# Version History

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# Table of Contents

[Version History 1](#_Toc211441638)

[Table of Contents 1](#_Toc211441639)

[Process Steps 1](#_Toc211441640)

[Creation of the G-Code Files 1](#_Toc211441641)

[Using the G-Code Files to Clean 4](#_Toc211441642)

[Cleaning the Top of the Carousel, sections 1 and 2. 4](#_Toc211441643)

[Setting the working origin of the laser 4](#_Toc211441644)

[Loading and Fine Aligning the G-Code File 4](#_Toc211441645)

# Process Steps

## Creation of the G-Code Files

A diagram of a circle with blue squares and lines

AI-generated content may be incorrect.Create a CAD sketch using a CAD tool of the area to be cleaned by the laser. The picture below was created using Shapr3d and then exported as a “DXF drawing from sketch”. It is a picture of the pads and various other elements as “construction” elements which are not saved in the DXF file. Then there are 5 polygons around each pad at a 0.1mm spacing which represents the path the laser should take to clean off excess resin. So 5 passes at 0.1mm steps.

A blue lines on a graph paper

AI-generated content may be incorrect.A blueprint of a blue square

AI-generated content may be incorrect. Then run the DXF2Gcode.exe (or DXF2Gcode.py) program. Load the dxfsettings\_5passcarousel.json file to initialize the g code settings:

* Reduces the preamble to: G21, G90, M4 S0
* Reduces the postscript to: M5 ; turn laser off
* Laser set to low power S100
* Feedrate at 1500mm/min
* Changed WPos origin to MPos -477, -197.1, -68.2. The approximate center of the template and optimal laser focus height

A screen shot of a graph

AI-generated content may be incorrect.Load the DXF file, Carouselcleanarea5passes.dxf. Create a top G-Code file by offsetting the DXF by -50mm in the Y offset, selecting sections 1 and 2 to engrave and saving the G-Code; topcarousel5passeslowpower.nc

Note – we can create the high-power versions by doing a find/replace of the S100 string to S10000.

G-code displays:

A screen shot of a graph

AI-generated content may be incorrect. A screenshot of a computer

AI-generated content may be incorrect.

A screen shot of a graph

AI-generated content may be incorrect.The create the bottom G-Code file by pushing the “reset all” button, then offset Y by +50 and selecting section 2 to engrave. Then save the G-Code; bottomcarousel5passeslowpower.nc

## Using the G-Code Files to Clean

## Cleaning the Top of the Carousel, sections 1 and 2.

Place the Carousel on the in the shifted down position, so the bottom of the carousel is slightly off the bottom of the worktable. See the picture of the DXF2Gcode for the top section above.

A screenshot of a computer

AI-generated content may be incorrect.Run the Gcode2Laser.exe program (or Gcode2Laser.py).

### Setting the working origin of the laser

1. Connect to the Laser system (GRBL) likely on serial port COM4
   1. Select the COM port in the drop down and press the Connect button
2. Clear any errors the laser system may have
   1. Press the Soft Reset button – hardware and firmware restart, reboots GRBL
   2. Alternatively Clear Errors – is a software clean up, keeps GRBL running.
3. Home the system
   1. Press the Home button
   2. Laser will perform its homing process. When it finishes check the laser position it should be MPos: -797, -397, -3
4. Set the working origin to this position
   1. Press the Set Origin (G10 L20 P1 X0 Y0 Z0) button
   2. Check the laser position, it should be MPos: -797, -397, -3 and WPos: 0,0,0
5. Execute a move command to the template center
   1. In the G-code: text box enter: G0 X320 Y200 Z-65.1 and press hit return or press the Execute button
   2. Check the laser position, it should be MPos: -477, -197, -68.1   
      and WPos: 320, 200, - 65.1
6. Set the working origin to this position. Now the laser is set to the same origin as the DXF file.
   1. Press the Set Origin (G10 L20 P1 X0 Y0 Z0) button
   2. Check the laser position, it should be MPos: -477, -197, -68.1   
      and WPos: 0,0,0

### Loading and Fine Aligning the G-Code File

Now that the working origin is set to approximately the right position, it is time to fine align the g-code to the Carousel part that is on the template. These next steps use a two point calibration process to remove any translation or rotation errors in the position of the Carousel part relative to the laser. Because 0.1mm matters, it is important to do the fine alignment accurately. The alignment will need to be done for each part on the top section and then again on for the bottom section.

#### Adding reference points

The first step is to edit the G-Code file and add two reference points that will be used for the fine alignment. These points should be something on Carousel that is easy to align the laser to with accuracy and the two points should be spread apart to get an accurate rotation measurement.

The outer bottom corners of the Section 3 pad 1 and Section 1 pad 16 are used in this write up. These points will be used for both the top and bottom section but note that the coordinates are different for these two cases.

For the top g-code file, topcarousel5passeslowpower.nc, insert these four lines at the top of the file:

|  |
| --- |
| ; Cleaning G-code for Carousel - top: sections 1 and 3  ; Reference points are the bottom outside corners of S3P1 and S1P16  ; reference\_point1 = (-199.2901, -152.4163)  ; reference\_point2 = (199.2901, -152.4163) |

For the bottom g-code file, bottomcarousel5passeslowpower.nc, insert these four lines at the top of the file:

|  |
| --- |
| ; Cleaning G-code for Carousel - bottom: section 2  ; Reference points are the bottom outside corners of S3P1 and S1P16  ; reference\_point1 = (-199.2901, -52.4163)  ; reference\_point2 = (199.2901, -52.4163) |

#### Doing the Fine Alignment

Now we are set for processing each carousel part with these G-Code files.