

LHR TECHNOLOGIES, INC.

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# CARVEWRIGHT CNC LEARNING GUIDE

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# INTRODUCTION – CARVEWRIGHT CNC SYSTEM

## WHAT IS CNC?

**C**NC (Computer Numerical Control) is a computer control process used to direct precise movements of robotic cutting, carving, and milling tools. It was most commonly found in industrial manufacturing settings, but as the technology has advanced, it is finding its way into everyday life. It is how nearly everything is made today. The CarveWright CNC is a “Personal CNC” or “Desktop CNC” system, referring to its small footprint and ease-of-use.

There are many different kinds of CNC Systems for doing various functions, but there is a common vocabulary that helps us identify and understand their basic operation.

## HARDWARE TERMS



FIGURE I.1 STEPPER MOTOR

**Axis** - Axis refers to a direction of movement. In a 3 axis machine, the machine’s cutting capability will be in 3 directions; X,Y, & Z, or forward and back, left and right, & up and down. It is possible for more or less axis depending on the function of the machine. *The CarveWright is a 3 axis machine.*

**Stepper Motors** - A stepper motor (figure I.1) is a brushless DC electric motor that divides a full rotation into a number of equal steps. The motor's position can then be commanded to move and hold at one of these steps without any feedback sensor (open-loop control), as long as the motor is carefully sized to the application. Stepper motors are commonly used for lower-end CNC systems, as they lack the feedback for increased speed, power and accuracy of servo motors.



FIGURE I.2 SERVO  
MOTOR

**Servo Motors** - A servo motor (figure I.2) is a brushed motor that uses a built-in encoder for error-sensing feedback (closed loop control) to correct the performance of a machine. This means that the system can sense the exact position of the motor, and make corrections, if the motor ever gets out of position. This is an advantage over stepper motors, as steppers have no feedback to inform the system when they get out of position. *The CarveWright is a full servo motor system.*

**Gantry** - A gantry (figure I.3) is a frame structure that spans an area and moves along tracks. A carriage is mounted to the structure that can move along the spanning bridge. Many CNC machines use a gantry structure for their 3 axis control. The movement of the gantry structure is the X axis, and the carriage is the Y axis. The Z axis refers to the up and down movement of the carriage. Gantry systems are limited to the working area within its tracks. This means the pieces being made with a gantry CNC are limited to the size of the machine itself. Small machines can only make small parts.

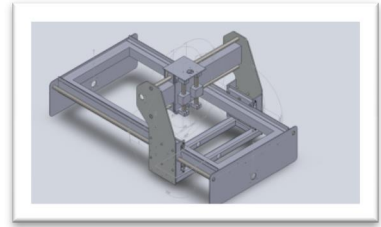


FIGURE I.3 GANTRY FRAME

**Feed-Through** - A feed-through is a machine that allows material to be feed through it at a controlled rate. This is commonly seen in printers as they feed paper through the machine along its X axis. Feed through systems are not limited by their footprint for the size of pieces they can make. A small machine can feed through long material. The CarveWright uses a feed-through system for large project capacity even with it's small footprint.

**Spindle** - The spindle on a CNC refers to the spinning cutting head where the bits (tools) are attached. The spindle is often the entire motor that drives the cutter, but in some cases can be driven by a motor located elsewhere in the machine. On low-end CNC machines, the spindle motor will often be a small off the shelf router that is mounted with brackets. The CarveWright (figure I.4) uses a cut motor that drives a spinning flexible shaft to drive the spindle.



FIGURE I.4 CARVETIGHT

**Controller** - The controller is the brain of any CNC. It's a computer that processes the machine code commands into the actual motion the machine performs. Controllers can range greatly in size and capability depending on the machine and application. The CarveWright uses the ServoSmart controller, which was designed specifically for it.

## SOFTWARE TERMS

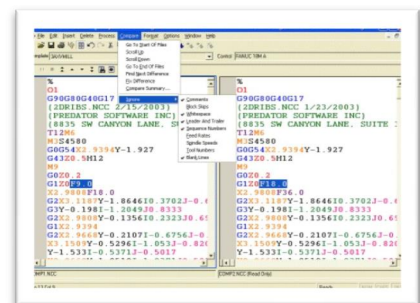
**Computer-aided design (CAD)** is computer software used to create a design. CAD software can be in either 2D or 3D and is an extremely precise way to design parts for manufacturing. There are dozens of CAD programs on the market today ranging in price and functionality. The CarveWright system uses its own CAD program called Project Designer.

**Computer-aided manufacturing (CAM)** is computer software used to convert the CAD files to machine language in order to control the machine. Many CAD programs have CAM software incorporated in order to simplify the workflow. Often, the machine being used is selected from a list for the proper code to be written. The CarveWright has an incorporated CAM software that writes the machine code during the upload process.

**Speed and Feed** - This refers to two separate settings in CNC; the cutting speed and the feed rate. The cutting speed is the speed difference between the cutting tool and the surface and the material it is operating on. It is usually described as feet per minute. The feed rate is the speed difference at which the cutter is advanced along the workpiece. They work together to determine how fast the cutter spins in relation to how fast the cutter is moved around the work piece. These settings are important to a successful project. The wrong settings can cause breaking of bits, machine crashing, motor stalls, and burning of material. Most CNC systems require these settings to be programmed in for each bit and for each operation. The CarveWright's speed and feed rates are pre-programmed, so they never have to be set by the user.

**Machine Setup** - In order for a CNC machine to run an operation successfully, it's parameters have to be defined. These parameters include setting the length of the cutter and the X, Y, & Z positions of the work piece. This is often a manual process of moving the machine's spindle to the defining positions to program them in prior to running the job. Some more advanced CNC systems today have automatic setup that eliminates the need for this manual process. The CarveWright has an automated machine setup.

**Machine language** (figure I.5) is a set of instructions sent to the machine to instruct it in its operation. This is the language of the machine and includes the commands of position, speed, direction, etc. The most common CNC machine code is G-code. There are also many different proprietary machine codes that have been developed by CNC manufactures over the years in order to increase the functionality and ease-of-use of their particular machines. The CarveWright CNC uses a proprietary machine code.



**Raster Cutting Operation** (figure I.6) - In computer graphics, a raster graphics image, also known as “bitmap”, is a dot matrix data structure representing a generally rectangular grid of pixels. Each pixel is a tiny square that represents a color. The combination of all of these tiny squares creates an image. A raster operation in CNC works much like a inkjet printer except each pixel has an assigned depth rather than a color. It works from one end of the graphic and moves along one line of pixels before moving to the next line of pixels. The Z axis changes its depth to match the depth information for each pixel, resulting in a 3D carving.



FIGURE I.6 RASTER CARVING LINE BY LINE

**Vector Cutting Operation** (figure I.7) - Vector graphics is the use of geometrical primitives such as points, lines, curves, and shapes or polygons—all of which are based on mathematical expressions—to represent images in computer graphics. These graphics are infinitely scalable, since they contain no pixel information. In CNC, a vector operation means the cutter can move along the path and trace along the line or curve. This type of operation can be very fast for operations like text, cutouts, and v-carving.

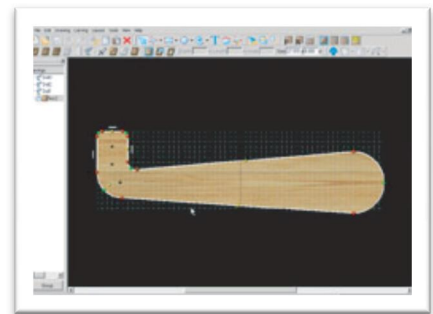


FIGURE I.7 VECTORS ROUT ALONG A PATH



## OVERVIEW OF THE CARVEWRIGHT MACHINE

### CARVEWRIGHT CNC MACHINE

You can think of the CarveWright CNC machine (figure I.8) as a subtractive 3D printer. It removes material, through cutting or carving, with a spinning bit, from a block of material set into the machine.

The CarveWright CNC System is unlike most CNC's in several ways. For one, the footprint of the machine is much smaller at only 15x18x26, but packs a lot of power for its compact size. The servo motors are a lot faster than the stepper



FIGURE I.8 CARVEWRIGHT CNC MACHINE

motors used on most CNC's. Unlike a gantry CNC, which is limited on project size by its bed, the CW uses a feed-through, belt drive system to feed material of virtually unlimited length. The controller is built into the machine and projects are uploaded to memory cards for transfer. Then the keypad and LCD panel located on the side of the CW allows the user to not only access their projects, but also many other built-in functions.

### PROJECT DESIGNER SOFTWARE

The Project Designer software (figure I.9), is available for PC or MAC, allows several options for creation of 3D designs. A library of elements (or patterns) is included with the software. These can easily be placed on the 3 dimensional virtual board in a drag and drop fashion and then manipulated in a variety of manners including resizing, rotating, inverting, grouping and mirroring to create one-of-a kind designs. Built in drawing tools allow for creation of designs along with various other tools for the addition of text, texture backgrounds, contoured regions, lines, curves and shapes. Other options include the ability to import images, purchasing additional patterns from the Pattern Depot, and purchasing add-on modules to further expand the software's features.

There are two versions of Project Designer available:

**Project Designer BASIC** is a free version that is packaged with every machine.

**Project Designer PRO** is an upgrade version that has many more features and updates.



FIGURE I.9 PROJECT DESIGNER SOFTWARE

Additionally, there are many add-on modules that expand the capabilities of the software.



The CarveWright System is designed to be modular, meaning you can buy only the features you want, and customize your software to your needs. This allows you control over your software and your budget.

## ADD-ON SOFTWARE MODULES

**Centerline Text** (figure I.10) adds an additional Rout Mode in the Text Tool feature. This feature uses the 60° and 90° V-groove bits to follow the center of the letters for a clean engraved, v-cut look. The depth of the centerline is determined by the width of the text selected.



FIGURE I.10 CENTERLINE TEXT

**Conforming Vectors** (figure I.11) enables v-bit routing along a carved surface. Without Conforming Vectors, these types of routs can only be made on the flat, top surface of the board. The “conform” feature can be applied to any vector function, including Centerline Text and Vector Groups.



FIGURE I.11 CONFORMING VECTORS

**2D Vector Drawing Suite (2D Advanced)** (figure I.12) is a tool bar add-on for Project Designer that expands the drawing and vector manipulation capabilities of the software. Define vector paths quickly, trace images, trim and merge vectors together, and many other features that assist in creating your own drawings.

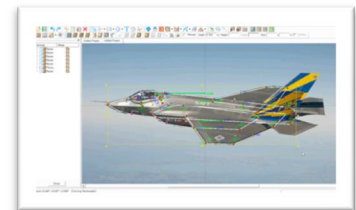


FIGURE I.12 VECTOR DRAWING SUITE

**3D Pattern Modeling Suite (3D Advanced)** (figure I.13) is a tool bar add-on for Project Designer that enables modeling of 3D relief patterns. Extrude, sweep, and puff shapes into dimensional creations. These tools are easy-to-use and make your own custom pattern design fun and simple.

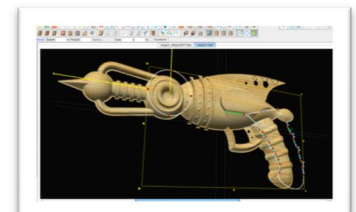


FIGURE I.13 PATTERN MODELING SUITE

**The DXF Importer** (figure I.14) allows the user to import 2D vector files created in 3rd Party software packages. DXF is a common format for vector software such as AutoCad, Illustrator, CorelDraw, and more. The DXF Importer tools allow for scaling, rearranging, flipping, rotating, auto-connecting of lines, splitting (tiling designs), create boards to layout shapes, and ultimately, importing those boards into Designer to be carved or cut out.

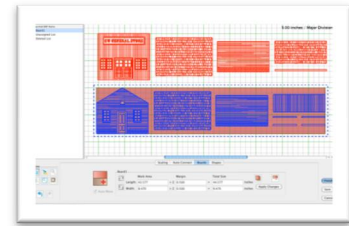


FIGURE I.14 DXF IMPORTER

**The STL Importer** (figure I.15) enables importing of 3D STL files and preparing them for carving. This is done by scaling the model to the desired output size, and then slicing, or cutting, it into pieces that can be carved on a flat board by the machine. The cut angles and depths can be customized to give the best possible strategy for retaining the details of the model. These slices, once carved, can then be reassembled into a physical 3D model.

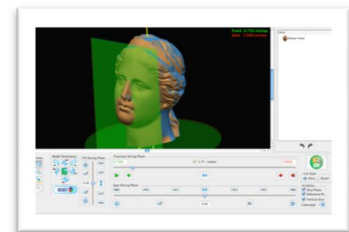


FIGURE I.15 STL IMPORTER

**Pattern Sculptor** (figure I.16) is a creative sculpting and editing tool for 3D relief carving patterns. Quickly and intuitively smooth, smudge, and add or remove details to prepare patterns for relief carving. This software only works with Project Designer PRO.

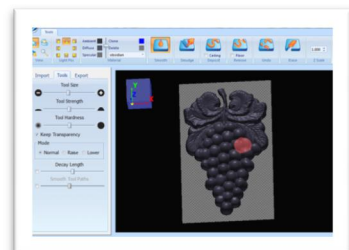


FIGURE I.16 PATTERN SCULPTOR

**Pattern Editor** (figure I.17) is supplied FREE with the CarveWright **Scanning Probe**. Its primary purpose is to provide tools for cleaning up and preparing scans for carving. Once finished, the patterns can be saved directly to Project Designer's pattern library for immediate integration into your designs for carving.

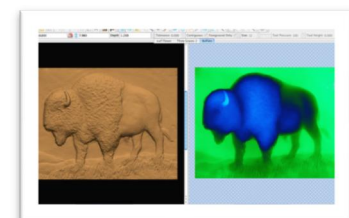


FIGURE I.17 PATTERN EDITOR

**Keyhole Function** (figure I.18) enables plunge cutting keyhole shaped mounting slots in items such as picture frames and plaques. It's a quick and easy way to automate making these hanging slots, so your work can be displayed. With Designer's ability to design on the front and back of your boards, adding these professional looking hanging slots becomes simple. The keyhole bit required for this is included with this module.

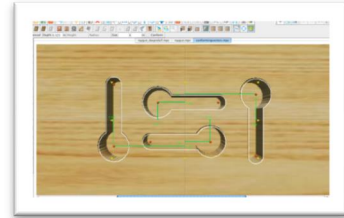


FIGURE I.18 KEYHOLE FUNCTION

## ACCESSORIES

**Scanning Probe** (figure I.19) can also be purchased as an accessory to the CarveWright. This probe attaches like a bit on the CW machine and allows for the reproduction of 3-dimensional objects by probing the object with an accuracy of up to .005 of an inch. The resulting 3D data can then be downloaded and accessed from the included Pattern Editor software for further manipulation and use by the user.



FIGURE I.19 SCANNING PROBE



FIGURE I.20 ROTARY JIG

**Rotary Jig** (figure I.20) and accompanying software, enables the design, import, and carving of turned projects. It's like a lathe, but with carvings. The rotary software, included with purchase of the jig, shows the carved round piece alongside a flat board where the design is manipulated. The jig is simple to use. Load your material, calibrate the jig, and carve your pieces in the round. With the STL Importer add on, you can even import STL's directly into the rotary format.

**Sanding Mops** (figure I.21) are a great way to speed up and simplify the sanding and cleaning of your carvings. Attach it to a drill press or another high speed motor, and quickly polish your projects without removing your carved details. It will literally save you hours of tedious, hand sanding work. With two grits and two sizes, no matter the project, we've got you covered. We also have sandpaper refills for when you wear them out from all the great projects you are making.



FIGURE I.21 SANDING MOPS



FIGURE I.22 MEMORY CARD



FIGURE I.23 PROGRAMMER

**Memory Card & Programmer** (figures I.22 & I.23) are used to easily transfer of your project, from the Project Designer software, to the CW machine. The memory card programmer attaches to a USB port and the project is uploaded to the memory card. During this upload process, a time estimate calculation is displayed for the amount of time to project will take. There are also quality settings for changing the speed of the project. The higher you set the quality level, the slower the machine carves. The memory card allows the design work to be accomplished from your office or computer room away from any sawdust or other possible hazards in your workshop.

The card is inserted into the memory card slot on the side of your CW machine, and the project is selected from the on board keypad and LCD. The capacity of the memory card is large enough to hold a significant number of projects and scans. How many it will hold depends on the size of the individual projects. If the card fills up, simply delete some of the files using the Flash Manager in the software. As long as you save the project file to your computer hard drive before compiling, it can be put onto the memory card over and over. Compiled project files cannot be transferred from the card back to the software.

**Third Party Accessories** (figure I.24) developers are becoming more and more a part of the CarveWright family. Many of these products are great additions to your CarveWright machine and are produced by customers easier and less expensive than we could.



FIGURE I.24 THIRD PARTY ACCESSORIES

**CarveWright Bits** include a variety of bits for different carving and cutting purposes. The CW carving & cutting bits are all high quality carbide designed for longer-life and more precise cutting performance.



FIGURE I.25 CARVEWRIGHT BITS

There are three categories of bits (figure I.25) used with the system:

**Carving Bits** are solid carbide ball nosed bits. Carving bits are used for doing detailed “raster” carving and shaping. There are several sizes available for various types of carving.

**Cutting Bits** are solid carbide straight end-mill bits. Cutting bits are used mostly for doing vector cutout functions. The bit will follow a path, or line, designated in the software to cut an object out, drill holes, or route lines into the material.

**Decorative Bits** are a variety of “router” bits with several profiles to choose from. They are “plungeable” and specifically calibrated with the Project Designer Software to ensure proper speed and feed settings for each bit. They are sold individually or as a set.

Carving Bit accessories, such as split collets & rubber stop collars, description and uses are also available at

[www.carverwright.com/bits/](http://www.carverwright.com/bits/)

**Pattern Depot** (figure I.26) includes thousands of patterns from which to

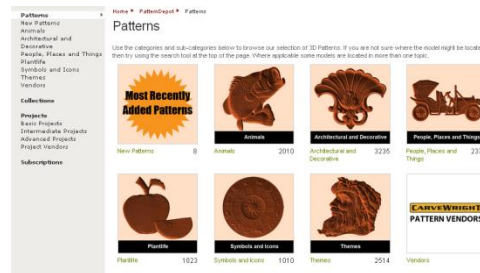


FIGURE I.26 PATTERN DEPOT

choose, save to your Pattern Library in your Project Designer software and then use over and over again in your projects. There are also many pre-designed projects available with all the project files and instructions needed to create them.

To see the patterns and projects available, visit <http://patterns.carverwright.com>

For more information about the complete CarveWright product line, visit [www.carverwright.com](http://www.carverwright.com)



## WHAT CAN THE CARVEWRIGHT CNC DO?

Now that we have some basic understanding of what the CarveWright is, let's explore what it can do. The CarveWright is a very versatile system suitable for innumerable types of projects. It is, mostly, up to the imagination of the user to determine what it makes. However, some types of projects are more common than others.



FIGURE I.27 LITHOPHANE CARVING

### TYPES OF PROJECTS

Some Common Projects with the CarveWright CNC:

- Sign Making
- Furniture Design and Restoration
- Architectural Elements
- Crafts
- Home Decor
- Model Making
- Mold Making
- Musical Instruments
- Lithophanes (figure I.27)



Craft projects that wow



Sign makers rejoice



Woodworking wonders



Model making master



Manufacturing & Prototyping



3D Print your ideas

### CAPACITY OF THE CW

#### Maximum Dimensions

- Width – 14.5"
- Depth – 5"
- Length – 12' carving
- Weight – 20 lbs
- Work pieces over 3' long will require additional support, such as out-feed rollers, at the appropriate height.

#### Minimum Dimensions

- Width – 1.5"
- Depth – .5"
- Length – 7"
- If any of these dimensions fall below the minimum limitations, the work piece will require a jig.

**ACCEPTABLE  
MATERIALS**

Approved For Use:

- Wood  
(Hard and Soft woods)
- Foams  
(HDU, XPS; EPS)
- Plastics  
(PVC, Polycarbonate, Corian,  
Cast Acrylic)
- Machinable Wax

NOT Approved For Use:

- Glass
- Ceramics
- Stone
- Metals
- Concrete
- Soft plastics  
(low melt temperature)



## Quiz

1. What does CNC stand for?
2. What is the difference between a feed-through and a gantry?
3. Is the CarveWright a feed-through or a gantry?
4. Describe the two types of cutting operations.
5. What is the Scanning Probe?
6. Name the two types of CNC drive motors.
7. Which type of drive motors does the CarveWright use?
8. What is the name of the CarveWright CAD/CAM software?
9. What are the maximum board dimensions of the CarveWright System?
10. Can the CarveWright carve/cut metal?
11. Name three add-on software modules for CarveWright, and describe what they do?
12. What are the three categories of bits used with the CarveWright System?

*There is certainly more to know from this section, but this should give you a good indication of what you should have learned.*

# CHAPTER 1 – GETTING STARTED

## *BEFORE YOU BEGIN CARVING*

I know you are excited to give your new purchase a test drive, but there are some things you need to do and learn first. Most is located in our Getting Started Section under the SUPPORT menu:

<http://support.carviewright.com/getting-started/>

### INSPECT AND INVENTORY:

The first step in getting started with the CarveWright CNC is to un-box the machine, inspect it for any shipping damage and inventory your order. If there are any issues, contact LHR Technologies, Inc. at 713-473-6572.

### MACHINE SET-UP:

Follow the instructions in the Quick Start Guide located in the box and on our website. READ BEFORE YOU TURN ON YOUR MACHINE.

### REMEMBER SAFETY FIRST:

Please follow all safety suggestions listed in the CarveWright Machine Manual.

### CREATE A CUSTOMER ACCOUNT:

Next, you will install your Designer software, create your own Customer Account and register your machine, software licenses and computers. Make sure to follow the steps in the Designer Software Quick Start Guide located in your box and on our website. These steps need to be accomplished before proceeding with this learning guide. NOTE: You created a Store Account, when you purchased your machine; not a Customer Account.

### ADDITIONAL RESOURCES:

Make sure you also read the CarveWright Hardware Manual and watch the instructional DVD. These contain the basic operating and troubleshooting information needed to successfully use the CarveWright CNC System.

The CarveWright Project Designer Manual is also very thorough in its explanation of the CarveWright software and should be used as a companion to this guide.

Other resources include tutorials, videos, Tips & Tricks, FAQs, maintenance schedules, repair documents, a Forum, Local User Groups and START U members.

## *HOW TO DESIGN YOUR PROJECT*

### **TRASH IN = TRASH OUT**

Start with quality patterns or, if you are importing an image (whole other animal), use a high resolution. Remember images on the internet are a low resolution, so that they will quickly load on the browser page. Some clean up of these patterns can be done with other add-on software.

Use any True Type Font, but remember thin fonts may result in chip out. Lower the height and add draft to help prevent this.

There are four quality settings. The higher the setting, the less the sanding will be required. You may want to carve a test piece prior to carving in your more expensive materials.

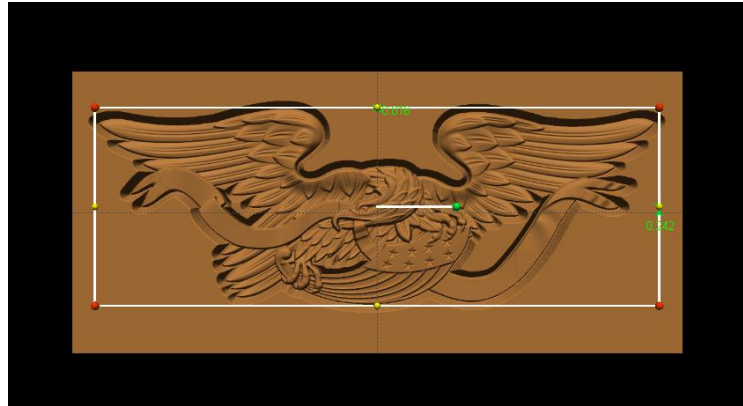
Use sharp bits. It should be sharp enough to scrape away part of your fingernail. Bit optimization could also help with your projects success.

### **DETERMINE PROJECT SIZE**

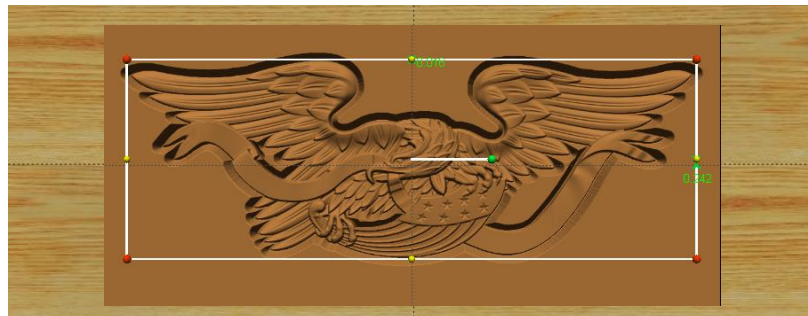
Your desired finished piece size will most often dictate what size virtual and actual boards you will need.



Finished Project size – Example: 24" x 8.436"



Virtual Board Size (always larger than project) – Example: 26" x 12" x .75"  
Reserve .5" as keep out zone at the top of your virtual board to avoid board tracking roller when doing cut-outs.



Actual Board (always larger than virtual) – Example: 33" x 13"  
Needs 3.5" on each end from start of carve to automatically stay under the rollers. This can be from the board or from a jig. Width is not as critical, just keep in mind, if your virtual is 12" and your actual is 12", but your machine measures it as 11.999" then it will ask if you want to shrink your project to fit the board. (Unless, of course, you don't care if it shrinks it down.)

## PROJECT DESIGNER BASICS

### PROJECT DESIGNER BASIC & PRO



The Designer software is available in the BASIC & PRO versions. Every registered machine allows for one BASIC license, which can be installed and registered on two computers. The PRO version, additional add-on software, patterns & project licenses can be added to these BASIC licenses. It is available for both MAC and

Windows Operating Systems. Check out further information such as computer requirements in the Software FAQs.

Designer is used as a virtual board, to which you add different elements, such as patterns, text, drawing tools, textures, surfaces and more to create a PROJECT for carving on the machine. Always save your projects (.mpc) files to your hard drive for future use or changes.

Upon upload to the memory card, those elements are changed into a language that the machine understands and is no longer readable by the Designer software.



Designer software is only forward compatible. Projects designed in BASIC can be opened in PRO, but those designed or saved in PRO cannot be opened in BASIC. Only one version can be open at a time, but both can be installed on your computer. Any new features will be programmed for the PRO version.

### STEP-BY-STEP TUTORIALS

These step by-step tutorials have been designed to give you the opportunity to learn by doing. They can be printed and sat beside you at your computer, while you follow each step to learn the different design features and create the project of each tutorial. Photos in these tutorials show what you should similarly be seeing on your own screen.

Projects include:

- Design Basic
- Basic Shell
- My First Carve

All of these tutorials can be completed using just the features of Designer BASIC.

**This project covers the following design concepts:**

- STARTING SOFTWARE
- MENUS, TOOLBARS OR MOUSE
- MANIPULATING THE WORKPIECE
- PATTERN PLACEMENT
- PATTERN MANIPULATION
- CENTERING
- MIRRORING
- TEXTURE
- MANAGING DATA
- UPLOADING TO MEMORY CARD



## INSTRUCTIONS:

### ➤ STARTING THE SOFTWARE

The Welcome screen appears with project options.

Select "New Project"

Set your board piece dimensions.

Length: 12"

Width: 5.5"

Thickness: .750"

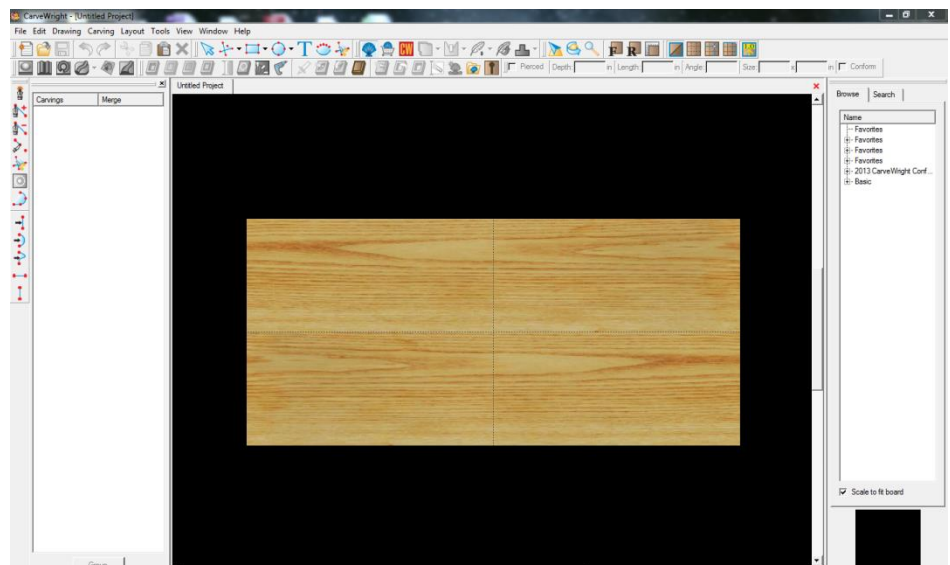
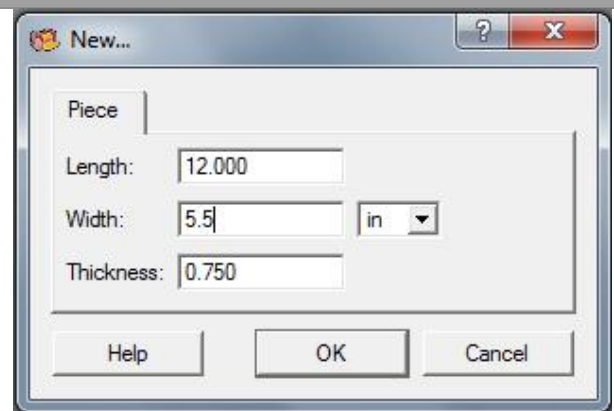
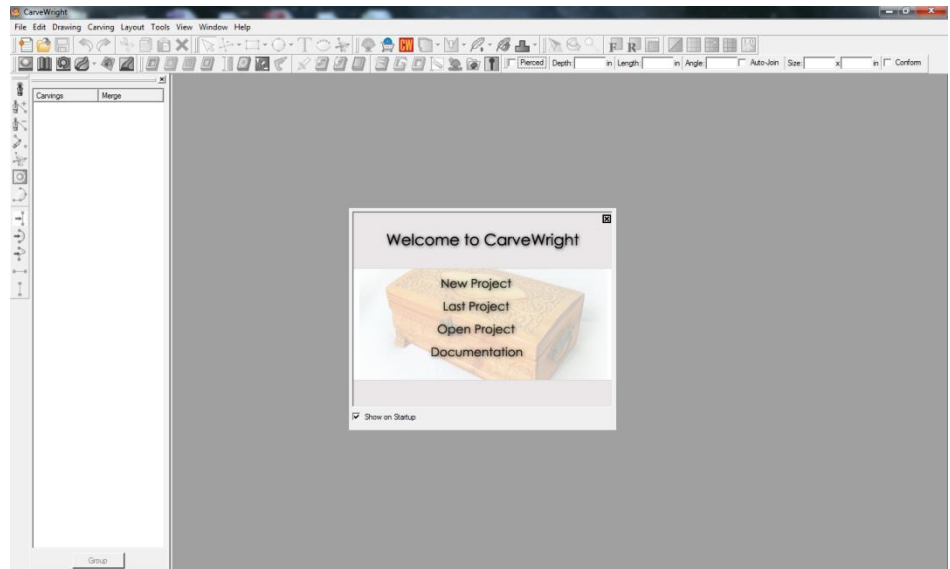
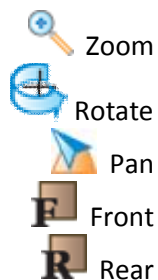
Click ok

NOTE: Put in the dimensions of the project board. This needs to be the finished size of your project. Do not include the 7" margin required by the machine. (more on the 7" rule later in this lesson)

### ➤ MENUS, TOOLBARS OR MOUSE


### ➤ MANIPULATING THE WORKPIECE

Board piece will display on screen in three dimensions.





## PATTERN PLACEMENT

 Select the “pattern tool” to open the pattern library along the right side.


Select the basic folder and find the Rosettes. Select Rosette 04 and place in on the board.

### ➤ PATTERN MANIPULATION

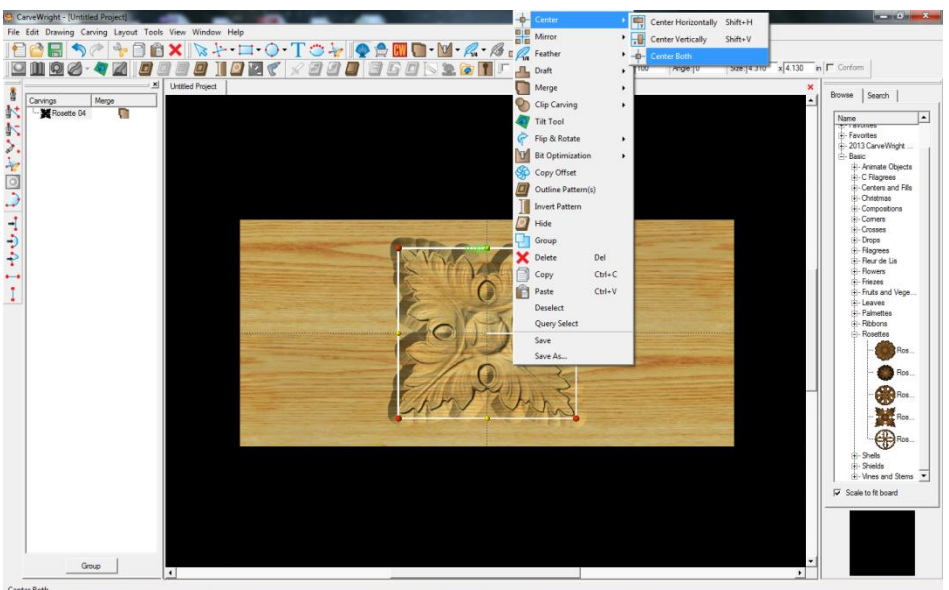
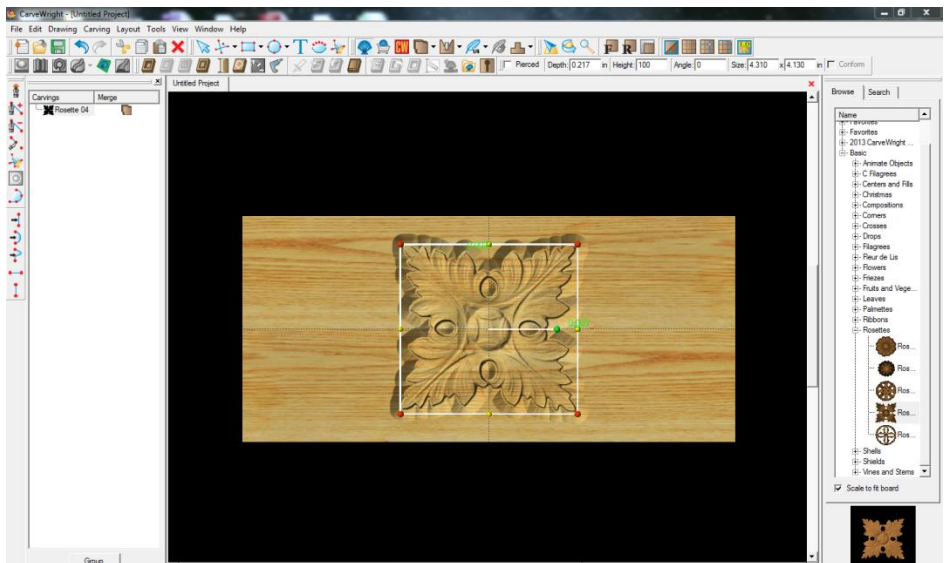
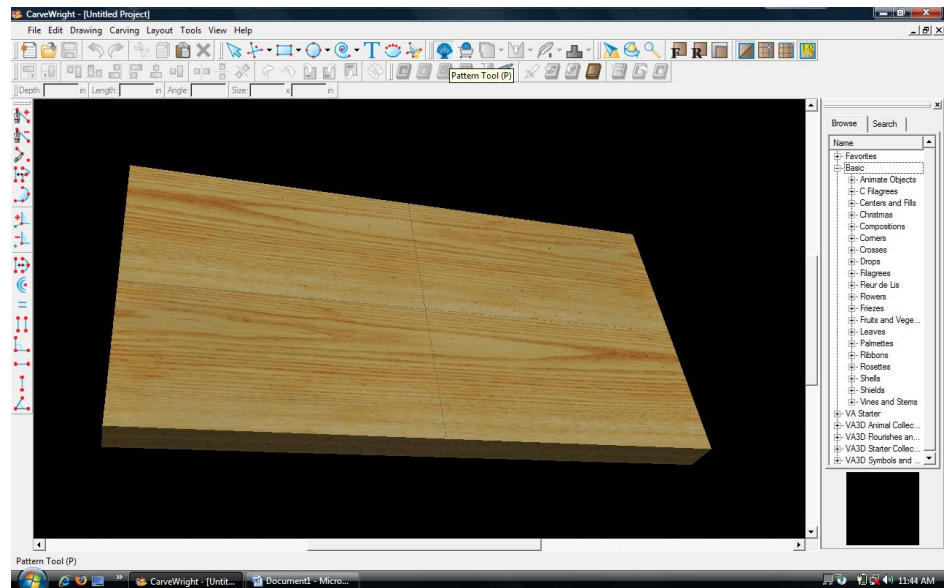
Use Red Nodes on the corners to Scale the pattern larger or smaller without skewing the pattern.

KEEP OUT ZONE: Top .5” unless using sled to protect Board Tracking Roller.

### ➤ CENTERING

 Right-Click on pattern to bring up menu of available options.

Select “Center”  
“Center Both”

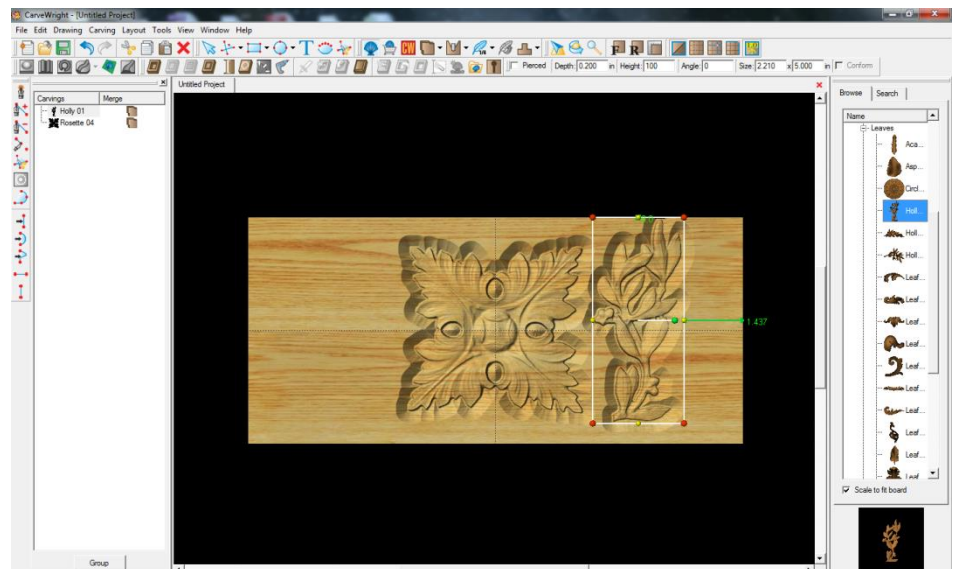




## ➤ PATTERN PLACEMENT

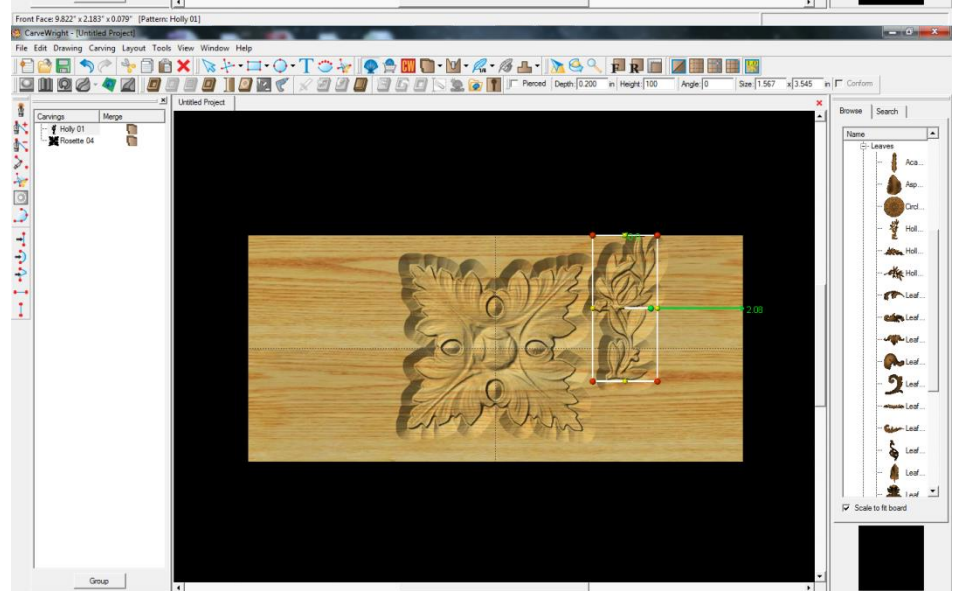
Open the Leaves folder under Basic in the Pattern Library.

Select Holly 01 and place the leaves on the board.

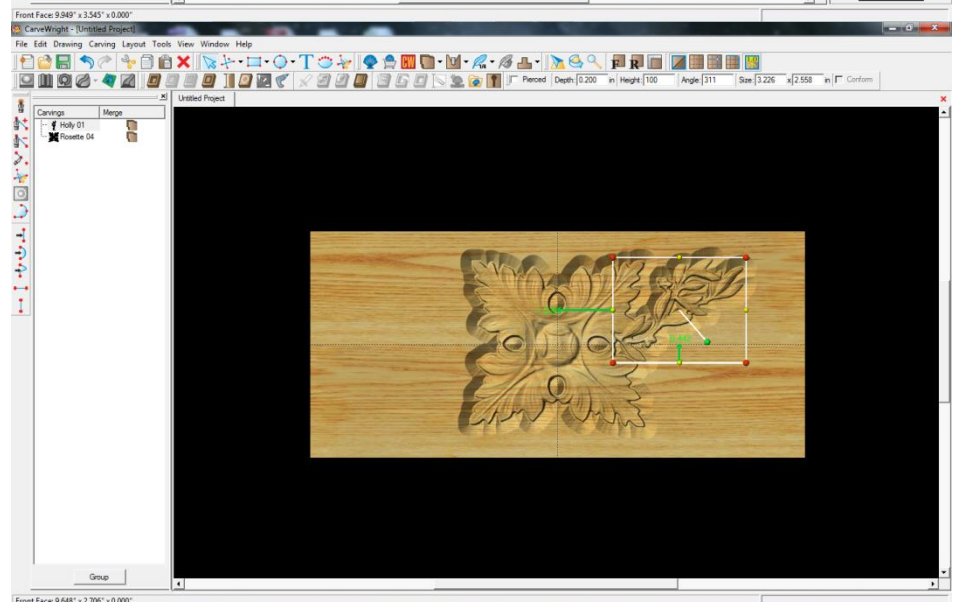


## ➤ PATTERN MANIPULATION

Scale using the red corner dots.



Rotate using the green dot.



## ➤ MIRRORING



Select leave pattern.  
Right-click and select Mirror >  
Mirror All.

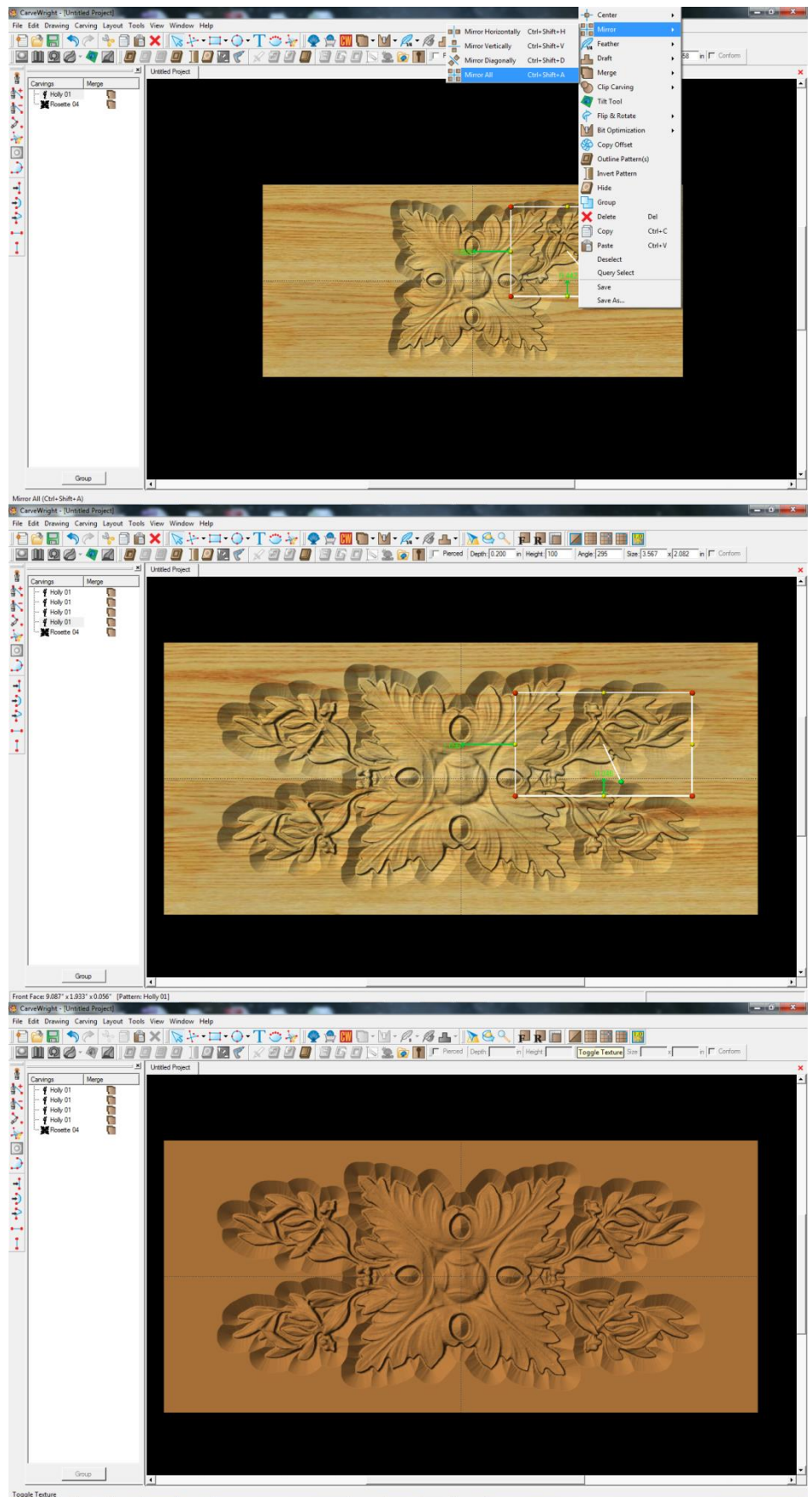
Notice the pattern is reflected on  
all four corners. If you move one;  
the others follow exactly.

Move patterns and adjust the  
angle & size to get your design  
arranged the way you like.

## ➤ TEXTURE



Toggle texture to see design.



## ➤ MANIPULATING THE WORKPIECE



Zoom in or out to view.



Rotate design to view it from different angles.

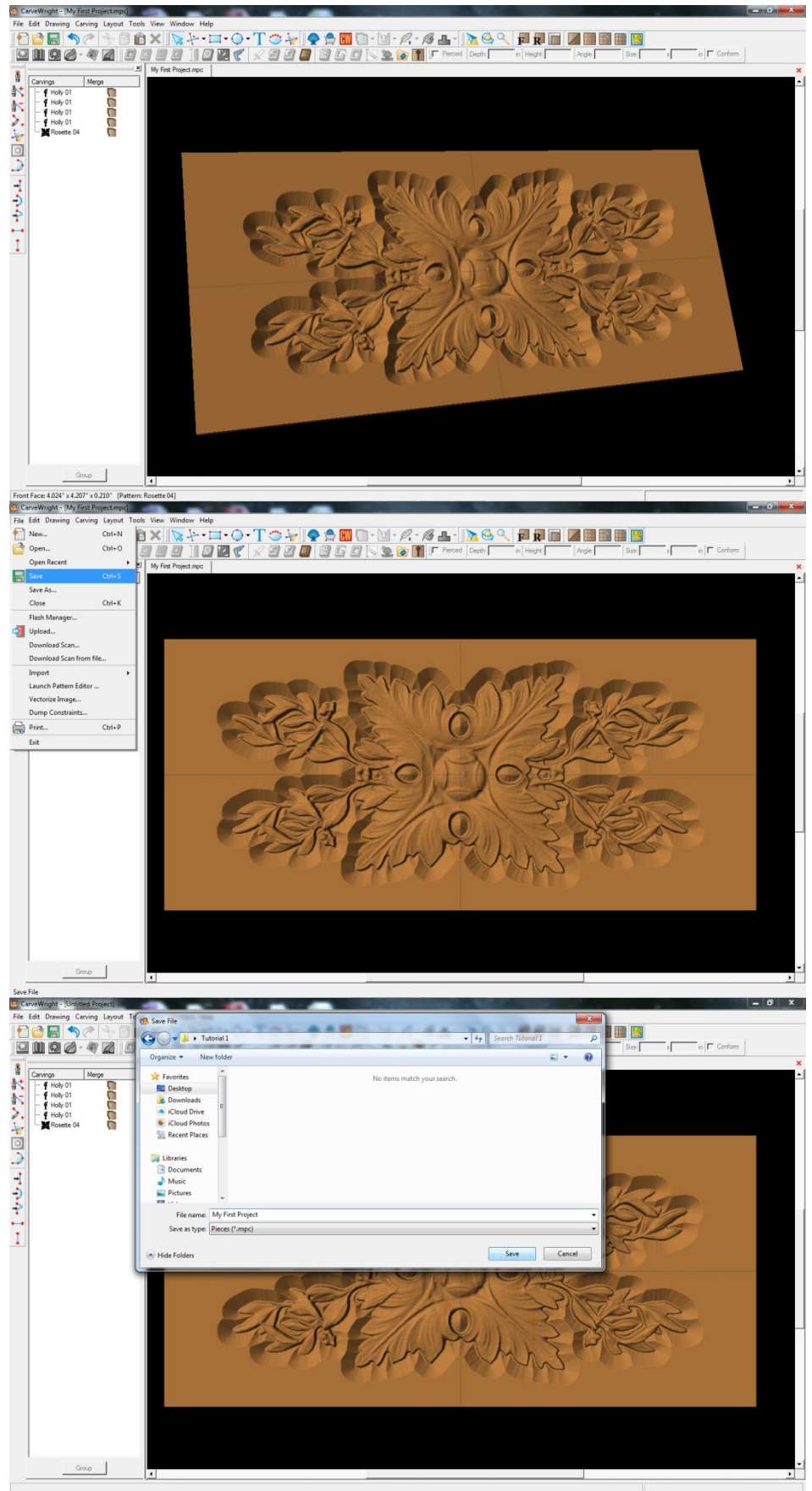
## ➤ MANAGING DATA



Select “File”, “Save”

Always save your project to your hard-drive, but NOT in the CarveWright Program Folder. Once uploaded to the card, you cannot bring it back into the software for further manipulation or changes.

\*\*\*\*\*IMPORTANT\*\*\*\*\*  
Name file and click “Save” to hard drive.





## ➤ UPLOADING TO MEMORY CARD



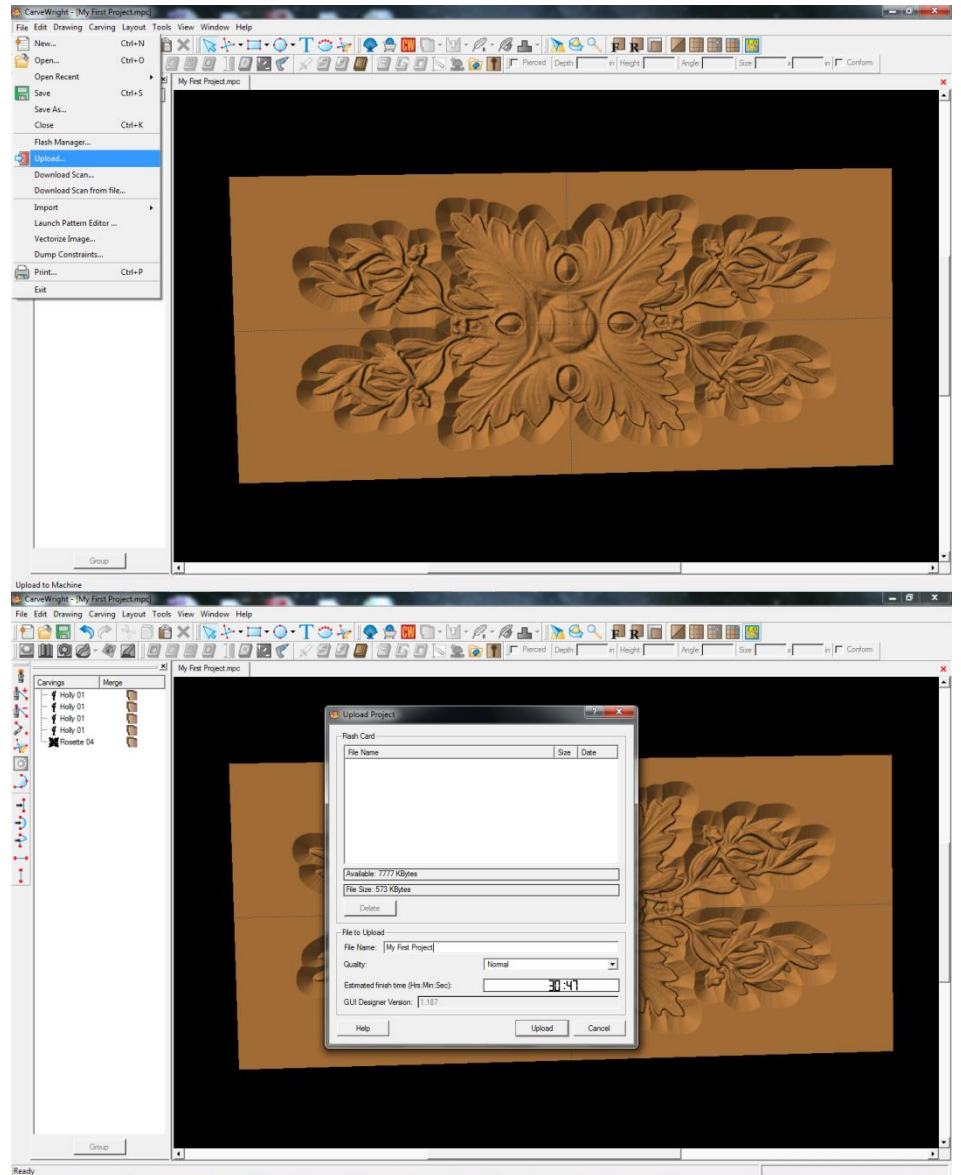
Plug in your memory card programmer and insert the memory card.

Select “File”, “Upload”

Notice the estimate time based on which quality setting is selected. The higher the quality the slower the machine will carve.

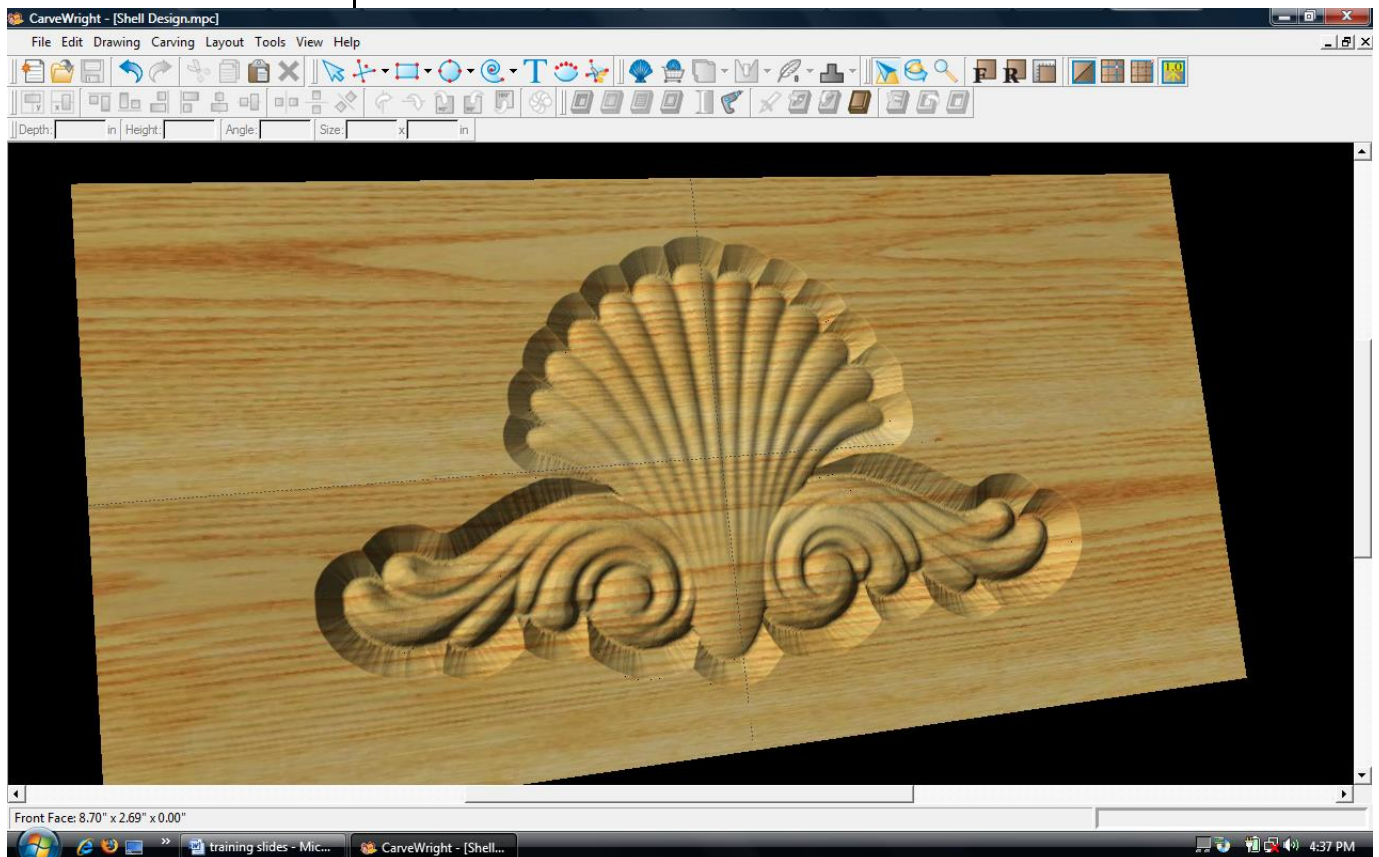
Save to memory card.

Example:  
*MyFirstProject\_N\_31*  
(Recognizable name\_quality setting\_estimated time to carve)



**This project covers the following design concepts:**

- STARTING SOFTWARE
- MENUS, TOOLBARS OR MOUSE
- MANIPULATING THE WORKPIECE
- PATTERN PLACEMENT
- PATTERN MANIPULATION
- CENTERING
- MIRRORING
- MANAGING DATA
- UPLOADING TO MEMORY CARD



## INSTRUCTIONS:

### ➤ STARTING THE SOFTWARE

The Welcome screen appears with project options.

Select “New Project”

Set your board piece dimensions.

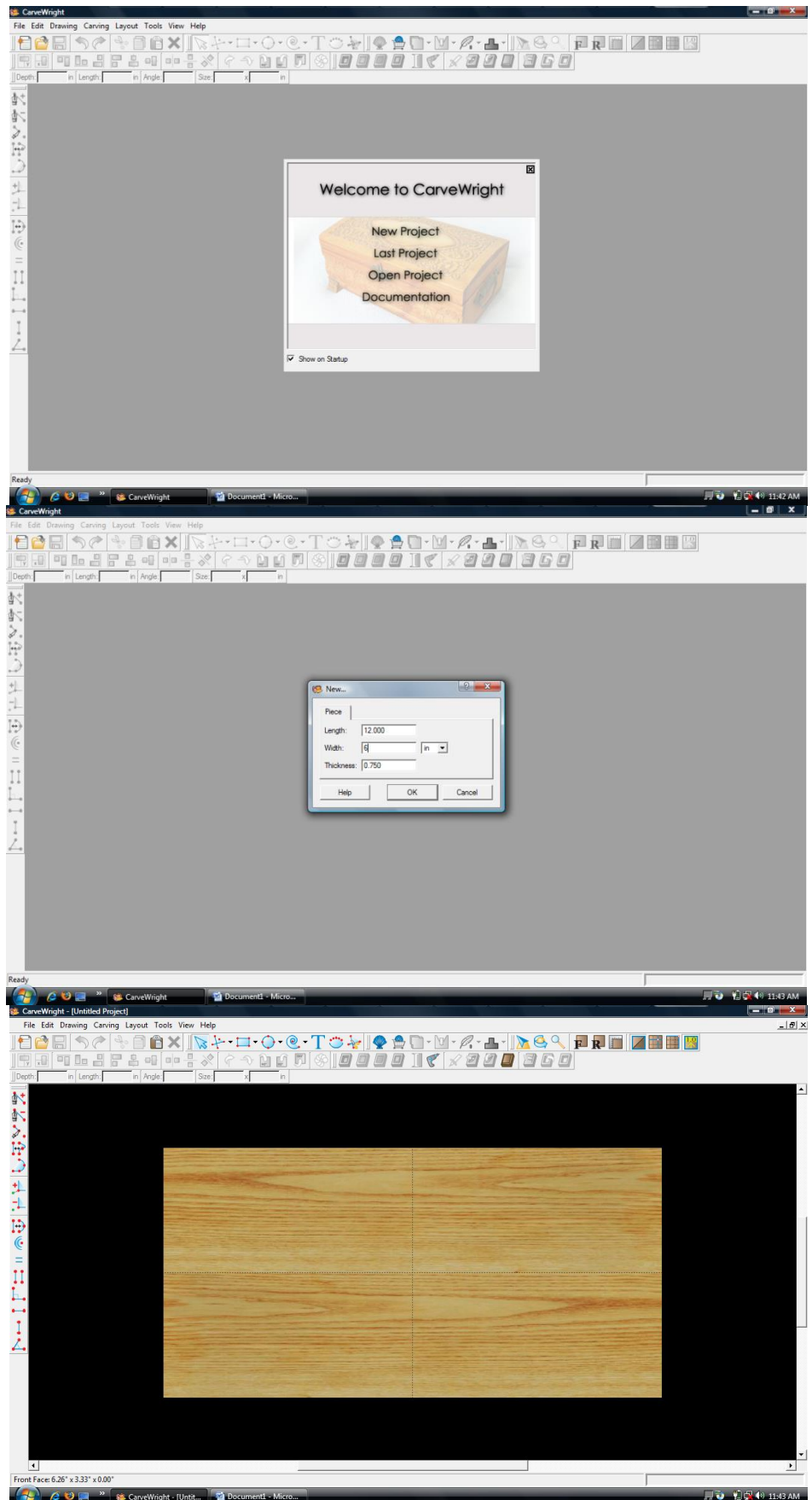
Length: 12”

Width: 6”

Thickness: .75”

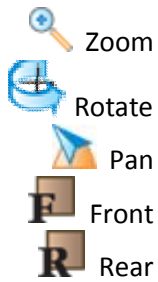
Click ok

### ➤ MENUS, TOOLBARS OR MOUSE



## ➤ MANIPULATING THE WORKPIECE

Board piece will display on screen in three dimensions.



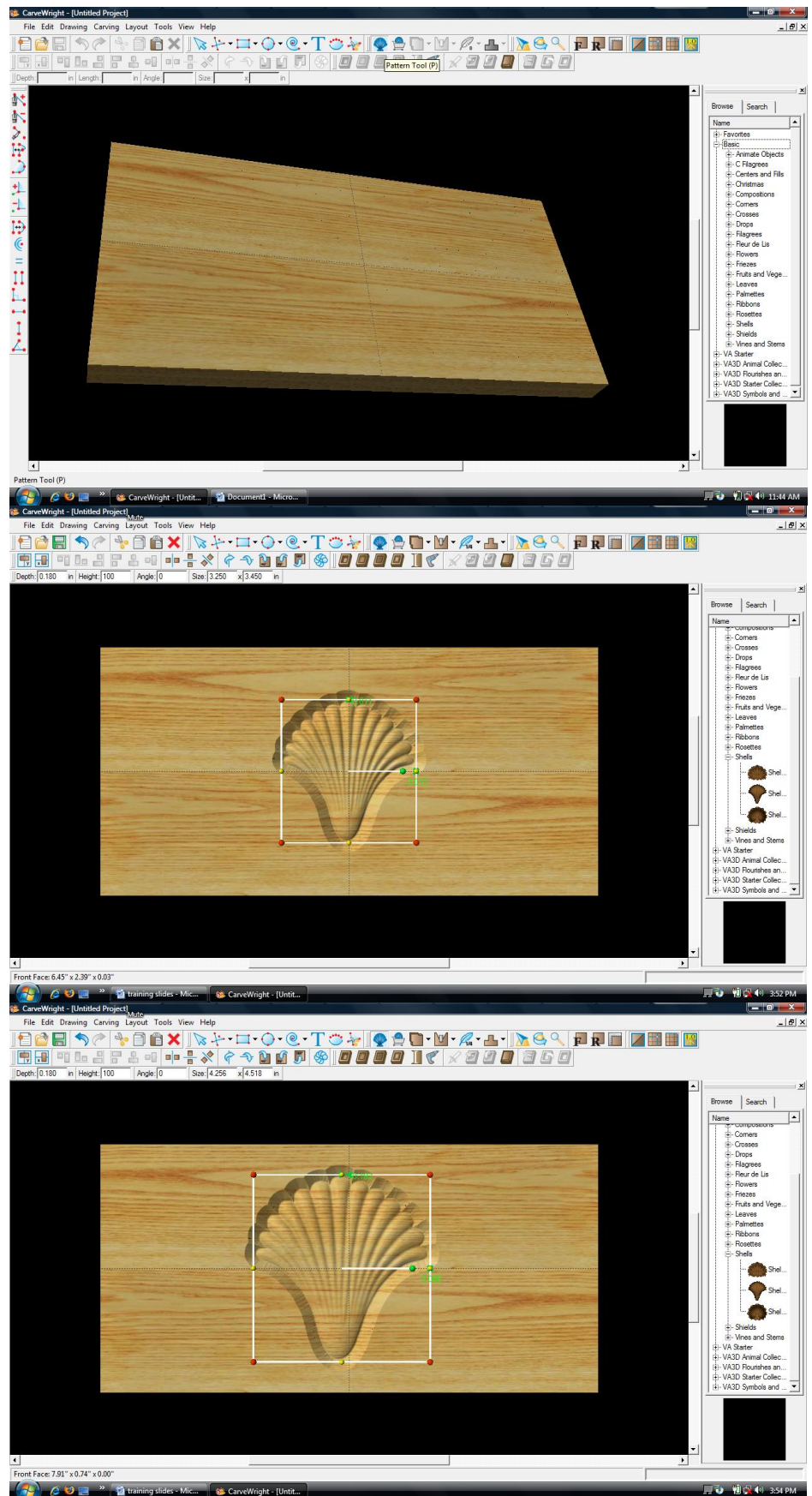
## ➤ PATTERN PLACEMENT

Select the “pattern tool” to open the pattern library along the right side.

Select “Shell 02” under “Shells” in the Basic Library.  
Click on board to place.

## ➤ PATTERN MANIPULATION

Use Red Nodes on the corner to Scale the Shell larger.



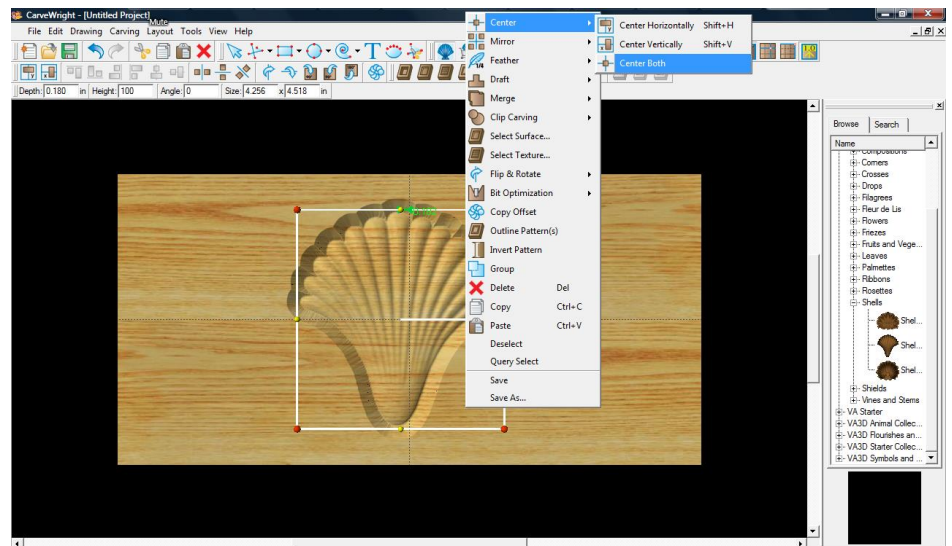


## ➤ CENTERING



Right-Click on “Shell” to bring up menu of available options.

Select “Center”  
“Center Both”

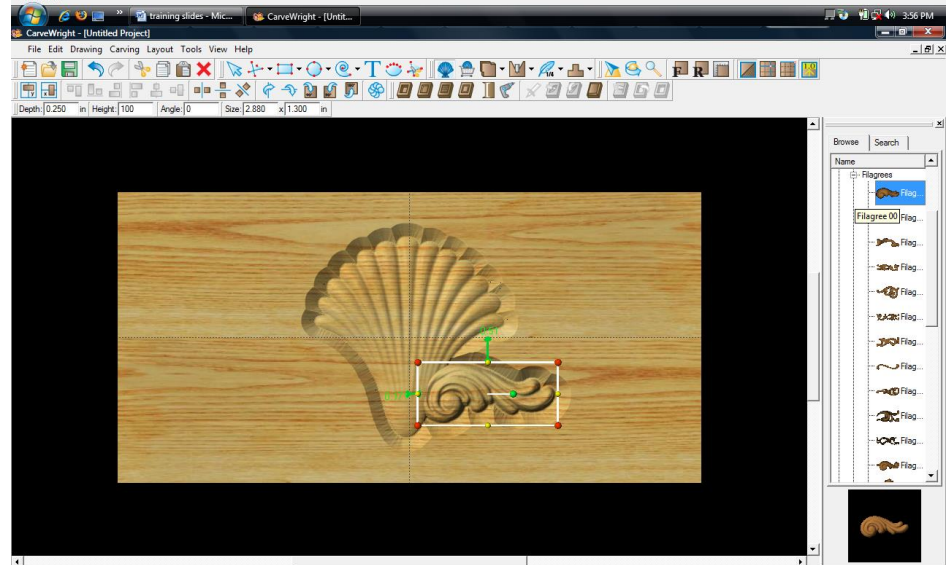


## ➤ MIRRORING

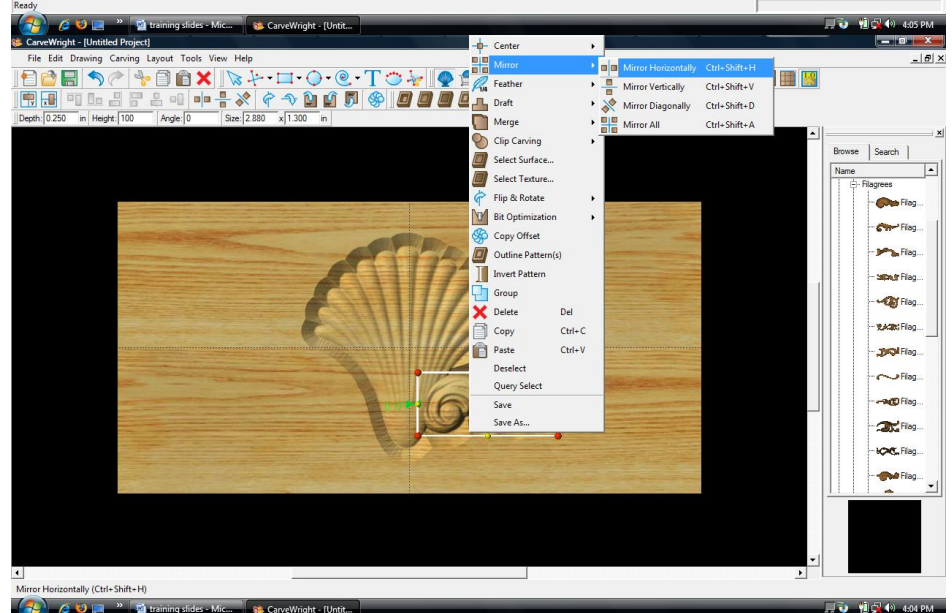


Select “Filagree 00” under  
“Filagrees” in the Basic  
library.

Place on board next to the  
shell.

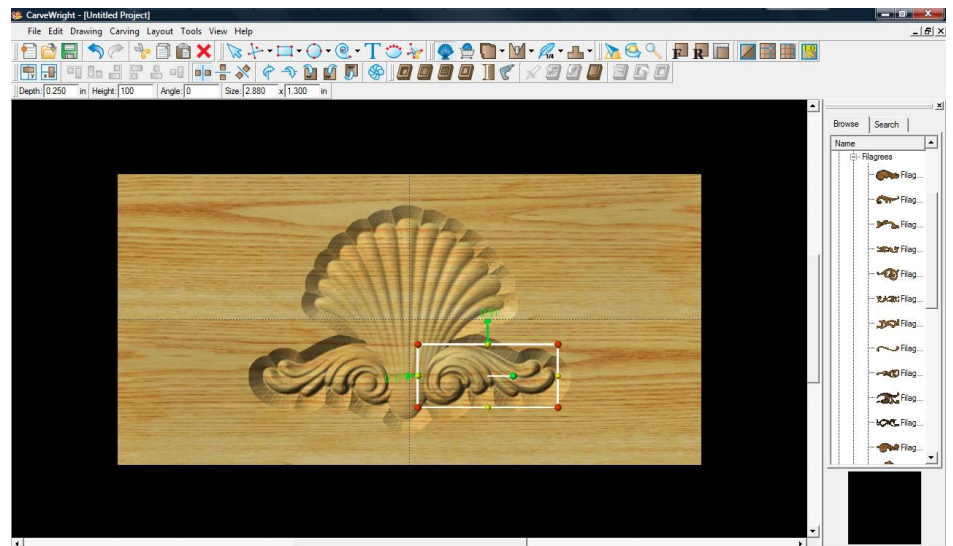


Right-Click and select  
“Mirror”, “Mirror  
Horizontally”.

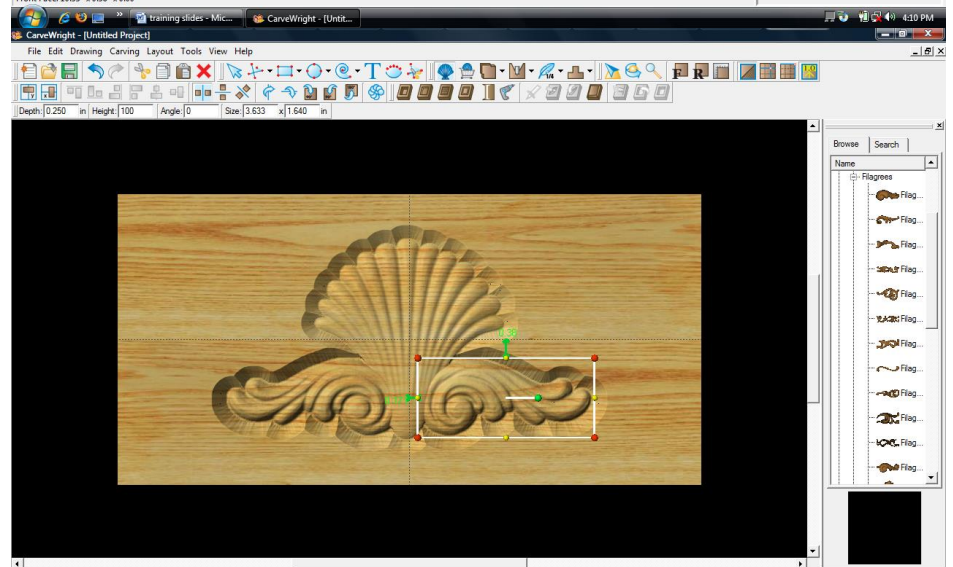




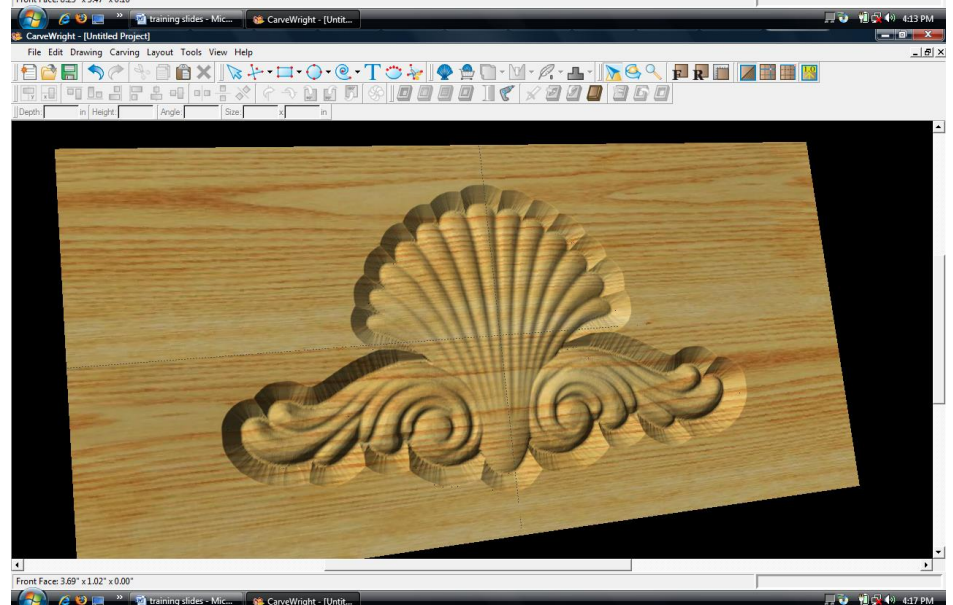
Notice the pattern is reflected across the board. If you move one; the other follows exactly.



Scale the pattern up and position around the base of the shell.



Rotate design to view it from different angles.



