



3D-LITHOPHANE.COM

CNC Router Studio User Guide

Make G-code for your hobby CNC router, and run it, from one place.

CNC Router Studio

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CNC Router Studio

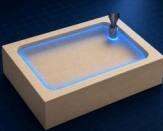
G-code for hobby routers, written in your browser. Your original picture never leaves this computer. There is no queue and nothing to wait for.

⚠️ **A router throws chips, and a cutter that breaks throws pieces of itself.** Goggles and ears, work clamped down and not held, sleeves and hair out of the way, and your hand nowhere near the cutter while the spindle turns. **Air-cut the file first** — zero Z well above the work, run the whole job in the air, and watch it. Then check the Z zero again before you cut for real. Look at the tooltip preview before you send anything, and start with a shallow depth of cut: a setting that suits one machine and one piece of wood is wrong for the next.



**Photo to carved relief**

A picture carved into wood: a roughing pass to take the waste out in layers, then a ball-nose pass over the surface. The preview shows the surface your cutter will really leave, not the one you asked for. It is the only way to find out before you cut that the bit is too big.



**3D simulator** FREE

Cut the file into a block of wood on screen and turn it round, before a cutter does it for real. It reads the finished file rather than the plan that made it, so it can catch the writer out, and it takes any GRBL file, not only the ones made here.



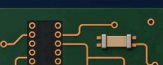
**Send to machine** FREE

Run the file on your router from the browser: connect over USB, jog, set the zero, frame the job and cut, with a stop at every cutter change. Chrome or Edge on a computer, nothing to install. Try it first with the simulated machine.



**Photo to carved relief**

A picture carved into wood: a roughing pass to take the waste out in layers, then a ball-nose pass over the surface. The preview shows the surface your cutter will really leave, not the one you asked for. It is the only way to find out before you cut that the bit is too big.



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For CNC Router Studio on the website and as the app for Windows and Mac.
October 2026.

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1 What it is, and getting started

CNC Router Studio is a set of tools for hobby CNC routers that run **GRBL** (most 3018-style machines, and many bigger ones). It does two jobs:

- **It makes the G-code:** a photo carved as a relief, shapes cut out or pocketed, V-carved lettering, your own drawings in the 2D designer, and circuit boards in the PCB designer.
- **It runs the G-code:** *Send to machine* connects to your router over USB, lets you move it and set the zero, and feeds it the job, with a stop at every bit change.

Everything runs on your own computer. Your pictures and drawings are never uploaded.

On the website, or as the app

The same tools are on **3d-lithophane.com** (the CNC Router Studio menu) and in the **desktop app** for Windows and Mac (the Software page). On the website, *Send to machine* needs **Chrome or Edge on a computer**, because only they can talk to a USB port. The app has this built in.

Your account and what is free

- Sign in with your free **3d-lithophane.com account**, on the website or in the app.
- Free: **2 jobs a day** on your live machine and **2 G-code downloads a day**. Setting a job up, the previews, the Simulator, the 3D simulator, jogging, Move and Draw are never counted.
- **Unlock CNC Router Studio** once, for life, for no limits, in the app and on the website. Launch price \$24.97 for the first 7 days after the release, then \$39. It is bought on its own: it is not part of the Supporter plans.

While the CNC tools are in beta

They are open to our beta testers. The Software page says how to become one.

The usual order

- 1 Make the G-code with one of the tools (or bring your own file).
- 2 Watch it cut in the **3D simulator**.
- 3 Open **Send to machine**, connect, check the Machine tab once, and set the zero.
- 4 Frame the job, then cut it.

2 Safety first

A router throws chips, and a bit that breaks throws pieces of itself.

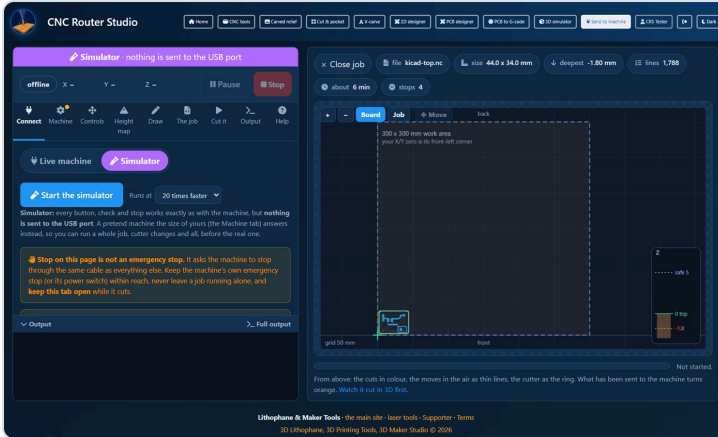
Wear goggles and ear protection, clamp the work down (never hold it), keep sleeves and hair away, and keep your hands away from the bit while the spindle turns.

- **Stop on the page is not an emergency stop.** It asks the machine to stop through the same cable as everything else. Keep the machine's own emergency stop, or its power switch, within reach.
- **Never leave a job running alone**, and keep the page or the app open while it cuts.
- **Air-cut a new file first:** set Z zero well above the work and run the whole job in the air.
- **Check the Z zero again** before you cut for real, and after every bit change.
- **Start shallow and slow.** There is no table of "correct" feeds in these tools on purpose: what suits one machine, bit and piece of wood is wrong for the next.
- Z0 is always **the top of the material** in the files these tools make.

