

BANTAM PCB MILL

CNC Mill

Work Area:

139,7 x 114,3 x 40,64 mm

Single or double sided PCBs



SAFETY

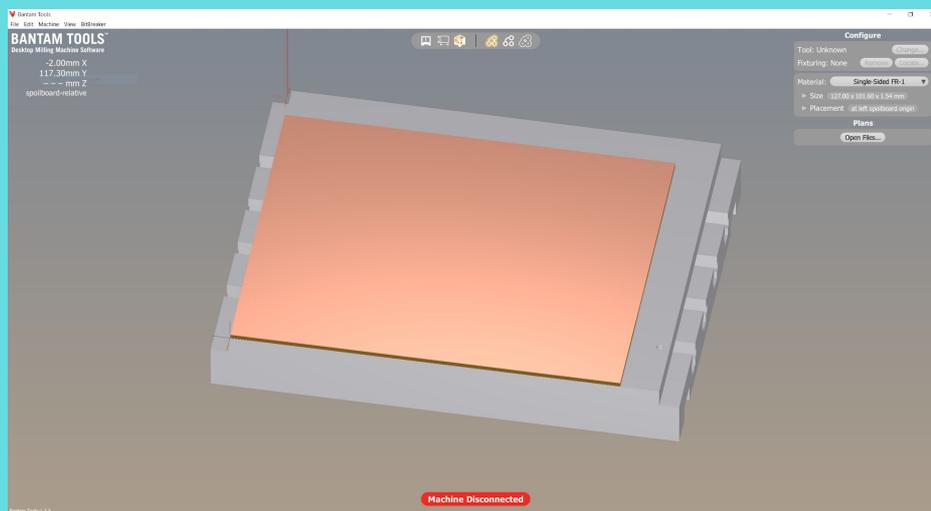
- **Do not use the machine without the covers closed**
- **Wear safety goggles**
- **Wear gloves when handling the alcohol**
- **The tools may have sharp edges, be careful not to cut yourself**
- **In doubt? Ask a Makerspace Manager**





When designing your PCB make sure to check out the design rule files (DRC) that you can find at the end of this Introduction.

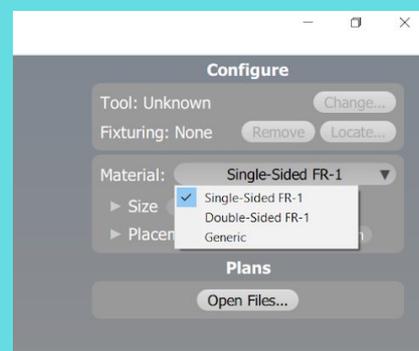
When opening the Bantam Tools software you will be prompted with this view.



Using the buttons on the top you can change between views.

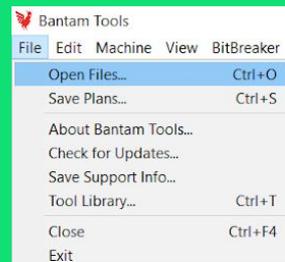
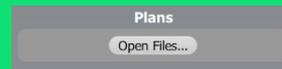
Or let the software show you more less.

The first thing you want to do is to choose your material on the right. The Single / Double-Sided FR-1 are the ones sold in the Makerspace.

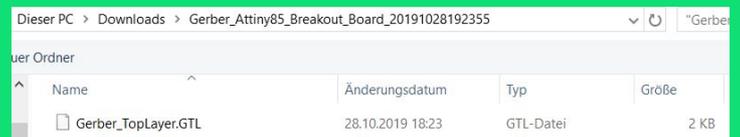




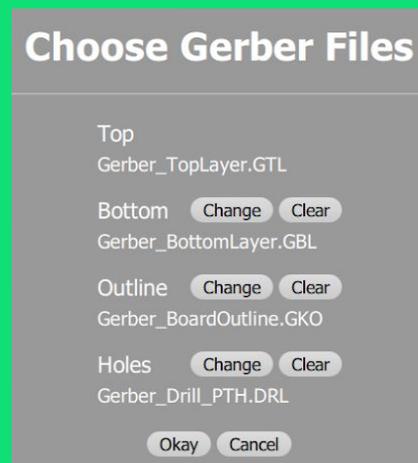
By either selecting “File – Open Files” or using the “Open Files...” button on the right you can select your Gerber file.