## ➤ MANAGING DATA



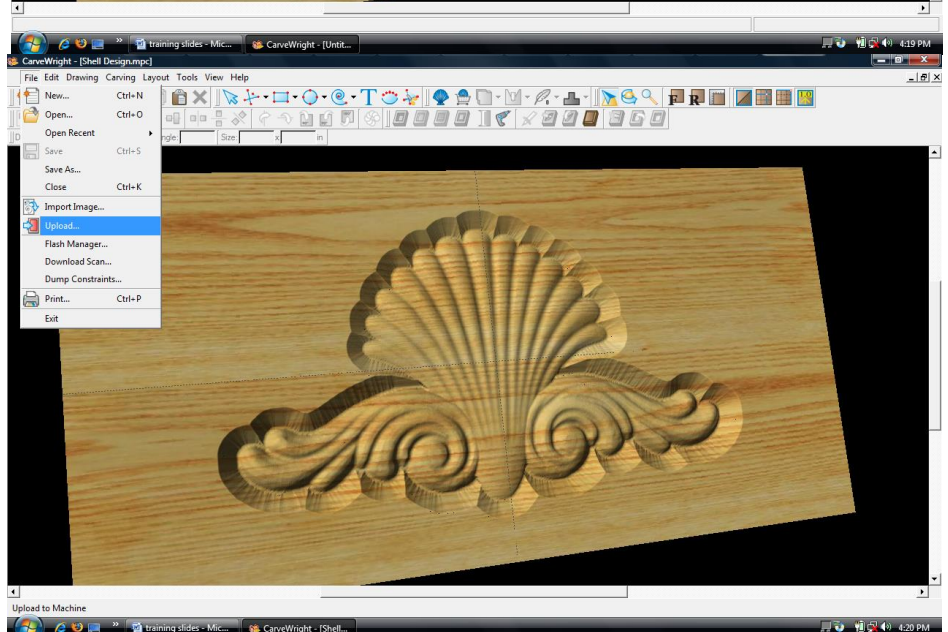
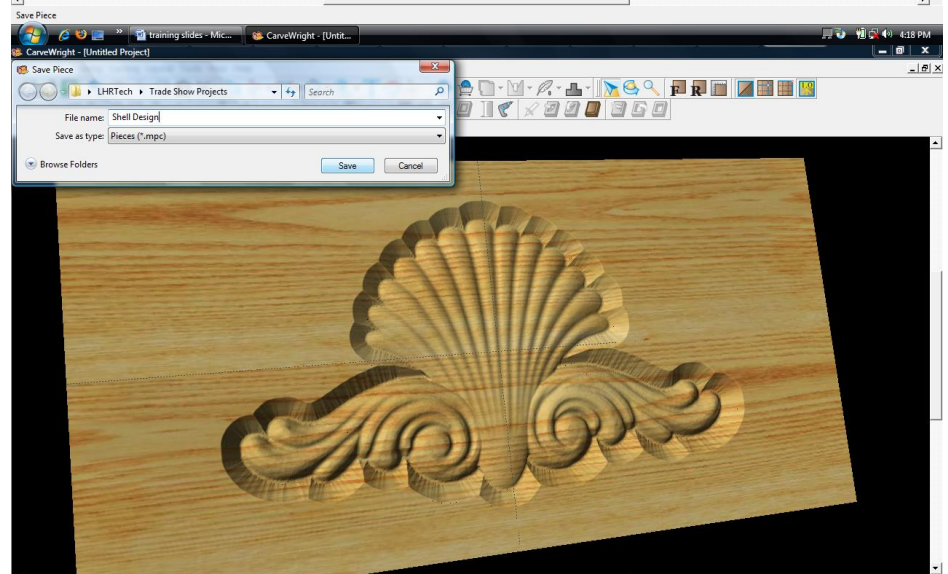
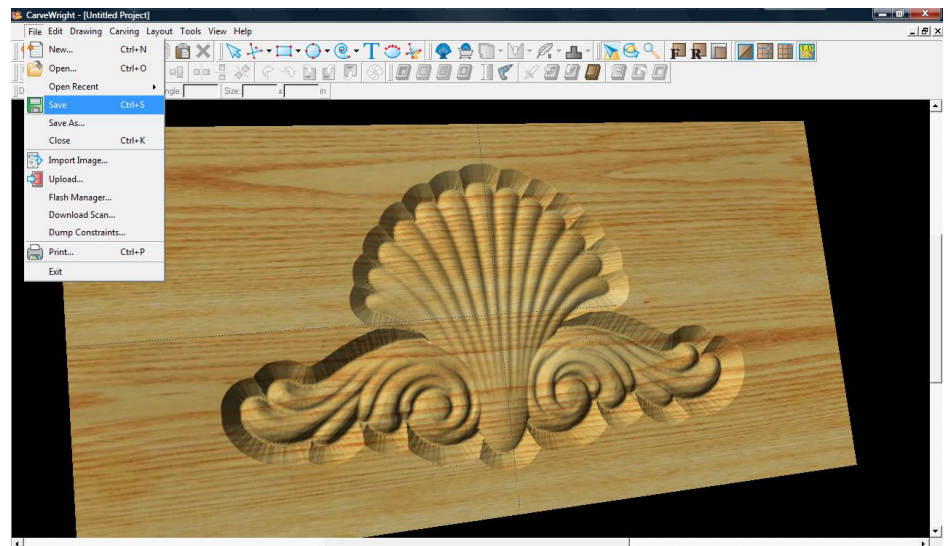
Select “File”, “Save”

\*\*\*\*\*IMPORTANT\*\*\*\*\*  
Name file and click “Save”  
to hard drive.

## ➤ UPLOADING TO MEMORY CARD



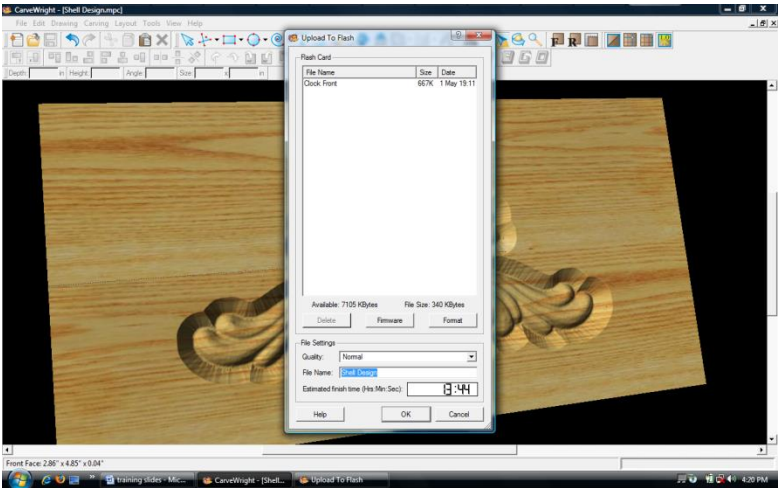
Select “File”, “Upload”



Notice the estimated carving time of 13 min 44.

Save to memory card.

Example:  
Shell\_N\_14  
(Recognizable name\_quality  
setting\_estimated time to  
carve)



This project covers the following design concepts:

- ✓ STARTING SOFTWARE
- ✓ MENUS, TOOLBARS, SHORTCUT KEYS OR MOUSE BUTTONS
- ✓ MANIPULATING THE WORKPIECE
- ✓ PATTERN PLACEMENT
- ✓ PATTERN MANIPULATION
- ✓ CENTERING
- ✓ MOVE ELEMENT
- ✓ MIRRORING
- ✓ FINE TUNING & OPTIMIZATION
- ✓ ADJUSTING DEPTH
- ✓ MANAGING DATA
- ✓ UPLOADING TO MEMORY CARD
- ✓ SELECT QUALITY SETTING
- ✓ NAME PROJECT





## INSTRUCTIONS:

### ✓ STARTING THE SOFTWARE

Open the CarveWright Project Designer Software

*The Welcome screen appears with project options.*



Select “New Project”

Set your project board dimensions.

Length: 7”

Width: 7”

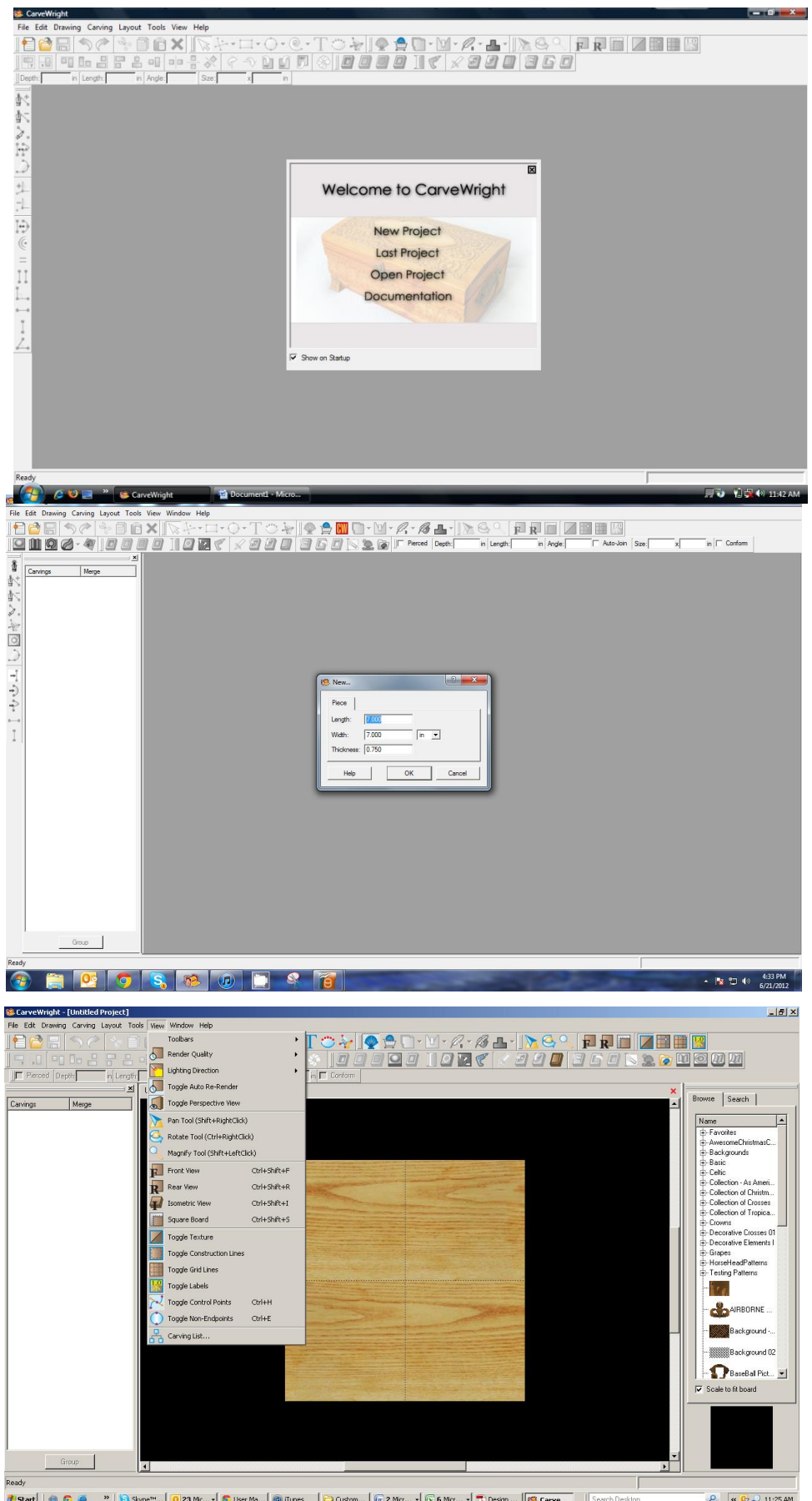
Thickness: .75”

Click OK

*The project board size is not necessarily the actual size of the board being put into machine.*

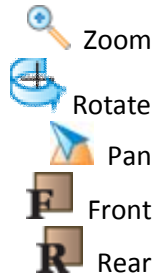
### ✓ MENUS, TOOLBARS, SHORTCUT KEYS OR MOUSE BUTTONS

*For every software function, we provide you three distinct ways to access that function. They are usually menu, icon or right-click. Some common functions, such as Copy and Paste, also use shortcut keys. These will also work in Project Designer.*




## ✓ MANIPULATING THE WORKPIECE

Board piece will display on screen in three dimensions. You can use these tools to get a different view of your project board.



## ✓ PATTERN PLACEMENT

Select the “Pattern Tool”  to open the pattern library along the right side.

Select “spring” under “Season Patterns” in your Favorites library.

Click once on pattern & once on board to place or click & drag to the board. Double-clicking will attempt to open it in Pattern Editor Software.

## ✓ PATTERN MANIPULATION

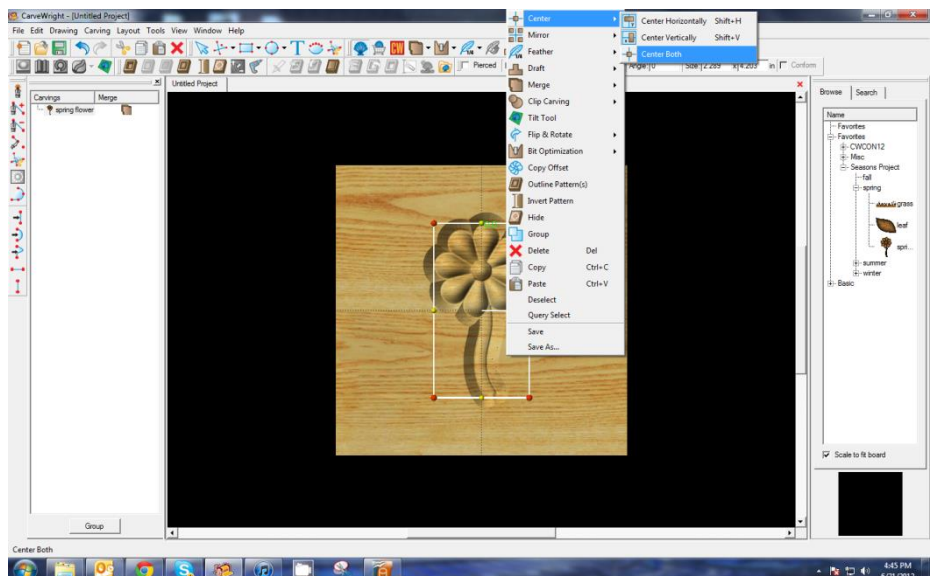
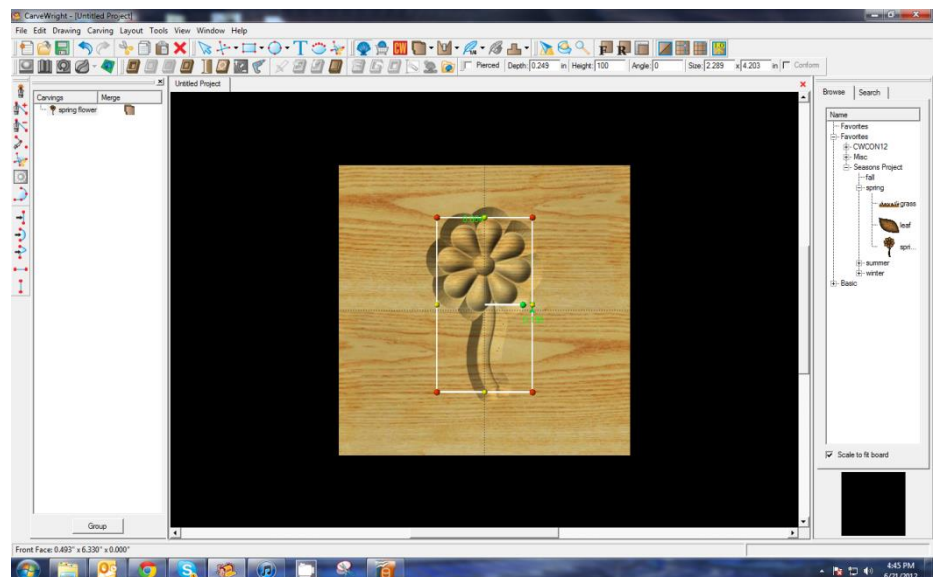
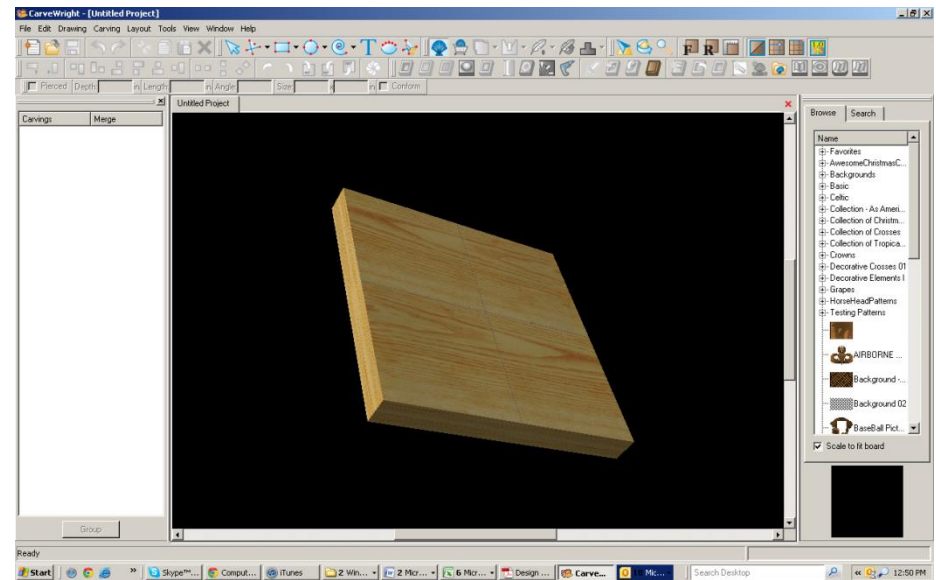
Use Red Nodes on the corner to Scale the element larger or smaller.

Yellow nodes will stretch or skew the element.

## ✓ CENTERING

Right-Click on “spring” to bring up menu of available options.

Select “Center” > “Center Both”  
If item is grey, then it is not available with the selected element.





## ✓ PATTERN PLACEMENT



Select “leaf” under “Season Patterns” in your Favorites library.

Place on board next to the stem.

## ✓ MOVE ELEMENT

To move a selected element, find the point of the element where your cursor turns to 4 arrows pointing in north, south, east & west directions.

Click once and drag to location.

## ✓ MIRRORING



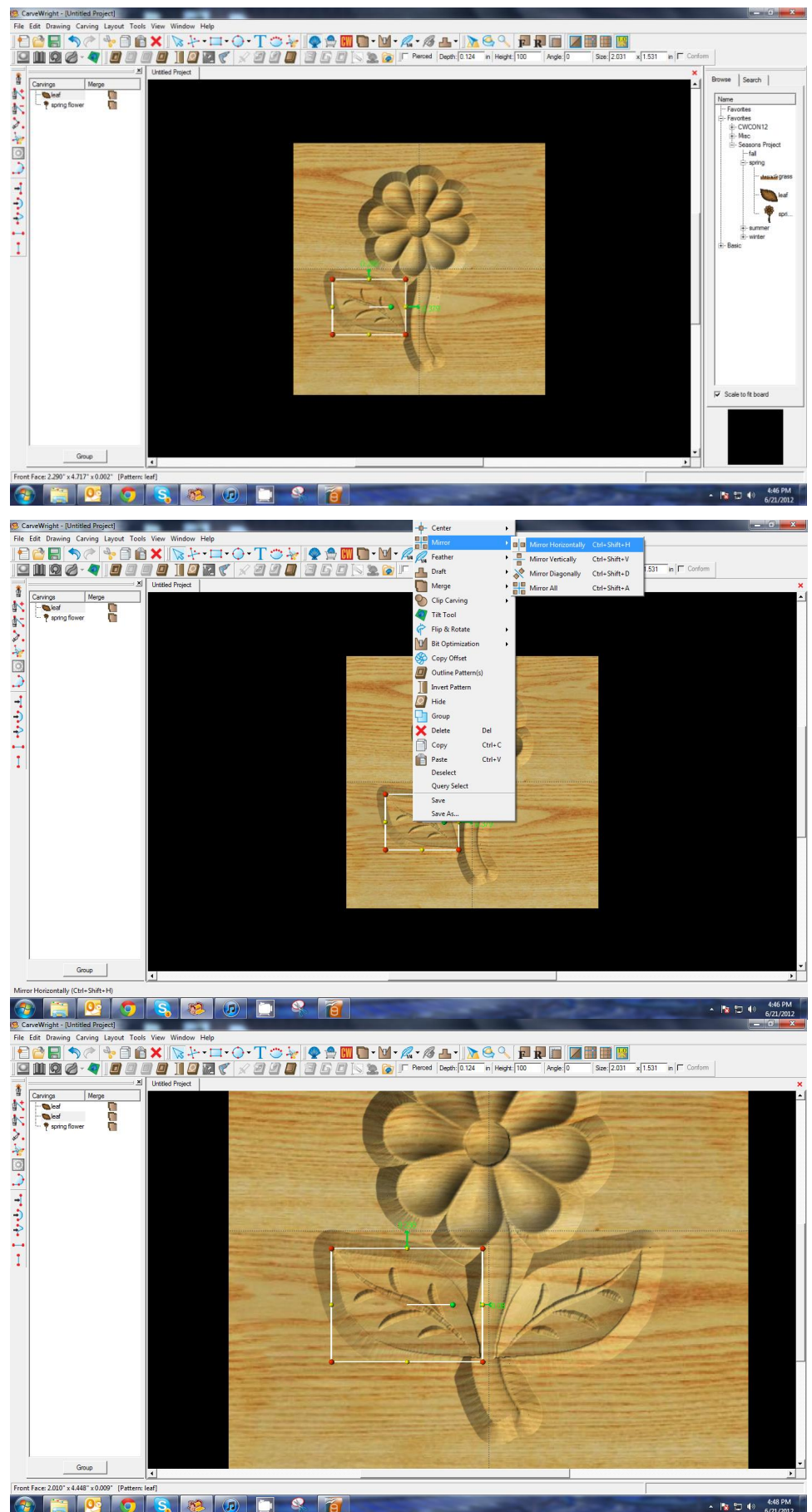
Right-Click on the element and then select “Mirror” > “Mirror Horizontally”.

*Notice the pattern is reflected across the board’s centerline.*

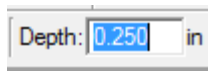
*Scale the pattern to size and position around the base of the stem.*

## ✓ FINE TUNING & OPTIMIZATION OF YOUR PROJECT

*You should make adjustments to one of the two elements. Adjusting the depth of the flower may make it loose some of its detail. Plus, you may want the leaf to appear behind the stem.*



### ✓ ADJUSTING DEPTH



Change the “Depth” of the leaf to .250”  
Hit “Enter” to apply.

*If you make changes to one mirrored object, it is reflected in the other(s).*



Rotate or zoom in on your project to view it from different angles and make any necessary adjustments.

### ✓ MANAGING DATA

Select “File” > “Save”



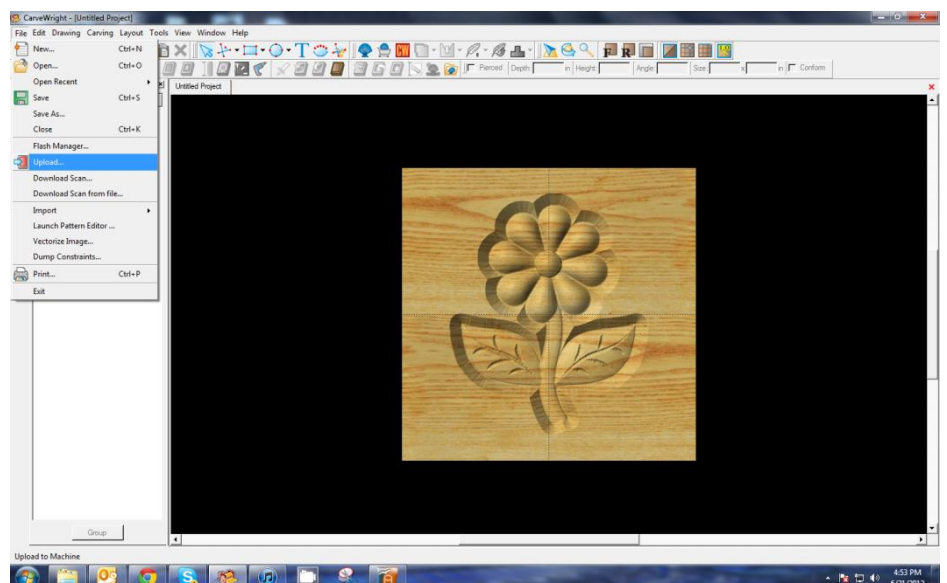
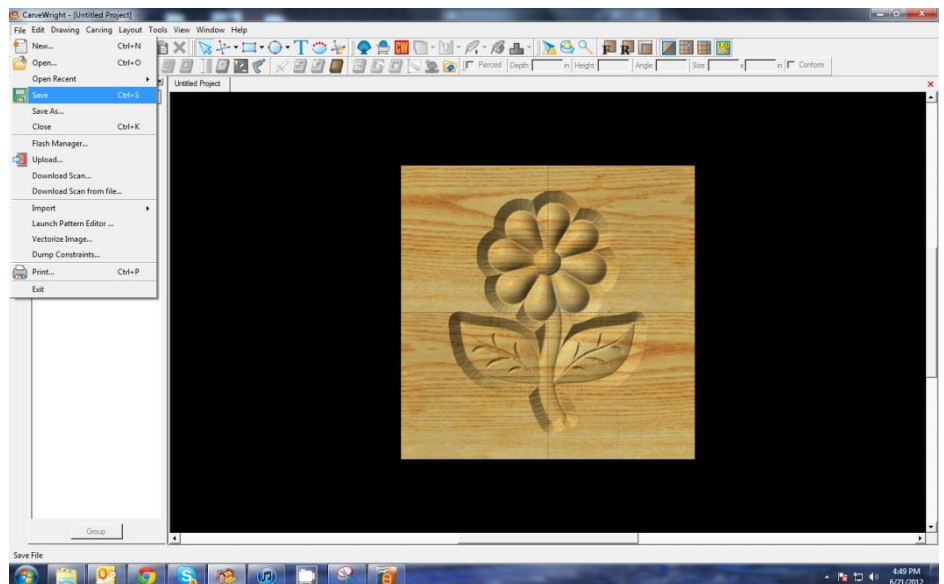
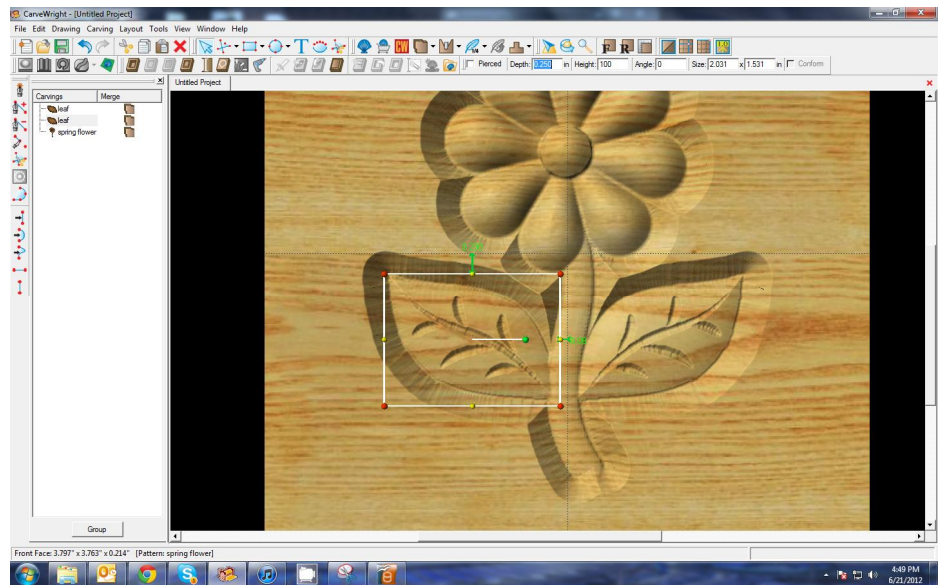
**\*\*\*\*\*IMPORTANT\*\*\*\*\***

Once a project is uploaded to a memory card, it cannot be brought back from the memory card into the software. Always **SAVE YOUR PROJECT** on your hard drive. A **Projects folder** is recommended and you should know where you saved it.

Name file and click “Save”

### ✓ UPLOADING TO MEMORY CARD

Make sure your Memory Card & Programmer are properly attached via your USB port, Select “File” > “Upload” to save to your memory card.



## Select Quality Setting

- DRAFT
- NORMAL
- BEST
- OPTIMUM

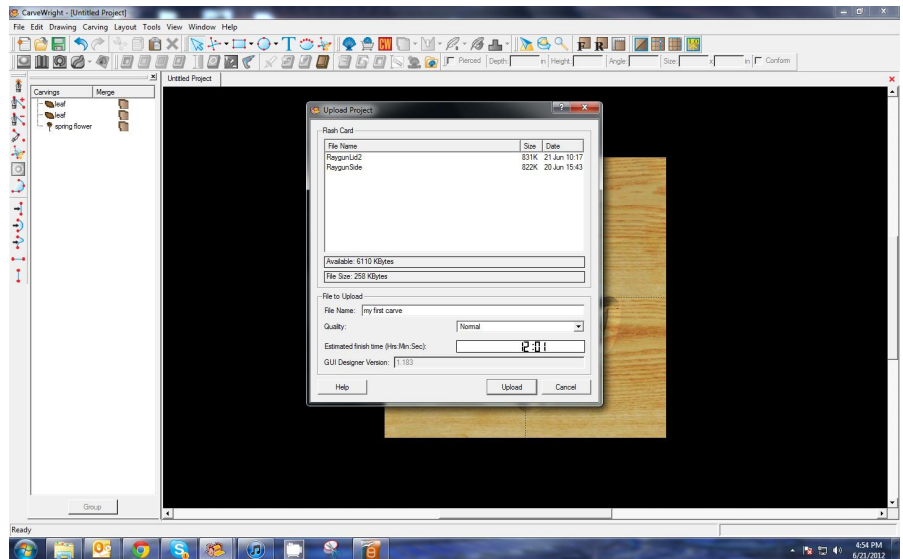
*These settings determine the number of passes the machine makes to carve your project. The more lines the better the surface finish. Make your decision based on material type, fondness of sanding vs. machine time, & test carve vs. final. Notice the estimated carving time differs by quality setting.*

## Name Your Project

*Example:  
myfirstcarve\_N\_12m  
(recognizable name\_quality  
setting\_estimated time to carve)*

Click "Upload"

NOTE: Actual board to be placed in machine should be 7" longer or you should use a sled that has 3.5 extra inches on each end to STAY UNDER THE ROLLERS.



WAIT! Don't start carving yet!

There are still more things to know!

### *PROPER PREPARATION OF MATERIALS*

**P**roper board preparation is crucially important to successful operation of the CarveWright System. The quality of your output will depend on the quality of your materials. Following some simple steps will ensure you greater success with your projects.

*All of the topics addressed in this document are outline and discussed in the Hardware Manual, as well as the CarveWright Instructional Video.*

#### **BOARD PREPARATION**

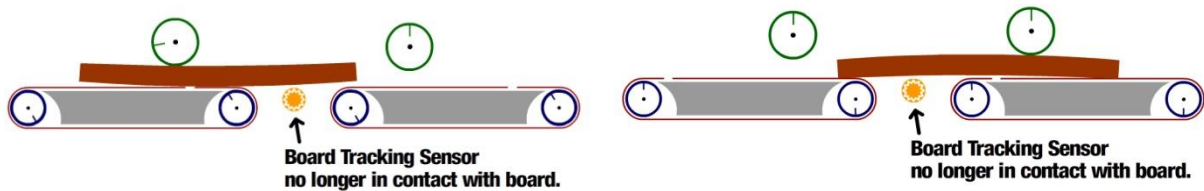
The actual board that is loaded into the machine for carving needs to meet some basic requirements for success.

Here's why. The machine measures the board using two sensors. One is an electronic eye (board sensor assembly) at the base of the z-truck, which measures the width and the other is the brass wheel or roller (board tracking encoder) that measures the length of the board. The board must maintain constant contact with the wheel in order to get an accurate measurement and project results.

**Here are some of those basic requirements for the material being put into the machine:**

#### NEEDS TO BE STRAIGHT AND SQUARED

If the board varies in its width, it can become wedged in between the squaring plate and the sliding plate. This can cause improper board tracking and can possibly break some teeth on the x-drive gears.



#### CANNOT HAVE ANY WARPING

Warping can cause issues that prevent the board from making proper contact with the board tracking encoder. The little brass roller on the keypad side of the machine is the board tracking sensor. Its teeth actually track the edge of the board creating the length measurement. Anything that interferes with that measurement will result in an error or failed project.

#### 90° ANGLE AND FREE FROM DEFECTS

The board's edge that will ride along the board tracking sensor needs to be a 90° angle (not curved) and free from any knots, divots or other defects.

#### NEEDS TRACTION

The board tracking sensor needs to maintain steady contact with the roller. A board that is too slick can slip. A strip of masking tape along the bottom edge that goes over the roller will give it the extra bite that it may need.

#### STAY UNDER THE ROLLERS

If one end of the board pops out from under the 80 or so lbs of pressure that the compression rollers have, the board could pop up and lose contact with the roller. Also, if you have the required outfeed rollers for boards over 3 ft, you want to make sure the board is not "lifted" off the wheel as it goes onto an outfeed roller that may be set too high.

#### MASKING A BOARD

The board sensor assembly needs to "see" a consistent reflection as it measures the board width. If your board is a dark color, either naturally or painted, has knots in the path that it is trying to measure or has a great variation in colors, you may want to run a strip of masking tape (beige) across the area that it is trying to "see".



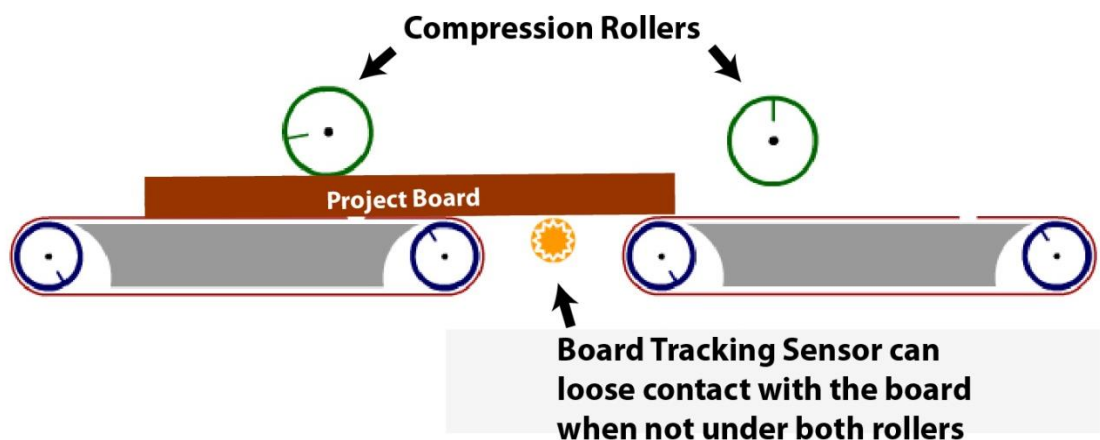
## THE 7 INCH RULE

One of the most important items (and commonly missed) when getting started with the CarveWright CNC System is that the projects you carve need to be “Under the Rollers”. To do this, you need to make your actual project board 7” longer than the “virtual” board that appears in the Project Designer software when you are laying out a project. This creates a 3.5” margin on both ends of the board for the machine to keep the board under the compression rollers to achieve the highest quality and to avoid problems with the project.



**FIG 2.2.2 - 7 Inch Rule. A & B showing the extra 3 1/2 inches on both ends of the board**

When you load a project board and crank the machine down onto it, there are two compression rollers that engage the board and hold it into place. These 2 rollers are what you want to stay underneath. This means when the board is moving back and forth creating your project the board is always held down by both rollers. When a board comes out from under one of the rollers, the board will slightly “pop up” on the end that is no longer held down. This can result in several issues; the board can come off the board tracking sensor creating a mis-measurement or error, it can cause an unsightly “snipe”; or a change in elevation of the carving; or, in the case of cutouts, the added stress this can put on the cutting bit can cause the bit to break.



**FIG 2.2.3 - Stay Under Rollers. This board is under only one roller.**



**NOTE: If you don't have the extra 7 inches and you select "YES" to stay under rollers, the machine will automatically shrink your project down to add the 3.5" to both ends. Your project will then be squished down, so the machine can claim the 3.5" on each end.**

**FOLLOW THESE STEPS TO MAKE SURE YOU ARE FOLLOWING THE 7" RULE.**

- Make absolutely sure that your real board size is AT LEAST 7" longer than the "virtual" or board in Designer. If your project in the software is 12" long, you need to load a 19" board into the machine.
- When setting up the project at the machine, it is easiest to stay under rollers by choosing the "Centered on Length" option. If you ever see an option on your LCD display for "scale project" you need to review your board dimensions. This means the machine has measured your board to be smaller than what is needed. Just remember, you don't normally want the machine to resize your projects in any way at all.
- If you follow these steps, you will know that your project board will always be long enough to stay under the rollers. Since you now know you have a long enough board, you can answer NO to stay under rollers and it will result in the same outcome as choosing YES.

If you follow the setup instructions outlined above, you can be assured of success when carving/cutting your projects. Some may ask, "If I make my board 7" longer than my Designer board, won't that be wasting some wood?". Yes, 3.5" on each end of the board is not used and can go into your recycle pile. There are methods of "jigging" your project to eliminate this waste. Several jigging methods are covered in this Tips & Tricks

[http://www.carviewright.com/assets/tips/CarveWrightTips\\_and\\_Tricks\\_Apr08.pdf](http://www.carviewright.com/assets/tips/CarveWrightTips_and_Tricks_Apr08.pdf).

## CARVING A PROJECT

Once your project is saved and uploaded to the memory card, the card can then be inserted into the machine and the machine turned on.

**ALWAYS HAVE THE MACHINE IN THE OFF POSITION WHEN INSERTING AND REMOVING THE MEMORY CARD.**

### SELECT YOUR PROJECT

The projects on the cards are accessed from the keypad. Simply press the '1' (**Projects**) shortcut key to open the Projects Menu which can then be browsed using the **up and down arrows**. Once located, the desired project can be selected by pressing **ENTER**. Upon selection of a project from the project menu, the CarveWright will lead the user through the preparation process.

### PROJECT ORIENTATION

Before starting, it is important to note the orientation of the project as viewed on the computer screen as compared to the orientation of the project as it is being carved on the machine. This is important in the event that a specific orientation or location of the project on the material is desired. If the project appears as in Figure 2.3.1 on the computer screen it will be carved in the machine as seen in Figure 2.3.2. Also, raster carvings will be completed from the front to the back of the machine beginning at the *Starting Corner*. In the case of Figure 2.3.2 the "P" will be carved first and the "T" last.

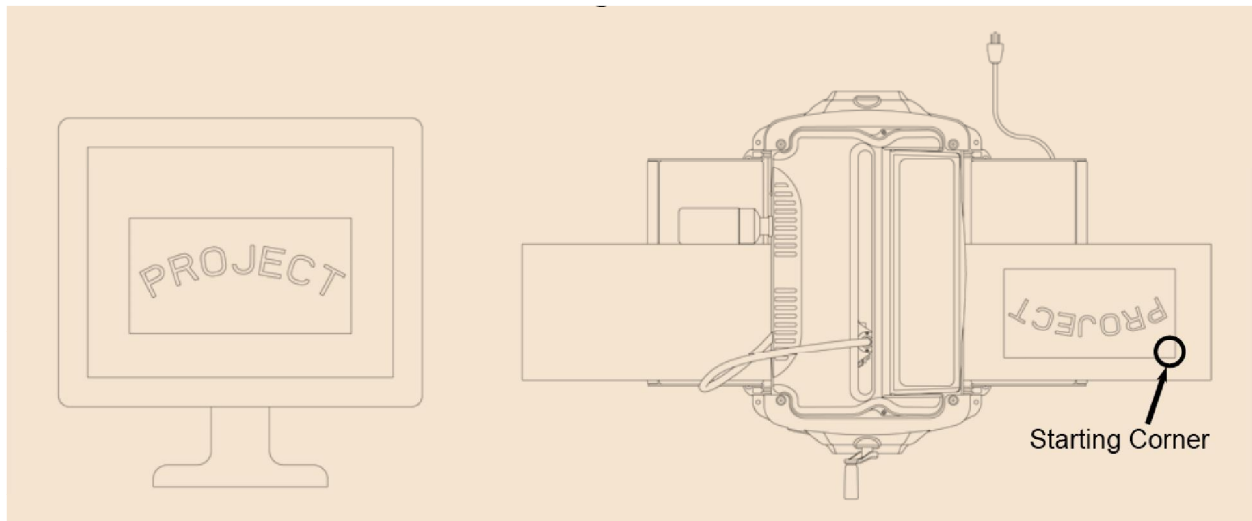


Figure 2.3.1 Orientation Of The Project On The Computer Screen

Figure 2.3.2 Orientation Of The Project In The Machine

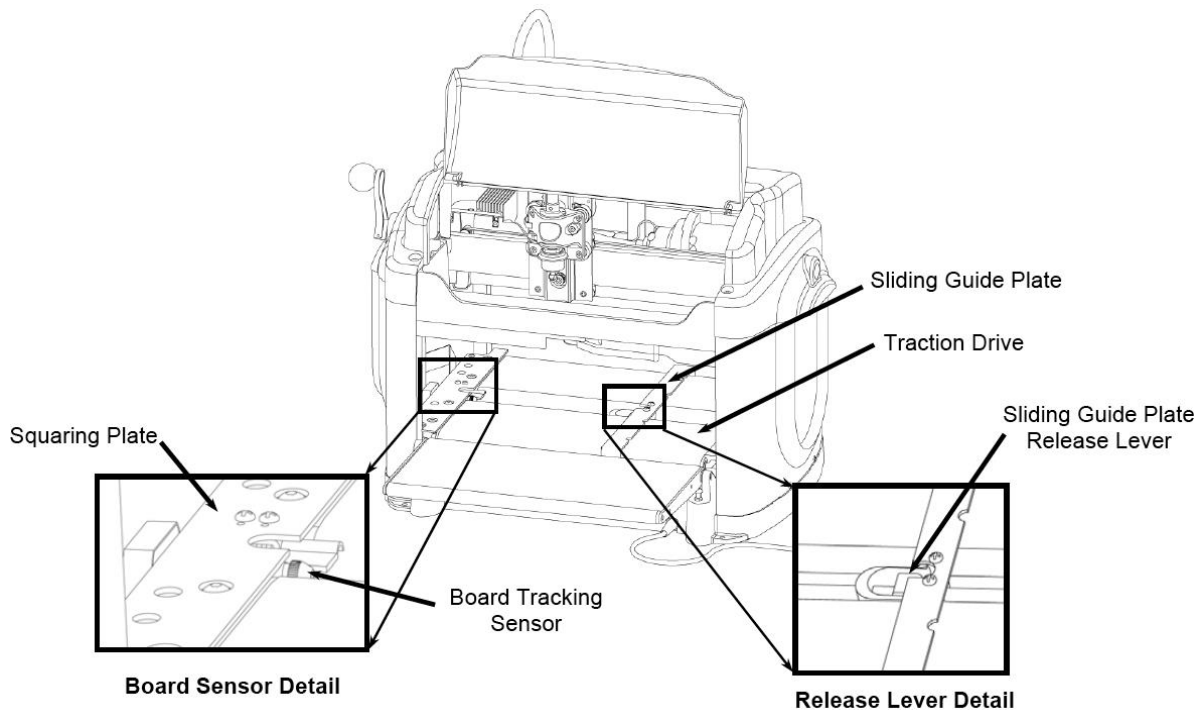
**PROPER INSTALLATION OF THE WORKPIECE IS CRITICAL TO THE PERFORMANCE AND CONTINUED OPERATION OF THE MACHINE.**

**INSERT  
WORKPIECE**

Press down on the sliding guide plate release lever and move the sliding guide plate to the right so that it will clear the width of the workpiece.

Check the bottom of the workpiece for features that will make it unusable in the machine. The bottom surface of the workpiece where it contacts the squaring plate must be flat and level for a width of at least  $\frac{3}{8}$ ths inches along the bottom edge to allow the Board Tracking Sensor to accurately calculate the position of the workpiece at all times (see Figure 2.3.3).

If a workpiece does not have the required surface available for the sensor to follow (e.g., if it is already carved on the back), it will be necessary to fasten the workpiece to a sled or carrier jig to do further work on it. If a workpiece is slightly cupped or bowed, the workpiece should be inserted with the cup or bow facing down. (See Section 2.2: Board Preparation for details on proper board preparation)



**Figure 2.3.3 Workpiece Insertion Details**

Lay the workpiece on the traction drive so that it is centered lengthwise under the head.

Push the board firmly up against the squaring plate.

Gently push the sliding plate up against the inside edge of the workpiece. DO NOT push the sliding plate against the workpiece with significant force. The sliding plate is used to guide the workpiece and is not intended to lock the piece in position.

At this point it is critical to assure that the workpiece can travel freely in and out of the machine along its entire length without binding or encountering significant drag. Do this by moving the workpiece in and out of the machine by hand while it is lying flat on the traction drive.

**WARNING:** Do not attempt to load a workpiece that has a significant taper to the sides. A tapered workpiece will bind between the sliding plate and the squaring plate and will damage the traction drive.

**WARNING:** Do not attempt to load a workpiece that varies in thickness by more than 1/16" along its entire length. Using a workpiece with a larger thickness variation than 1/16" can lead to damage to the machine.

Next, lower the head by turning the head crank handle counterclockwise. Once the correct pressure loading of the head is reached the clutch will begin to ratchet (causing a clicking sound). It is recommended that the crank be rotated at least two full revolutions once the clicking sound is heard to assure full loading.

The clutch is intended to load the board against the traction drive with consistent force. In certain cases the machine can sense if the workpiece is not loaded enough and repeatably display *Please Load Board* on the LCD. Most often this decreased loading is caused by insufficient lubrication of the four vertical corner posts or the two vertical leadscrews. Please search for *Checking Head Pressure* in the troubleshooting section of our support site for the proper instructions on how to address this. <http://support.carviewright.com/checking-the-head-pressure/>

Make sure that the top safety cover is closed before proceeding.

Once the board is properly loaded, return the keypad and LCD to continue the project setup. The next question the machine will ask is to "Stay Under Rollers?" This question is covered in *Section 2.2 Board Preparation*. With a board, properly prepared following the 7 Inch rule, you can answer NO, as it will automatically stay under the rollers.

The machine will then measure the workpiece. If the size of the inserted workpiece does not match the size of the designed project then the machine will prompt for additional information. The machine will ask different questions based on if the workpiece installed in the machine is larger or smaller than the project designed in the software. If the workpiece is smaller than the designed project, then the

options are: *Scale* the project to fit the workpiece or *Load New Board*. If the *Scale* option is selected then options *Center On Board*, *Jog To Position*, or *Place On Corner* are displayed in order to locate the project on the workpiece.

**WARNING:** Be very careful when scaling down a project at the machine. The machine will scale the entire project to the largest size that will fit the inserted workpiece while maintaining the overall aspect ratio of height to width. It will not change the aspect ratio to fit that of the inserted workpiece. Scaling down can also lead to undesirable thinning of carved elements that may lead to chip out.

If possible, measure the workpiece to carve before starting the project layout in the software. This will help guide the design and prevent unintended scaling issues if the project design is different than the available workpiece. Measuring it with the machine will be the most accurate way. If the inserted workpiece is larger than the project design then the available options are: *Keep Original Size*, *Scale* the project to fit the workpiece, or *Load New Board*. If *Keep Original Size* or *Scale* is selected then options *Center On Board*, *Jog To Position*, or *Place On Corner* are displayed in order to locate the project on the workpiece.

Once all of the required data has been entered, the machine will prompt to insert the required bit. It will first ask to confirm the bit. Pressing ENTER will then move the cutting truck to the center of travel for easier access to the chuck. For projects that require more than one bit, the machine will prompt for each bit at this point and will store the calibration settings. The machine will locate the bit tip with its touch plate and will then locate the top surface of the board by touching the bit tip to the surface of the workpiece.

If the workpiece chosen has existing carved features or defects that would prevent the bit from touching the top surface, it is possible to choose where the bit will touch when finding the board surface. To do this watch as the machine begins the operation to find the bit tip position. The message *Finding Surface* will be displayed on the LCD. Press the STOP key when this message appears. When prompted choose the *Jog To Touch* option. Use the arrow keys to move the bit tip to a suitable flat spot on the board and press ENTER to record position. The machine will remember this location and use it to locate the tips of all the bits used in the project. It is also possible to make "Jog To Touch" the default method by choosing this in the *Configurations Menu*. This option remains set only until the machine is powered off.

The machine will then proceed to carve the project. A real time carving completion estimator will be displayed on the LCD and provides an estimate as a percentage of how much of the current carving is completed.

When the carving is completed, lift the top safety cover and crank the head up to free the workpiece. The workpiece can then be removed and examined.

After removal from the machine, it is advisable to blow it free of dust with compressed air before proceeding to sanding with the Sanding Mops.

## **QUICK PROJECT SETUP**

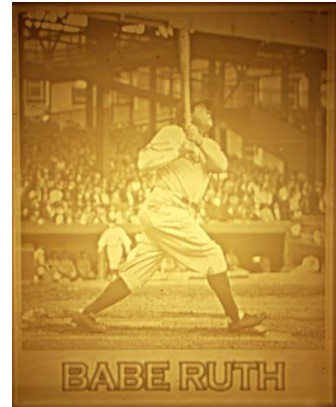
For most projects arranged in the tutorials from this guide, the machine setup commands are as follows. These commands assume you have followed the steps for properly setting up your board as outlined earlier in this section.

- Insert the memory card into the CarveWright CNC.
- Turn the machine on and *1.Project Menu* is automatically displayed.
- Press enter to access the project list.
- Scroll to the desired project and press enter.
- Load the board and crank the head down.
- Select NO to *Stay Under Rollers* and the machine proceeds to measure the width and the length.
- The machine next asks *Keep Original Size*, press enter for yes.
- Then press enter to select *Center On Board*.
- Choose NO for *Cut Board to Size*.
- The machine then prompts for the bit, press enter and the truck moves to the center for loading. Load the bit.
- Once the bit is loaded, press enter and the machine will measure the bit on the touch plate and then find the board surface.
- Last, the machine carves the project.



# CHAPTER 2 – CARVING SIGNS AND LITHOPANES

The two most common uses for the CarveWright CNC, especially for new users, is to make signs and lithophanes. We all know what a sign is, but what is a lithopane? A lithopane is an image carved into a translucent material that can only be seen clearly when back lit with a light source. Both signs and lithophanes are easy to make with the CarveWright System and in this section we will show you how.



What's in this Section?

This section will cover using basic drawing tools, text, depth & height, bit optimization, textures, and import image. These procedures will cover Project Designer BASIC, Project Designer PRO, Centerline Text, and Conforming Vectors.

## TUTORIALS

**Live Laugh Love Sign** – This project also covers fine tuning & optimization of your project with depth, height, feathering & draft; use of the text tool, drawing tools, regions, textures, & carving list; changing the board settings and selection of quality settings.

**Spring Blooms Sign** – Expanding on the “My First Carve” project using more Project Designer features, including text, regions, and textures.

**Winter Snowflake** – Project that continues to introduce more tools, including the basics of optimization including feather and draft.

**Martian Ray Gun** – Martian Ray Gun sign project reinforcing the features learned from previous tutorials.

**House Number Sign** – This project adds instruction in using drawing tools, grids & snap to grid; adding constraints; using Centerline Text (sold separately) and Conforming Vectors (sold separately), copy & paste, flip & rotate, creating a closed regions & staying under the rollers.

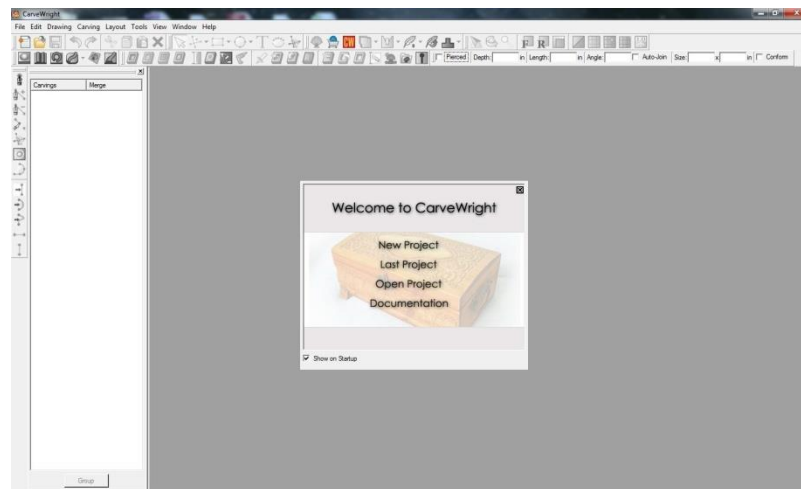
**Importing Images** – There are several different image file types that can be used to import logos, clipart, photographs, scanned drawings, and more. This Design Project aims to assist you in overcoming some of the basic challenges.

## OVERVIEW OF TEXT TOOLS

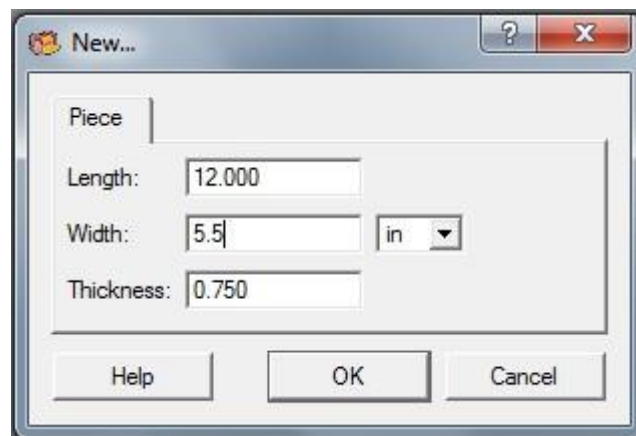
### TRUE TYPE FONTS

The text tools are used to place text onto your project board. This text can be manipulated and carved using a variety of Rout modes. The Text Tool uses whatever True Type Fonts (.ttf) you have located in your font folder. The fonts are not coming from Designer. Remember one of your computers may not have the same fonts as your other computer. There are many fonts available online, but they may not all be ideal to carve and too many fonts may slow down your software.

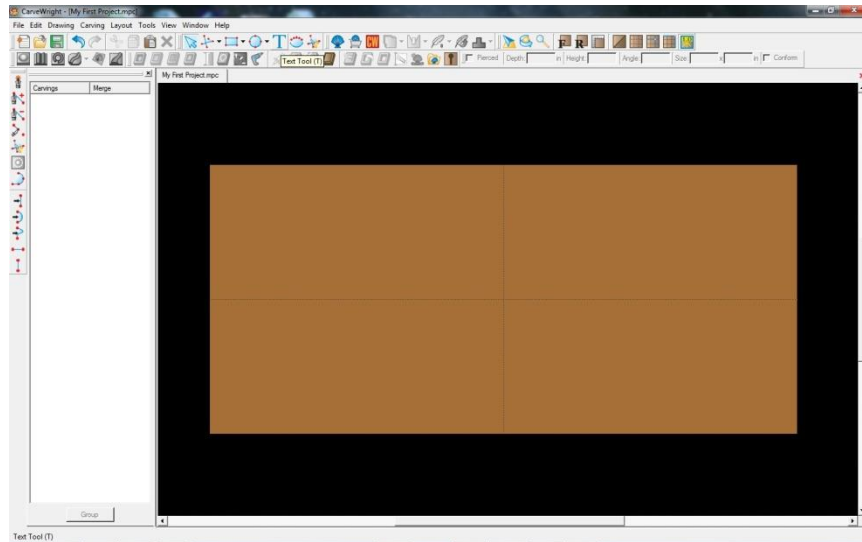
### USING THE TEXT TOOL



Open Project Designer and click on New Project.

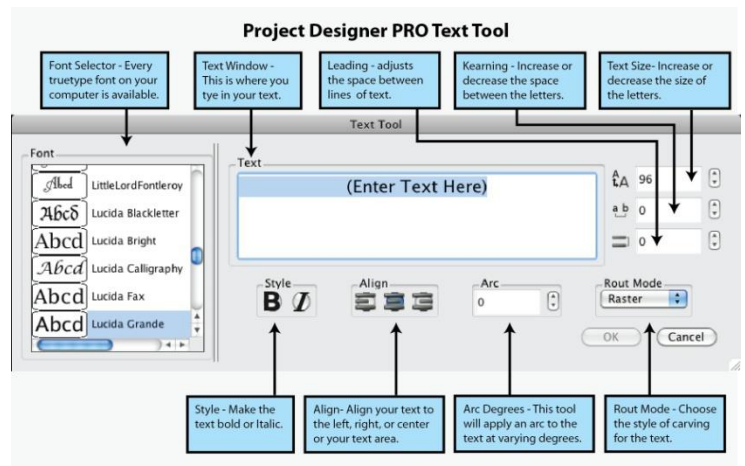
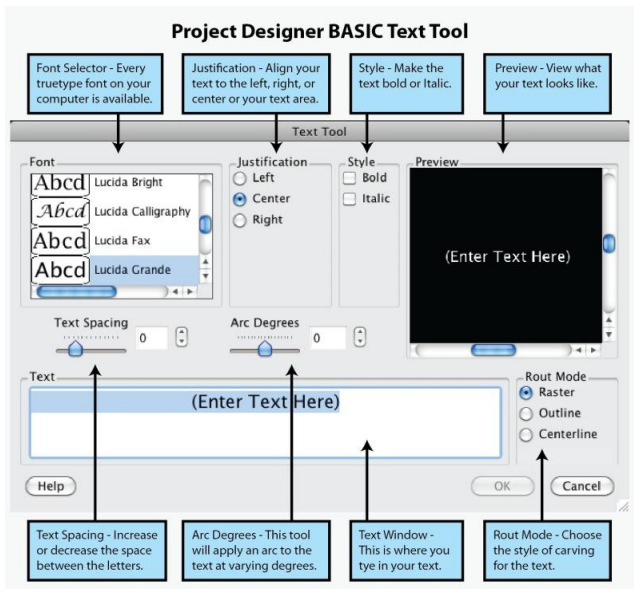


Put in the dimensions of the Project board. This needs to be the finished size of your project. Do not include the 7 inch margin required by the machine. (more on the 7 inch rule later in this lesson)



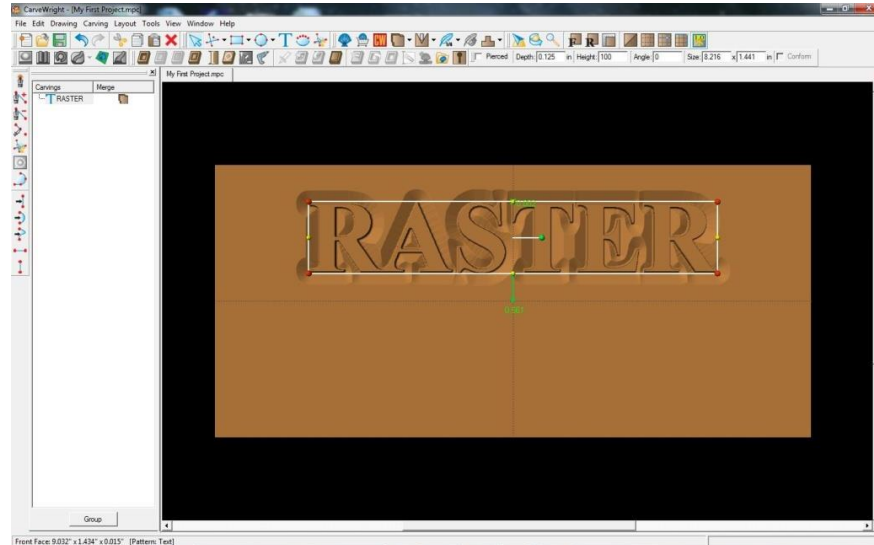
Select the Text tool from the tool bar at the top of the screen and click anywhere on the project board.

This will open the Text Tool window. This window is slightly different in Designer Basic and Designer PRO.



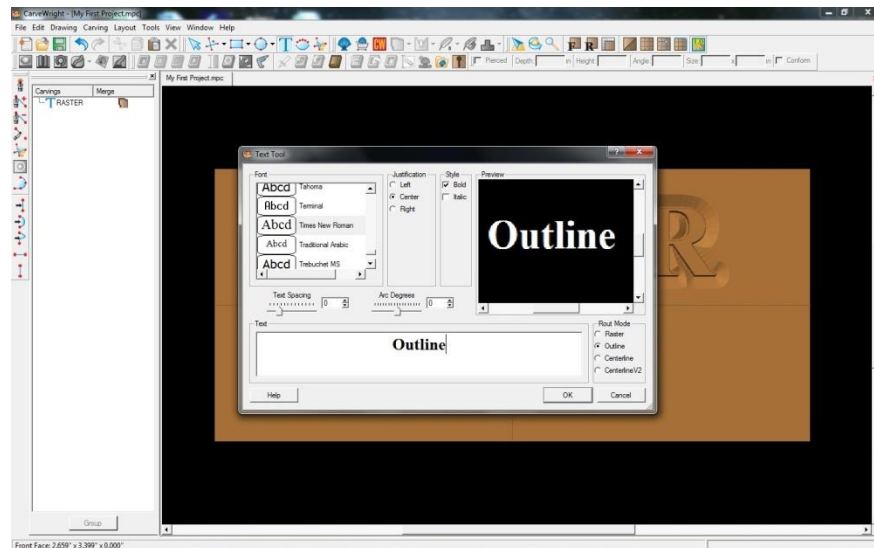
**NOTE: The Centerline option under Rout Mode is only available in Demo mode, if the Centerline Text Add-On Module has not been purchased and activated.**

Using this text window to type whatever is wanted to appear on the board. For this tutorial, we are going to write the word “RASTER”, choose “Times New Roman” in the font selector, select “Bold” as a style, and choose the Raster “Rout Mode”. Click “OK” to complete and then we’ll see the text displayed on the board.



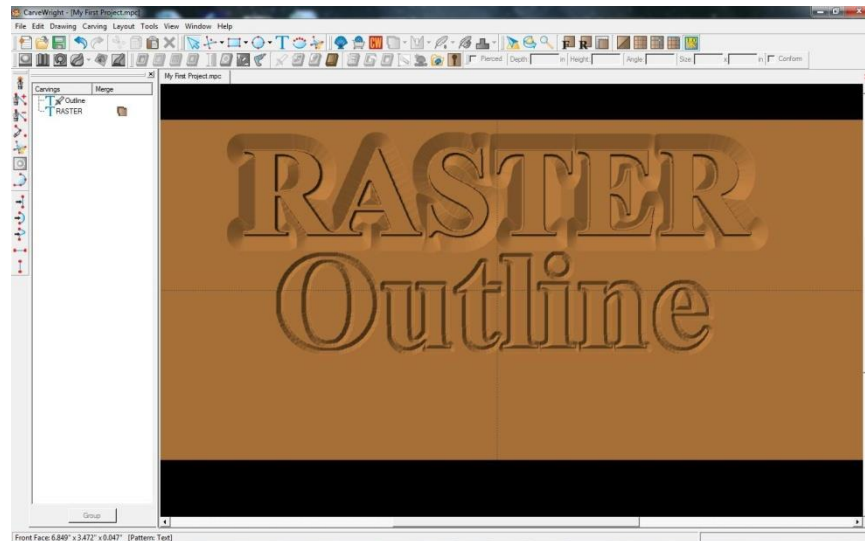
This text has all the features of a pattern and can be adjusted in size, position, and depth the same as any other pattern. Being in Raster mode, this text will be carved out as a raster, line by line, the same as the carved patterns.

Select the Text Tool again and click on the board to open it again. The Text tool will remember the font settings we used before, but this time we will write the word “OUTLINE”, and choose the outline “Rout Mode”.

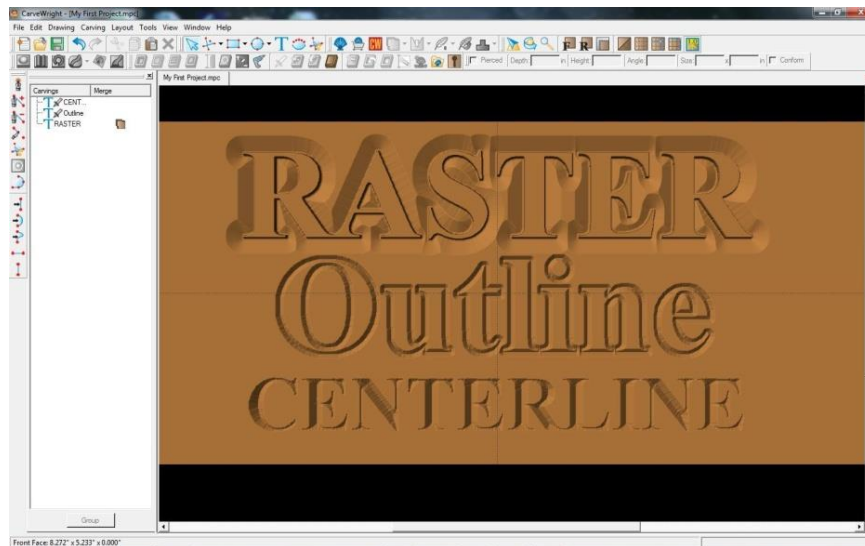


Click ok and this will display on the board.

The outlined text appears with a v-grooved outline around the text. This will be cut with a 90 degree V-bit by default as a vector function. As a vector cut, the V-bit will trace around the letters rather than carving line by line like the raster.

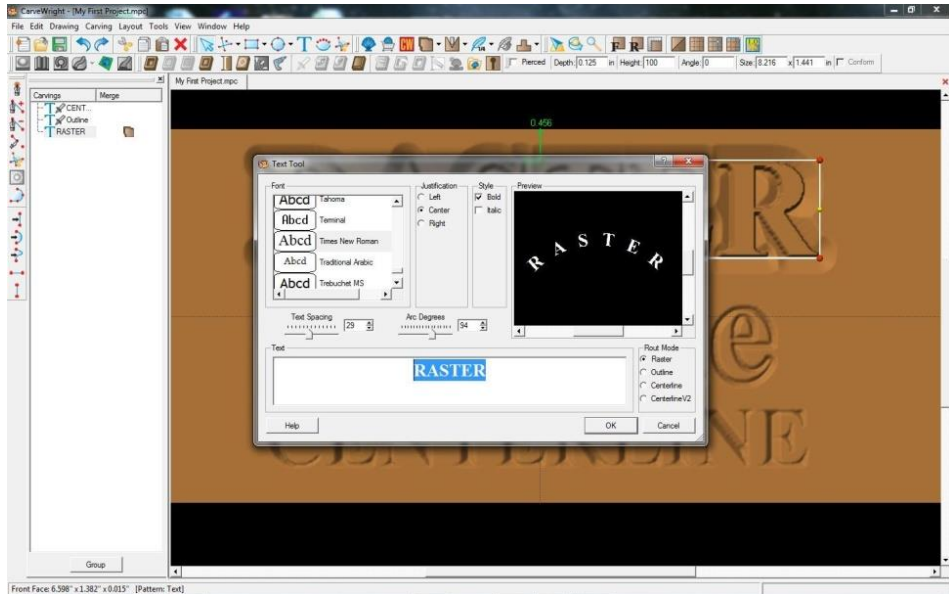


Select the Text Tool again and click on the board to open it again. Now we will write the word "CENTERLINE", choose the Centerline "Rout Mode", and click OK. If you have not purchased and activated Centerline Text, this will be working in DEMO mode and will not be able to be carved.



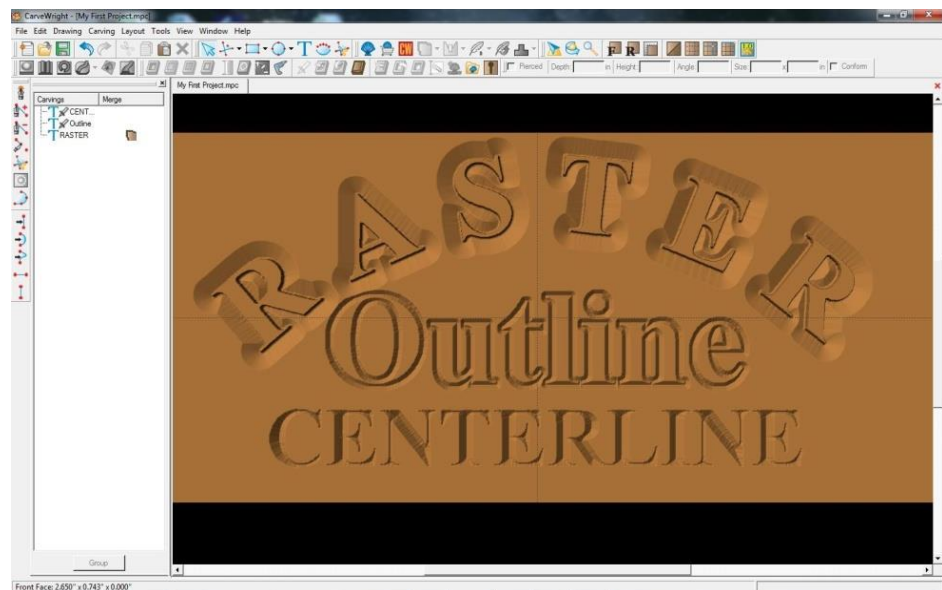
Centerline Text is an algorithm that calculates the centerline of the font and calculates the depth based on the width of those lines. It defaults to using a 90 degree v-bit and will carve the letters as a vector path. You can change this to the 60 degree v-bit using the Select Bit icon.

Since the depth of Centerline text is determined by the variations in width of the font, you cannot change the depth, except by changing the size. Centerline is applied to the top surface of the board. If you wish to use Centerline within a carved region or on any surface below the top of the board, you will need the Conforming Vectors add-on.



Now, double click on the word RASTER on your board. This will open the Text Tool window again, allowing you to make edits to this piece of text. Use the arc slider to curve the lettering, and try increasing the spacing. Click ok, again, and the edited text will display with your new settings.

Now that we are familiar with the text tools, you are ready to make a sign!





## PROJECT OPTIMIZATION

When creating projects in Project Designer, there are several steps necessary for optimizing the project for carving. There are several tools used for this process, primarily they are: draft, feather, and bit optimization.

### DRAFT

Draft sets an angle from the outer top edge of raised carvings out to the base of the carving. It is primarily used to reduce chip-out issues. There are 4 settings of draft to choose from for raster patterns or text.



**Draft None** Removes any Draft settings



**Draft Small** This sets a small angle to the outer top edge of raised carvings to reduce chip-out issues.

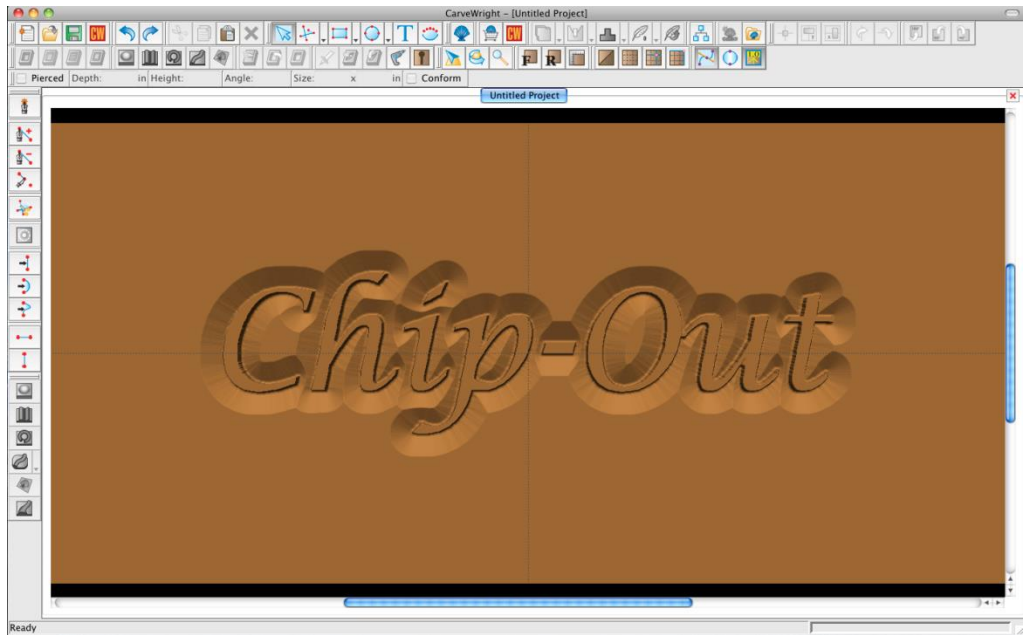


**Draft Medium** This sets a medium angle to the outer top edge of raised carvings to reduce chip-out issues.



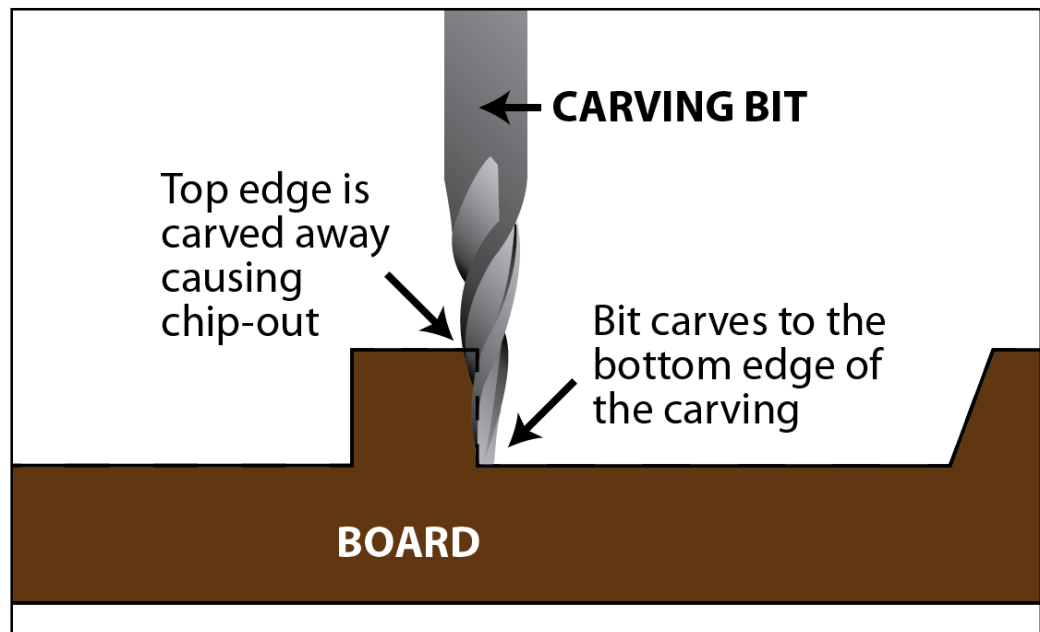
**Draft large** This sets a large angle to the outer top edge of raised carvings to reduce chip-out issues.

As an example, let's create some raster text on a board and choose a font with thin lines.



**Figure 1: No Draft**

By default, the text has straight edges raising up from the base of the letter to the top surface. We call these straight edges “cliffs”. The problem that can occur with these edges has to do with the taper of the carving bit that is used to carve these. This angle can carve away the top edge of the cliff when it is carving the bottom corner. (Figure 1)



Draft is used to add an angle to these outer edges to give clearance for the taper of the bit. (figure 2)

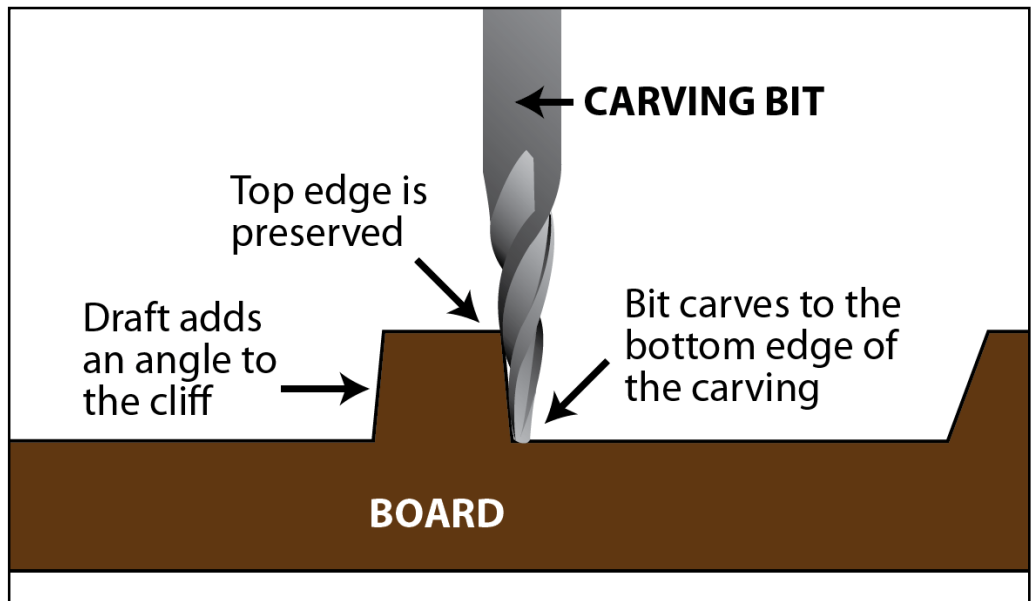
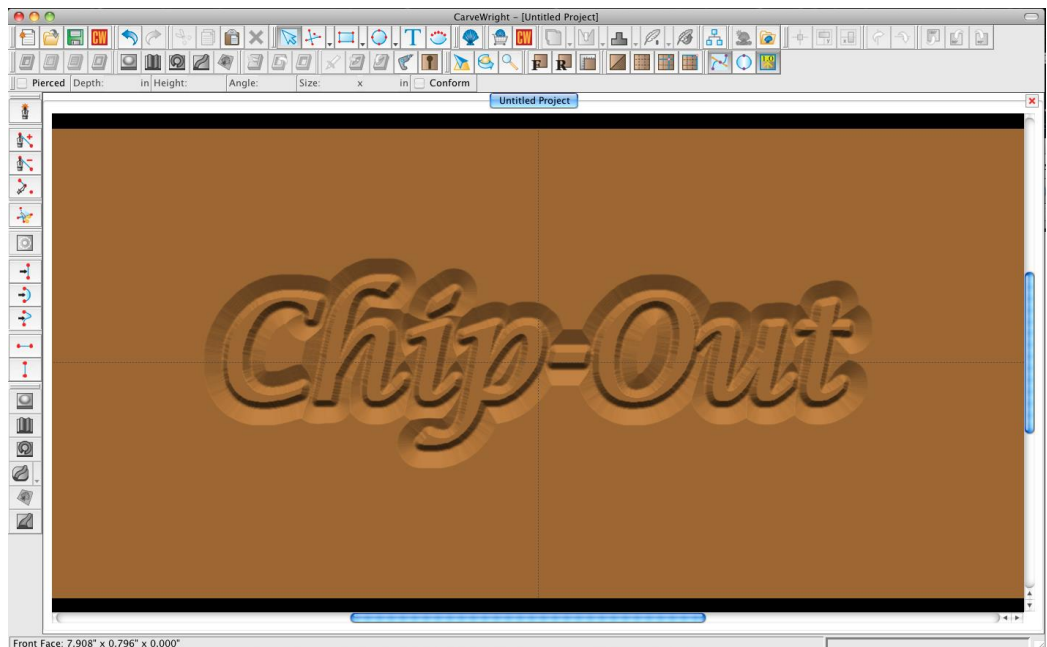


Figure 2: Draft Small

As an added benefit, the draft settings can also create a nice bevel to the outer edge that enhances the look of the design. It's not only functional, but it looks great too.