PART ONE

Send to machine

3 Connecting the machine



The Connect tab. Left: the tabs and the controls. Right: the preview of the job.

Send to machine is split in two halves. On the left, the **tabs**: Connect, Machine, Settings, Controls, Height map, Draw, The job, Cut it, Output and Help. On the right, the **preview**: the job from above, or, before a job is open, the live view of where the machine goes. The bar at the top always shows the machine's state (Idle, Run, Hold, Alarm), where it is, and the **Pause** and **Stop** buttons.

- 1 Plug the router in by USB and switch it on.
- 2 Close any other program that uses the machine (your usual sender), or the port is busy.
- 3 Choose **Live machine**, leave the speed at **115200** (GRBL's), and press **Connect the machine**.
- 4 Pick the machine in the list of ports. It is often called *USB Serial*, *CH340* or *Arduino*.

The machine says hello (its GRBL version shows in the output), and the page reads its settings.

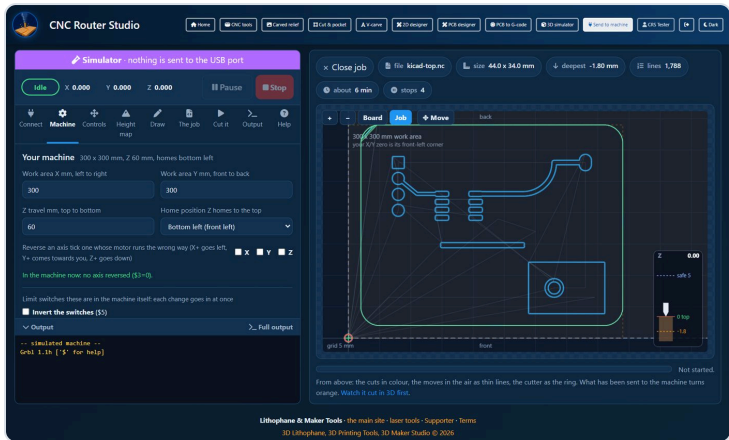
Try everything first with the Simulator

Choose **Simulator** instead of Live machine: a pretend machine the size of yours answers, and nothing goes to the USB port. Every button, check and stop works the same, so you can run a whole job, bit changes and all, before the real one. It can run 5 or 20 times faster.

GRBL 0.9 and 1.1

Both work. On an older GRBL 0.9 the page jogs with ordinary moves, and the feed and spindle buttons change the speeds in the lines it has not sent yet (0.9 has no speed buttons of its own).

4 Your machine, its settings and limit switches



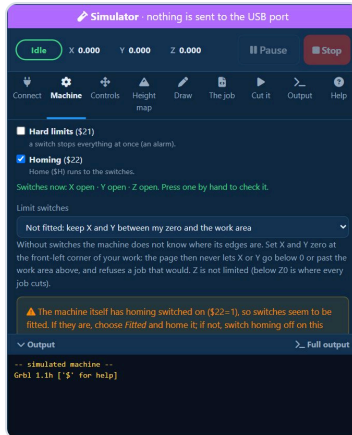
The Machine tab: the work area, the Z travel, the home corner and reversed axes.

Fill in the Machine tab once. It is saved in this browser (or the app).

Setting	What it is
Work area X, Y	How far the machine can move left to right and front to back, in mm.
Z travel	How far Z can move, top to bottom.
Home position	The corner the machine homes to, if it has switches.
Reverse an axis	Tick an axis whose motor runs the wrong way (X+ should go right, Y+ away from you, Z+ up). This is GRBL's \$3, so it goes into the machine itself.
Limit switch settings	Invert the switches (\$5), hard limits (\$21) and homing (\$22), shown as the machine has them. Each change goes into the machine at once.

Read from the machine takes the sizes from the machine's own settings;
Send these to the machine stores yours in it.

Limit switches: fitted or not



Without switches the page keeps X and Y between your zero and the work area.

- **Fitted:** home the machine (**Home (\$H)**) after switching it on. Then the page knows where the edges are, and keeps jogs and Move inside them.
- **Not fitted** (the safe default): the machine does not know where its edges are, so the page puts up **walls**. Set X and Y zero at the front-left corner of your work: X and Y then never go below 0, nor past the work area. A jog stops at the wall, and a job that would cross it is not started, with what to change. Z is not limited, because below Z0 is where every job cuts.

The page also reads the machine: if homing or hard limits are switched on in GRBL but you chose *Not fitted*, it says so, and the other way round.

To reach past the wall

Set a new zero further on, or, if switches are fitted, choose *Fitted* and home the machine.