Navigate to your file and open the top layer file (.GTL).



The software will then automatically load all other files. Check if the files are correct. If needed use the “Change” button to adjust.

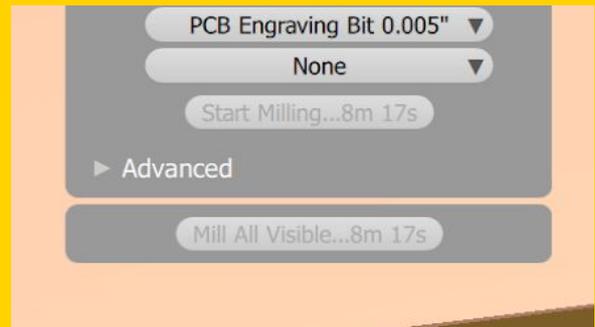


After pressing “Okay” the file should be shown on the preview. If needed use the “Placement” tool to adjust the location on the material.

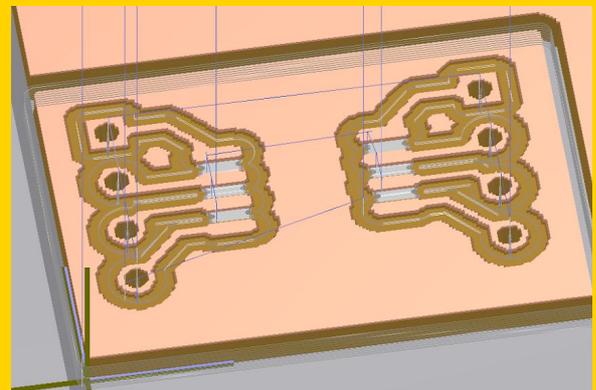




After adding the second tool the error message underneath the tools disappears.



Also we can see all the areas being machined in the preview.



NOTE: It is important to keep your available tools in mind when designing your PCB. Using bigger tools will always end with smaller machining times.

The total machining time can be found on the bottom of the tool selection window.



MILLING YOUR PCB

Log in to the machine to turn it on. The lights in the machine should turn on.

The software will recognize the machine and ask you to home it. Make sure nothing is located on the table and press “Start Homing...”

Using the toolbar on the right press the “Loading” button to bring the table to the front.

Clean both the bottom side of the PCB as well as the table using isopropanol. Then apply the double sided tape to the bottom side of the material.



Home Machine

The Bantam Tools Desktop PCB Milling Machine doesn't know where it is yet. Make sure nothing is obstructing the X, Y & Z carriages.

When ready, home the machine to get started!

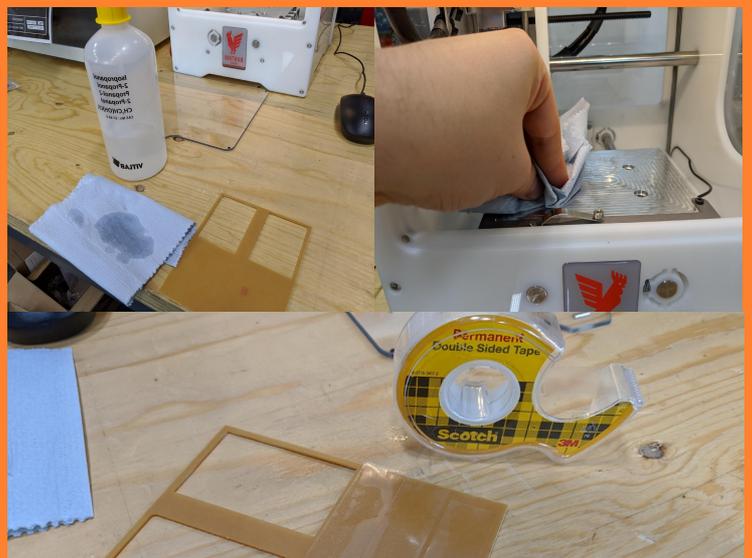
Start Homing...

