

CNC ROUTER TRAINING MANUAL

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PURPOSE

The purpose of this manual is to familiarize readers with the preparation, operation, and requirements to use the Shapeoko CNC Router. This training is to be completed under supervision by a staff member familiar with the Shapeoko CNC Router. Do **NOT** Attempt this training without first letting a Makerspace staff member know.

DOCUMENT ORGANIZATION

The document is organized as follows ...

- Safety Warnings
- Pre-Check
- General Operations
- Specific Example Certification
- Tool Specifications
- Prohibited Materials

Warning!!!!

The Shapeoko CNC router uses a high torque spindle to rotate a bit at thousands of rpm. Keep hands clear of machine while it is working.

Please ask a staff member to accompany you while completing your training and even after you get certified.

Using the CNC Router with prohibited materials may be unsafe. The accepted materials are wood, plastics and certain aluminums, however cutting of aluminum is only acceptable in certain instances (ask makerspace staff for assistance with aluminum cutting. Never leave the CNC Router on its own while you are using it.

Make sure to read the general safety warnings on the next page **BEFORE** continuing your training.

If you have any questions regarding the CNC Router or the training, please ask the staff for assistance.

General Warnings

- Before connecting the power tool to a power source, make sure the power switch is in the OFF position.
- Before starting the tool, clear the work area of all foreign objects.
- Always wear eye protection, ear protection, and respiratory protection near the machine in use.
- Ensure all shirts are tucked in, loose clothing is not permitted while using this machine. Ensure to remove all jewelry including, but not limited to, necklaces, watches, rings, wristbands, earrings, and other accessories that may be caught in the CNC Router.
- Long hair past the shoulders must be put up in a bun or be put under a hat.

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SHAPEOKO CNC ROUTER

The steps for certification are as follows, and will be explained in more detail.

1. Machine Check
2. Preparing the Machine
3. Setting up the software
4. Cutting the workpiece

If you wish to learn more about this CNC router before beginning your training, additional information on getting started with the Shapeoko 3 CNC Router can be found here.

[Introduction](#)

You will not need to install the software, as it is installed in the Makerspace, however if you wish to install it on a laptop or personal device that is acceptable.

Training Piece(s) to be Chosen and Completed

All of the starter projects at this hyperlink location, [Shapeoko Jumpstart](#) , are acceptable as your training piece. If you wish to see more detailed videos and tutorials on how to make such pieces, each has its own design videos and tutorials. Once you navigate to the link, scroll down to the table of contents and choose the “project” you would like to complete. OfCourse you may prepare for your training before coming to the makerspace.

This is the procedure you will be following while completing your training.

Machine Check

1. The checking of the Shapeoko CNC Router will be done daily by the Makerspace Staff, and the machine will be ready for use. If concerns arise, or you wish to know how to check the machine before use, please refer to the Machine operating checklist on page 2 of the Shapeoko XL manual found here, [shapeoko3_xl_assembly.pdf](#)

Preparing the machine

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1. Secure the workpiece (the piece you wish to cut), right-side up in the desired orientation to the worksurface using a technique appropriate to the material.
2. Ensure the work area is clear of all cables and debris. Make certain that there is nothing beneath the rails which may interfere with the carriage movement.
3. Connect the USB cable from the Carbide Motion board to the computer.

Setting up the Software

1. Start Carbide Motion 5 on your computer
2. Turn on the Shapeoko CNC Router by flipping the red in-line rocker switch on the power supply cord to the ON position. Once it is on, you will be able to see a blue light on the within the Carbide Motion board.
3. If necessary, home the cutting tool to the proper place in relation to the workpiece.
4. Load the NC file (the gcode which instructs the machine). Start the compact router and set to correct speed.

Cutting the Workpiece and Finishing Up

1. While staying clear of the work area, monitor and make sure there are no issues with the machine during operation. Ensure there is no buildup of dust, debris, or fumes, as well as watch for items becoming loose. Do not reach into the machine's work envelope or insert any objects while the machine is operating.
2. If an item becomes loose, or debris begins to cloud the workspace and you are concerned for your safety or the safety of the machine, please get the attention of one of our makerspace staff. Do not attempt to rectify mistakes on your own.
3. Once the job has completed, turn off the router and return the gantry to the home position. Ensure the mill has completely stopped spinning before removing the finished pieces and clearing off any debris.

Any other questions you have may be found here [Shapeoko 3 Resources](#) on the Shapeoko official website.

CONTACT

If you have any other questions, contact the Makerspace staff at makerspace@utrgv.edu