Z check: when it cuts deeper than you set

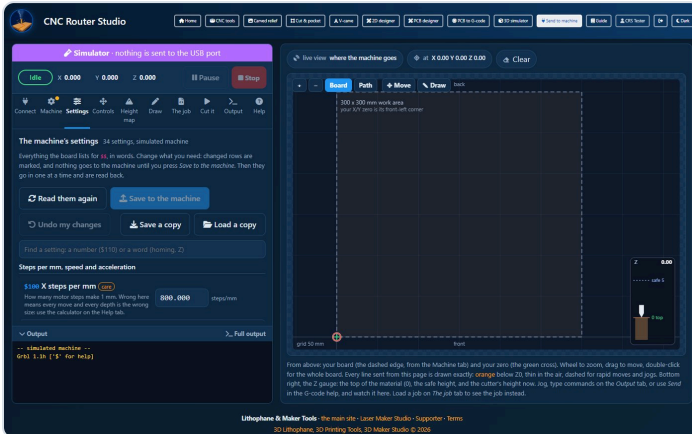
The files made here go exactly as deep as you set. If a cut comes out deeper, the cause is in the machine, and the **Z check** at the bottom of the Machine tab finds it:

- 1 It shows the machine's Z settings: steps per mm (\$102), top Z speed (\$112) and how quickly Z speeds up (\$122), and says when the speed looks high for a small router.
- 2 **Move Z up 10 mm**, and measure how far it really went with a ruler or calliper. Type that in: if it is not 10, the page works out the right \$102 and **Store it in the machine** puts it in. Move it again to check.
- 3 Lay a sheet of paper on the material and bring the bit down until the paper just stops sliding. **Up and down 20 times** moves Z up and back at full speed and stops where it started. If the bit now pins the paper, Z loses steps going up and every pass ends up

deeper than the last: lower \$112 and \$122.

Also tighten the collet nut firmly (a bit sliding down cuts deeper as the job goes on), and set Z zero again after every bit change.

All the settings: the Settings tab



The Settings tab: every setting of the connected board, in words, ready to change.

The **Settings** tab shows everything the connected board lists for \$\$, grouped and in words: steps per mm, speeds and acceleration for each axis, travel and limits, homing, the spindle, the step signals and the reports. Each one says what it does and its unit; the ones that change how the machine moves are marked *care*.

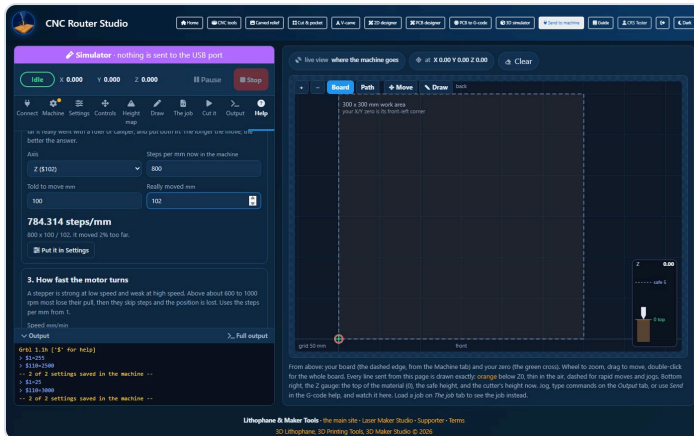
- 1 Change what you need: type a number, or tick a box (on, or the axes it applies to). A changed row is marked and shows what the machine has now. A value that will not do (a letter, or too small) is shown in red and cannot be saved.
- 2 Press **Save to the machine**. It lists the changes, and warns about the risky ones (steps per mm, a reversed axis, homing with no switches, laser mode on a router). Then they go in one at a time and are read back, and it says which ones the machine took.
- 3 **Undo my changes** puts the boxes back as the machine has them.

Type in *Find a setting* to narrow the list: a number such as \$110, or a word such as *homing*. **Save a copy** keeps every setting in a text file, and **Load a copy** fills the boxes from one (to put a machine back as it was, or to copy a machine's settings to another); nothing is sent until you press Save. Settings the board does not have are left out. On GRBL 0.9 there is no \$30 to \$32, and \$10 has five report options.

Before changing a lot

Press **Save a copy** first: if the machine moves oddly afterwards, **Load a copy** and Save puts it straight back.

The stepper calculator



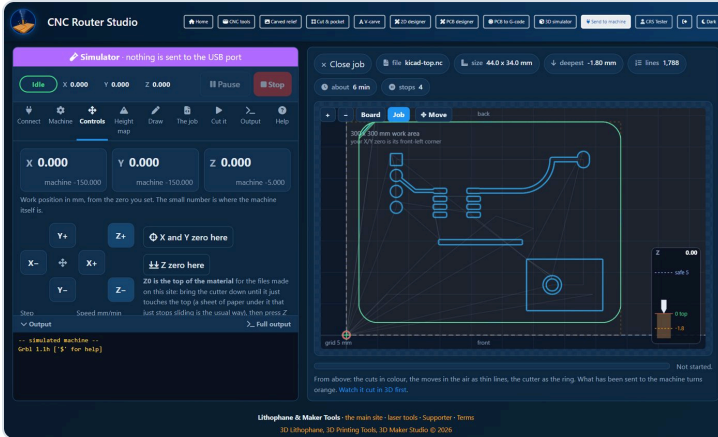
The stepper calculator on the Help tab, fine tuning Z from a measured move.

At the bottom of the **Help** tab. Four parts:

- 1 Steps per mm from the parts:** the motor (200 steps a turn for most), the microstepping set on the driver, and the drive: a lead screw or ball screw (its lead, the mm it moves in one turn), a belt and pulley, or a rack and pinion, with any reduction between the motor and the screw. A T8 lead screw with 16 microsteps is 400 steps per mm.
- 2 Fine tune from a measured move:** jog an axis a long way, measure how far it really went, and it works out the right steps per mm (what it has now, times the distance asked, divided by the distance measured).
- 3 How fast the motor turns** at a speed you choose, and the steps a second that needs. Above about 600 to 1000 rpm most steppers lose their pull and skip steps.
- 4 Driver current (Vref):** the voltage to set on the little screw of an A4988, DRV8825 or TMC2208/2209 driver for your motor's current. Big drivers (TB6600, DM542) use DIP switches instead.