## FEATHER

This sets an angle projected up and out from the base of the pattern's outer edge. Used for creating a transition from the top surface of the board to the base of the carving. There are four settings to choose from in Designer BASIC, and a custom setting in Designer PRO



**Feather None** Removes any feather settings.



**Feather 1/8** This sets the degree of feathering to 1/8"



**Feather 1/4** This sets the degree of feathering to 1/4"

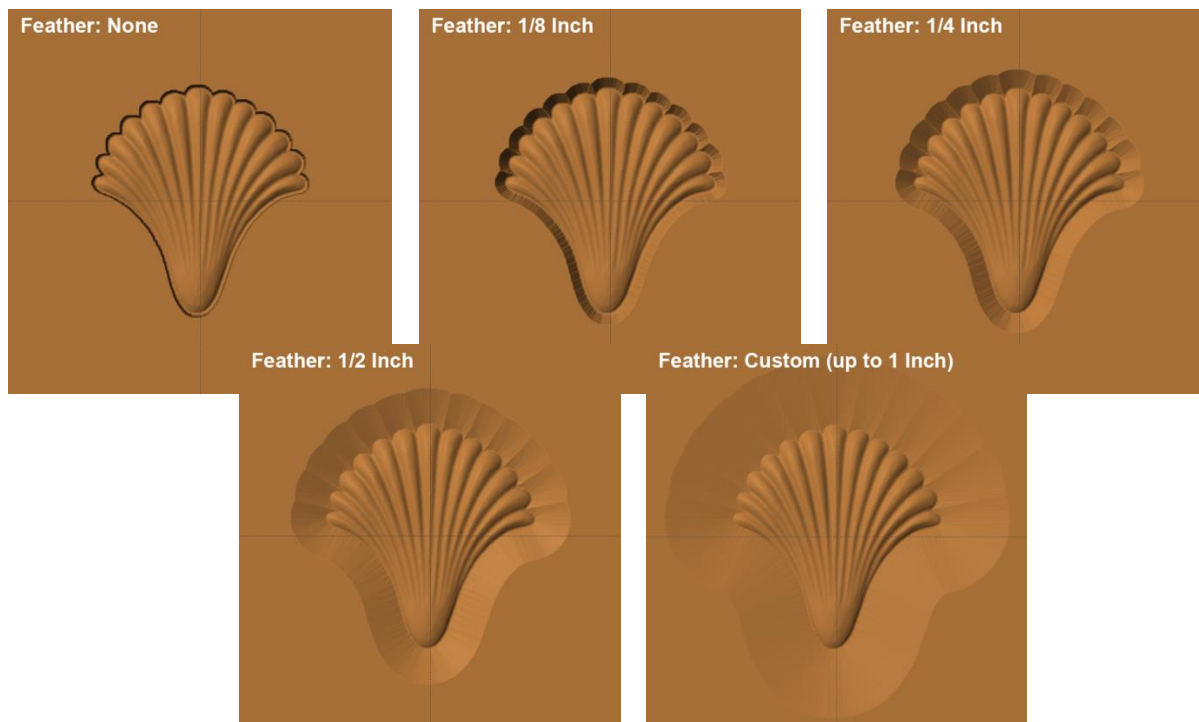


**Feather 1/2** This sets the degree of feathering to 1/2"



**Feather Custom (Designer PRO)** This sets the degree of feathering to any dimension up to 1"

Feathering can reduce wear on the machine and bits, by creating a smoother transition around carvings, especially for deep carvings.



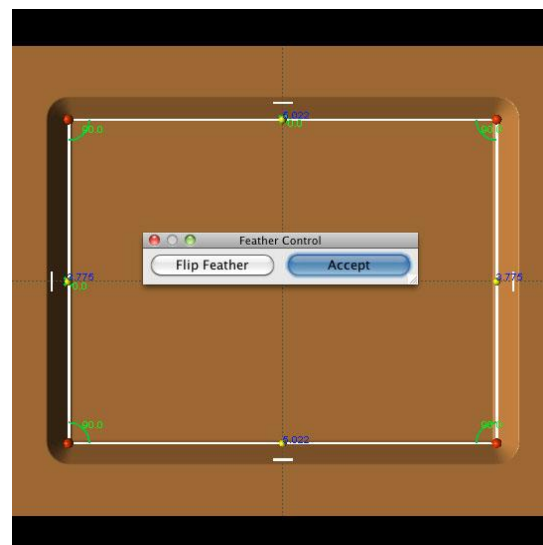
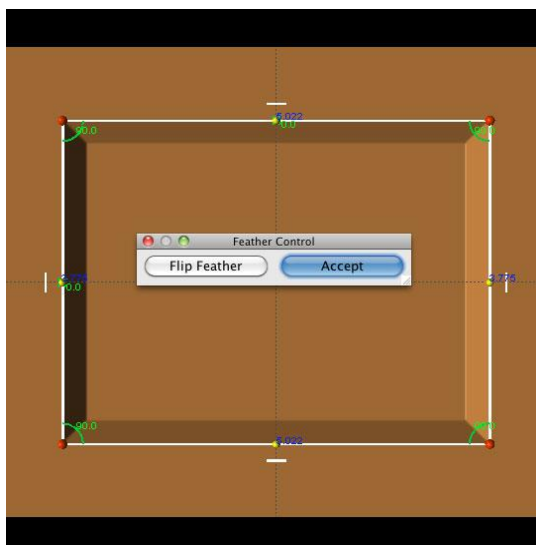


Feather . left to right = None, 1/8, 1/4, and 1/2"



### Flip Feather

Carved regions, created with any of the drawing tools, can have their feathers either on the inside or outside of the line. The Flip Feather icon is only highlighted when a carved region is selected.



## BIT OPTIMIZATION

Sets the limit with which the bit carves into tight areas to preserve the top level detail. There are five settings to choose from optimizing your carvings.



**Bit Optimization: None** Applies no bit optimization.



**Bit Optimization: Low** Slightly, decreases the depth of the carve in tight areas.



**Bit Optimization: Medium** Decreases the depth of the carve in tight areas at medium level.

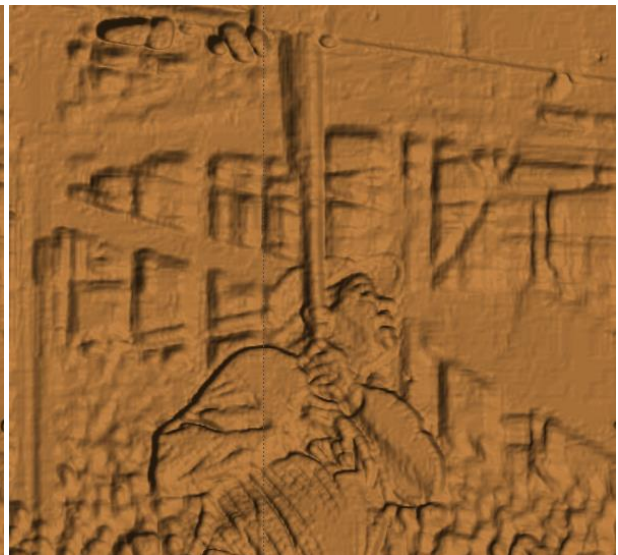
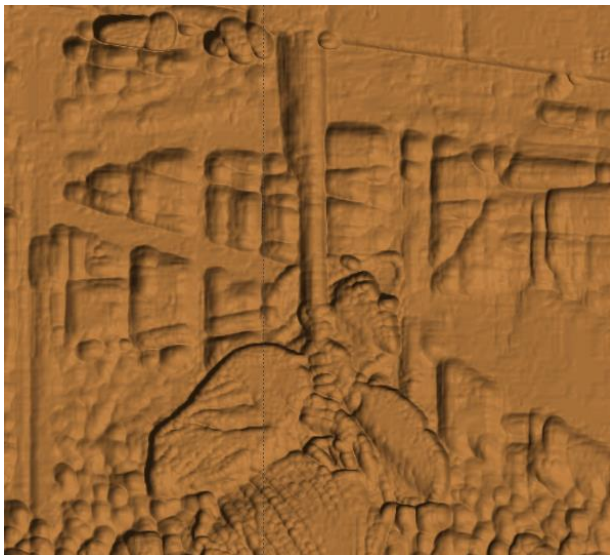


**Bit Optimization: High** Decreases the depth of the carve in tight areas at high level.

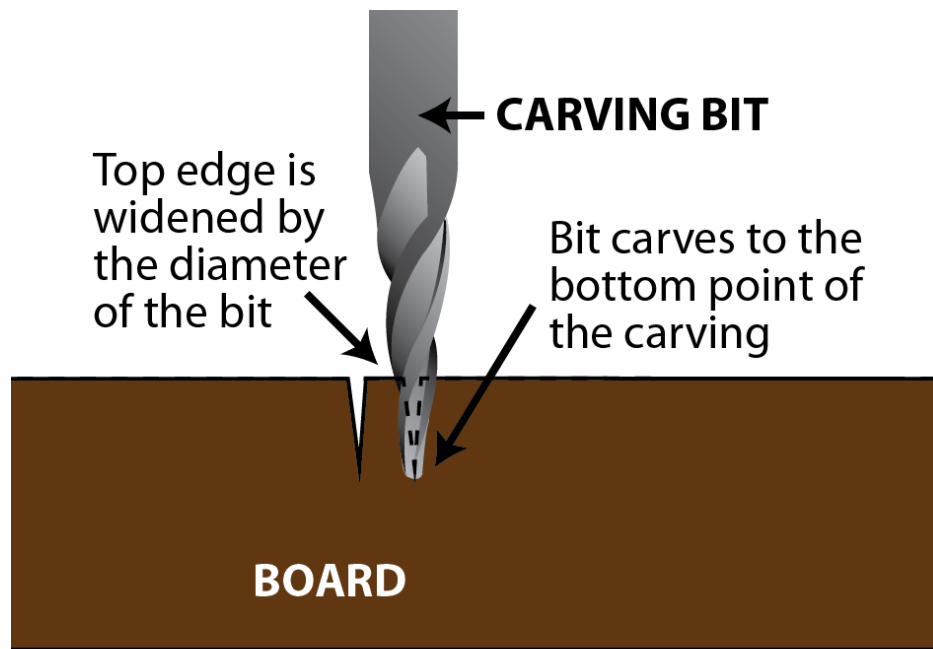


**Bit Optimization: Best** Eliminates all top level detail thinning in tight carved areas.

As an example lets import a photograph and place it on the board. Photographs are good example because of the large amount of individual pixels that can vary greatly in depth. Some of these pixels can be deep, but they are right next to high pixels, essentially creating a “hole”. When the bit goes to carve this, it will cause a widening of that hole from the diameter of the bit.







## *FINE TUNING*

The adjustment of depth and height are essential tools for fine tuning your designs in Project Designer. These tools allow the creation of more intricate layering of patterns to create more visual interest in the design.

### **DEPTH**

Depth is describing the lowest level, or the base, of the carving, pattern or element. Most patterns, when placed on the board, are set to be at 1/4" deep. With the depth tool, this depth can be changed to whatever depth desired within the limits of the bit.

Depth: 0.250 in

Depth at .25+



Depth at .5+



Below: Depth left to right .125", .25" and .5"



## HEIGHT

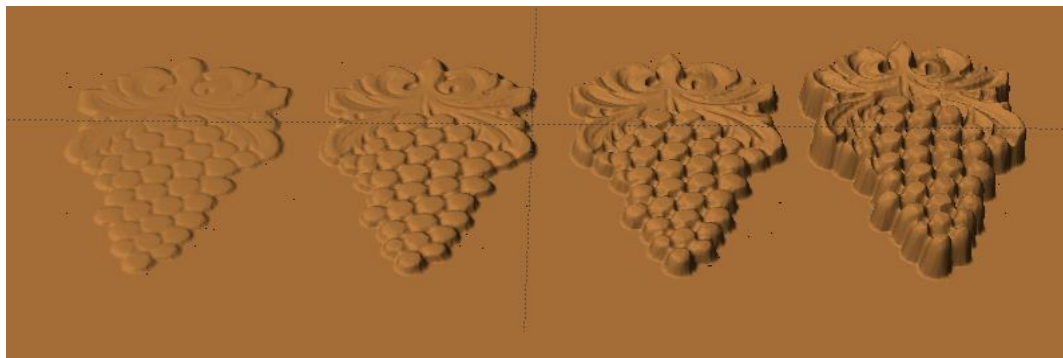
This is a relative value of the height from the deepest part of the carving to the top of the board being used. It can be set from 0-999 with 999 being no material removed from the highest point of the element. It will default to 100, which is it's original thickness.

Height: 100

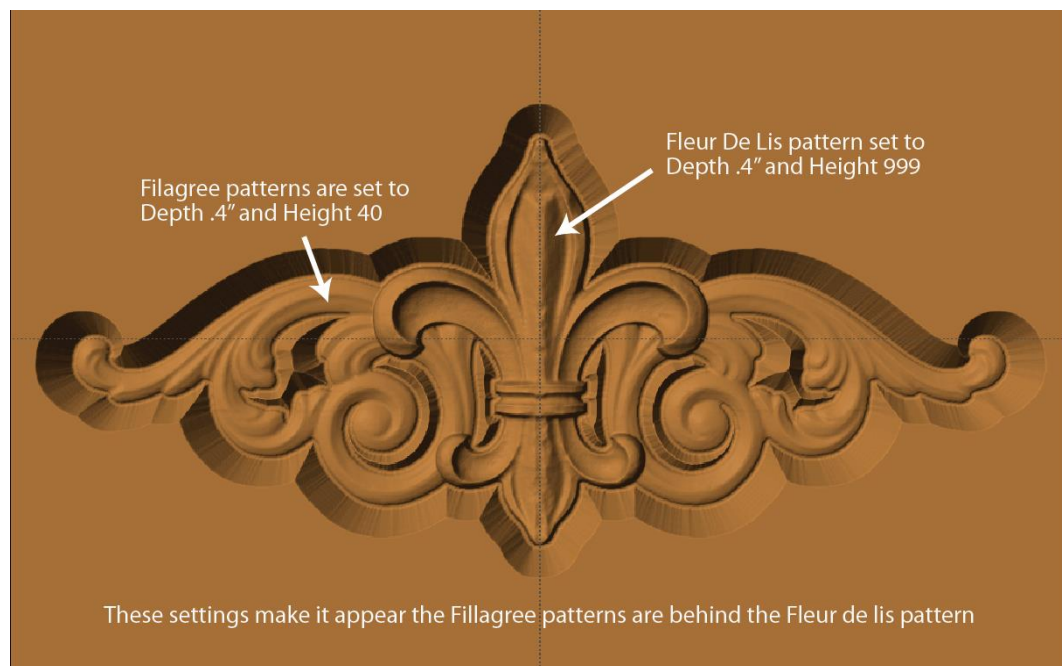
This basically means you can make a pattern taller or shallower within its set depth. The deeper the pattern is, the higher you can raise it since there is more distance to work with.

Height at 100

Height at 30



Depth for each = .5". (From left to right – height = 20, 50, 100, 999)

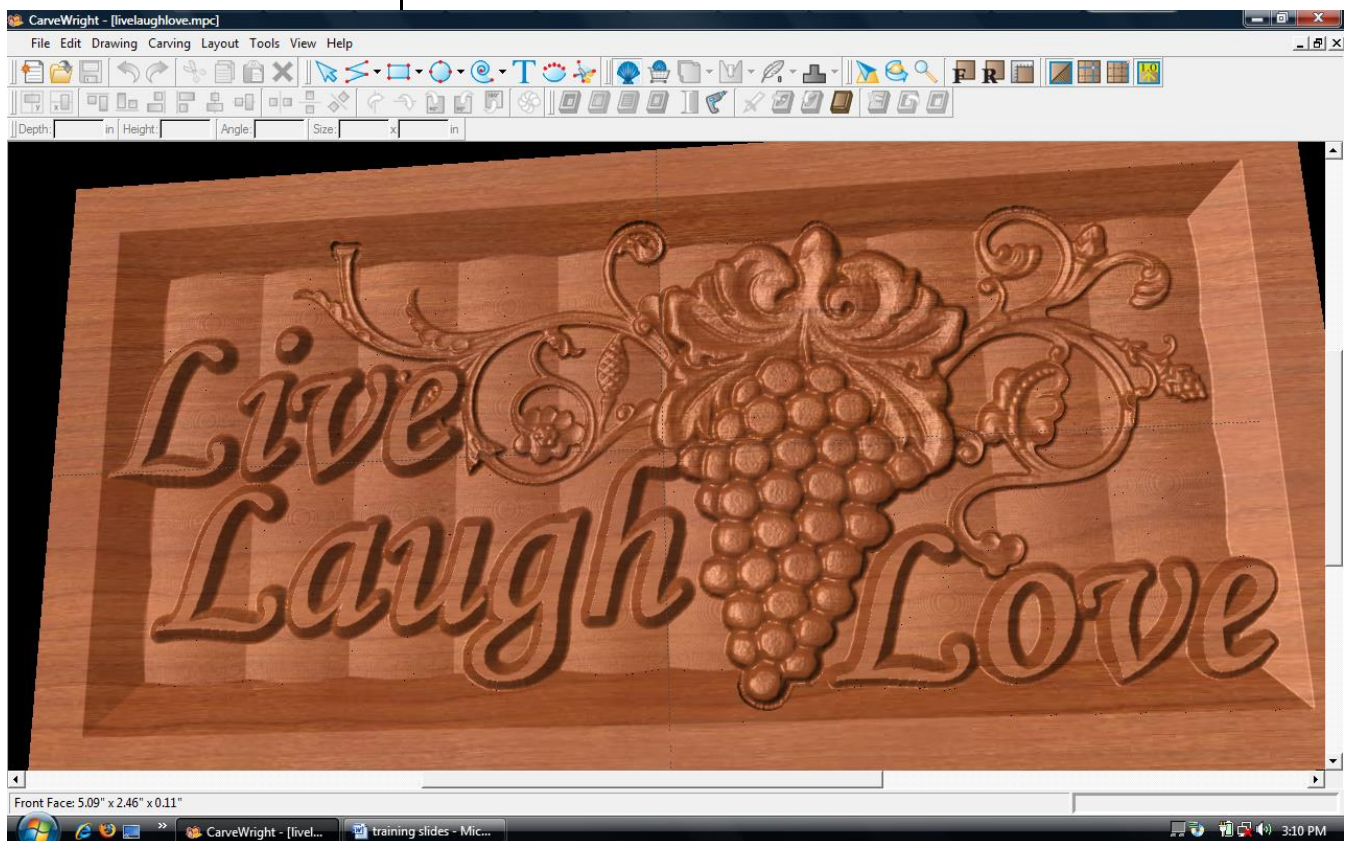


Depth and height when used together can create the effect of elements appearing to be behind or above other elements.

### LIVE LAUGH LOVE

This project covers the following design concepts:

- PATTERN PLACEMENT
- PATTERN MANIPULATION
- FINE TUNING
- ADJUSTING DEPTH & HEIGHT
- TEXT TOOL
- DRAWING TOOLS
- REGIONS
- TEXTURES
- CARVING OPTIMIZATION
- FEATHERING
- DRAFT
- CARVING LIST
- BOARD SETTINGS
- MANAGING DATA
- UPLOADING TO MEMORY CARD
- QUALITY SETTINGS





## INSTRUCTIONS:

### ➤ STARTING THE SOFTWARE

Open the CarveWright Designer Software

The Welcome screen appears with project options.



Select “New Project”

Set your board piece dimensions.

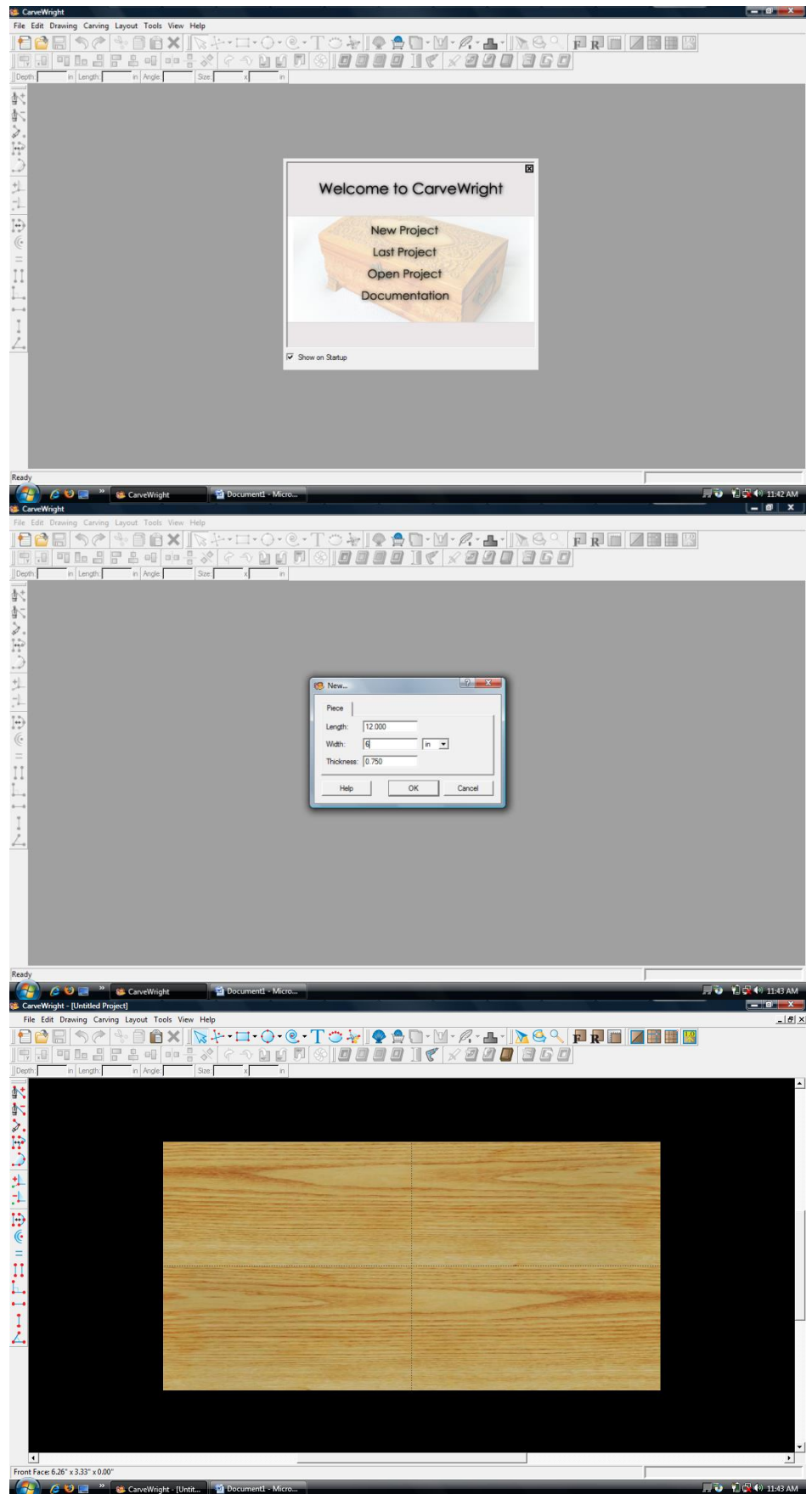
Length: 12”

Width: 6”

Thickness: .75”

Click ok

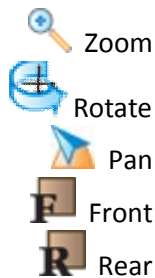
### ➤ MENUS, TOOLBARS OR MOUSE






## ➤ MANIPULATING THE WORKPIECE

Board piece will display on screen in three dimensions.



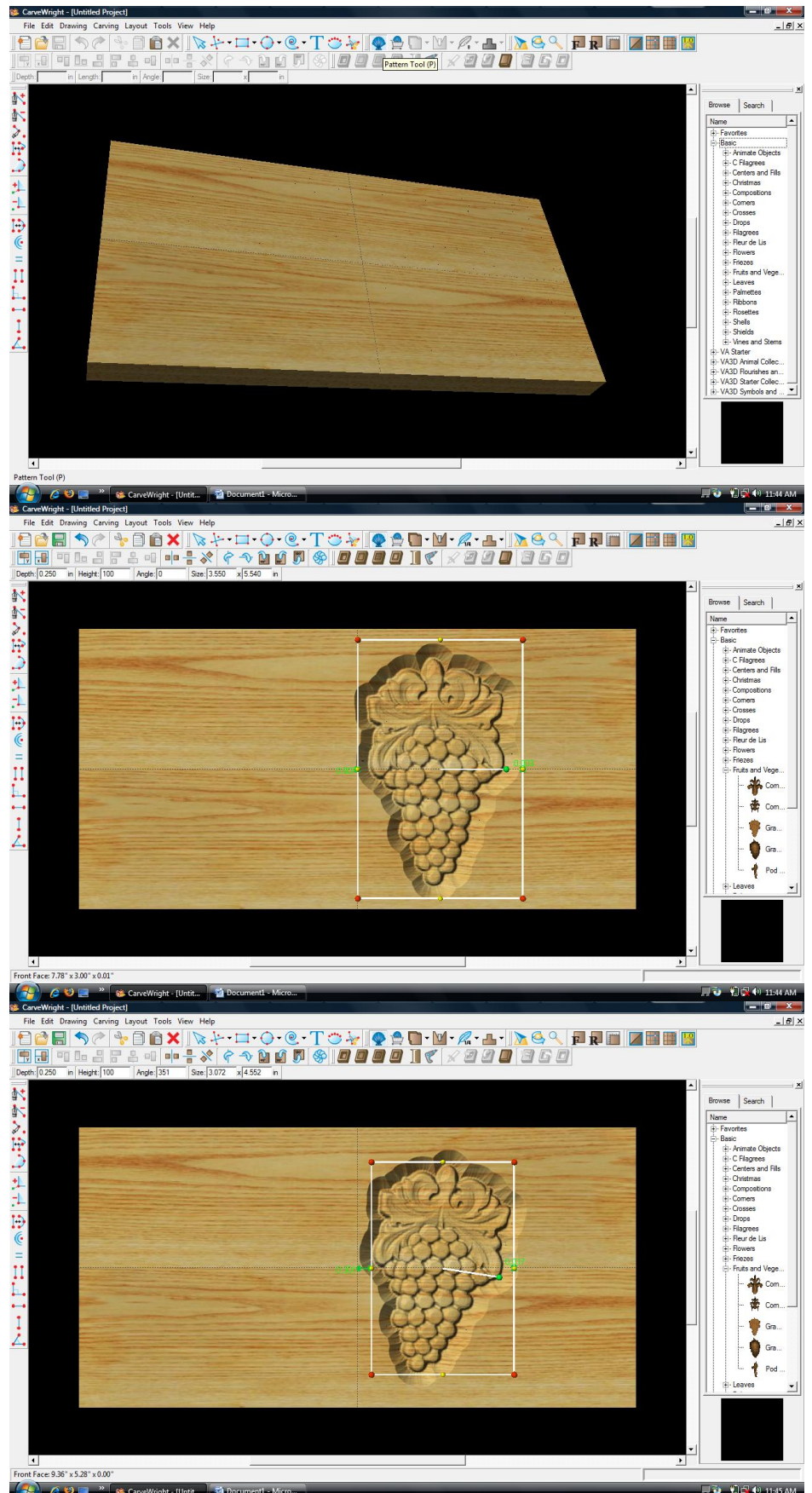
## ➤ PATTERN PLACEMENT

 Select the “pattern tool” to open the pattern library along the right side.

Select “Grapes01” under “Fruits and Vegetables” in the Basic Library. Click on board to place.

➤ PATTERN MANIPULATION  
Use Red Nodes on the corner to Scale the pattern.

Also, use the Green Node to Rotate the pattern



## ➤ PATTERN PLACEMENT & MANIPULATION

### Adding Additional Patterns



Select “Vine04” under “Vines and Stems” in the Basic Library. Drag and drop it onto the board.

Rotate and scale to fit with other pattern.

\*\*\*\*\*IMPORTANT\*\*\*\*\*

Notice how the patterns overlap.  
The stem of the vine is surfacing through the grape pattern.

### ➤ FINE TUNING

To fix this we will adjust the depth and height.

#### ➤ ADJUSTING DEPTH

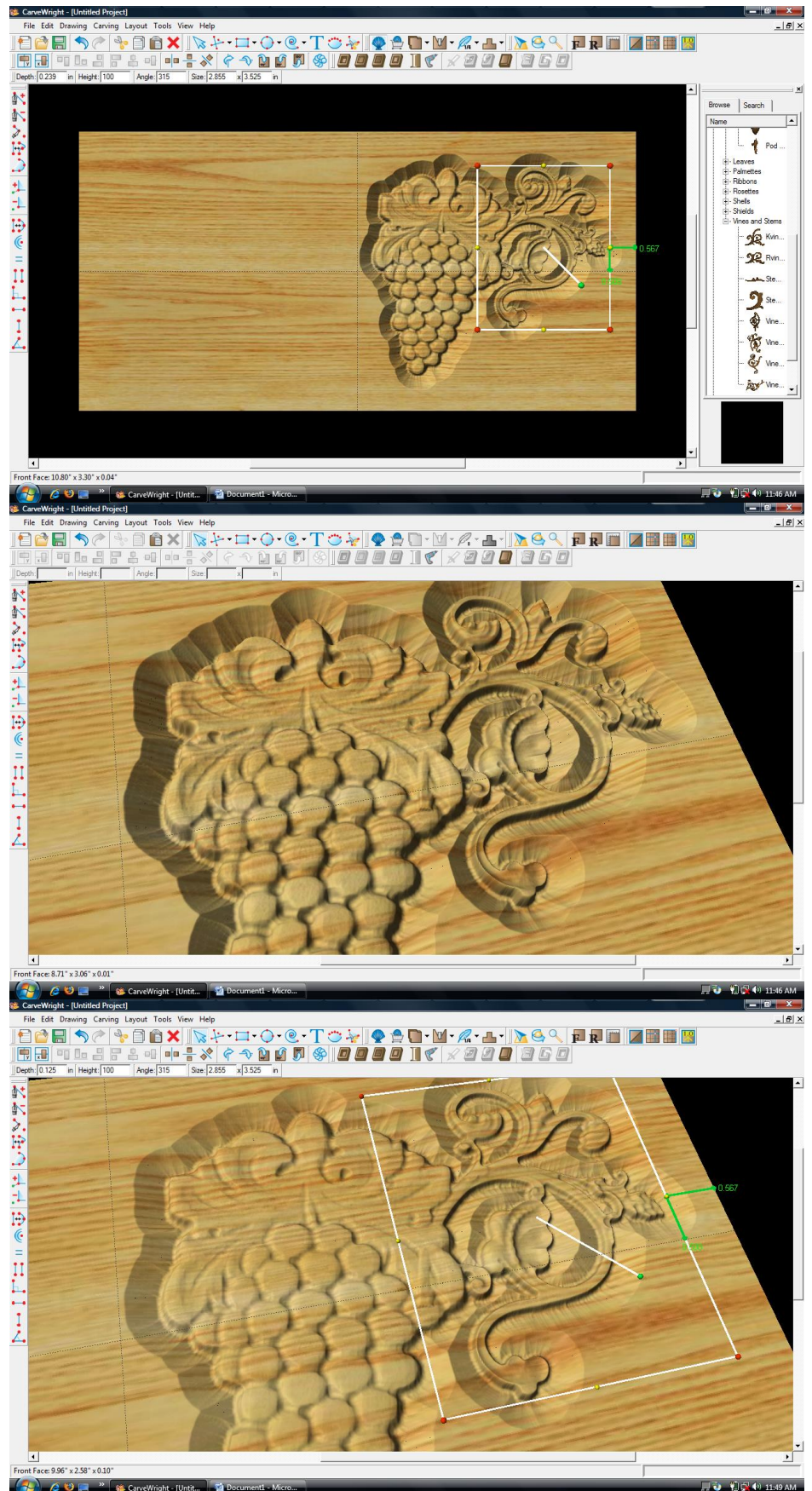
Select grapes and change depth to “.125” or “1/8” inch.

Change the vine depth to “.125 or 1/8” inch. This shallows the entire design for faster carving, but does not fix the overlap.

#### ➤ ADJUSTING HEIGHT

Select the vine pattern and adjust the Height to “30”. This lowers the overall thickness of the pattern.

Notice the stem is gone.





## ➤ BOARD SETTINGS



Use “Toggle Texture” to remove wood grain for better viewing.



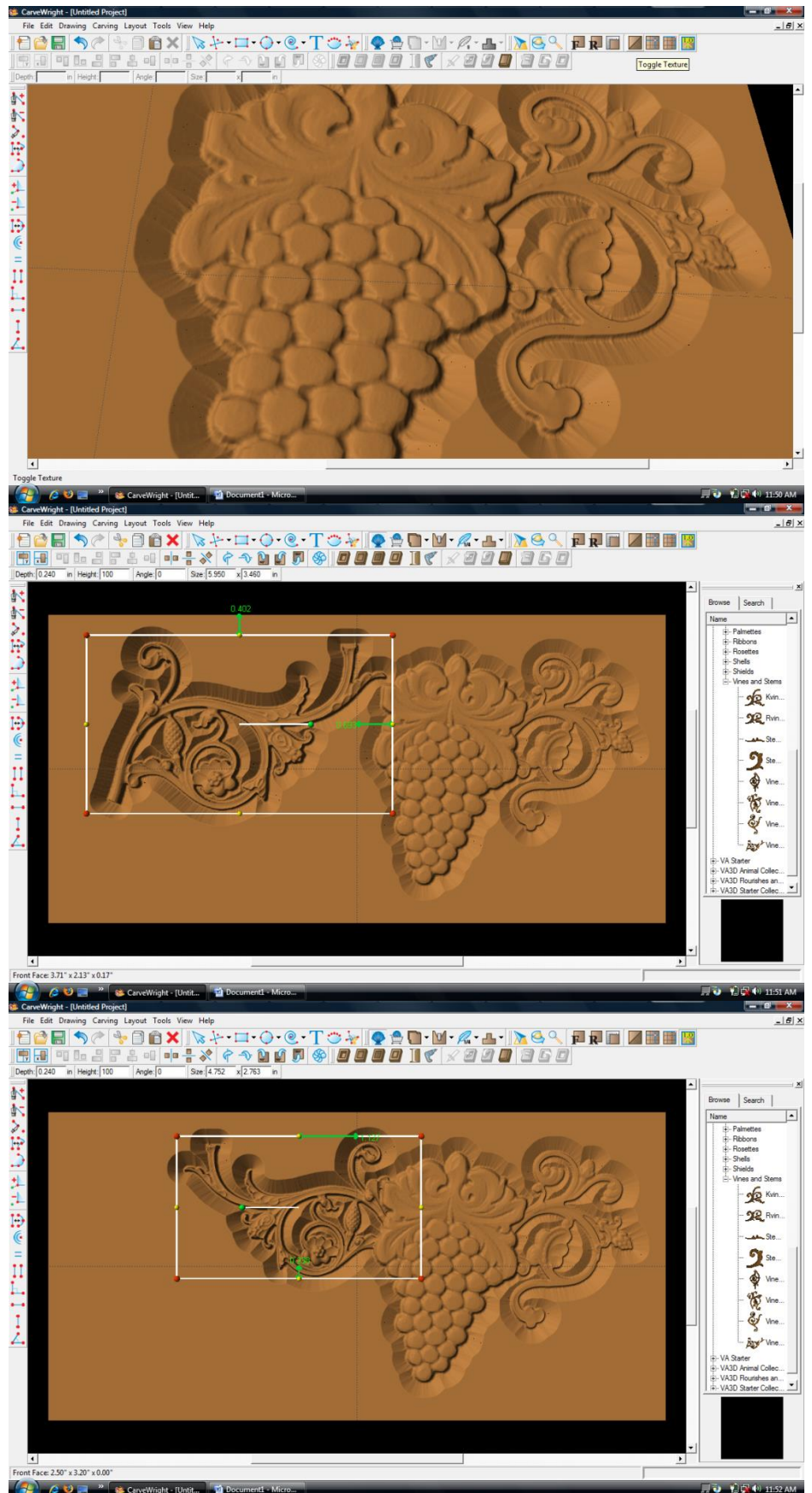
Select “Vine06” from “Vines and Stems” in the Pattern Library and place onto board.

Use the right-click button on the mouse to bring up menu of available options for that pattern.



Select “Flip & Rotate”- “Rotate Horizontally”.

Scale pattern down and overlap with grapes.



- FINE TUNING
- ADJUSTING DEPTH & HEIGHT

Like other patterns, change the Depth to “.125” or “1/8” inch.

Change the Height to “30” to match other vine pattern.

### ✓ TEXT TOOL

**T**

Next, select the “Text Tool” and click on board.

Text dialog box will appear.

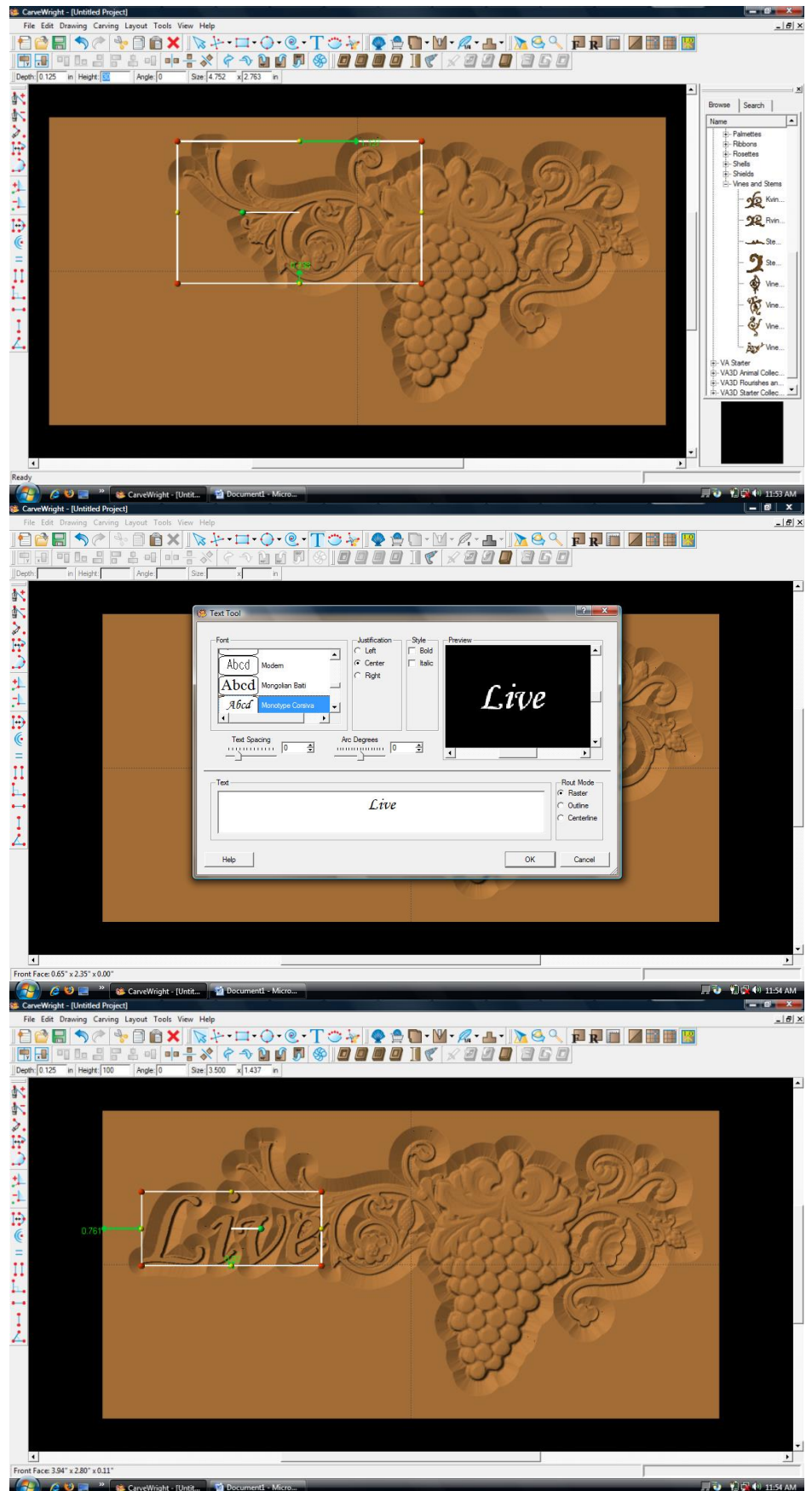
Select from any of the true type fonts that you have on your computer.

Type the word “Live”

Select “Raster” from one of the available Rout Modes.

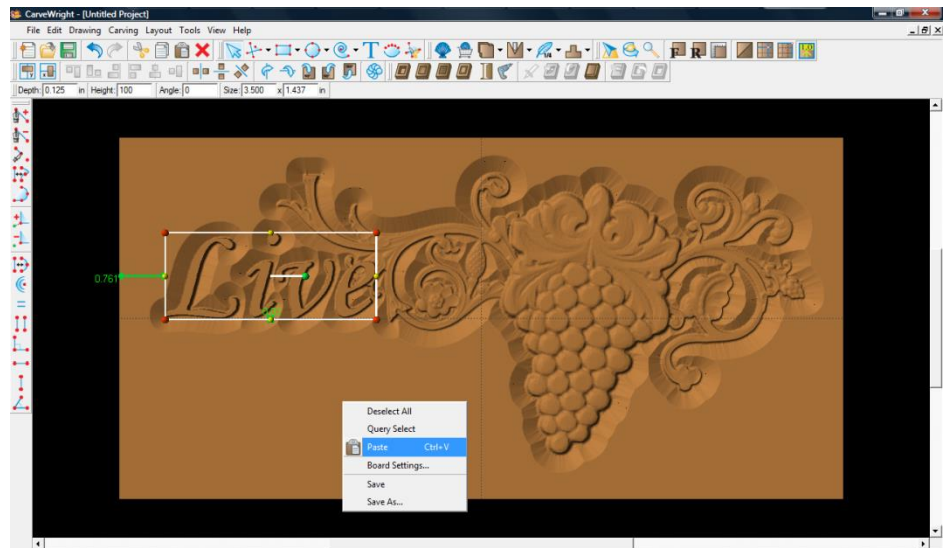
Notice the other options available from “Text Tool”.

Manipulate the size and placement of the word, just as you would a pattern by scaling up and overlapping with the vine.

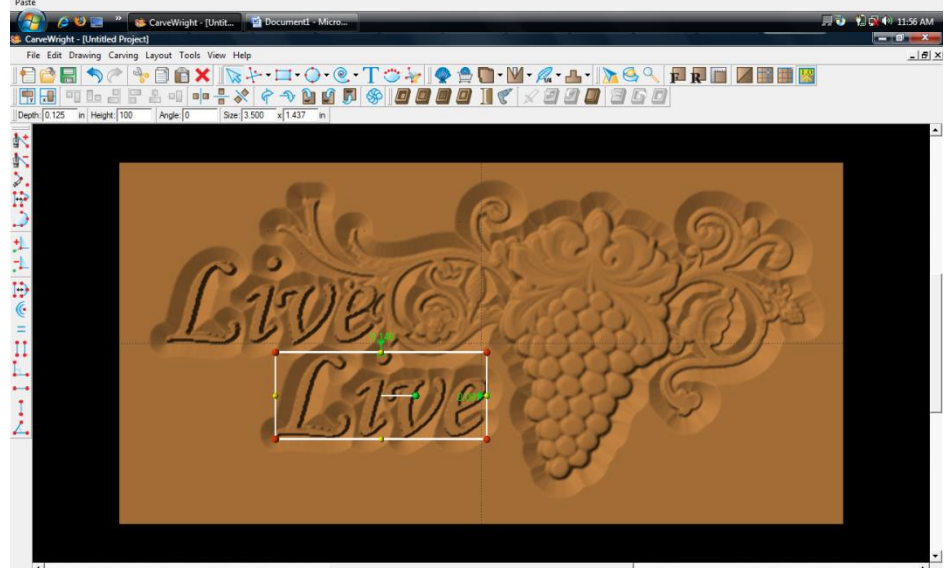




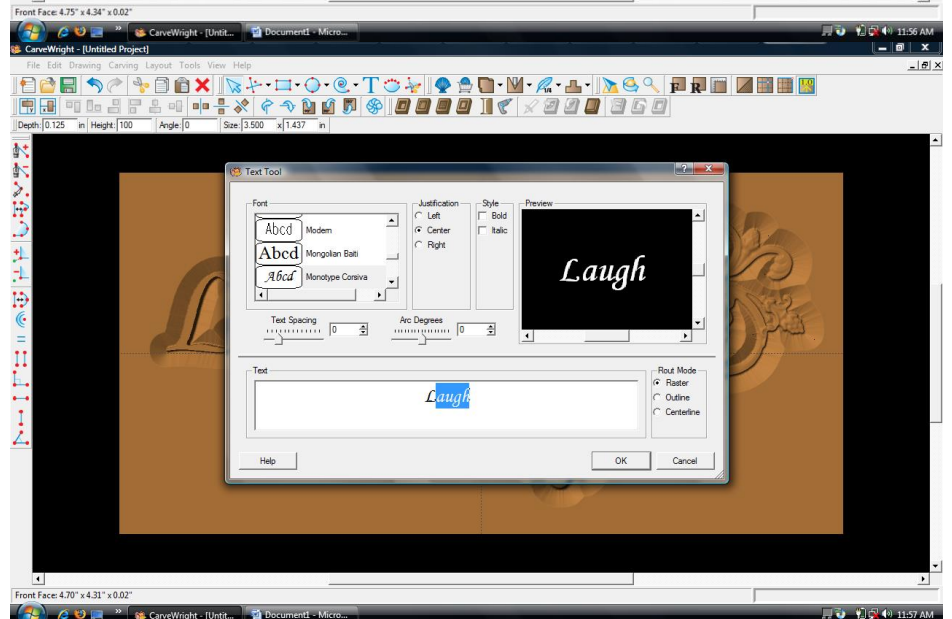
Right Click on “Live” and select  
“Copy”.



Click on board, right click and  
select “Paste”.



The word “Live” will appear again  
on the board. Double click on  
word.



Text dialog box will reopen.


Change the word to “Laugh” and  
click “OK”.



The word “Laugh” will appear on the board the same size as “Love”.

Move to place as shown.

Click an open area of the board to unselect “Laugh”.

 Right click and select “Paste” again.

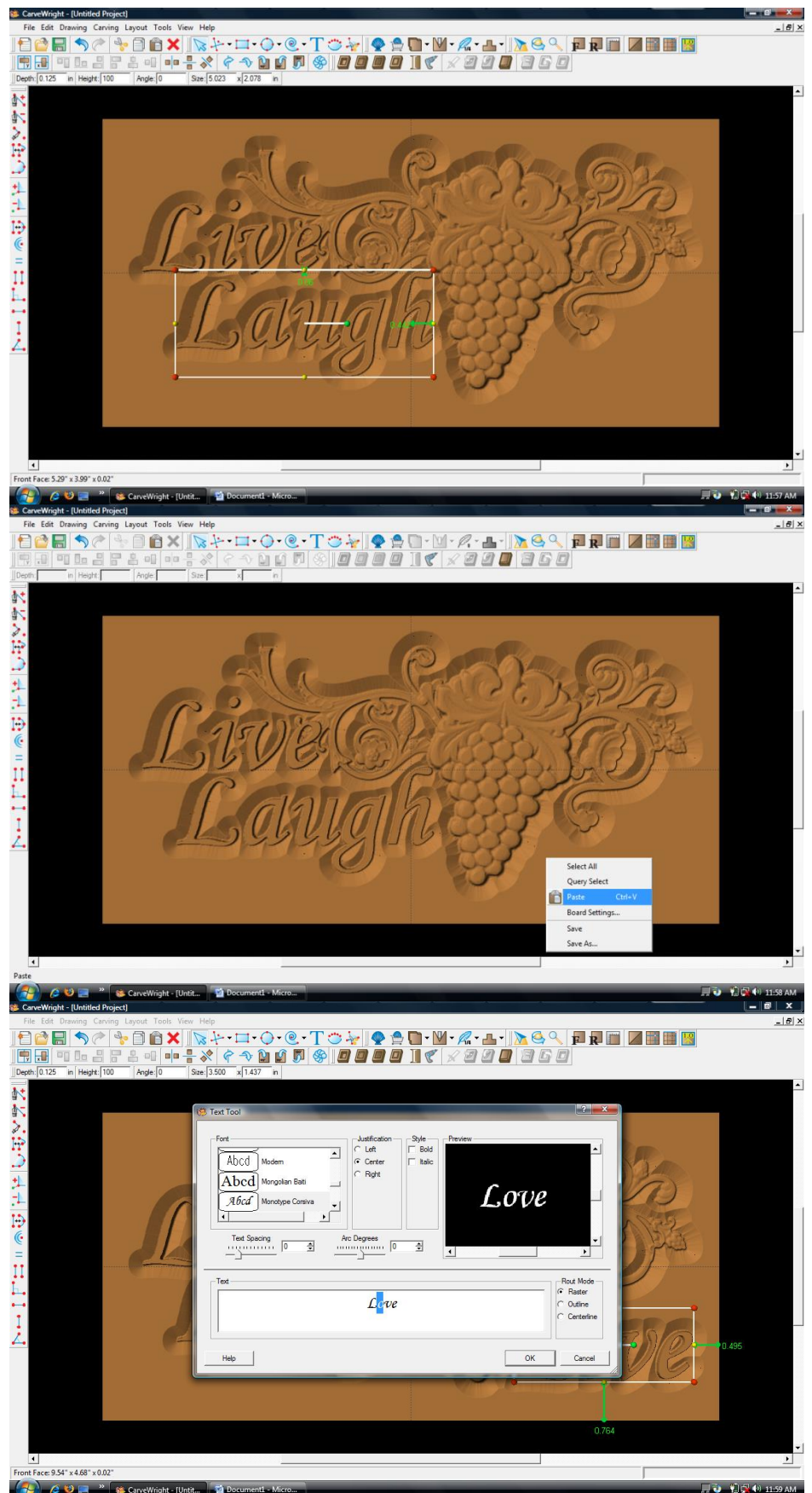
The word “Live” from the clipboard will appear on the board again.

Double click the word.

When the Text dialog box appears, change word to “Love”.

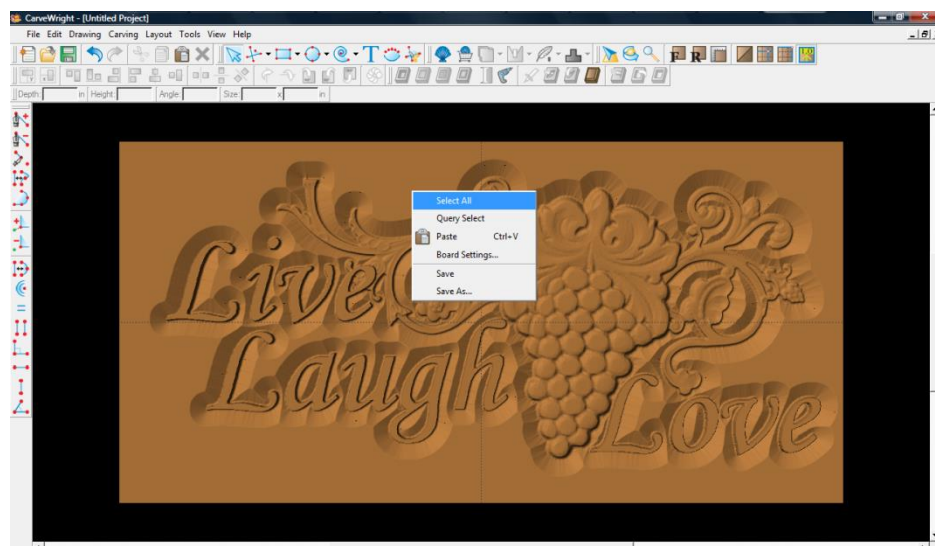
Move to place as shown.

Click “OK”.



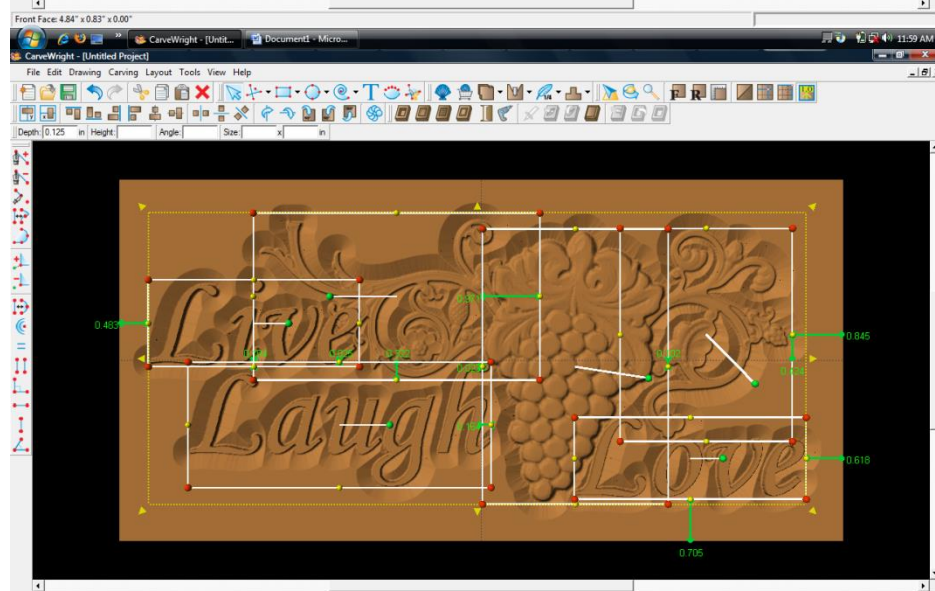


Right click on an open area of the board and choose “Select All”.

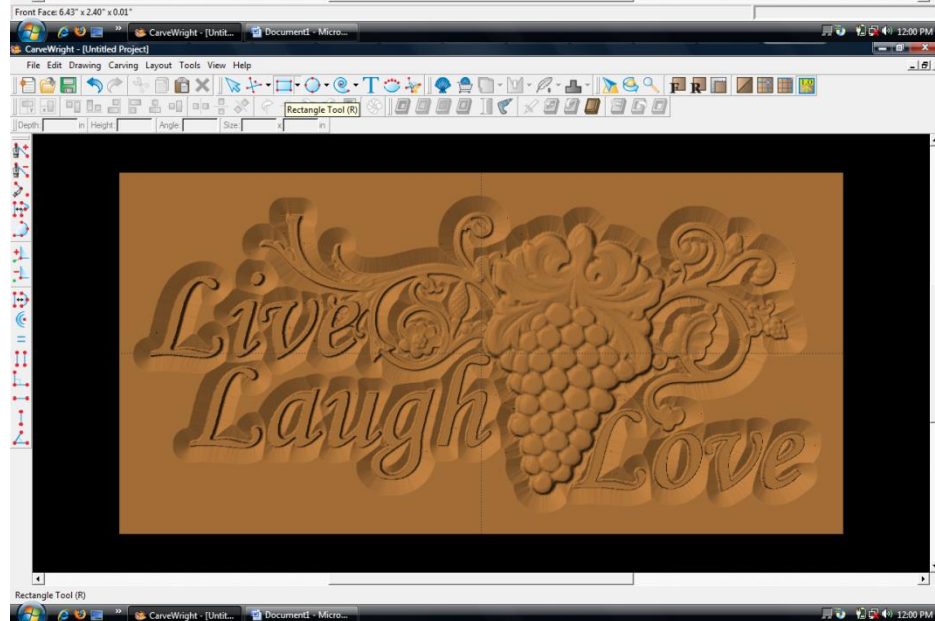


Notice the yellow dotted line around all patterns.

This allows you to move everything together.



Adjust the patterns so they are better centered on the board.



## ✓ DRAWING TOOLS



Select the “Rectangle Tool”.

Draw Rectangle across the entire board, leaving a border as shown.

## ✓ REGIONS

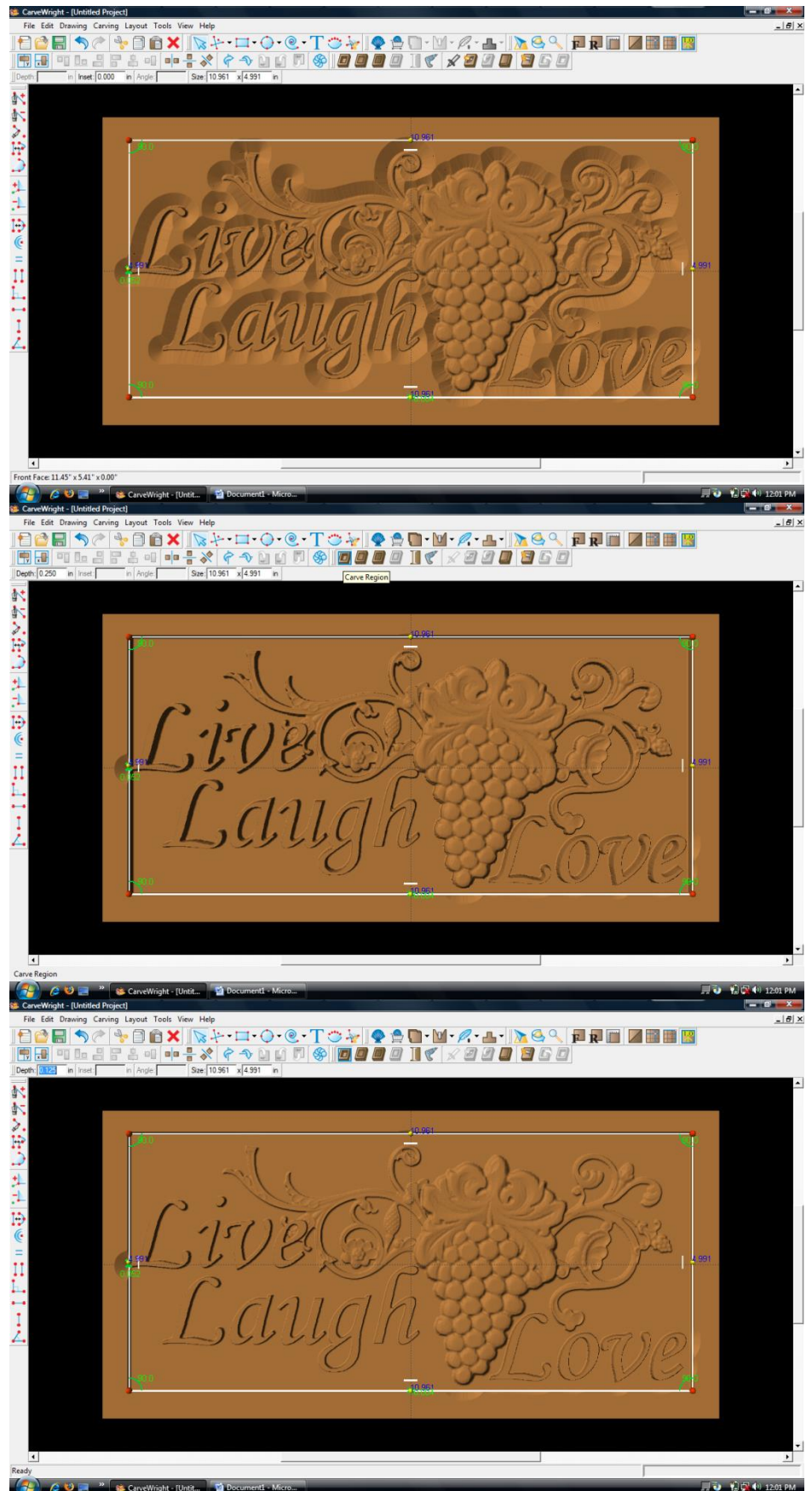


Select “Carve Region”.

This applies a carved area to the rectangle with a default depth of .25”.

- FINE TUNING
- ADJUSTING DEPTH

Change the Depth to “.125” to shallow this region to match the rest of the carvings.





Right click and select “Center Both”.

### ➤ TEXTURE

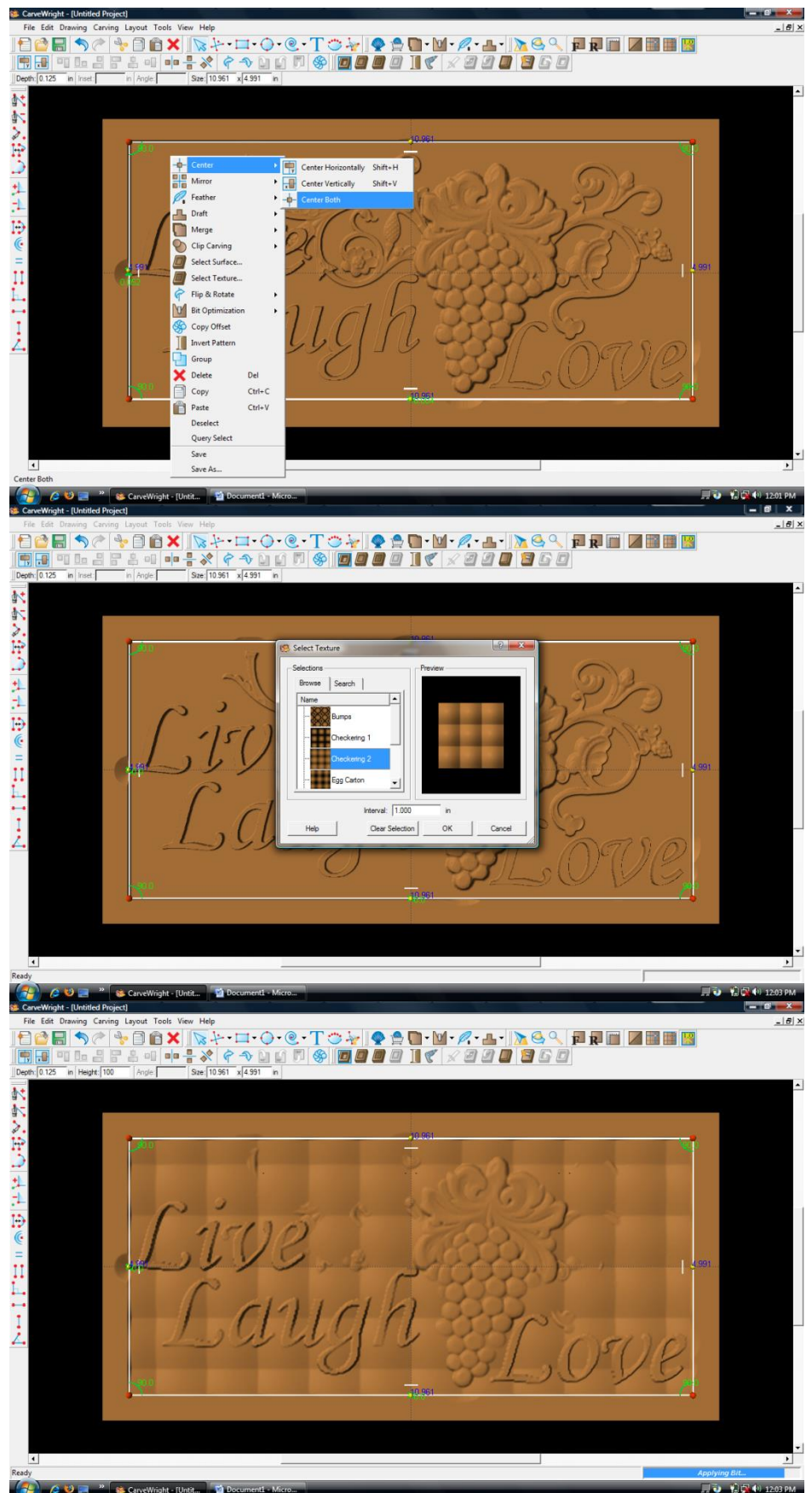


Click on “Select Texture”.

Texture dialog box appears displaying a variety of available textures.

Select “Checkering 2” and leave the interval at 1”.

Texture appears in the rectangular region, but is overtaking parts of the design.





- FINE TUNING
- ADJUSTING HEIGHT

Correct this by adjusting the Height to “20”. This sets the texture back enough to be more subtle.

- MANIPULATING THE WORKPIECE



Rotate and/or zoom your workpiece to see your design board more clearly.

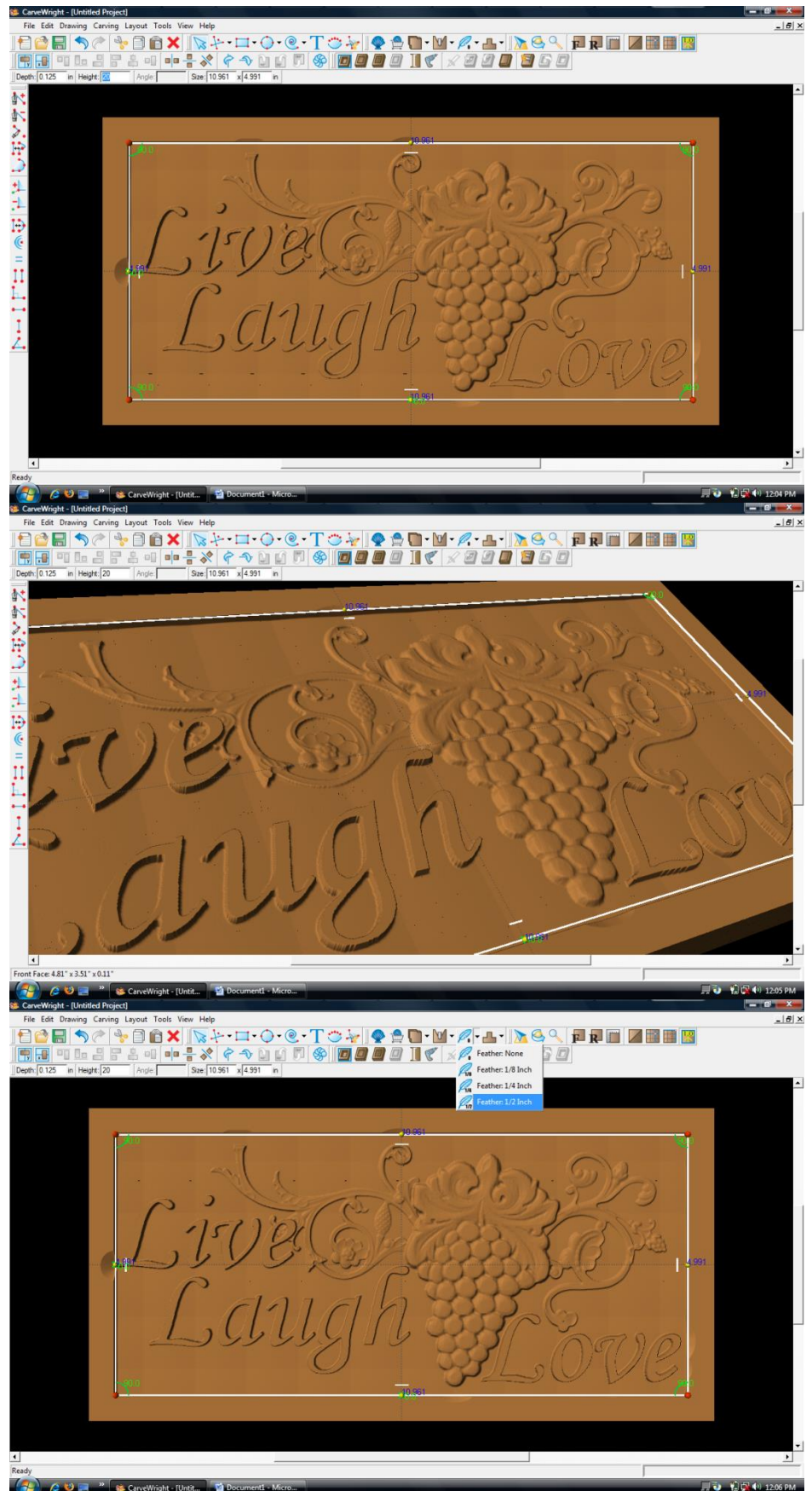
- CARVING OPTIMIZATION

- FEATHERING



With the rectangular region selected, click on the “Feather Tool”.

From the drop down menu, select “Feathering ½ inch”.



Adding a feathered edge applies an internal bevel to the region.

It helps to eliminate a straight up and down edge referred to as a “cliff edge”.

➤ CARVING LIST

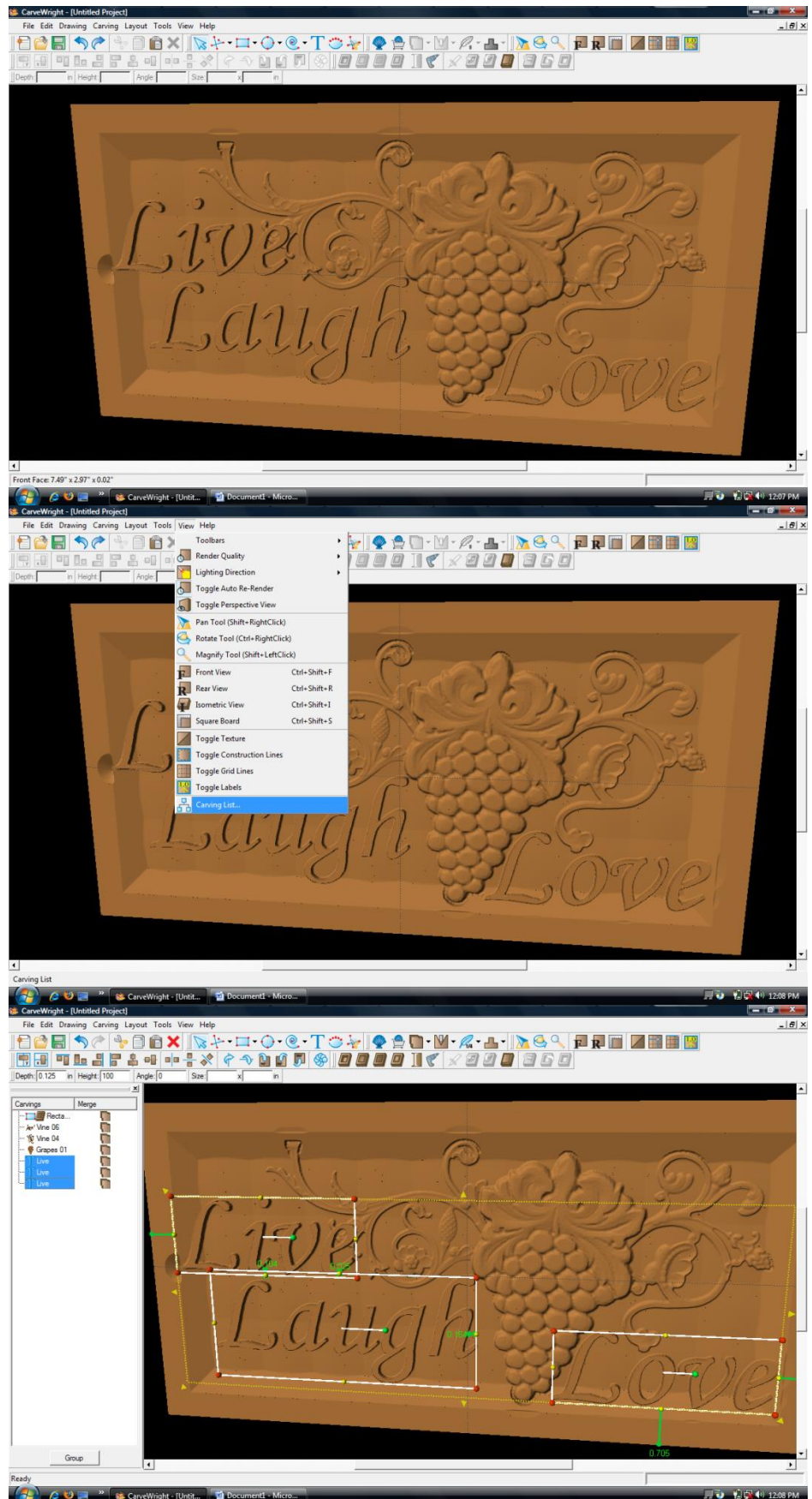


Select “View” and then “Carving List”

The Carving List opens on the left displaying every element on the virtual design board.

These elements can be rearranged or selected in a variety of ways.

Select the 3 text files by holding down the shift button and clicking on each of them.





## ➤ CARVING OPTIMIZATION

### ➤ DRAFT



Select the “Draft Tool” and choose  
“Draft Large”.



This puts a bevel on the edge of  
the letters removing cliff edge.

### ➤ FEATHERING



Select the “Feather Tool” button  
again. This time select “Feather  
None”.

This removes the feather from the  
letters.

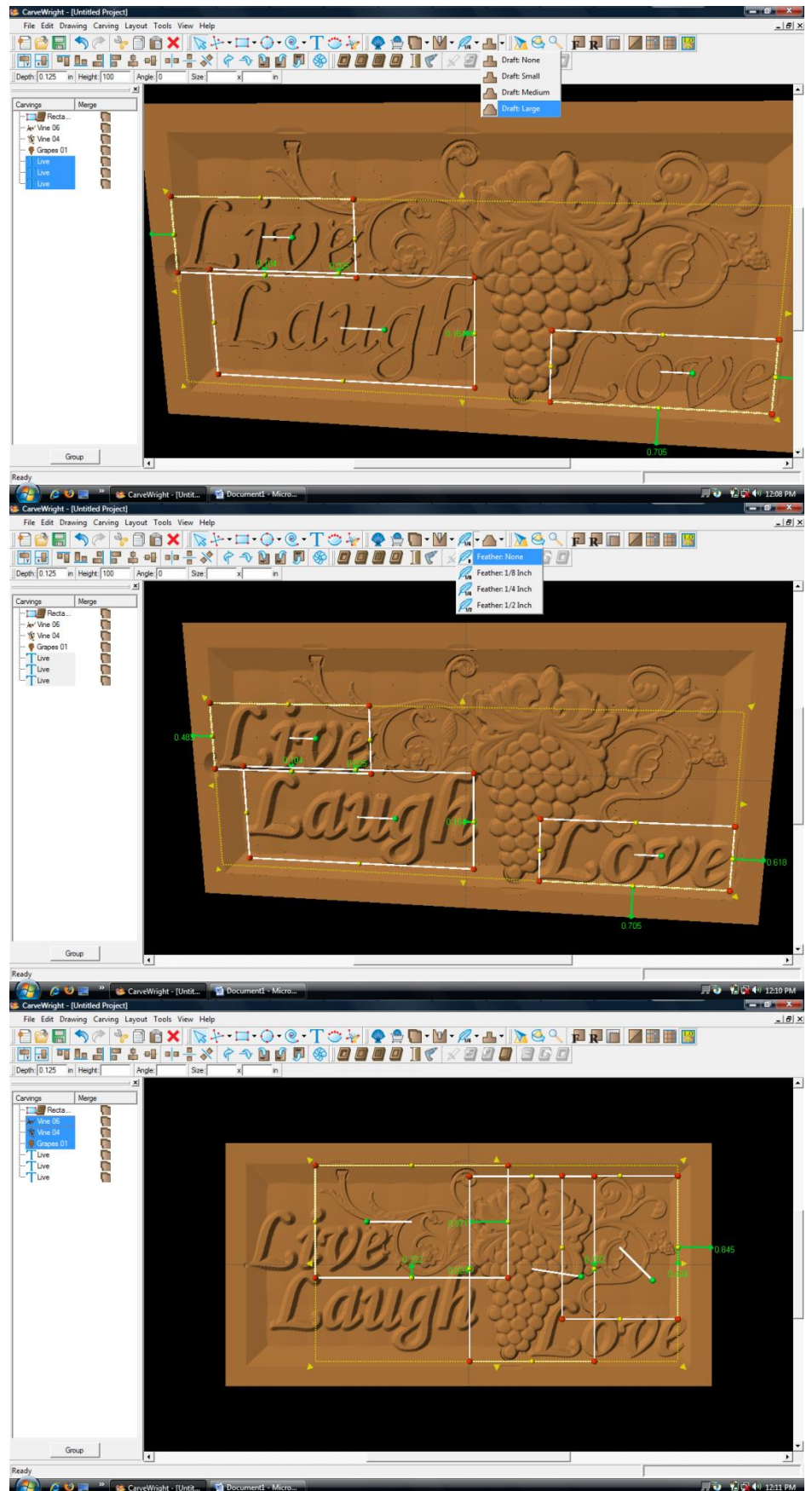
Select the 3 patterns from the  
Carving List.



Select “Draft” and choose “Draft  
Medium”.

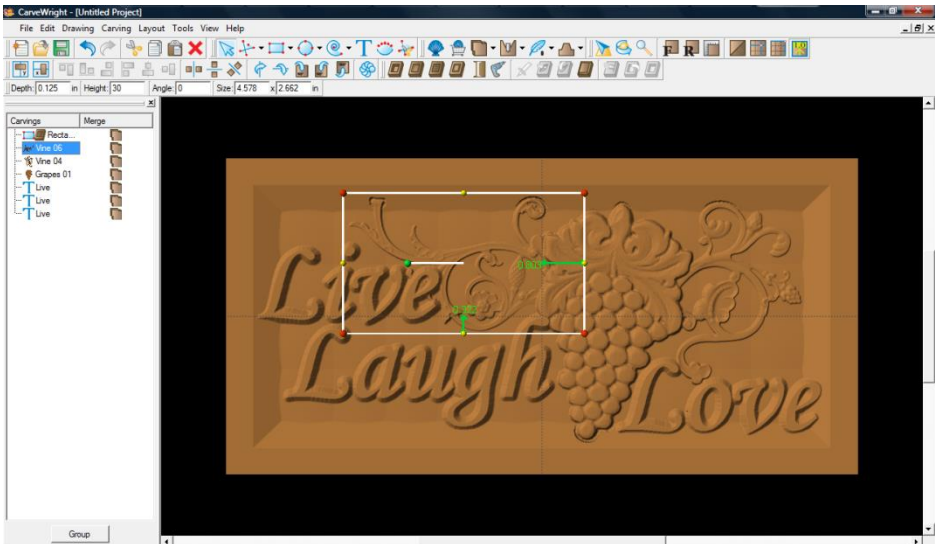



This slight bevel to the patterns  
aids in the removal of cliff edge.

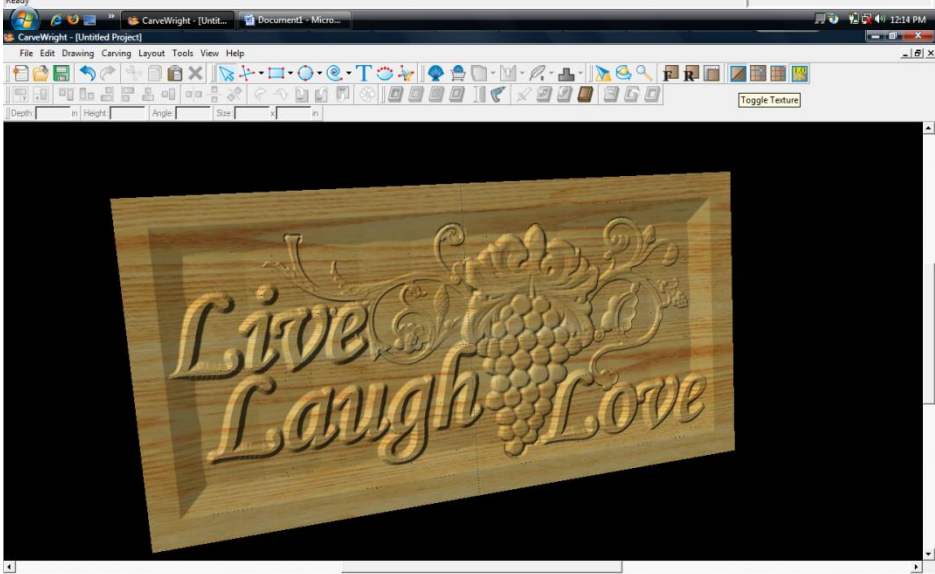





Now select each element and adjust their placement until the design arrangement is satisfactory.

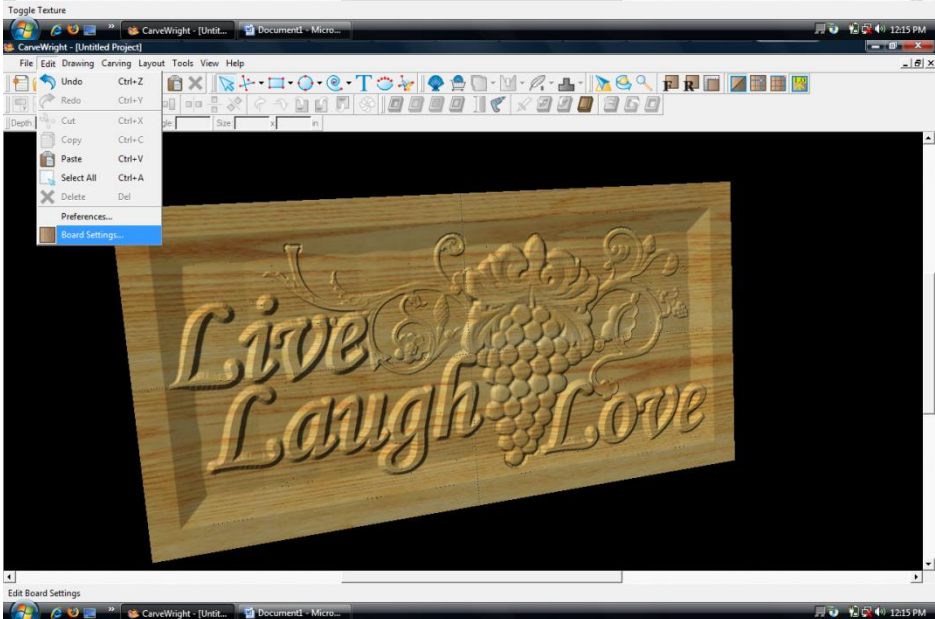


 Toggle the Texture back on to see the design with wood grain again.

