



# PYTHON XPR

[ USER GUIDE ]



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## **[ USER GUIDE ]**

Version 2021.5

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## GENERAL INFORMATION

### For your Safety

As with all machinery, there are certain hazards involved with the operation and use of your router. Use it with caution and at your own risk. Ignoring safety precautions may result in physical injury. When in doubt regarding its installation and operation, do NOT use the equipment until you have consulted a CNC Factory technician.

Read the following carefully and fully before operating the router:

1. Keep the work area clean and ensure adequate lighting is available.
2. Do NOT wear loose clothing, gloves, bracelets, necklaces, or ornaments that may be caught in the router.
3. Do wear face masks, safety goggles, ear muffs, and other body protection applicable for the operation or environment.
4. Make sure the emergency stop 'E-stop' button is pressed when entering the router work area.
5. Ensure that the power is disconnected from the router before servicing.
6. Never leave the router running without supervision.
7. Do not use dull, deformed, or broken cutting tools.
8. Ensure that keys, adjusting wrenches, and all loose items have been removed from the router and stored in a safe place.
9. Make sure all the nuts and bolts are secured in place.

### Noise Emission

This router is noise-emitting. However, the operator's exact exposure to noise cannot be determined precisely to set supplementary precautions, as it is affected by different factors, such as: duration of exposure, noise from adjacent machines and other sources, characteristics of the work environment, etc. Noise emission standards also vary country to country and we recommend consulting your local regulations. Wearing a hearing protection device is highly recommended when operating this machine.

### Router Specifications

This guide is for the general operation of the **Python XPR CNC Router**. Since most routers are made-to-order, the exact specifications of your router is found in your purchase order and its requirements in your pre-install guide.

### Limited Warranty

CNC Factory provides lifetime router support and warrants that it will be free of defects in workmanship and materials for a period of 18 months beginning on the date of delivery. This warranty does not include (wearable) parts consumed during normal operation or maintenance required in the ordinary course of operation. For full warranty details, refer to the General Terms and Conditions for the Sale of Products and Services signed during the purchase of this router.

## General Warnings



Improper operations that may cause the router to fail, damage it, or cause bodily injury to the operator are prefaced with this warning sign.



The program does NOT have an Undo button/option. If you configure and save the wrong values by mistake, your only option to revert to the original is to type back the original values and save again. If you do not remember the original values or are in doubt, please contact your CNC Factory technician for help reverting to the original settings. Using incorrect values may cause damage to your router or make it fail.



Critical interfaces that may cause irreparable damage to your router are usually password-protected. This password is available upon request from your CNC Factory technician. There will be advanced segments of the program that you will not need for your day-to-day operations and are reserved for technicians' use only, and they will be identified as such. Please avoid tinkering with advanced features, which may or may not be password-protected.

## Contacting Support

Your lifetime technical support can be accessed by calling 714-581-5999\* or online via:

**LOG IN TO ZENDESK**

If you do not have a Zendesk log-in, please contact support@cncfactory.com.

**OPEN KNOWLEDGE CENTER**

We will try to resolve your issue as quickly as possible via phone call or remote access. Should those not suffice, you may contact us at 714-581-5999 to talk about an on-site visit by a technician. Separate charges may apply.

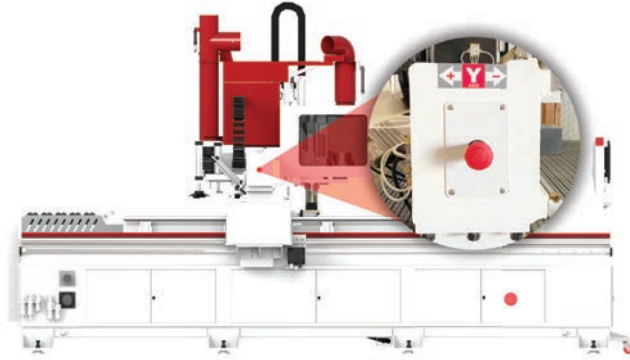
*\*only available during regular office hours*

## The Emergency Stop or E-stop

The E-stop is a safety feature that stops all operations of the router. You have three (3) emergency stop buttons that are easily accessible while the router is operating:



On the controller



On both sides of the gantry

To initiate an emergency stop, press the red button. Once pressed, the controller & router safety lights will turn red to alert you that your router is stopped.



Pressing the E-stop sends an electrical pulse to the entire router that shuts all operations down instantly—we recommend using it sparingly for emergencies and should not be utilized to pause or as a regular stop button, as frequent use may damage your motors.



To turn the router back on from an E-stop, turn the E-stop button clockwise, in the same direction as the arrows shown. The red safety lights will then turn to white.



For those on the gantry, a green ring appears when the E-stop is disengaged. When pressed and engaged, the green ring will disappear.

## Maintenance



### Lubrication

Our routers come with a fully automated, pressurized lubrication system for all the liner guides and ball screws. For best results, use 000 Semi-Fluid Lithium Grease.

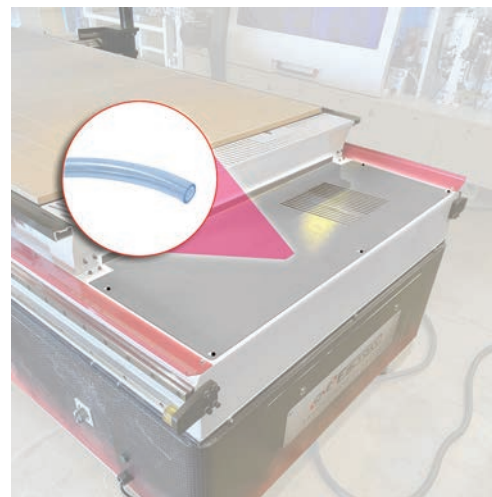
All helical racks & drill blocks require manual lubrication with Klüber Isoflex Topas L32N Special low-temperature grease. As a rule of thumb, apply 5cc of lubrication after every 40 hours of operation.



When lubricating, jog the machine all the way up to the area without the spoilboard, to avoid damaging it in case of leaks or drips. Oil on the spoilboard can clog it and affect material work holding.

### Daily Checks

1. Clean the router, wipe off any excess oil, and buff with a dry polishing cloth. This will reduce the chance for dust build up.
2. Check all liner guides and ball screws. Make sure there is a thin layer of oil on it.
3. Check cutter teeth for chips and dullness.
4. Collets and spindle collet holes must be cleaned regularly. Ensure that the slots in the collets are free of sawdust, as it can build up and prevent the collet from compressing. If the collet or spindle holes are clogged, the router bit may vibrate or get loose while cutting. Serious spindle damage or bodily injury may occur.
5. Check the AC unit drain, make sure it is not twisted or leaking into the control cabinet under the router bed.

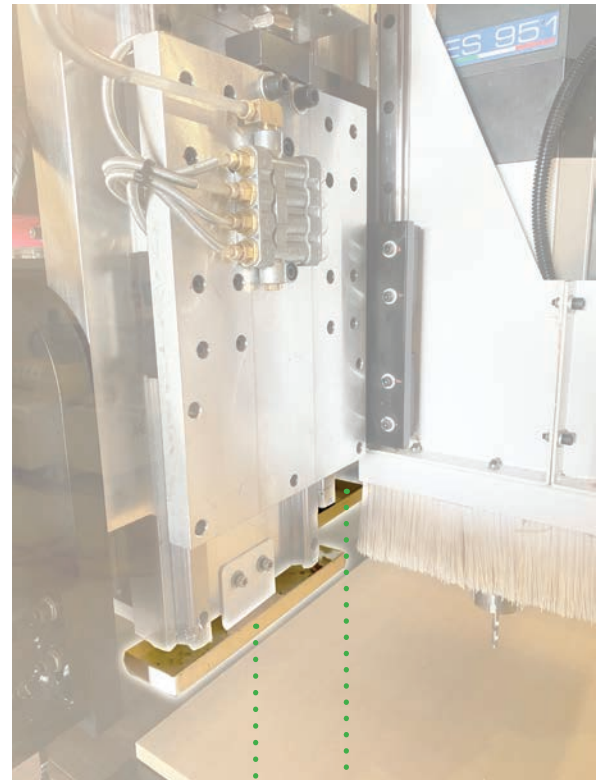


AC drain hose inside control cabinet



### Weekly Checks

1. Clean grease and dirt off the helical racks. Apply gear grease on all helical racks.
2. Check the dust collection pipe and brush hood. Clean off all debris and dust build up.
3. Generally inspect the router for any damage or loose/worn parts.
4. Empty oil tray under the liner carts.



Oil trays

### Quarterly Checks

Conduct a drill block grease check.

### Annual Checks

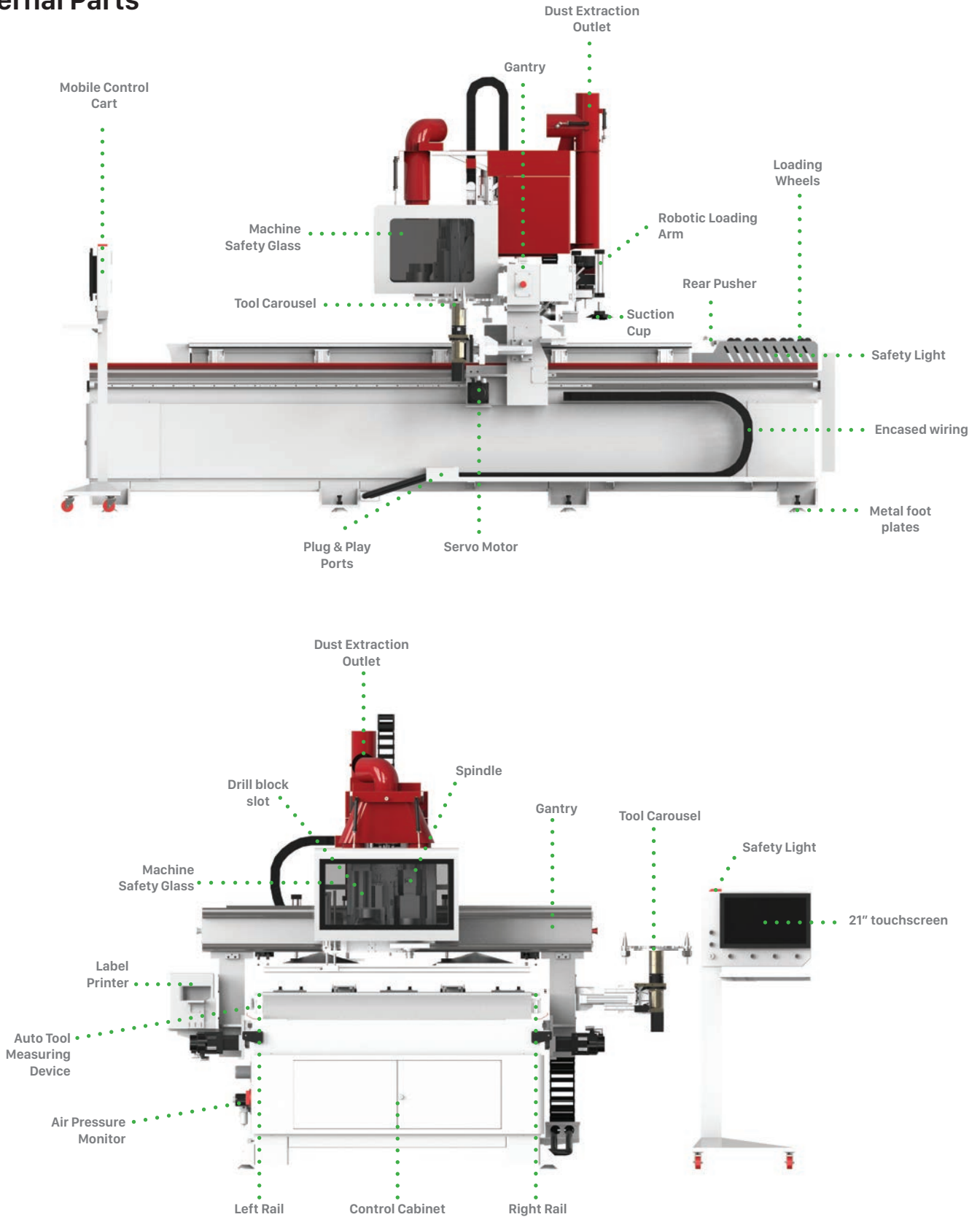
Schedule an on-site service with a CNC Factory technician.