Put it in Settings fills that axis on the Settings tab (\$100 X, \$101 Y, \$102 Z); press **Save to the machine** there to store it.

5 Moving it and setting the zero



The Controls tab: where the machine is, the jog buttons and the zero buttons.

The big numbers are the **work position**: from the zero you set. The small number under each is where the machine itself is.

Jogging

- The arrow buttons move X and Y; Z+ and Z- move Z.
- Choose the **step** (0.1, 0.5, 1, 5, 10, 20, 30 or 50 mm; it is kept for next time) and the **speed**. Z moves at a third of the speed.
- On the keyboard: the arrow keys move X and Y, **Page Up** and **Page Down** move Z (while the pointer is not in a box).

Setting the zero

- 1 Jog the bit over the front-left corner of your work and press **X and Y zero here**.
- 2 Bring the bit down until it just touches the top of the material. A sheet of paper under it that just stops sliding is the usual way. Use the 0.1 mm step for the last bit.
- 3 Press **Z zero here**.

Also here: **Go to X/Y zero**, **Home (\$H)**, **Unlock (\$X)** after an alarm, **Reset**, and the **safe height** for moves in the air.

The spindle

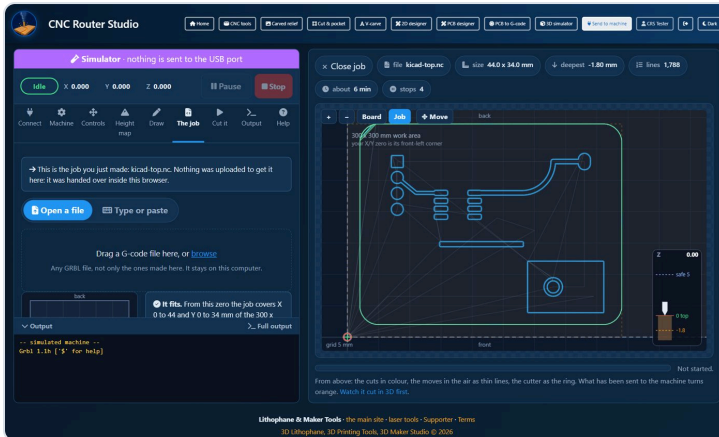
Under the controls, the **Spindle** slider sets a speed from 0 to 12000 rpm. **Spindle on** starts it at that speed, and while it runs it follows the slider; **Spindle off** stops it. During a job the file sets the speed (change it on the Cut it tab). GRBL turns the speed into power against its full

speed: \$30 on GRBL 1.1, usually S1000 on GRBL 0.9. A speed above that runs at full speed, and the page says so.

With a probe

A clip on the bit and a wire on the material can set Z zero for you, exactly: see the height map, *Zero Z with the probe here*.

6 Opening and checking a job



The job tab: the file, the checks, and the job drawn on the preview.

A job made with one of the tools arrives here by itself when you press **Send to machine** on that tool. Otherwise:

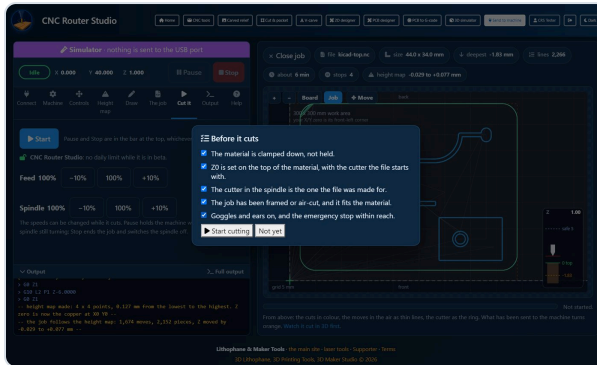
- **Open a file:** drag a G-code file onto the box, or browse. Any GRBL file works, not only the ones made here.
- **Type or paste:** an editor for G-code, with line numbers and **G-code help** (every command, what it does, and examples to insert). Press **Use this G-code** or **Ctrl** + **Enter**.

The checks

- The chips above the preview: the file's size, its deepest cut, its lines, about how long it takes, and how many stops (bit changes) it has.
- **It fits** (or not): where the job lands from your zero on the work area, and the bed drawn from above.
- Anything in the file worth a look: cutting with the spindle stopped, no pause after the spindle starts, and the like.

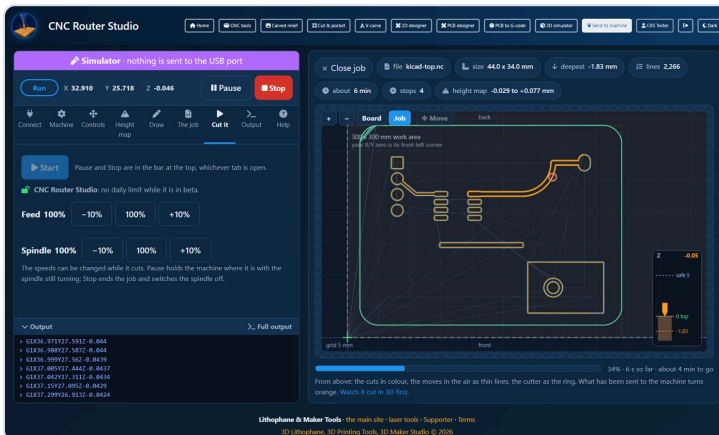
Frame the job traces the job's outline at the safe height with the spindle off, so you can see where it lands on the material before anything is cut.