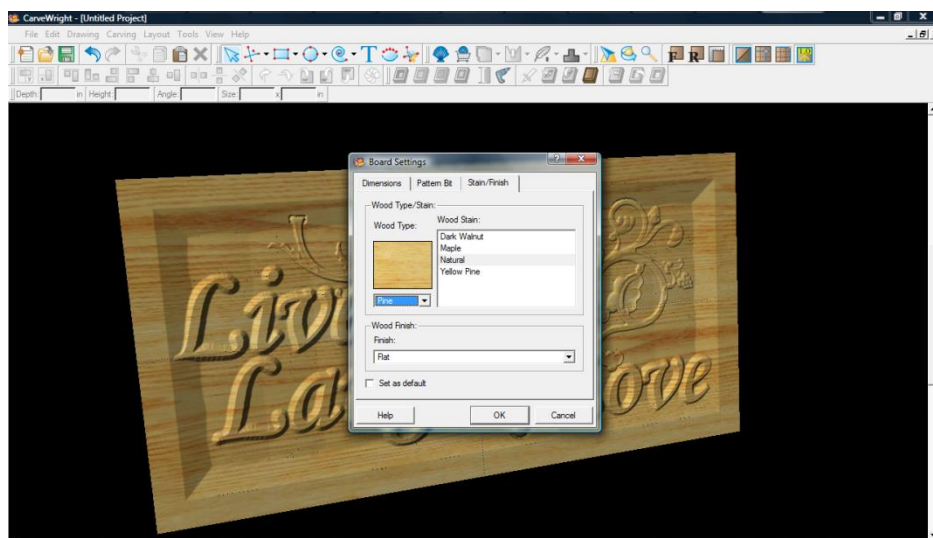


#### ➤ BOARD SETTINGS

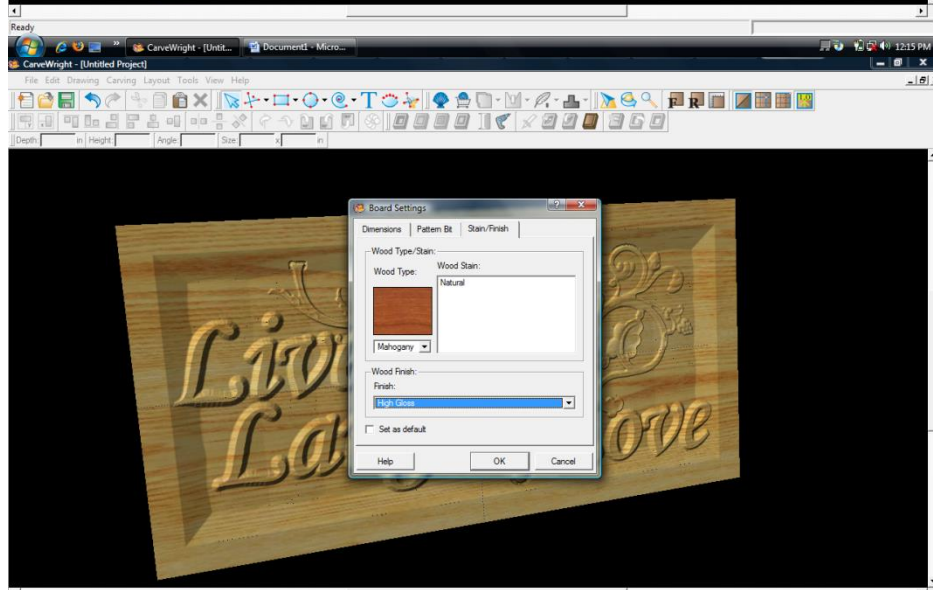
 Select “Edit” then “Board Settings” to open the board setting dialog box.



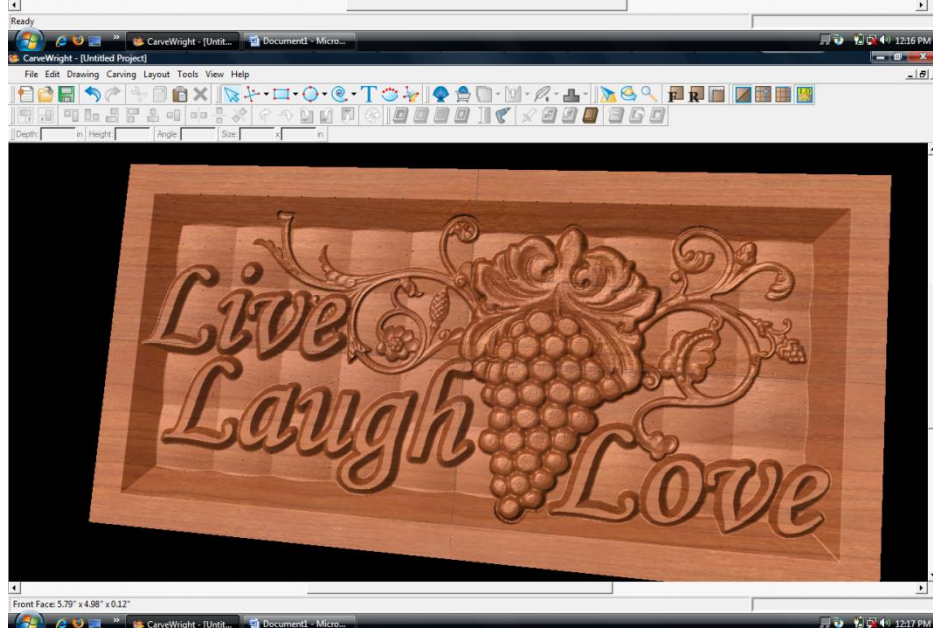
In the Board dialog box choose the Stain/Finish tab.



Change the wood type to “Mahogany” and the finish to “High Gloss”. Click “OK”.



The board’s appearance changes to look like a finished board.



Rotate to view it at different angles.



Select "File", "Save"

\*\*\*\*\*IMPORTANT\*\*\*\*\*

Name file and click "Save" to hard drive.

### ➤ UPLOADING TO MEMORY CARD

Select "File", "Upload"

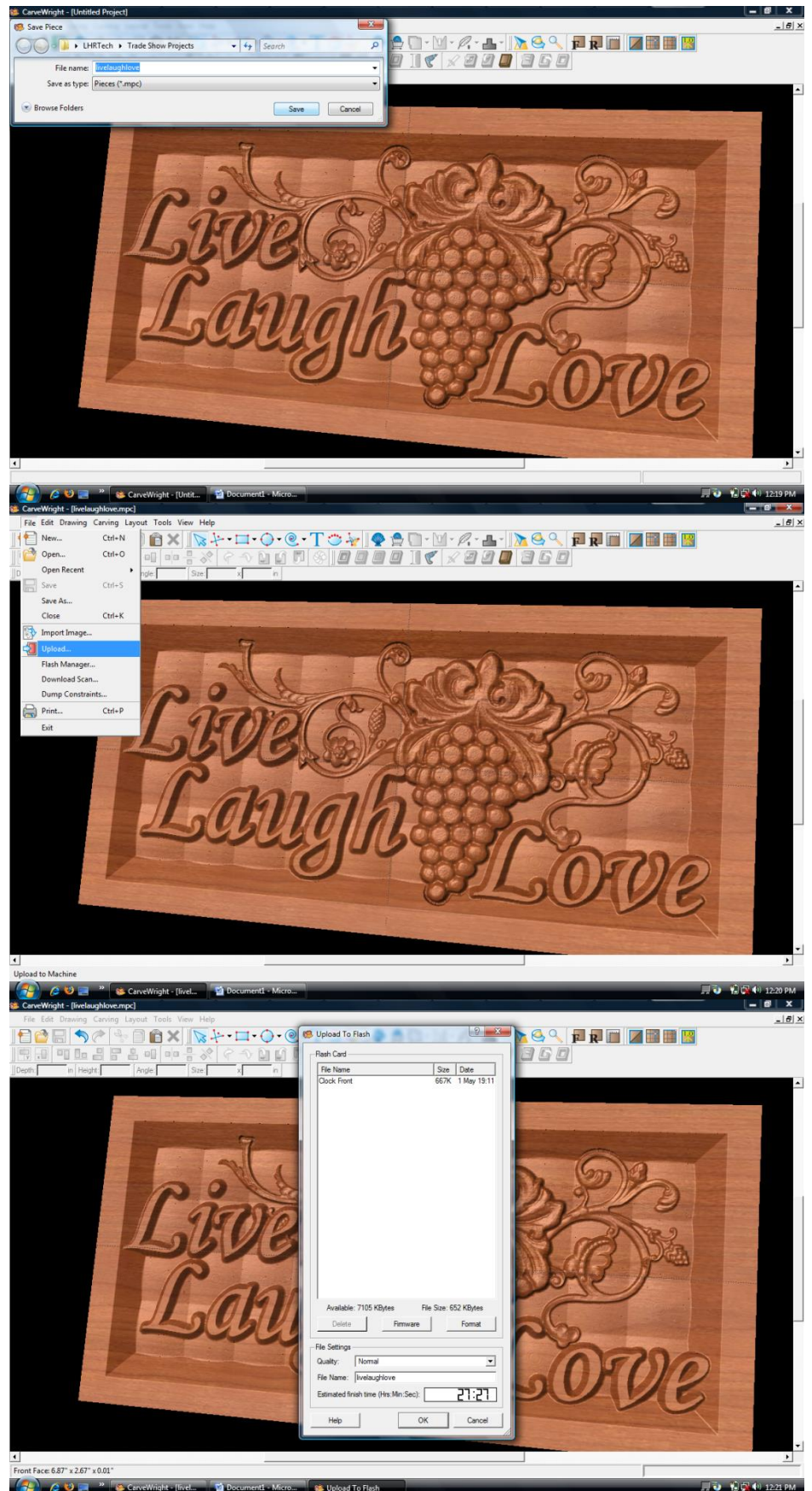
### ➤ QUALITY SETTINGS

Flash Manager dialog box appears.  
Set your quality setting to Best, Normal and then Draft to see how the estimated time to carve changes.

Save to memory card.

Example:

*liveloughlove\_N\_27*  
(recognizable name\_quality setting\_estimated time to carve)



## SPRING BLOOM

This project covers the following design concepts:

- ✓ OPEN PROJECT OR LAST PROJECT
- ✓ DRAWING TOOLS
- ✓ CENTERING
- ✓ CARVE REGION
- ✓ FEATHERING
- ✓ TEXTURES
- ✓ FINE TUNING
- ✓ ADJUSTING HEIGHT
- ✓ PATTERN PLACEMENT
- ✓ TEXT TOOL
- ✓ ADJUSTING DEPTH
- ✓ USING DRAFT
- ✓ BOARD SETTINGS
- ✓ MANAGING DATA
- ✓ UPLOADING TO MEMORY CARD
- ✓ SELECT QUALITY SETTING
- ✓ NAME PROJECT



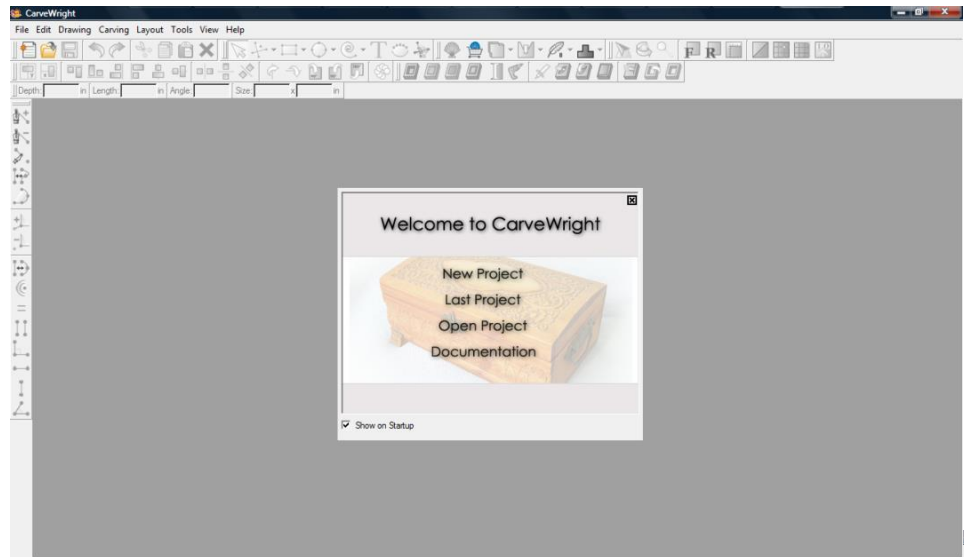
## INSTRUCTIONS:

### ✓ STARTING THE SOFTWARE

Open the CarveWright Project Designer Software

*The Welcome screen appears with project options.*

Select “Last Project” or “Open Project” (if you have done something else, since Project 1-12 “My First Sign”).



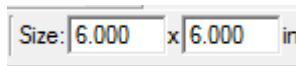
### ✓ DRAWING TOOLS



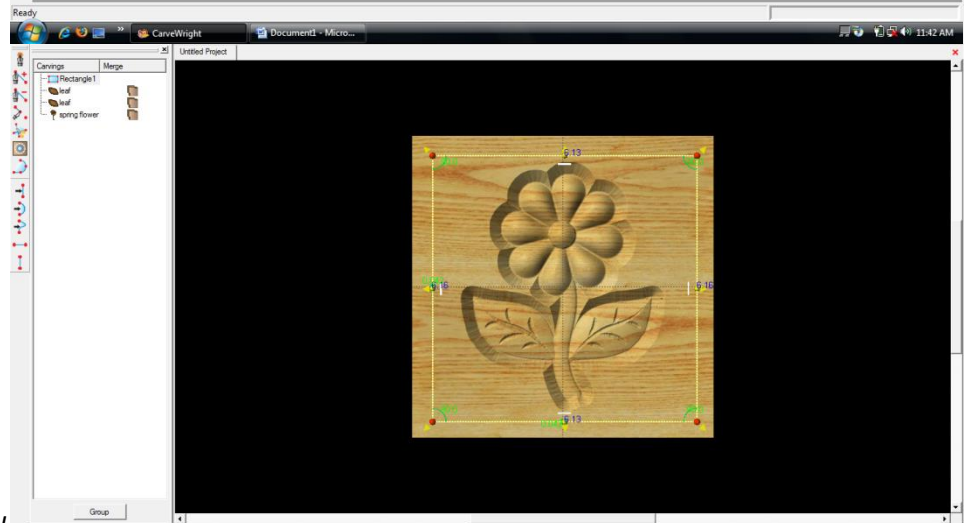
Select the “Rectangle” tool.

Click in top left corner and drag to subscribe rectangle area around the flower.

Set the “Size” to 6” x 6” and hit Enter to apply.



*You could have also used the square tool for this.*



### ✓ CENTERING



With the rectangle selected, right-click to bring up menu of available options.

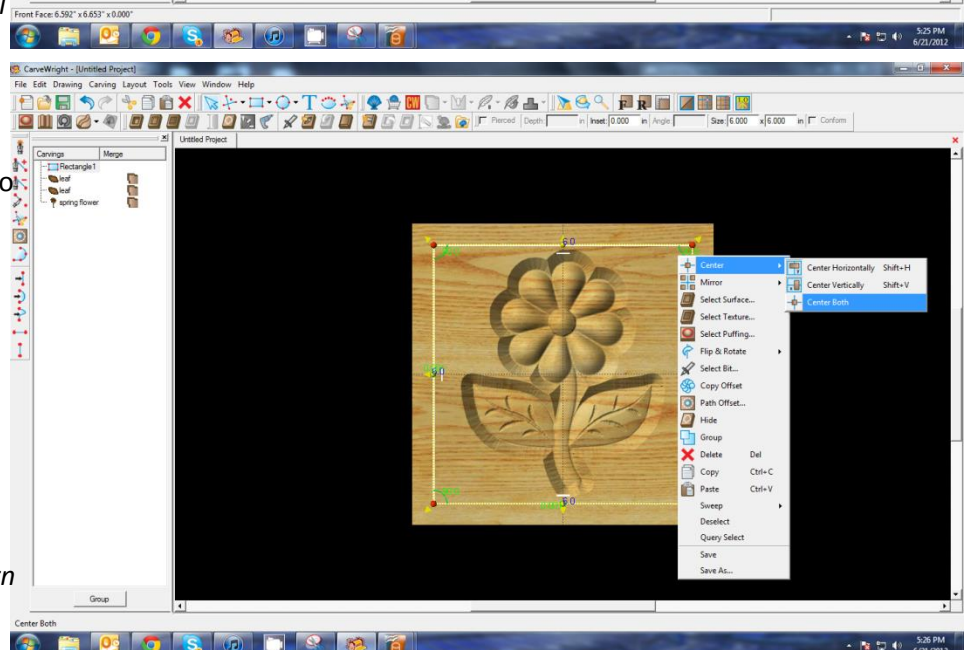
Select “Center” > “Center Both”

### ✓ CARVE REGION

Click on the “Carve Region” icon.



*This creates a carved out region inside the boundary. Automatically defaults to .250” depth. Remember depth of pattern & how depth effects carve time.*



### ✓ FEATHERING



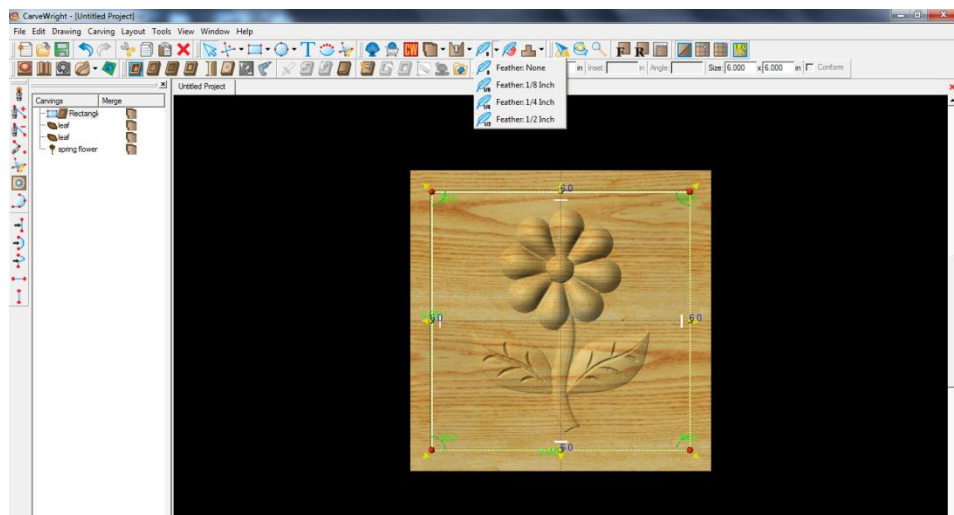


Click on “Feather” dropdown tool and select  $\frac{1}{4}$ ” feather.

Select “Accept”.



*This produces a ramped area and allows you to avoid “cliffs” while using a tapered bit.*



## ✓ TEXTURES

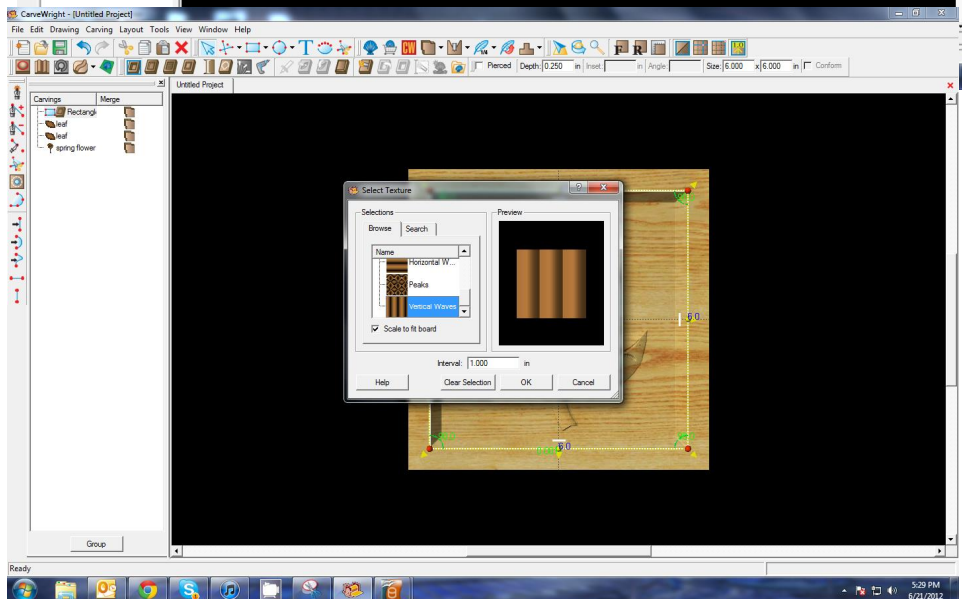
Select “Texture” tool.



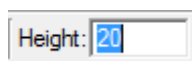
*Texture dialog box appears displaying a variety of available textures.*

Select “Vertical Wave” and leave the interval at 1”

*Texture appears in the rectangular region, but is overtaking parts of the design.*

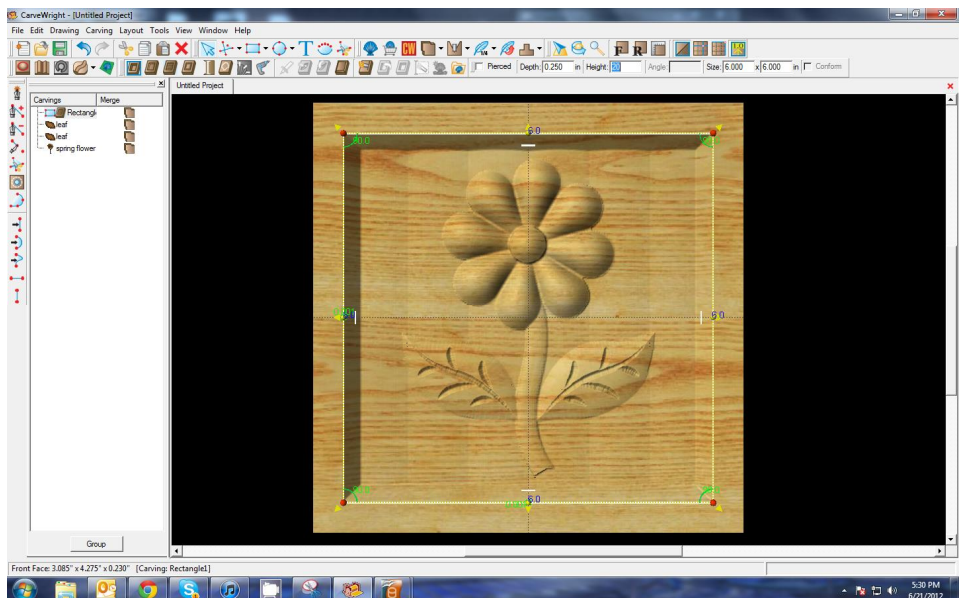


## ✓ ADJUSTING HEIGHT



Correct this by adjusting the Height of the texture to “20”.

*This sets the height low enough to not overpower the foreground objects.*



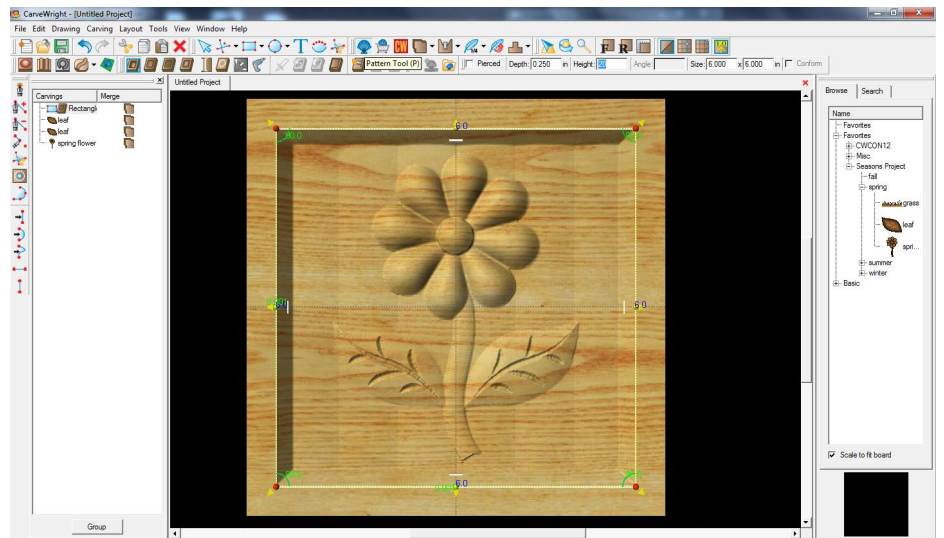


## ✓ PATTERN PLACEMENT

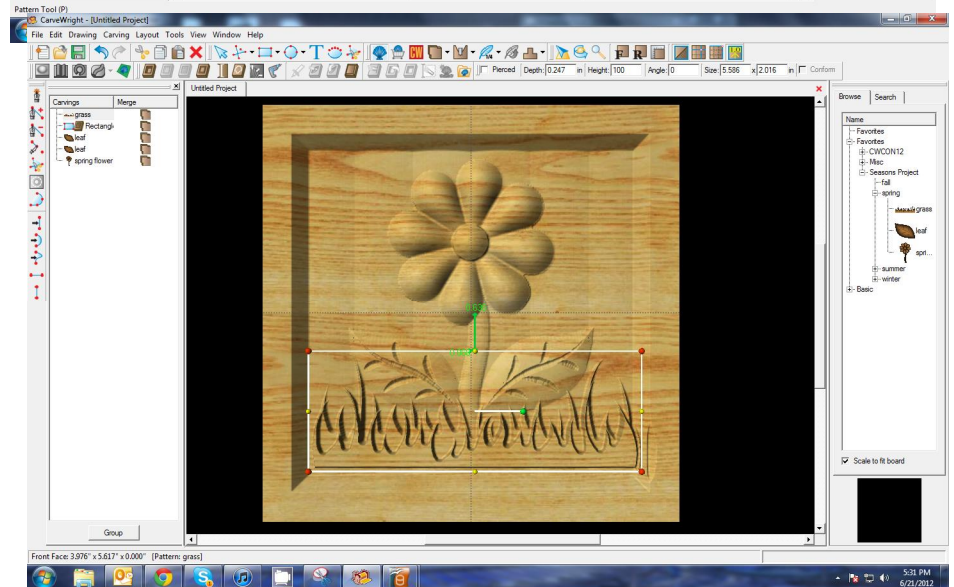


Open Pattern Library and click:

- + sign to open Favorites then
- + sign to open Seasons then
- + sign to open Spring pattern folder.

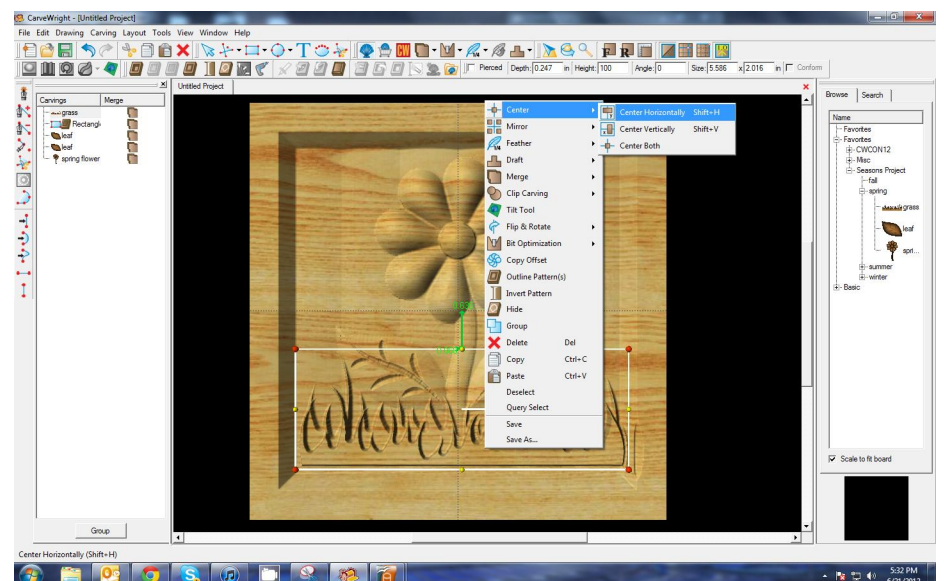


Select "Grass" pattern and place onto board as shown.



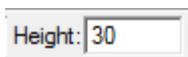
## ✓ CENTERING

Right-click to see available options and select Center > Horizontally.



## ✓ ADJUSTING HEIGHT

Change Height of grass to 30.



## ✓ FEATHERING

Change Feathering to None.



Make necessary adjustments to leaves or grass.



## ✓ TEXT TOOL

Next, select the “Text Tool” and click on board.

Text dialog box will appear. Select from any of the true type fonts that you have on your computer. *Some work better than others.*

Type the word “Spring”

Select “Raster” from one of the available Rout Modes.

*Notice the other options available from “Text Tool”.*

## ✓ FINE TUNING

Manipulate the size and placement of the word, just as you would a pattern by scaling to size.

## ✓ CENTERING



Right-click to see available options and select Center > Horizontally.

## ✓ ADJUST DEPTH

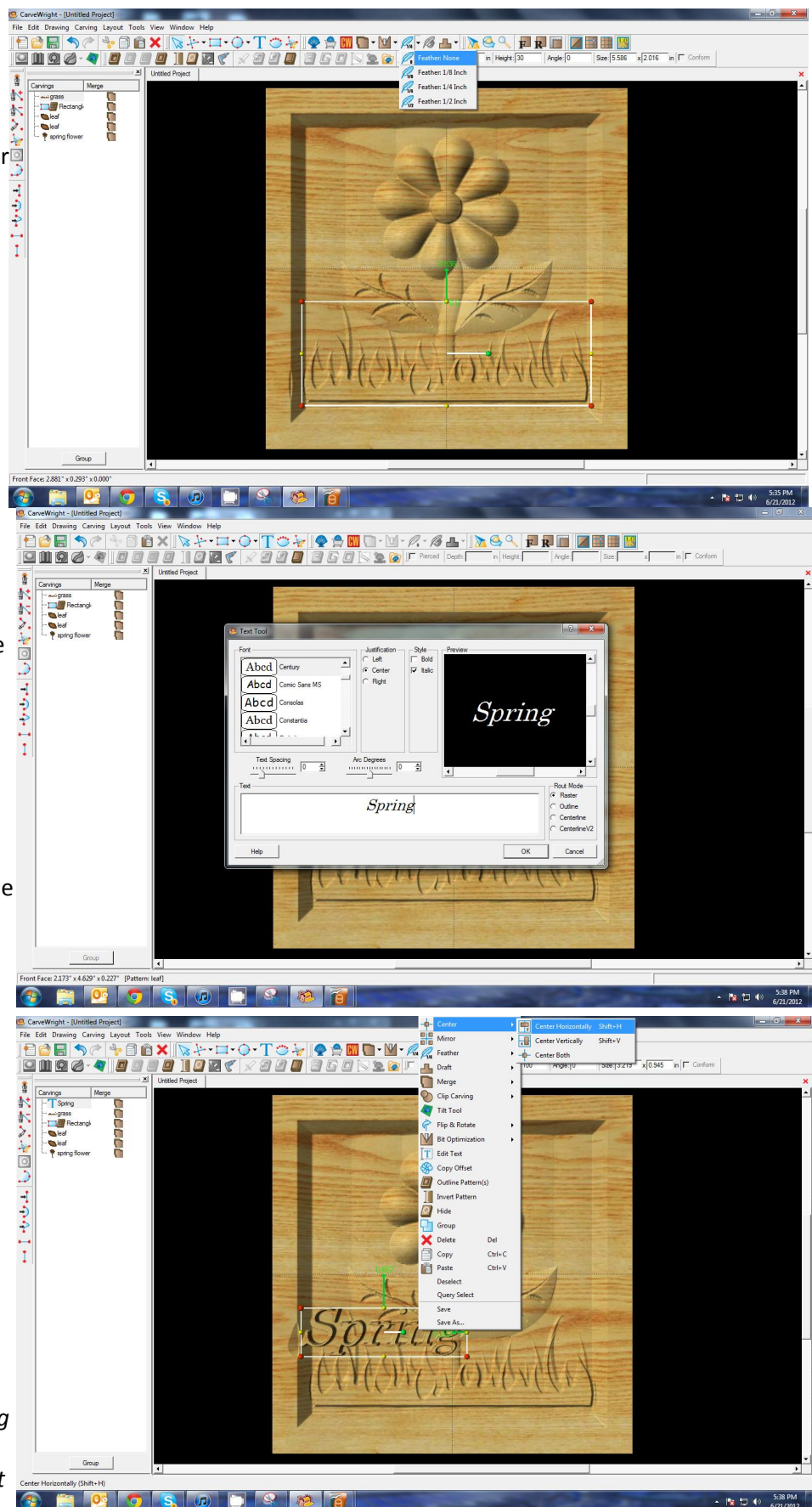
Depth: 0.250 in

Set depth to .25”

## ✓ ADD DRAFT

Select “Draft” drop-down menu and change to Medium.

*Draft gives a ramped area for the carving bit and avoids “cliffs” that may lead to chip out. Reducing the Height of the text may also help.*



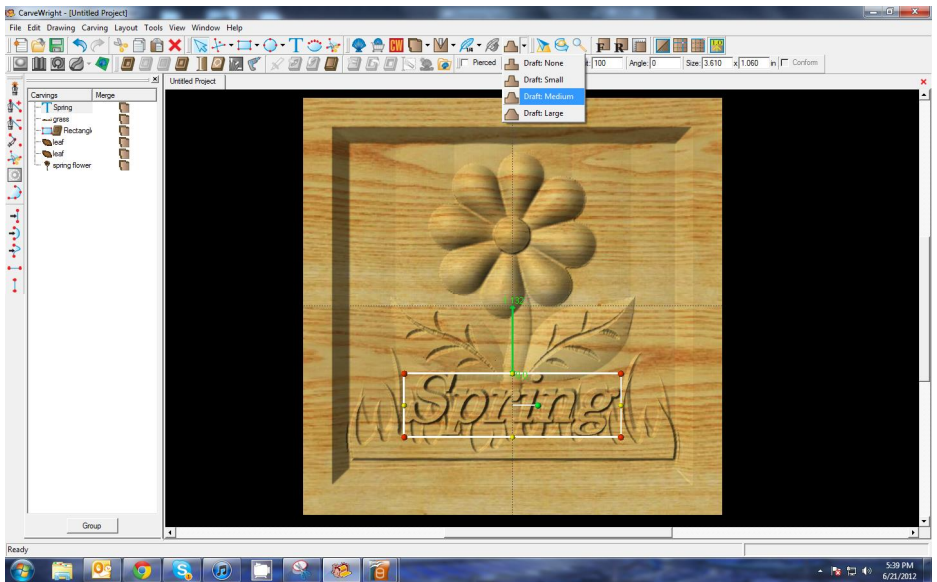


## ✓ BOARD SETTINGS

Use “Toggle Texture” to remove wood grain for better viewing.



Rotate or zoom in on your project to view it from different angles and make any necessary adjustments.



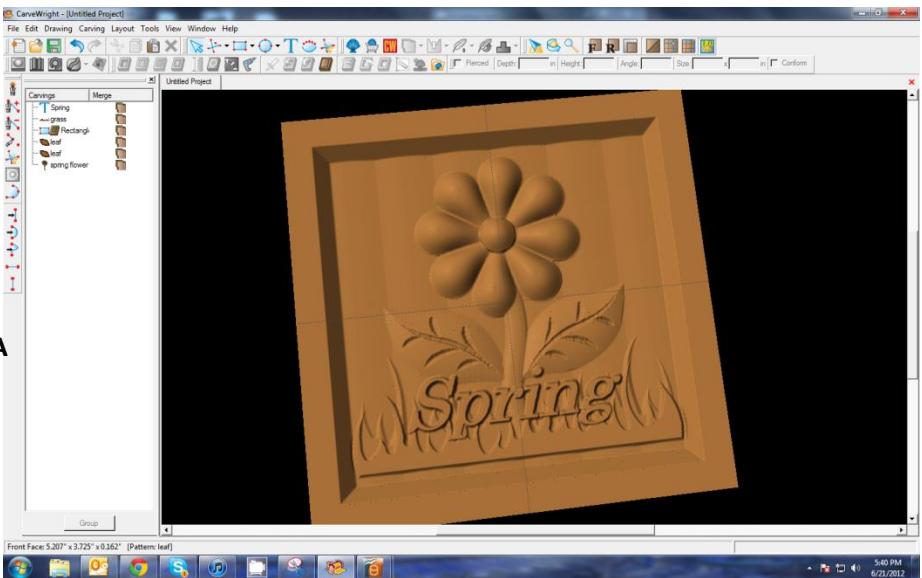
## ✓ MANAGING DATA

Select “File” > “Save”



\*\*\*\*\*IMPORTANT\*\*\*\*\*

Once a project is uploaded to a memory card, it cannot be brought back from the memory card into the software. Always **SAVE YOUR PROJECT** on your hard drive. A Projects folder is recommended and you should know where you saved it.



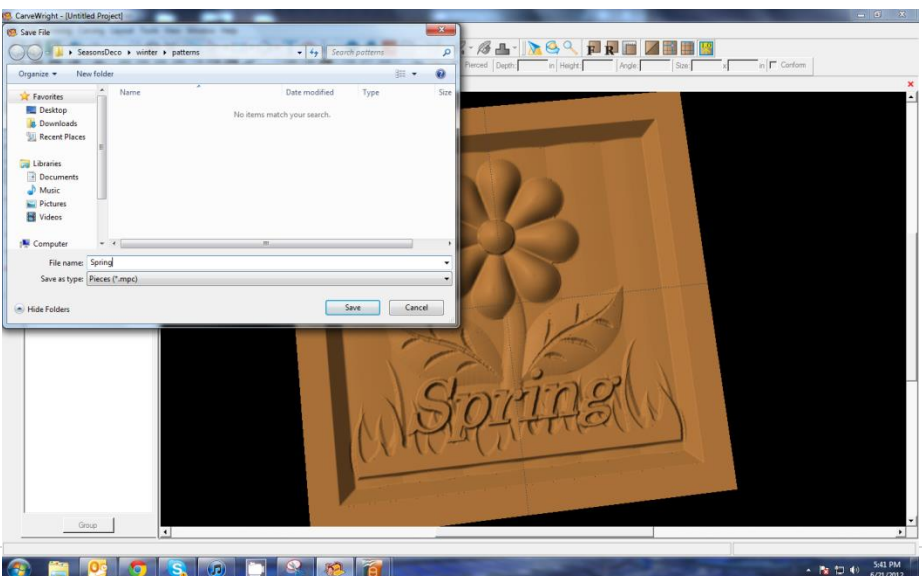
## ✓ UPLOADING TO MEMORY CARD

Make sure your Memory Card & Programmer are properly attached via your USB port, Select “File” > “Upload” to save to your memory card.



Select Quality Setting

- DRAFT
- NORMAL
- BEST
- OPTIMUM



*These settings determine the number of passes the machine makes to carve your project. The more lines the better the surface finish. Make your decision based on material type, fondness of sanding vs. machine time, & test carve vs. final. Notice the estimated carving time differs by quality setting.*

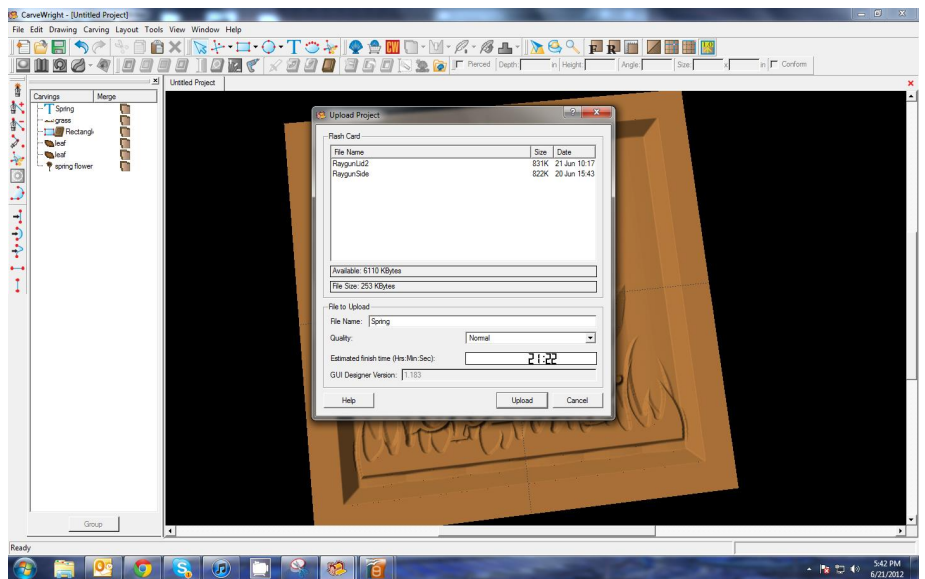
Name Your Project

*Example:*

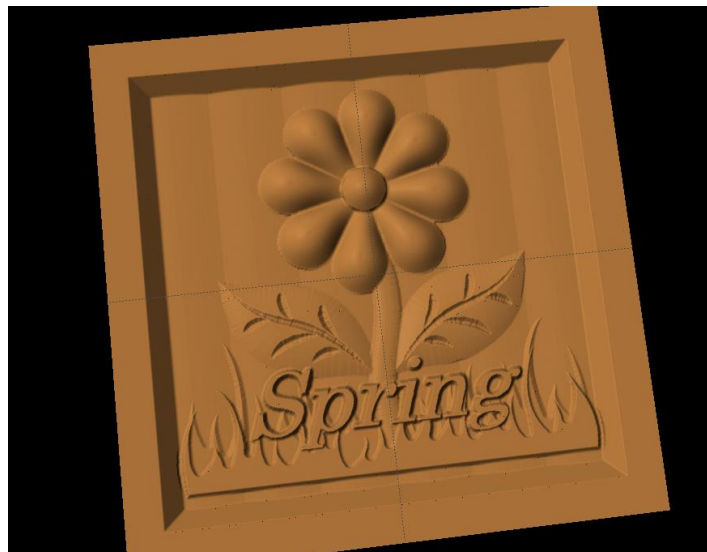
*springbloom\_N\_45m*

*(recognizable name\_quality  
setting\_estimated time to carve)*

Click "Upload"



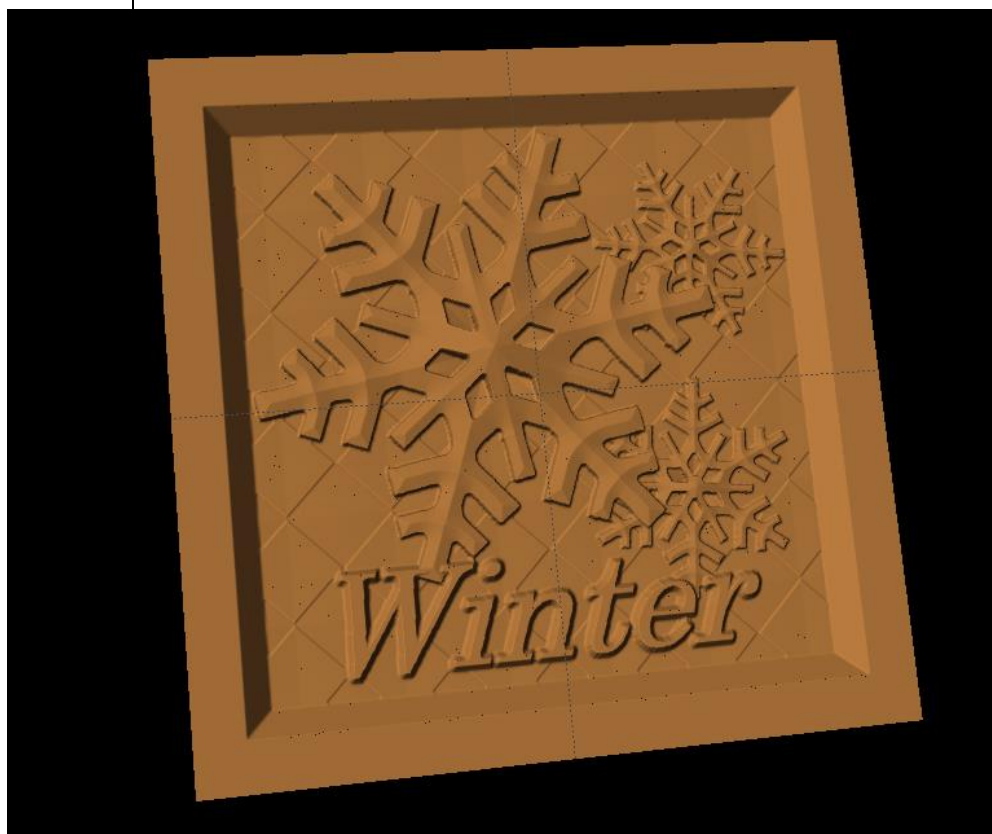
NOTE: Actual board to be placed in machine should be 7" longer or you should use a sled that has 3.5 extra inches on each end to STAY UNDER THE ROLLERS.



## WINTER SNOWFLAKE

This project covers the following design concepts:

- ✓ STARTING SOFTWARE
- ✓ MENUS, TOOLBARS, SHORTCUT KEYS OR MOUSE BUTTONS
- ✓ MANIPULATING THE WORKPIECE
- ✓ SNAP TO GRID
- ✓ DRAWING TOOLS
- ✓ CARVE REGION
- ✓ FEATHERING
- ✓ PATTERN PLACEMENT
- ✓ ROTATE ELEMENT
- ✓ COPY & PASTE
- ✓ ADJUSTING HEIGHT
- ✓ TEXT TOOL
- ✓ FINE TUNING
- ✓ ADJUSTING DEPTH
- ✓ TEXTURE
- ✓ BOARD SETTINGS
- ✓ MANAGING DATA
- ✓ UPLOADING TO MEMORY CARD
- ✓ SELECT QUALITY SETTING
- ✓ NAME PROJECT



## INSTRUCTIONS:

### ✓ STARTING THE SOFTWARE

Open the CarveWright Project Designer Software

*The Welcome screen appears with project options.*



Select “New Project”

Set your project board dimensions.

Length: 7”

Width: 7”

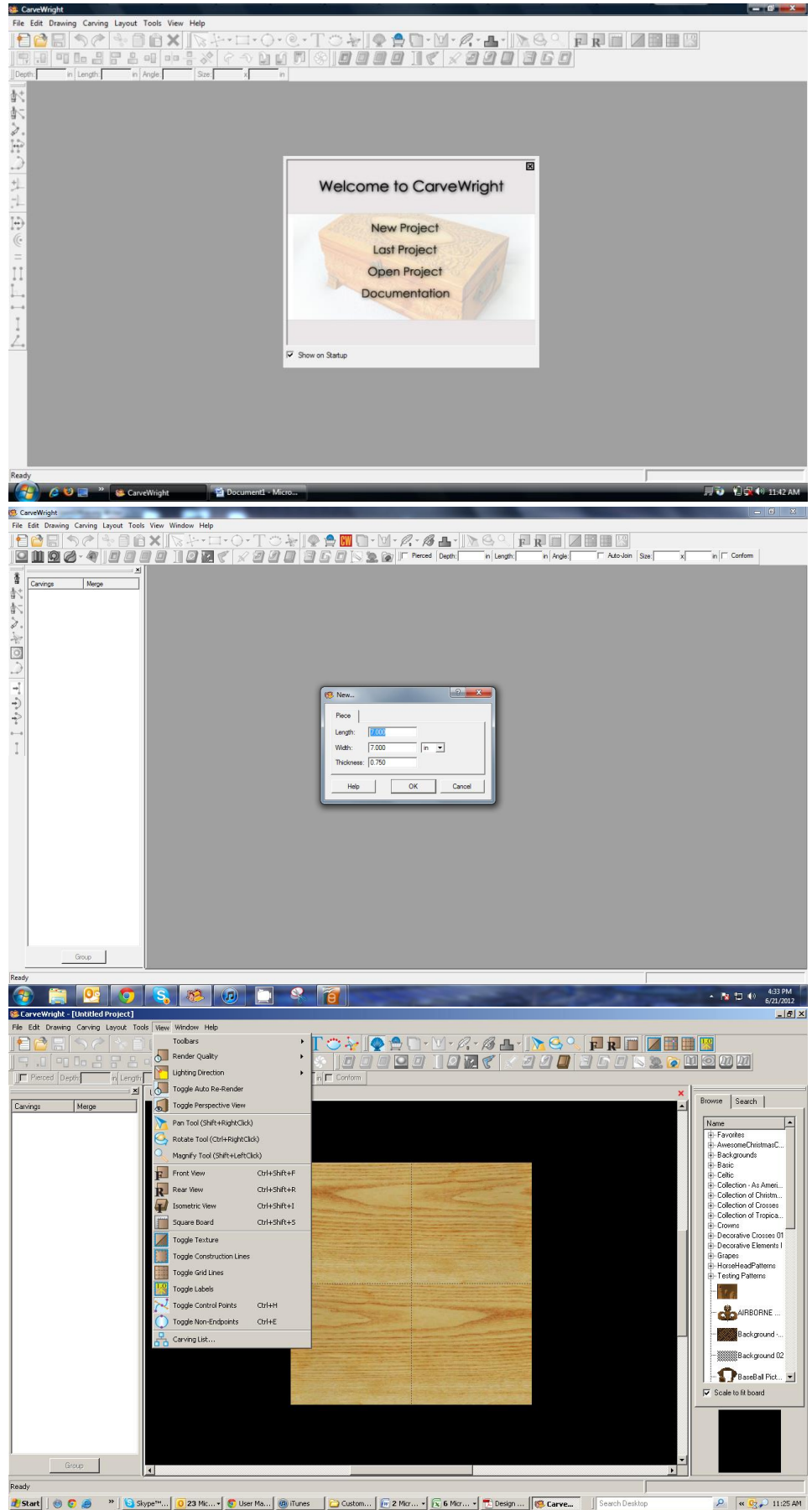
Thickness: .75”

Click OK

*The project board size is not necessarily the actual size of the board being put into machine.*

### ✓ MENUS, TOOLBARS, SHORTCUT KEYS OR MOUSE BUTTONS

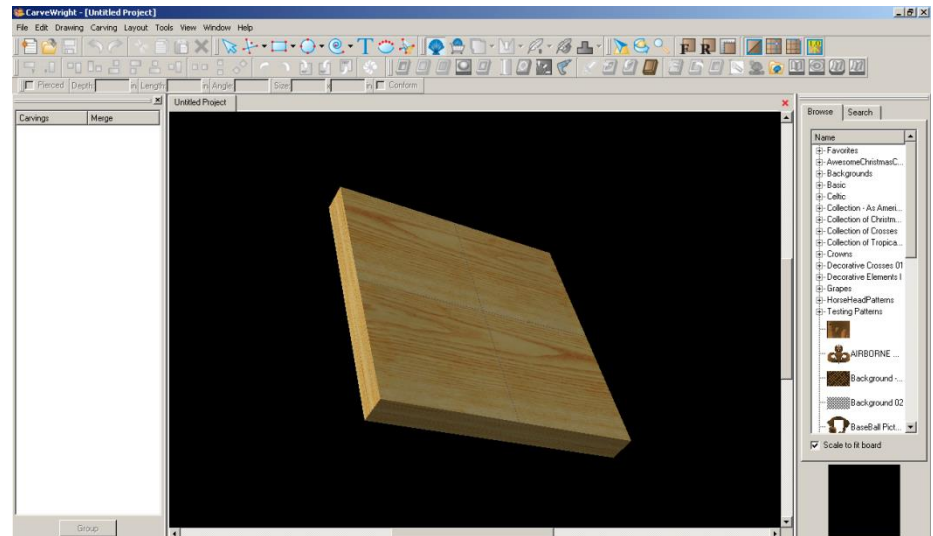
*For every software function, we provide you three distinct ways to access that function. They are usually menu, icon or right-click. Some common functions, such as Copy and Paste, also use shortcut keys. These will also work in Project Designer.*





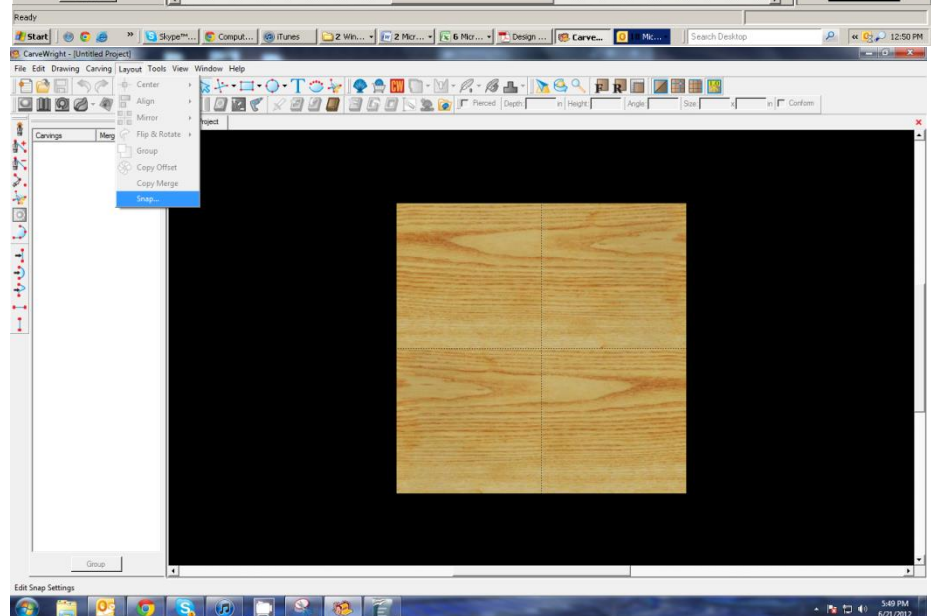
## ✓ MANIPULATING THE WORKPIECE

Board piece will display on screen in three dimensions. You can use these tools to get a different view of your project board.



## ✓ SNAP TO GRID

Under LAYOUT menu, select SNAP.

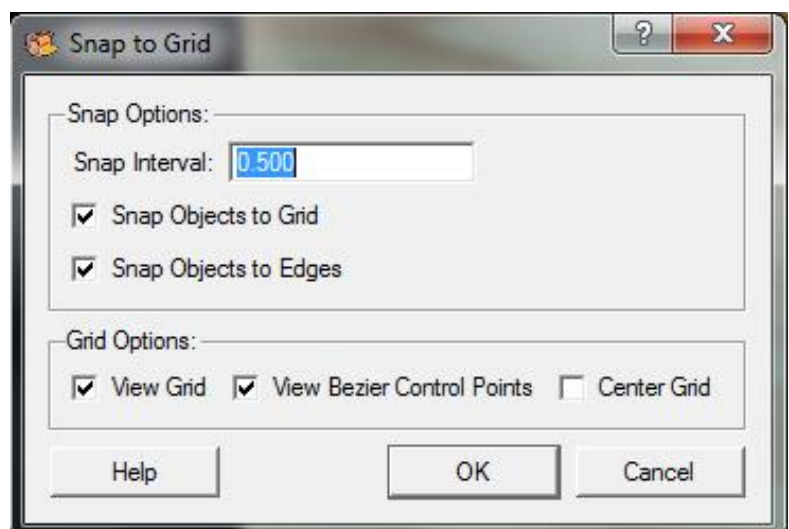


Snap Interval should be .5 inch interval by default.

Check boxes:

- Snap to grid
- Snap to edges
- View grid
- View Bezier Control Points (should already be selected as default)

Click ok

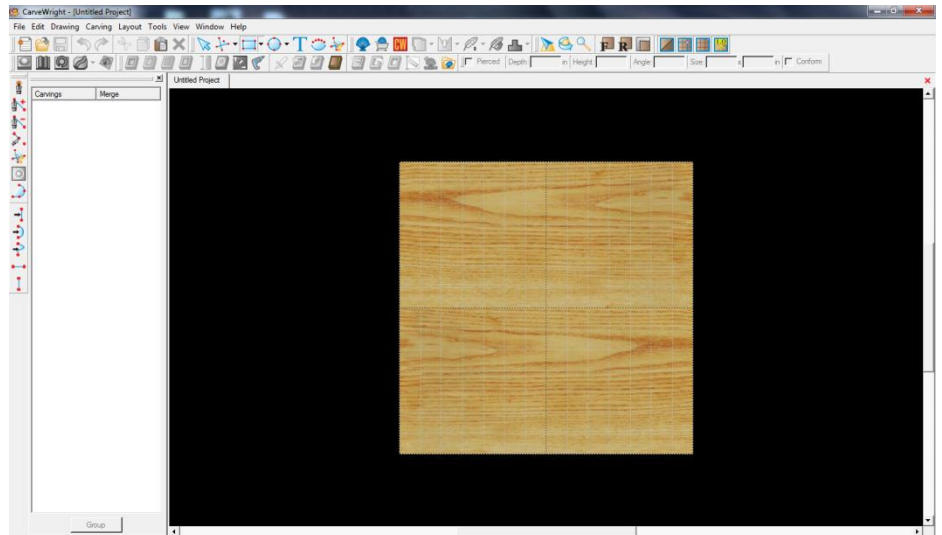


## ✓ DRAWING TOOLS



Using the grid, draw a box or rectangle .5" inside the project board, which should give you a box that is 6" x 6".

Select the "Pattern Tool" icon to open the pattern library along the right side.

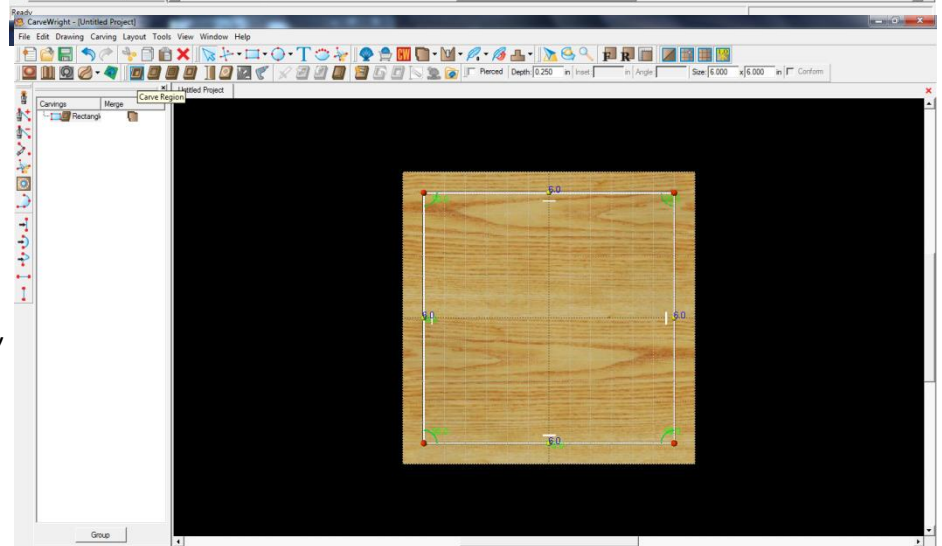


## ✓ CARVE REGION



Select "Carve Region" icon.

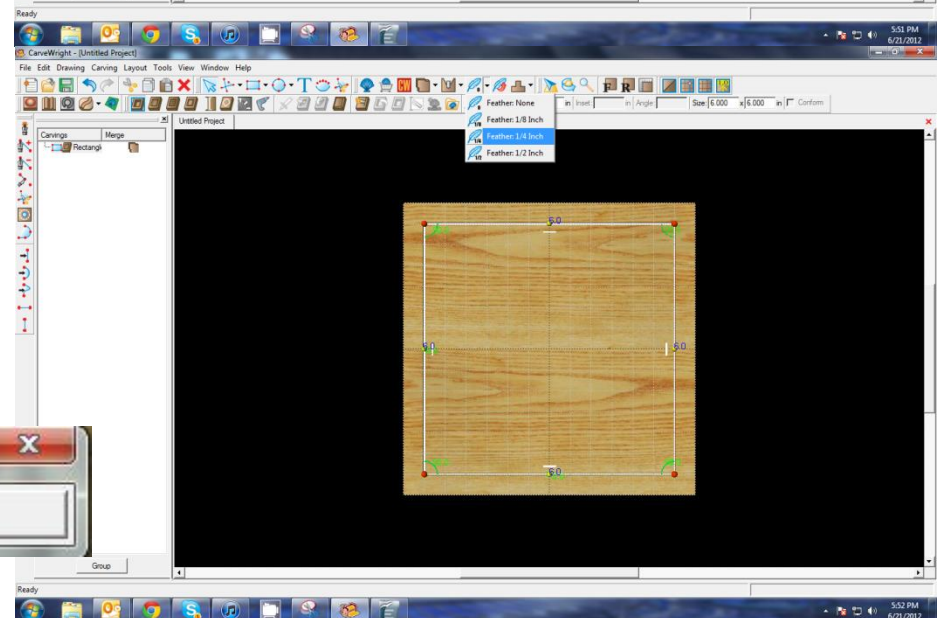
*This creates a carved out region inside the boundary. Automatically defaults to .250" depth. Remember depth of pattern & how depth effects carve time.*



## ✓ FEATHERING

Select the drop-down Feather menu and select 1/4" feather.

Select "Accept"



## ✓ PATTERN PLACEMENT



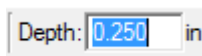
Select the “Pattern Tool” icon to open the pattern library along the right side.

Select “snowflake” under “Season Patterns” in your Favorites library from the winter folder.

*Click once on pattern and once on board to place or click and drag to the board.*

*Double-clicking will attempt to open it in Pattern Editor Software.*

Set depth of snowflake to .250”.

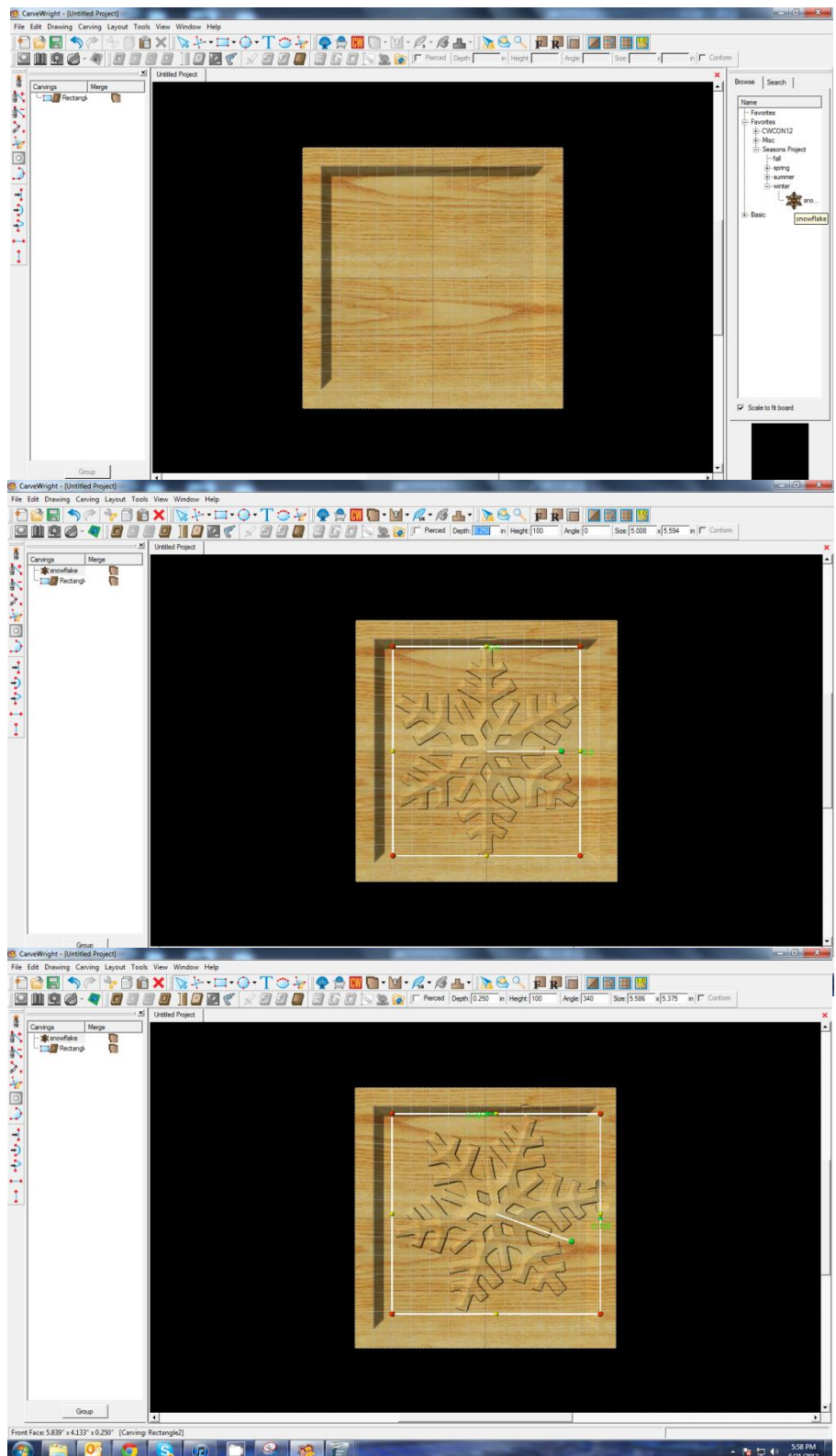


## ✓ ROTATE ELEMENT



Click on the green knob of the “Rotate” bar in the center of the element.

Rotate snowflake.





## ✓ PATTERN MANIPULATION



Use Red Nodes on the corner to Scale the element larger or smaller.

*Yellow nodes will stretch or skew the element.*

## ✓ SNAP TO GRID



Click "Toggle Snap to Grid" icon to turn grid OFF.

## ✓ COPY & PASTE

With the snowflake selected, right-click and select copy.

Right-click again and select paste.

## ✓ PATTERN MANIPULATION

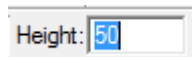


Use Red Nodes on the corner to Scale the element smaller.

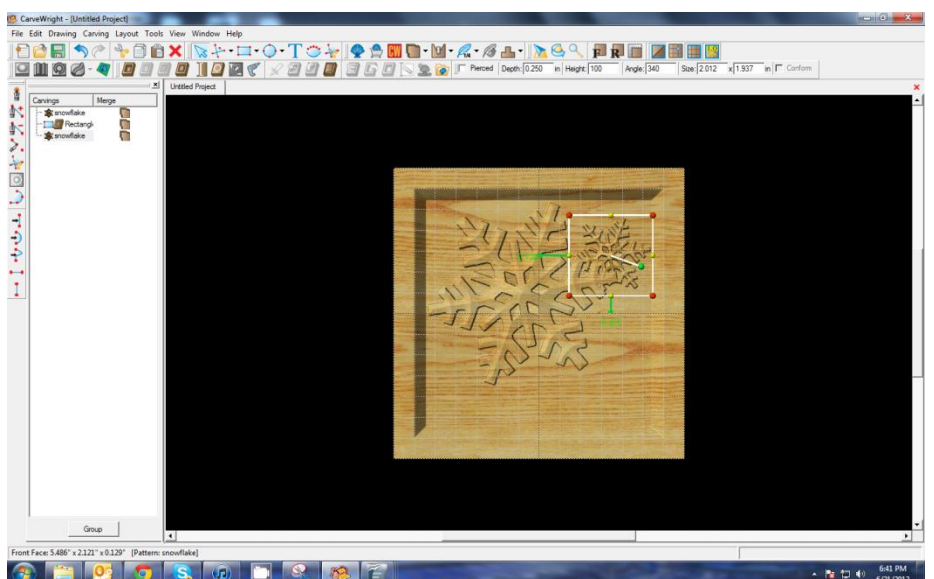
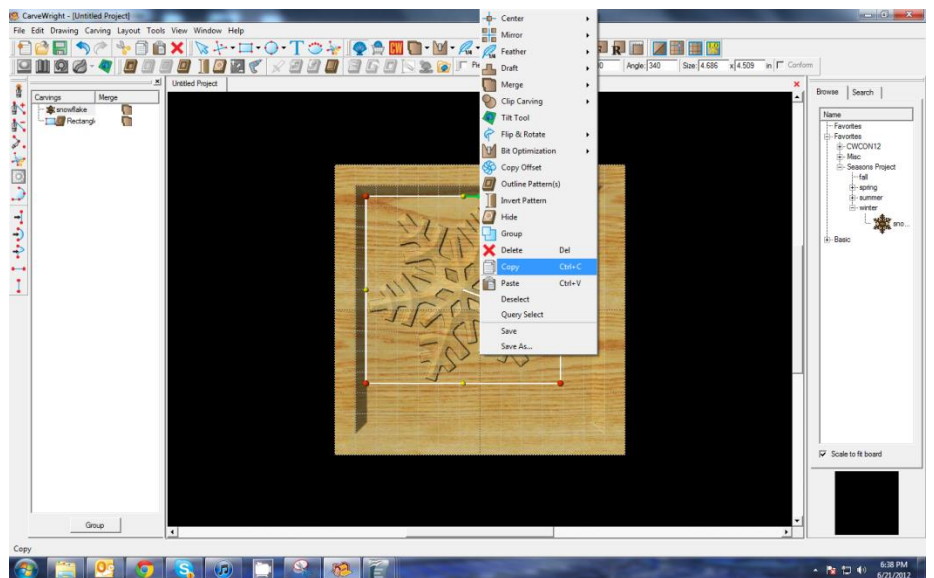
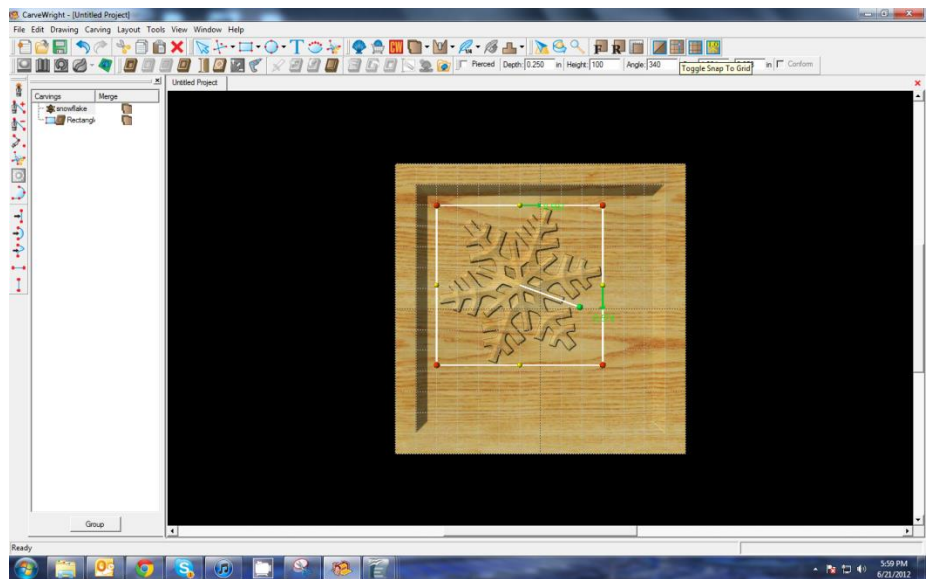
Use Rotate knob to rotate the pattern.

## ✓ ADJUSTING HEIGHT

Set the Height to .50.



*Adjusting height is useful in making the same elements look like they are behind or in front of other objects.*



## ✓ COPY & PASTE

Right-click again and select “Paste”.

*Since the last thing you copied was the snowflake, you do not need to copy it, again. It is still on your “Clipboard”.*

## ✓ PATTERN MANIPULATION

Manipulate the pattern, again, changing the rotation & size of it until you have it arranged as you would like.

## ✓ TEXT TOOL



Next, select the “Text Tool” and click on board.

Text dialog box will appear. Select from any of the true type fonts that you have on your computer. *Some work better than others.*

Type the word “Winter”

Select “Raster” from one of the available Rout Modes.

*Notice the other options available from “Text Tool”.*

## ✓ FINE TUNING

Manipulate the size and placement of the word, just as you would a pattern by scaling to size.

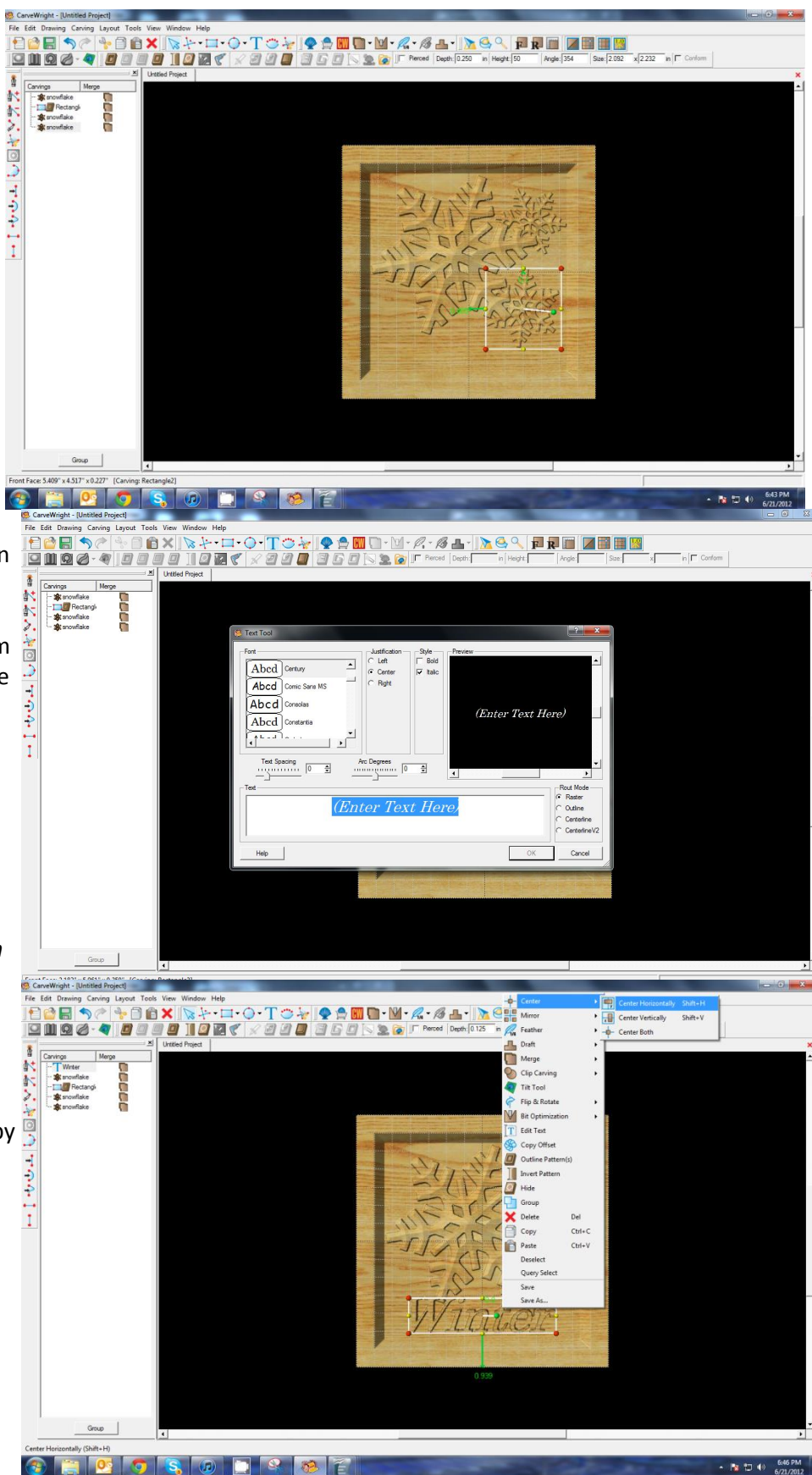
## ✓ CENTERING



Right-click to see available options and select Center > Horizontally.

## ✓ ADJUST DEPTH

Depth: 0.250 in





## ✓ TEXTURES

Select “Texture” tool.



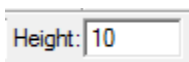
*Texture dialog box appears displaying a variety of available textures.*

Select “Peaks” and leave the interval at 1”

Click OK.

*Texture appears in the rectangular region, but is overtaking parts of the design.*

## ✓ ADJUSTING HEIGHT



Correct this by adjusting the Height to “10”.

*This sets the height low enough to not overpower the foreground objects.*

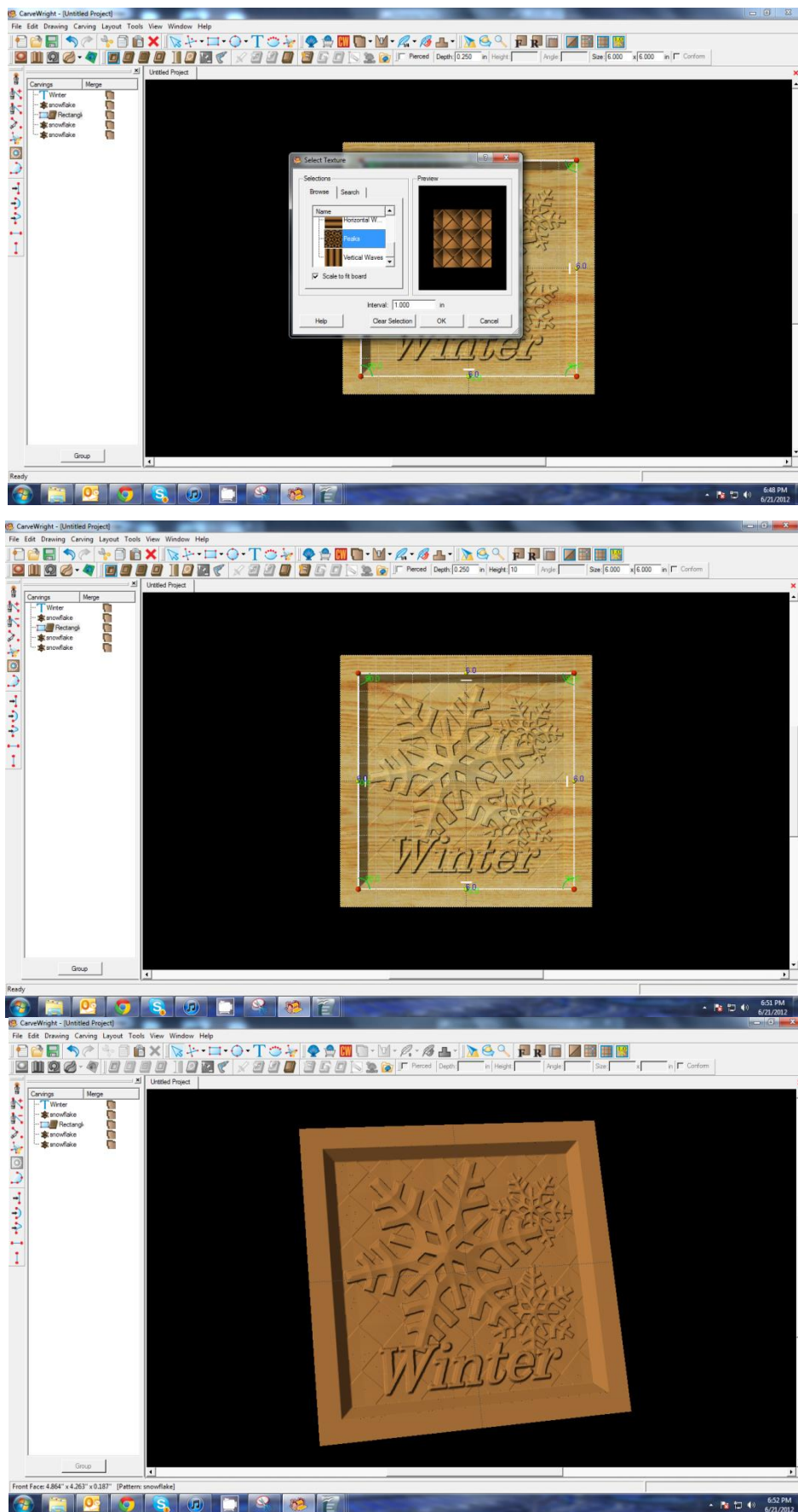
## ✓ BOARD SETTINGS

Go to View > Toggle Texture to remove wood grain for better viewing.

*Also look at View > Board Settings > Stain/Finish to see how you can change the Wood Type/Stain or Wood Finish. This is a great way to present a proposal to a potential customer.*



Rotate or zoom in on your project to view it from different angles and make any necessary adjustments.