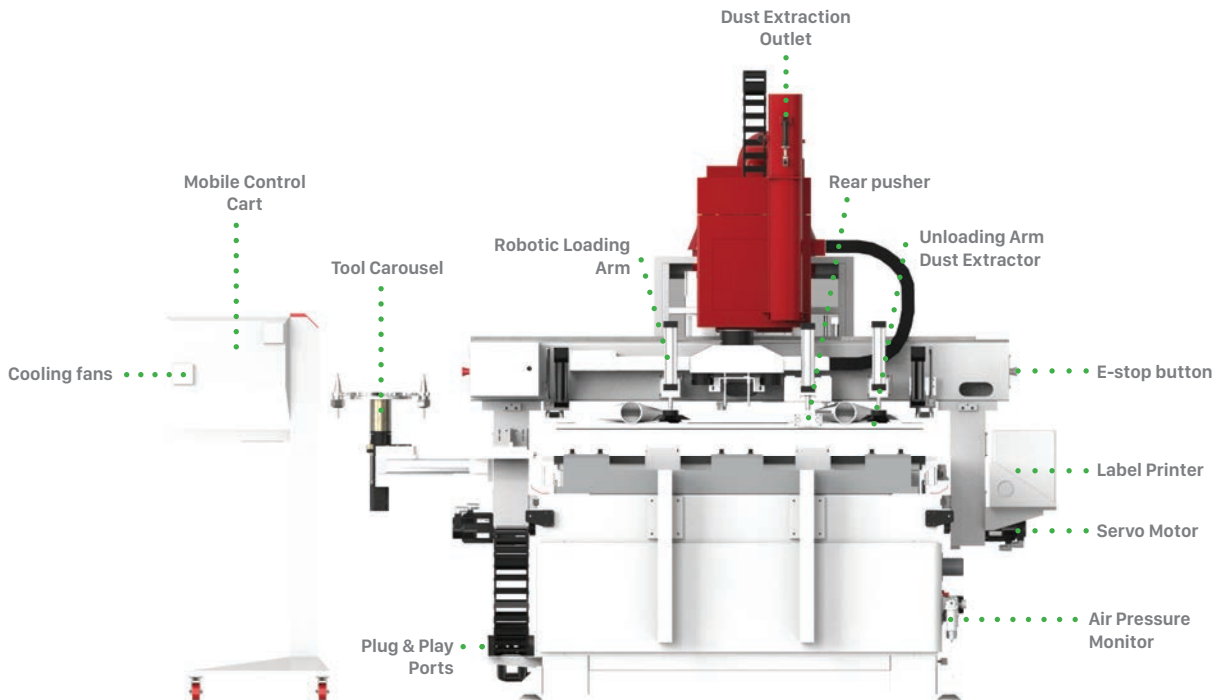
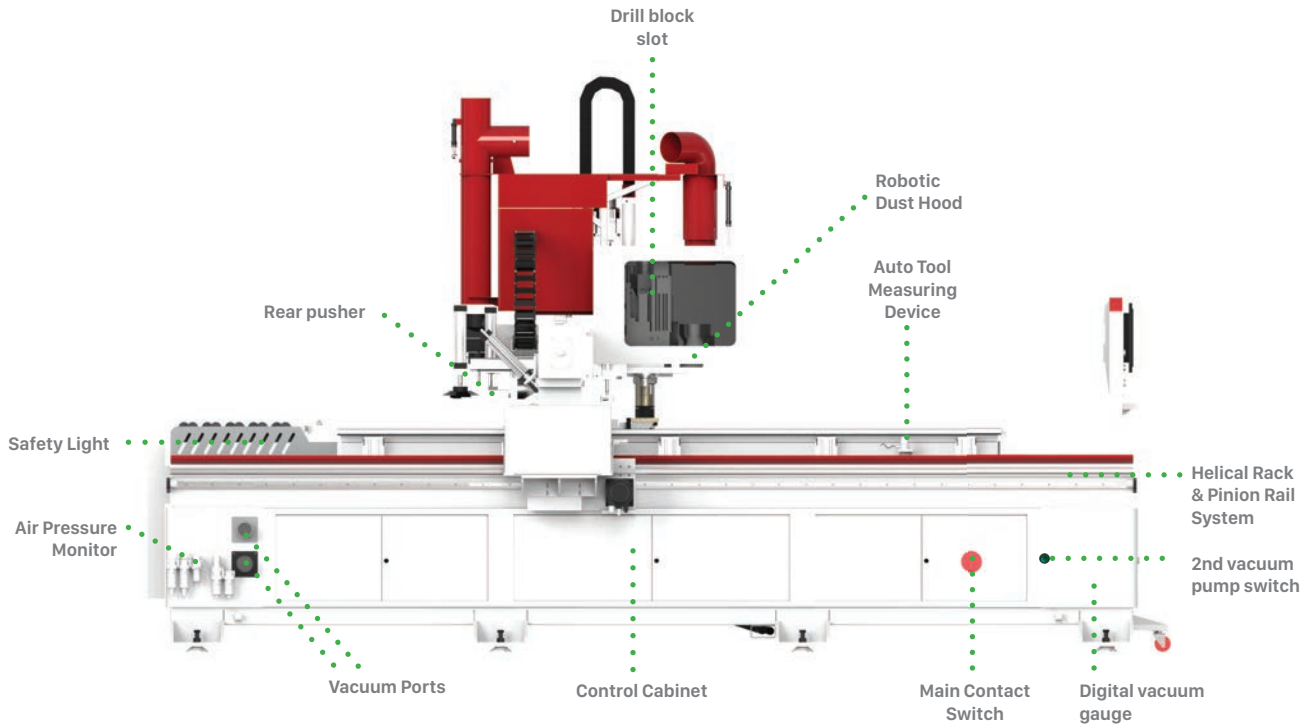
## Connectivity

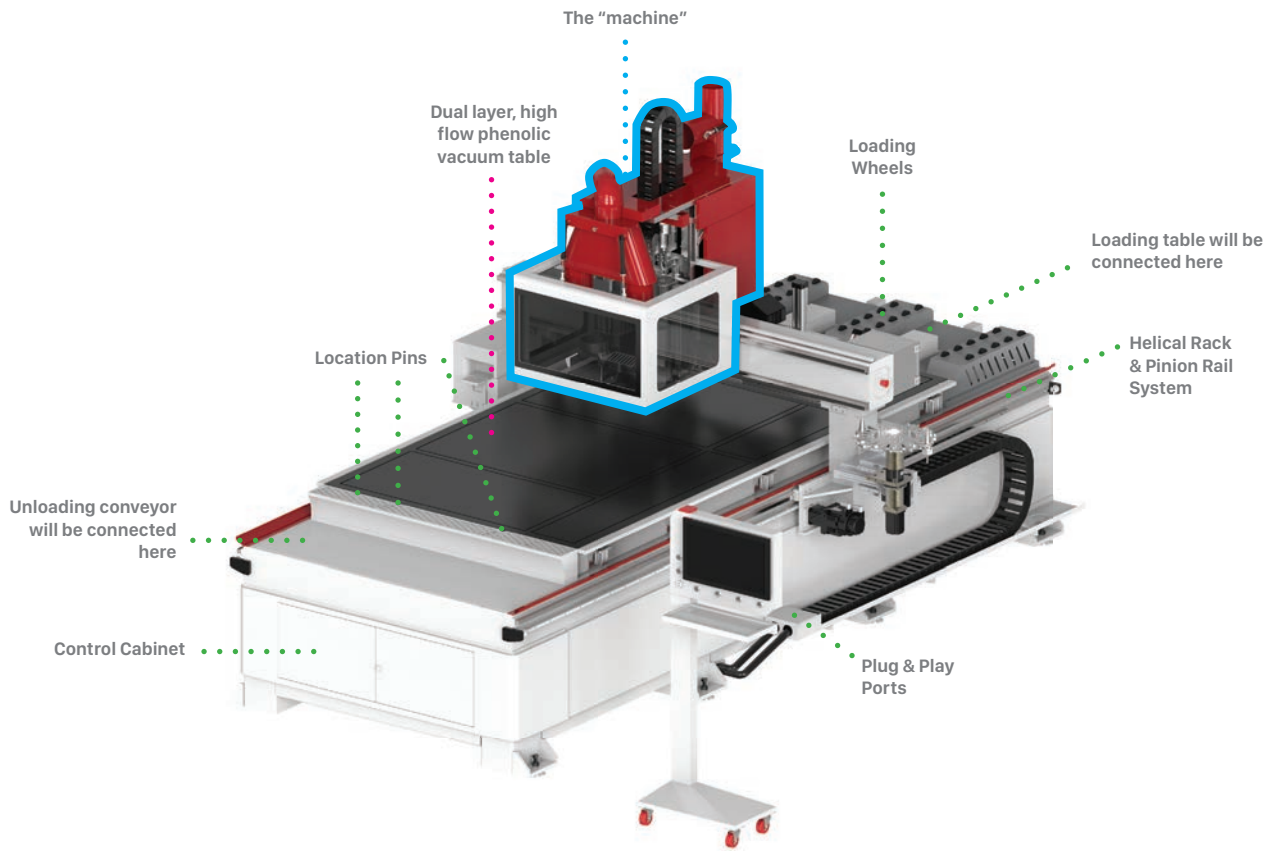
The Python has USB, WiFi and ethernet connections. It only requires the internet for virtual/remote access. Configurations for your router's connectivity will already be set-up by your technician during installation.

# PARTS OF YOUR ROUTER

## External Parts







## Notable Terminology

### Router

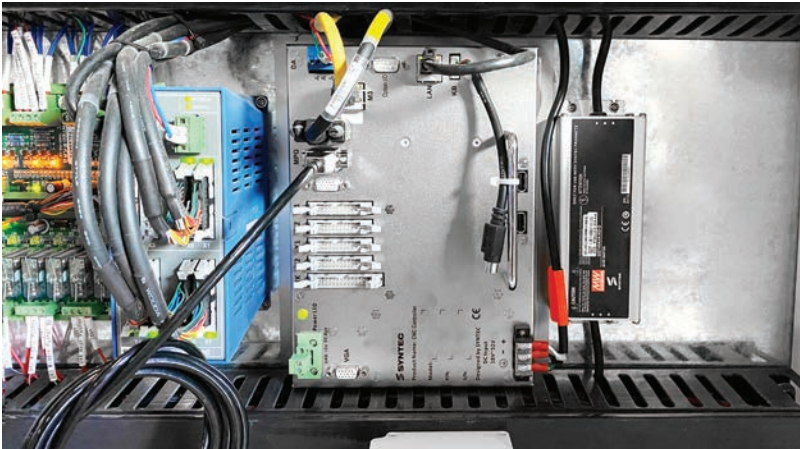
Refers to the entire Python XPR, including its controller/control cart.

### Machine

Refers to the block of components responsible for cutting that is anchored to the gantry (includes the spindle, drill block, and dust hood). Whenever there is a mention of machine movement, it refers to this block (and not to be confused with the router, since the router, after all, is stationary during operations).

## UNDERSTANDING YOUR CONTROLLER

### Main Controller vs. Control Cart



(ABOVE) Your actual, *main* controller is located inside your router cabinet. This is the brain of the machine. You may operate the router directly by connecting a screen directly to its VGA port, and importing files through its USB ports. We recommend this option for advanced technicians.