7 Cutting it



Five checks before every job.

- 1 Open the **Cut it** tab and press **Start**.
- 2 Tick the five checks (clamped, Z0 on the top, the right bit, framed, goggles and the emergency stop), then **Start cutting**.



A job running: what has been sent turns orange, with the progress and the time left.

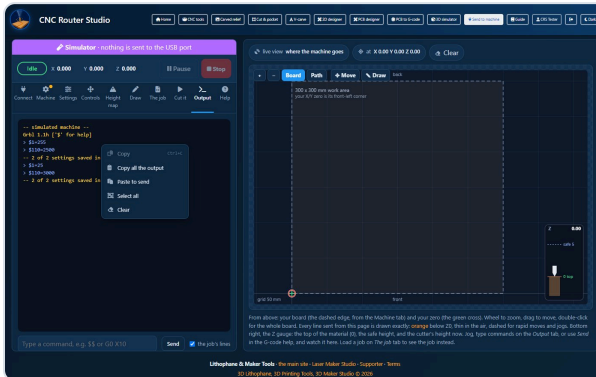
- **Pause** holds the machine where it is, with the spindle still turning. Press it again to go on.
- **Stop** ends the job: it holds the machine, then resets it, which empties its buffer and stops the spindle. It should keep its place; if it reports an alarm, unlock it, and home it if it may have lost its place.
- **Feed** and **Spindle**: -10%, 100% and +10% while it cuts.

Bit changes

When the file stops for a new bit (M0, M1 or M6), the page stops in front of it and says which bit to fit. The machine is then yours: jog clear, change the bit, set **Z zero** again on the top of the material, and press **Carry on with the job**.

The output

The **Output** tab shows everything said to and by the machine, with a box to type commands (for example \$\$ for its settings). **Save** keeps it as a text file. The latest lines also show under every tab.



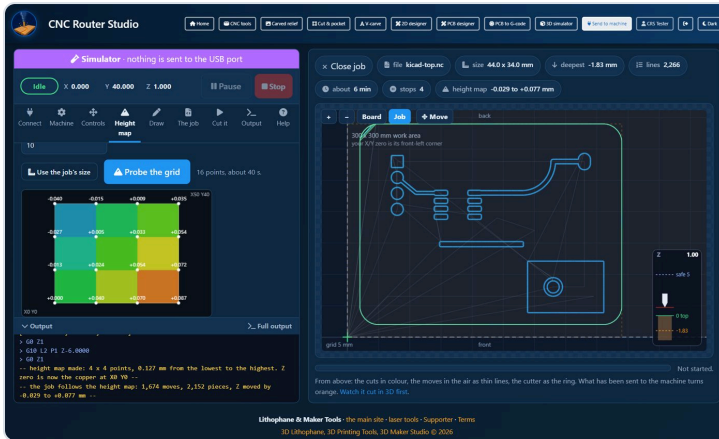
Right click on the output: copy, paste to send, select all, clear.

Right click on the output (on the Output tab or the strip under the other tabs) for **Copy** (what you selected), **Copy all the output**, **Paste to send**, **Select all** and **Clear**. A pasted line waits in the command box for you to check and send. Several lines (pasted there, or with **ctrl+V** in the command box) are sent one at a time after you say yes; they run as they are, so for a whole job use *The job* tab.

Your free jobs

On the free plan a job is counted when it starts on the *live* machine: 2 a day. Starting the same job again in the same visit is not counted again, and the Simulator never is.

8 The height map, for boards that are not flat



A 4 by 4 grid probed on a board: blue is lower, orange higher, each point with its height.

A circuit board, or any thin sheet, is never quite flat. Isolation routing on a PCB is only 0.05 to 0.1 mm deep, so a board 0.1 mm higher at one end is cut right through there and missed at the other. The height map fixes that: the probe touches the board at a grid of points, and every job then follows the board.

The probe

A crocodile clip on the bit and a wire on the copper (or a metal plate on the work), to the controller's **probe pin** and ground. Before the first grid, test it: start *Zero Z with the probe here* with the wire held away, and touch the wire to the clip while the bit comes down. It must stop at once. If it does not, press the machine's emergency stop and check the wiring.

Probing

- 1 Set X and Y zero where the job starts.
- 2 **Zero Z with the probe here**: the bit goes down slowly until it touches, and that is Z0.
- 3 Set the area (**Use the job's size** fills it in from the open job) and the points across and front to back. 4 by 4 is plenty for a small board.
- 4 **Probe the grid**. When it finishes, Z zero is set on the copper at the first point (front left).
- 5 **Jobs follow the height map** is ticked by itself: every job's depths now follow the board. The job shows a *height map* chip.

After a bit change

Set Z zero with *Zero Z with the probe here*, anywhere on the board: the map lines it up. Do not move the X/Y zero after probing, because the map is where the board was. The page warns you if it has moved.