## REMEMBER THESE FUNCTIONS FROM PREVIOUS STEP-BY-STEP PROJECTS

### ✓ MANAGING DATA

Select “File” > “Save”



### \*\*\*\*\*IMPORTANT\*\*\*\*\*

Once a project is uploaded to a memory card, it cannot be brought back from the memory card into the software. Always **SAVE YOUR PROJECT** on your hard drive. A Projects folder is recommended and you should know where you saved it.

### ✓ UPLOADING TO MEMORY CARD

Make sure your Memory Card



& Programmer are properly attached via your USB port, Select “File” > “Upload” to save to your memory card.

Select Quality Setting

- DRAFT
- NORMAL
- BEST
- OPTIMUM

*These settings determine the number of passes the machine makes to carve your project. The more lines the better the surface finish. Make your decision based on material type, fondness of sanding vs. machine time, & test carve vs. final. Notice the estimated carving time differs by quality setting.*

Name Your Project

*Example:*

*winterflake\_B\_1h45m*

*(recognizable name\_quality setting\_estimated time to carve)*

Click “Upload”

NOTE: Actual board to be placed in machine should be 7” longer or you should use a sled that has 3.5 extra inches on each end to STAY UNDER THE ROLLERS.

## MARTIAN RAY GUN

This project covers the following design concepts:

- ✓ STARTING SOFTWARE
- ✓ MENUS, TOOLBARS, SHORTCUT KEYS OR MOUSE BUTTONS
- ✓ DRAWING TOOLS
- ✓ CENTERING TOOLS
- ✓ CARVE REGION
- ✓ PATTERN PLACEMENT
- ✓ CREATING A RAISED REGION
- ✓ CHANGE DISPLAY
- ✓ TEXT TOOL
- ✓ USING THE CARVING LIST
- ✓ CREATING A TEXTURE
- ✓ GROUP PATTERNS
- ✓ MANAGING DATA



## INSTRUCTIONS:

### ✓ STARTING THE SOFTWARE

Open the CarveWright Project Designer Software

*The Welcome screen appears with project options.*



Select "New Project"

Set your project board dimensions.

Length: 15"

Width: 10"

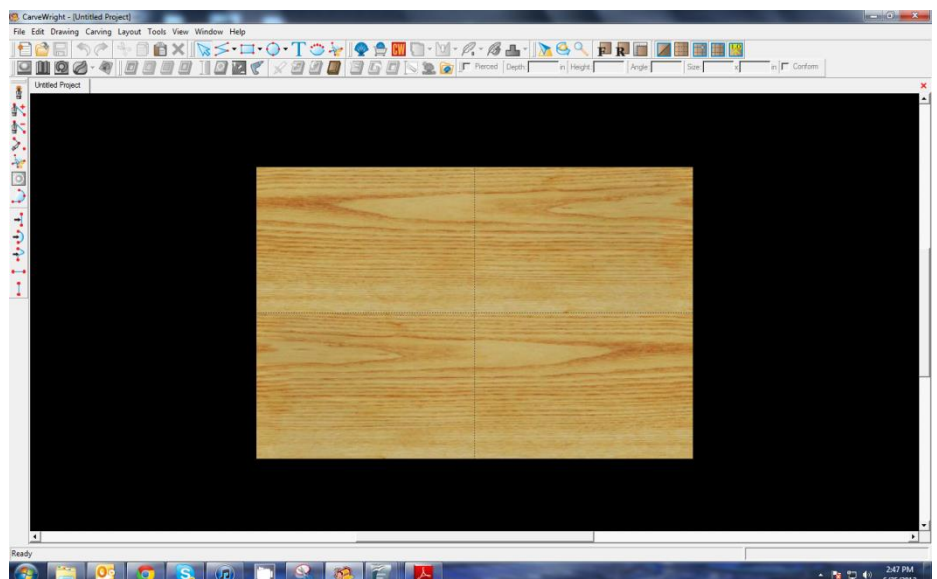
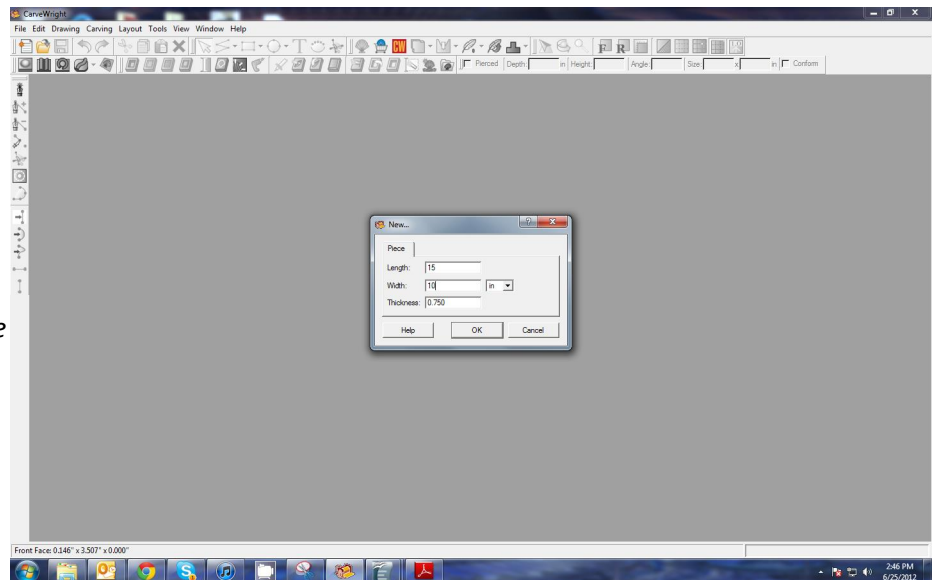
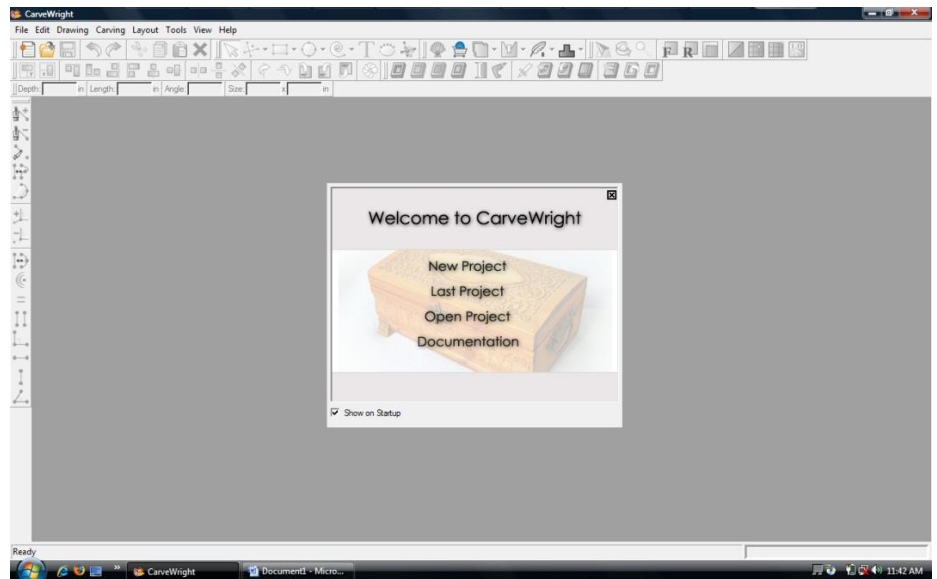
Thickness: 0.75"

Click OK

*The project board size is not necessarily the actual size of the board being put into machine for carving.*

### ✓ MENUS, TOOLBARS, SHORTCUT KEYS OR MOUSE BUTTONS

*For every software function, we provide you three distinct ways to access that function. They are usually menu, icon or right-click. Some common functions, such as Copy and Paste, also use shortcut keys. These will also work in Project Designer.*

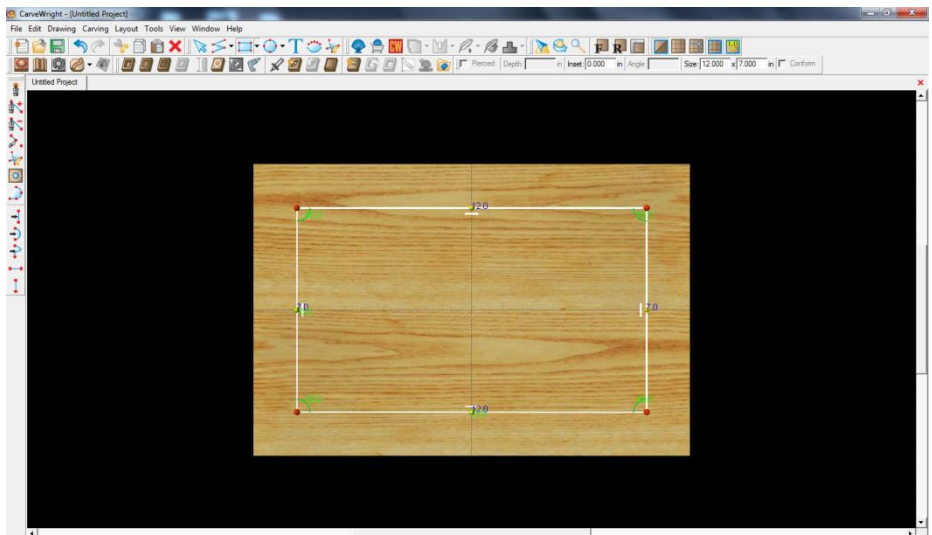
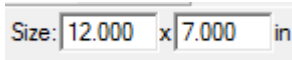


## ✓ DRAWING TOOLS



Using the rectangle tool create a box on the front face of the work piece.

Resize the box to be 12" long and 7" tall using the Sizing box found on the toolbar.

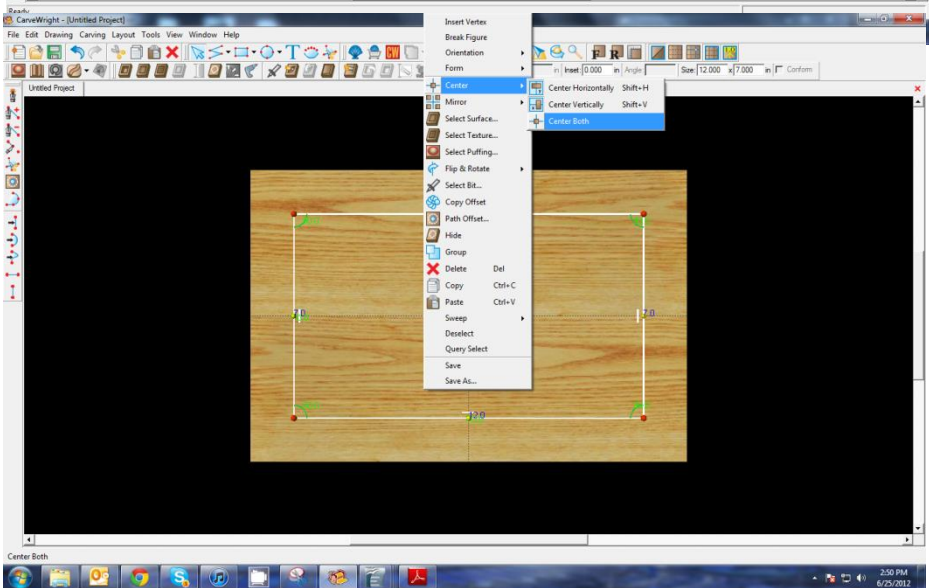


## ✓ CENTERING TOOLS



With the rectangle selected, right-click to bring up menu of available options.

Select "Center" > "Center Both"

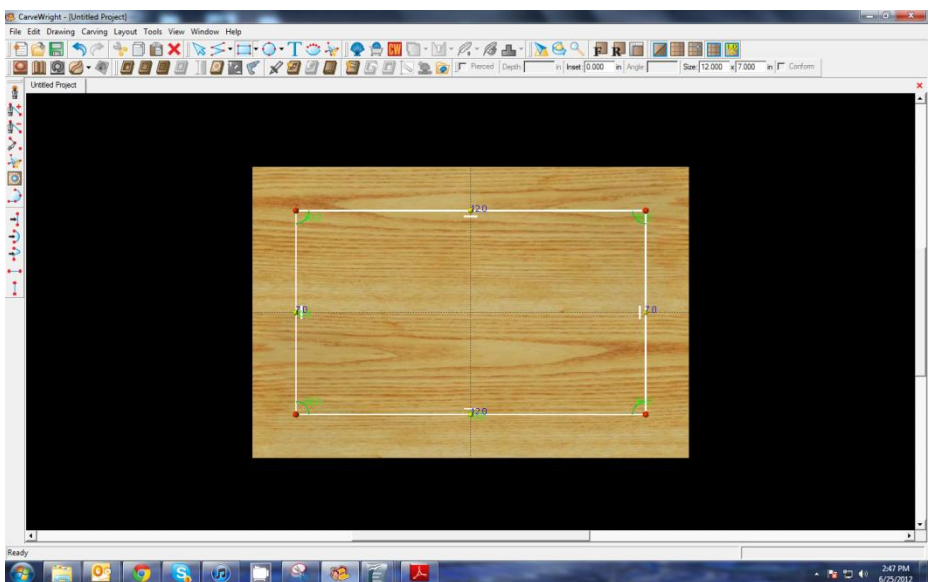


## ✓ CARVE REGION



Select "Carve Region" icon.

*This creates a carved out region inside the boundary. Automatically defaults to .250" depth. Remember depth of pattern & how depth effects carve time.*





## ✓ PATTERN PLACEMENT



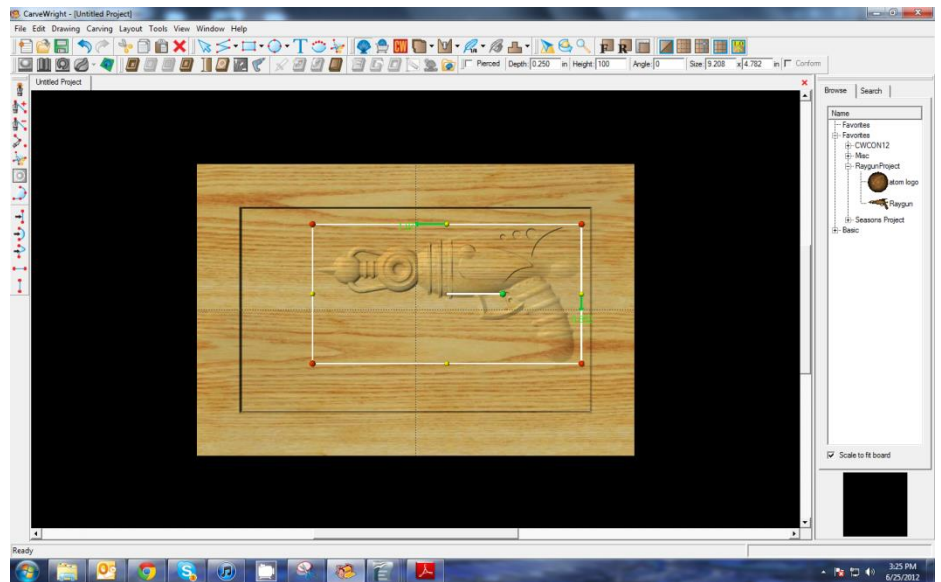
Select the “Pattern Tool” icon to open the pattern library along the right side.

Select “Raygun” under “RaygunProject” folder in your Favorites.

*Click once on pattern and once on board to place or click and drag to the board.*

*Double-clicking will attempt to open it in Pattern Editor Software.*

Place the Raygun pattern onto the board



With the Raygun pattern still highlighted, change its length dimension to 9”, set its height to 999, and set the depth to .25”. All of these variables can be found in the size box on the top toolbars.

Depth: 0.250 in Height: 999 Angle: 0 Size: 9.000 x 4.674 in

Click on the “Atom Logo” in the pattern library and place it on the board in front of the Raygun

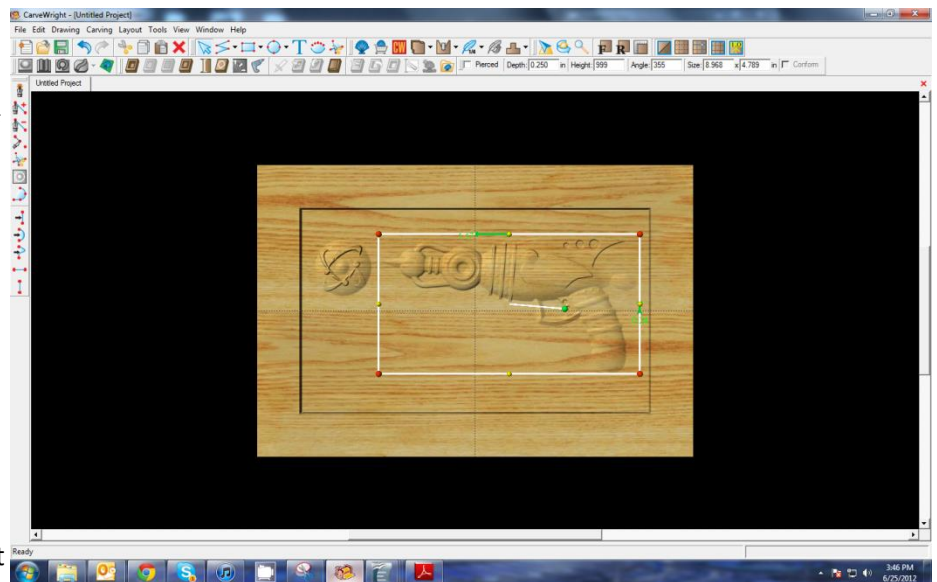
Set its depth to .25”

Rotate the Raygun pattern slightly. You can do this by using grabbing and dragging the center green handle



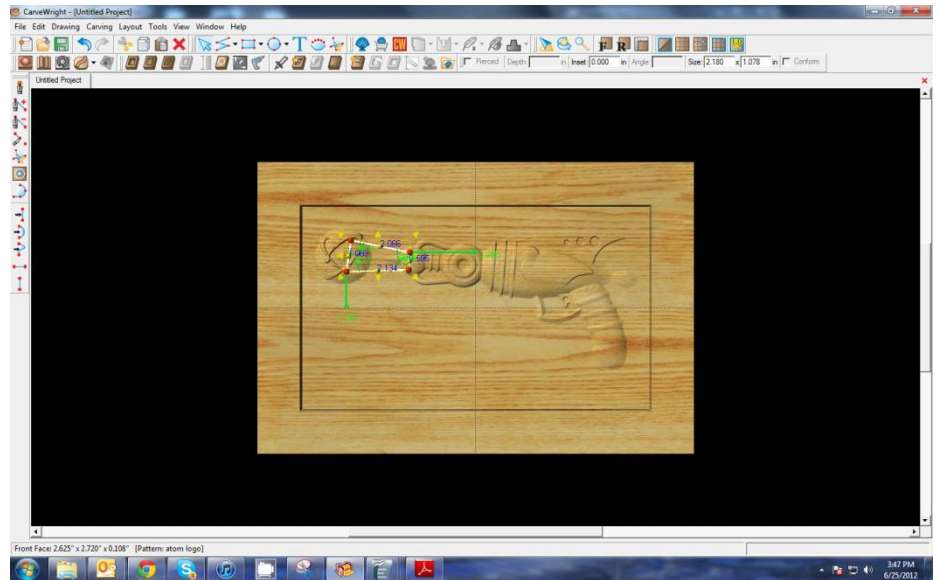
OR by inputting an angle in the Angle Input Box on the toolbar.

Angle: 355



## ✓ CREATING A RAISED REGION

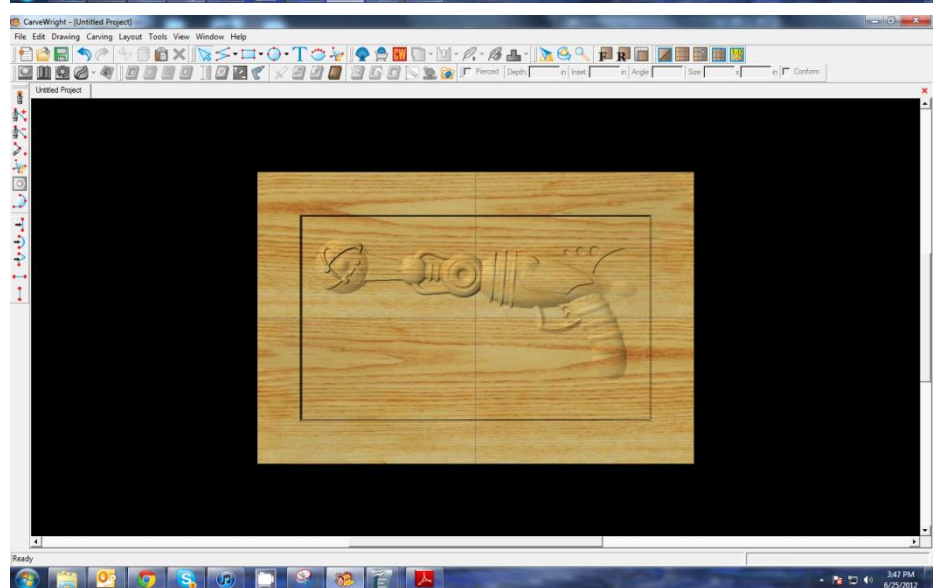
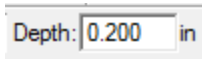
With the connected line tool, draw a tapered shape coming from the Raygun to the Atom logo.



## ✓ CARVE REGION

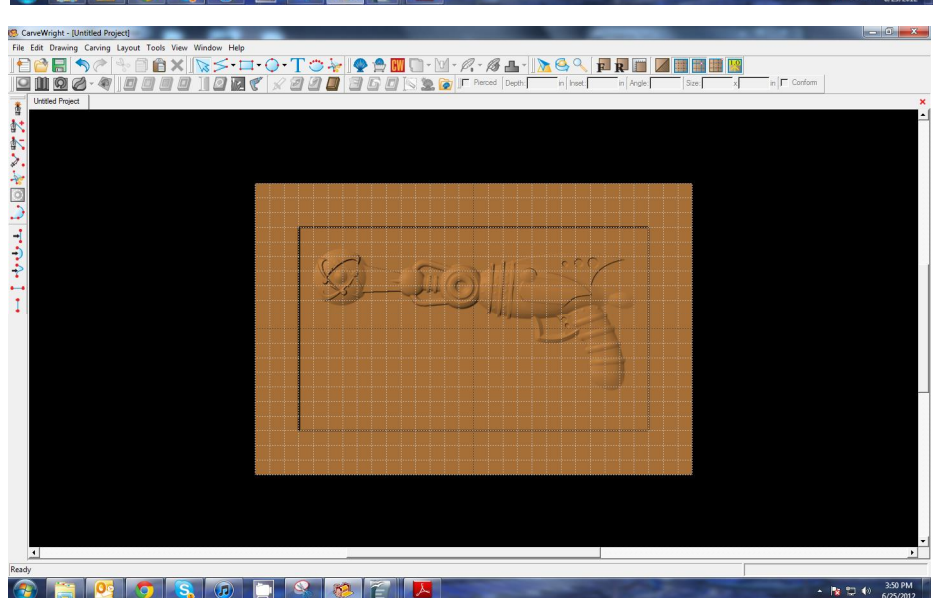


Select “Carve Region” icon and set the depth to .2”.



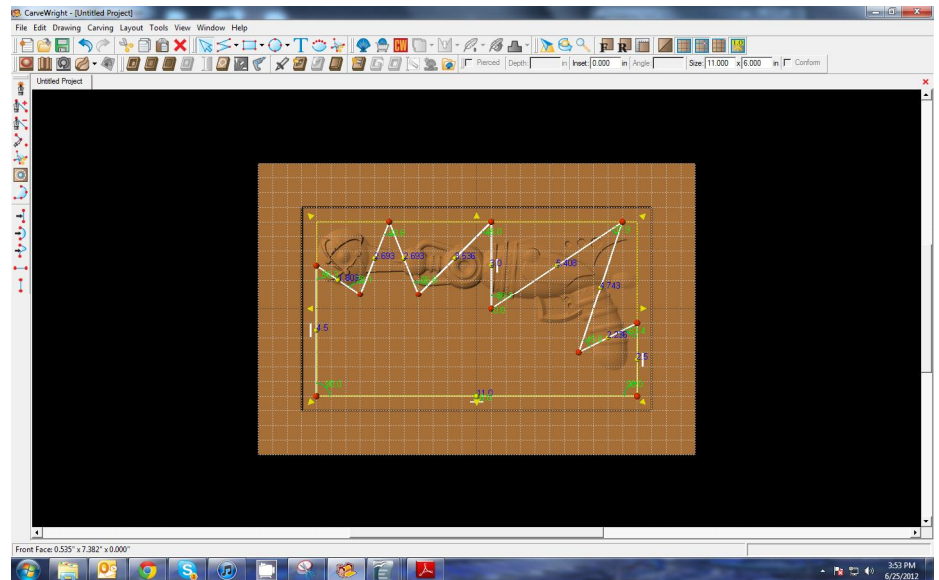
## ✓ CHANGE DISPLAY

Using the icons in the view toolbar, toggle texture off, toggle grid on, and toggle the snap to grid.



## ✓ CREATING A RAISED REGION

Select connected line tool again and draw starburst shape centered to the lower left.

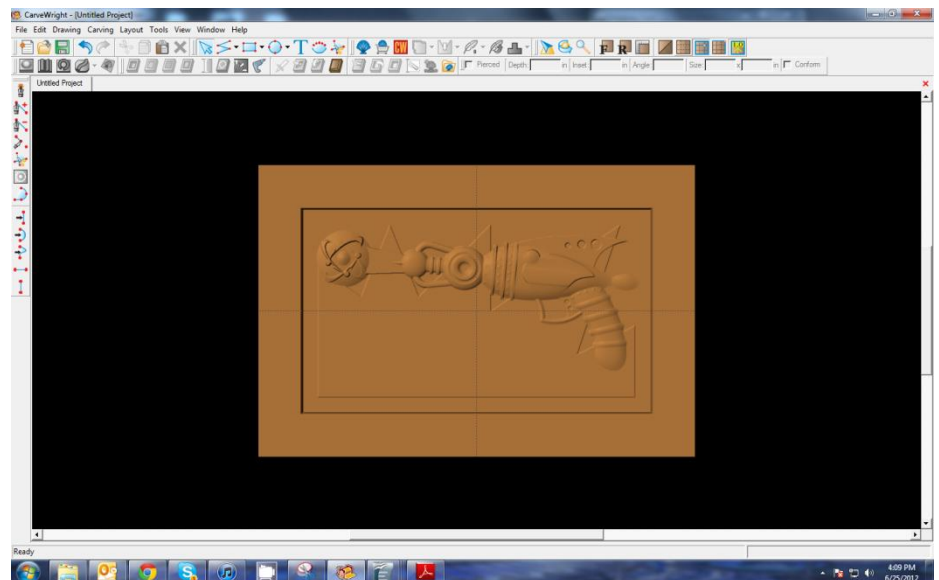


## ✓ CARVE REGION



Select “Carve Region” icon and set the depth of the starburst to .23”.

Depth: 0.230 in

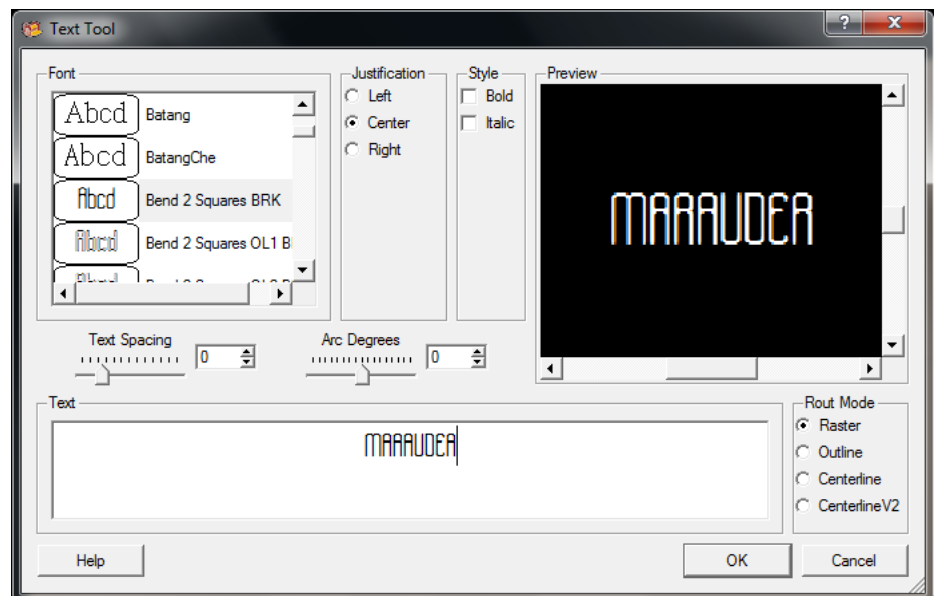


## ✓ TEXT TOOL



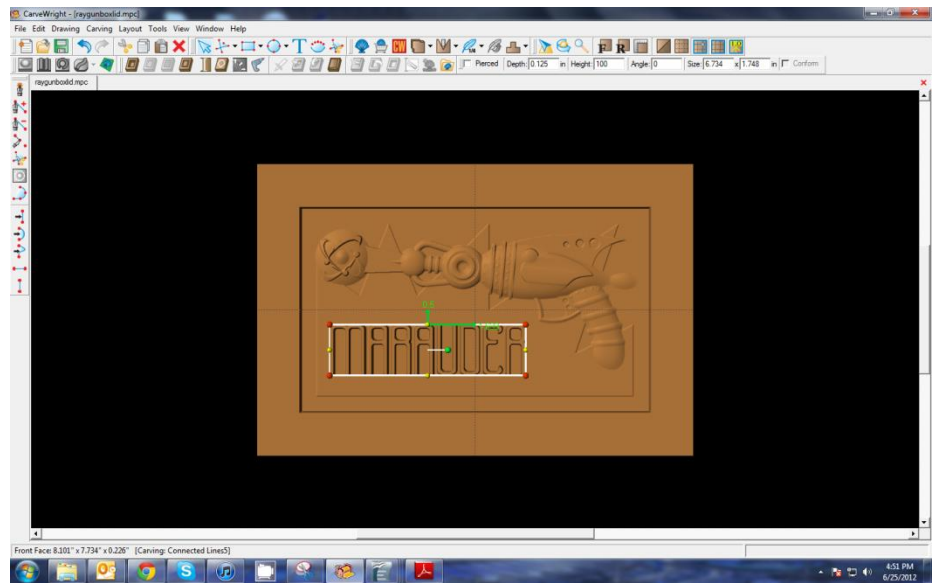
Next, select the “Text Tool” and click on board.

Text dialog box will appear. Choose your font and type the name of your Raygun and click on OK (We call ours MAAARAUDER and use a font called Bend2Squares downloaded for free from urbanfonts.com)

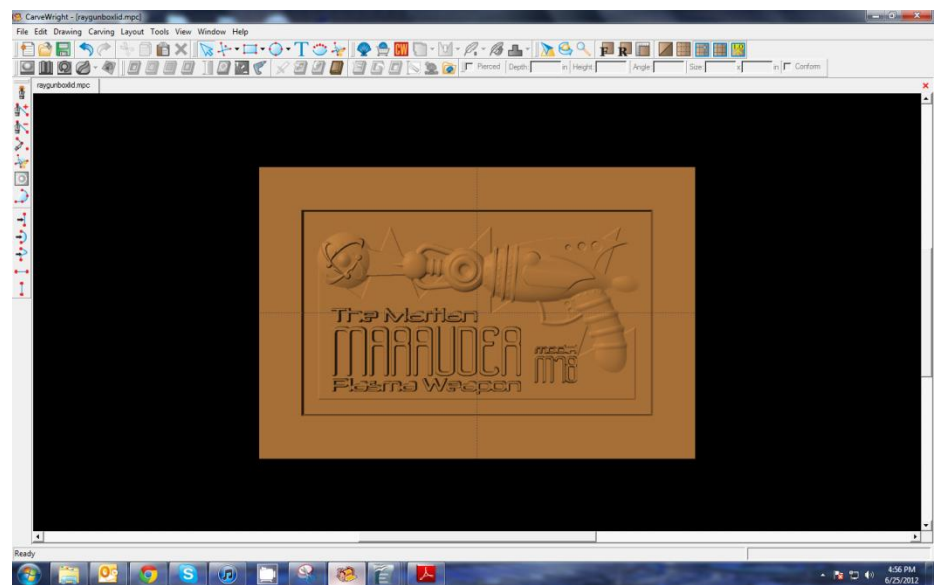
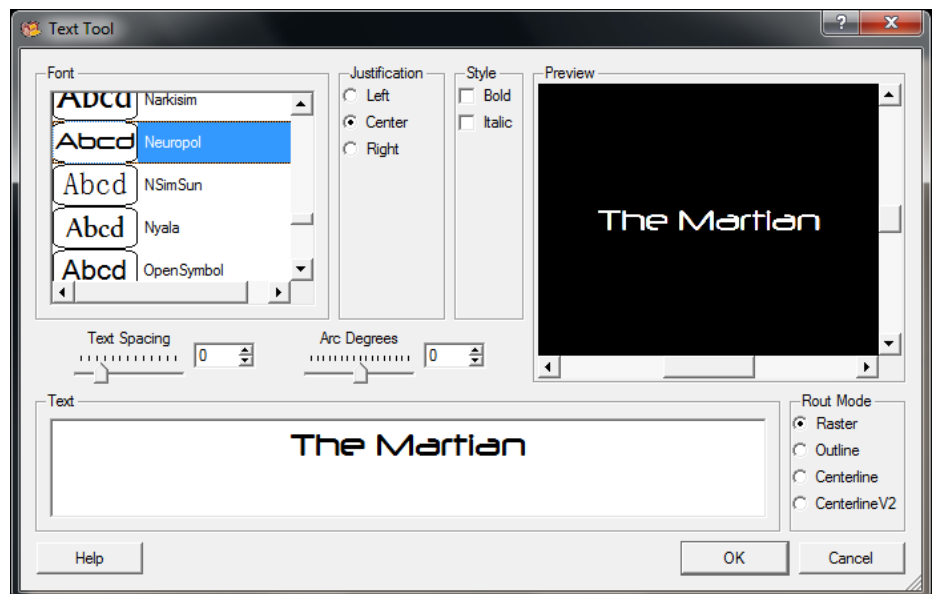


Select “Raster” from one of the available Rout Modes.

Scale the text and position it on the board.



Add more text where desired using the above steps. (The other font used is Neuropol and was free at dafont.com)





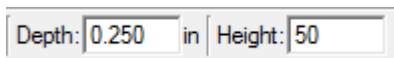
## ✓ USING THE CARVING LIST

Now with all your text placed, open the carving list by selecting the “carving list” icon on the toolbar.



From the carving list, select all of the text elements.

Set their depth to .25” and the height to 50.

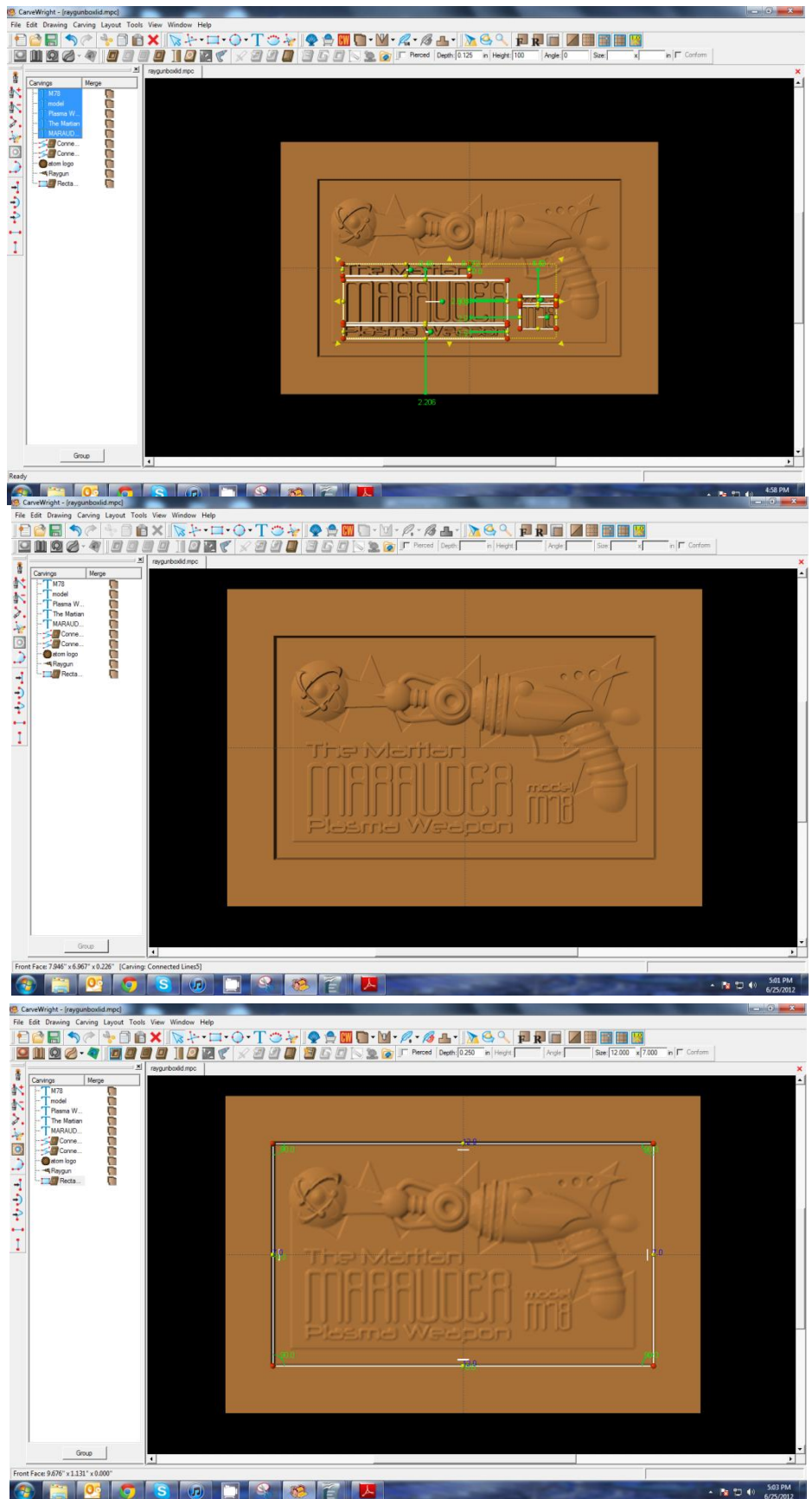


Set the draft of the text to medium using the “Draft” icon found on the toolbar.



## ✓ CREATING A TEXTURE

Select the background region that you created earlier and select the “texture” icon from the toolbar

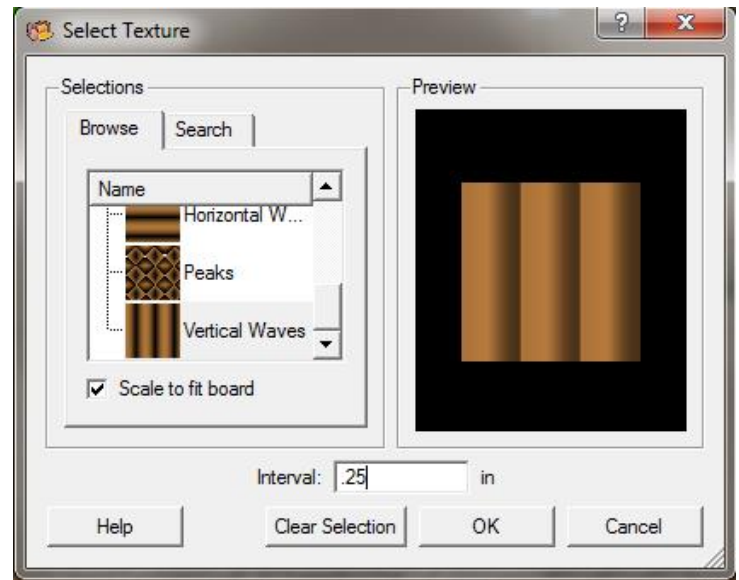




*The Texture dialog box appears displaying a variety of available textures.*

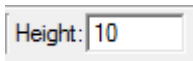
Select the Vertical Waves texture and set the interval to .25"

Click OK.

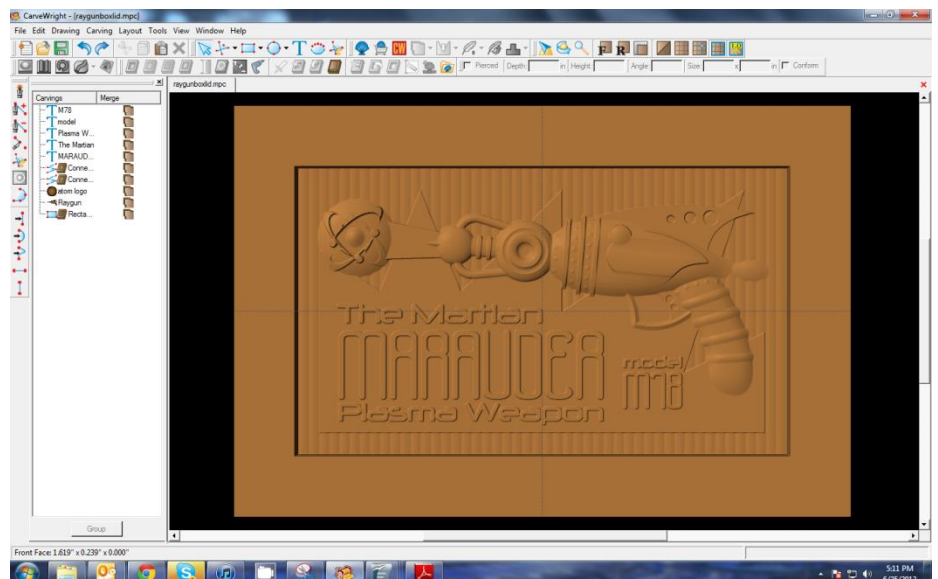
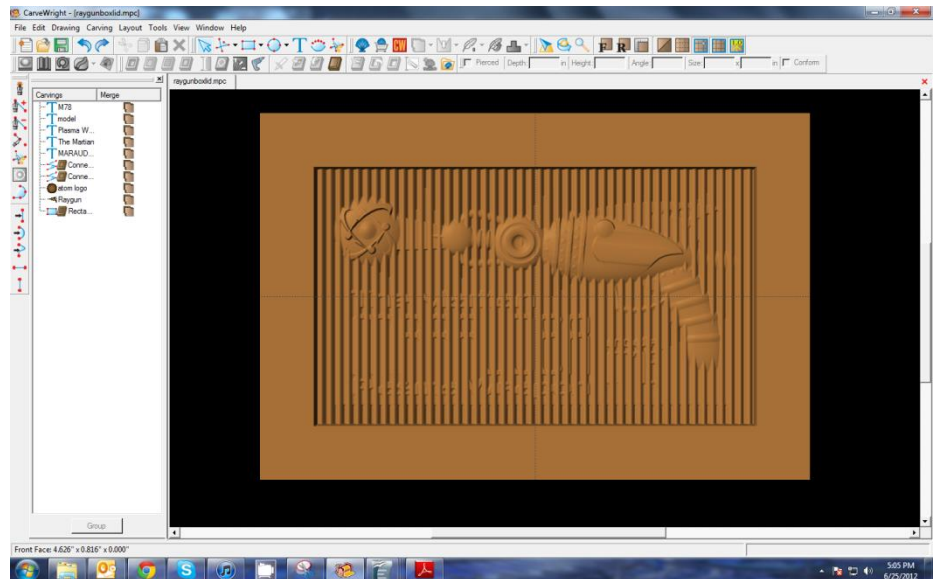


*The texture appears in the rectangular region, but is overtaking parts of the design.*

Correct this by adjusting the Height to "10".

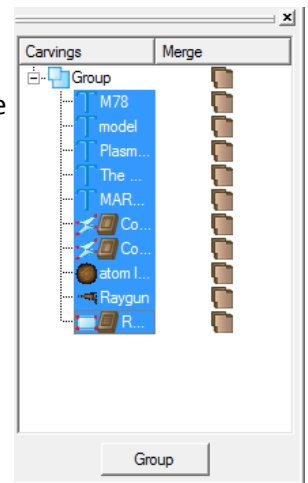


*This sets the height low enough to not overpower the foreground objects.*



## ✓ GROUP PATTERNS

In the carving list select everything that is in it and select the group button at the bottom of the list.



## ✓ MANAGING DATA

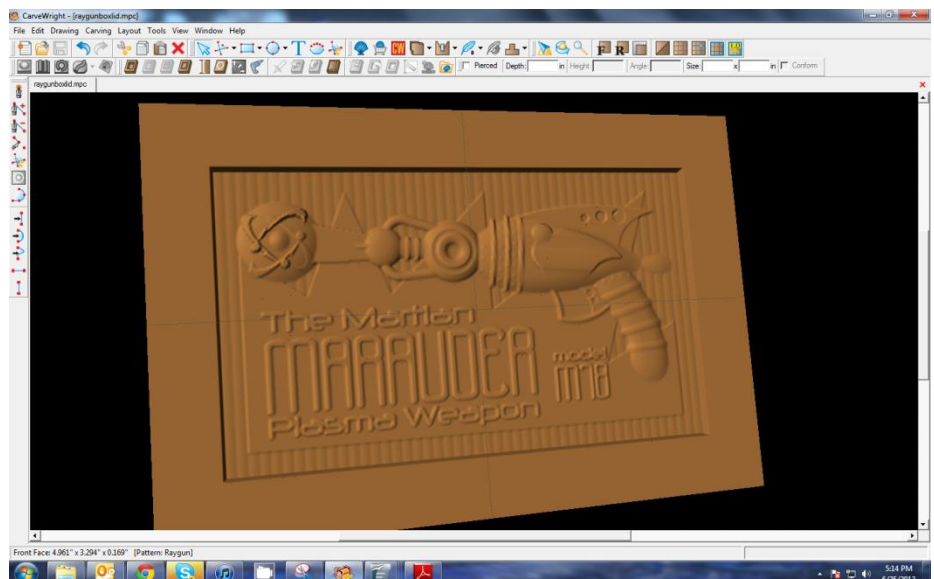
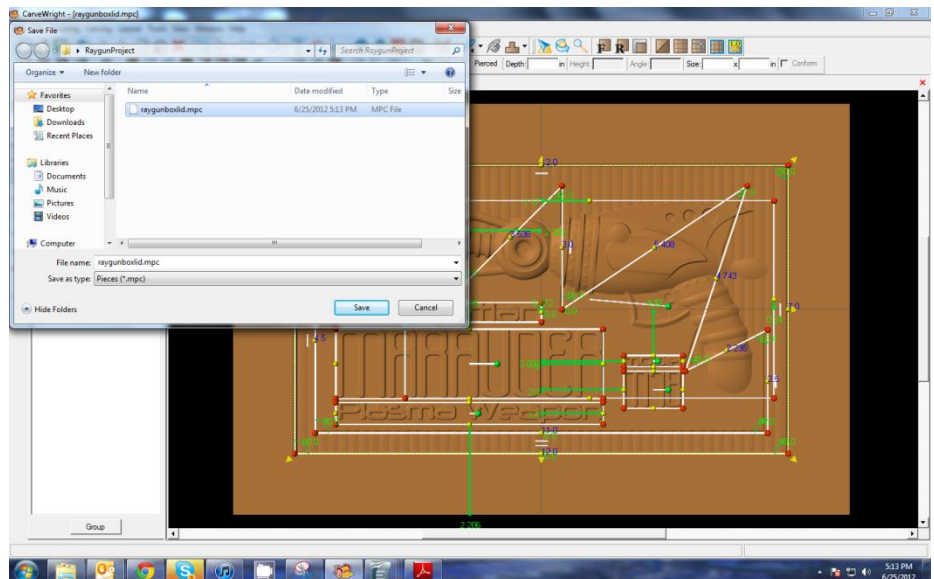
Save the project as Raygun box lid and we'll revisit it in a later project.

Select "File" > "Save"



### \*\*\*\*\*IMPORTANT\*\*\*\*\*

Once a project is uploaded to a memory card, it cannot be brought back from the memory card into the software. Always **SAVE YOUR PROJECT** on your hard drive. A Projects folder is recommended and you should know where you saved it.



## HOUSE NUMBER SIGN

This project covers the following design concepts:

- DRAWING TOOLS
- SNAP TO GRID
- SETTING CONSTRAINTS
- CUT PATH TOOL
- CENTERLINE TEXT
- COPY & PASTE
- FLIP & ROTATE
- CREATING A CLOSED REGION
- MANAGING DATA
- STAYING UNDER ROLLERS
- UPLOADING TO MEMORY CARD



INSTRUCTIONS:

## ➤ STARTING THE SOFTWARE

Open the CarveWright Designer Software

The Welcome screen appears with project options.



Select “New Project”

Set your board piece dimensions.

Length: 12”

Width: 5.5”

Thickness: .75”

Click ok

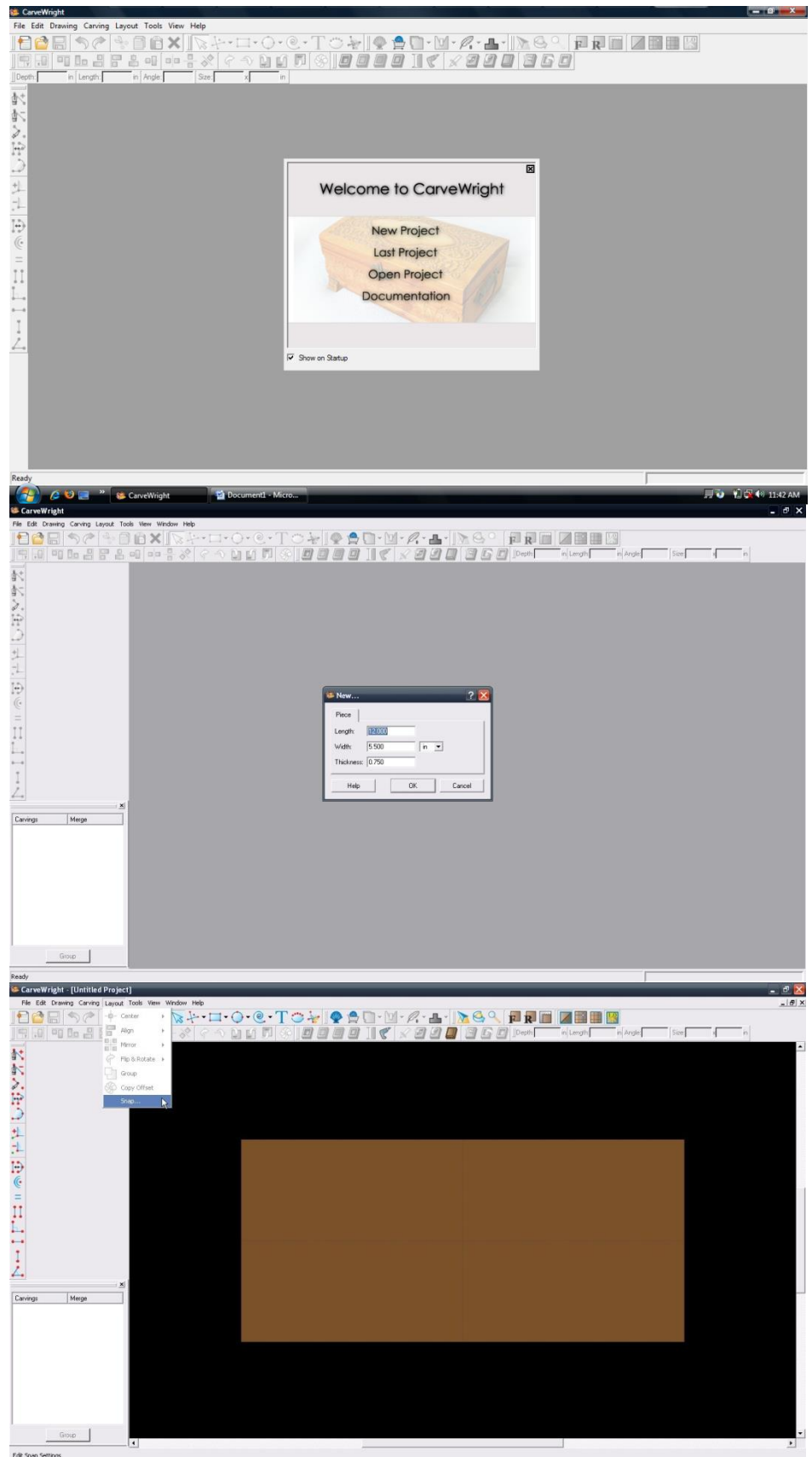
## ➤ BOARD SETTINGS



Use “Toggle Texture” to remove wood grain for better viewing.

## ➤ SNAP TO GRID

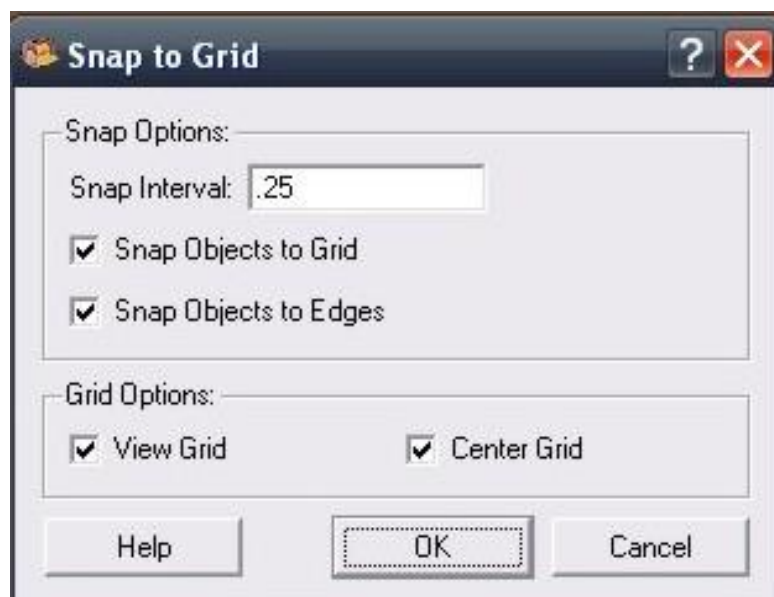
Go to the menu bar and click “Layout” then select “Snap...”



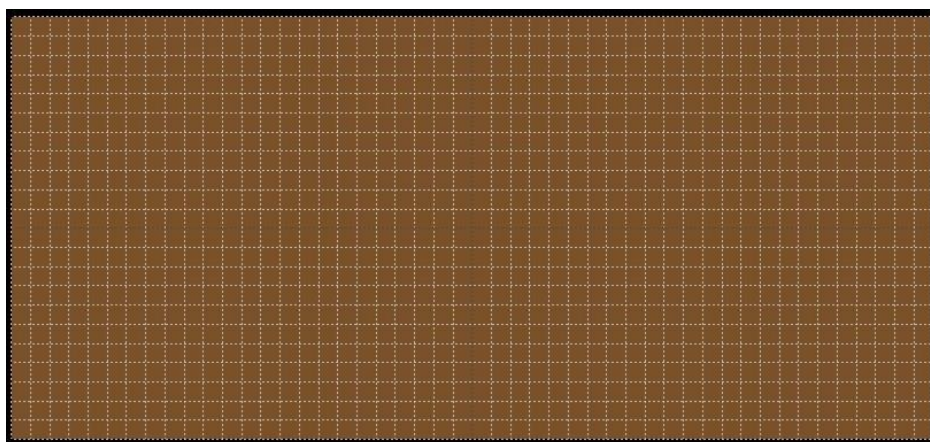
From the “Snap to Grid” dialog box change the “Snap Interval” to “.025”.

Check Snap Objects to Grid; Snap Objects to Edges; View Grid & Center Grid

Click “OK”



On your work piece you should now see a set of grid lines.

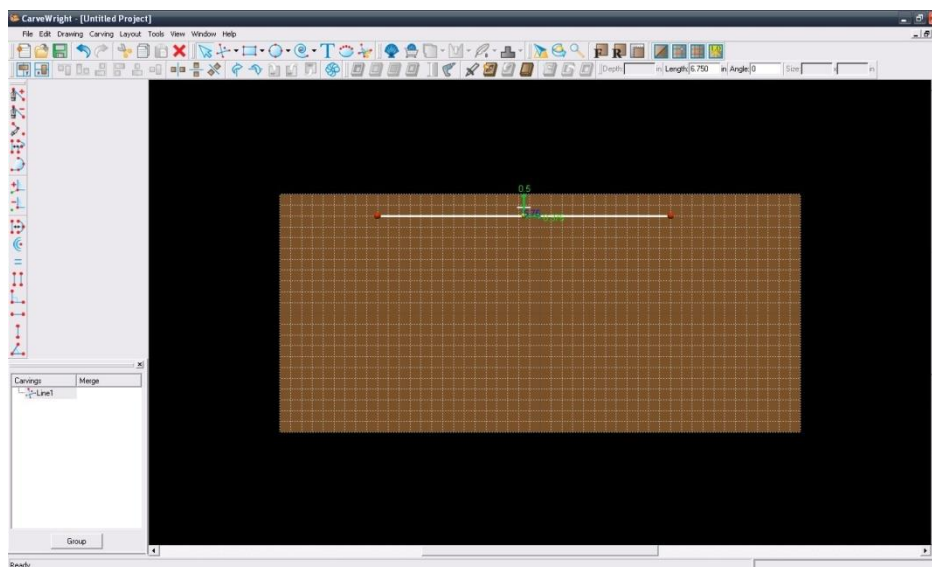


#### ✓ DRAWING TOOLS



Select the “Line Segment Tool”.

Draw a horizontal line on the board on the second gridline from the top. The vertical green arrow shows the distance from the element to the top (or edge) of the board. Move the element or change the number to “.05”.





## ✓ CONSTRAINTS

In the “Length” box or with the Blue Number type “8.0” and press Enter.

## ✓ DRAWING TOOLS



Click on the “Circle Drawing Tool” drop down menu and select the “Arc Tool”.

With your mouse pointer place your cursor over the left red node on your horizontal line.

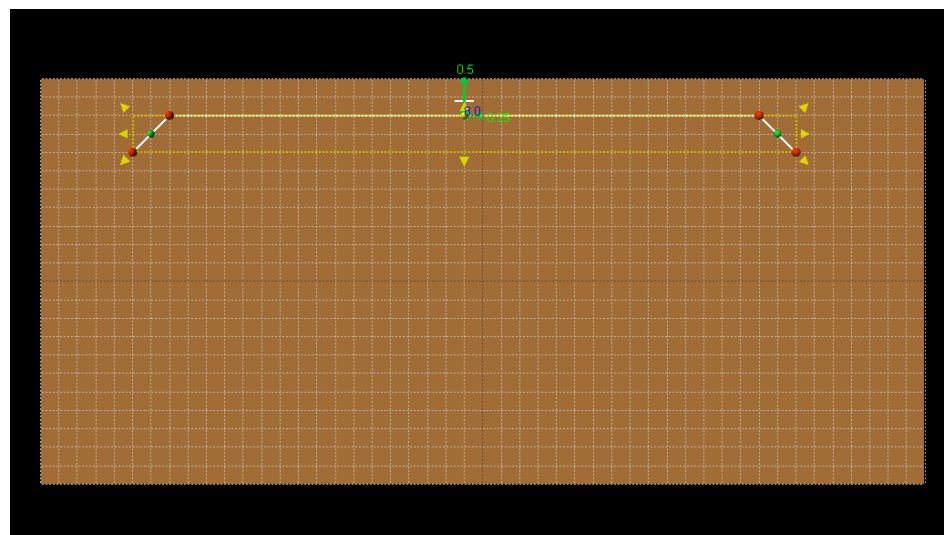
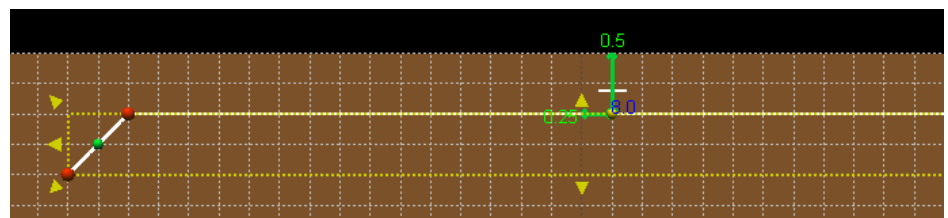
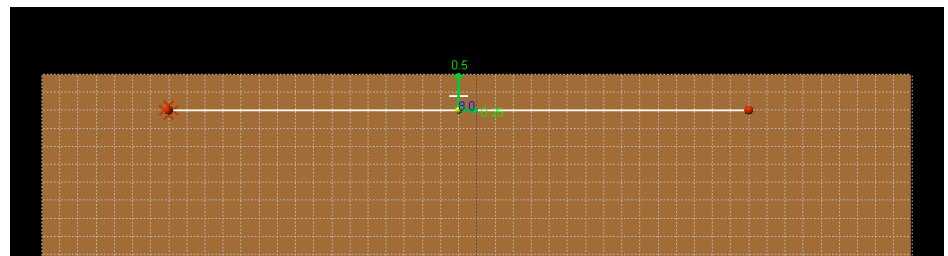
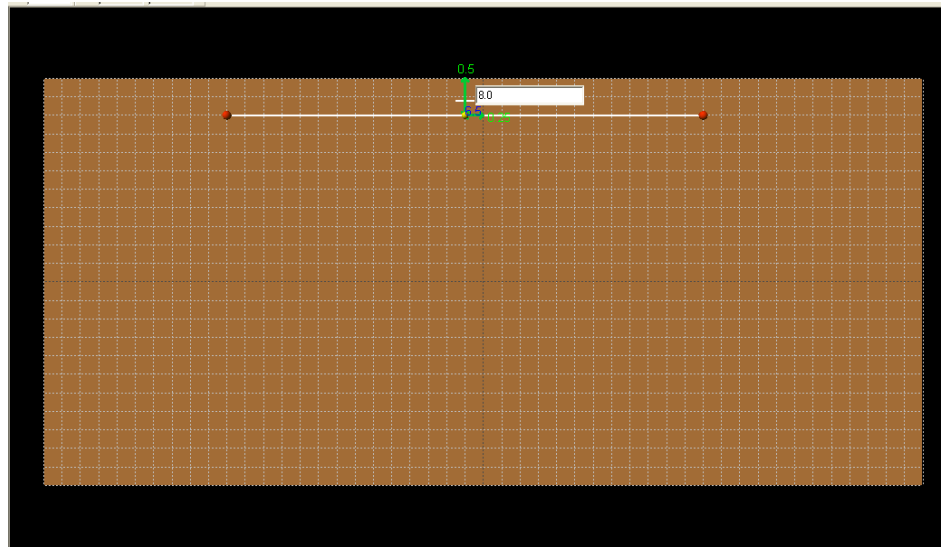
When done correctly it should give you a visual notification that you are connecting the two drawing methods.

When you see the connected notification, left click once. Now count two grid lines to the left and two grid lines down and left click once.

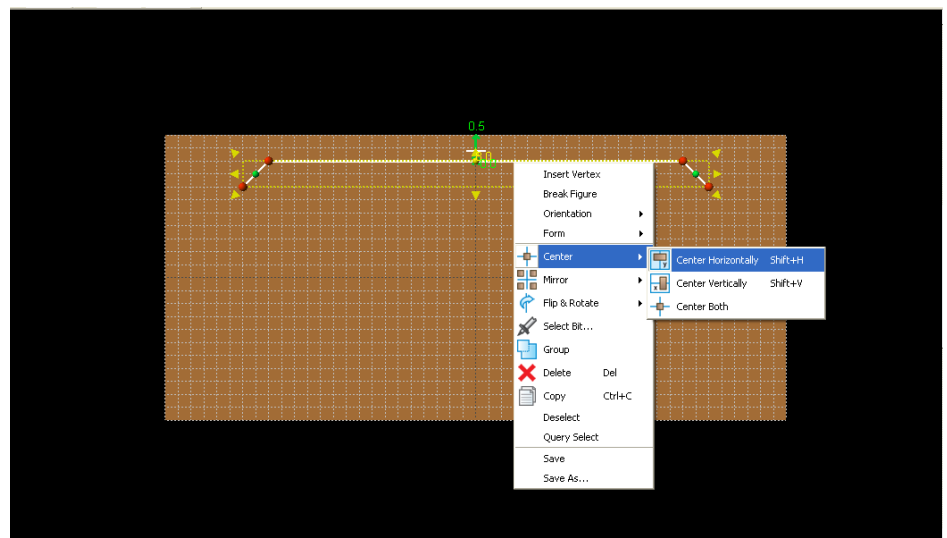
At this point, we will not set the arc radius.



Select the “Arc Tool” again. Do the same to the right side of the line segment. Your shape should look like the top part of a trapezoid.

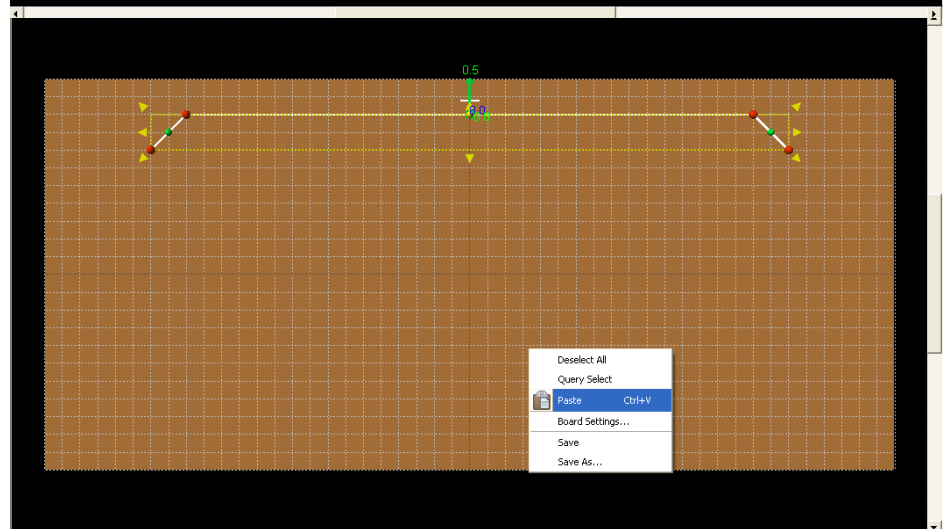


Right click on the line and select  
“Center”, “Center Horizontally”



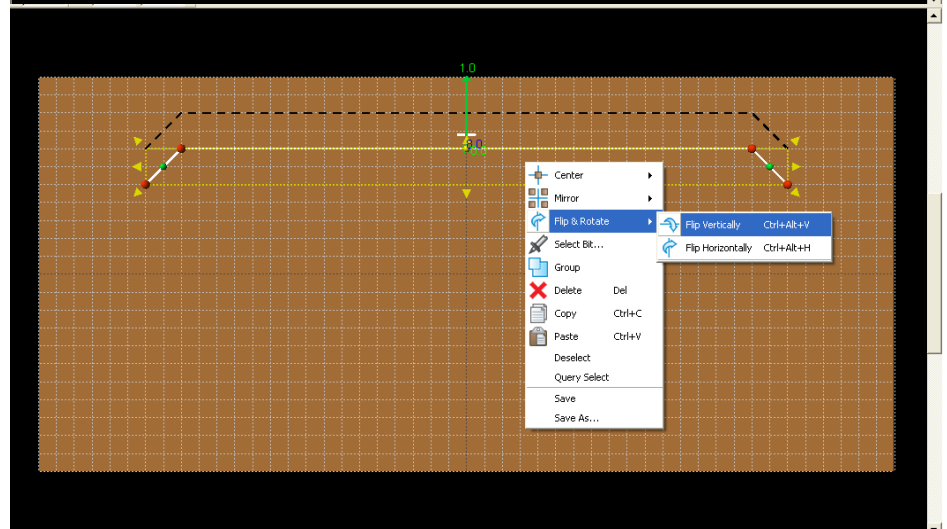
✓ COPY & PASTE

Select the line segment that was  
just created. Copy it and then  
paste.



✓ FLIP & ROTATE

With only the pasted line segment  
selected, Right click and select  
“Flip & Rotate”, “Flip Vertically”.



Now move the copied line to the second grid line from the bottom.

There should be two line segments in the Carving Tree.

#### ✓ CONSTRAINTS

Constraints are given to guarantee a uniform project layout.

On both line segments, set the Constraints for Center of the Board and Edge of the Board to "0.0".

NOTE: Changing the number applies a "Constraint" and the number indicates this by turning yellow.

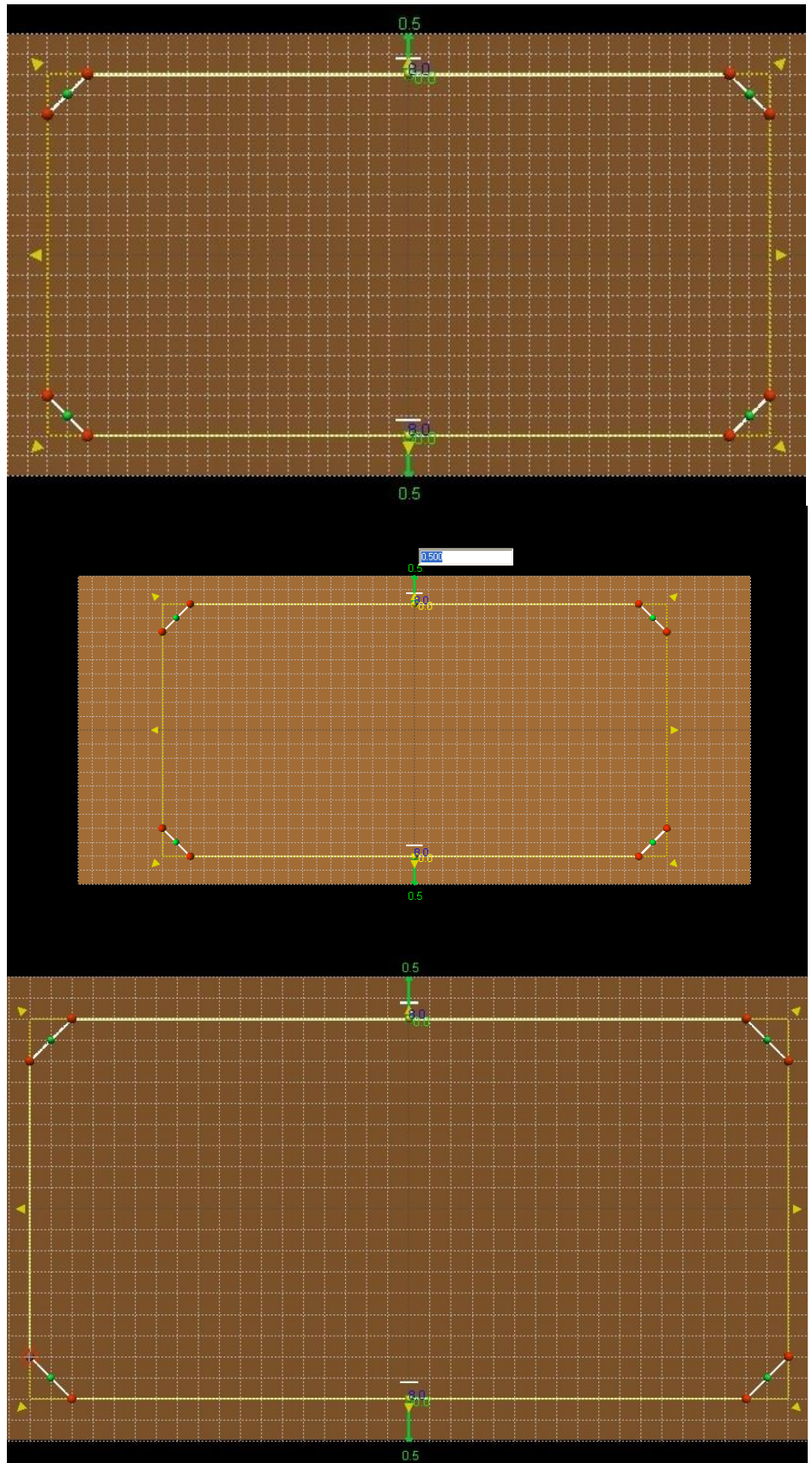
Note: To remove or edit a constraint, right click on the number and select remove.



Select the Arc Tool and connect to each red node on the left side of the work piece.

Note: If connection is successful, the Carving Tree will show only one Line Segment.

Repeat prior action with the right side of the design project.



## ✓ CREATING A CLOSED REGION

The shape should now be completely connected ("closed region").

## ✓ CUT PATH TOOL



Note: Region is not fully connected, if "Cut Path" option is not available when the element is selected.

Check each red node to make sure they are fully connected.

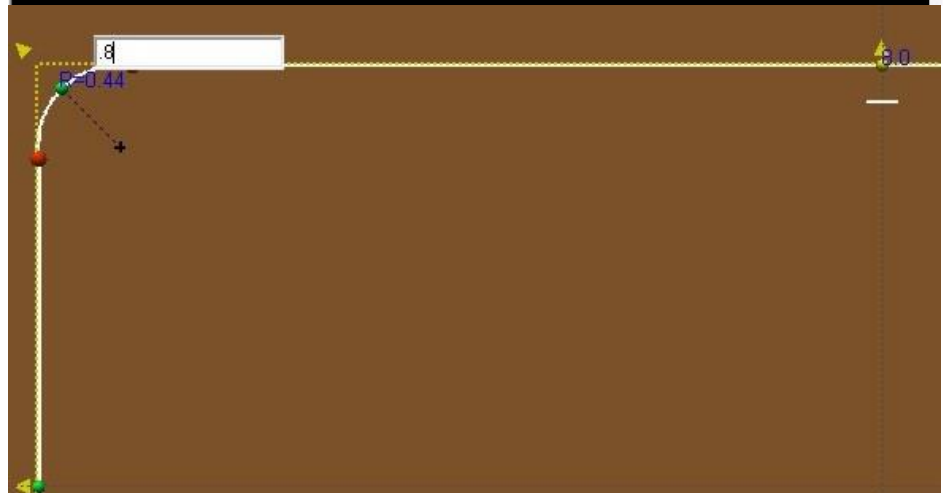
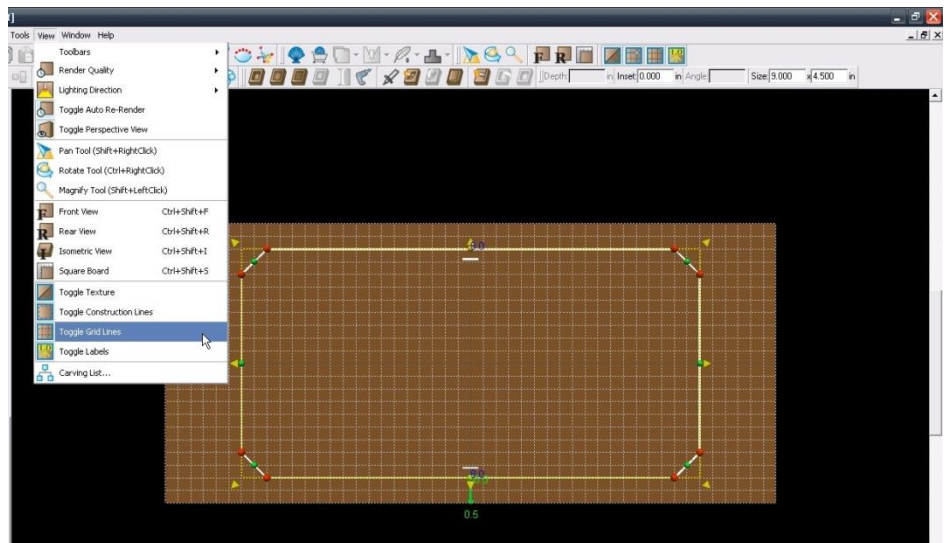
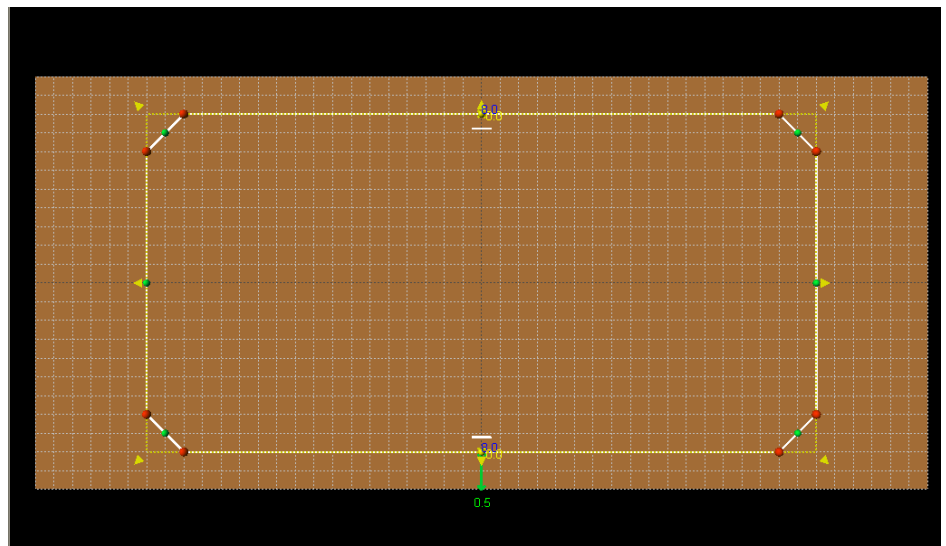


Go to View and select "Toggle Grid Lines"

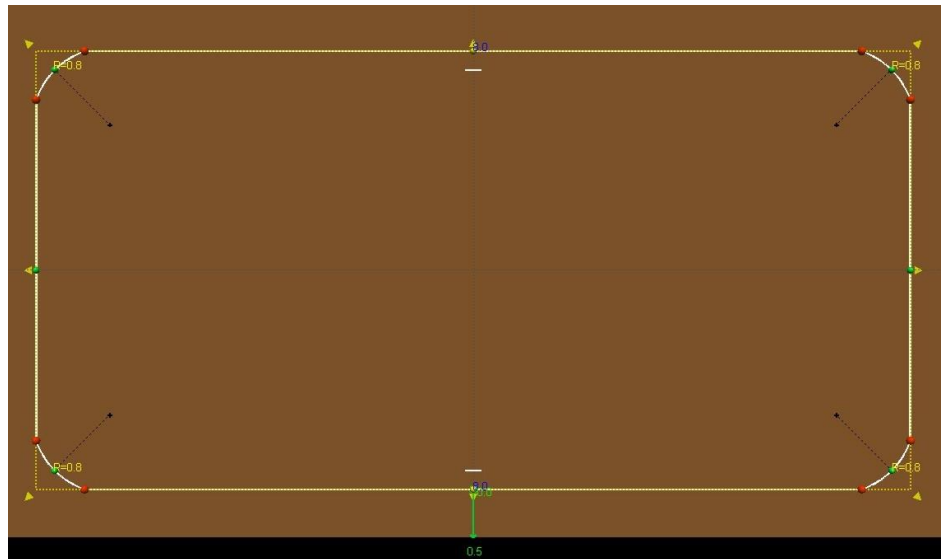
## ✓ SETTING CONSTRAINTS

Start with the upper left arc. Left click the green node and drag it toward the upper left of the board. Depending on how far you dragged your arc, your radius (R=) will vary.

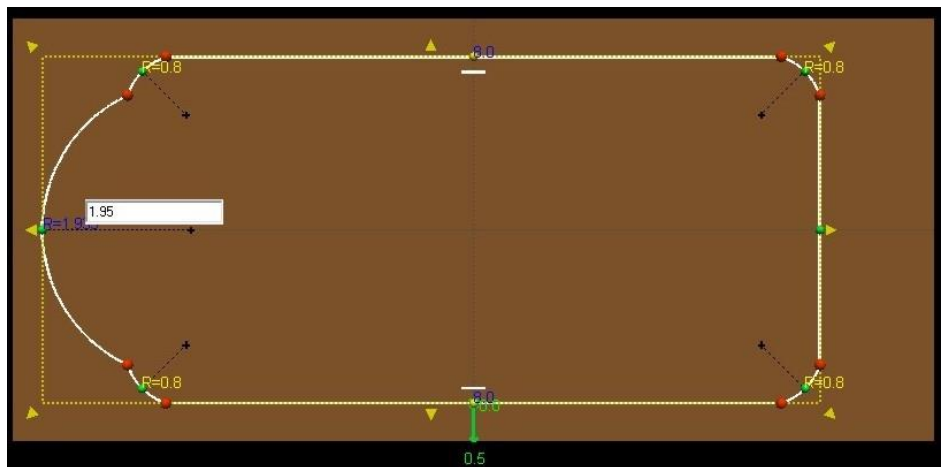
Left click on your radius (R=#) and a box will open where you can constrain your radius. Type ".8" in the box and press Enter.