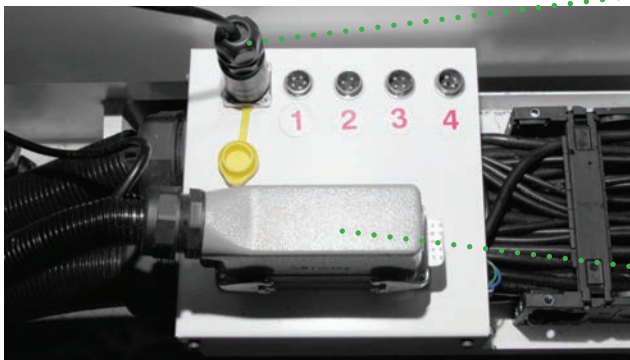
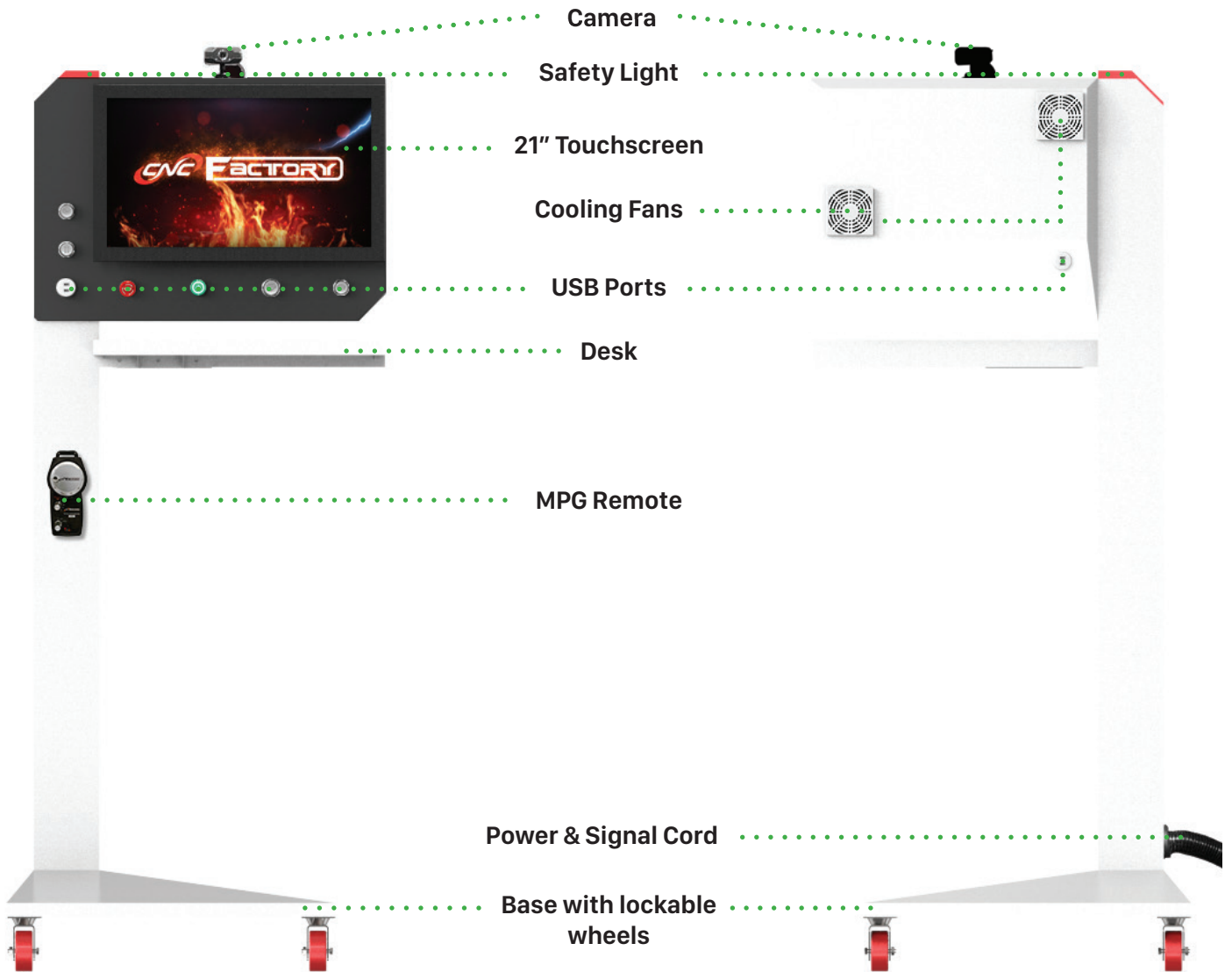
(RIGHT) This “controller” is a PC with a Windows operating system, and is sometimes referred to as the “control cart”. An emulator allows this to behave similarly to your main controller. We recommend using this in operating the router since it has a bigger, touchscreen display, as well as the familiar Windows system that is more user-friendly.



It is important to note the difference since some operations on the Python are typically used only for the main controller and not for the PC controller/control cart. In this manual, we may also use the term “controller” interchangeably for both. However, for clarity, when talking about the “main controller”, we are only referring to the one inside your router.



**Parts of your Control Cart**



**Signal Cord**

Sends a network signal to the main controller.

**1:** Loading table power

**3:** Unloading table data

**2:** Unloading table power

**4:** Light curtain

*\*Soon, a 5th port for loading table data will be available.*

**Power Cord**

Powers up the CPU & Screen.



### Safety Light

Tells the router's current operating status. For the XPR series, the rear side of the routers have similar safety lights.

- **White Light**- Static mode: no operation is in progress and the router is ready for a command. In this mode, the bottom right of the screen will display "Ready"
- **Red Light**- Alarm mode: there is an operational issue or error. In this mode, the 'Alarm' display at the bottom right of the screen will blink red with "Not Ready" beside it.
- **Green Light**- Operation mode: operation is in progress. No other command may be executed unless the current operation is stopped. In this mode, the bottom right of the screen will display "Busy".

### Start Button

Press to start operation. You will have to physically press the button to run a program. This is intentional to prevent unintended starting from accidental pressing of touchscreen buttons or to prevent people with internet access to your controller from operating your router remotely.

### Pause Button

Pauses the operation. While on pause, your router is still fully powered, motors are still running, the spindle or drill block are still spinning (although the feed will be zero), and it will not affect all other commands that are queued up. To resume operation, press the Start button again.

**USB Ports**

Dual ports for importing files or connecting wireless devices (keyboard, mouse).

**E-Stop Button**

Instantly shuts everything down including power to the loading and unloading tables (if available). You will need to restart all files interrupted by this shutdown.

**Power Button**

Turns the controller and the router on/off. When turning it on, allow a few seconds for the controller to power up. Once the safety light turns white, it means the main controller is operational and you may click on the Viper icon on your desktop.



If there are pending alarms, the safety light may light up red after powering on.

Before turning off your router, we recommend shutting down the PC before pressing the power button. Skipping this step may degrade your PC over time.

**Vacuum Buttons**

Sends signals to the vacuum box to turn on/off your vacuum pumps. Each button corresponds to a designated pump (maximum of 2 vacuum pumps).

**Wireless Handheld MPG Remote**



Move clockwise to move on an axis' positive direction. Move counterclockwise to move on an axis' negative direction.

Controls the axes

- Turning all the way counterclockwise turns the remote off. Selecting an axis automatically turns it on.

Controls the range of movement (either by 1mm, 10mm, or 100mm increments).

Status lights (1st bar: power indicator, 2nd bar: signal quality, 3rd bar: low battery).

The MPG remote requires two AA batteries. Remove the protective rubber case to access the battery terminal (at the back).



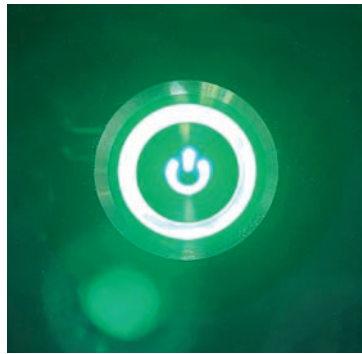
## BASIC OPERATIONS

### Turning On the Router

1. Make sure there is no object or person around the router's motion area to prevent collision.
2. Make sure power and air are connected to the router.
3. Make sure all the E-Stop buttons are released.
4. Rotate the main contact switch clockwise until it clicks in place.
5. Press the green power button on the control cart. The power is on once it turns red.  
It may seem counterintuitive, but **RED** light = controller is **ON**  
**GREEN** light = controller is **OFF**
6. After booting into Windows, wait for the Safety Light to turn on, then double click the Python icon on the desktop and wait for the program to initialize. If you click the Python icon before the safety light comes on, a Connection Setting window may appear. Just press [F2 IP Connection] to resolve this error.
7. Press and hold the button on the spindle to put the previous tool back into the spindle. Release the button to lock the tool.
8. Make sure no alarm is pending or flashing. Go to the Utilities screen, click [Spindle warm up].
9. Once the spindle warm up is completed, the machine is ready to use.



Main contact switch at the side of the router.



Power button on the control cart.



Wait for the safety light to turn white before starting the program.



Python program icon on the controller desktop.

#### Spindle Warm Up button

Warm up the spindle only during initial spindle setup or when not in use for a prolonged time. Otherwise, you can warm it up once a month.

Utilities Screen Tab

The screenshot shows the CNC Utilities Page interface. At the top, it displays 'G54', 'N0 L1', 'Coord.', '2020/12/15', '11:07:37', and tabs for 'Utilities', 'Advance', and 'Operation'. The main area is titled 'CNC Utilities Page' and contains several buttons: 'Spindle warm up', 'Material Align', 'Resurface Spot Board', 'Drill Cylinder', 'Drill On', 'Spindle Forward', 'Table Clean', 'Material Thickness', 'Block Offset', 'HOME', 'MDI', and 'Auto Tool Measure'. A large red 'STOP RESET' button is prominent in the center. To the right, there is a 'Machine' status panel showing X, Y, Z, and C coordinates at 0.000. Below that, there are speed and feed rate settings for F, S, and SP. At the bottom, there is a 'Hold' and 'Reset' button, and a row of function keys: F1 Coord., F2 Program, F3 Offset/ Setting, F4 Monitor, F5 Maintain, F6 User Param., F7 Fast Diag., and F8 About.

## Turning Off the Router

1. On the Utilities screen, switch to Jog Mode by clicking on the [Jog] button.
2. Jog the machine to the tool changer side, press and hold the button on the spindle to release tool and put that tool in the tool changing station.
3. Jog the Z-axis all the way up.
4. Close the Python software by click the top right X.
5. Shut down Windows.
6. Press the power button on the control cart.
7. Rotate the main contact switch to the OFF position.
8. Disconnect air from the router. Your drill block will drop down after air is disconnected.



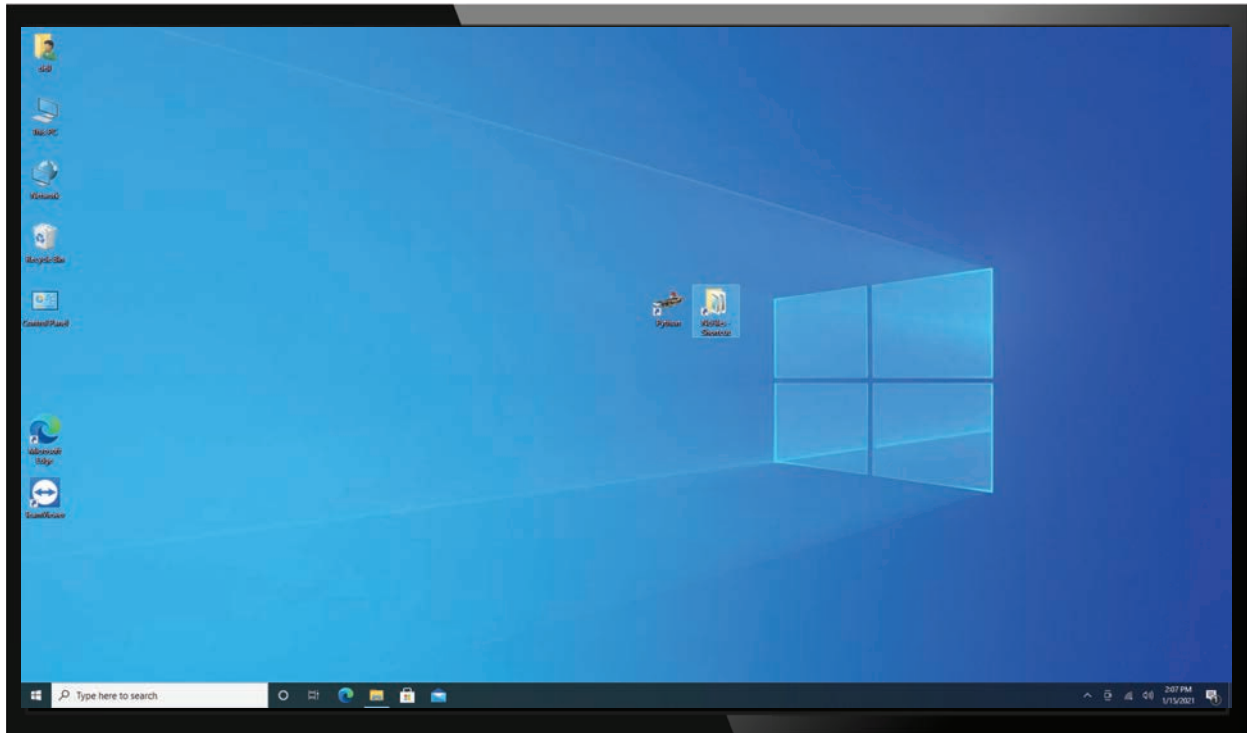
As long as you jog the Z-axis all the way up BEFORE turning the machine off, it should not hit your vacuum table.

