



Bit Builder Tool

Select Bit

Define Bit

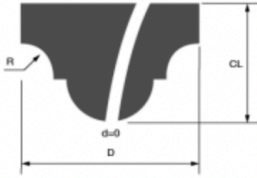
Bit Name

Major Diameter (D) Tool Type

Minor Diameter (d)

Cut Length (CL) Profile

Radius (R)



Max Depth/Pass Material

Cleaning Depth Machine

Cleaning Feed

Bit Find

Notes

Feeds and Speeds

Carving

Depth (in)	Feed Rate (in/s)
0.000	0.500
0.450	0.450
0.500	0.400

Feed Calculation

Spindle Speed Plunge Rate

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Intro

The Bit Builder gives users the ability to add new or custom configure existing bits. This will allow for ultimate control over all the speed, feed, and spindle settings for every bit. Custom bits can be stored globally in your system or are stored on a project level. This means if someone designs a project with a specific bit setting and they share that project, the bit setting will come automatically with the project.

Glossary

We need to establish some baseline terminology, as the terms below are used to describe other functions within the software.

Global Bits - A global bit is a bit that is available to any project.

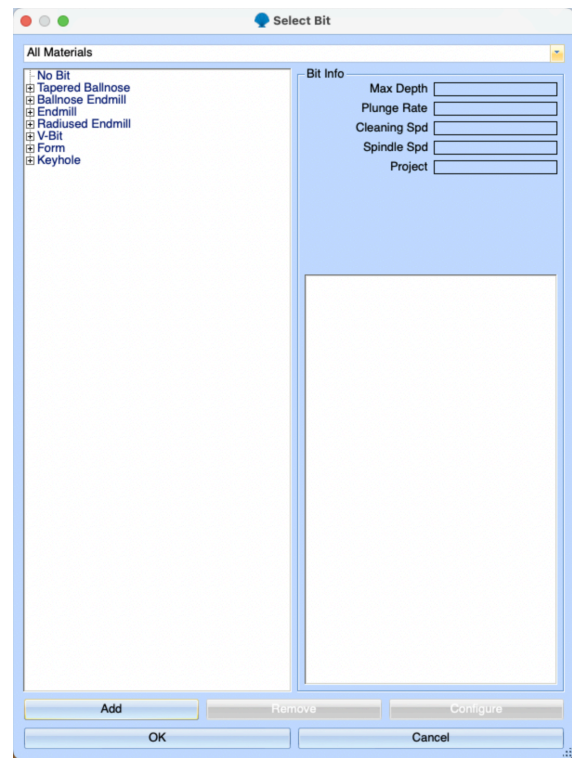
Project Bits - A project bit is a bit only available to the project it was configured within.

Cleaning Pass - A final pass on a vector cutting operation to create a smoother finish.

Carving - Carving is describing the rastering of 3D carvings. This is produced by taking many small passes with the carving bit, building the 3D image one line at a time. This uses bitmapped based imagery.

Cutting/Vector - A cutting operation can be lines, circles, splines, or any other number of geometric vector elements where the bit follows the path of the line.

Region - a closed vector shape.



Editing and Adding Global Bits

In Designer, under the *Board Setup* tab, find the **Edit Bit** tool to open the Select Bit dialog.



Select Bit Dialog

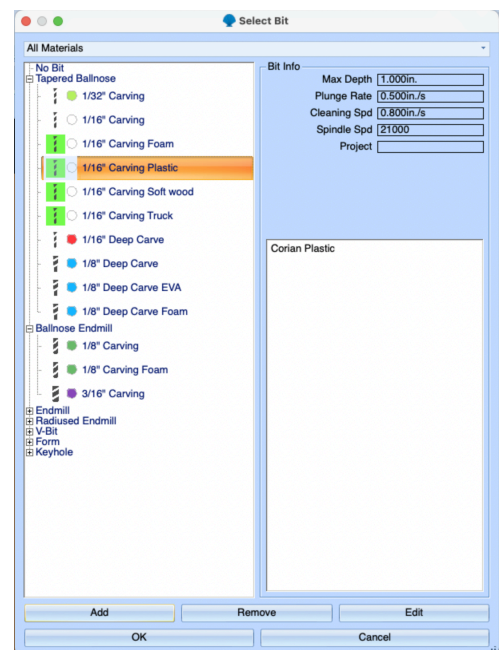
###The select bit dialog will display a list of bit categories with the appropriate bits within them.