▶ Move

Re-Home

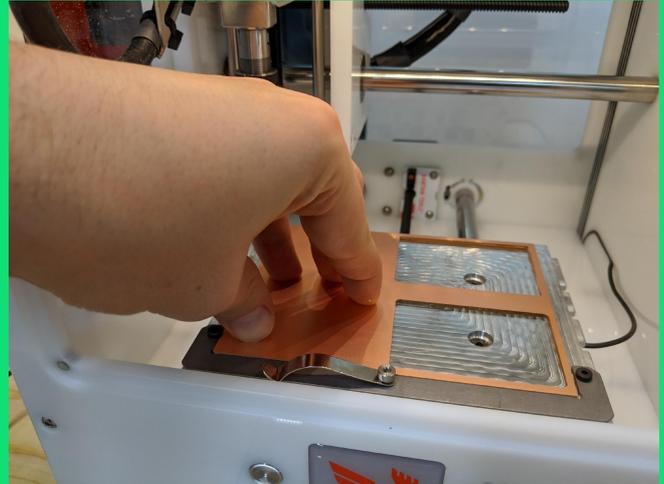
Origin

Loading



MILLING YOUR PCB

Place your material on the table. Make sure it is aligned with the front left corner of the bracket.



Insert all the window on the machine and press the “Mill all Visible” button. The software will ask you to confirm.

Mill All Visible...8m 15s

Start milling?

Milling will pause and prompt you to change the tool when necessary.

Okay Cancel

Every time the machine needs you to change a tool, it will tell you. Make sure you are inserting the correct tool.

Insert the new tool.

[Help](#)

PCB Engraving Bit 0.005"

If a tool is already inserted, remove it. Slide the new tool all the way into the collet. Hold the tool in place and hand-tighten the collet nut, then tighten the nut with the wrenches until snug.

Cancel

[Back](#)

[Continue...](#)

The tools for the tool change can be found on top of the machine. Make sure to always put them back so they do not get lost.



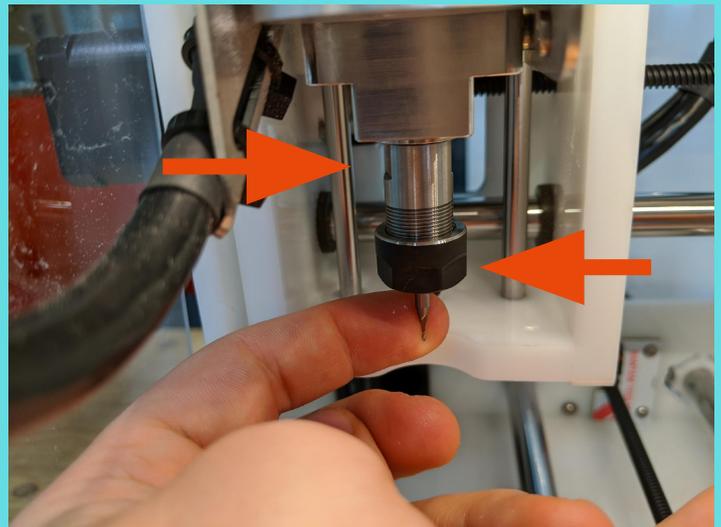
MILLING YOUR PCB

When changing the tool make sure to support it, so it can not fall out and hit the table. Use the two wrenches at the indicated positions. Hold the top wrench and turn to bottom one to left to loosen and to the right to secure a tool.

To make sure that the machine will not mill to deep it will measure each tool. To do so make sure everything on the right is correct and press “Locate Tool”.