The screenshot shows the CNC Utilities Page interface. At the top, it displays 'G54', 'N0 L1', 'Coord.', '2020/12/15', '11:07:37', and tabs for 'Utilities', 'Advance', and 'Operation'. The main area is divided into several sections:

- Current Tool No.:** 0
- CNC Utilities Page:** Contains buttons for 'Spindle warm up', 'Material Allment', 'Resurface Spoil Board', 'Drill Cylinder', 'Drill On', 'Spindle Forward', 'Table Clean', 'Material Thickness' (0.000), 'Block Offset', 'HOME', 'MDI', and 'Auto Tool Measure'.
- STOP RESET:** A large red button with white text, highlighted by a vertical green dotted line labeled 'Z-axis controls'.
- Axis Controls:** A grid of buttons for 'Z+', 'Y+', 'JOG', 'X-', 'X+', 'FAST', 'Z-', and 'Y-'. The 'JOG' button is highlighted by a horizontal red dotted line labeled 'Jog button'.
- Machine Status:** A table showing coordinates for X, Y, Z, and C axes, all at 0.000.
- Parameters:** A table showing feed rate (F: 0.000 mm/min), spindle speed (S: 1000 RPM), and various over-speed limits (G00, G01, SP) with percentage ranges and adjustment buttons.
- Bottom Bar:** Contains buttons for 'Hold', 'Reset', 'Tool Measure', 'WorkPiece Coord', 'Vacuum Zone Setup', 'Simulation', 'Run Screen', 'Ready', 'Jog', and 'Alarm'. Below this are function keys F1 through F8.

Annotations on the right side of the screenshot include:

- A red dotted line pointing to the window's close button (X) labeled 'Close Window'.
- A red dotted line pointing to the 'Utilities' tab label labeled 'Utilities Screen Tab'.
- A red dotted line pointing to the 'JOG' button labeled 'Jog button'.



## Getting Started with your Shortcuts

By default, you will have the following shortcuts pre-installed on your controller's desktop:

- Python icon

To begin operating, click on the Python icon on your desktop. After loading, you will see the Main Screen.



The program contains all the controls for *all* functionalities of CNC Factory 5th generation routers. Further upgrades may be required on your router to perform all these functionalities. Please contact **[support@cncfactory.com](mailto:support@cncfactory.com)** if you wish to upgrade your router.

- CNC File folder [This PC > Local Disk (C:) > Network > CNC > NcFiles]

This is where you upload all your files from your CAD/CAM software. When saving files here, we recommend saving all files of a single job in 1 folder. We do not recommend saving a folder inside another folder (or multiple file levels) as this may cause a program error.

## Main Screen

This is the first screen you see after opening the Python shortcut. It shows real-time information of your machine location and speed. These will make better sense once you have gone through the rest of the operations in this manual. There is no action needed on your part for this screen.

This standard CNC display shows the following information:

The screenshot shows the CNC Machine Main Screen with the following information:

- Current File:** G0307 N0 L1
- Date:** 2021/1/9
- Time:** 13:35:25
- Main Tabs:** Utilities, Advance, Operation
- Machine XYZ:** X: 0.000, Y: 0.000, Z: 0.000
- Relative XYZ:** X: 0.000, Y: 0.000, Z: 0.000
- Absolute XYZ:** X: 0.000, Y: 0.000, Z: 0.000
- Dist. To Go XYZ:** X: 0.000, Y: 0.000, Z: 0.000
- Feed Speed (F):** 1000.0 mm/min, 100 % (Actual)
- Spindle Speed (S):** 1000 RPM, 100 % (Actual)
- Run Time:** 0 : 0 : 0
- Part Count:** 0 T 0
- Main Navigation Belt:** Hold, Reset, Cool Measure, WorkPiece Coord, Vacuum Zone Setup, Simulation, Run Screen, Ready, Auto, Alarm
- Function Keys Menu:** <<, F1 Coord., F2 Program, F3 Offset/ Setting, F4 Monitor, F5 Maintain, F6 User Param., F7 Fast Diag., F8 About, >>

### Back Button

Press to go back to the previous page, or multiple times to return to the Main Screen.

## Operation Page

[MAIN SCREEN > OPERATION TAB]

You will use this screen about 98% of the time, and it is made up of the following components below. Activated buttons are in green.

**Current tool**  
 ⚠ When switching tools, make sure this is updated. The machine may crash if the numbers are incorrectly assigned.

Name of current file

Main Tabs

The screenshot shows the CNC Operation Page interface. At the top, it displays 'G54', 'CYLINDER 2.CNC N0 L1', 'Coord.', '2021/1/7', '15:31:19', and 'Main Tabs' (Utilities, Advance, Operation). Below this, the 'Current Tool No.' is 3. The main area is divided into several sections: a large 'STOP RESET' button, a 'CNC Operation Page' menu with buttons for AUTO, 4\*8 Material, Simulation, File Import, Select File, Working File, Load, Unload, Load Un-Load, Dust Hood, Location Pins, and Vacuum Hold Down; a jog control panel with Z+, Y+, JOG, X-, X+, FAST, Z-, Y-, and MPG buttons; and a 'Machine' status panel showing coordinates (X: 45.355, Y: 2944.561, Z: -0.132, A: 6.000, C: -0.705) and spindle speed (F: 0.000 mm/min, S: 24000 RPM). At the bottom, there is a 'Standard Controls' bar with buttons for Hold, Reset, Tool Measure, WorkPiece Coord, Vacuum Zone Setup, Simulation, Run Screen, Jog, Ready, and Alarm. Below that is a function key bar with F1-F8 and navigation arrows.

CNC Operation Controls

**Standard Controls**

These appear in both Utilities & Operation tabs

## CNC Operation Controls

A blue rectangular button with the word "AUTO" written in green capital letters.

### AUTO

Tells the router to automatically perform its functions. **Automatic operations** will not activate unless the router is on Auto Mode.

A green rectangular button with the text "4\*8" on the top line and "Material" on the bottom line, both in white.

### Material Selection

Lets you select different material sizes. By default, it starts with the 4'x8' size. When you switch between sizes, the router's vacuum hold down locations will adjust to match your selected size. Other size-dependent features, such as unloading and unloading, will also refer to the size indicated here.

Smaller models, such as the 4'x8' Python, may only have 1 size option. In this case, the button is automatically selected.

A blue rectangular button with the word "Simulation" written in green.

### Simulation Mode

A simulation of the Auto function. If you click on Simulation while the machine is performing an operation on Auto mode, it will *pause* that operation. You may then use the **MPG remote** to manually go forward or go in reverse for that operation, one movement at a time.

*Example:* When you press Simulation while automatically loading material, the operation will pause. You can then use the MPG remote to manually control the pace of loading by turning the MPG dial clockwise or counterclockwise.

A blue rectangular button with the text "File" on the top line and "Import" on the bottom line, both in green.

### File Import

To import files directly into the *main* controller in your router cabinet, via the USB ports.

A blue rectangular button with the text "Select" on the top line and "File" on the bottom line, both in green.

### Select File

Selects files you want to use. By default, it imports files that are placed in the **CNC File folder**.

Working  
File

#### **Working File**

Selects a group of files you want to use. Pressing this button takes you to the Workinglist System Page which lets you control the execution of multiple files, including label printing.

Load

#### **Load**

Loads the raw material from the hydraulic loading table and aligns it with the spoilboard.

Unload

#### **Unload**

Unloads the processed material to the unloading conveyor. While unloading, a central vacuum suction extracts dust from the spoilboard, and two side nozzles blow air to the railings to clean the process area for the next material.

Load  
Un-Load

#### **Load and Unload**

Loads raw material from the hydraulic loading table, cleans the spoilboard, and unloads processed material into the unloading conveyor.

Dust Hood

#### **Dust Hood**

Moves the dust hood up and down. There is no need to press this button once the machine is on Auto mode. On rare occasions, you may want to raise the hood while the router is cutting to see it in action. This will cause the dust/debris to fly all over your work area though.

Location  
Pins

#### **Location Pins**

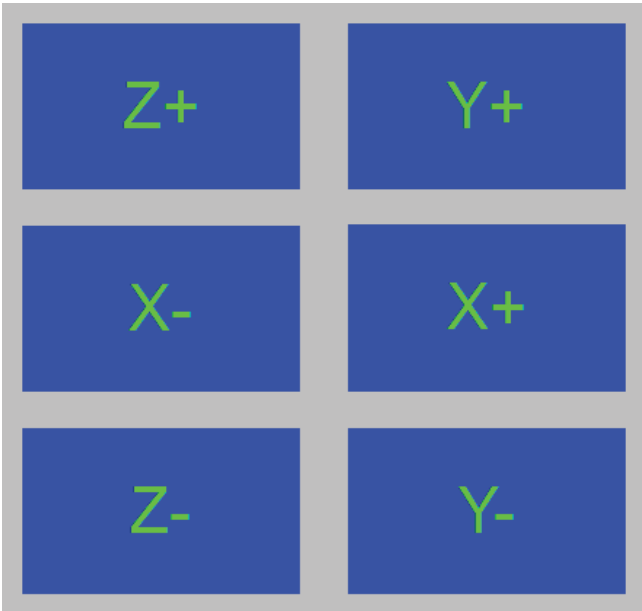
Moves the pins up and down. This is usually pressed when aligning manually loaded material. If you are on Auto mode, the location pins will automatically activate during the alignment phase of loading.





**Jog**

Click to activate Jog Mode. Here, you can manually control the movement of the machine according to each axis.



**Axis buttons (for X, Y & Z)**

Each axis has a button for positive and negative directions. The machine moves at a maximum speed of 15,000mm/min to the corresponding direction each time an axis button is pressed.



**Fast**

For a faster jog. Click while on Jog mode to move the machine at a maximum speed of 55,000mm/min to the corresponding direction each time an axis button is pressed.



**MPG (Manual Pulse Generator)**

Click to use the wireless handheld remote.

Machine	
X	0.000
Y	0.000
Z	0.000
C	0.000

**Machine Coordinates**

These are informational only and cannot be pressed nor altered. Indicates the exact, real-time position of the machine per axis.

- A (Alpha) - location reference for the ATC carousel
  - C (Charlie) - location reference for the robotic dust hood motor
- \* Both are advanced controls for technicians' use.*



F	0.000	mm/min
---	-------	--------

**Feed Rate**

Indicates the exact, real-time cutting speed of the machine in millimeters per minute (mm/min). In G-code programming, the feed rate value is found in the G01 (or G1) line.

S	1000	RPM
---	------	-----

**Spindle Rate**

Indicates the exact, real-time rotational speed of the spindle in revolutions per minute (RPM).

*Press on the numbers with the +/- sign to change values. The new values will appear in the adjacent white box. By default, the rates are set to 100% of the speed indicated in your G-code.*

G00 Over	25%	-	100%	+
-------------	-----	---	------	---

**G00 Over**

Increases or decreases the rapid movement (or travel speed) of the machine in increments of 25%, from 0% to 100%.

G01 Over	100%	-10%	100%	+10%
-------------	------	------	------	------

**G01 Over**

Increases or decreases the cutting feed rate in increments of 10%, from 10% to 150%.

SP Over	100%	-10%	100%	+10%
------------	------	------	------	------

**SP Over**

Increases or decreases the spindle rate in increments of 10%, from 50% to 120%.



Changes to these values will immediately take effect upon pressing the buttons while the machine is in operation. NEVER stop the machine while the router or drill bit is inside your material as it may cause fire.

*If you have an unloading table:* On rare occasions, the G01 changes its value during unloading when it triggers a sensor by accident. In this case, you would need to manually press 100% again to make sure the machine runs the next file properly.

## AUTO vs SIMULATION Mode

### Auto Mode

Each operation in Auto Mode contains a sequence of instructions for different parts.