When you select a bit within the list, information about that bit appears to the right. This information can help you identify important settings without opening the bit for editing. There is also a notes field where information specific to the bit can be stored for reference.

At the top of the select bit dialog, you can select a material to narrow the choice of bits.

From this dialog, you can also Add, Remove, or Edit bits.

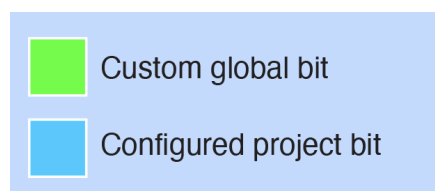
- Adding a bit is creating an entirely new bit to the list.
- If you click Add with No Bit selected, you will get a blank bit template.
- If you have a bit selected and you click Add, it will copy the settings of that bit to use as a template.
- Editing a bit makes changes to that bit and will be applied in all instances of that being used in projects.



Note: It is not advisable to edit global bits unless you are certain you want those changes to be applied globally.

Bit Color Highlights

- Custom global bits are highlighted in GREEN
- Configured project bits are highlighted in BLUE and only visible while working in the specific project that bit was customized for.



Edit Bit Dialog

When adding or editing a bit, the edit bit dialog will open and allow you to change the settings for that bit. The fields are defined below.

Bit Name

Define a name for the bit. It is advisable to list the size, type, and usage.

Example: 1/8" Cutting Bit Soft Wood

Tool Type

This is the category of the bit.

Profile dimensions

The dimensions that define the bit's geometry. The dimensions correlate with the profile image.

Max Depth/Pass

This is the maximum depth the bit will be allowed to cut in a single pass.

Cleaning Depth

This is the depth the cleaning pass will cut (when a cleaning pass is asked for in a function, the software will leave this much depth to be cut at the end using the cleaning feed rate).

Cleaning Feed

The feed rate to cut the cleaning pass.

Bit Find

The dropdown options for bit range are "Normal Range" and Extended Range. This is referring to when the system begins looking for the touch plate when doing a bit touch. Normal range uses the Cut Length setting, but in situations where a collet or something is extending the length of the bit, the extended range should be checked to trigger the system to look for the bit plate sooner.

Material

A material may be assigned to a bit by selecting from the list, or by adding a new material. Add a new material by selecting the + icon and give it a name.

Machine

This is for defining which machine the bit is configured for by selecting from the list, or by adding a new machine. Add a new machine by selecting the + icon and give it a name.

Notes

This is a section where information specific to the bit can be stored for reference.

Feeds and Speeds

Feeds and Speeds describe how fast the cutting truck is traveling (feed) and the RPM (speed) of the cut motor. The feeds are defined at different depth levels linearly, meaning they gradually ramp up or down to the next defined depth feed rate.

Carving

Carving feeds define how fast the bit is traveling during each raster path at various depth levels. Each quality level can be defined.

Stepover

This defines how far the next raster line moves. It is described as a percentage of the bit's diameter.



The image shows a software window with two tabs: "Carving" and "Cutting/Vector". The "Carving" tab is active. Inside, there are four sub-tabs: "Draft", "Good", "Best", and "Optimal". The "Best" sub-tab is selected. It contains a table with two columns: "Depth (in)" and "Feed Rate (in/s)".

Depth (in)	Feed Rate (in/s)
0.200	4.000
0.350	2.000
0.500	1.500

Below the table, there is a "Stepover" field set to "8" and a unit selector set to "% (0.005")".

Cutting/Vector

Cutting feeds define how fast the bit follows the path of the line at various depth levels.

Feed Calculation

Absolute Depth

The feed will be dependent on the total depth of the workpiece. This allows for using bits that get much wider as they go deeper.

Relative Depth

This feed is calculated based on the actual depth of cut, not the total cut depth. This allows for multiple passes at higher speeds since it is only working with the amount of material it is encountering.



The image shows a software window with two tabs: "Carving" and "Cutting/Vector". The "Cutting/Vector" tab is active. It contains a table with two columns: "Depth (in)" and "Feed Rate (in/s)".