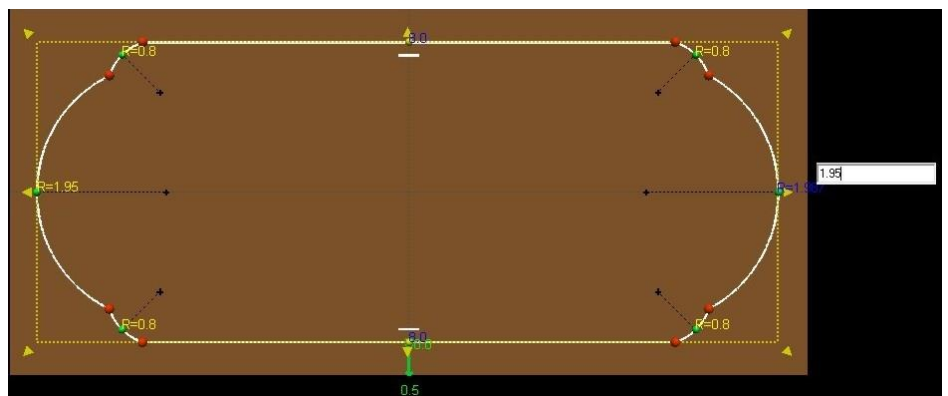
Repeat this step to constrain the three remaining corners to “.8”.



To change the radius on the vertical arcs, Left click and drag the left green node to the edge of the board. Once you have an arc left click on the radius (R=#) and change it to “1.95”.



Repeat this step to constrain the other vertical arc to “1.95”.





## ✓ CUT PATH TOOL



Select the “Cut Path Tool”.

In the “Cut-Out Control” select “Flip Cut”, “Hide Cut-Out” and “Accept”.

“Flip Cut” changes the cut path from the inside of the vector line to the outside of the line. When cutting out carved patterns, the outside is preferred for better results.

## ✓ TEXT TOOL



Select the “Text Tool”.

Click anywhere on the board.

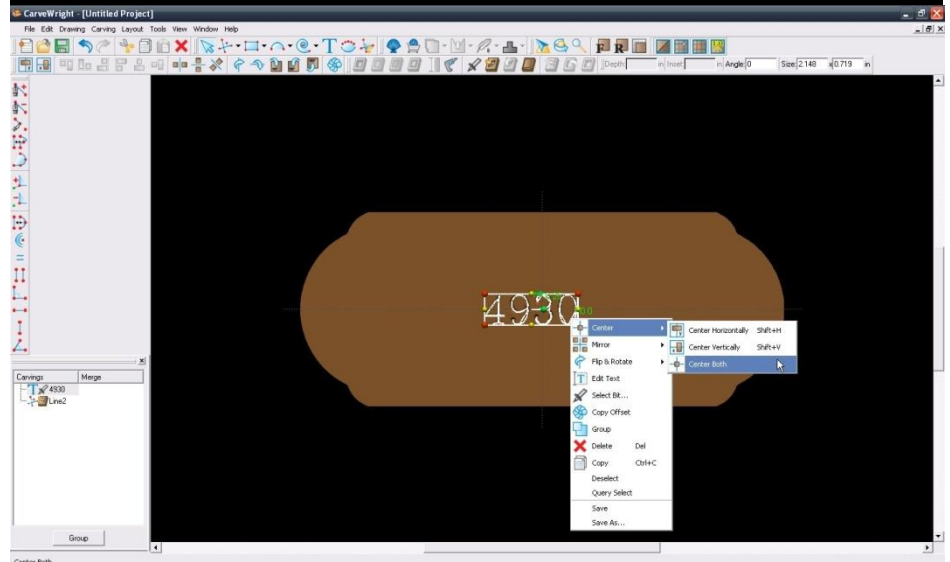
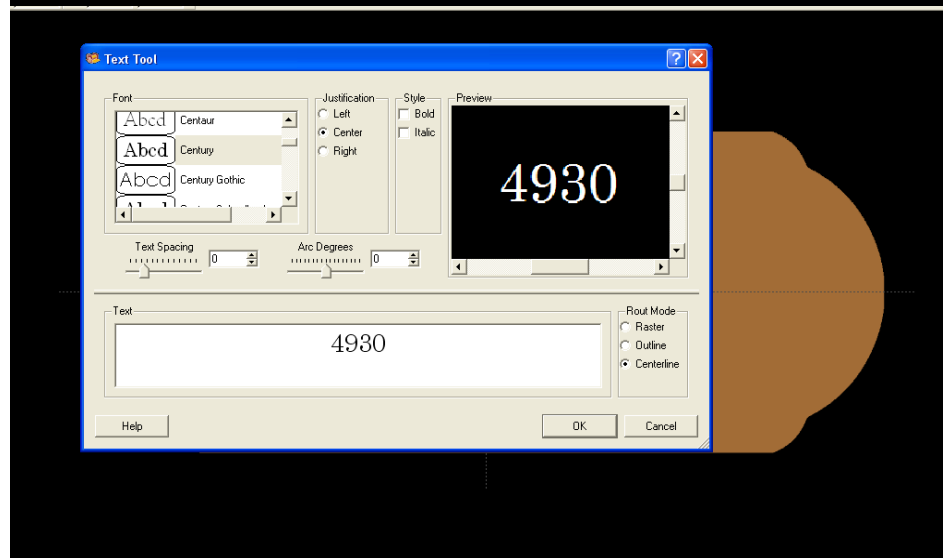
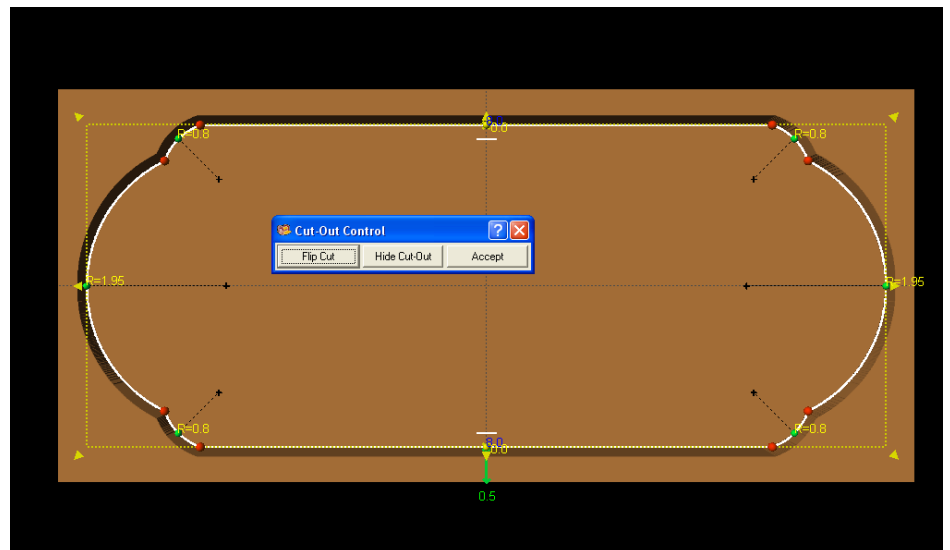
Select the following options:

Font = “Century”  
Justification = “Center”  
Text = (Your house number)  
Rout Mode = “Centerline”

Select “OK”

Right click on the newly added text and select “Center”, “Center Both”.

To resize the address simply click and drag any of the red nodes.



Once the address is the size you like, save the project.



Select “File”, “Save”

\*\*\*\*\*IMPORTANT\*\*\*\*\*

Name file and click “Save” to hard drive.

- UPLOADING TO MEMORY CARD



Select “File”, “Upload”  
Save to memory card.

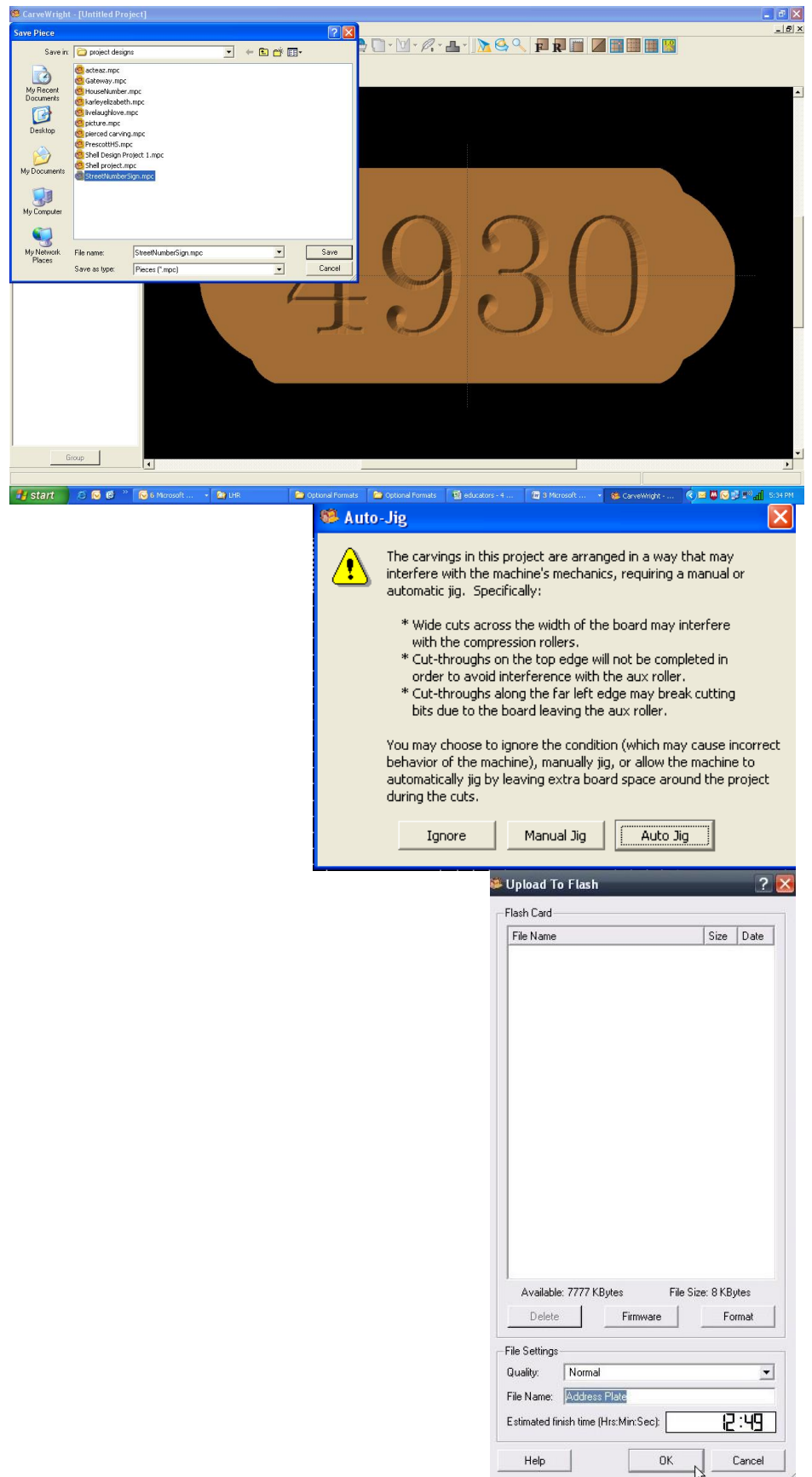
- STAYING UNDER ROLLERS

Note: The Auto-Jig option may appear when uploading to the memory card. Auto-Jig scales a project according to a predetermined set of dimensions to avoid possible errors. In this case the board we setup in the software is 12”. The actual piece that should be inserted into the machine needs to be at least 19” to stay under the rollers. Therefore, select “Ignore”.

Example:

*streetnumbersign\_N\_13*

*(recognizable name\_quality  
setting\_estimated time to carve)*



## *IMPORTING IMAGES AND MAKING LITHOPANES*

Project Designer always comes with an import image function. This importer, accessed from the file menu, allows the import of several bitmap, or raster, image type. The file types that can be uploaded are the following: BMP, JPG, JPEP, PNG, MNG, GIF, XPM. The most common of these formats used are the JPG and PNG formats, which are the standard image files found on the internet and produced by digital cameras.

### **RESOLUTION**

Images can vary greatly in resolution, so it is important to understand what it is in order to pick proper images for importing. Resolution in digital images is described by pixels. Raster, or bitmap, images are composed of rows and columns of individual squares referred to as pixels. The size and number of these pixels determine the resolution. The rows and columns of pixels are described as width and height, and the size of the pixels is described as PPI (pixels per inch). The higher number of pixels an image has, the higher resolution it is. It is important to use the highest resolution images you can for good quality carvings. It is important to note that you cannot add pixels to an image to increase resolution. An image can always be reduced, but never enlarged without losing image quality.

For example; the CarveWright carves at a resolution of 128 ppi. So if I were to make an 8"x10" lithopane, I would need an image of 1024x1280 for the best quality carve.

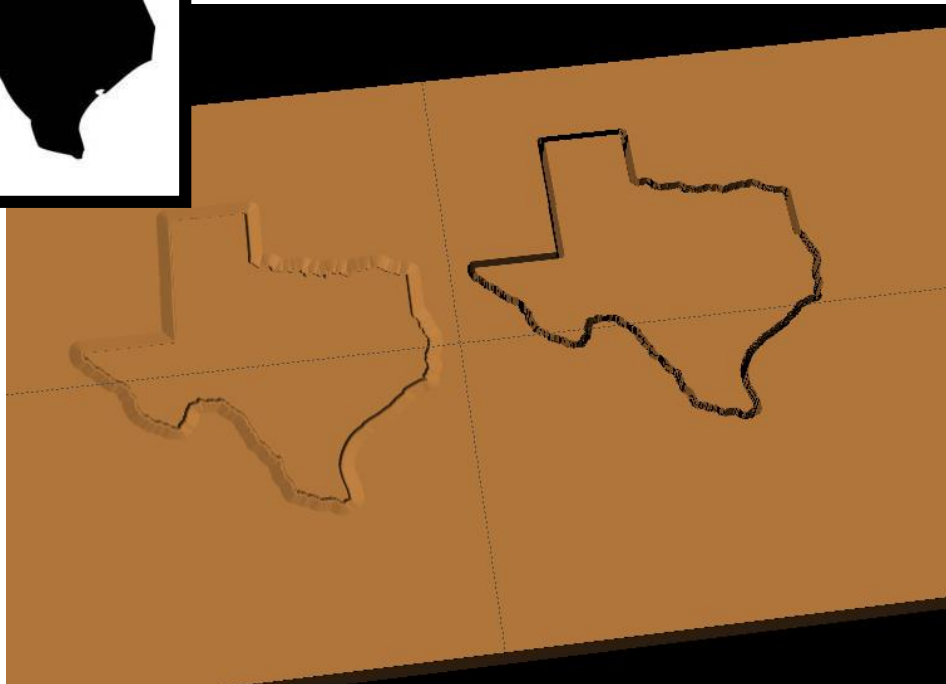
The next two tutorials in this section describe the process of importing images and making lithopanes.

## IMPORTING IMAGES

This project covers the following design concepts:

- ✓ IMPORT IMAGE
- ✓ SELECT CROP
- ✓ 3D VIEW
- ✓ CHANGING DEPTH
- ✓ LOWER TO REMOVE IMAGE BACKGROUND
- ✓ SAVE ITEM

There are several different types of images that can be imported into the Designer software and made into patterns. Besides various file formats, there are different types of images from logos to clipart to photographs to scanned drawings. As unique and different as they may be, so too, are their challenges. This Design Project aims to assist you in overcoming some of the basic challenges.



*The Designer software comes preloaded with over 50 quality patterns to use in your project designs. There are also over 7,000 patterns available on the CW PatternDepot in virtually any subject imaginable. Add to that the ability to import digital images and the possibilities with your CarveWright Designer Software become endless.*

## BASIC IMAGE INFORMATION :

*A digital image is a numeric representation (normally binary) of a two-dimensional image. (Wikipedia)*

### ✓ IMPORT IMAGE

Open Designer Software.

Go to “FILE > IMPORT > IMPORT IMAGE FILE”.

Navigate to wherever your image is located on your computer.

### \*\*\*IMAGE FILE TYPES & RESOLUTION\*\*\*

*The basic Designer Software can import various file types. These file types are considered “raster” and are made up of pixels, rather than geometric shapes (vector).*

- .png
- .jpg (.jpeg)
- .bmp (bitmap)
- .gif
- .mng
- .xpm

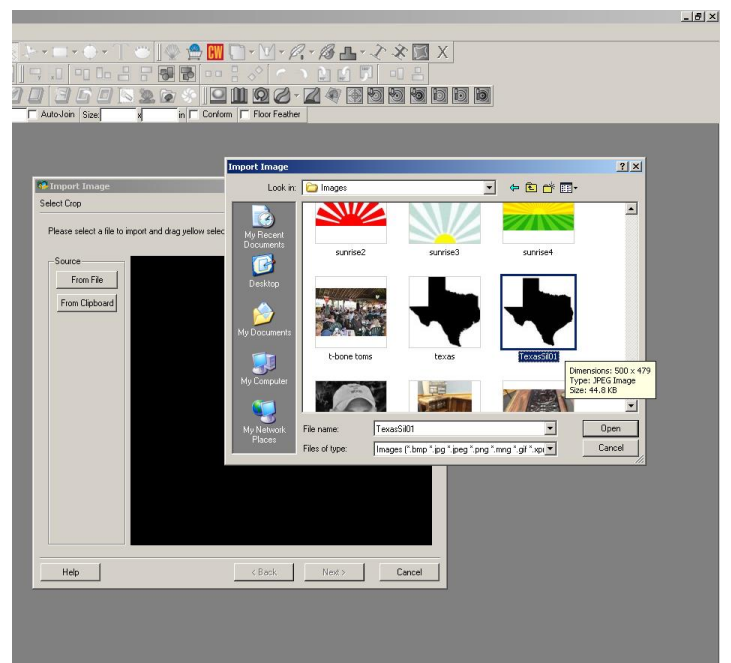
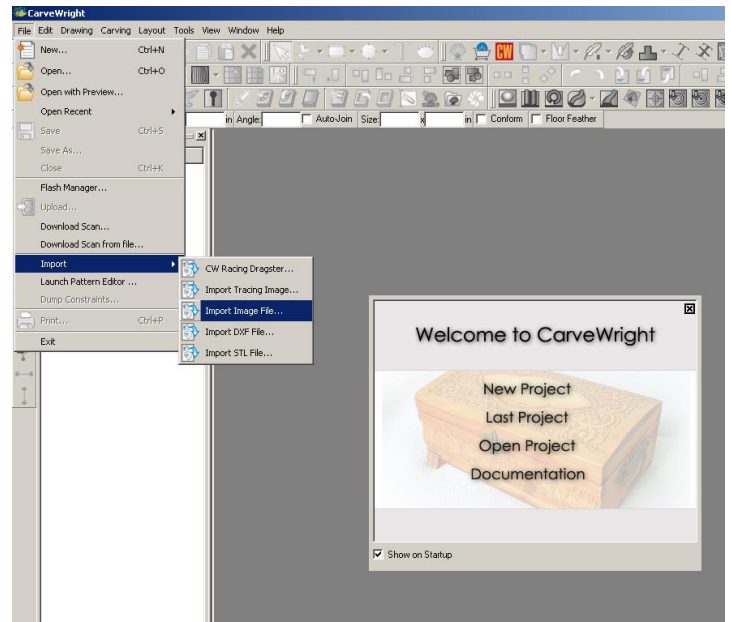
**Image resolution** is the detail an image holds. There are several types of resolutions, but importing **higher resolution images results in better quality patterns**.

Digital images come from a variety of sources. Some of these may not be satisfactory to use or may require additional “clean-up” to be of usable quality.

The Internet is a great source for variety, but remember, images on the internet are usually low resolution, so that they will load onto your computer screen faster. Some digital photographs are very high resolution. Scanned photographs have other issues, such as low resolution flatbed scanners, poor quality image being scanned, debris on scanner or defects on image. Scans of hand-drawn images also take into account how hard or lightly you are pressing down on the pencil.

**A high resolution logo from your customer is much better than a customer’s company logo pulled off of their website.**

Select the image you want to import. Click “Open”.





## ✓ SELECT CROP

*During import image, you can crop your image. (Licensed patterns cannot be cropped in this method. For those we use the “clip carving” function.)*

To crop, hover over the dotted yellow line until you get the double ended arrow, then Click and Drag to frame the image, however you would like to crop that image.

*Converting a 2d image into 3d has presented itself as quite a challenge, and is almost impossible as there is simply not enough information in a flat 2d image to make it true 3d. The Designer software gets you close by converting your 2d image into a grayscale and “assigning” a carving depth based on that grayscale. White gets the deepest carve and black the shallowest. There are 254 levels of gray inbetween that make up the detail. This conversion takes place by clicking the NEXT button.*

Click “Next”.

## ✓ 3D VIEW

*There are several things you can do to manipulate your pattern at this point in the import process:*

**Zoom & Rotate:** *The Pattern View window that is the larger area on the right side will allow you to ZOOM or ROTATE the pattern to get a better view of it.*

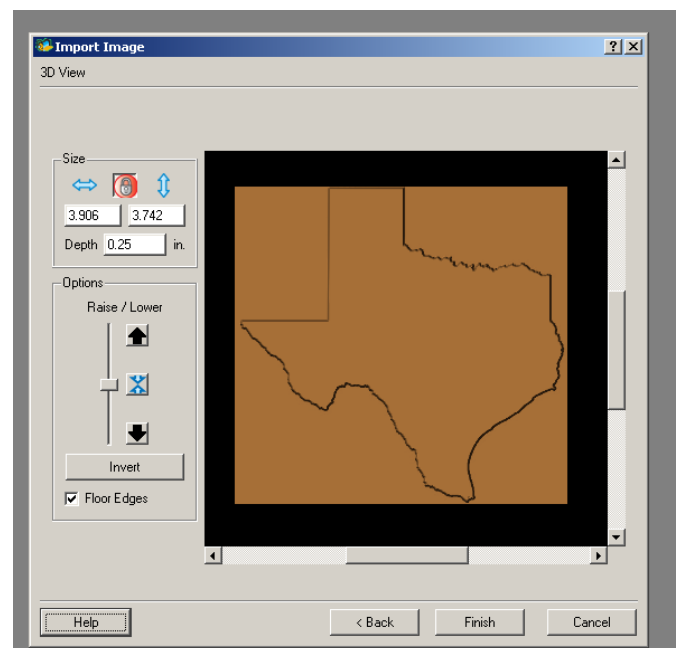
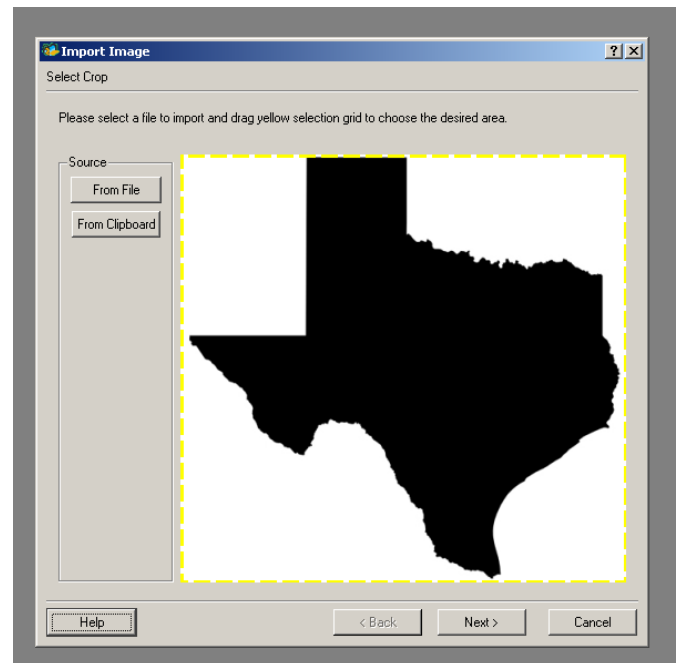
**Size:** *The image width and height can be changed. The lock keeps the pattern in proper aspect without skewing it.*

**Depth:** *The depth is the size difference between white & black. Default is always .25, but you may often want to narrow the difference for a smoother transitioning pattern by lowering the depth.*

**Raise / Lower:** *Raise moves the pattern up and eliminates the top layers (default is black). X resets it to the original. Lower moves the pattern down and eliminates the bottom layers (default is white).*

**Invert:** *Changes the pattern to white on top and black on bottom.*

**Floor Edges:** *Floor edges should be left on to keep the edges all at the same depth for consistent feathering of the pattern.*



*This image technically should have two levels – white and black. White is the deepest & black is the shallowest by default unless you selected Invert.*

#### ✓ CHANGING DEPTH

Change depth to 0.1 or leave for thicker pattern.

#### ✓ LOWER TO REMOVE IMAGE BACKGROUND

Click the down arrow once to remove the white background.

*If it is not a pure white background, you may need to click several more times to get rid of most of the background that you do not want. Pattern Editor (advanced software purchase required) may need to be used to clean up some patterns.*

Select “Finish”.

#### ✓ SAVE ITEM

Select the location in your Pattern Library Favorites folder (or create a New Category), where you want to save your new pattern.

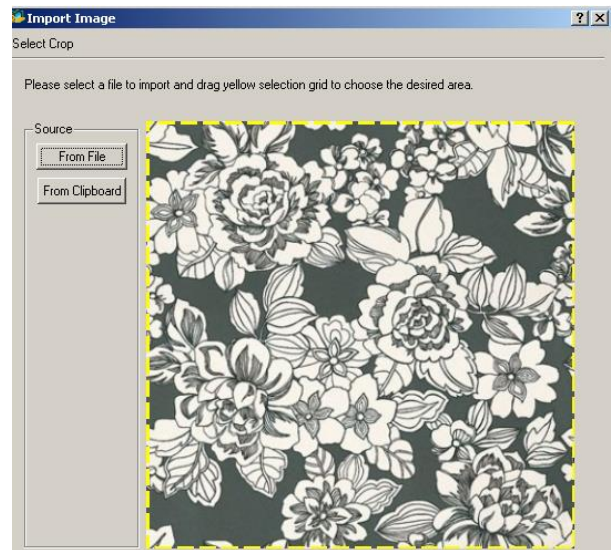
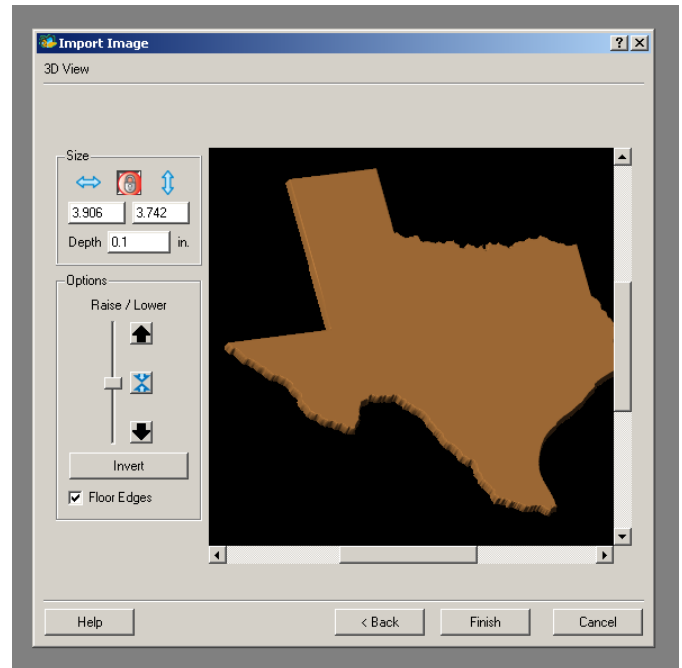
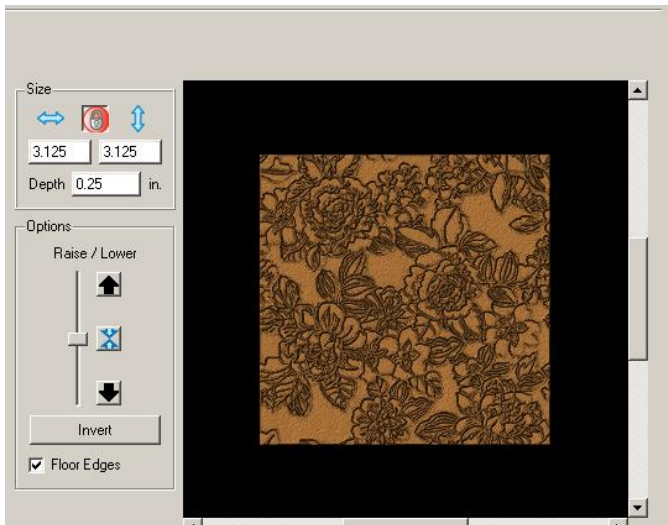
Name the pattern.

Select “Save”.

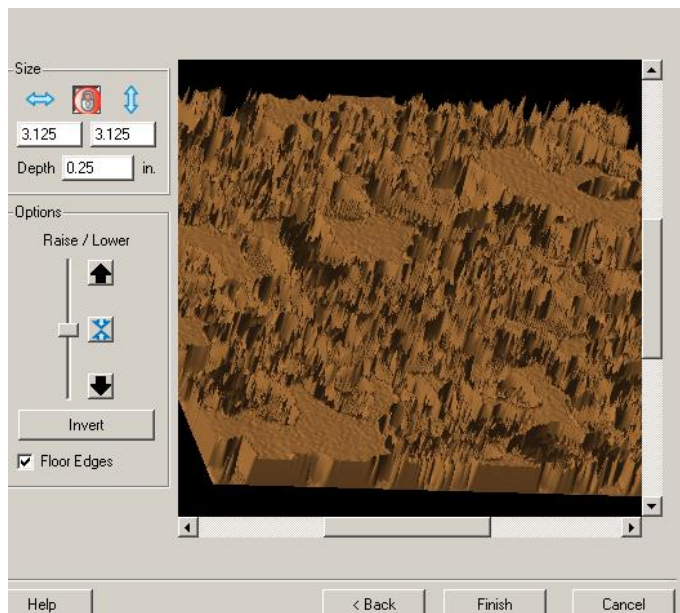
Now you can use the new pattern in your projects or use the shape of it to make cut-outs.

**EXPERIMENT TO FIND A PATTERN THAT WORKS:**

*This is the image with multiple  
layers of gray.*

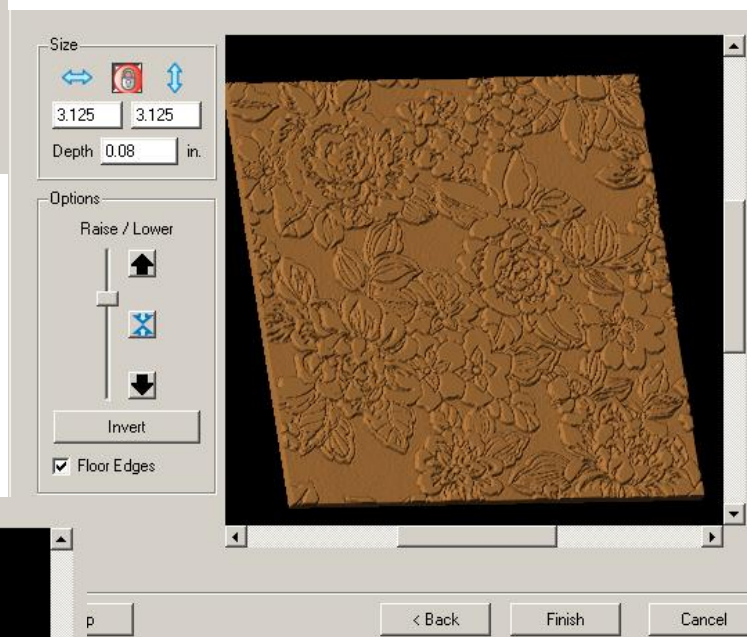


*This is the pattern imported with NO manipulation.*

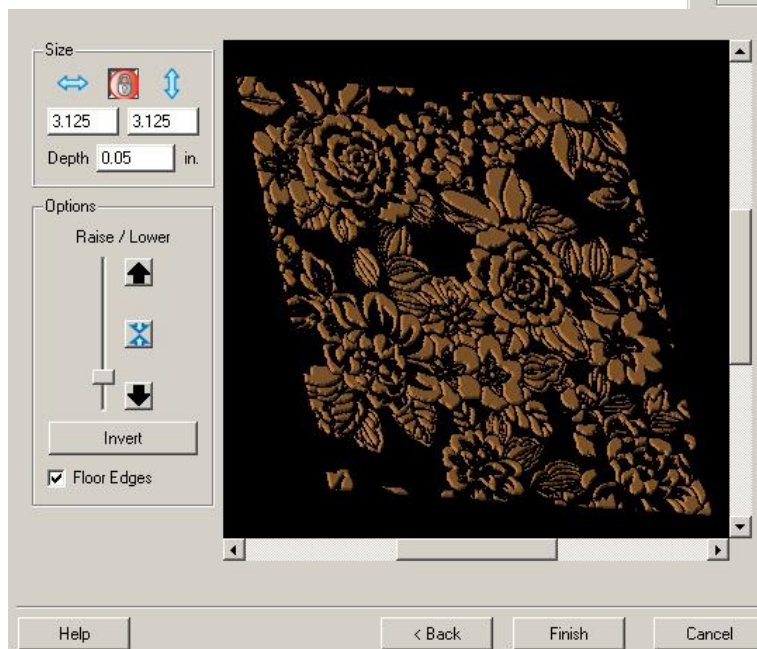


*This is the same pattern viewed from the side. (EEK!)*

*This is the pattern after being manipulated.*



*Here is another option.*



*Other manipulation can be done using advanced software such as Pattern Editor, 2d Vector Drawing Tools & 3d Pattern Modeling.*

## CREATING A LITHOPANE

*Adopted from Tips & Tricks article; Lithopane 101 by Jason Allen and edited by CarveBuddy*



**History:** Originally Lithopanes (lithophanes) were made as a part of a piece of porcelain, typically the bottom of a cup or mug so the user would see the image when the cup was empty.

It was created as a wax original by an artist who carved the wax to create thin and thick areas that would represent light and dark areas. This wax original went through several steps to end up as a part of the piece of porcelain.

Our modern Lithopanes are made using editing software and carving or CNC machines. The lithopane itself is carved from a sheet of translucent material (usually  $\frac{1}{4}$  of an inch thick). The carving creates the light and dark areas due to the variations in thickness. By carving away the material, an image can be formed that is visible when lighted from behind.



Like a stained glass window, a Lithopane needs to be illuminated from behind to reveal the image. Illumination may be provided by an incandescent or fluorescent light, candle light, or sunlight. Direct sunlight is not needed -- the light from an overcast day will provide adequate back illumination.

The Lithopane can be used mounted or unmounted. There are a number of mounting methods, some of them include:

- 1) Mounted in a box with back lighting
- 2) Attached to a suction cup to hang in a window
- 3) As a part of a piece of stained glass art
- 4) In the base of a lamp
- 5) Inserted in a frame

Although the first mounting style is commonly used as a night light, the image can be viewed in normal room lighting using a 9 watt puck+ light for back illumination, available for around \$10 at any home improvement store.



**Size:** In theory, the lithopane can be made in any size, but there are practical limits. Because the width of the CarveWright is limited, the maximum width is about 14". They look great in standard 4x6, 5x7 and 8x10 sizes but you can make whatever size you wish.



Our largest lithopane was used on the Cpl. Jason Dunham memorial and it measured 14"x 28" (fig. 1) As long as you stay within the 14.5" maximum width of the CarveWright, you could honestly make a lithopane 8 feet in length.

**Color/Tint:** The material that Lithopanes are made of comes in a variety of colors. In sunlight, using a white material, the color/tone of the Lithopane can be similar to a black and white photograph. Using a Bone or off-white color yields a sepia tone (antique-looking) photograph. The effect depends upon the color of the material being used. When used as a night light, an incandescent bulb will give the lithopane a warm tone. For larger Lithopanes, fluorescent lighting may be used and will provide a more neutral tone.

### **SUGGESTIONS FOR PHOTOGRAPHS**

Need some ideas of how to pose your subject? Browse stock photo sites that are in business to sell the rights to photos. The contributors to these sites are amateurs and professionals that have uploaded their photos for use by others. It costs nothing to look --- just search by the type of subject (like baby, dog, deer, etc.). Looking at how the pros compose a photograph can give you some good ideas on how to compose your own photos.

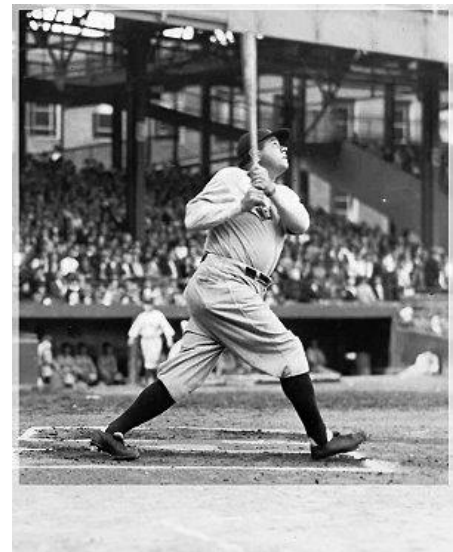
**Zoom in on the subject** -- try to make the photo sized as close as possible to the finished product that you want to achieve.

**Use a white or light-colored background** -- this will make the subject stand out.

**Save pictures at the highest resolution allowed** -- too low of a resolution will decrease the sharpness and quality of the lithopane.

**Image Requirements:** To make a good lithopane, a good digital image is needed. The best source is from a digital camera, but it is also possible to scan a photograph. If you scan and/or edit an image, be certain to save it at the highest resolution possible.

**Crop or Zoom In on the Subject:**  
Cropping an image is done to draw attention to the subject. This will also eliminate a good amount of any unwanted background. (You can crop an image when you import your image into the Designer software that is included with your CarveWright machine) There are limits to how much the subject can be enlarged, depending upon the resolution of the photo -- as you zoom in, the pixels in the final image tend to become blocky, which reduces the sharpness of the final carving.





*Editor:* For the %techies+, here is a general guide for the recommended maximum size litho using various megapixel settings. At different resolutions, some cameras offer an option to choose different image qualities. For the %non-techies+ simply select %best+ and you'll be able to achieve great looking lithos.

Camera Resolution (megapixels)	Dimensions (in pixels)	Maximum Carving Size (in inches)
2	1,633 x 1,225	4 x 6
3	2,048 x 1,536	5 x 7
4	2,464 x 1,632	6 x 8
5	2,592 x 1,944	6 x 9
6	3,008 x 2,000	6.5 x 10
7	3,072 x 2,304	7.5 x 10
8	3,264 x 2,448	8 x 10
9	3,464 x 2,598	8 x 12
10	3,651 x 2,739	8.5 x 13
11	3,830 x 2,872	9 x 13.5
12	4,000 x 3,000	9 x 14

The more pixels in the image file, the higher the resolution. Here's an example of a digitally scanned photo at an original 2400 x 3000 resolution.

**Isolating the Subject:** Many times it is desirable to isolate the subject (crop) from the background. First the background is removed around the image (this can be done using the Pattern Editor software that is included with the scanning probe or with any photo editing software), then it is often best to %feather+ the edge to soften it.

**Composite Images:** Isolated images also make it possible to make a composite of several individual images. This is useful if two (or more) subjects are to be combined from different photos or rearranged to different locations on the same photo.

**Avoid Low-Quality Images:** Images that have been compressed for email or websites may have a reduced quality that may look fine for onscreen display, but are not suitable for lithos. In either of these cases, if it is necessary to use such an image it will be best to check with the original owner of the image, to see if a high-quality (hi-res) image is available. The net effect of using low-quality/low-resolution images will be that the lithopane will not be as sharp as when the original image is used, and may

suffer from jpg artifacts (defects) that occur when an image has been compressed for the web or email.

**Scanned Prints:** As a general rule, if the lithopane image is to be made from a scanned print (photo), the image on the print should be at least the same size as the lithopane.

**Professional Photographs and Artwork:** The Federal Copyright Act provides protection to authors and artists for their original works, including photos and drawings. Among the protections that copyright owners have is the exclusive right to make copies of that work and prepare other works based on the original. You should steer clear of using material that is covered by copyright. In order to make a lithopane from a copyright protected item (regardless of whether it is marked with the © symbol or not), permission must be granted by the owner. The owner is the photographer, artist or the company that he or she works for.

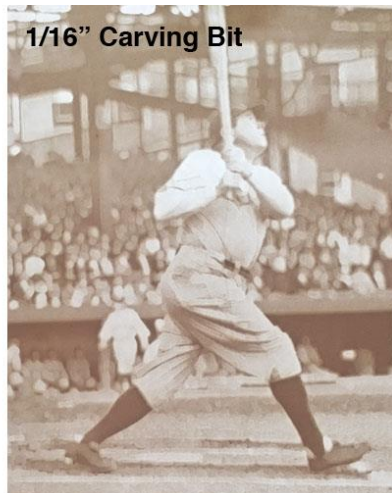
## THE ART OF MAKING LITHOPANES

Ladies and gentlemen this is truly a simple process, every Lithopane that we have produced has been created and edited using just the software that is included with our CarveWright machine and scanning probe (the scanning probe software is not necessary to make great lithopanes).

**Our Process:** The process starts with a digital photograph. The digital photo is imported into the Designer software, where the software will convert the image to as many as 256 shades of grey and build a height map+image from it. The digital information from this image provides the depth value for the shades of grey in the image.

The Designer software reads the image data and converts each pixel value into a depth to be carved into the material you are using, typically it is some type of cast acrylic material (Corian®, Staron®, Meganite®). These materials are opaque at normal thicknesses, but as the thickness decreases, they become more and more translucent. This effect duplicates the light and dark areas in the photograph. The carving can be done using the 1/16" Carving bit that came with your CarveWright machine and takes anywhere from 35 minutes to 2 hours depending on the quality setting you select (good lithopanes can be produced using the 1/32" Carving bit but for

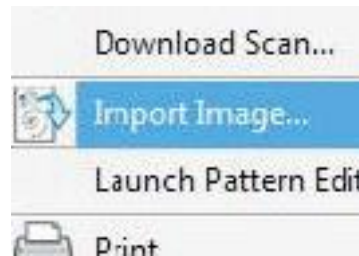
better results use the 1/16" Carving bit). With Designer PRO, the 1/32" Carving bit is an available option for achieving even higher detail.



**Use the following 9 steps and you will be making great Lithopanes that can be cherished for many generations to come!**

### STEP 1

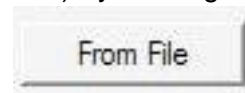
Decide on the image that you would like to make into a Lithopane.



### STEP 2

Start your Designer software, then click on %File+ and scroll down to %Import Image+ click again - this will open the %Import Image+ window that asks you for the source of your image (i.e., where it is located) - you are given

two options %From File+ or %From Clipboard+. Select the appropriate option.



### STEP 3

If you click %From File+, which is common, navigate to the photo file location.

### STEP 4

Select the photograph you would like to edit and double click on it, or simply click %Open+.

### STEP 5

The Designer software will import it into the %Import Image+ window - here you will be able to crop the image to select the part of the image that you

would like to make your Lithopane from.



You can select any part of the photo (called cropping) by clicking and dragging on the dashed yellow box that is around the photo or image.

### STEP 6

Once you have finished the cropping of your image, simply click the %Next+ button located at the bottom of the %Import Image+ window - doing so will convert the window over to

the %3D View+ window and will also do the magic of converting your image into the %Height map+ that will be used to produce your Lithopane. At this point you have some editing options %Raise+, %Lower+ or %Invert+ the image - we recommend you do none of these - just click the %Finish+ button.

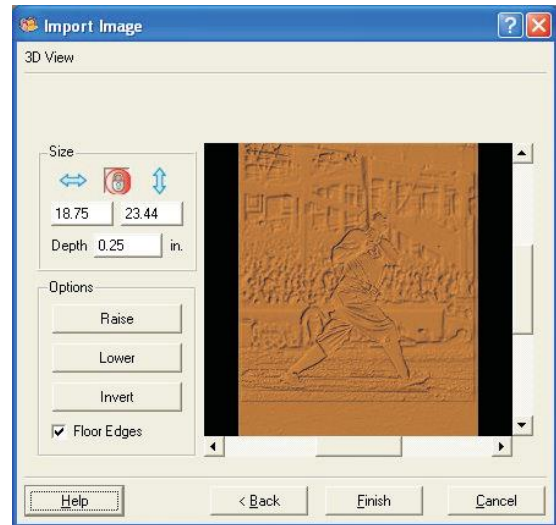
Give your image a name in the %Save Item+window and click %Save+. The image is now a CarveWright pattern (ptn) and can now be found in your pattern library by clicking on the blue shell at the top of your Designer software.

### STEP 7

Click on the blue clamshell to open your pattern list, find the pattern that you just created from your image, click on it,



then click on your board, place the image pattern on the board as you desire.



### STEP 8 - Setting Depth and Height

The settings that we use are as follows - set your depth to .180 and the height to 450 - these settings will give you a nice, bright Lithopane that can be enjoyed at all hours of the day (it can be viewed in daylight when mounted in a backlit box).

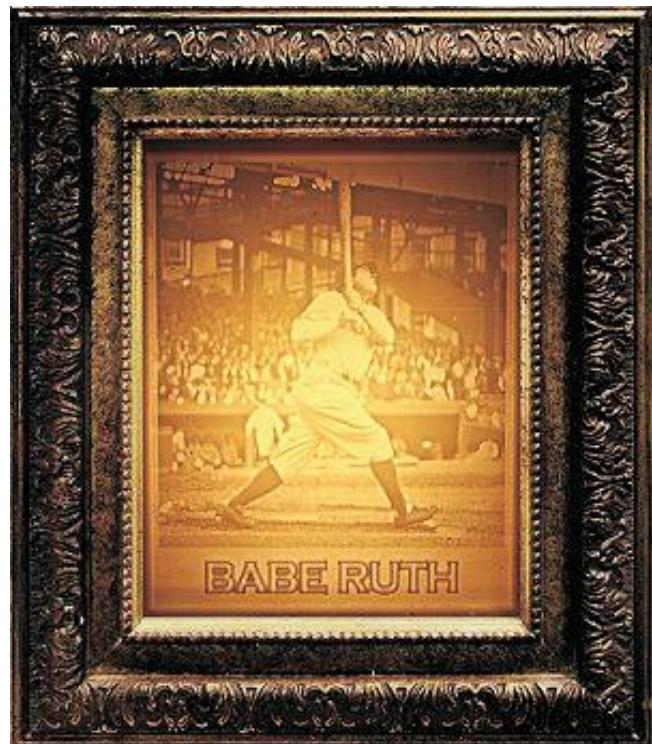
### STEP 9

Save your project as an mpc file with any name you choose, then upload your project to the memory card when you're ready to run the project at the machine.

### Lithopane Results:

This 8x10 carving was done on Bone Corian from the CarveWright Store. Runtime was 59 minutes on BEST quality setting.

The pictures here don't do the lithos justice - you have to see one up close, and in person to appreciate the detail and marvelous backlighting effect.





## MAKING A “SLED” OR “JIG” FOR LITHO CARVING

Most litho carving is done on 1/4+thick material, which is too thin to feed through the machine. Therefore, it is necessary to construct a jig (sled) for the material to be placed into. The jig will add to the overall thickness to meet/exceed the minimum 1/2+needed for the machine.

Making a jig for carving on cast acrylic is very simple. Perhaps the easiest way to make your jig is to use your CarveWright/CompuCarve.

Go to your local Home Center and buy a piece of 3/4+thick MDF (Medium Density-Fiberboard). Next, cut the piece to your desired dimensions. For this example we will use a 24+Long x 12+Wide x .75+Thick piece of MDF, and will create a jig to fit a sheet of 1/4+thick acrylic up to 11+x 17+. A common size is 8x10.

Feel free to adjust the jig size and the 8x10+recess dimensions to accommodate whatever size acrylic sheet you require. Just be certain that the overall size of the jig is a *minimum* of 7+longer than the acrylic you will carve on. This is essential so the jig will always be captive under the compression rollers.

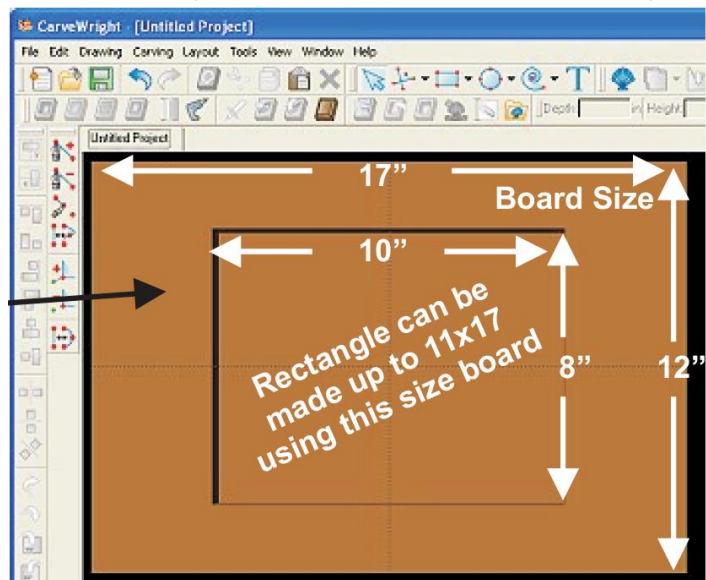


Create a new layout in Designer with a virtual board measuring 17+ Long x 12+Wide x .75+Thick. (The virtual board is 7+shorter than the

real board you place into the machine, which in this case will be 24+long).

Draw an 8x10+rectangle on the board and use the CENTER BOTH function to place the rectangle deadcenter on the board. (In our example, the jig will actually be 14+longer than the actual acrylic piece. This will allow you to create a rectangle recess up to 11+x 17+if desired.) Make the rectangle a CARVE REGION with a depth of .25+. This is the recess that your acrylic sheet will be placed, so it will sit flush with the top of the jig's surface.

Save the project, then upload it to your memory card and run the project on the 24+long MDF board. Once completed, you now have a jig to hold your cast acrylic sheet.





## CHAPTER 3 – DYNAMIC SURFACE

There are many tools in the Project Designer Software that allow for a lot of variety in your carvings. The ability to carve all the way through your board, merge carvings and surfaces to each other, clip carvings to fit within a shape, and more.

### What's in this Section?

This section will cover using domes, textures, piercing, clip carving and merging. These procedures will cover both Project Designer BASIC and Project Designer PRO, Centerline Text, and Conforming Vectors.

#### *TUTORIALS*

**Summer Sun** – Learn more about layering using depth and height and the pierced carving tool.



**Pierced Wind Grill** - This project shows how to use the pierced carving tool, clip carving & drill holes.

**Carving Cutouts – No Cutting Bit Required** – This technique demonstrated how to carve your project all the way out of the board with using only the carving bit. This technique is perfect for doing appliques and other pieces where a bit change isn't needed.

**Red Rooster Coffee Sign**– Project Includes many techniques including import image and clip carving. Use this image for importing the sunrise.

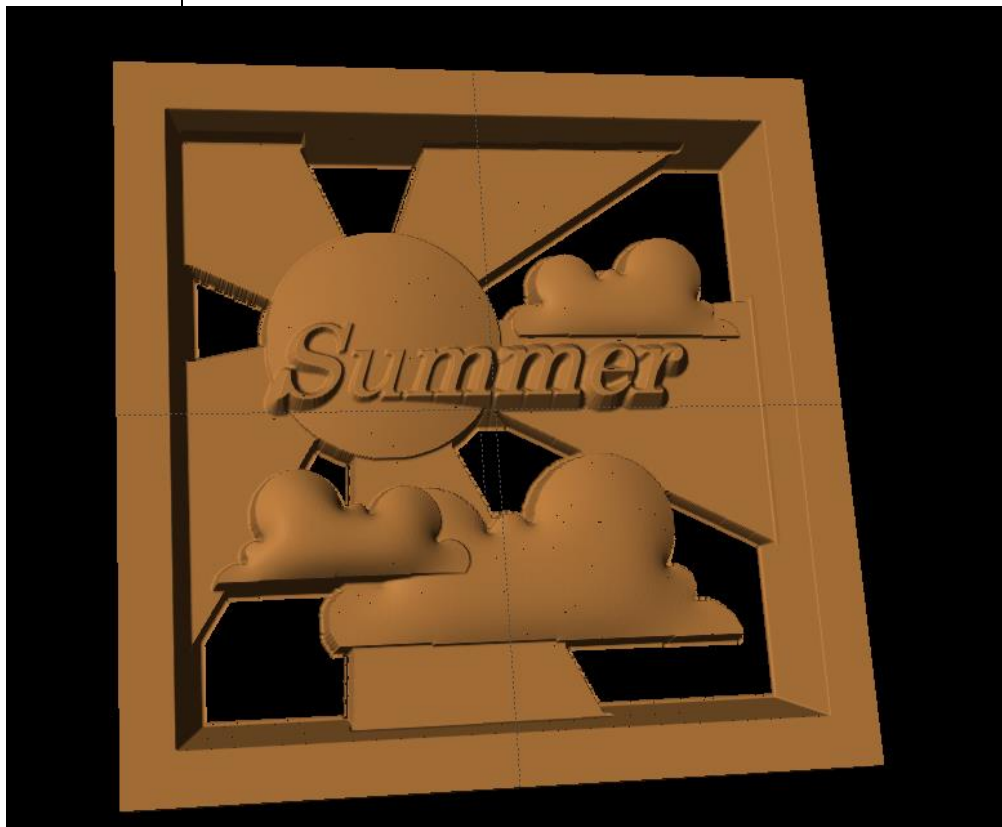
**Home of the Brave**- This project shows how to use the pierced carving tool, clip carving & drill holes.

**Curved Box Side** – This project reinforces previously learned features and adds the surface tool, attachments, and the merge features.

**Lighthouse Welcome** - Sign This 2 part project introduces several tools such as merging, clip carving, Conforming Vectors (sold separately), and cut path.

This project covers the following design concepts:

- ✓ STARTING SOFTWARE
- ✓ MENUS, TOOLBARS, SHORTCUT KEYS OR MOUSE BUTTONS
- ✓ MANIPULATING THE WORKPIECE
- ✓ SNAP TO GRID
- ✓ DRAWING TOOLS
- ✓ CARVE REGION
- ✓ FEATHERING
- ✓ PATTERN PLACEMENT
- ✓ ROTATE ELEMENT
- ✓ COPY & PASTE
- ✓ ADJUSTING HEIGHT
- ✓ TEXT TOOL
- ✓ FINE TUNING
- ✓ ADJUSTING DEPTH
- ✓ TEXTURE
- ✓ BOARD SETTINGS
- ✓ MANAGING DATA
- ✓ UPLOADING TO MEMORY CARD
- ✓ SELECT QUALITY SETTING
- ✓ NAME PROJECT



## INSTRUCTIONS:

### ✓ STARTING THE SOFTWARE

Open the CarveWright Project Designer Software

*The Welcome screen appears with project options.*



Select “New Project”

Set your project board dimensions.

Length: 7”

Width: 7”

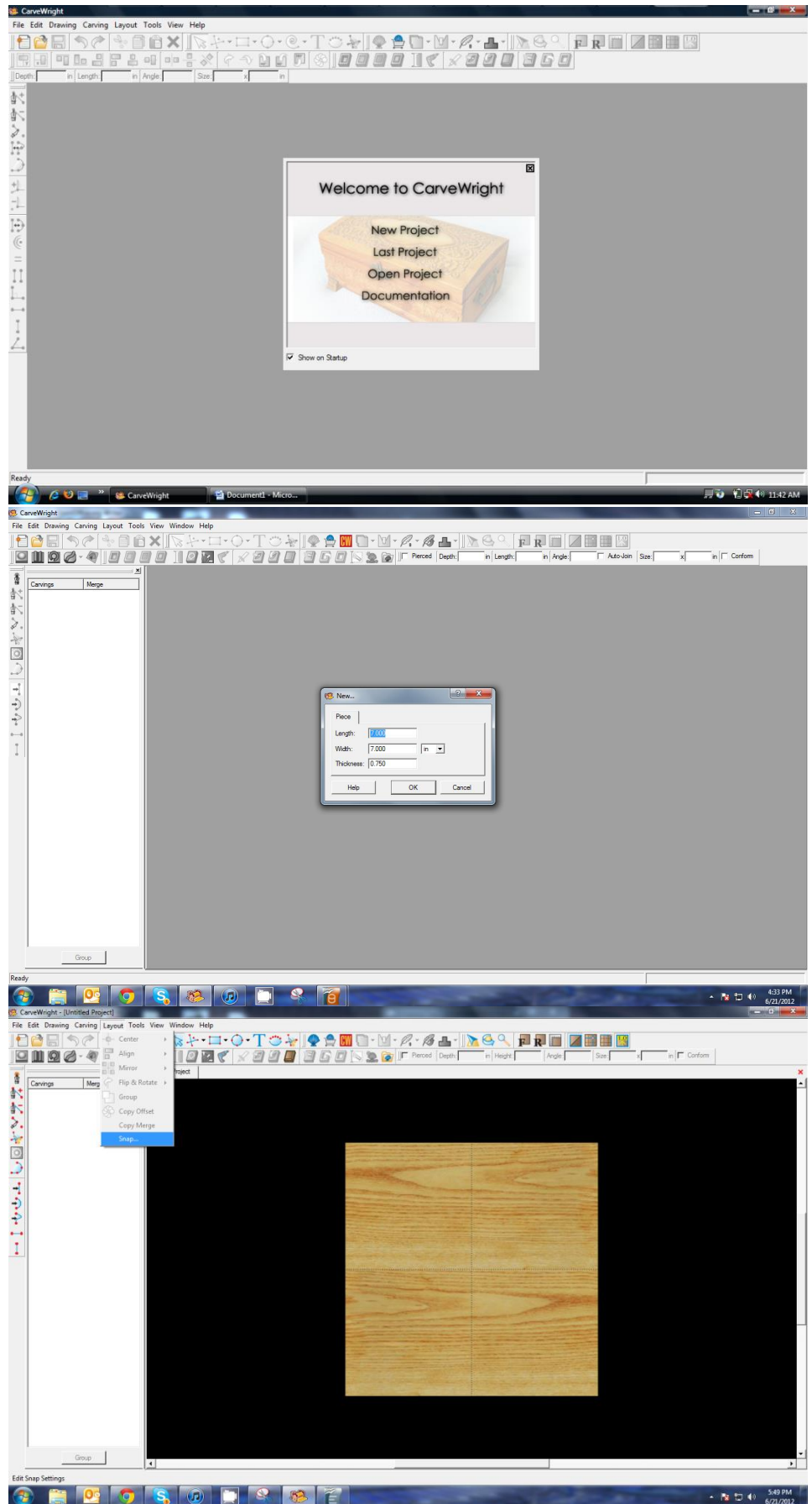
Thickness: .75”

Click OK

*The project board size is not necessarily the actual size of the board being put into machine.*

### ✓ SNAP TO GRID

Under LAYOUT menu, select SNAP.

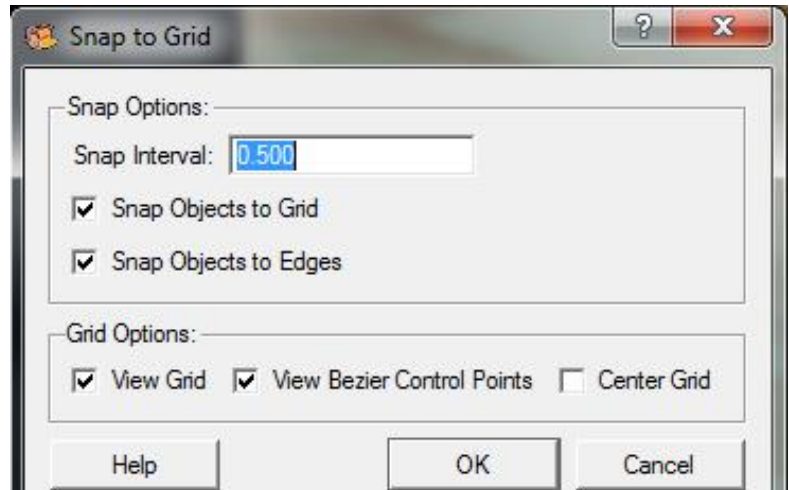


Snap Interval should be .5 inch interval by default.

Check boxes:

- Snap to grid
- Snap to edges
- View grid
- View Bezier Control Points (should already be selected as default)

Click ok

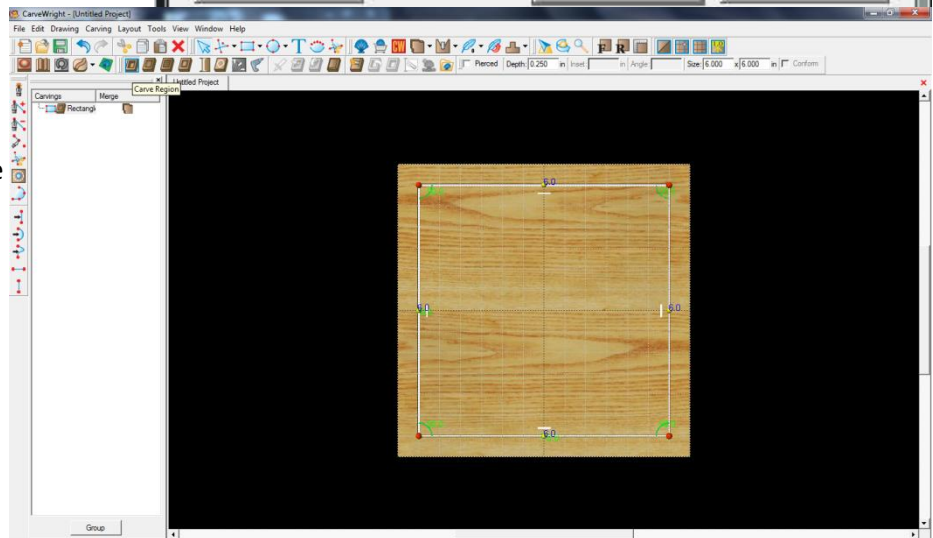


## ✓ DRAWING TOOLS



Using the grid, draw a box or rectangle .5" inside the project board, which should give you a box that is 6" x 6".

Select the "Pattern Tool" icon to open the pattern library along the right side.

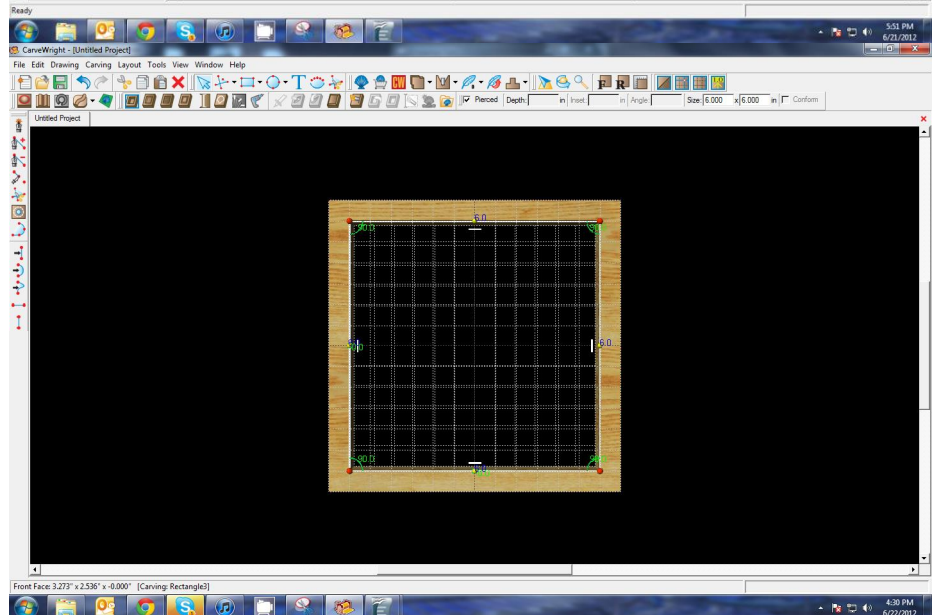


## ✓ PIERCED CARVE



Check the "Pierced" box on the toolbar.

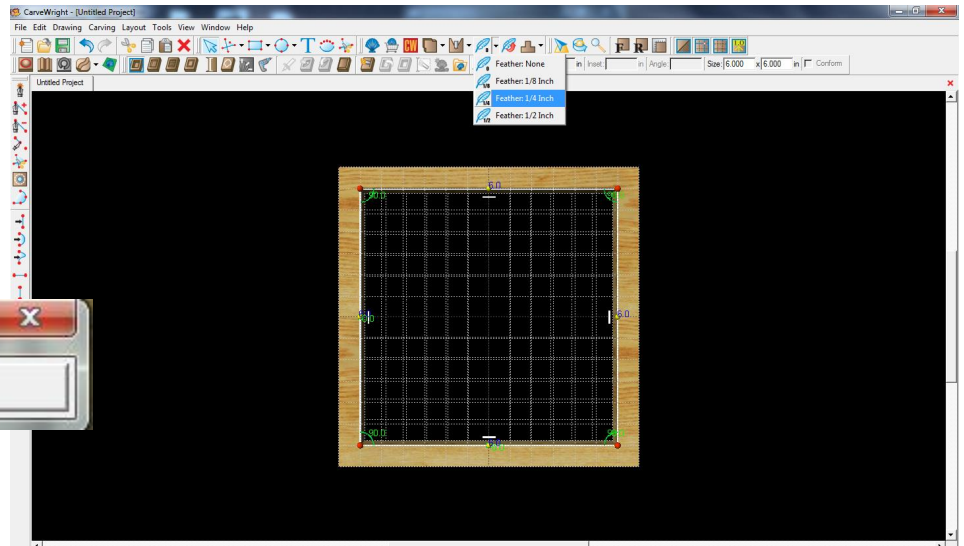
*If you cannot find a certain icon on your tool bar, click on View > Toolbars to make sure they are all selected.*



## ✓ FEATHERING

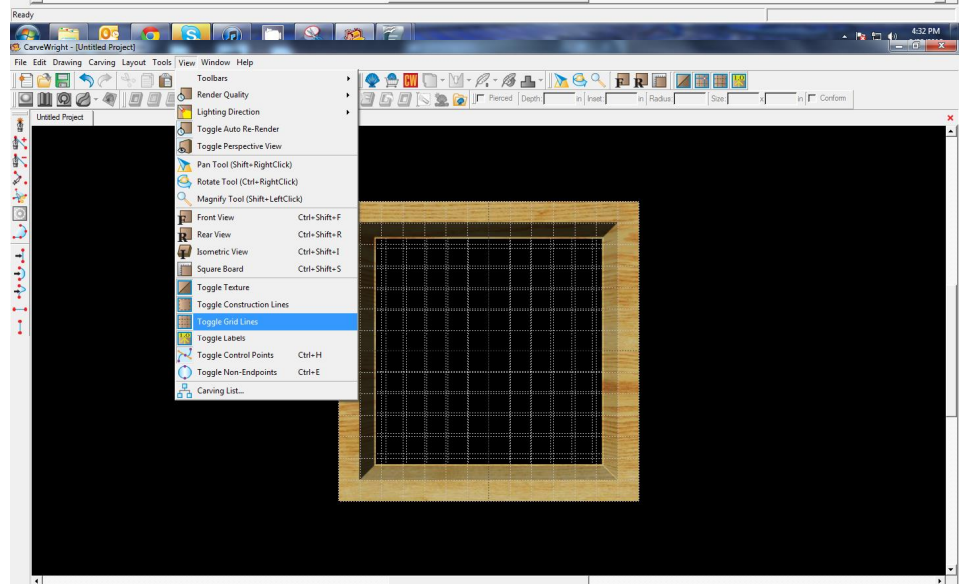
Select the drop-down Feather menu and select ¼" feather.

Select "Accept"



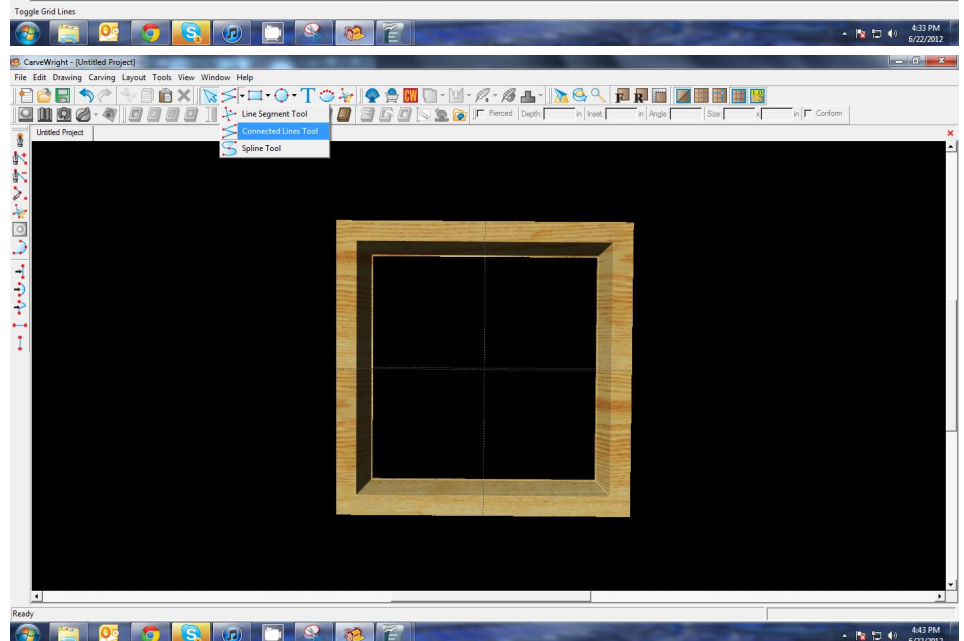
## ✓ SNAP TO GRID

Click "Toggle Snap to Grid" & "Toggle Gridline" icons to turn OFF.



## ✓ DRAWING TOOLS

Select the "Connected Lines" tool.





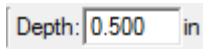
Draw the Sun Rays by clicking in one area to create the first point, move to the next point and click once, so on until you come back to the first point. To make a closed region hover over the first point until you see the “star burst” and click.



Click Carve Region



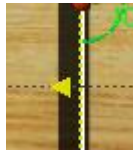
Set depth to .05”



Center Both



Adjust size so that the rays slightly overlap the sides.



✓ DRAWING TOOL

Draw a circle at the intersecting point of your rays.



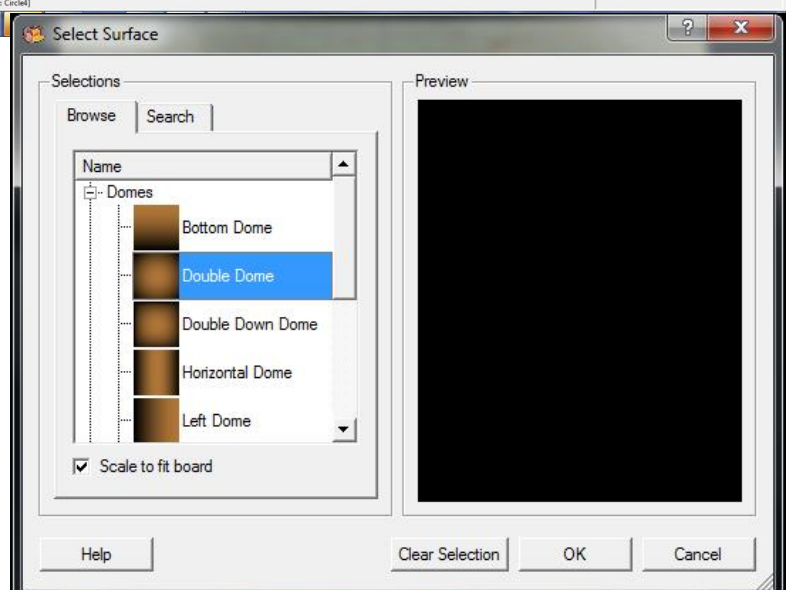
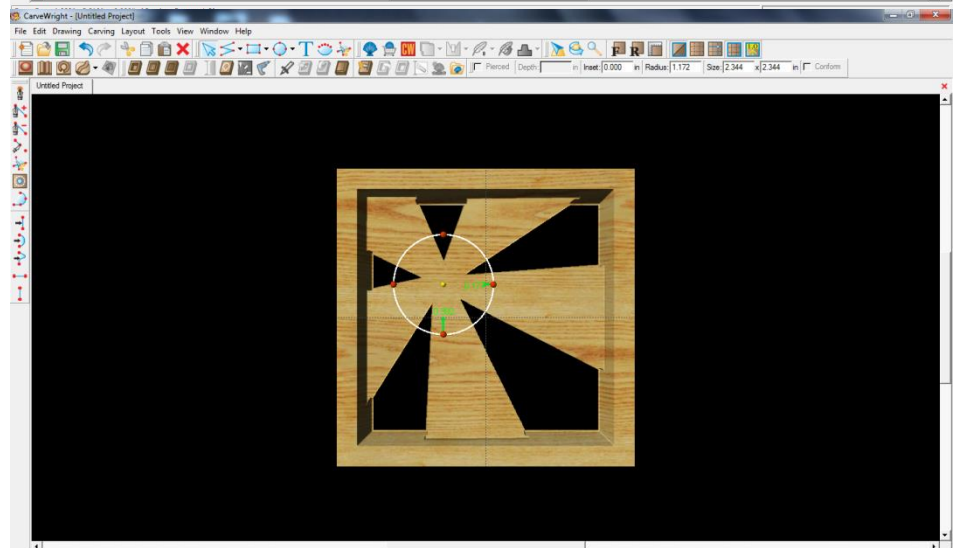
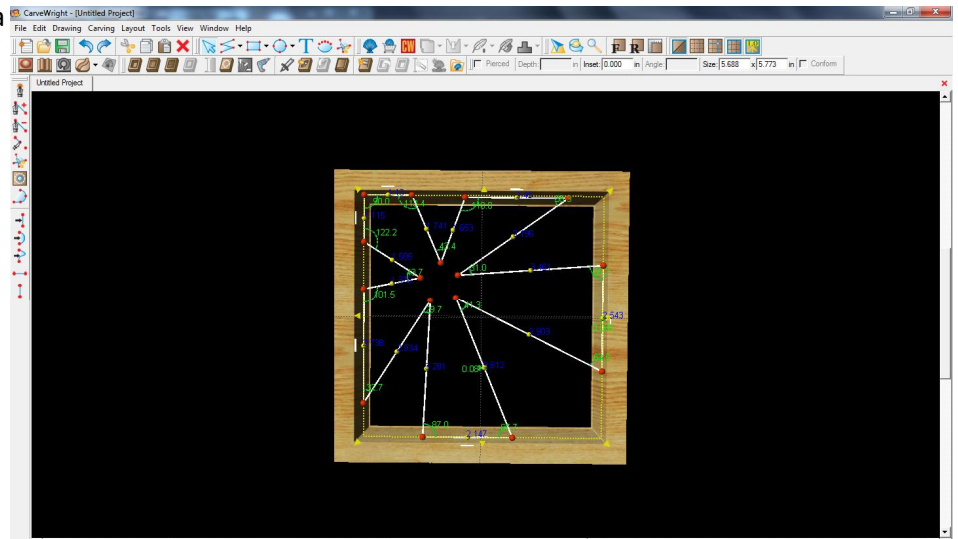
✓ SURFACE

Select “Surface” Icon



Select “Double Dome”

*The darker area is the deepest.*



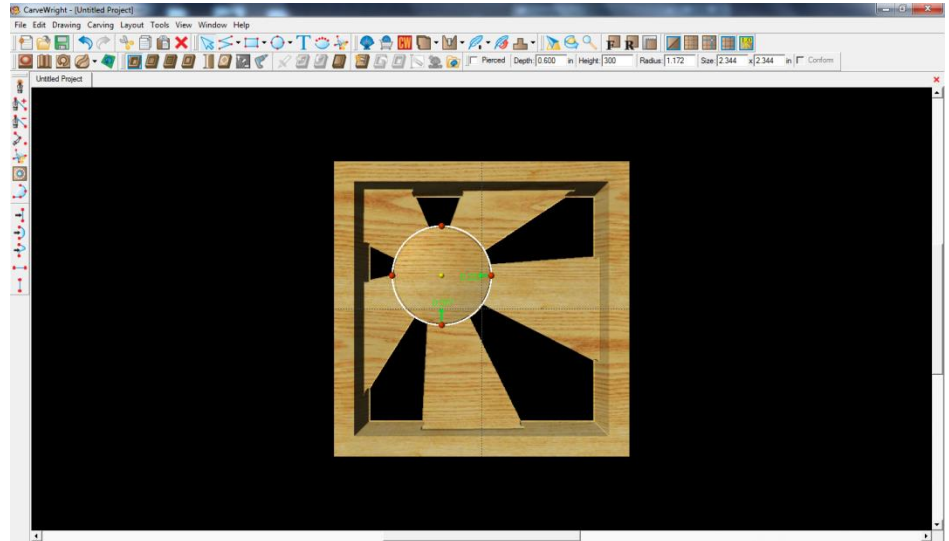
## ✓ FINE TUNING

Set Depth to .06"

Depth: 0.600 in

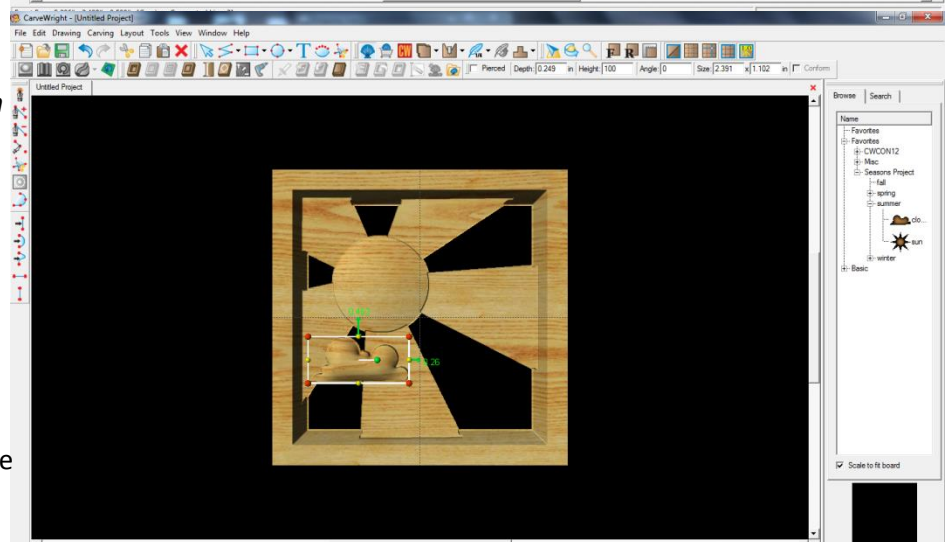
Set Height to 300.

Height: 300



## ✓ LAYERING PATTERNS

*Patterns merge with one another and can be arranged using even the same pattern by overlapping, changing the orientation and varying the size, height and depths you can create your project.*



## ✓ PATTERN PLACEMENT



Select the "Pattern Tool" icon to open the pattern library along the right side.

Select "cloud" under "Season Patterns" in your Favorites library from the summer folder.

Place on project board.