9 Move and Draw on the preview

Once connected, and with no job open, the right half shows the **live view**: every move the page sends, drawn exactly, with your board and your zero. The wheel zooms, a drag moves the view, and a double-click shows the whole board. Bottom right, the Z gauge shows the top of the material, the safe height and where the bit is.

Move

Press **Move** on the preview: a click sends the machine to that point, and a drag makes it follow the pointer. **Esc** stops it at once. The strip at the bottom says whether the bit is in the air or cutting, with its own speed. Without limit switches, Move stops at the walls too.

Draw, then cut

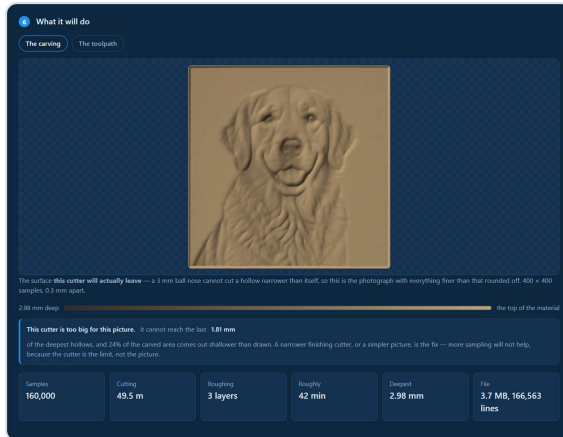
The **Draw** tab lets you draw a shape on the live view and cut it straight away:

- 1 Pick the bit, and how you draw: *Freehand* (press and drag) or *Point by point* (click each corner).
- 2 Choose where it cuts: *Centre* (on the line), *Outside* (cut a part out), *Inside* (a hole) or *Pocket* (hollow out the inside).
- 3 Set the depth, each pass, the feed, the plunge and the spindle speed.
- 4 **Make the cut**: it becomes the job, with the checklist, Pause and Stop as any job.

PART TWO

Making G-code

10 Photo to carved relief

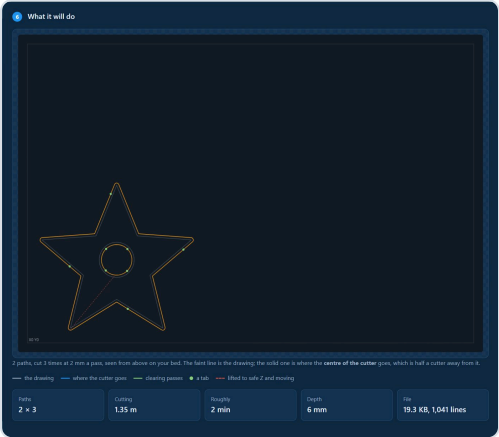


A photo as the carving the bit will really leave, with the numbers under it.

A picture carved into wood: light parts stand proud, dark parts are cut away. A **roughing** pass takes the waste out in layers, then a **ball-nose** pass goes over the surface.

- 1 The picture:** a clear subject on a plain background carves best. It stays on your computer.
- 2 The shape to carve:** brightness, contrast, gamma and smoothing, watching the preview.
- 3 Size on the material, and how deep.**
- 4 The cutters:** the finishing bit (a ball nose is the one for a relief) and the roughing bit.
- 5 Your machine:** the bed, the corner of the zero, the feeds and the spindle speed.
- 6 What it will do:** the carving as the bit will really leave it, not as you asked for it. If the bit is too big for the detail, it says so, before you cut.
- 7 The G-code:** download it, watch it cut in 3D, or send it to the machine.

11 Cut & pocket



A star and a circle from an SVG: the drawing, the bit's path, and the tabs.

Cut a shape out of the material, or hollow one into it, from an **SVG** (best) or a PNG or JPG that is traced to outlines first.

Operation	What it does
Cut it out	The bit runs outside the line: the shape you drew is the part you keep.
Cut the hole	The bit runs inside the line: a hole the size you drew.
Clear a pocket	Hollows out the inside to the depth you set.
Score on the line	No offset: the middle of the bit follows the line.

- **Depth** and **depth per pass**: the cut comes off in layers. For a cut-out, the depth is the material's thickness plus a little.
- **Lead-in ramp**: the bit slopes into each pass instead of plunging.
- **Holding the part down**: tabs, small bridges left on the last pass, so the part is still there when the cut finishes. Cut them with a knife afterwards.

The offsetting is real, not approximate: a shape narrower than the bit simply has no path, and the page says how much of your drawing that applies to.

12 V-carved text and outlines

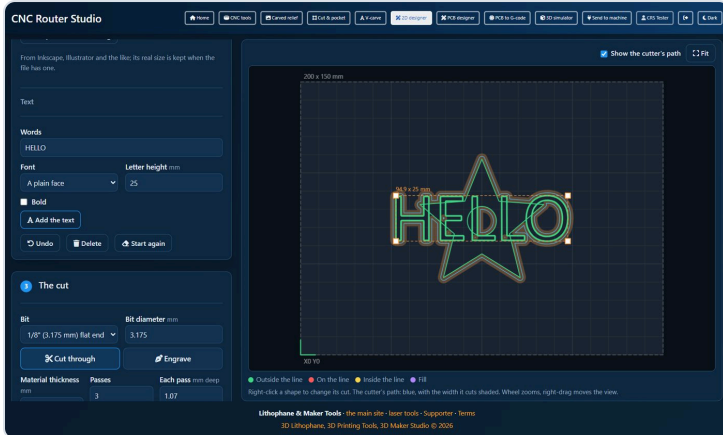


V-carving: the depth follows the width of each stroke, so every corner comes to a point.