Depth (in)	Feed Rate (in/s)
0.000	0.300
0.438	0.150
0.000	0.000

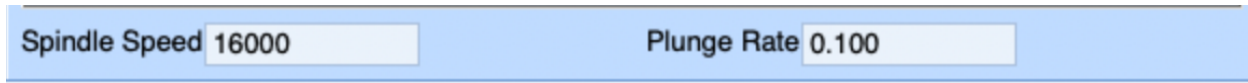
Below the table, there is a "Feed Calculation" dropdown menu set to "Absolute Depth".

Spindle Speed

The RPM speed of the cut motor.

Plunge Rate

The plunge rate is a feed rate specific to when the bit is first plunging into the workpiece.



Restricted Bit Functions

Certain tools within the software are restricted to specific Tool Types due to the nature of their functions. These tools are described below.

Carving Bit

Under the *Carving Tab* is a tool called **Carving Bit**. This tool changes the raster carving bit that is used within a project. It is restricted to only the Tapered Ballnose and Ballnose Endmill tool types, as they are the only bits used for rastering.



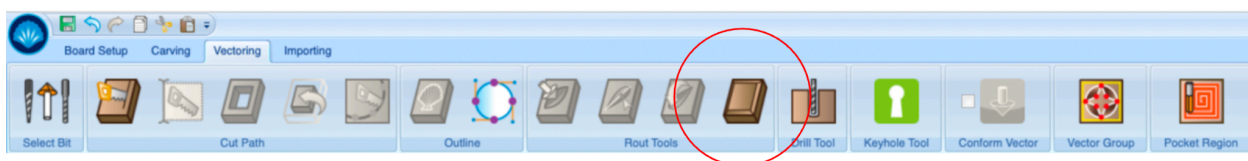
Cut Path

The **Cut Path** tool under the *Vectoring Tab* is for creating tabbed cutouts. It is restricted to only Endmill bits.



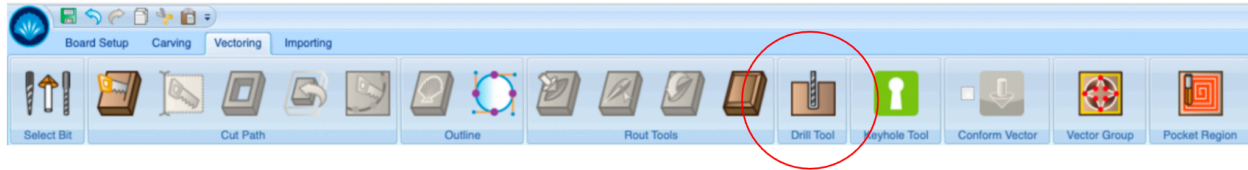
Edge Rout

The **Edge Rout** tool under the *Vectoring Tab* is for assigning a routed profile to a project's edge. Only Form bits are available for this function.



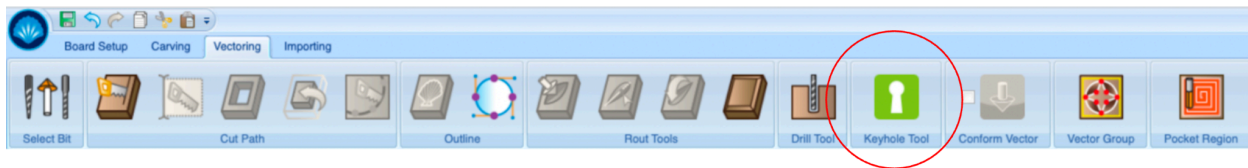
Drill Tool

The **Drill Tool** under the *Vectoring Tab* is for creating drill holes. It is restricted to only Endmill bits.



Keyhole Tool

The **Keyhole Tool** under the *Vectoring Tab* is for making keyhole slots and is restricted to only Keyhole bits.

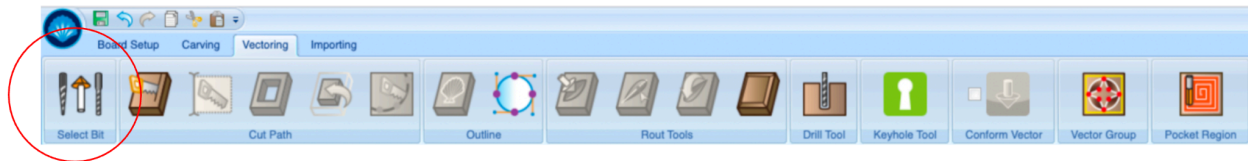


Non-restricted Bit Functions

These are bit functions that don't restrict the types of bits that can be assigned.

