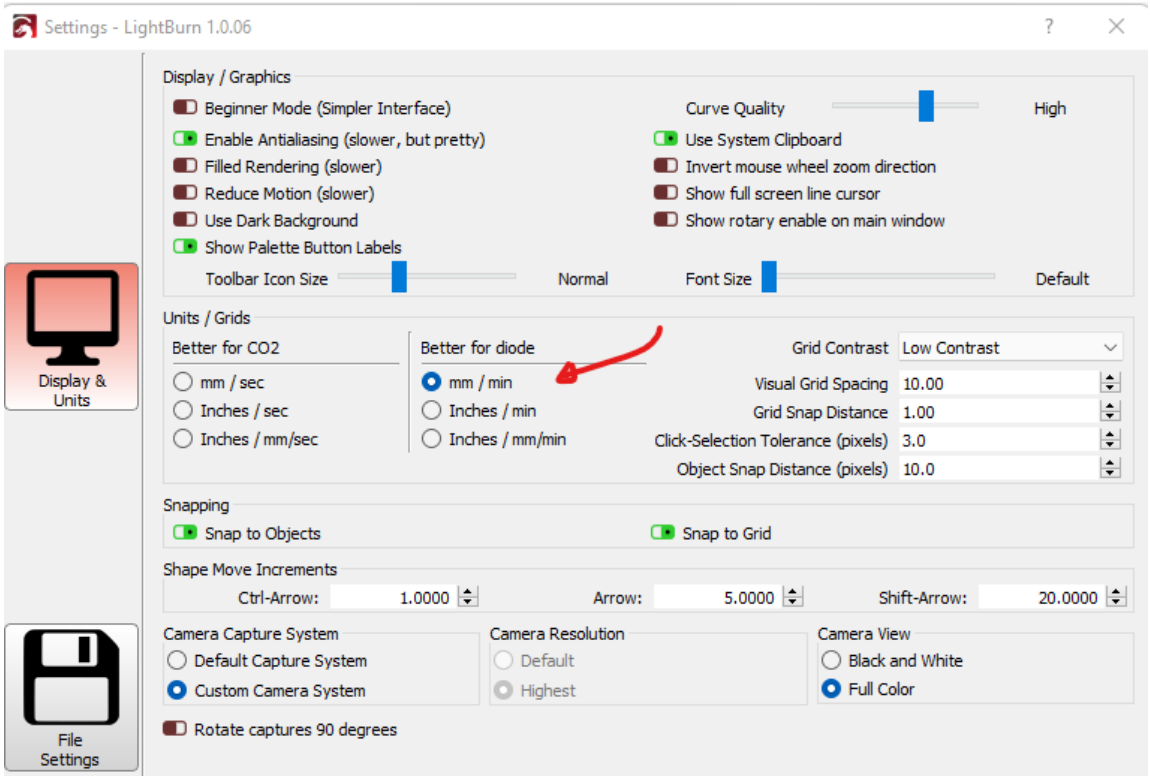
Doing your first proper design

Now you can download and install Lightburn and start designing. As mentioned, I won't go into a lot of detail here about how to use Lightburn, but make sure that you:

1) Enable the 1 month free trial
2) Disconnect your laser from LaserGBRL before you try to connect it in Lightburn
3) Edit / Device Settings to set your Working Size, Enable Z axis, Use G0 moves for overscan, Enable laser Fire button & S-value max to the max speed of your router (mine is 24,000):



4) Edit / Settings and select Better for diode “mm / min” unless you have a CO2 laser:



James Dean finishes his video by showing you how to make a Laser In Use sign – this is a great learning exercise and produces something useful.

This is mine using a piece of 6mm MDF:

For guidance, with my 7.5w laser properly focused I used the following speed & power settings:

- The laser graphic: Fill & Line / 1800 / 50%
- LASER IN USE: Line / 1600 / 80% (3 passes)
- NO ENTRY: Fill & Line / 1800 / 50%

You should have a play and find out what settings suit your laser, your focal point and your choice of material.

One thing to note when using Lightburn – if you want to export GCode to run in LaserGRBL, explicitly name the file with a ".nc" extension as the default ".gc" extension is not recognised by LaserGRBL.