The one that makes letters look cut rather than routed: with a V-bit, the depth follows the width of each stroke, so a serif tapers away to nothing and every inside corner comes to a true point.

- 1 **What to carve:** type the words and pick a font (a serif face is the classic), bold or italic, and press **Use these words**. Or drop a drawing.
- 2 **The V-bit:** its angle (60° is the usual choice for lettering), its diameter, the deepest it may go, and the step between passes.
- 3 **When a stroke is too wide** for the bit, the middle is left standing: a second, flat cutter can clear it.
- 4 **Size and where it goes, your machine,** then the preview and the G-code.

13 The 2D designer



The 2D designer: a star from an SVG and the word HELLO, each in the colour of its cut.

Draw what you want to cut, right here: over a photo, with lines and shapes, text as outlines, or an SVG you import.

The board and drawing

- **The board:** its width and height. X0 Y0 is its front-left corner. You can put a photo under it to draw over (it is never cut, and never uploaded), or let the page trace its outline for you.
- **Draw:** *Move*, *Line* (click each point), *Freehand*, *Rectangle* and *Circle*; *Import an SVG drawing*; and *Text* (words, font, letter height).
- **Right-click** a shape for its size in mm, a percentage, copy, turn 90°, mirror, move to the middle, delete, and where the bit cuts. Drag a corner handle to resize it.

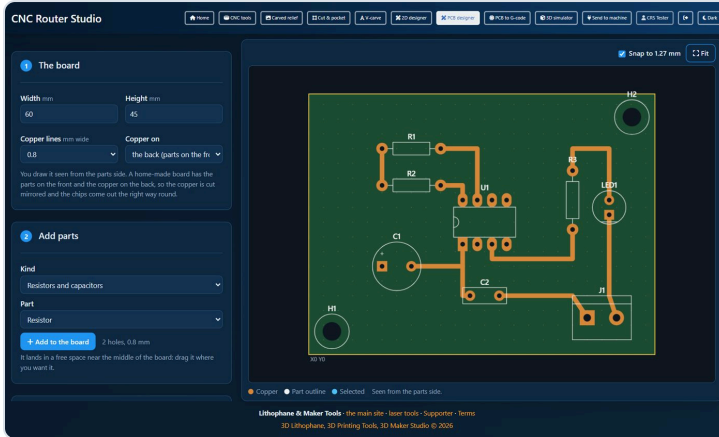
Where the bit cuts, in colour

- **Outside the line (green):** the shape you drew is what comes out.
- **Inside the line (yellow):** a hole the size you drew.
- **On the line (red):** the middle of the bit follows it. Open lines are always cut on the line.
- **Fill (violet):** when engraving, the whole shape sunk in.

The cut

- **Cut through:** the material's thickness, a little deeper, the number of passes and the depth of each (change one and the other follows), and tabs.
- **Engrave:** the depth, the passes and the depth of each.

14 The PCB designer



A small 555 LED blinker: parts, copper lines and two mounting holes.

Draw a simple one-sided circuit board with through-hole parts, then make the cut files in one click.

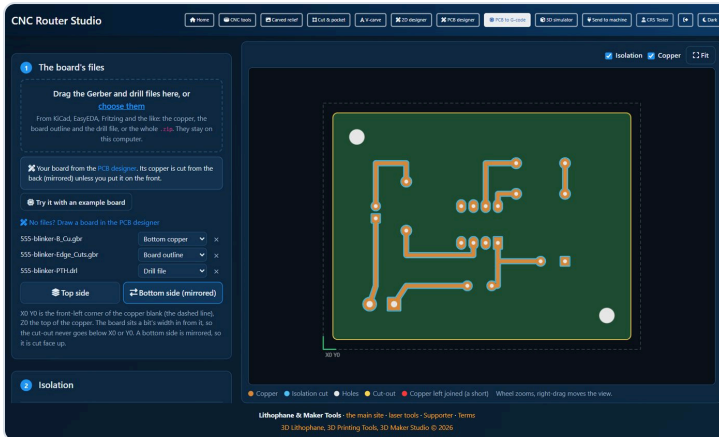
- 1 The board:** its size, the width of the copper lines, and which side the copper is on. A home-made board has the parts on the front and the copper on the back, so the copper is cut mirrored and chips come out the right way round. You draw it seen from the parts side.
- 2 Add parts:** choose the kind, then the part, and press **Add to the board**. It lands in a free space: drag it where you want it. Resistors, capacitors, diodes, LEDs, transistors, regulators, chips of 4 to 28 pins, switches, potentiometers, connectors, a 7-segment display, a buzzer, pads and mounting holes.
- 3 Connect them:** choose **Copper line**, click a pad, click the corners, and click the pad it goes to. **R** turns the selected part, **Delete** removes it, and its lines follow when you move it.
- 4 Make it:** the page warns you about a part off the board, pads too close, a line over a pad, or lines that cross. Then **Make the cut files** opens the board in PCB to G-code.

You can also download the Gerber files for any other program, and save or open your design as a file.

The pin letters

On transistors and regulators the letters (E B C, I G O, G D S) are the usual pin order: check them in your part's datasheet.