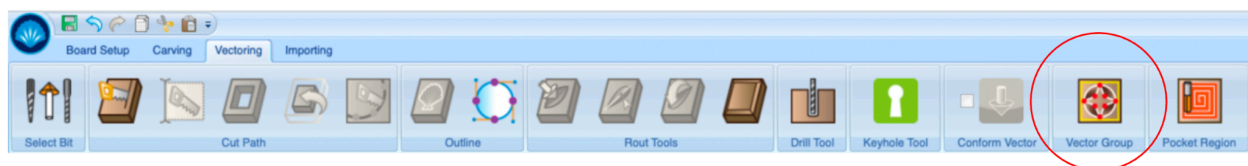
Select Bit

Under the *Vectoring Tab* is the **Select Bit** tool. This tool allows you to assign any bit within the library to a vector path.



Vector Group

Vector Group under the *Vectoring Tab* is for assigning centerline and pocketing bits to vector shapes.



Pocket Region

Pocket Region under the *Vectoring Tab* is for assigning a pocketing bit to a vector shape.



Configuring a Project Bit

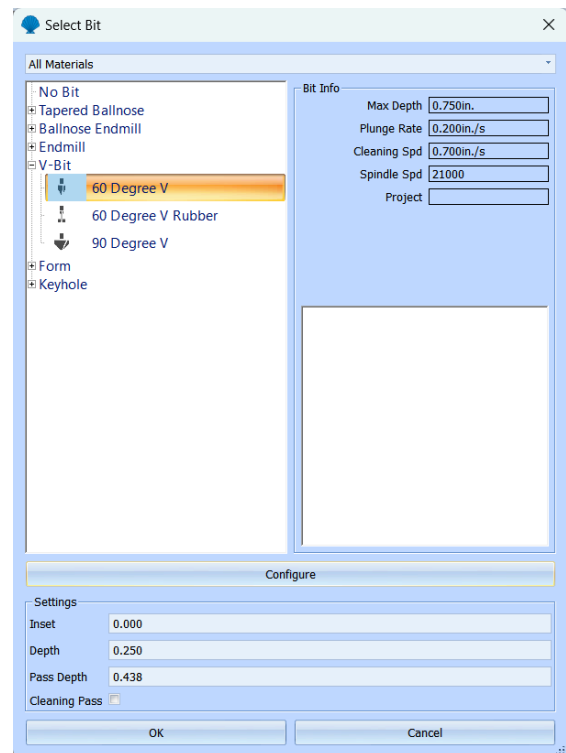
Within a project, when assigning any bit to a function, there is an option to Configure. Configuring opens the Edit Bit window and automatically makes a copy of the bit selected. This new bit and any edits made when configuring it are only saved within the project in which it was configured.

This is especially useful when experimenting with different feed and speed settings while developing a project.

Saving and Sharing

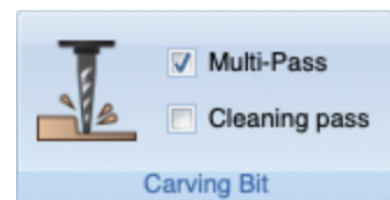
The bit is saved with the project, so if shared or sold to another, it will retain that bit configuration.

You can also add a configured bit as a **Global Bit** by accessing it under the **Edit Bit** tool under the *Board Setup* tab. Select the bit and click the Add button. From there, simply click save, and it will be added to the Global Bit list.



Multi-pass and Cleaning Pass Checkboxes

There is a check box for Multi-pass and a check box for Cleaning pass next to the carving bit selection icon in Designer 5. Below are explanations of their usage.



Multi-pass

Multi-pass uses the Max pass depth setting of the bit for the depth of each pass. The step over for all but the final pass is the stepover of the draft mode. The feed rate is driven by the feed rates of the quality selected and is relative to the depth. All the preprogrammed CarveWright carving bits have a .5" minimum pass depth, so unless your carving is deeper, it will just use 1 pass. Unchecking multi-pass disregards the pass depth setting and uses the speed and feed setting for the full depth specified.

Cleaning pass

Cleaning pass uses the cleaning pass settings for the bit. Checking the box will have the machine make one final carving pass over the carving using the carving at the specified depth and feed rate resulting in a cleaner finish on your carve. When doing multipass, it isn't always necessary to use a cleaning pass as the multiple passes usually result in a cleaner carve already.