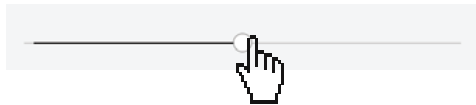
Example: [Auto] Unloading instructs the router to:

- Turn off the vacuum flow
- Travel to the end of the material
- Start the unloading table
- Drop the unloading arm
- Activate the dust extraction suction
- Push the material towards the unloading table
- Raise the location pins after pushing all materials to the unloading table

### Simulation Mode

A simulation of the Auto function. If you click on Simulation while the machine is performing an operation on Auto mode, it will pause that operation. You may then use the MPG remote to manually go forward or go in reverse for that operation's sequence, one movement at a time.

Think of Simulation Mode as pausing a video, and then moving the slider left or right to rewind or fastforward the clip one frame at a time.



## AUTO vs JOG Mode

### Simulation Mode

Lets you control different parts independently, manually. If you just want to control the Unloading arm movement, switch to Jog Mode.

#### IN THE UTILITIES PAGE

##### Auto Exclusive Operations

The following are operations that work only in Auto Mode:

- Material Alignment
- Resurface Spoilboard
- Table Clean
- Auto Tool Measure

##### Jog Exclusive Operations\*

The following are operations that work only in Jog Mode:

- Spindle warm up
- Drill Cylinder **[requires upgrade]**
- Drill On **[requires upgrade]**
- Spindle Forward
- Block Offset **[requires upgrade]**

\*These, however, are activated in Auto mode if they are part of an automatic sequence.

#### IN THE ADVANCED PAGE

Buttons of individual parts can only be activated when in Jog Mode.

## Utilities Page

[MAIN SCREEN > UTILITIES TAB]

Name of current file

Main Tabs

CNC Utilities Controls

### Standard Controls

These appear in both Utilities & Operation tabs

## CNC Utilities Controls



### Spindle Warm Up

Warms up the spindle by running it and increasing its speed gradually. This process takes about 1-2 hours. We recommend warming up the spindle when it is unused for a prolonged time (over the weekend) or when a new one is installed. Pressing on this button also activates the “Spindle Forward” button.

**Material Aliment**

**Material Alignment**

Automatically aligns material. Works on Auto Mode. Some models have the material alignment as an upgrade.

**Resurface Spoil Board**

**Resurface Spoilboard**

Opens the resurface spoilboard screen. Once on the screen, press the [Start Milling] button to start resurfacing. The machine will start only on Auto mode.

*This part is for advanced use by technicians.  
 The letters in the parenthesis correspond to the graph on the left.*

During resurfacing, the machine will first switch to the fly cutter tool then cut in a zigzagging motion as shown on this graph.

Processing Range	
Coordinate System	0
T	8
X length(I)	0.000
Y length(J)	0.000
Y feed (W)	0.000
Z direction parameter	
Z feed (D)	0.000
Total processing (H)	0.000
S	0
XY speed (F)	0
Z speed (E)	0

Press this to start resurfacing.



Your fly cutter is typically set in tool holder #8. Your machine may fail if you move the fly cutter to a different tool holder without adjusting the settings on this screen. If you are switching to a different fly cutter, contact your CNC Factory technician to set up this page for you.

Drill  
Cylinder

**Drill Cylinder [requires upgrade]**  
Moves the drill block up or down.

Drill On

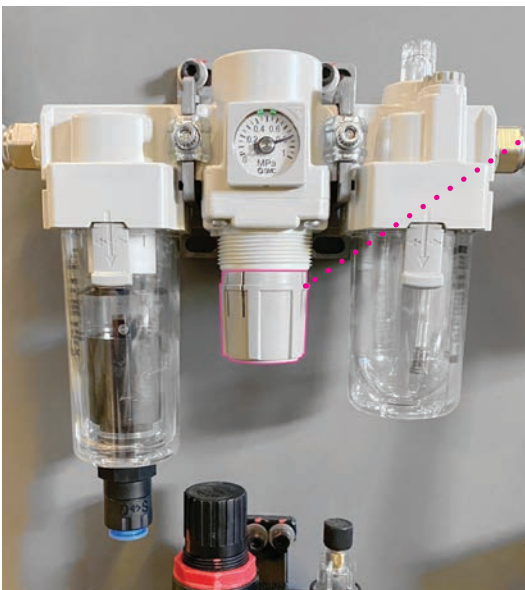
**Drill On [requires upgrade]**  
Turns the drill block on/off.

Spindle  
Forward

**Spindle Forward**  
Runs the spindle.

Table  
Clean

**Table Clean**  
Cleans the table with the central dust extraction and the side air nozzles. The side nozzles require air pressure of at least 0.8 mPa in the main air system. The system will alert you if there is insufficient air pressure as you press this button.



You can raise air pressure by pulling the gray cap down (exposing an orange ring) and turning to the right to increase and left to decrease air pressure. Push the cap back up until the orange ring disappears to lock in the new pressure.



Do not use air pressure over 0.8 mPa as too much air pressure may damage the joints of the air lines of your router.



**Material Thickness**

Click to specify the thickness of your material. The dust hood will hover just above the thickness that you specify.



- If the value indicated is *below* the actual material thickness, there will be a gap between the dust hood and the material where dust and debris may escape.
- If the value indicated is *above* the actual material thickness, it will squish the dust hood brush.

For both scenarios, the depth of the cut will also be inaccurate.



**Block Offset [requires upgrade]**

Opens the block offset options. This is an advanced feature for technicians. See the Step-by-Step chapter at the end of this manual for **Adjusting Drill Block Offsets**.

Shows the reference values from the spindle to each drill block port

G54				G6666 N0 L1				Coord.	2021/1/12	17:02:38	Utilities	Advance	Operation		
Drill No.	X Comp.	Y Comp.	Z Comp.	Drill No.	X Comp.	Y Comp.	Z Comp.								
T21	0.000	0.000	0.000	T34	0.000	0.000	0.000								
T22	0.000	0.000	0.000	T35	0.000	0.000	0.000								
T23	0.000	0.000	0.000	T36	0.000	0.000	0.000								
T24	0.000	0.000	0.000	T37	0.000	0.000	0.000								
T25	0.000	0.000	0.000	T38	0.000	0.000	0.000								
T26	0.000	0.000	0.000	T39	0.000	0.000	0.000								
T27	0.000	0.000	0.000	Preservation				T21		T22		T23			
T28	0.000	0.000	0.000					T24		T25		T26		T27	
T29	0.000	0.000	0.000					T28		T29		T30		T31	
T30	0.000	0.000	0.000					T32		T33		T34		T35	
T31	0.000	0.000	0.000					T36		T37		T38		T39	
T32	0.000	0.000	0.000	T40		T41		T42		T43					
T33	0.000	0.000	0.000	T44		T45		T46		T47					
								Hold		Reset		Tool Measure			
								WorkPiece Coord		Vacuum Zone Setup		Simulation			
								Run Screen		Ready		Jog			
								Alarm							
								F1 Coord.		F2 Program		F3 Offset/ Setting			
								F4 Monitor		F5 Maintain		F6 User Param.			
								F7 Fast Diag.		F8 About		>>			

**Tool block info**

(Buttons are active only on Jog mode. Clicking on the buttons sends a signal to release air to the solenoid that pops the tool out)

- **T21 to T29:** for the drill block
- **T31 to T39:** for air solenoid tools or marking blocks
- **Preservation Button** - saves edited values (requires password)

## HOME

### Home

Since your router does not require homing, this feature is only for technicians when they perform absolute encoding during installation.

## MDI

### MDI (or Manual Data Input)

Allows advanced operators to manually input their own G-code data.

1. After entering the G-code, press [F1 Ok]. The code will then appear in the filename portion of the screen.
2. Press the Start button to execute.

## Auto Tool Measure

### Auto Tool Measure

If activated, it will prompt the machine to measure a tool before using it. If you have already measured a tool previously, there is no need to leave this activated.

Once activated/deactivated, this alarm appears: "MLCHint 2 Automatic knife close (R590.2) PLC Hint". The 'alarm' is a misnomer since this is just an informational alert that states you have switched modes. It is not an error alarm and does not cause your Alarm display or safety lights to turn red.

## Advanced Page

[MAIN SCREEN > ADVANCED TAB]

Shows controls for individual parts and is activated when in Jog Mode. Buttons are just toggle switches to activate/deactivate individual parts. This is an advanced area used by technicians for troubleshooting. Parts not included in your router model are deactivated by default.

For example, pressing on the “Left Rail” button will raise or lower it.

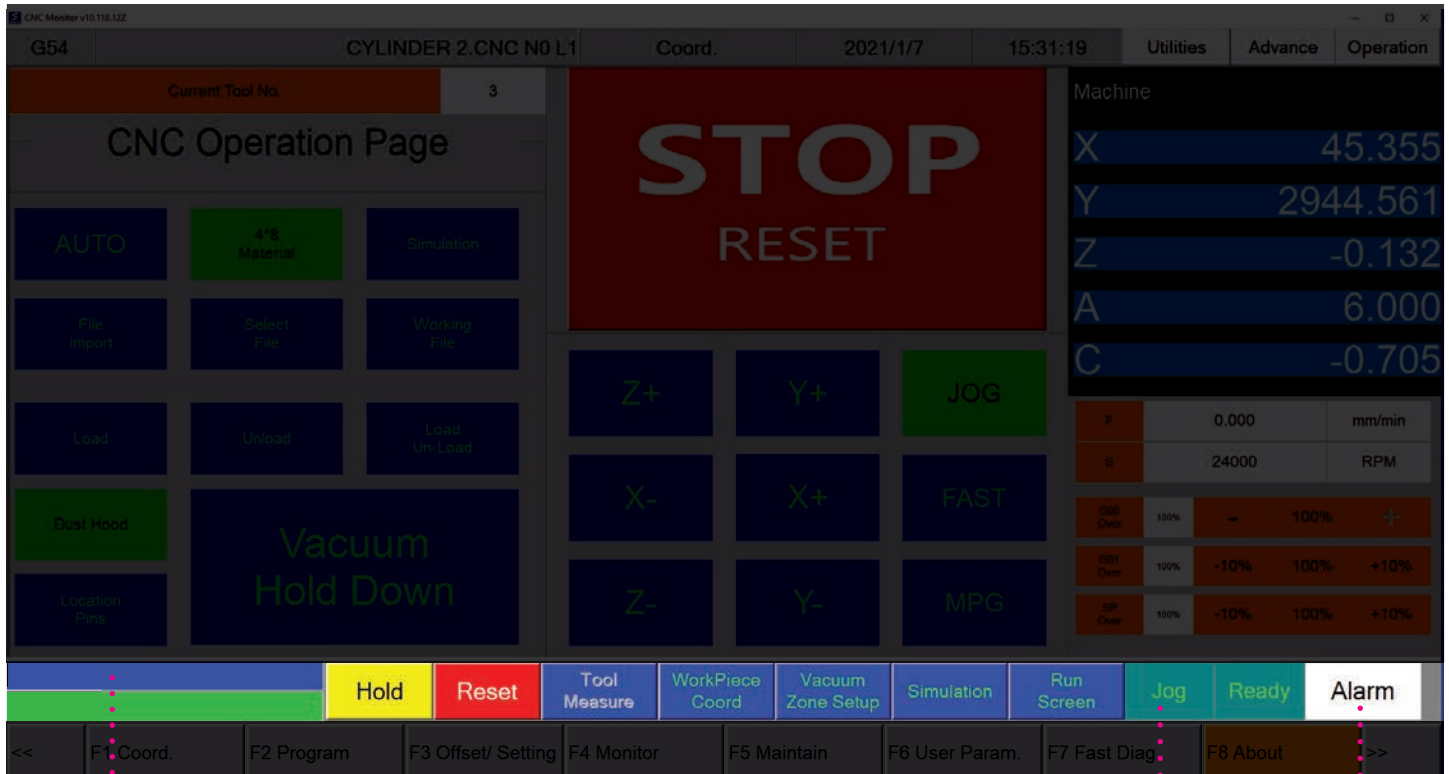


The screenshot shows the 'CNC Advanced Page' interface. At the top, it displays 'G54', 'CYLINDER 2.CNC N0 L1', 'Coord.', '2021/1/7', '15:31:39', and navigation tabs for 'Utilities', 'Advance', and 'Operation'. The main area contains a grid of blue buttons for various functions: Left Rail, Right Rail, Side Pusher, Unloading Arm, Front Pins, Rear Pusher, Middle Pusher Up&Down, Middle Pusher, Suction Cup Cylinder, SuctionCup Flow, Sticker Cylinder, Sticker Suction Flow, Tool Magazine Out, Tool Magazine Return (highlighted in green), Tool Magazine Forward, Tool Magazine Reverse, Printer Setting, Material Alimant, LightCurtain AlarmEnable, ColdAir Gun, Blowing the knife, and Spindle warm up. A bottom bar contains status buttons: Hold (yellow), Reset (red), Tool Measure, WorkPiece Coord, Vacuum Zone Setup, Simulation, Run Screen, Jog (green), Ready (teal), and Alarm (white). Below this bar are function keys: <<, F1 Coord., F2 Program, F3 Offset/ Setting, F4 Monitor, F5 Maintain, F6 User Param., F7 Fast Diag., F8 About, and >>.