15 PCB to G-code



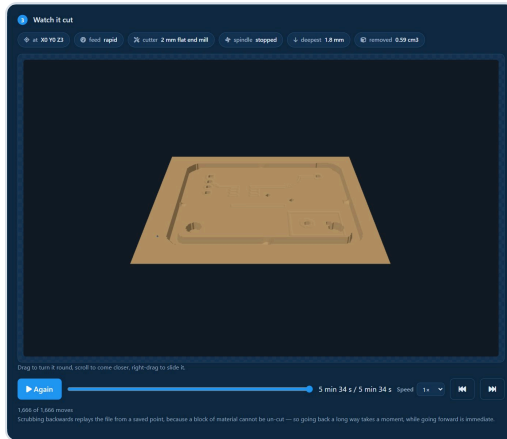
PCB to G-code: the board on the copper blank (the dashed line), with the isolation round the copper.

Mill a circuit board from the files a PCB program exports (KiCad, EasyEDA, Fritzing), or from the PCB designer. Drop the copper, outline and drill files, or the whole .zip. Each file gets a role, which you can change.

- **Top or bottom side:** a bottom side is mirrored, so it is cut face up.
- **Where it lands:** X0 Y0 is the front-left corner of the **copper blank** (the dashed line). The board sits a bit's width in from it, so the cut-out never goes below X0 or Y0. The page says how big the blank must be.
- **Isolation:** a V-bit (its angle and tip) or a small end mill cuts round the copper, at the depth and in the passes you set.
- **Shorts:** where two bits of copper are closer than the bit can get between, the page marks them in red. A finer bit, or a smaller V-bit angle, usually fixes it.
- **Holes:** a drill for each size (the machine stops and says which drill to fit), or one end mill that mills the bigger holes round.
- **Cut-out:** round the board's outline (or a rectangle), in passes, with tabs.

Download everything makes one file that stops before each new bit; or download each part on its own. **Send to machine** and **Watch it cut in 3D** work as on the other tools. For a board that is not flat, probe it first.

16 The 3D simulator



The example board after the whole file has run in the 3D simulator.

Cut the file into a block of wood on screen, and turn it round, before a bit does it for real. It reads the **finished file**, not the plan that made it, so it can catch the writer out, and it takes any GRBL file.

- **The file:** drop a G-code file, or press *Watch it cut in 3D* on any tool.
- **The material and the cutter:** its thickness, the margin round the job, the bit, and the detail.
- **Watch it cut:** Run it, the slider to go anywhere in the file, and the speed. At **1×** it runs in real time, from the time the job is worked out to take, so a 10 minute job takes about 10 minutes to watch; **2×**, **4×**, **8×**, **10×**, **20×** and **50×** run that many times faster, and the button at the end goes straight to the finish. Drag to turn the block, scroll to come closer.
- **What is in the file:** anything worth a look, such as moving sideways with the bit down.

What it cannot tell you

It is geometry: it shows where the bit goes and what it removes, not the bit flexing, the wood tearing or the spindle slowing down. It is never a reason to skip the air-cut.

PART THREE

When something is wrong

17 Problems and fixes

What you see	What to do
No port in the list	On the website use Chrome or Edge on a computer. Check the cable and that the machine is on; close your other sender. Some machines need a CH340 driver installed.
Connects, then nothing	Check the speed is 115200, then press Reset.
An axis goes the wrong way	Tick it under Reverse an axis on the Machine tab (it goes into the machine).
Alarm	Press Unlock (\$X). Home it if it may have lost its place. A hard limit alarm means a switch was hit: jog away from it first.
"At its wall"	No limit switches: X and Y stay between your zero and the work area. Set the zero where the job starts, or choose Fitted if the machine has switches.
"Goes past the walls"	The job is not inside the work area from your zero. Move the zero so the whole job is in front of and to the right of it, or make the job smaller.
"It does not fit"	Check the sizes on the Machine tab, and where your zero is.
The machine refused a line	The page stops and shows the line. Skip it and carry on, or stop the job. A refused \$J on GRBL 0.9 is normal: the page uses ordinary moves there.
The probe did not touch	Check the clip and the wire, and that Z zero is close to the board; then Unlock.
The cut is too deep or too shallow	Set Z zero again on the top of the material, with the bit that is in the spindle. On a PCB, use the height map.
Today's free jobs or downloads are used up	They come back tomorrow, or unlock CNC Router Studio for no limits. The Simulator and the 3D simulator are always free.

Still stuck? Write to support@3d-lithophane.com. **Save** on the Output tab makes a file of everything the machine said: send it along.

18 Keys and quick reference

Key	Where	What it does
   	Send to machine	Jog X and Y one step
 	Send to machine	Jog Z up and down
	Send to machine	Stop Move; drop the shape being drawn
 + 	The G-code editor	Use this G-code
    	2D designer	Move, Line, Freehand, Rectangle, Circle
	PCB designer	Turn the selected part
	2D and PCB designers	Delete the selected shape or part
 + 	2D and PCB designers	Undo
 , double-click	Drawing lines	End the line

A few GRBL words

Word	Meaning
\$H	Home, on the limit switches
\$X	Unlock after an alarm
\$\$	List the machine's settings
G0 / G1	Move in the air / cut at the feed
M3 / M5	Spindle on / off
M0	Stop here (a bit change)
G38.2	Probe: move until the probe touches