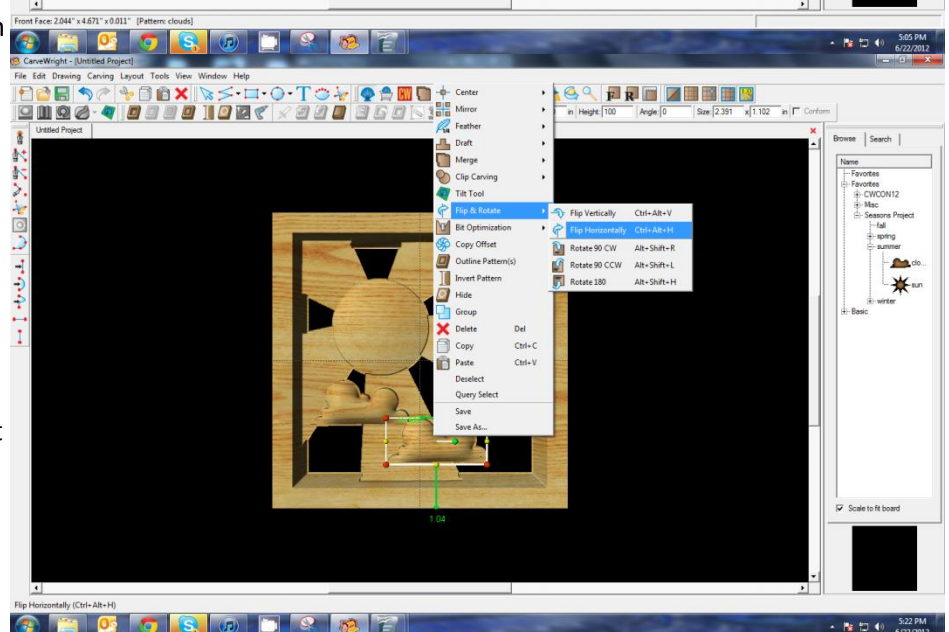
Copy & Paste to add another cloud.

## ✓ FLIP & ROTATE

Right click on the second cloud and select Flip Horizontally.



Resize larger than the first cloud and position slightly overlapping first cloud.



Adjust the depth of the larger cloud to .45" and the height to 50.

Depth: 0.450 in Height: 50

Right Click on the larger cloud; then paste and move to the upper right quadrant of the project.

✓ TEXT TOOL

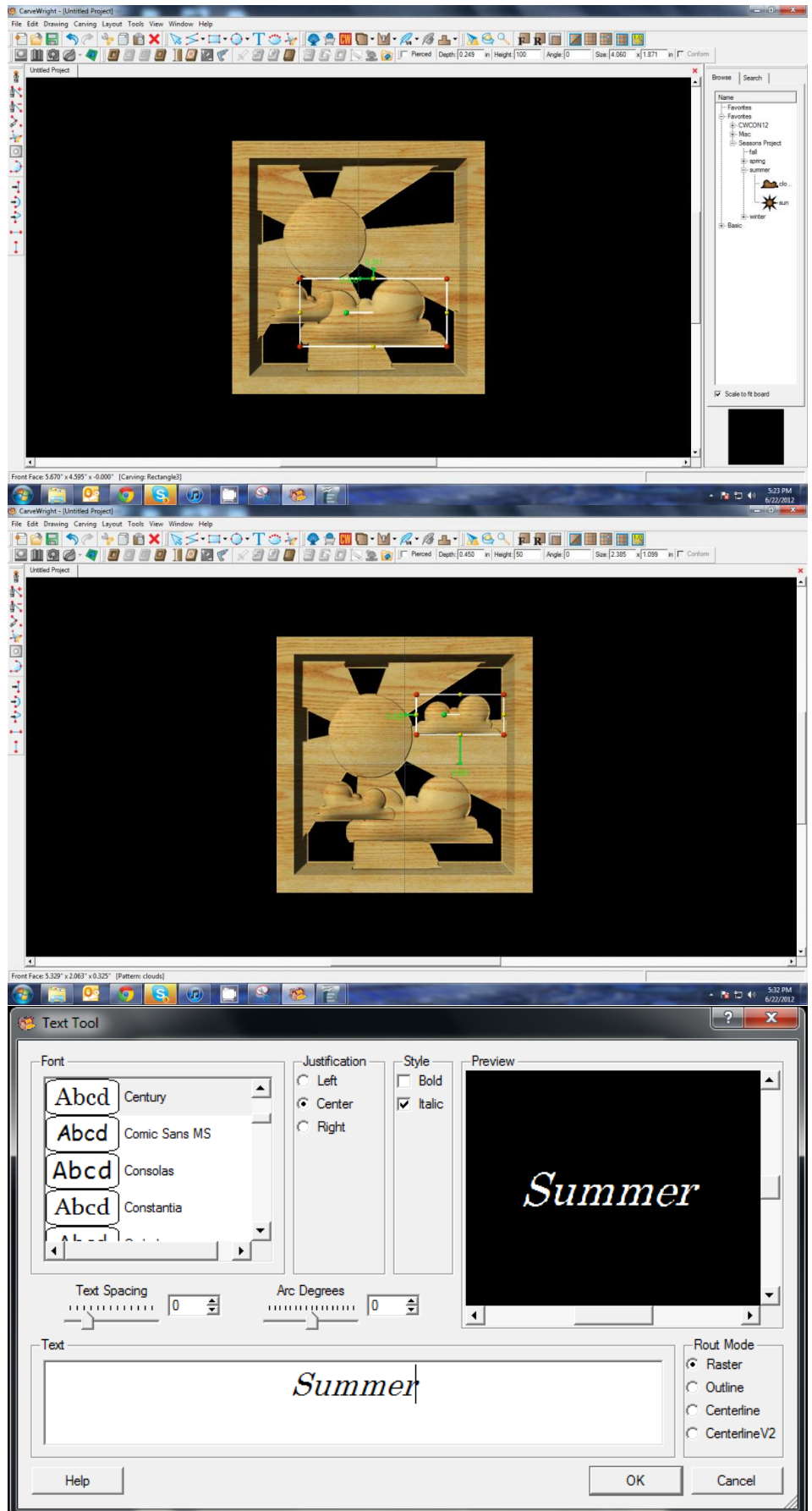


Next, select the "Text Tool" and click on board.

Text dialog box will appear. Select from any of the true type fonts that you have on your computer. *Some work better than others.*

Type the word "Summer"

Select "Raster" from one of the available Rout Modes.

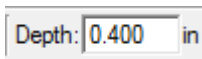


## Center Horizontally



Position the word to go across the Sun and into the Sunray. The entire word should have a background behind it.

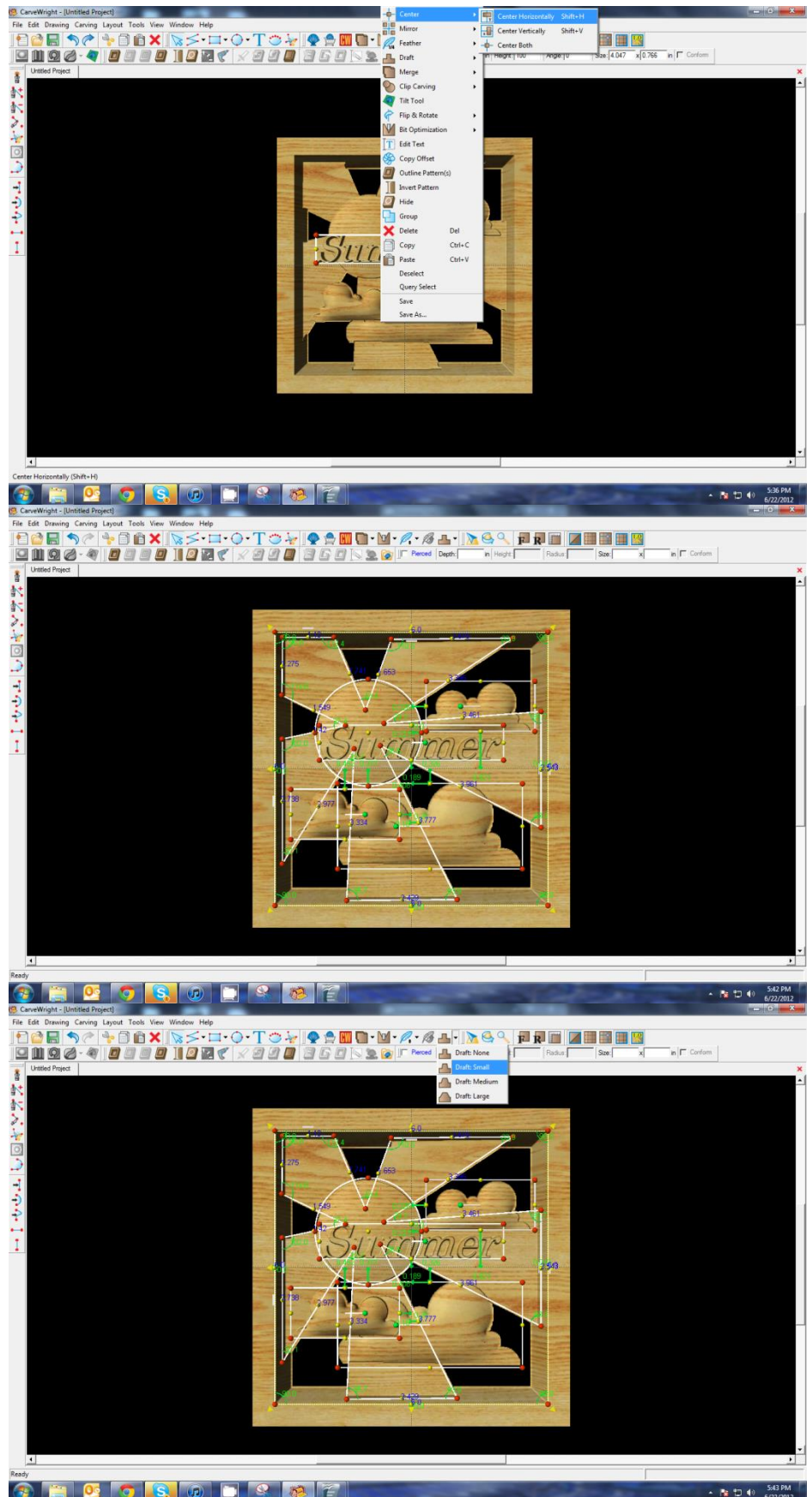
Set Text Depth to .04"



## ✓ SELECT ALL

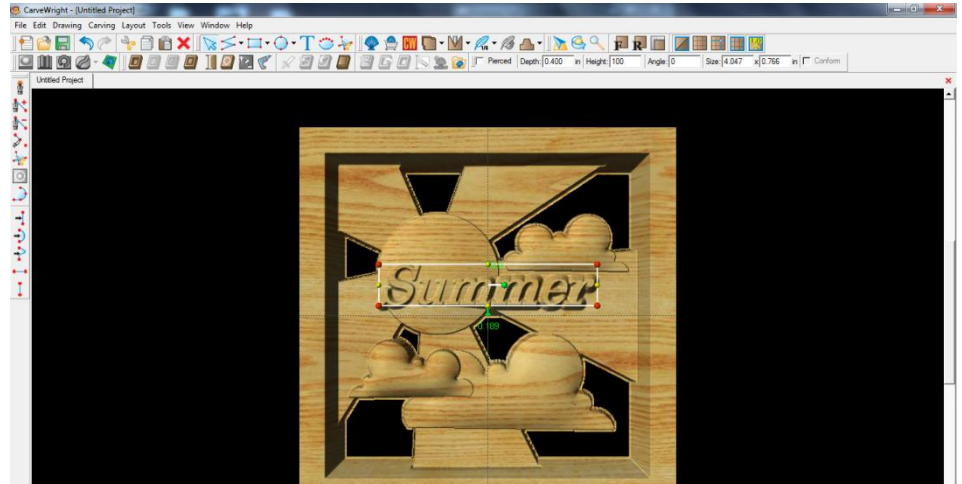
Select all by clicking once on one corner and then holding down the mouse button, drag your mouse to the opposite corner. *You can also right-click on the board (no element selected) and then select Select All.*

With everything selected, click on the "DRAFT" drop-down menu and apply a "Small Draft".





With just the word selected, apply a MEDIUM draft.



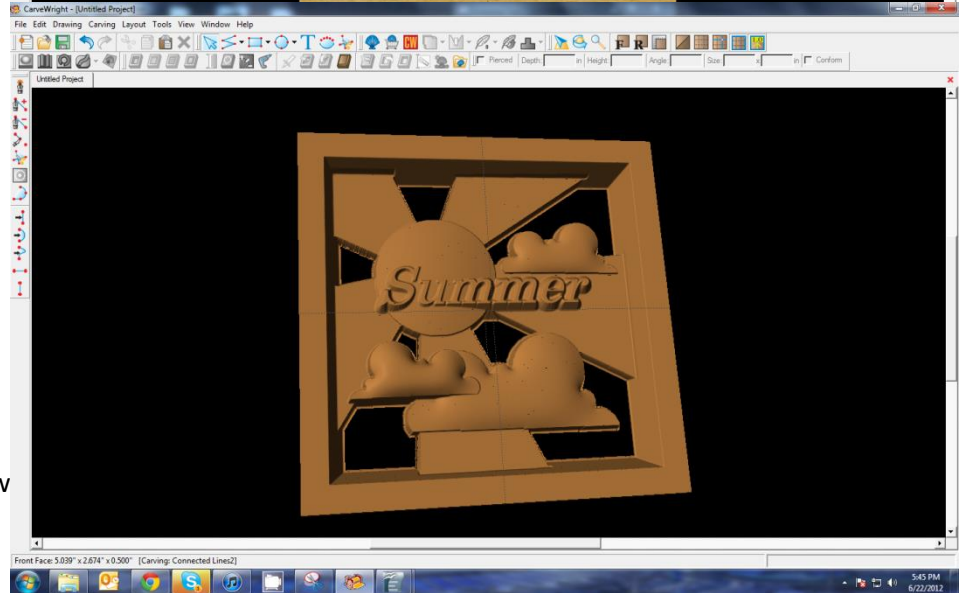
#### ✓ BOARD SETTINGS

Go to View > Toggle Texture to remove wood grain for better viewing.

*Also look at View > Board Settings > Stain/Finish to see how you can change the Wood Type/Stain or Wood Finish. This is a great way to present a proposal to a potential customer.*



Rotate or zoom in on your project to view it from different angles and make any necessary adjustments.



### REMEMBER THESE FUNCTIONS FROM PREVIOUS STEP-BY-STEP PROJECTS

#### ✓ MANAGING DATA

Select "File" > "Save"



#### \*\*\*\*\*IMPORTANT\*\*\*\*\*

**Once a project is uploaded to a memory card, it cannot be brought back from the memory card into the software. Always SAVE YOUR PROJECT on your hard drive. A Projects folder is recommended and you should know where you saved it.**

#### ✓ UPLOADING TO MEMORY CARD

Make sure your Memory Card



& Programmer are properly attached via your USB port, Select "File" > "Upload" to save to your memory card.



### Select Quality Setting

- *DRAFT*
- *NORMAL*
- *BEST*
- *OPTIMUM*

*These settings determine the number of passes the machine makes to carve your project. The more lines the better the surface finish. Make your decision based on material type, fondness of sanding vs. machine time, & test carve vs. final. Notice the estimated carving time differs by quality setting.*

### Name Your Project

*Example:*

*Summersun\_B\_3h30m*

*(recognizable name\_quality setting\_estimated time to carve)*

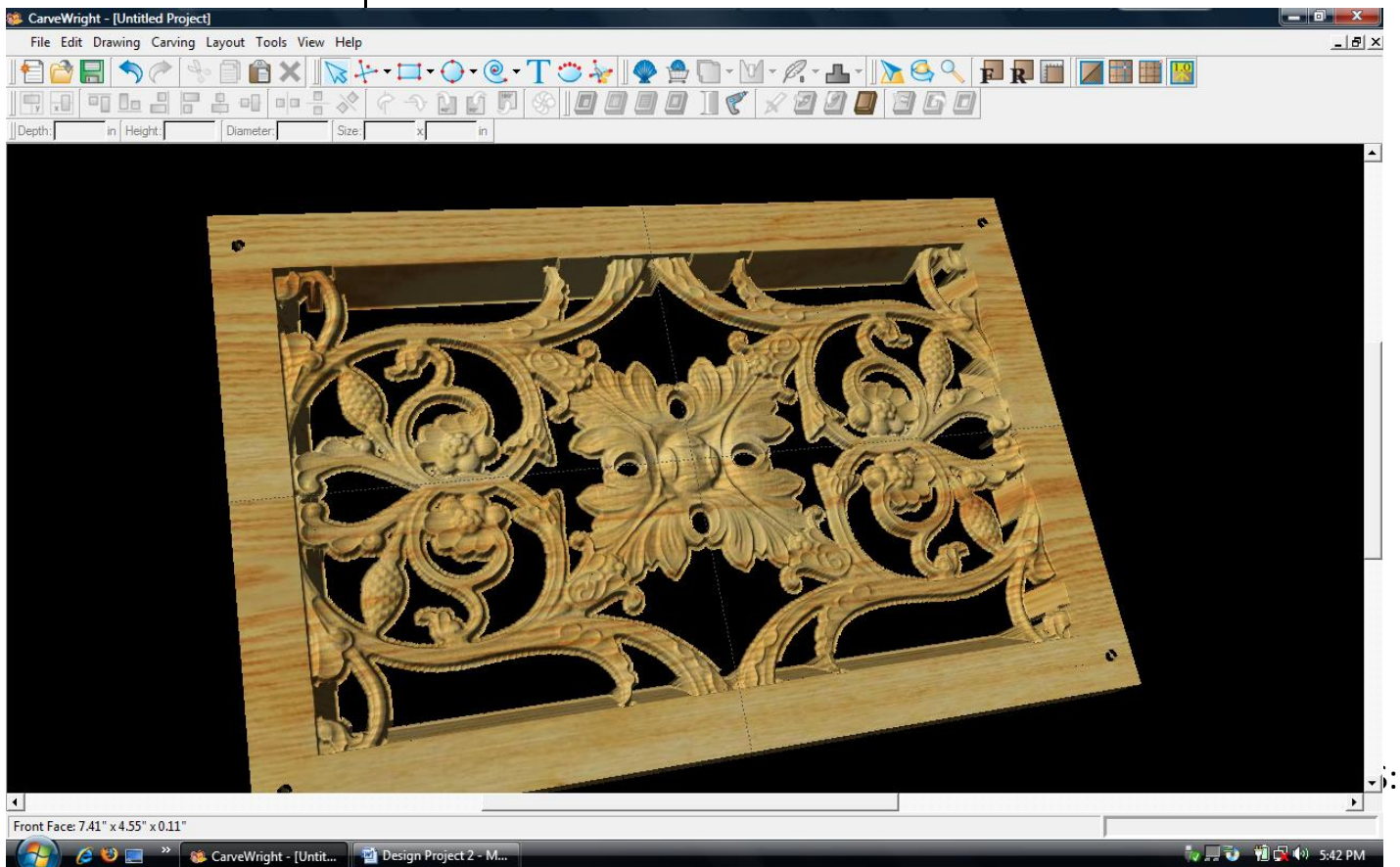
Click "Upload"

NOTE: Actual board to be placed in machine should be 7" longer or you should use a sled that has 3.5 extra inches on each end to STAY UNDER THE ROLLERS.

## PIERCED WIND GRILL

This project covers the following design concepts:

- PATTERN PLACEMENT
- PATTERN MANIPULATION
- FINE TUNING
- ADJUSTING DEPTH & HEIGHT
- DRAWING TOOLS
- REGIONS
- CARVING OPTIMIZATION
- FEATHERING
- CARVING LIST
- BOARD SETTINGS
- MANAGING DATA
- UPLOADING TO MEMORY CARD
- QUALITY SETTINGS
- PIERCED CARVING
- DRILLING HOLES
- CLIP CARVING



➤ STARTING THE SOFTWARE

Open the CarveWright Designer Software

The Welcome screen appears with project options.

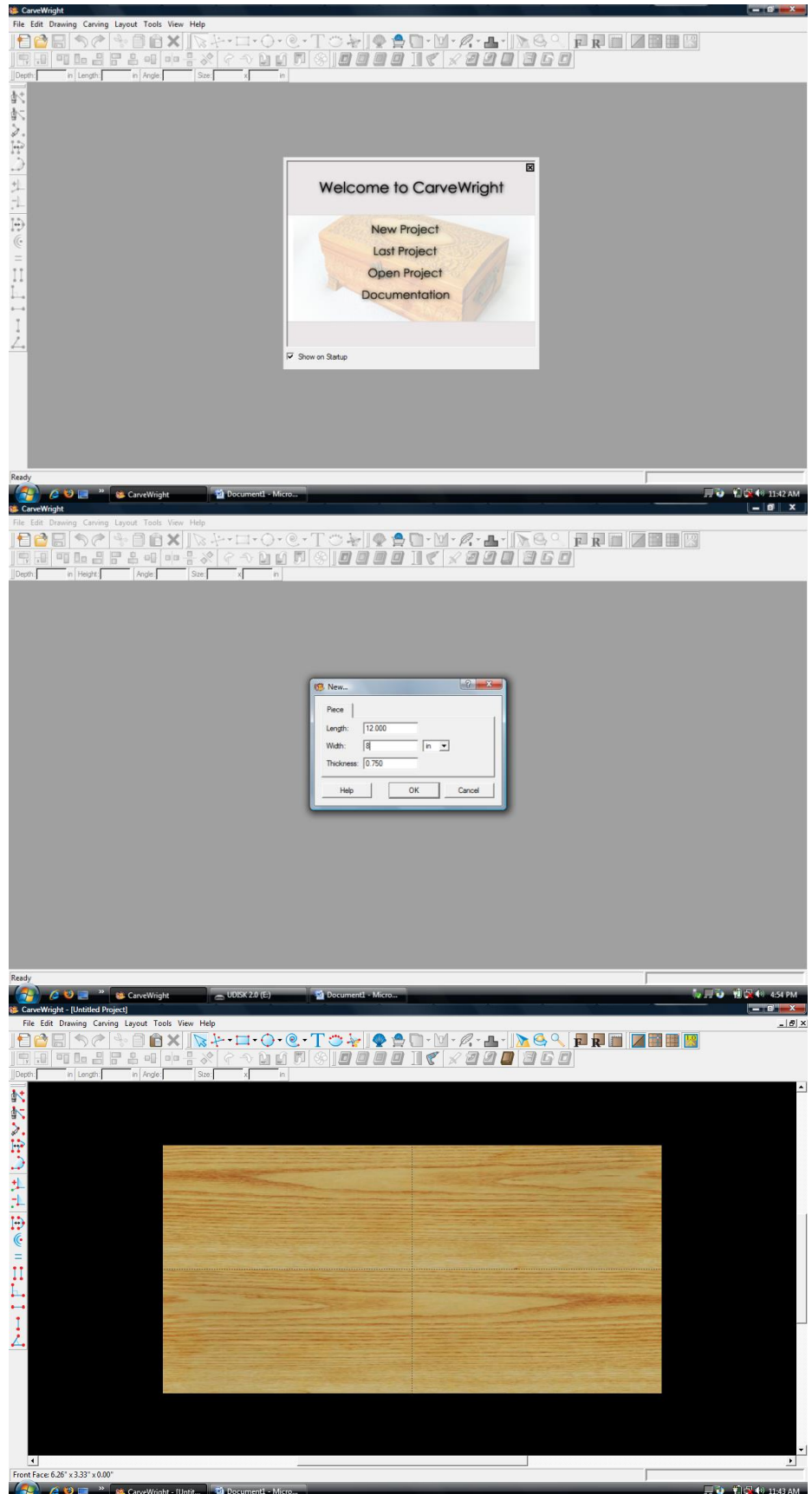


Select “New Project”

Set your board piece dimensions.  
Length: 12”  
Width: 8”  
Thickness: .75”

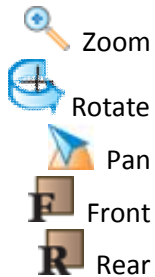
Click ok

➤ MENUS, TOOLBARS OR MOUSE



## ➤ MANIPULATING THE WORKPIECE

Board piece will display on screen in three dimensions.



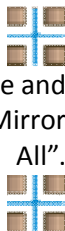
## ➤ DRILL HOLE TOOL



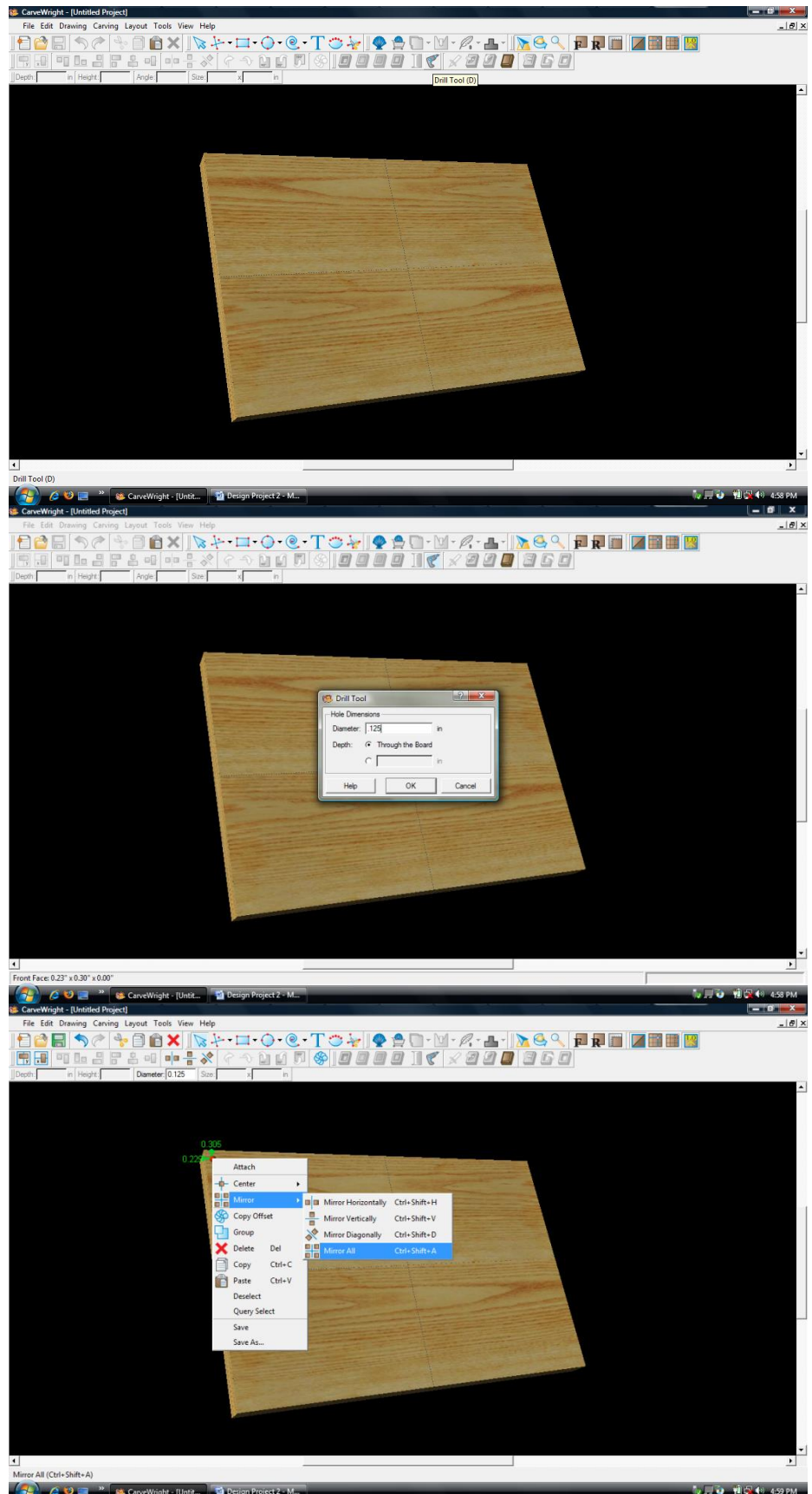
Select the “Drill Hole Tool” and click on the top left corner of the workpiece.

Drill Hole Tool dialog box appears. Type “.125” inch for the diameter of the hole.

## ➤ MIRROR



Right click on the hole and select “Mirror”, “Mirror All”.





Holes should now appear in all four corners.

### ➤ PATTERN PLACEMENT



Select the “pattern tool” to open the pattern library along the right side.

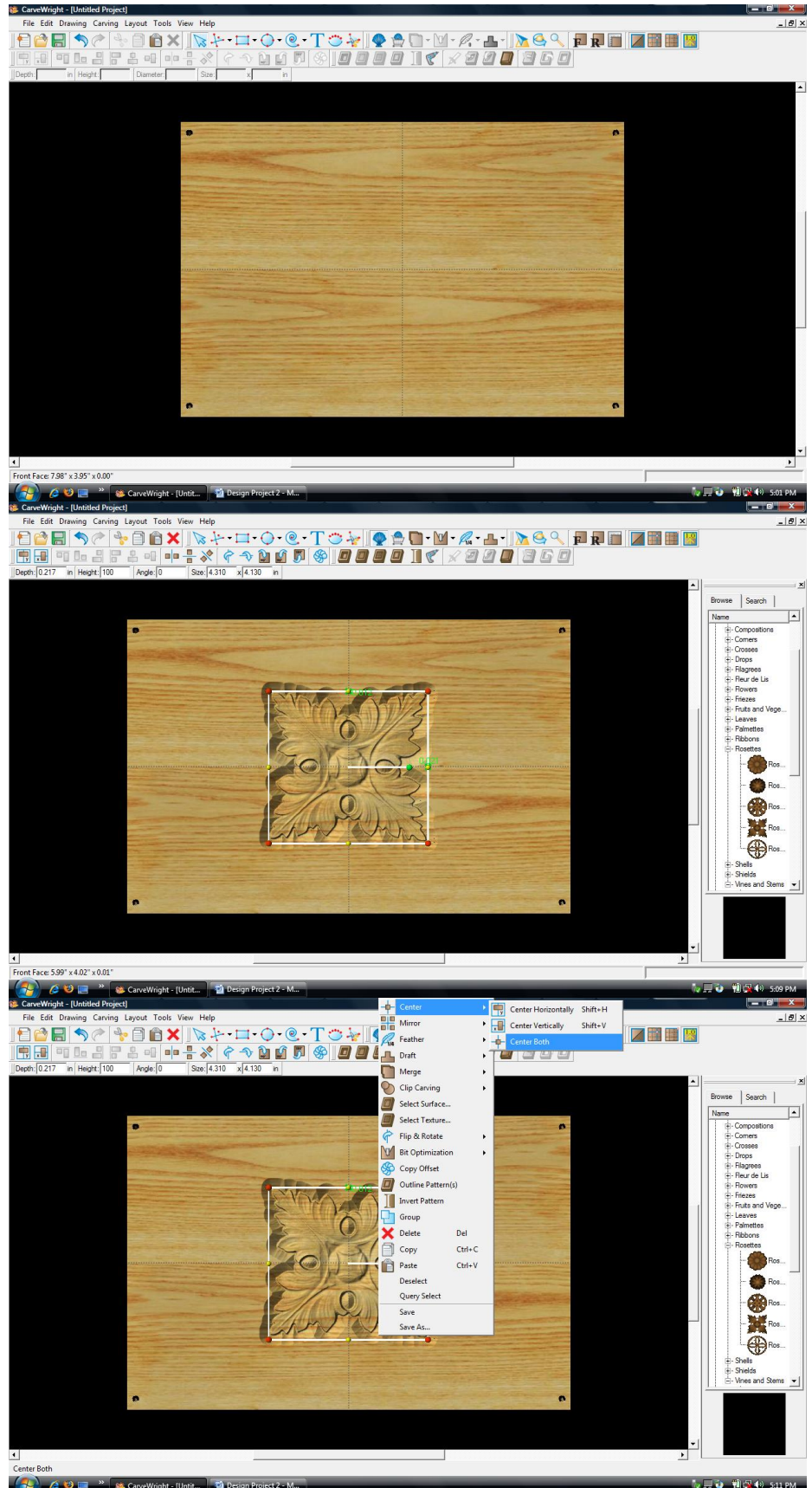
Select “Rosett04” under “Rosettes” and place on board by clicking or drag & drop.

### ➤ CENTERING

Right-Click on “Rosett04” to bring up menu of available options.



Select “Center”, “Center Both”.



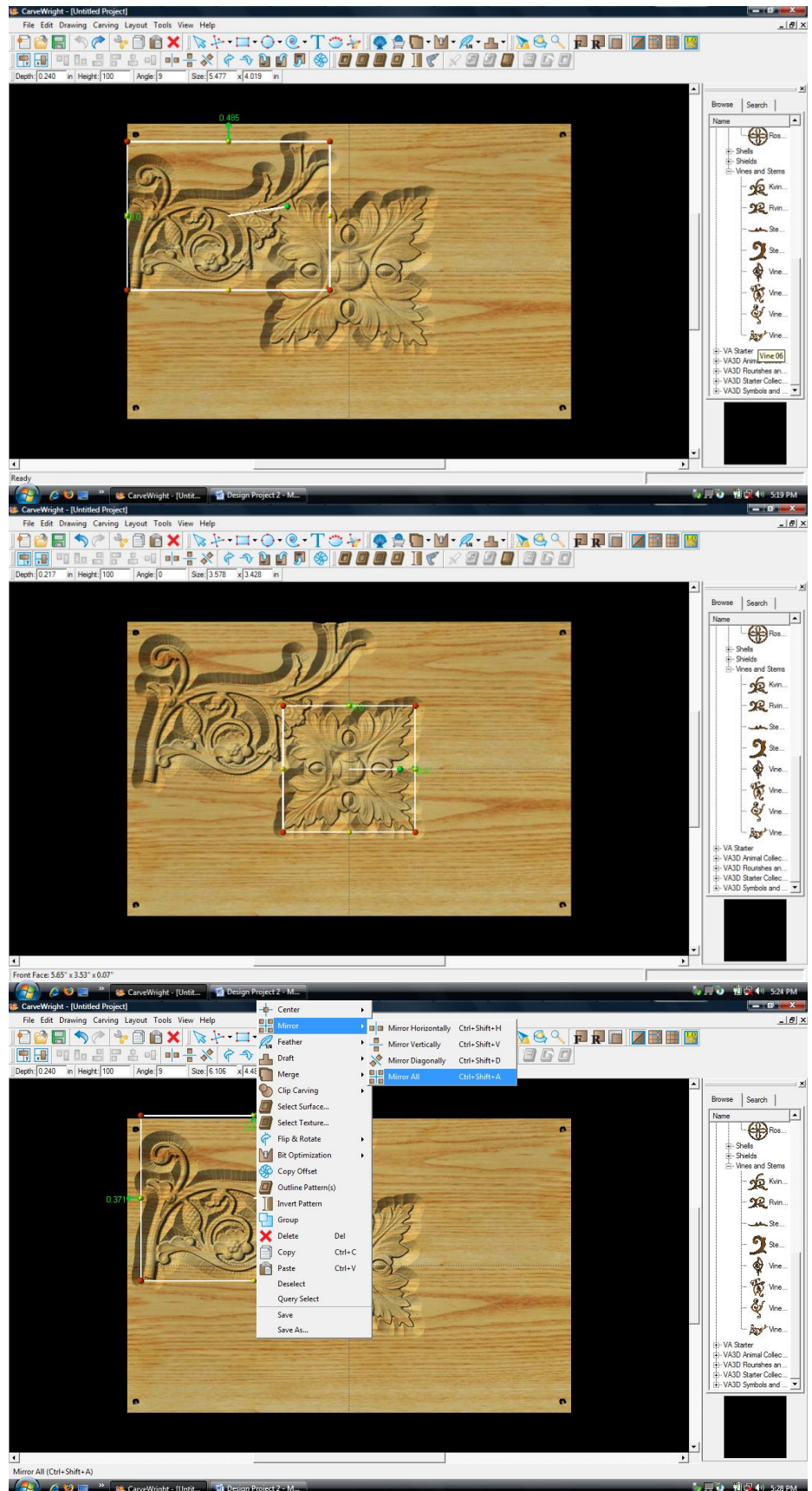




Select “Vine06” under “Vines and Stems” in the Basic Library. Place it onto the board.

Select the “rosette” and scale down the size. Use the Red node to maintain scale.

Select the “vine” pattern, right click and select “Mirror All”.



## ✓ DRAWING TOOLS



Select the “Rectangle Tool”.

Draw Rectangle across the entire board, leaving a 1” border as shown.

## ✓ REGIONS



Select “Carve Region”.

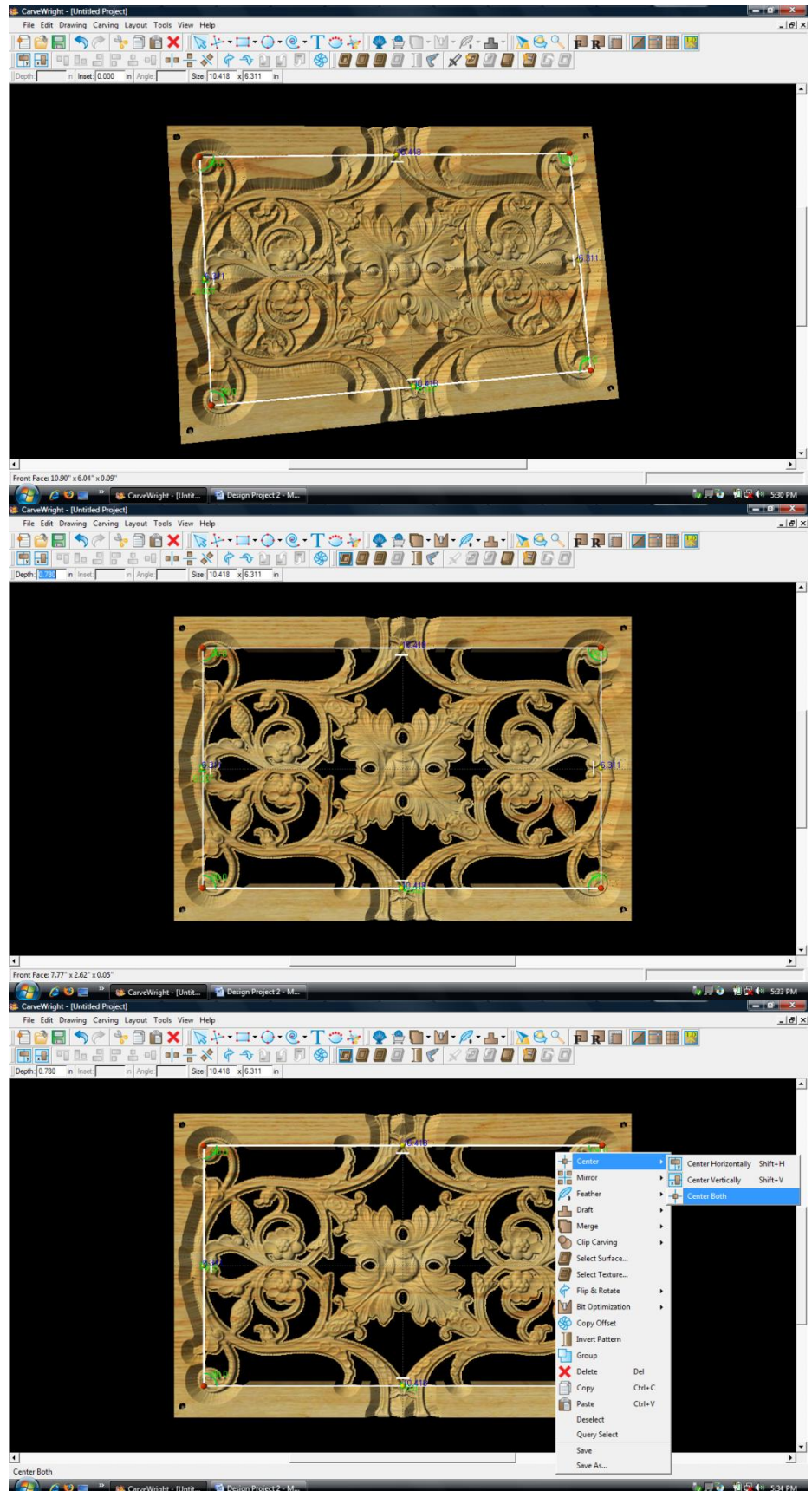
This applies a carved area to the rectangle with a default depth of .78”.

## ➤ CENTERING

With the rectangle selected, right click to bring up menu of available options.



Select “Center”,  
“Center Both”.



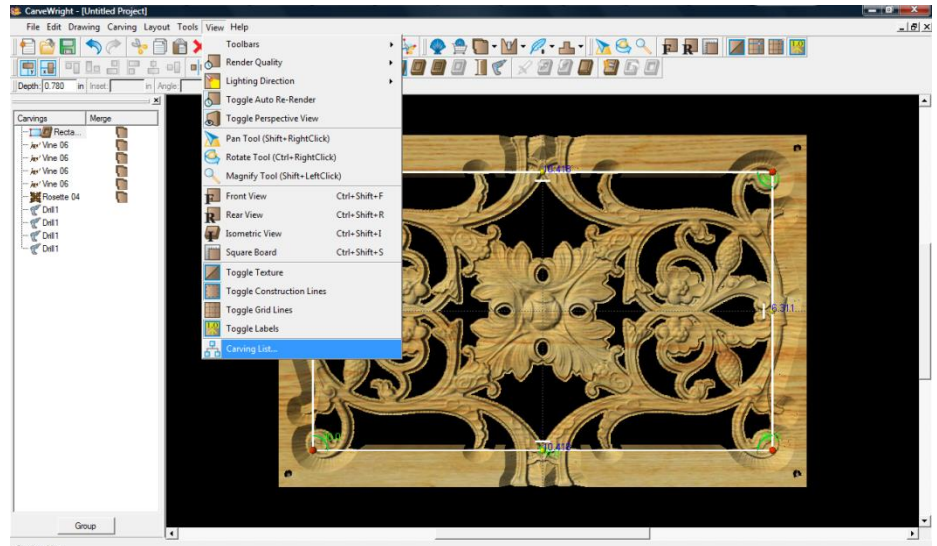


## ➤ CARVING LIST



Select “View” and then  
“Carving List”

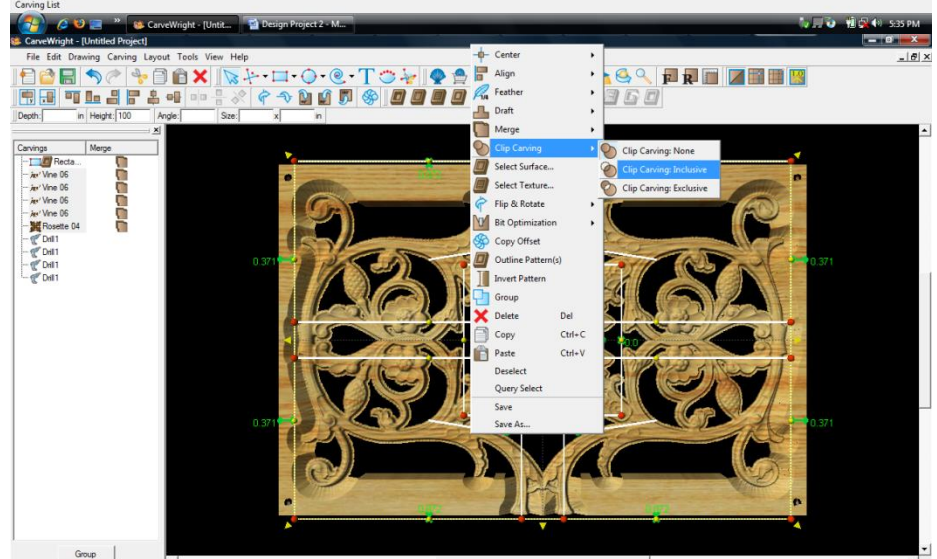
The Carving List opens on  
the left displaying every  
element on the virtual  
design board.



## ➤ CLIP CARVING



Select all of the pattern files  
in the Carving Lists, right  
click and choose “Clip  
Carving Inclusive”.



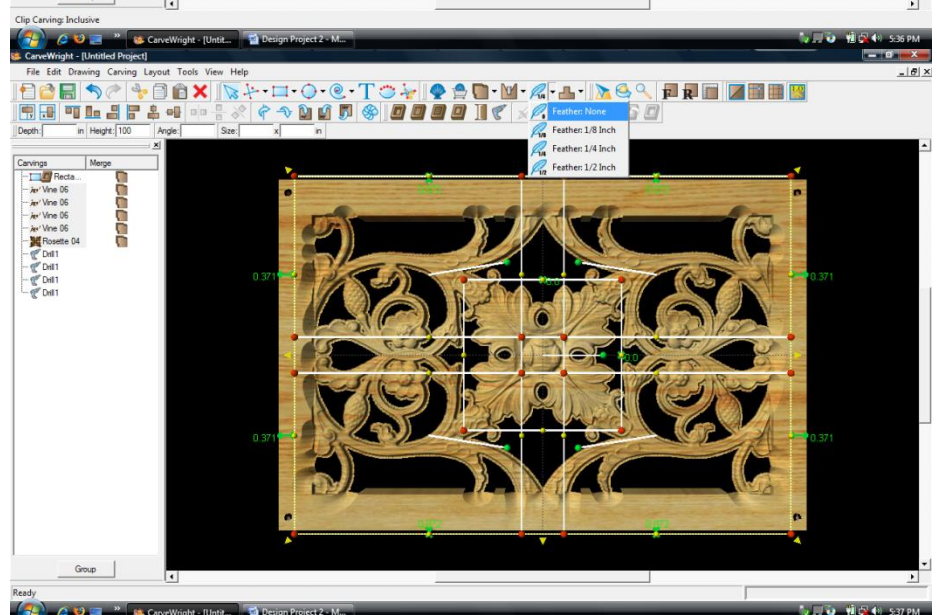
## ➤ CARVING OPTIMIZATION

## ➤ FEATHERING



With the all still selected,  
click on the “Feather Tool”.

From the drop down menu,  
select “Feathering None”.



## ➤ CARVING OPTIMIZATION

### ➤ FEATHERING



Select the Rectangle, right click and select "Feather ¼ inch".

### ➤ MANIPULATING THE WORKPIECE



Rotate and/or zoom your workpiece to see your design board more clearly.



Select "File", "Save"

\*\*\*\*\*IMPORTANT\*\*\*\*\*

Name file and click "Save" to hard drive.

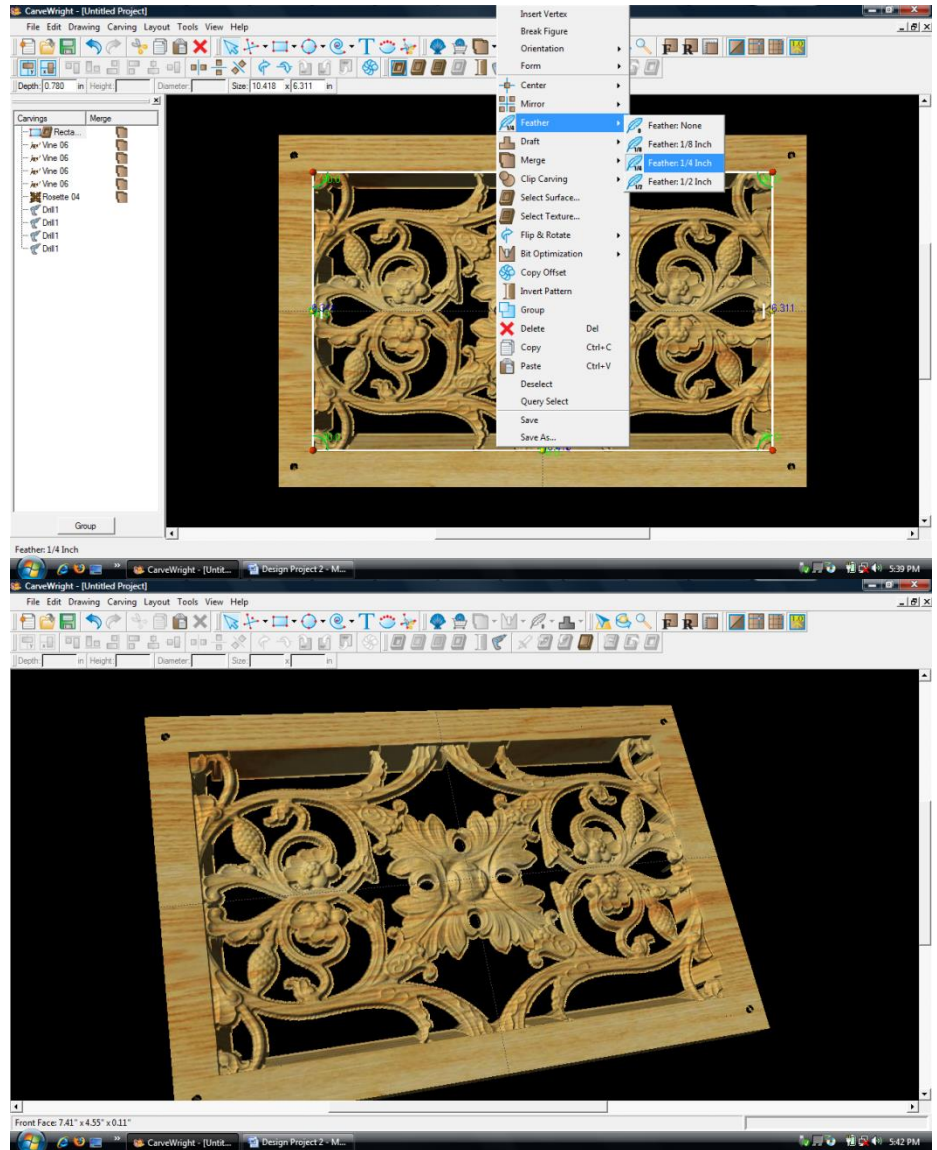
### ➤ UPLOADING TO MEMORY CARD



Select "File", "Upload" Save to memory card.

Example:

*piercedrosette\_N\_45*  
(recognizable name\_quality  
setting\_estimated time to  
carve)



## CARVING CUTOUTS

This project covers the following design concepts:

- ✓ STARTING SOFTWARE
- ✓ PATTERN PLACEMENT
- ✓ PATTERN MANIPULATION
- ✓ PIERCED PATTERN
- ✓ OUTLINE PATTERN – 3 OPTIONS
- ✓ PATH OFFSET
- ✓ CONNECTED LINES TOOL
- ✓ PIERCED CARVE REGION
- ✓ ADD FEATHERING
- ✓ CREATE TABS
- ✓ LINE SEGMENT TOOL
- ✓ SET TABS
- ✓ FINETUNING
- ✓ SAVE & UPLOADING TO MEMORY CARD

This technique, generally, means your project will be done with only the carving bit. There would be no need for the measuring of both the carving & cutting bits during setup, or bit changes. It eliminates the chances of the cut path not lining up with the pattern and avoids the use of the cutting bit altogether.





## INSTRUCTIONS:

### ✓ STARTING SOFTWARE

Open the CarveWright Project Designer Software

*The Welcome screen appears with project options.*  
Select “New Project”

Set your project board dimensions.

Length: 20”

Width: 14”

Thickness: .75”

*Remember your actual board should be bigger than your virtual board unless you are using a sled.*

Click OK

### ✓ PATTERN PLACEMENT

Open the Pattern Library Tool and select the STAR from the BASIC folder under CENTERS AND FILLS.

*To place a pattern, you can either click once on the pattern and then once on the virtual board or you can click and drag it onto the board.*

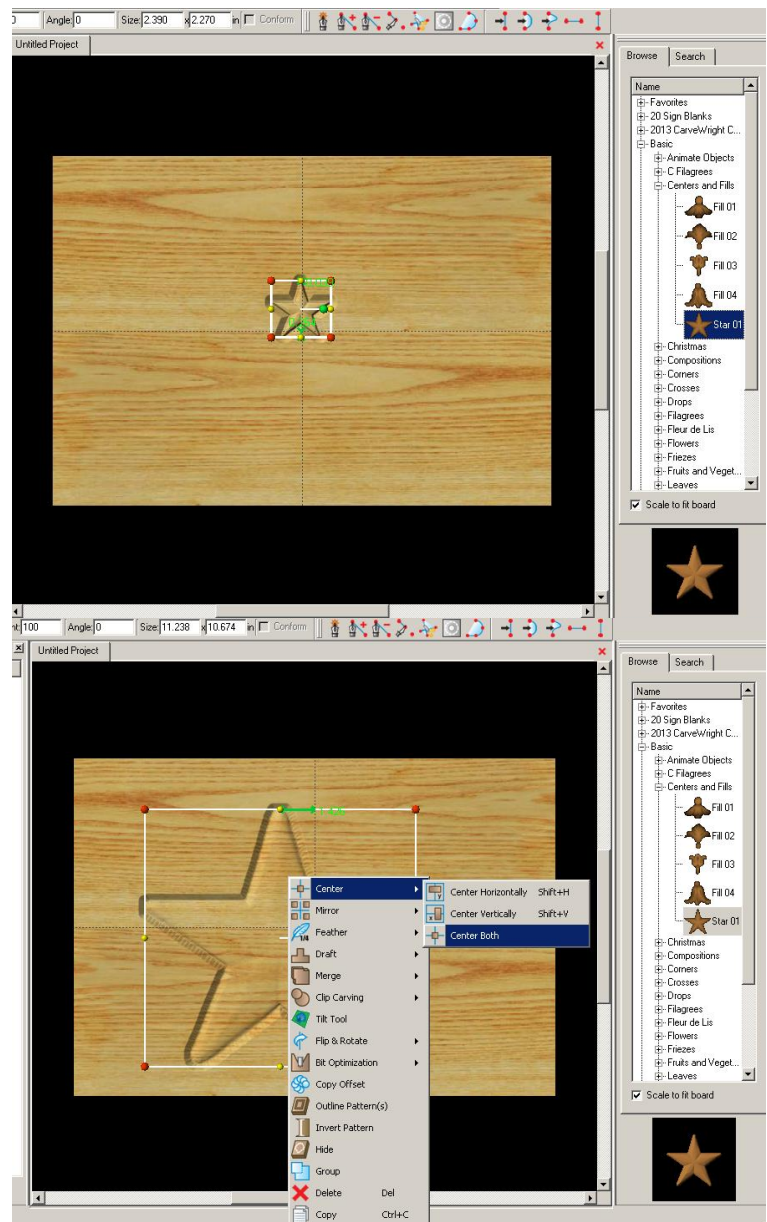
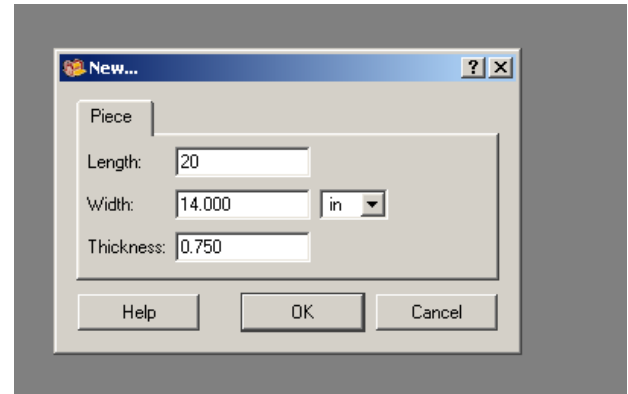
*If you double click on the pattern, it will attempt to open it in Pattern Editor software and give you a message that “You may only edit unlicensed patterns, which you have authored.” Pattern Editor is also an advanced feature that you may not have purchased or activated.*

### ✓ PATTERN MANIPULATION

Resize to fit using one of the corner red knobs, so that your pattern stays proportional and is not skewed.

*Remember to keep at least a ½” away from the top portion of the board, so as not to interfere with the tracking roller.*

Right-click on the pattern and select CENTER & CENTER BOTH to center it on the board both horizontally & vertically.



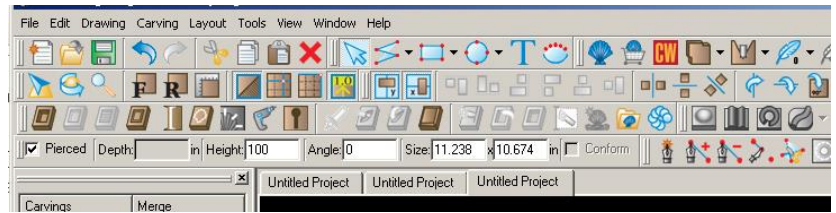
*This will lock the pattern into place and you will not be able to move the pattern placement until you go back and select again to toggle that feature off.*

## ✓ PIERCE PATTERN

With the pattern selected, click the Pierced button on the Input Toolbar.

*This sets the depth of the pattern to the bottom of the board.*

Change the FEATHERING to NONE.



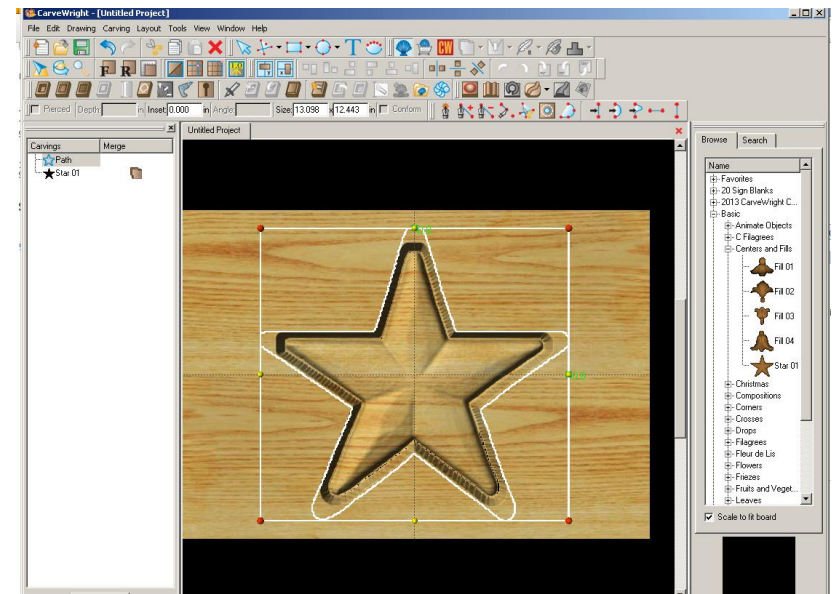
## ✓ OUTLINE PATTERN

**THREE WAYS TO OUTLINE:**

**Option 1:** Uses the drawing tools in the Designer Software (1.X & 2.X)

With some patterns, you can right-click on the pattern and select OUTLINE PATTERN and then enlarge it to fit around the pattern.

Center outline path.



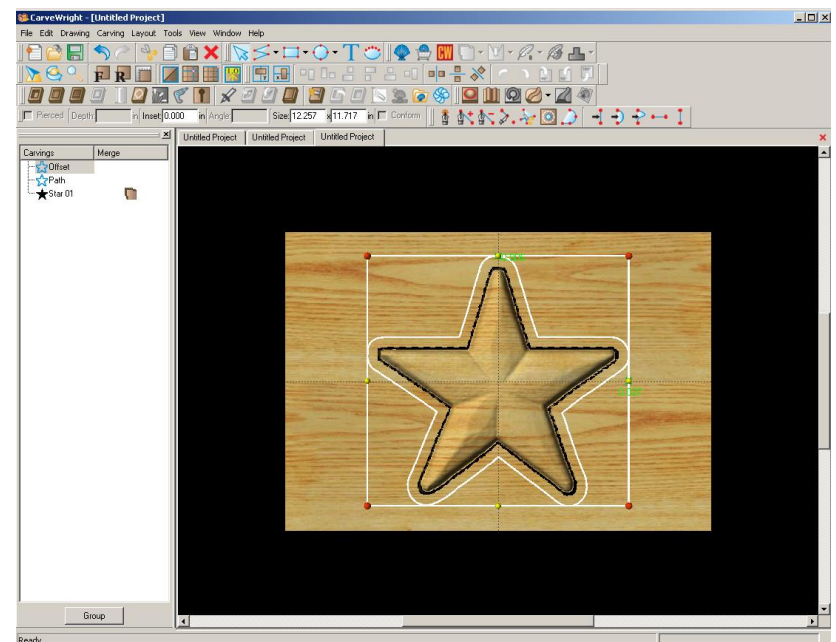
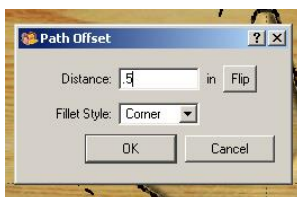
**Option 2:** Uses the PATH OFFSET tool that is part of the advanced 2D Vector Drawing Suite (purchase required).

With the pattern selected, right-click and select OUTLINE PATTERN. Then select the PATH from your Carving List.

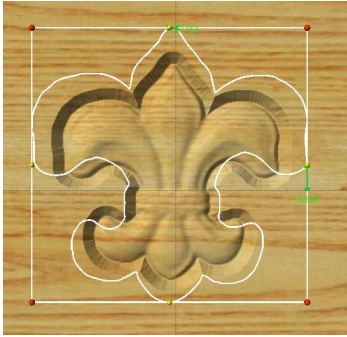


## ✓ PATH OFFSET

Click on the PATH OFFSET tool and set the distance from the path to offset the outline. I selected .5 and hit OK.



### Option 3: Uses the drawing tools in the Designer Software (1.X or 2.X)



Because of the shape of some patterns, it is not always possible to use options 1 or 2. You will instead need to manually draw a path around the pattern using the CONNECTED LINES TOOL.

#### ✓ CONNECTED LINES TOOL

Click on the Connected Lines Tool from the DRAWING TOOLBAR. Outline around the shape close to it, but not touching or crossing the pattern.

*To close the shape make sure you get the STARBURST. When you have a closed path, the CUT PATH Tool will become an option. If it is not, play with the ends of the connected lines until they become closed.*

#### ✓ PIERCED CARVE REGION

Now that you have a closed region, we are going to select the Carve Region tool and then select PIERCED.

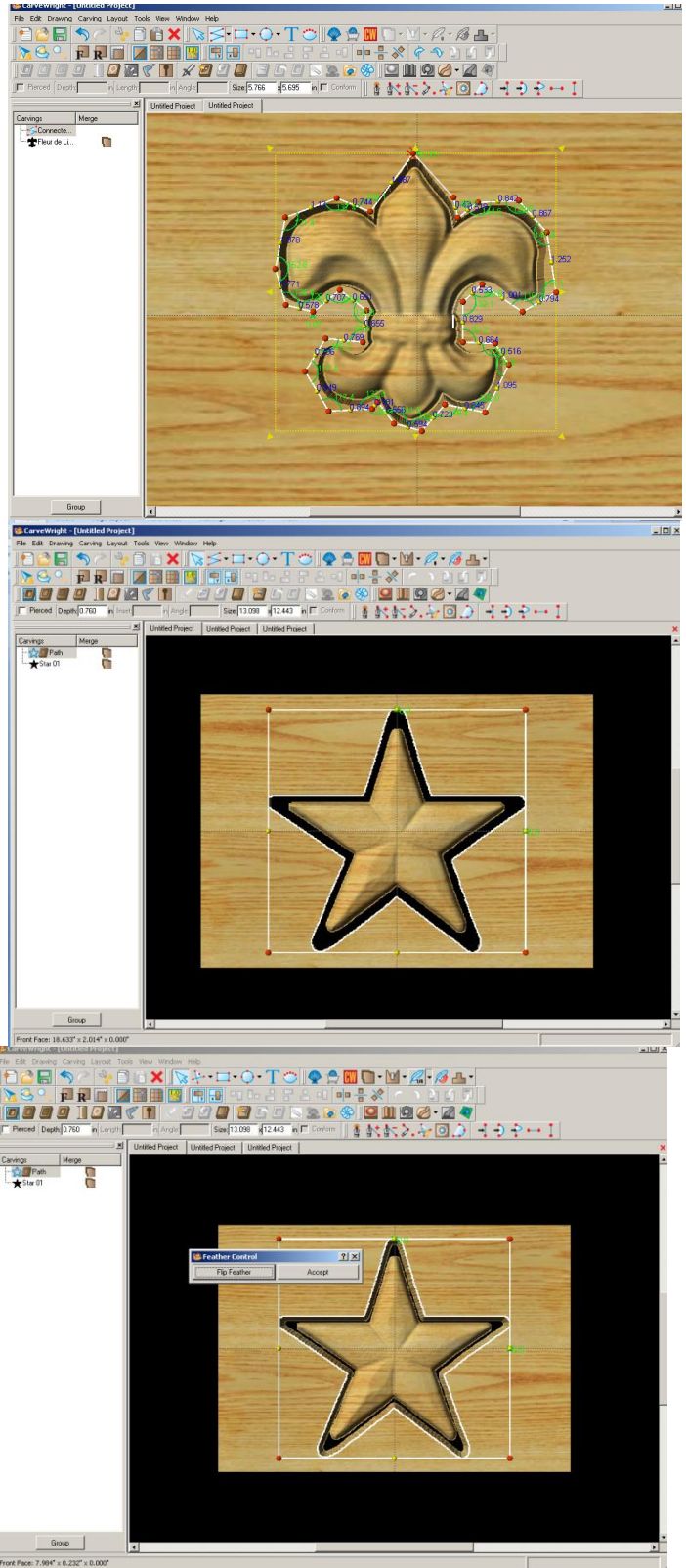
*Remember, because there are two separate belts pulling your board through and a space between them, your carving bit will NOT carve into the belts or machine. You will need to make sure that it does not interfere with the tracking roller. If you are closer than a 1/2", it will give you a warning message.*

#### ✓ ADD FEATHERING

*Cliffs are straight up and down edges that the top part of the tapered carving bit may hit. To avoid this, add a feathering to give it a ramped area to carve.*

Select path & Feathering tool, feathering size that gets you close to pattern, but not connected, and Accept it on the inside of the path.

*You may need to look at the back of the board to see how close you are and make adjustments.*





### ✓ CREATE TABS

*To keep from having a loose piece floating around in your machine, we will create tabs to hold the pattern to the project board.*

### ✓ LINE SEGMENT TOOL

*First, you will need to use the LINE SEGMENT TOOL from your drawing toolbar.*

Draw lines across the pattern and carve region to connect the pattern to the board.

### ✓ SET TABS



Click on the Tabs icon and select the settings. *(I usually just let it default and hit OK.)*

### ✓ FINETUNING

*You can look at the REAR of the board to see the tab placement and if there are any changes you would like to make. Don't forget to consider adding DRAFT or BIT OPTIMIZATION to your pattern.*

### ✓ SAVE & UPLOAD TO CARD



Select "File" > "Save"

\*\*\*\*\*IMPORTANT\*\*\*\*\*

**Once a project is uploaded to a memory card, it cannot be brought back from the memory card into the Software. Always SAVE YOUR PROJECT on your hard drive. A Projects folder is recommended and you should know where you saved it.**

### ✓ UPLOADING TO MEMORY CARD

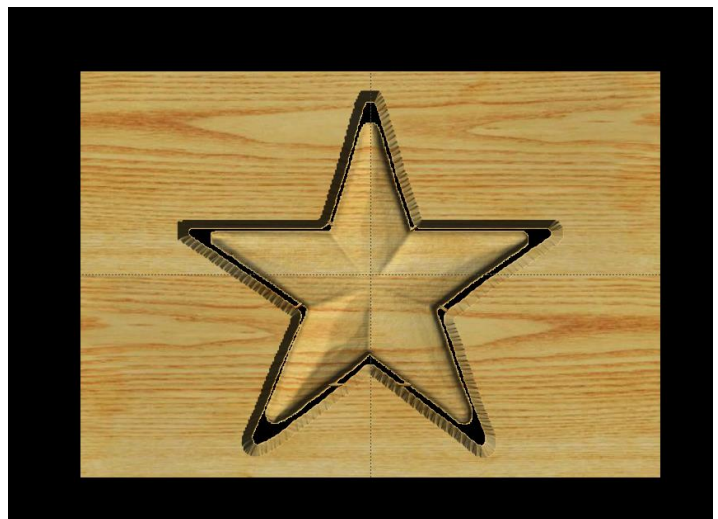
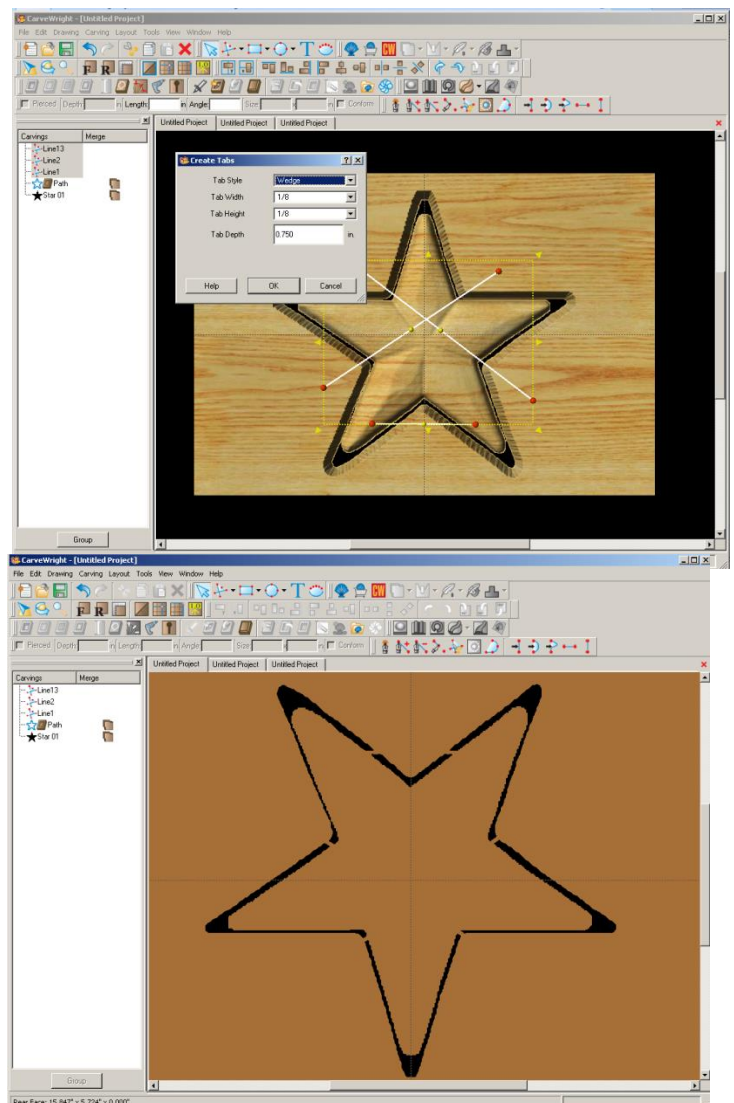


Make sure your Memory Card & Programmer are properly attached via your USB port, Select "File" > "Upload" to save to your memory card.

Select Quality Setting

Name Your Project

Click "Upload"





## RED ROOSTER COFFEE

This project uses only PROJECT DESIGNER SOFTWARE and covers the following design concepts:

- ✓ STARTING SOFTWARE
- ✓ MENUS, TOOLBARS, SHORTCUT KEYS OR MOUSE BUTTONS
- ✓ MANIPULATING THE WORKPIECE
- ✓ SNAP TO GRID
- ✓ DRAWING TOOLS
- ✓ CARVE REGION
- ✓ FEATHERING
- ✓ DOWNLOAD PATTERN
- ✓ PATTERN PLACEMENT
- ✓ COPY & PASTE
- ✓ FINE TUNING
- ✓ TEXT TOOL
- ✓ CENTERING
- ✓ ADJUSTING DEPTH
- ✓ MIRRORING TEXT
- ✓ UNDO
- ✓ COPY & PASTE
- ✓ CONSTRAINTS
- ✓ IMPORTING IMAGES
- ✓ CLIP CARVE
- ✓ MANAGING DATA
- ✓ UPLOADING TO MEMORY CARD
- ✓ SELECT QUALITY SETTING
- ✓ NAME PROJECT



## INSTRUCTIONS:

### ✓ STARTING THE SOFTWARE

Open the CarveWright Project Designer Software

*The Welcome screen appears with project options.*



Select "New Project"

Set your project board dimensions.

Length: 24"

Width: 14"

Thickness: .75"

Click OK

*The project board size is not necessarily the actual size of the board being put into machine.*

### ✓ MENUS, TOOLBARS, SHORTCUT KEYS OR MOUSE BUTTONS

*For every software function, we provide you three distinct ways to access that function. They are usually menu, icon or right-click. Some common functions, such as Copy and Paste, also use shortcut keys. These will also work in Project Designer.*

### ✓ MANIPULATING THE WORKPIECE

*Board piece will display on screen in three dimensions. You can use these tools to get a different view of your project board.*



Zoom



Rotate



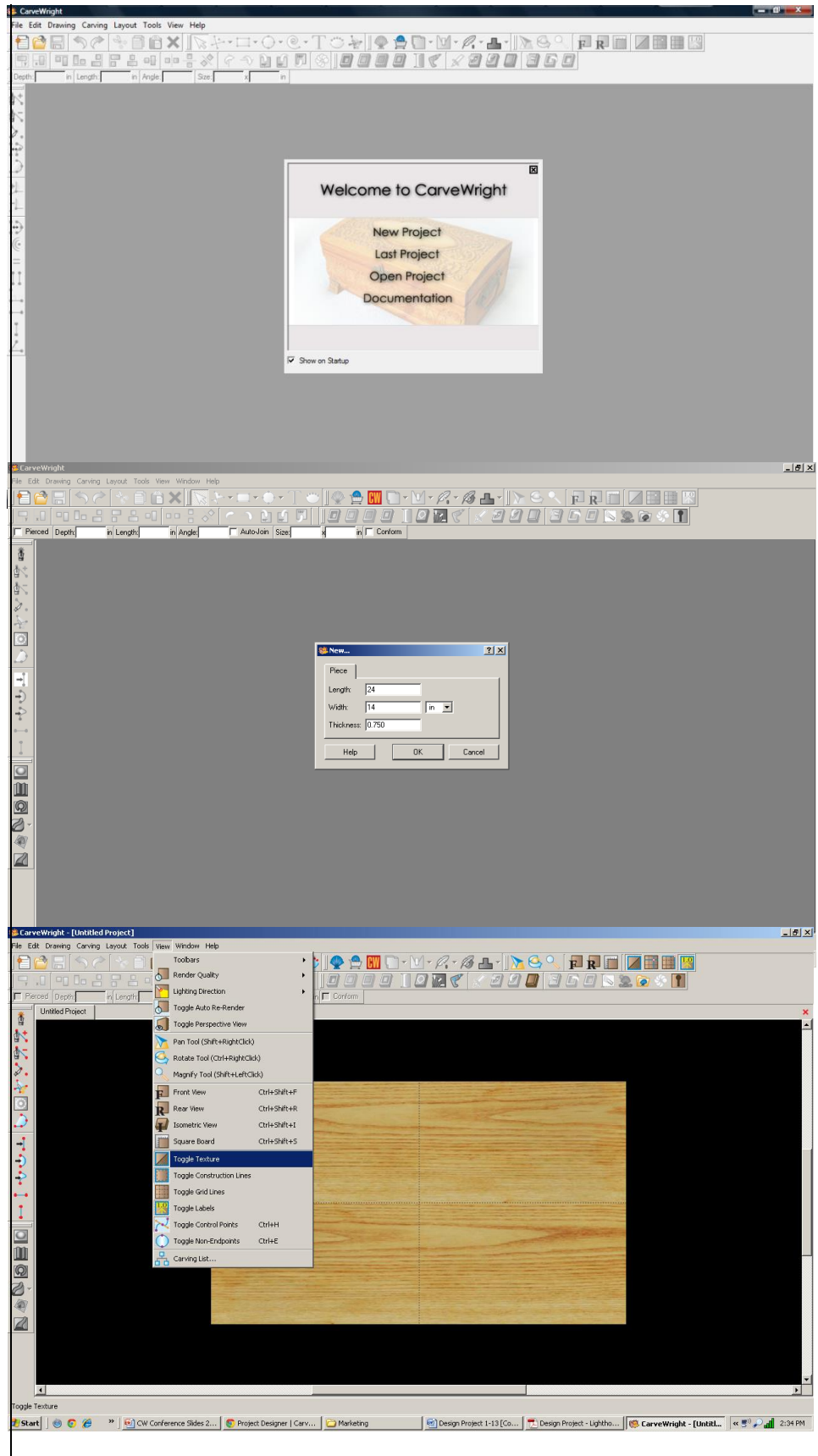
Pan



Front



Rear



Toggle Texture to turn off the wood grain.

## ✓ SNAP TO GRID

Under LAYOUT menu, select SNAP.

Snap Interval should be .5 inch interval by default.

Change interval to: 1 inch

Check boxes:

- Snap to grid
- View grid
- View Bezier Control Points (should already be selected as default)

Click ok

Click the Front icon and zoom in to get closer to the project board.

## ✓ DRAWING TOOLS



Using the grid, draw a rectangle 1" inside the project board from sides & top. Make it 22" long & 9" tall.

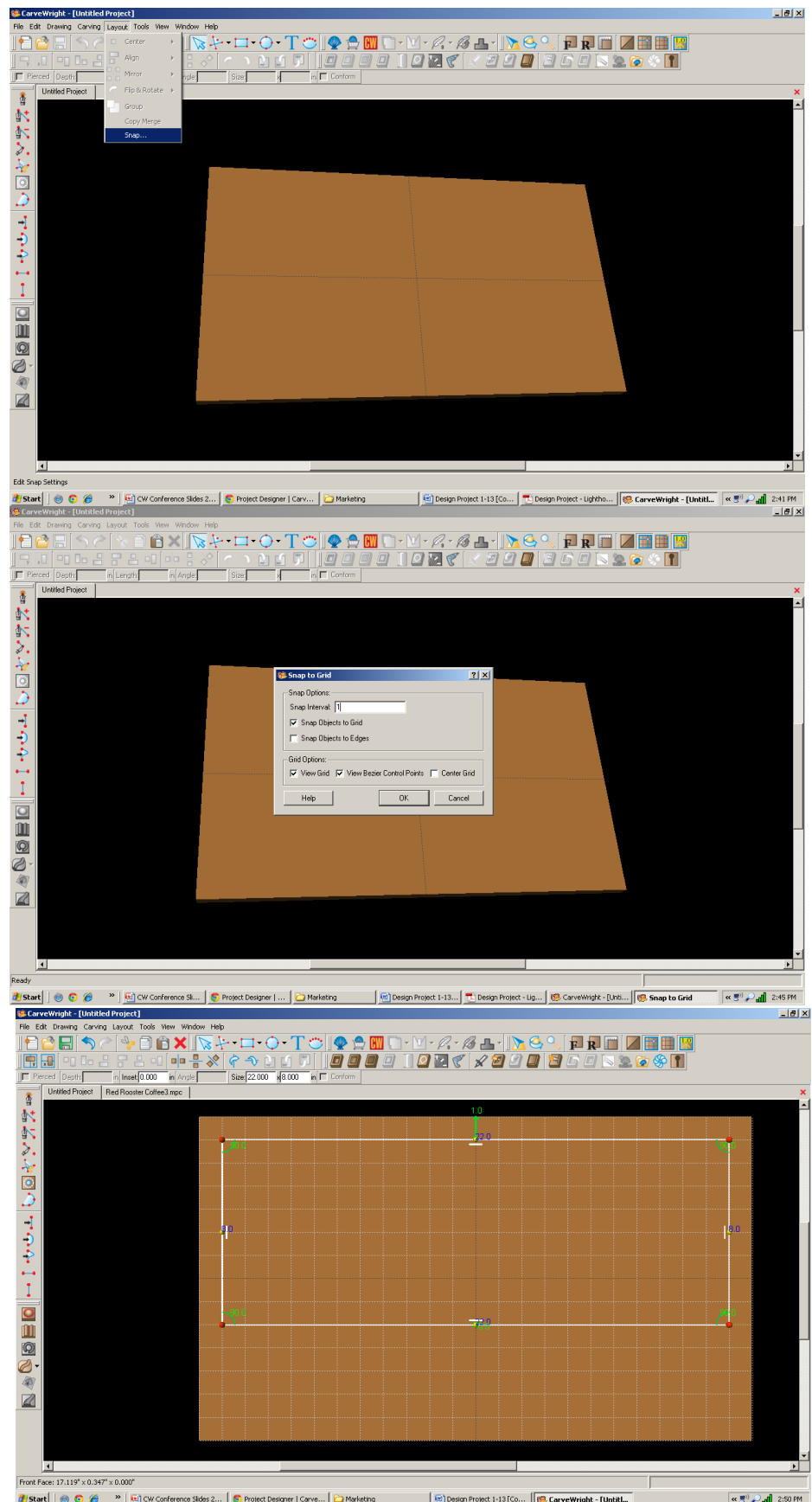
Select the "Pattern Tool" icon to open the pattern library along the right side.

## ✓ CARVE REGION



Select "Carve Region" icon.