## Main Navigation Belt

[APPEARS ON ALL TABS]



### Input preview (blue) field

Whenever you input values in an editable field, those values are previewed here.

### Machine status

- If on Auto or Jog Mode
- If Ready or Busy
- Any alarms

- **Hold** - stops an operation. Despite its name, this does not pause an operation and let you resume after. It works similarly to the reset/stop buttons.
- **Reset** - stops or resets the operation
- **Tool Measure** - to change tools. Opens the tool measure screen. Only works if you are on Auto mode in the Operation tab.
- **Work Piece Coord** - to change workpiece starting points. Opens the workpiece coordinate screen.
- **Vacuum Zone Setup** - to change vacuum zones. Opens a pop-up window.
- **Simulation** - goes to a simulation of the Auto function. Pauses all active operations.
- **Run Screen** - shows the G-code of your current file as well as repeats information from the Main Screen.

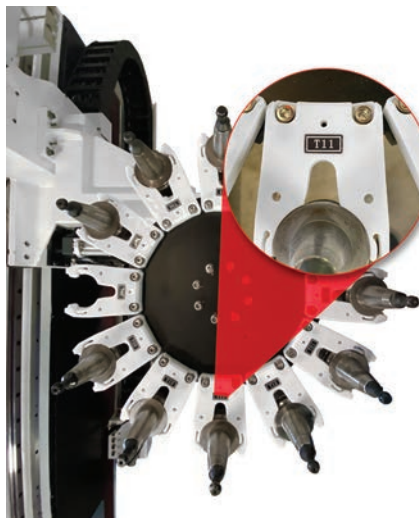
**Tool Measure Screen**

The Tool Measure Screen lets you measure tools automatically. You need to measure tools **only when you (a) change/adjust a bit, or (b) rearrange the position of your tools.** For simplicity of use, **only configure the Workpiece No. P field.** The rest of the controls are for advanced use of technicians.



Only change the Workpiece No. P field. On some router models, this appears as the **"Tool Number T"** field.

1. In the Tool Measure screen, click on the Workpiece No. P field. Once highlighted in yellow, type in the number corresponding to the tool you would want to measure. You can find your tool's number at:



The ATC tool carousel



In Utilities > Block Offset > Tool block info (for drill and marking blocks)

2. Press Enter to save.
3. Press F1 to start.
4. The tool measuring is completed once your safety light goes from green to white.



Entering the wrong tool number (or even entering a non-existent or empty tool holder number) may damage your machine and/or cause it to fail.



When you command the machine to measure a tool, it will return whatever tool is currently on the spindle to its original place first, then proceed to measuring. The machine with the new tool will then go down to the tool measuring device three times to take the measurements.



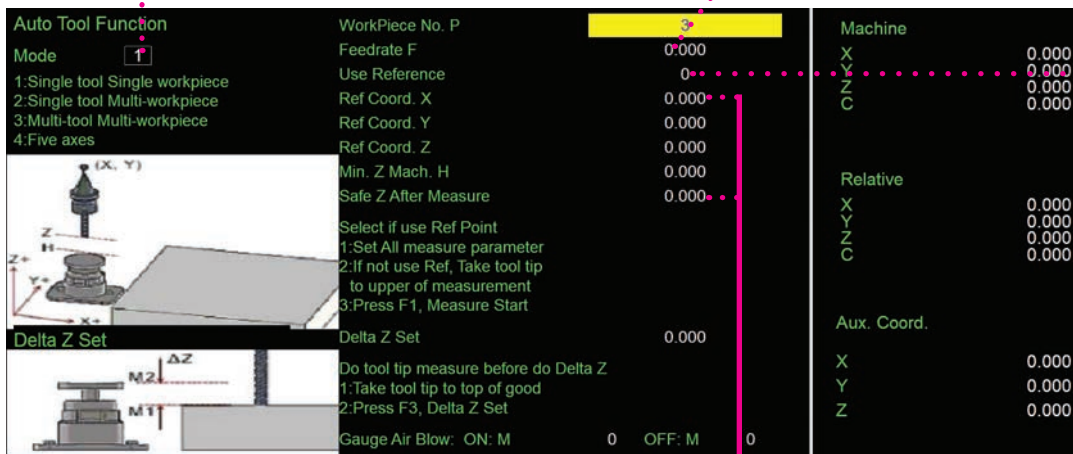
This next part is for informational purposes only. Changing the default values may cause your machine to fail.

**Mode**

You router should always be in Mode 3:  
 Multi-tool, multi-workpiece.

**Feedrate F**

Speed the machine will be moving  
 as it goes through the tool change in  
 mm/min.



**Use Reference**

Grants or denies permission to use the succeeding reference coordinate values. "1" means "true" or allows you to use the reference. "0" means "false" or does not allow you to use the reference.

**Reference Coordinates**

Identifies the location of/ directional limits for your tool measuring device.

### Workpiece Coordinates Screen

The Workpiece Coordinates Screen lets you use alternate workpiece starting points, instead of your default G54 coordinates. You can create and save up to 100 workpiece coordinates here.

**External Shift**

Any value placed here will be added or subtracted to the value of the G54 .

**G54 Slot**

Default Points

G54	G6666 N0 L1	Coord.	2021/1/12	17:47:58	Utilities	Advance	Operation
<b>External Shift</b>		<b>G54P1(G54)</b>		<b>G54P2(G55)</b>		<b>Machine</b>	
X	0.000	X	0.000	X	10.000	X	0.000
Y	0.000	Y	0.000	Y	11.000	Y	0.000
Z	0.000	Z	0.000	Z	0.000	Z	0.000
C	0.000	C	0.000	C	0.000	C	0.000
<b>MPG Shift</b>		<b>G54P3(G56)</b>		<b>G54P4(G57)</b>		<b>Relative</b>	
X	0.000	X	0.000	X	0.000	X	0.000
Y	0.000	Y	0.000	Y	0.000	Y	0.000
Z	0.000	Z	0.000	Z	0.000	Z	0.000
C	0.000	C	0.000	C	0.000	C	0.000
						<b>Aux. Coord.</b>	
						X	0.000
						Y	0.000
						Z	0.000
Hold		Reset		Tool Measure		WorkPiece Coord.	
Vacuum Zone Setup		Simulation		Run Screen		Ready Auto Alarm	
<<	F1 Apply Mach. Coord.	F2 Apply Rel. Coord.	F3 Apply Aux. Coord.	F4 Inc. Input	F5 Manual Center	F6 Apply Mach. Coord. Inc.	F8 Next Coord. Page >>

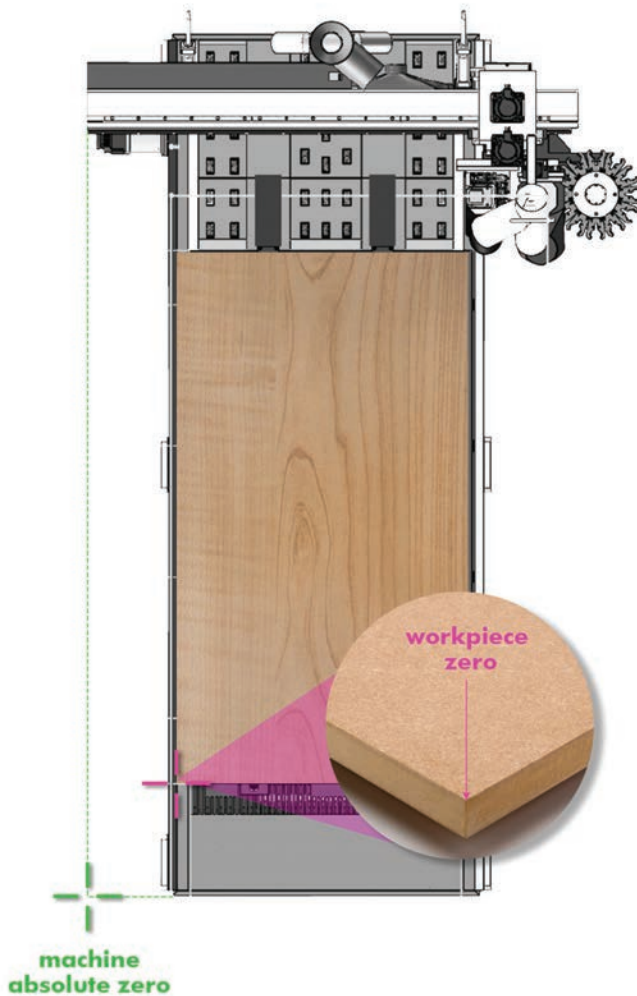
**Coordinate Slots**

Empty slots by default for customization. Goes from (from G54P2 to G54P100).

**Coordinate Info Panel**

- Machine- the current, exact position of the machine.
- Relative - a position relative to another specified position. This is an advanced feature for technicians.

The screen shows the first 6 workpiece coordinates, to view the rest, press [Page Up] or [Page Down] on your keyboard.



### Machine Absolute Zero Vs. Workpiece Zero

The **machine's absolute zero** is the lowest value the machine can go in the X & Y axis. It's usually at the lower leftmost point of your router.

The **workpiece zero** (or G54) is an offset to the workpiece home position. It's usually at the lower leftmost point of your work piece. Most of the code executed by the router will be based on your G54; these coordinates will already be set-up in your router.

#### To save a new workpiece coordinate:

1. Set your Operation page to Jog mode.
2. Jog your machine to your chosen location using the on-screen controls or MPG remote.
3. Go back to the Workpiece Coordinate screen.
4. Select an empty coordinate slot.
5. Copy the machine's current location from the Coordinate Info panel into the empty coordinate slot:
  - Manually by highlighting and typing on each axis. Press enter to save the new values. You can edit one axis at a time.
  - Automatically by pressing the [F1 Apply Mach Coord] function key. A pop up will appear each time to confirm your choice.



#### *When will I need to use this?*

Since cuts, by default, are referenced from the G54 location, the area close to your G54 can be subject to overcutting. Setting workpiece coordinates farther from your G54 from time to time can extend the life of your spoilboard.

### Vacuum Zone Setup Screen

Appears as a pop-up screen once clicked. This screen allows you to select which vacuum zones to activate. Depending on your router model, you may activate between 4-6 zones. By default, all zones are activated. And should you have 2 vacuum pumps, both will provide equal suction on activated zones.



To customize vacuum zones:

1. Select the letters of the zones corresponding to your choice. Selected zones are in green, deselected zones in blue.
2. Press the "Save As New Zone Setting" button.
3. Close the Vacuum Zone Setup window.



We recommend sticking to the default settings where all zones are activated, since having only partial hold down may cause your spoilboard to bow.

### Reset to Default Zone

Activates all zones. Make sure to click 'Save As New Zone Setting' after resetting to keep this setting.

### Vacuum Pressure Alarm Enable

If enabled, the router will alert you in all instances where the vacuum pressure is not enough (Usually when the pressure is under 0.5 mPa).



The vacuum pressure gauge is very sensitive and will alert you of low pressure even on operations that do not require vacuum (such as tool changing). You may keep this deactivated to avoid having constant alerts. Your router will still function properly even if deactivated. Even if the alerts are off, your router will continue to cut *only* if there is sufficient hold down.



## Run Screen

Shows the G-code of your current file as well as repeats information from the Main Screen.

**Run Time:** Running time of the current file

**Accu. Time:** Accumulated or total running time of the router. It goes back to zero whenever the router is reset or by pressing [F8 Clear Accum. Cycle Time]

Information you can reference when editing G-code

Your G-code will appear here

You can preview your tool path here by pressing [F2 Simulation Switch]

## F1 Edit

To edit the G-code for advanced users.