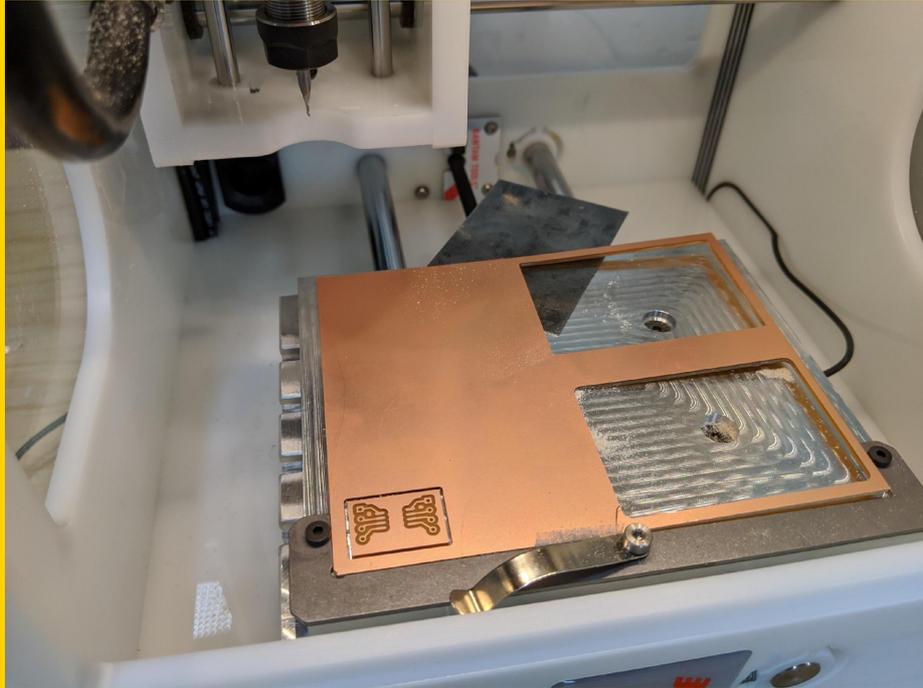
After the measurement the machine will start milling.

Using the bar at the bottom of the software you can check the progress on your job.



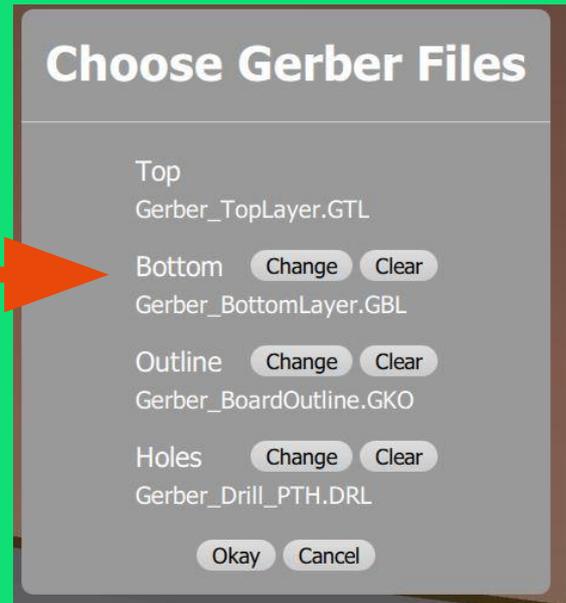
MILLING YOUR PCB

After your job is done, check the result, then take out your PCB using a spatula and clean the machine using a vacuum cleaner. Don't forget to put back all the tools in their package.

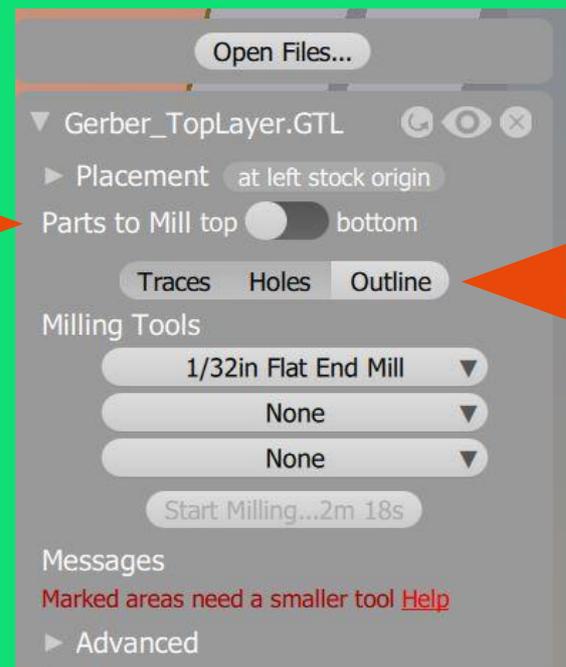


MILLING DOUBLE SIDED PCB

In case of double sided PCBs the process is the similar. First make sure that the bottom layer is chosen correctly while importing.