Keyboard commands:

- Arrows to move the cursor
- [Page Up] & [Page Down] to switch pages
- [Home] and [End] to bring the cursor to the start or end of a line

### **F2 Simulation Switch**

Shows a graphical representation of the G-code and displays the tool trajectory of the current file.

### **F3 MDI Input**

Stands for Manual Data Input. This is an advanced feature used for testing purposes by technicians. This is deactivated by default.

### **F4 Param Set**

Switches the screen between machine settings and information. This is an advanced feature for technicians.

### **F5 Tool Wear Set**

To modify the new diameter and height of tools when they wear down. This is an advanced machining technique. We recommend using tool providers such as [Deluche by CNC Factory](#), which provide you brand new bits for the same price as sharpening. Brand new bits do not require Tool Wear Set modifications.

### **F6: Start MPG Shift**

Shows coordinates when on MPG simulation mode.

### **F7 Work Record**

Shows the current machining record. Pressing F1 allows you to export the record to an external device. Pressing F2 clears the work record.

### **F8 Clear Accum. Cycle Time**

Clears the accumulated cycle time.

*more options [>>]*

### **F1 Graph Adjust**

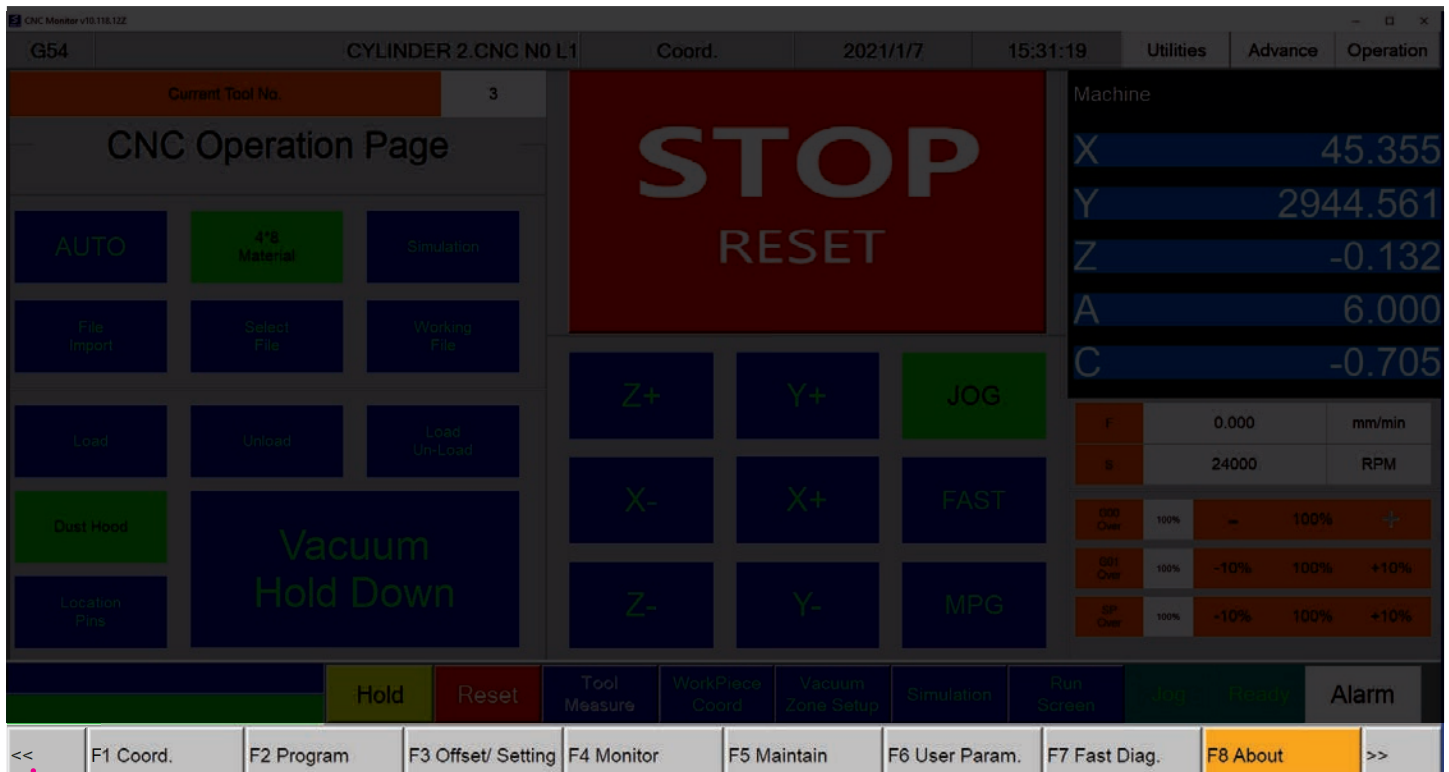
Allows zooming in and out of the simulation graph. This is enabled if you are on Simulation mode.



## Function Keys Menu

[APPEARS ON ALL TABS]

Below are the main Function Keys on your Main Screen & Tab Pages. Function Key options usually vary according to the active operation/screen. Most function keys are for advanced use by technicians.



### Back Button

Press to go back to the previous page, or multiple times to return to the Main Screen.

### F1 Coord

For resetting and switching coordinates.

### F2 Program

For editing G-code.

### F3 Offset/Setting

For workpiece coordinate info and tool setting/measurement.

### F4 Monitor

Similar to [Run Screen](#).

### F5 Maintain

For alarms, server and system settings.

### F6 User Param

For editing user parameters.

**F7: Fast Diag**

Displays system data.

**F8 About**

Displays general system information.

*more options [>>]*

**F1 PLC Status**

Displays info on programmable logic controllers. Each data point corresponds to the PLC in your router.

**F2 Diag.**

Displays system data, global data, coordinates & operation log.

**F3 Param**

For editing all user parameters.

**F4 Sys Admin**

To log-in to system admin with a password.

**F5 Auto Labeling**

Controls for the label printer.

**F8 Working List**

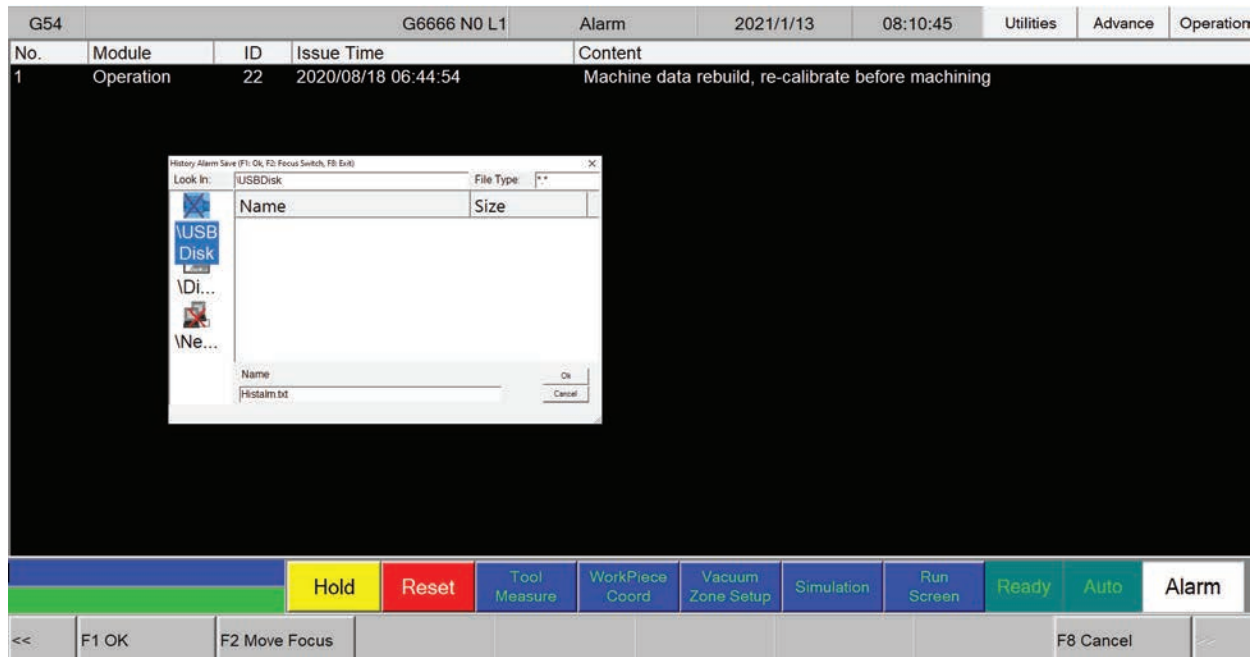
Controls for the [working list](#).

## STEP-BY-STEP GUIDES

### Checking your Alarm History

If you encounter an alarm (or multiple alarms) and need the assistance of a CNC Factory technician, this page will help provide information to your technician to properly diagnose your issue. We recommend you save/take a screenshot of your most recent alarms and send it as an attachment when requesting for a service ticket.

1. Click [F5 Maintain]
2. Click [F1 Alarm]
3. Click [F2 History Alarm]
4. Save a screenshot OR press [F3 Save Alarm] + [F1 Ok] to save the file



### Backing up your Files

For more complicated technical issues, we may ask you to create a backup of your file and send it to us, instead of guiding you remotely with multiple steps, so we can diagnose and correct properly.

1. Click [F5 Maintain]
2. Click [F6 Backup Sys]
3. Click [F1 Next], select a destination and press [Ok]
4. Click [F1 Next] and then [F1 Ok].

Back up takes about 3-20 minutes. Should the window state that it is “not responding”, give it a few seconds to process and it should resume back up. Your backup will be saved as a zipped folder in your previously set destination.

## Activating Function Keys

If your program does not show Function Key Shortcuts (F1, F2, etc).



What your screen  
looks like without  
Function Keys

1. From the Main Screen, go to the gray menu buttons at the bottom and press [Maintain]
2. Click [Sys Setting]
3. Click [Set MMI Config]
4. At the bottom of the table, at the "[Fenubar] No Function No." row, select the value "TRUE"
5. Click Modify and a pop-up window will appear.
6. Change the value from "True" to "False" in the pop-up window and click [OK]
7. Close the program to reset.
8. Open it again by double clicking the Python icon. The Function keys should be visible.



## Executing your first (single) file

1. Turn the router on.
2. Save your design file into the **CNC File folder**.
  - Save to the folder if designing from the controller
  - Save to the folder after importing via USB
  - Save to the folder after downloading from the internet (cloud, email)
3. Double click on the Python icon.
4. From the Main Screen, click on the [Operation] tab.
5. Click [Select File].
6. Select the file from the CNC file folder.
7. After you select the file, the top part of the screen should show the filename you selected
8. After you check that the filename is correct, check the material size. If not, click on the [Material Selection] button to switch to your preferred size.
9. Then switch to the Utilities Page by clicking on the [Utilities] tab.
10. On the Utilities page, click on [Material Thickness] and specify the dimensions.
11. Press [Load] to load the material
12. Once the material is loaded and aligned, press the [Start] button to begin cutting.

## Using Working List/File

A driverless CNC feature that allows queueing of up to 999 files. (\*only available in the XPR series and ideally used with the loading/unloading tables). Jobs under the working list are executed one after the other. It also shows the real-time status of each file for easy monitoring.

**File Panel**

**Label Panel**

To switch between pages

Shows current page (top) and total number of pages (bottom)

Order	PLate ID	Station	Status
1	R500101N.nc	1	Printing
2			Non Process
3			Non Process
4			Non Process
5			Non Process
6			Non Process
7			Non Process

Order	Label Name
1	R5020031.jpg
2	R50p0001.jpg
3	R5030011.jpg
4	R5010021.jpg
5	
6	
7	

Hold Reset Tool Measure WorkPiece Coord Vacuum Zone Setup Simulation Run Screen Jog Ready Alarm

<< F1 Exchange Row F3 ArrangeWorkingLi F4 ClearList F5 Back to Break Point >>

### File Panel

#### Order

Shows the sequence of the jobs in queue.

#### Plate ID

Shows the filename.


#### Status

- **Non Process:** no operation is in process.
- **Alignment:** alignment/loading/unloading is in process.
- **Working:** cutting is in process.
- **Printing:** label printing is in process. Printing usually takes place before cutting.
- **Completed:** all file operations are completed.

### Label Panel

The label panel info shown corresponds to the selected file from the file panel. Each file can have multiple labels. The label info will automatically change as you go down your file list.

Order	Label Name
1	R5020031.jpg
2	R50p0001.jpg
3	R5030011.jpg
4	R5010021.jpg
5	
6	
7	



..... To switch between pages

1 / 1

..... Shows current page (top) and total number of pages (bottom)

Label

Single Label

Label Preview

Single Panel

#### Order

Shows the sequence of labels in queue.

#### Label Name

Shows the label filename.

#### Single Label Button

Selects a single label for printing.

#### Label Preview Button

Shows a preview of the JPG image of your label.

#### Single Panel Button

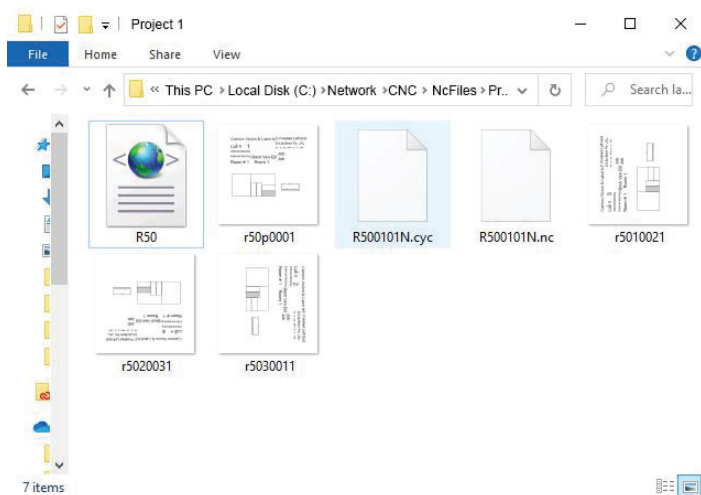
Selects the entire panel of labels for printing.

## Working List Step-by-Step:

1. Save your design file in the **CNC File folder**:
  - Save to the folder if designing from the controller
  - Save to the folder after importing via USB
  - Save to the folder after downloading from the internet (cloud, email)
3. Open the Python program and go to the Operation Page by clicking on the [Operation] tab.
4. Press [Auto].
5. Go to the Working list page by clicking the [Working File] button.
6. Press [F4 Clear List] and click [Ok] to delete your previous working list. When you clear your list, you are only removing them from the Working List screen and not from your CNC File Folder.
7. Press [F3 Arrange Working List].
8. Select the files you want to use by ticking on the checkbox corresponding to it. You may also click [F2 Select All] to select everything (Note that F2 Select All only selects all individual files, and not folders).
9. Press [F1 Output List].
10. Press [F1 Ok] or click [Ok] from the pop-up window. Your imported files should now appear in your working list, for both the file and label panels (if applicable). If not, **change your file extension**.
11. Press the Start button to begin executing.

## What does an imported file look like?

The file you import to the working list typically comprise of the following:



- **XML Document** - links the other files to the Python program
- **NC\*** - contains the G-code for your job
- **CYC** - contains commands on where to place the labels
- **JPG** - the actual images printed on the labels

\*file extension may vary and can be changed [See next page].



## Changing your File Extension

By default, the program runs “.nc” files. If your G-code file has a different extension (e.g. “.cnc”), you can change them by:

1. You must be on the Working List Page First. Click [Operation] tab, then [Working File].
2. Below, on the Function Keys Menu, click on the right arrow to reveal additional menu items.
3. Select [F1 Set Extension Name].
4. Type in the new extension in the extension filter pop up, then press [Ok].

**For files not having a “.nc” extension:** If you do not change the extension name to match your files, it will not appear on the working list when you import it.

If your files still do not appear after changing the extension name, or your file appears but not its labels, go to the Working List Parameter Setting Screen\*\*.

1. You must be on the Working List Page First. Click [Operation] tab, then [Working File].
2. Below, on the Function Keys Menu, click on the right arrow to reveal additional menu items.
3. Select [F8 Working List Setting].
4. Go to “Load File Type”, click the arrow to show the dropdown options and select “xml”, then press Enter.
5. Go back to the main Working List Screen.
6. Press [F3 Arrange Working List] and select your files again.
7. Press [F1 Output List] and [Ok].
8. The label panel should show files associated with your G-code file.

*\*\* The other options in the Working List Parameter Settings are for advanced use by technicians.*

## Measuring Larger Tools

Follow these steps to measure tools that will not fit your tool holder:

1. On the [Tool Measure] screen, press [F1 Start]. The machine will do a tool change if necessary then move to the tool measuring device.
2. Once it starts to go down to measure it, hit the [Reset] button.
3. Go to the [Operation] page and click [MPG].
4. Use your MGP remote to move the spindle and attach your oversized tool to it.
5. Bring the spindle to the center of your tool measuring device. Remember, the spindle needs to go down 3 times to measure your tool— make sure your oversized tool will not crash into anything as it goes down. You can place the spindle higher to make sure the tool blade is not touching the sensor.
6. Switch back to [Auto] mode.
7. Go back to the [Tool Measure] Screen.
8. Highlight the “Use Reference” area, enter “0” the hit [Enter] to save.
9. After the Use Reference value is turned to zero, press [F1 Start].



The tool measuring device near the corner of your router

*This will tell the machine that the tool measuring device is already directly under the spindle, so it will prompt it to just go directly down for measurements.*

G54	G0307 N0 L1	Coord.	2021/1/15	11:42:23	Utilities	Advance	Operation										
<b>Auto Tool Function</b>		WorkPiece No. P	3	<b>Machine</b>													
Mode	1	Feedrate F	0.000	X	0.000	Use Reference Field											
1:Single tool Single workpiece	Use Reference	0	Y	0.000	.....												
2:Single tool Multi-workpiece	Ref Coord. X	0.000	Z	0.000	.....												
3:Multi-tool Multi-workpiece	Ref Coord. Y	0.000	C	0.000	.....												
4:Five axes	Ref Coord. Z	0.000	<b>Relative</b>														
		Min. Z Mach. H	0.000	X	0.000	.....											
		Safe Z After Measure	0.000	Y	0.000	.....											
Delta Z Set		Delta Z Set	0.000	Z	0.000	.....											
Select if use Ref Point 1:Set All measure parameter 2:If not use Ref, Take tool tip to upper of measurement to press F1, Measure Start 3:Press F1, Measure Start		Do tool tip measure before do Delta Z	0	C	0.000	.....											
1.Take tool tip to top of good 2.Press F3, Delta Z Set		Gauge Air Blow: ON: M	0	<b>Aux. Coord.</b>													
		OFF: M	0	X	0.000	.....											
				Y	0.000	.....											
				Z	0.000	.....											
<table border="1"> <tr> <td>Hold</td> <td>Reset</td> <td>Tool Measure</td> <td>WorkPiece Coord</td> <td>Vacuum Zone Setup</td> <td>Simulation</td> <td>Run Screen</td> <td>Ready</td> <td>Auto</td> <td>Alarm</td> </tr> </table>								Hold	Reset	Tool Measure	WorkPiece Coord	Vacuum Zone Setup	Simulation	Run Screen	Ready	Auto	Alarm
Hold	Reset	Tool Measure	WorkPiece Coord	Vacuum Zone Setup	Simulation	Run Screen	Ready	Auto	Alarm								
<table border="1"> <tr> <td>&lt;&lt;</td> <td>F1 Start</td> <td>F2 Reset</td> <td>F3 Z Delta Set</td> <td>F4 Apply XY Ref. Coord.</td> <td>F5 Apply Z Mach. Coord.</td> <td>F7 Gauge Z Coord. Teach</td> <td></td> <td></td> <td></td> </tr> </table>								<<	F1 Start	F2 Reset	F3 Z Delta Set	F4 Apply XY Ref. Coord.	F5 Apply Z Mach. Coord.	F7 Gauge Z Coord. Teach			
<<	F1 Start	F2 Reset	F3 Z Delta Set	F4 Apply XY Ref. Coord.	F5 Apply Z Mach. Coord.	F7 Gauge Z Coord. Teach											

10. Once finished, make sure to change your Use Reference value back to “1” for your regular bits.

**For advanced users:**

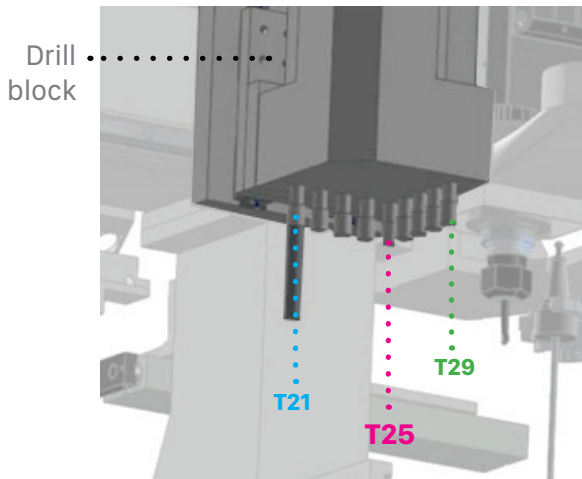
**Adjusting Drill Block Offsets [requires upgrade]**

You can adjust the drill block offset to indicate the direction (and by how much) the machine needs to travel in order for the drill block to bore at the same location where the spindle did previously.

1. In the [Operation] page, click [JOG].
2. Go to the [Utilities] page and click [Block Offset].
3. Highlight the field you want to adjust, type in the new value and press [Enter].
4. Once the number has changed, press [Preservation] to save.
5. If prompted for a password, type in "521" and press [F1 Ok].

Adjust T25 first

G54				CIRCLE.NC N0 L1				Alarm				2021/1/15 13:49:10				Utilities				Advance				Operation			
Drill No.	X Comp.	Y Comp.	Z Comp.	Drill No.	X Comp.	Y Comp.	Z Comp.	Drill No.	X Comp.	Y Comp.	Z Comp.	Drill No.	X Comp.	Y Comp.	Z Comp.	Drill No.	X Comp.	Y Comp.	Z Comp.								
T21	0.000	0.000	0.000	T24	0.000	0.000	0.000	T27	0.000	0.000	0.000	T30	0.000	0.000	0.000												
T22	0.000	0.000	0.000	T25	160.000	12.000	0.000	T28	0.000	0.000	0.000	T31	0.000	0.000	0.000												
T23	0.000	0.000	0.000	T26	0.000	0.000	0.000	T29	0.000	0.000	0.000	T32	0.000	0.000	0.000												
T24	0.000	0.000	0.000	T27	0.000	0.000	0.000	T30	0.000	0.000	0.000	T33	0.000	0.000	0.000												
T25	160.000	12.000	0.000	T28	0.000	0.000	0.000	T31	0.000	0.000	0.000																
T26	0.000	0.000	0.000	T29	0.000	0.000	0.000	T32	0.000	0.000	0.000																
T27	0.000	0.000	0.000	T30	0.000	0.000	0.000	T33	0.000	0.000	0.000																
T28	0.000	0.000	0.000																								
T29	0.000	0.000	0.000																								
T30	0.000	0.000	0.000																								
T31	0.000	0.000	0.000																								
T32	0.000	0.000	0.000																								
T33	0.000	0.000	0.000																								



We recommend adjusting T25 first and then just use the values you placed there as a reference for other numbers. Based on the physical layout of the drill block:

- T25, T26, T27, T28, T29 should have the same X-axis value
- T21, T22, T23, T24, T25 should have the same Y-axis value.
- The distance between tool slots is 32mm.

## CHECKLIST

**I know how to:**

- Keep a safe working environment
- Contact customer support
- Use the emergency stop
- Perform router maintenance
- Use the controller
- Use the MPG remote
- Turn on the router
- Turn off the router
- Import files to my controller desktop
- Access the Python program
- Access the Operation and Utilities pages
- Switch between Auto & Jog modes
- Jog my machine
- Tell which operations work on Auto and on Jog
- Pause an automatic operation and use the MPG remote for simulation
- Select my material size
- Set my material thickness
- Load and unload my material
- Increase or decrease my machine speed
- Turn my drill block on/off **[for upgraded models]**
- Resurface my spoilboard
- Clean my table
- Measure my tools automatically
- Control vacuum zones
- Check my alarm history
- Back up my files
- Activate function keys
- Execute a single file
- Execute multiple files with the working list
- Measure larger tools

If you ticked off all the boxes, congratulations! You are now ready to use the **5th generation Python XPR**.