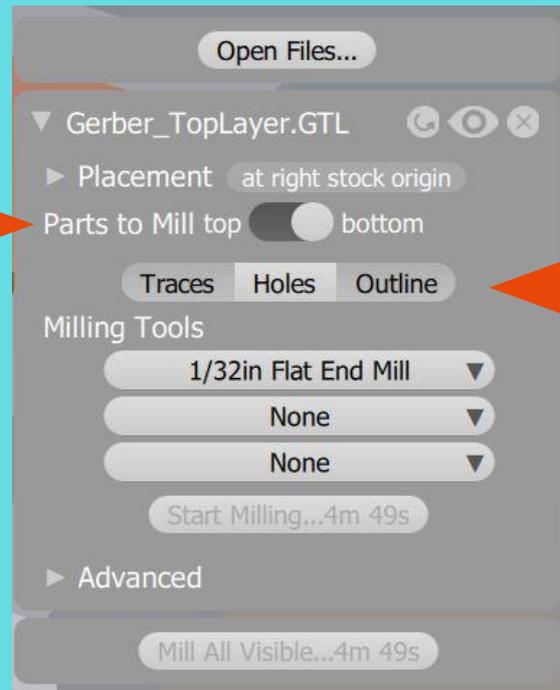
Next in the setting ensure that “Parts to Mill” is set to top and that the outline is turned off. You can verify using the preview



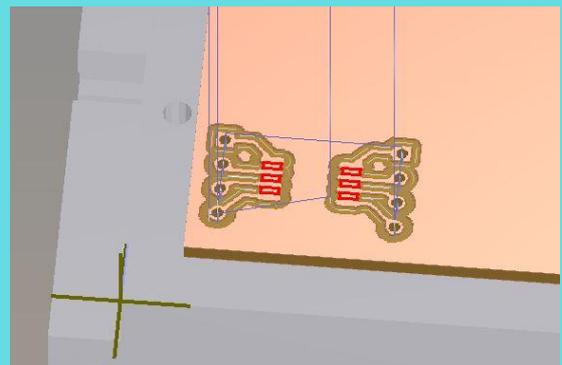
MILLING DOUBLE SIDED PCB

After the front side is done adjust the settings. This time you want “Parts to Mill” to be set to bottom. In addition you want to turn on the outline but not the holes.

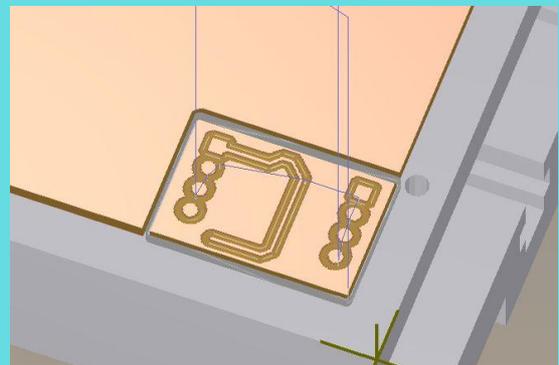
Again verify with the preview.



This is what the preview for the top could look like. The PCB is aligned with the front left corner and there is milling of the outside.



The preview for the bottom shows the PCB aligned with the front right. Also you can see that the wholes are not drilled but the outline is.



PCB RULES

- **Minimum trace width: 6 mil for Othermill Pro**
- **Minimum trace spacing: 6 mil for Othermill Pro**
- **Minimum via/pad annular ring thickness: 6 mil for Othermill Pro**
- **Minimum drill size: 16 mil (or smaller with non-standard bits)**
- **Minimum SMD pad size: 6 mil for Othermill Pro**
- **Polygon isolation value: 1 mil larger than the largest tool you want to use**
- **Route traces to through-hole pins on the bottom side only (holes are not plated)**
- **Slotted/oval holes are not supported**

If you have any questions or are unsure at please make sure to consult one of our Makerspace Managers.