*This creates a carved out region inside the boundary. Automatically defaults to .250" depth. Remember depth of pattern & how depth effects carve time.*



## ✓ FEATHERING

Select the drop-down Feather menu and select 1/8" feather. Select "Accept"

Select "Decorative Rooster" under "2013 Conference Collection".



Click once on pattern and once on board to place or click and drag to the board.

Double-clicking will attempt to open it in Pattern Editor Software, which you

## ✓ DRAWING TOOLS



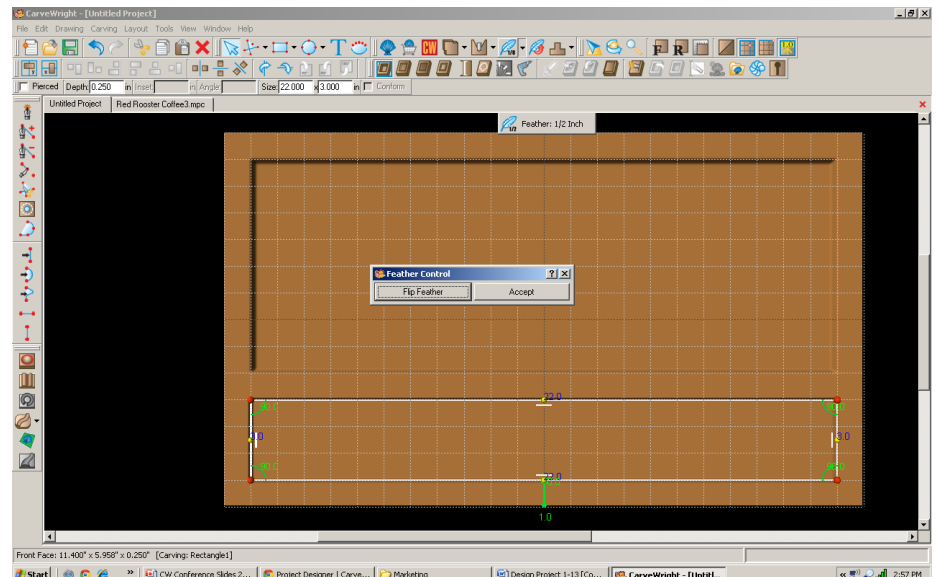
Using the grid, draw a rectangle 1" inside the project board from sides & bottom. Make it 22" long & 2" tall.

## ✓ CARVE REGION



Select "Carve Region" icon.

This creates a carved out region inside the boundary. Automatically defaults to .250" depth. Remember depth of pattern & how depth effects carve time.

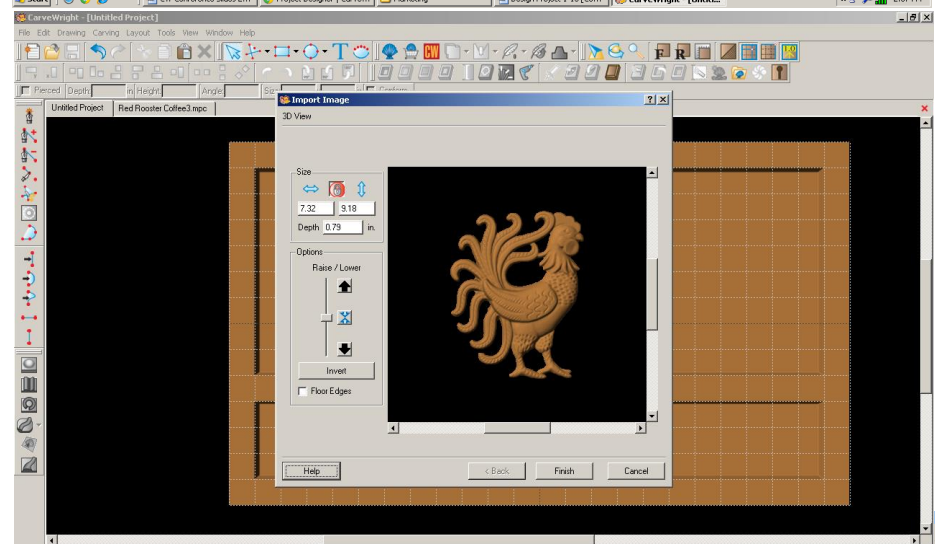


## ✓ FEATHERING

Select the drop-down Feather menu and select 1/8" feather. Select "Accept"

## ✓ DOWNLOAD PATTERN

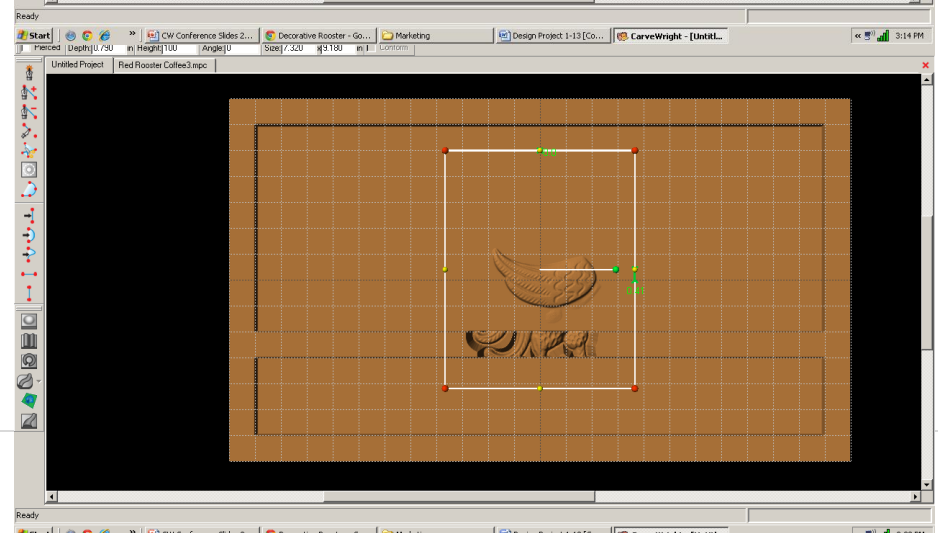
Patterns must be placed into your Pattern Library Favorites folder either as an individual pattern or as a collection. The TRY button lets you play with a pattern to see if you want to buy it. It will have a red background until it is purchased and activated (licensed).



## ✓ PATTERN PLACEMENT



Select the "Pattern Tool" icon to open the pattern library along the right side.





cannot do since it is licensed and you are not the author of the pattern.

### ✓ FINE TUNING

Manipulate the size and placement of the pattern by scaling to size from a corner.

Place it near the middle of the top rectangle and make smaller. We can adjust size & placement later.

Set depth of rooster to .250".

Turn off Snap to Grid & View Grid under Layout > Snap

### ✓ TEXT TOOL



Next, select the "Text Tool" and click on board.

Text dialog box will appear. Select from any of the true type fonts that you have on your computer. I used "Elephant". *Some work better than others.*

Type the word "Red Rooster Coffee" and arch to about 143 degrees.

"Raster" is selected by default.

### ✓ FINE TUNING

Manipulate the size and placement of the word, just as you would a pattern by scaling to size from a corner.

### ✓ CENTERING



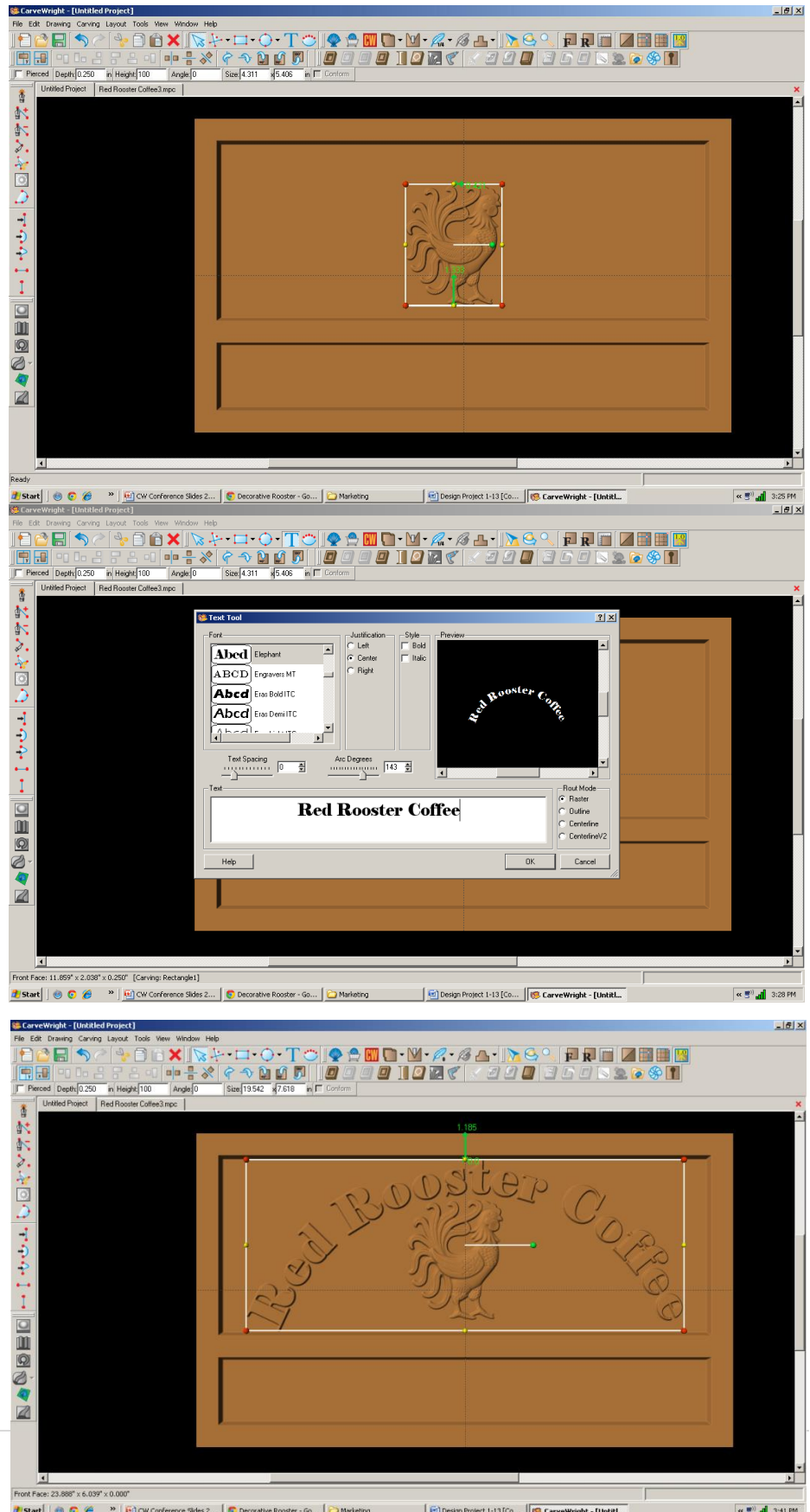
Right-click to see available options and select Center > Horizontally.

### ✓ ADJUST DEPTH

Depth: 0.250 in

✓ FEATHERING: None

✓ DRAFT: Medium



## ✓ TEXT TOOL

Select the “Text Tool” and click on board.

Type the word “Since 2007” and change arch to 0 degrees and Text Spacing to 60.

“Raster” is selected by default.

Font: I used “Papyrus”

*Thin fonts tend to chip out, so to avoid this lower the height and add draft or select a fatter font.*

## ✓ FINE TUNING

Manipulate the size and placement of the word to under the rooster’s feet.

CENTERING: Horizontal

ADJUST DEPTH: 250

ADJUST HEIGHT: 75

FEATHERING: None

DRAFT: Medium

## ✓ TEXT TOOL

Select the “Text Tool” and click on board.

Type the word “Fresh Roasted at Ratisseau’s Roost” or your own personalized message and change Text Spacing to 0.

“Raster” is selected by default.

Font: I used “Papyrus”

## ✓ FINE TUNING

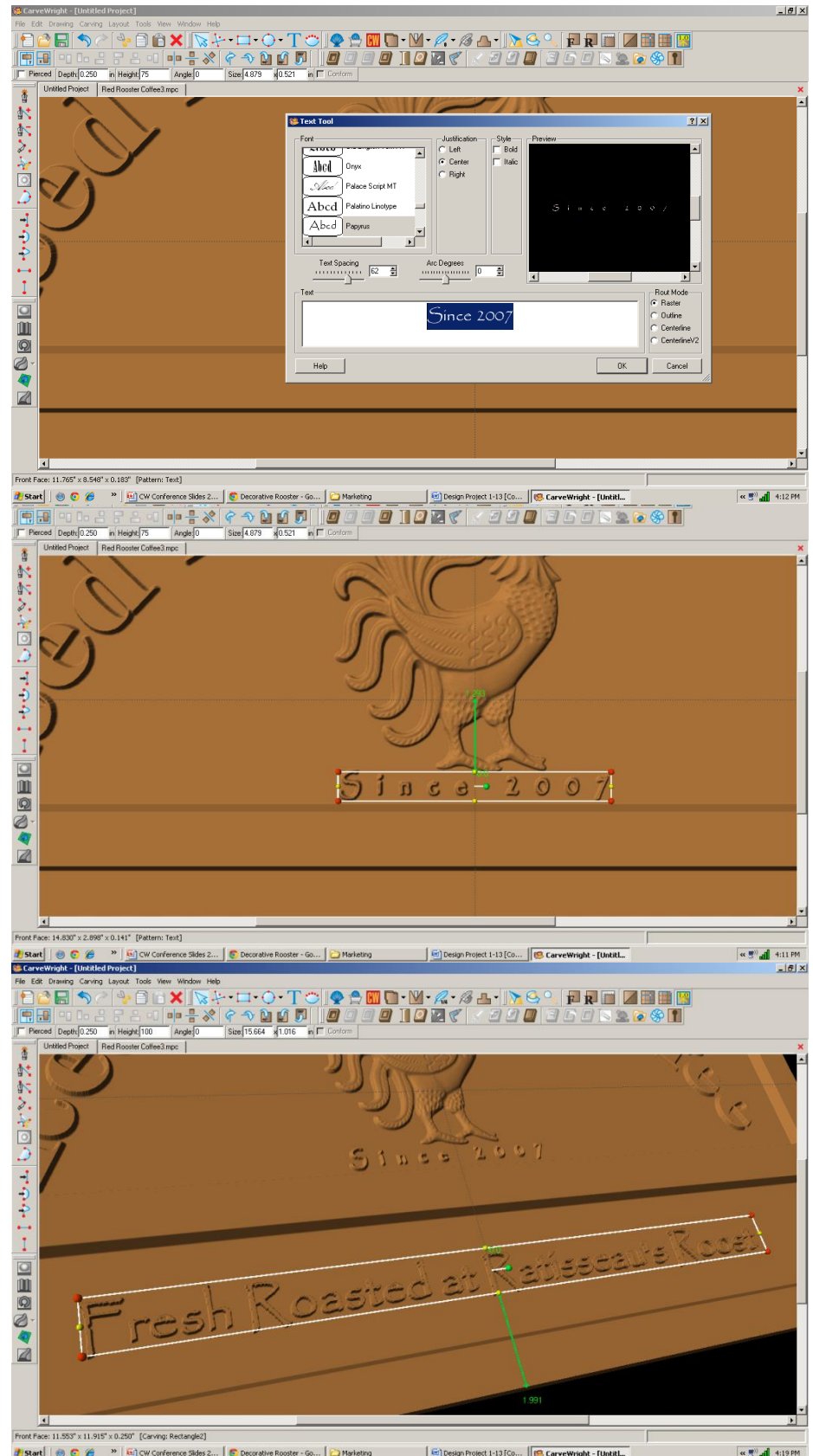
Manipulate the size and placement of the word to under the bottom rectangle.

CENTERING: Horizontal

ADJUST DEPTH: 250

FEATHERING: None

DRAFT: Medium



## ✓ TEXT TOOL

Select the “Text Tool” and click on board.

Type the number “5”.

Font: I used “Elephant”, again.

Open your Character Map and copy the “cent” sign for your font.

**START > ALL PROGRAMS > ACCESSORIES > SYSTEM TOOLS > CHARACTER MAP** on my Windows XP. You can select & copy or use the shortcut key **Alt+0162**.

## ✓ FINE TUNING

Manipulate the size and placement to left hand side of bottom rectangle.

ADJUST DEPTH: 250

FEATHERING: None

DRAFT: Medium

## ✓ MIRRORING TEXT

*Note: Be careful mirroring text because the letters will be backwards.*

## ✓ UNDO



The **UNDO** tool w/ **Ctrl-Z** will undo previous done functions, as will **CTRL-Z**.

## ✓ COPY & PASTE

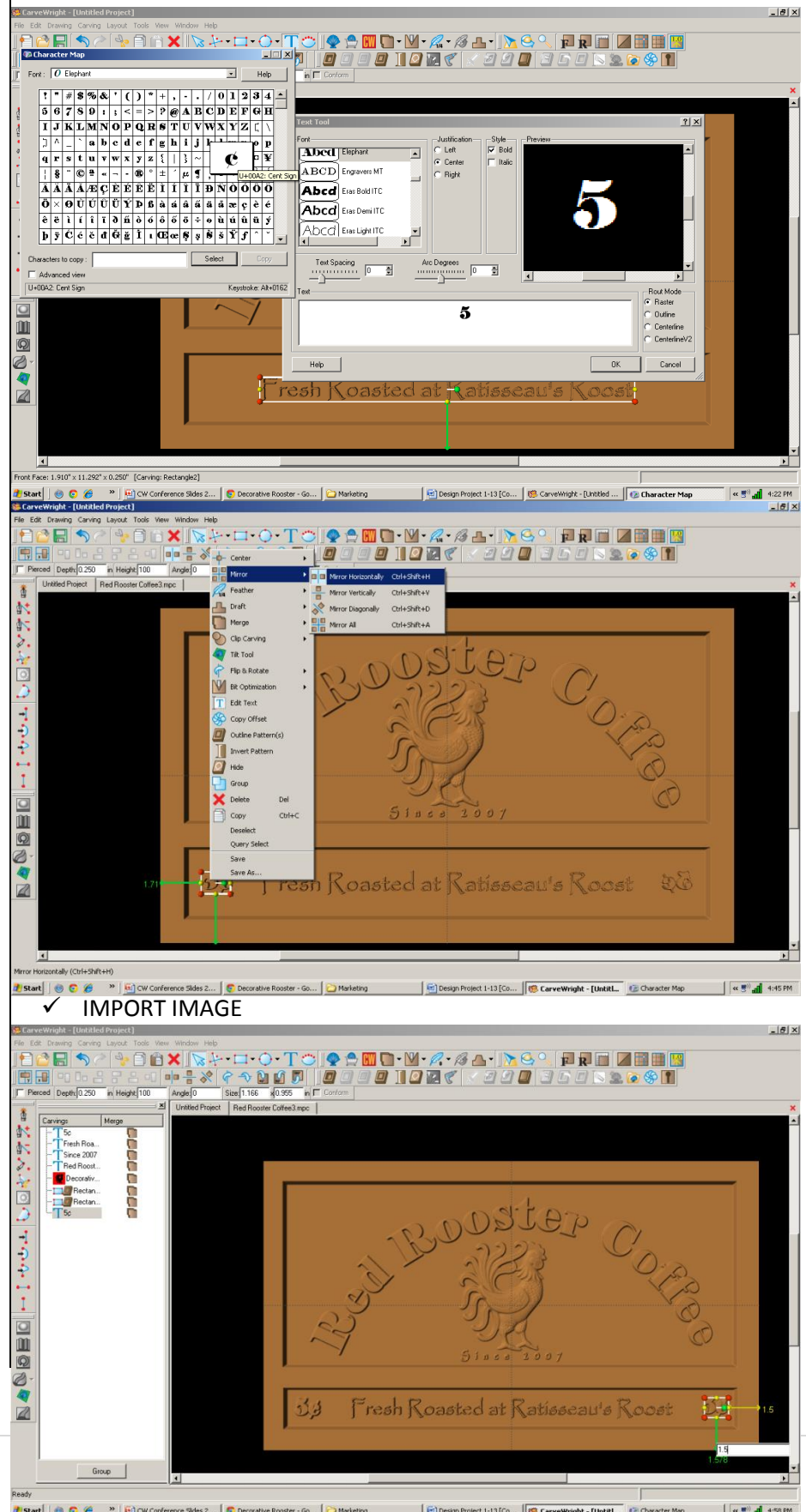
*Designer pastes the new item on top of the old item.*

Copy and Paste then move to right side of bottom box.

## ✓ CONSTRAINTS

Use the constraints to get them both the same distance from the bottom

and edges. Set both to 1.5”. Hit enter in the constraint box.  
*If you ever get in this box by mistake, escape will get you out.*





Designer can import several file formats. Remember that trash in will be trash out, so select images with high resolution. This is not usually found on the internet for purposes of speed in uploading.

Some images are also copyrighted and should not be used.

Most images will come in as a square or rectangle, even if the background is white. If given a choice between format,s PNG will not give you the white background.

Search on the internet for “sunrise clipart” Images. I used Google search engine. Select your image to see bigger view. Right click and select SAVE IMAGE AS to your Desktop.

Back in Designer go to FILE > IMPORT > IMPORT IMAGE > FROM FILE and navigate to your desktop. Select your sunrise image.

Adjust the yellow dotted lines to crop the bottom of the image.

Click NEXT.





## ✓ IMPORT IMAGE

The software automatically converts the image to grayscale. White gets the deepest carve and black the shallowest carve. This is the way you want to keep it for Lithophanes as the deeper carve allows more light flow and shallower carve restricts it.

Use the options to adjust SIZE, if necessary. Make sure to Lock to keep correct proportions of the image.

Change the depth to .2" to lessen the distance between white & black levels.

Use the OPTIONS bar to remove from the top or bottom of the image. One click on the down arrow took away the unwanted background for me.

Click NEXT, name and save into your FAVORITES folder.

## ✓ PATTERN PLACEMENT



Select the "Pattern Tool" icon to open the pattern library along the right side.

Select imported image from your FAVORITES folder.

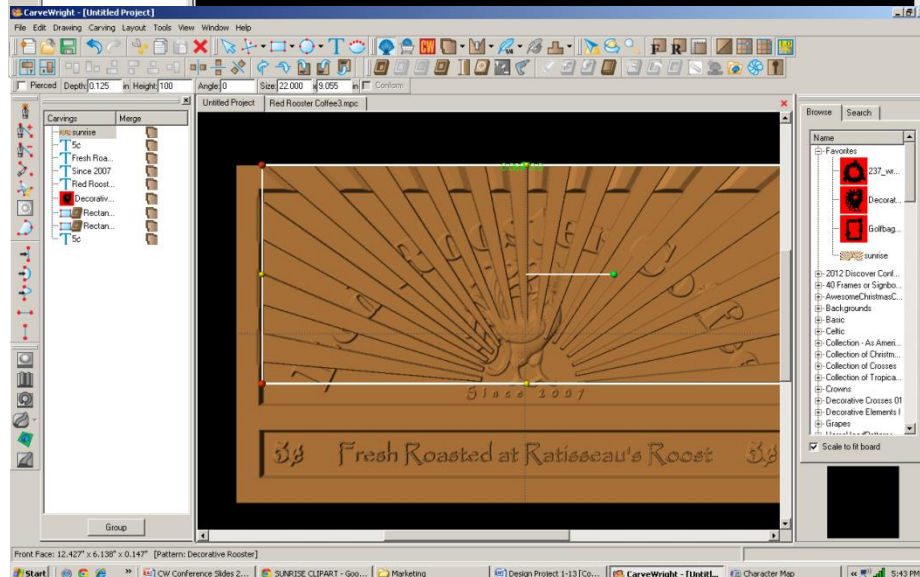
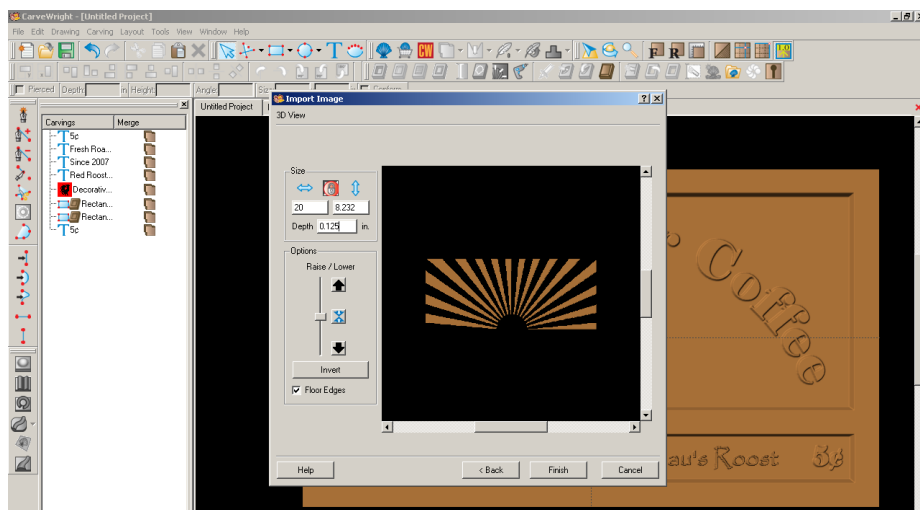
*If you need to edit the image and have the Pattern Editor license, double-click on it to open the tool.*

## ✓ FINE TUNING

Manipulate the size and placement to the top rectangle. I wanted the sun larger, so I am using the corners to stretch the image and maintain proportion until the sun is as big as I want it to be.

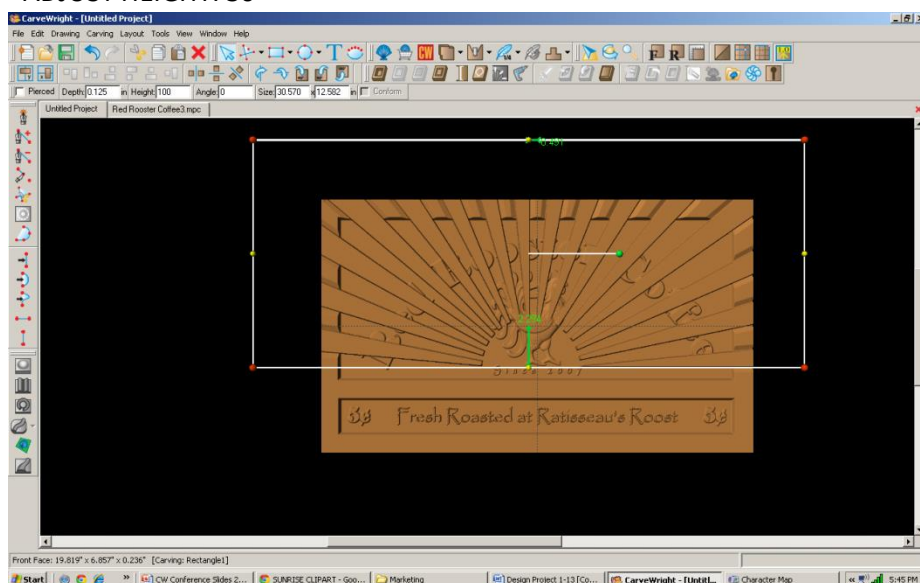
ADJUST DEPTH: 250

FEATHERING: None



DRAFT: Medium

ADJUST HEIGHT: 30



## ✓ CLIP CARVE

Right-click on the image and select Clip Carving > Inclusive.

*Clip Carving must have a closed & carved region below it. Inclusive shows image inside. Exclusive shows image outside.*

## ✓ CARVING LIST

*The Carving List is very useful especially when there are lots of elements on your project board.*

Go to VIEW > CARVING LIST.

## ✓ FEATHERING

Select both rectangles and select Flip Feathering.

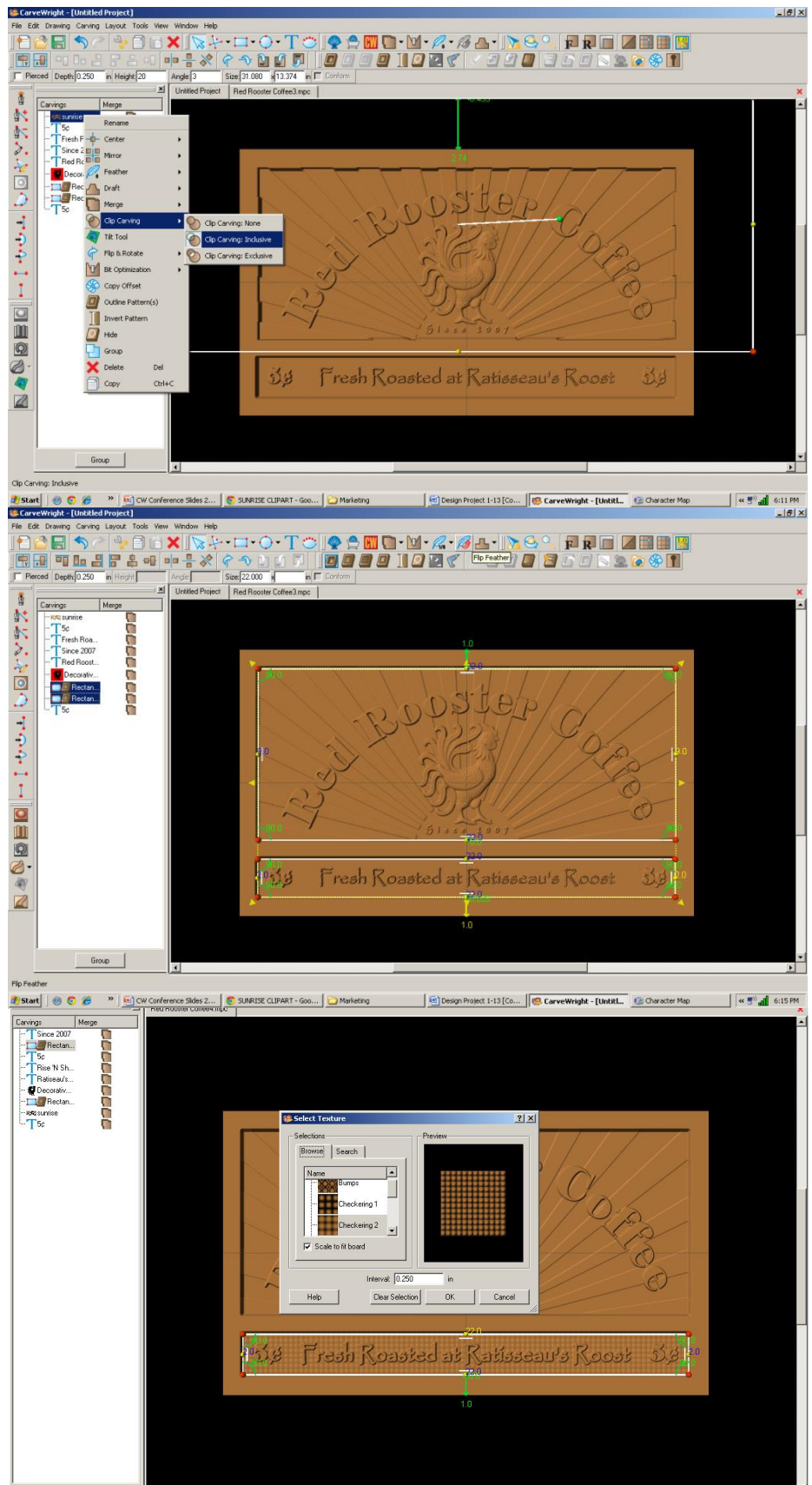
## ✓ TEXTURES

Select bottom rectangle and click on Select Texture Tool.

Select Checkering 2 and change interval to .25

Click OK  
Change Height: 25

Fine Tune any elements and do a test carve to check heights.



## REMEMBER THESE FUNCTIONS FROM PREVIOUS STEP-BY-STEP PROJECTS

### ✓ MANAGING DATA

Select "File" > "Save"



#### \*\*\*\*\*IMPORTANT\*\*\*\*\*

Once a project is uploaded to a memory card, it cannot be brought back from the memory card into the software. Always SAVE YOUR PROJECT on your hard drive. A Projects folder is recommended and you should know where you saved it.

### ✓ UPLOADING TO MEMORY CARD

Make sure your Memory Card & Programmer are properly attached via your USB port, Select "File" > "Upload" to save to your memory card.



Select Quality Setting

- DRAFT
- NORMAL
- BEST
- OPTIMUM

*These settings determine the number of passes the machine makes to carve your project. The more lines the better the surface finish. Make your decision based on material type, fondness of sanding vs. machine time, & test carve vs. final. Notice the estimated carving time differs by quality setting.*

Name Your Project

Example:

redroosterN\_2h45m

*(recognizable name\_quality setting\_estimated time to carve)*

Click "Upload"

NOTE: Actual board to be placed in machine should be 7" longer or you should use a sled that has 3.5 extra inches on each end to STAY UNDER THE ROLLERS.

## HOME OF THE BRAVE

This project covers the following design concepts:

- ✓ STARTING SOFTWARE
- ✓ DOWNLOAD PATTERN
- ✓ INSTALL PATTERN
- ✓ ACTIVATE PATTERN
- ✓ PATTERN PLACEMENT
- ✓ VIEW GRIDLINES
- ✓ CENTER HORIZONTALLY
- ✓ MANIPULATE VIEW
- ✓ FINE TUNING
- ✓ CARVING LIST
- ✓ OUTLINE PATH
- ✓ CARVE REGION
- ✓ SNAP TO GRID
- ✓ DRAWING TOOLS
- ✓ SELECT TEXTURES
- ✓ GROUPING
- ✓ MERGE ADDITIVE
- ✓ CUT PATH
- ✓ SAVE & UPLOAD





## INSTRUCTIONS:

### ✓ STARTING THE SOFTWARE

Open the CarveWright Project Designer Software

\*\*\*\*\*PLEASE NOTE\*\*\*\*\*

*Since, we are going to be messing with licenses, open with “Run as Administrator”, if using Win 7 or 8.*

*The Welcome screen appears with Options – New Project; Last Project; Open Project or Documentation*

Select “New Project”

Set your project board dimensions.

Length: 20”

Width: 11”

Thickness: .75”

Click OK

*Determining board length: finished, virtual or actual board. See 7” Rule in Tips & Tricks – “Handy Tips for Everyone! – ISSUE 3 December 2007”*

### ✓ DOWNLOAD PATTERN

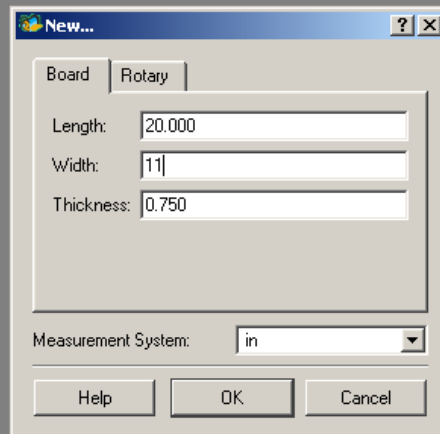
3 ways to Download a Licensed Pattern:

1. Click the green TRY
2. Click on Download link in email
3. Log into Customer Account and click on DOWNLOAD PATTERN link

PAY ATTENTION TO WHERE YOU ARE PUTTING THE PATTERN

*Downloads typical go into your “Downloads” folder, unless you specifically direct it to another folder or to your DESKTOP.*

*16 BIT refers to a higher resolution pattern.*



Use our search to find the patterns you need for any project.


CarveWright Software Accessories Bits Materials Service & Parts Third-Party PatternDepot

2014 CarveWright Conference

# JUNE IS BIT MONTH!

more offers

Home ▶ PatternDepot ▶ Patterns ▶ Plantlife ▶ Flowers ▶ Allamandra

A 3D rendered image of a brown, textured plant pattern, specifically an Allamandra flower. The pattern is shown in a cluster, with several leaves and flower buds. A red circular badge with the text "16 bit" is overlaid on the bottom right of the image.

### Allamandra

Allamandra

Like 0 Tweet 0 +1 0 Pin it

Our price: \$5.00 more products by:

Quantity 1 (this product is downloadable)

SKU: 0002-01-0002838

Add to cart Try Add to wish list

Be the first to review/rate this product

Ask a question about this product

## ✓ INSTALL PATTERN

In Designer Software, Go to FILE > OPEN

Navigate to where you downloaded the pattern.

*Again, it usually goes to your DOWNLOADS FOLDER. You may want to sort that folder by Date Modified ↓ for most recent download.*

*Numbers after it in parenthesis means you have downloaded it before.*

Select the pattern (.ptn) and Open.

*Pattern will open in an Import Image window.*

Select “Finish”, then “Next”.

*You do not need to make any adjustments to a licensed pattern or rename them. It will be put into your FAVORITES folder in the Pattern Library Tool. (Blue Shell)*

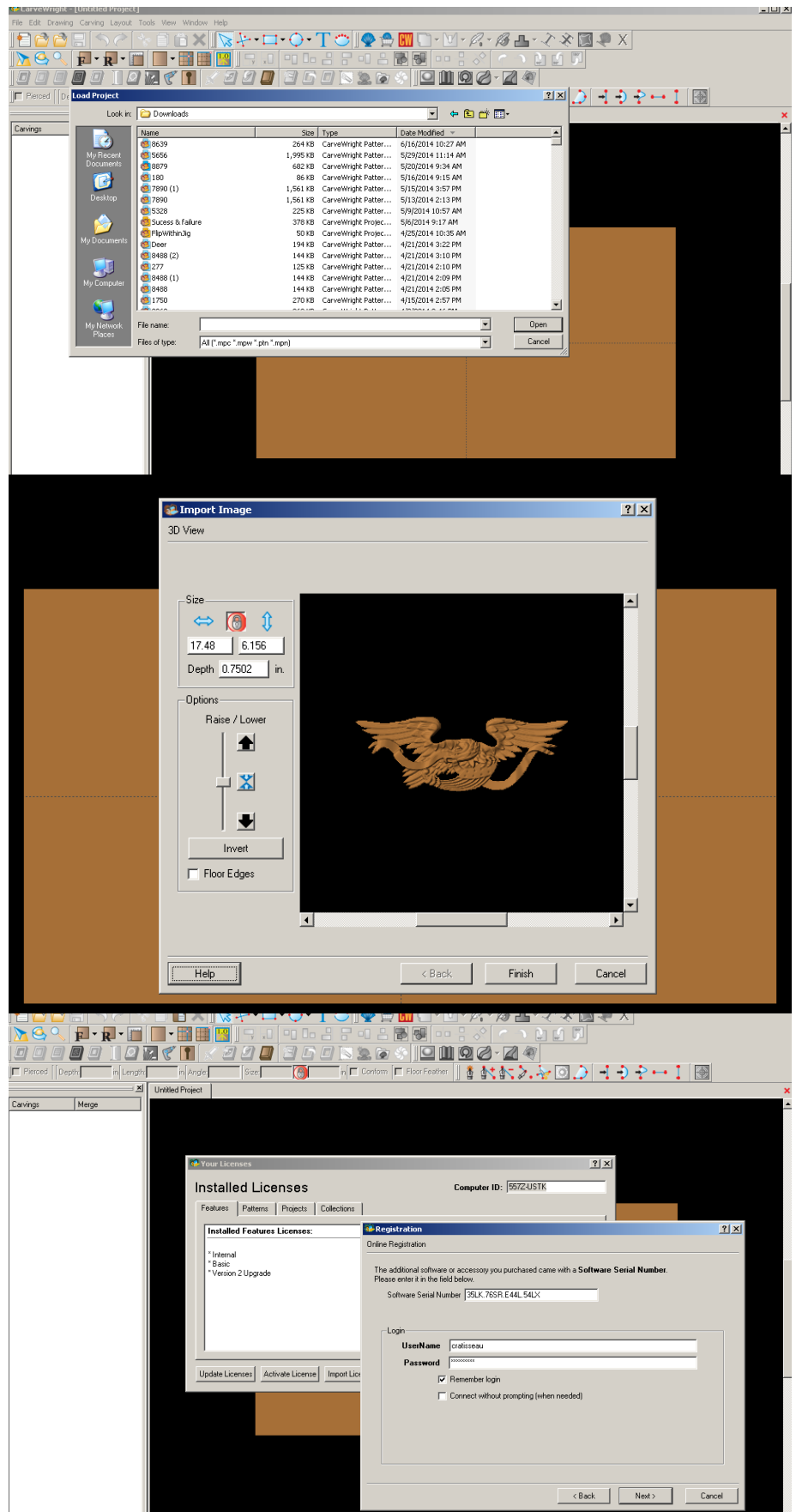
## ✓ ACTIVATE LICENSE

Go to HELP > MANAGE LICENSES > ACTIVATE LICENSE

Select “License Online Now”

Enter Serial Number with capital letters and decimal points. It will be in the follow format using both letters & numbers. XXXX.XXXX.XXXX.XXXX

Customer Account Username & Password Required.



## ✓ PATTERN PLACEMENT



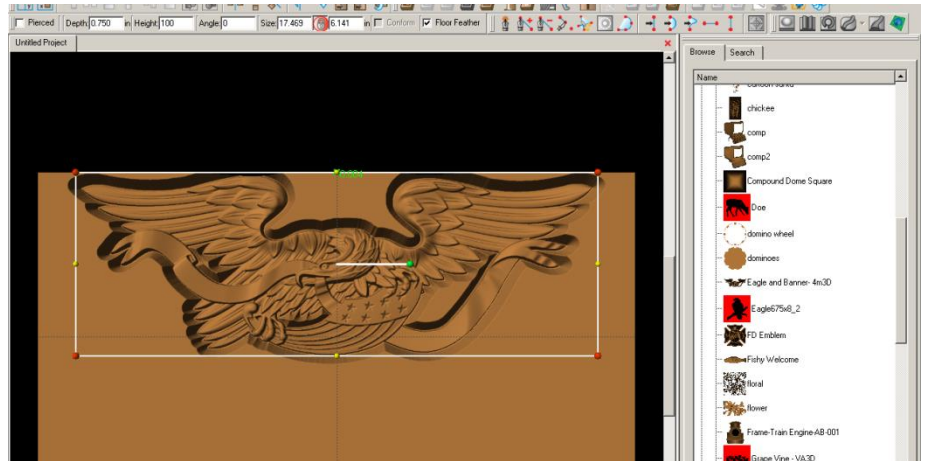
### Open Pattern Library

Notice in Pattern Library:

Red background = unlicensed.


White background = licensed or licensed not required.

Place “Eagle & Banner – 4m3d” pattern onto board by clicking and dragging to the board or by clicking ONCE on pattern to select and ONCE on board to place .



Conference attendees received this pattern complimentary from one of our Sponsors - CNC Mini Projects. Please contact LHR Technologies to find out how you can purchase this pattern.

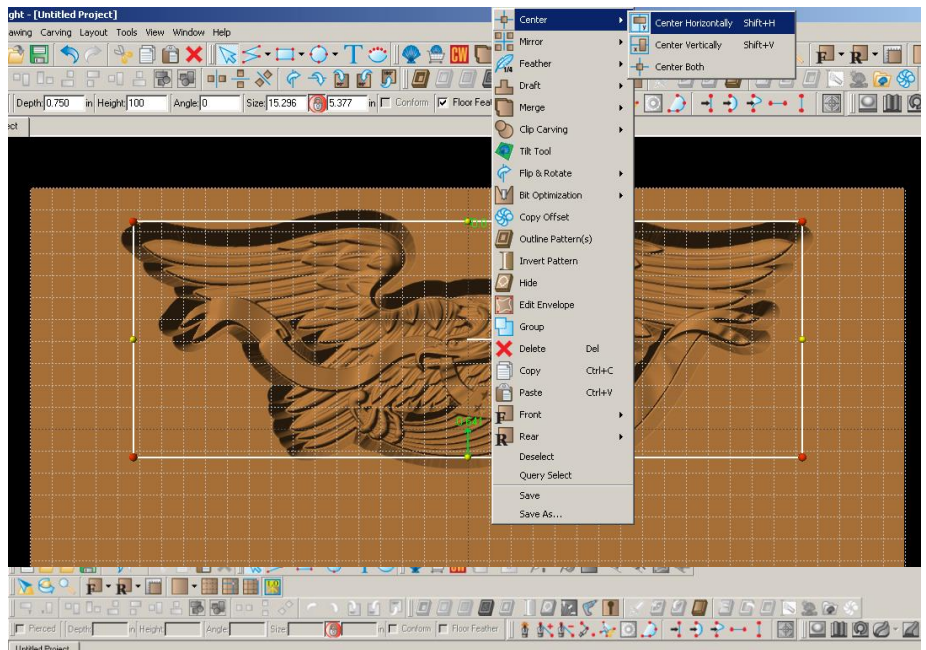
## ✓ VIEW GRIDLINES

Go to Icon  or VIEW menu > Toggle Gridlines.


To set the interval of the gridline, go to LAYOUT > Snap and set interval to .5”.

Move your pattern down from top at least ½”. *This is to avoid contact with tracking roller unless you are going to use a sled. See Tips & Tricks – “Carving Jigs – Carrier Boards, Sleds and Rails – ISSUE 7 April 2008”*



Select Toggle Gridlines, again, to turn it off.




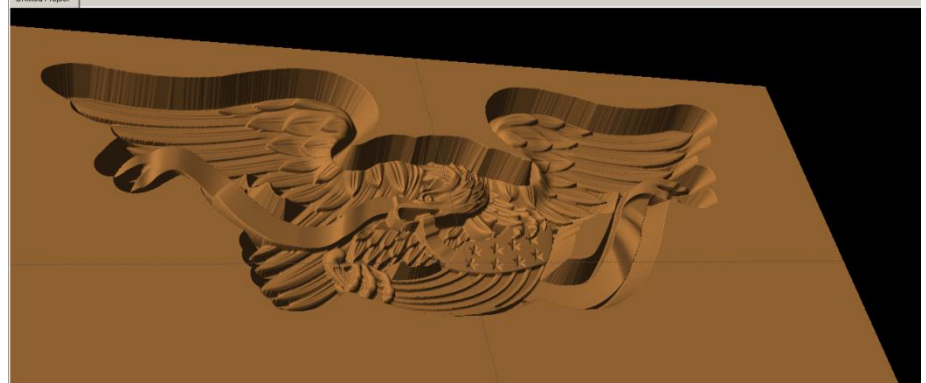
## ✓ CENTER HORIZONTALLY

Right click on element to see available options for this pattern. Select Center > Center Horizontally. 

## ✓ MANIPULATE VIEW

Zoom  and Rotate  board to get a better view of your pattern and what fine tuning needs to be done, such as depth, height, peaks, & draft.

Mouse with roller wheel can be used for this too. Use  to go back to front view.





## ✓ FINE TUNING

Resize pattern to 14.5" length.

Change Depth to .25".

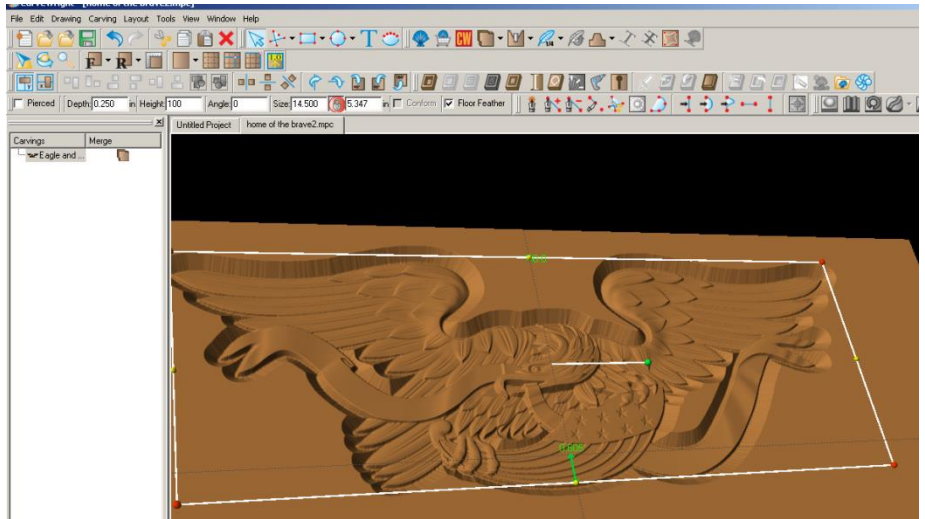
Add Draft to medium.

Add Bit Optimization to Pattern

## ✓ CARVING LIST

Open your Carving List, if it is not by going to VIEW > CARVING LIST.

*Carving List shows every element on that side of the project board.*



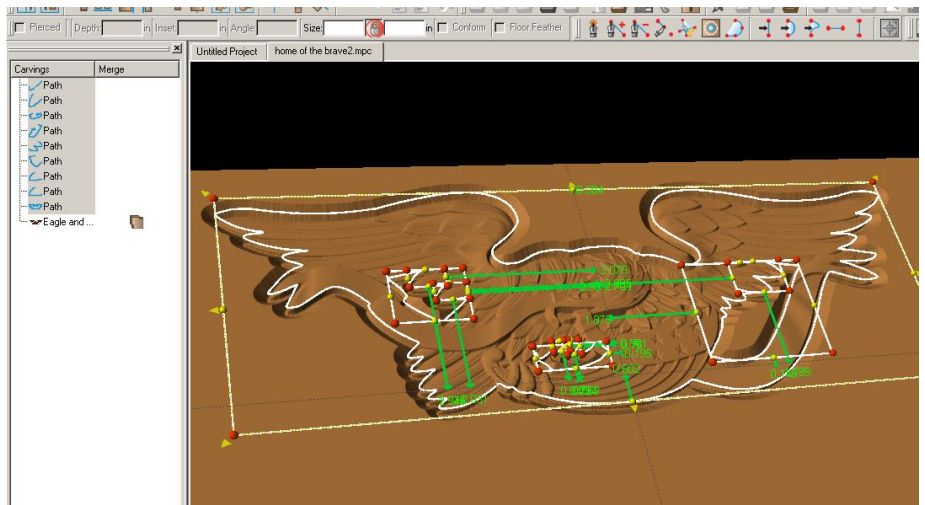
## ✓ OUTLINE PATH

*Removing the peaks in the open areas of the pattern can be done a couple of ways.*

Right click on pattern and select OUTLINE PATH.

Delete all paths from Carving List, except main eagle path.

Hit Delete key to delete them from the Carving List and your project board or select the delete icon. **✗**

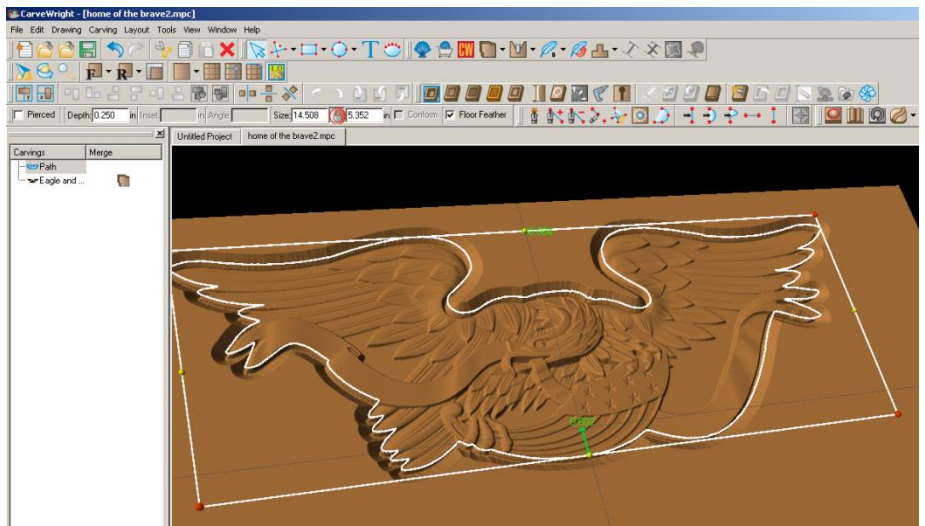


## ✓ CARVE REGION



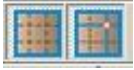
Select the eagle path  
Click the carve region tool.

*It will default to .25", which is the current depth of our pattern taking away the peaks in our open areas of the pattern.*





## ✓ GRIDLINES & SNAP TO GRID



Toggle on your Gridline

Toggle on your Snap to Grid

## ✓ DRAWING TOOLS

Select Connected Line tool



Draw an area that includes the paths inside the pattern.

Leave enough room for .5" border at bottom.

Make sure you get the "starburst" when connecting final point.

*Notice when you have a "CLOSED REGION", icons like carve region and cut path are no longer grey. This indicates that they are available for use with the element currently selected.*

Assign a CARVE REGION and leave at .25".

Add medium Draft to region.

## ✓ SELECT TEXTURES

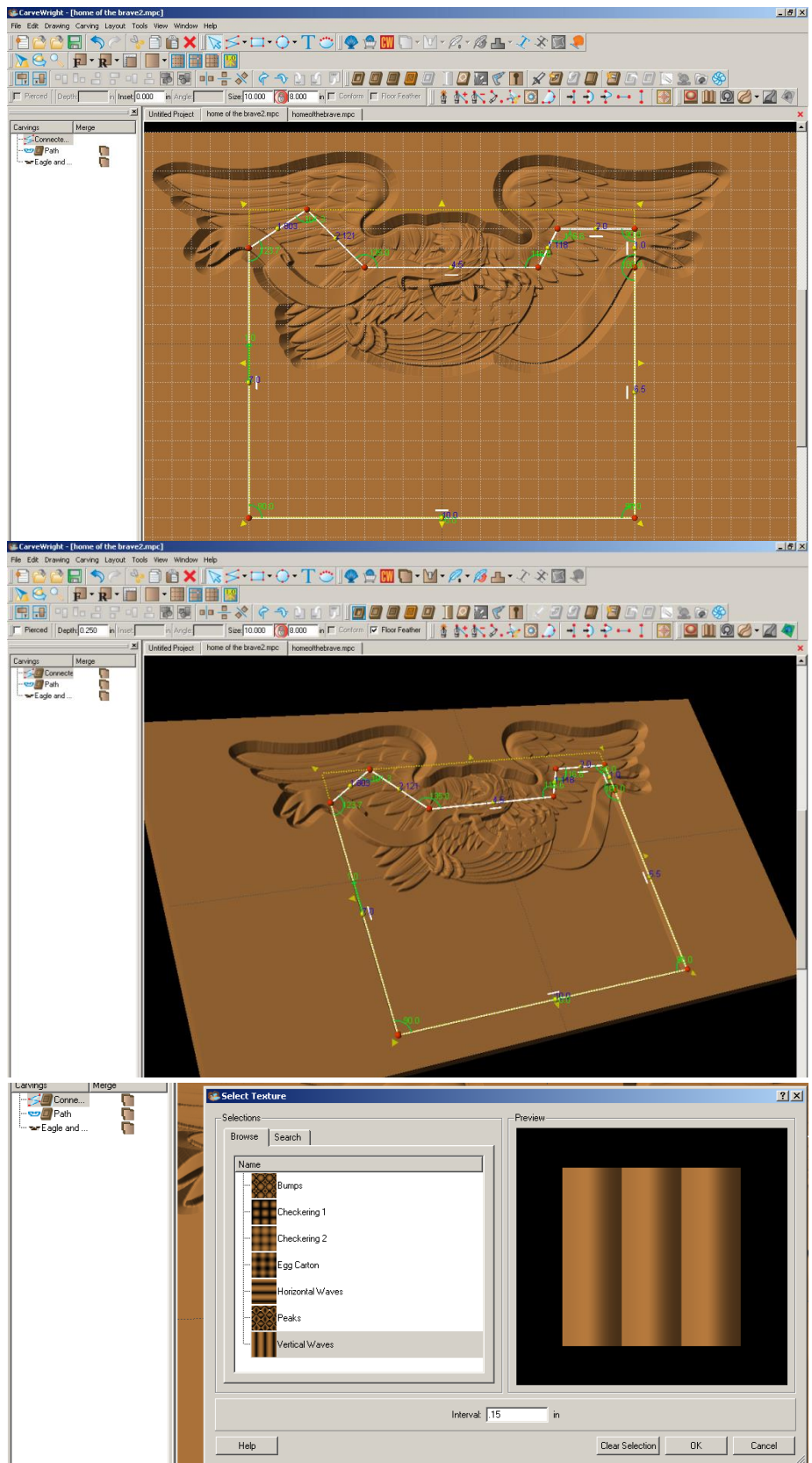


Click on the Select Textures tool.

Select Texture to use.

Change the interval of pattern to .15"

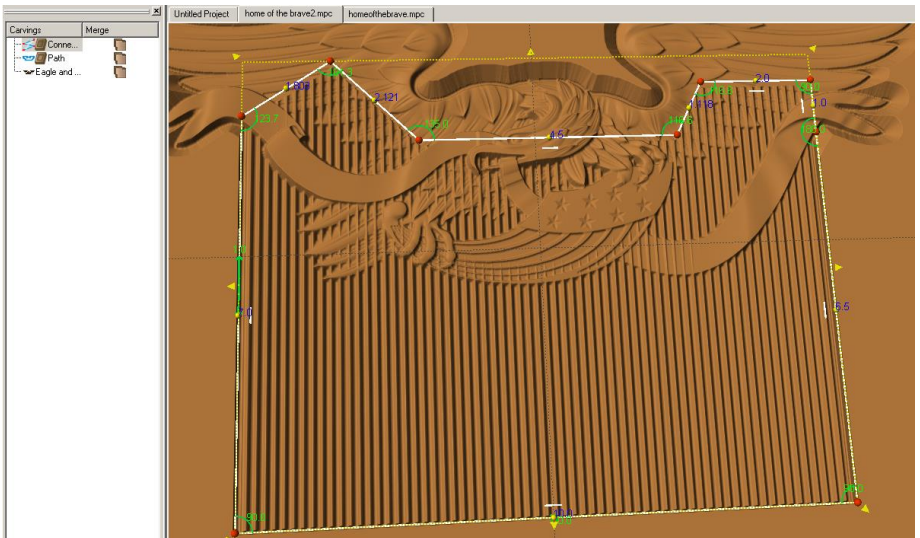
Click OK



## ✓ HEIGHT

*Notice how the vertical texture interferes with the pattern.*

Change the height to 10 for subtle effect and pushes it below the main pattern.

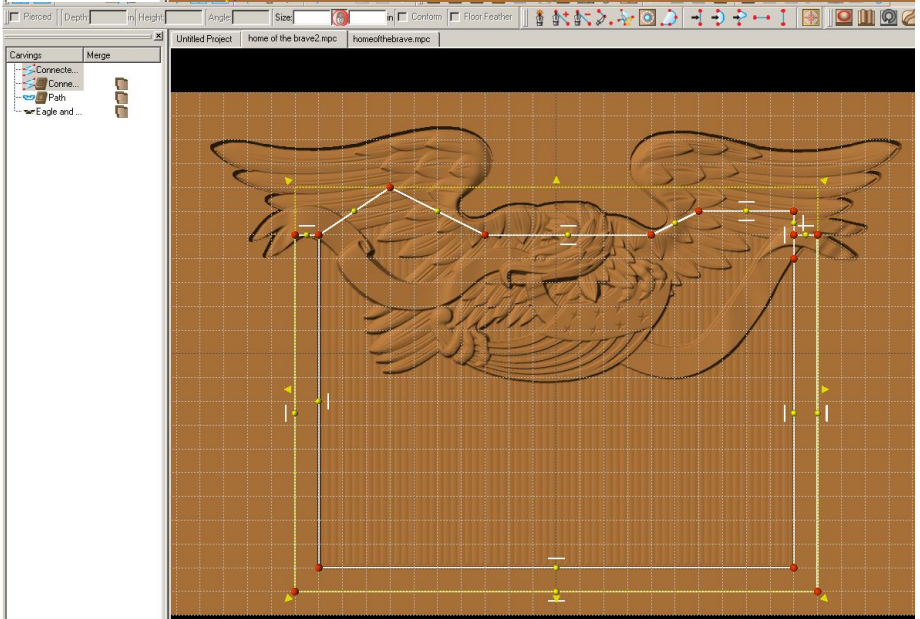


## ✓ DRAWING TOOLS

Turn back on Gridlines. Snap to grid should still be set.

Select Connected Line tool to draw .5 outside of textured carve region. Follow the line of the top of the first box where it goes through the eagle pattern.

Make closed region with “starburst”.



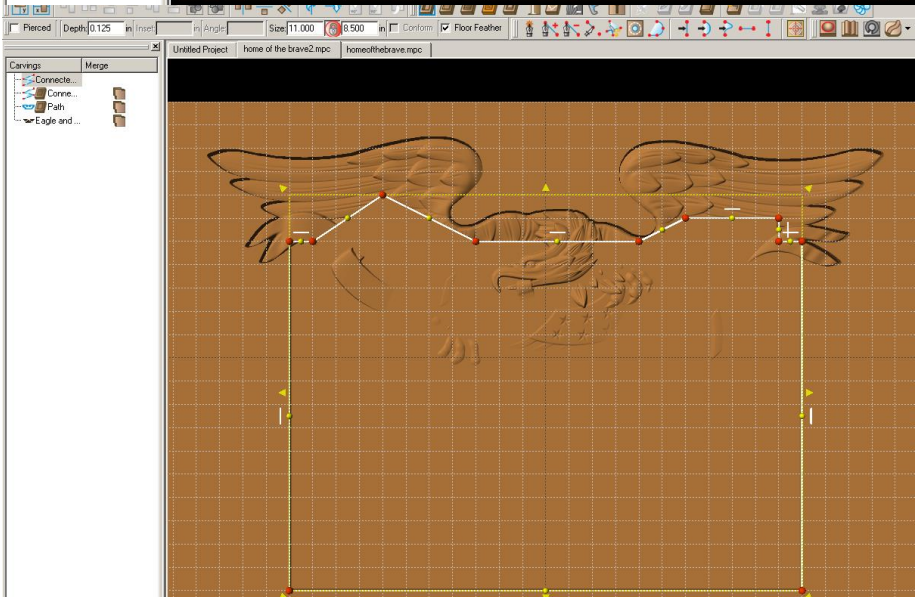
## ✓ CARVE REGION

Select CARVE REGION

Change depth to .125” to put below banner of pattern, but above textured middle to give a border to our project.

*Notice how the pattern and middle panel is overwhelmed, again, by the carve region.*

Toggle Gridline off.



## ✓ GROUPING

Select the two connected line areas that we want to merge.

Right click and select Group, so that the merge does not affect other elements.

## ✓ MERGE ADDITIVE



Click on the Merge Additive icon of the outside Connected Line region.

*Merge sets the conditions on how patterns or surfaces overlap one another.*

## ✓ CUT PATH



Select Path of eagle & outside Connected Line.

*Drawing tools must have carve region assigned to them. You can add a carve region, outline element, then remove the carve region after you have the path.*

Right click and select OUTLINE PATTERNS.

Flip Cut to outside of path and accept.

Customize with text.

## ✓ SAVE & UPLOAD TO CARD

Select "File" > "Save"



### \*\*\*\*\*IMPORTANT\*\*\*\*\*

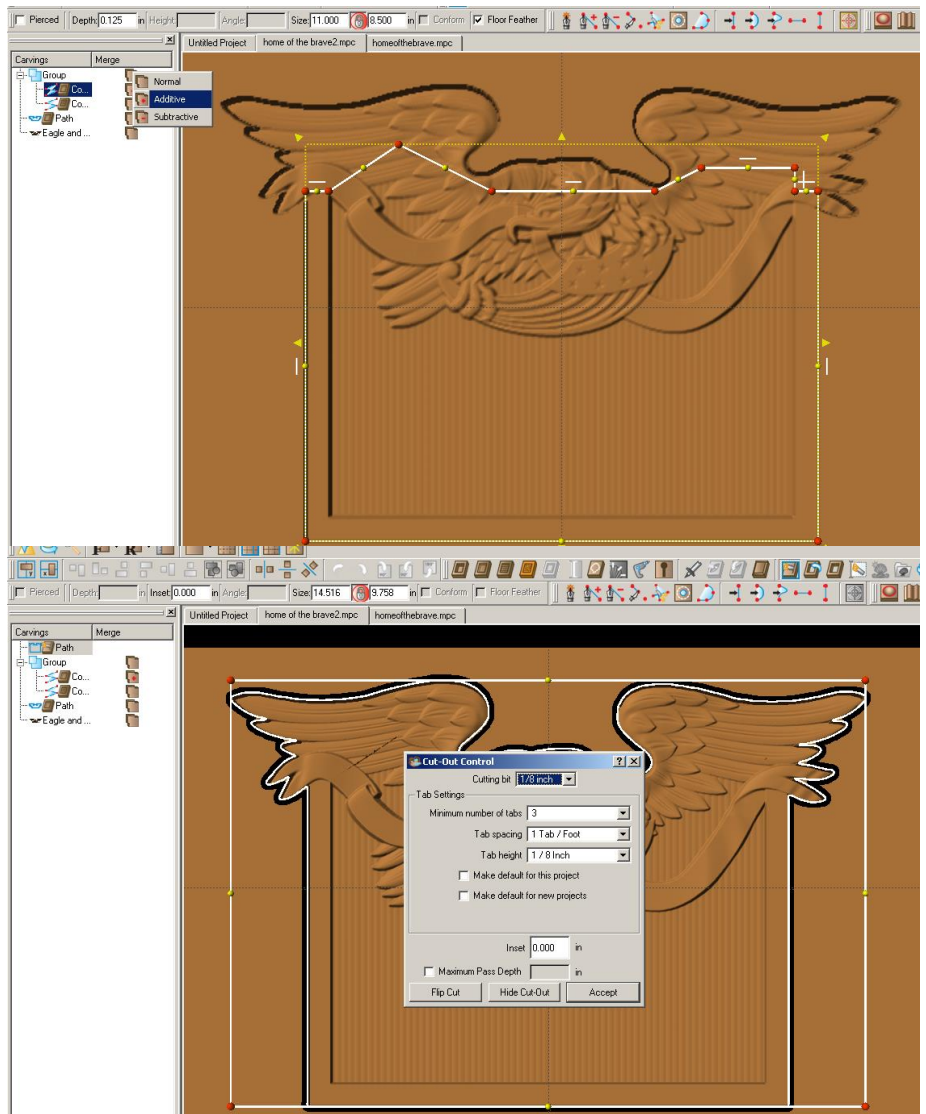
**Once a project is uploaded to a memory card, it cannot be brought back from the memory card into the software. Always SAVE YOUR PROJECT on your hard drive. A Projects folder is recommended and you should know where you saved it.**

## ✓ UPLOADING TO MEMORY CARD



Make sure your Memory Card & Programmer are properly attached via your USB port, Select "File" > "Upload" to save to your memory card.

Select Quality Setting > Name Your Project > Click "Upload"

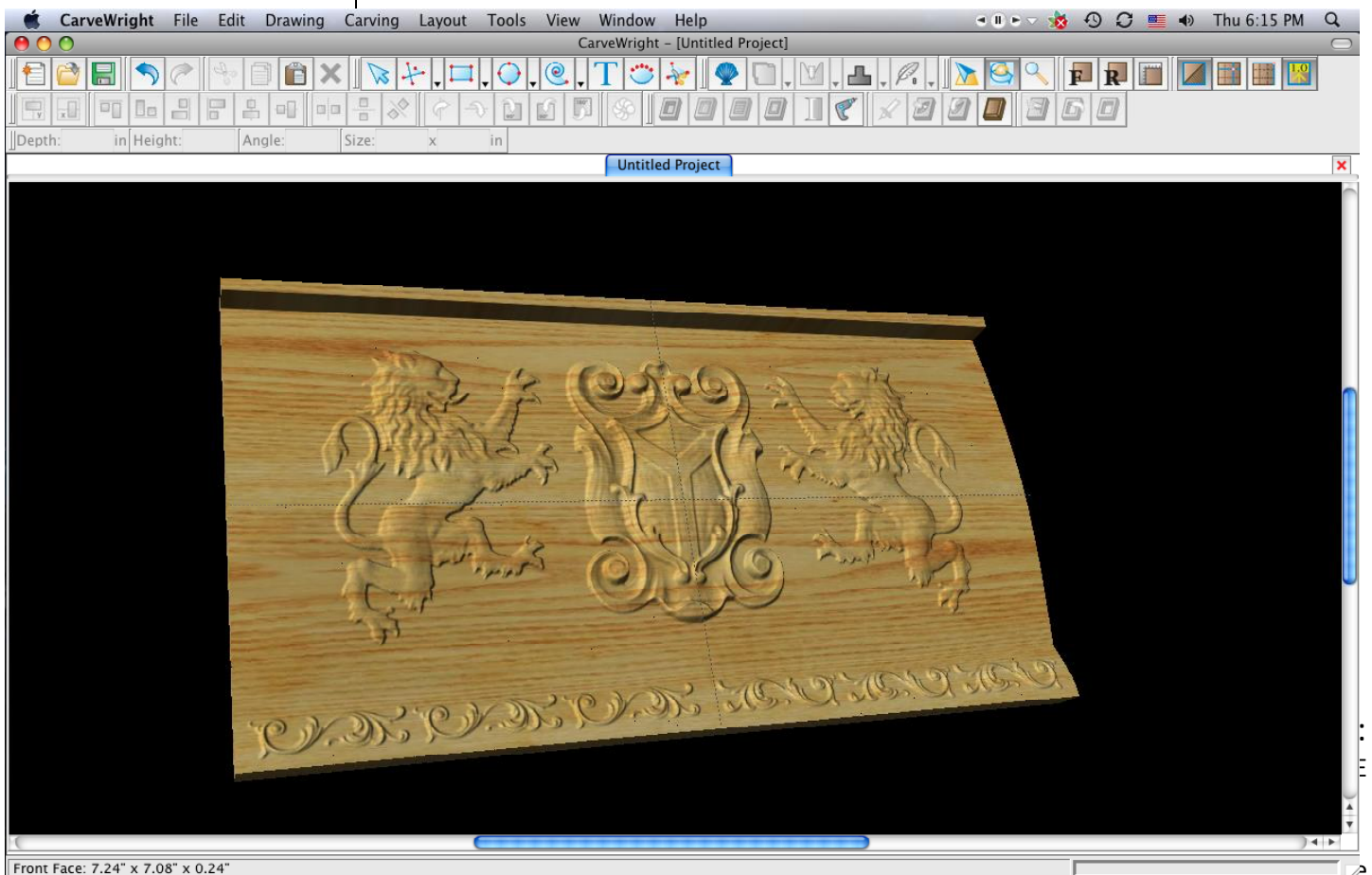




## CURVED BOX SIDE

This project covers the following design concepts:

- DRAWING TOOLS
- REGIONS
- SURFACES
- ADJUSTING DEPTH & HEIGHT
- CONSTRAINTS & ATTACHMENTS
- CARVING LIST
- MERGE
- MANAGING DATA
- UPLOADING TO MEMORY CARD





The Welcome screen appears with project options.



Select “New Project”

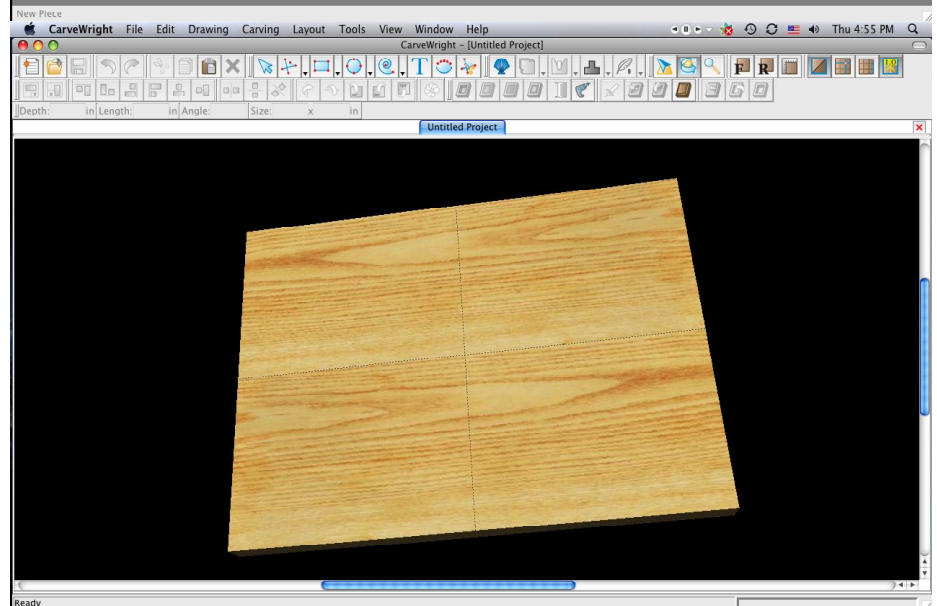
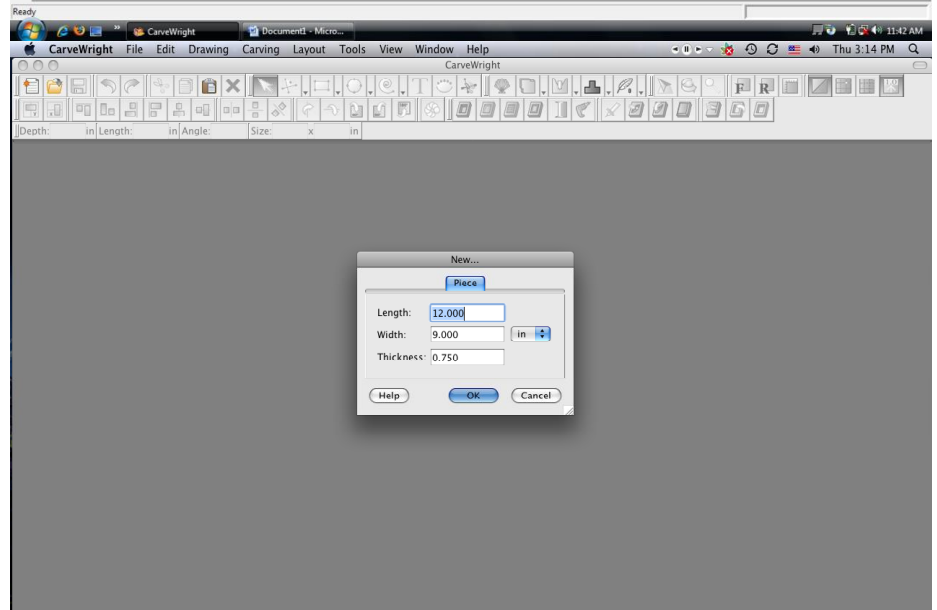
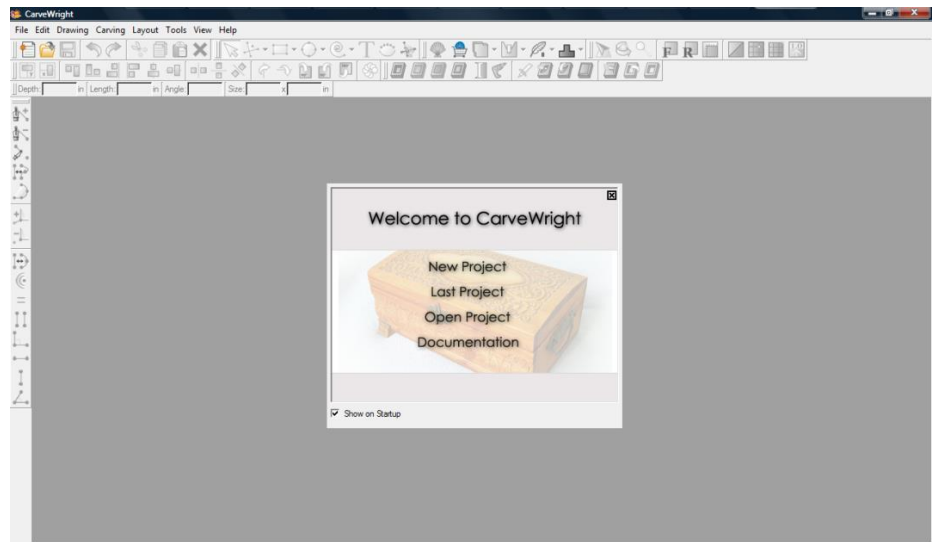
Set your board piece dimensions.  
Length: 14”  
Width: 7.5”  
Thickness: .75”

Click ok

### ➤ MANIPULATING THE WORKPIECE

Board piece will display on screen in three dimensions.

-  Zoom
-  Rotate
-  Pan
-  Front
-  Rear



## ✓ DRAWING TOOLS

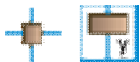


Select the “Rectangle Tool”.

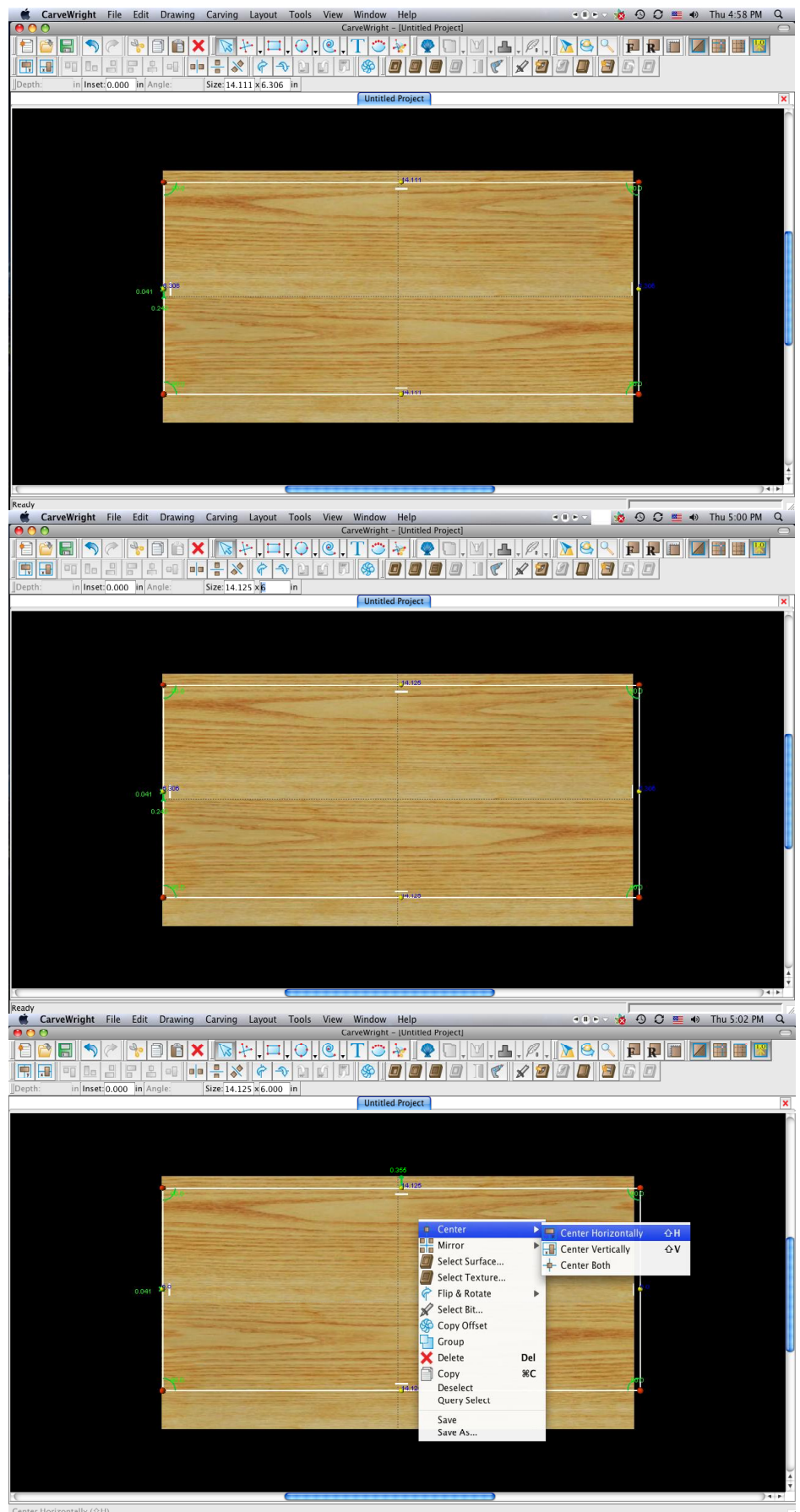
Draw Rectangle across the entire board, as shown.

Set size of rectangle to  
Width: “14.125 inch”  
Height: “6 inch”

## ✓ CENTERING



Right Click and select  
“Center”, “Center  
Horizontally”



## ➤ SURFACES

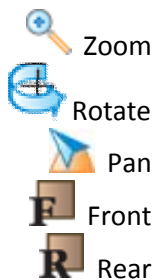


Use Select Surface Tool and choose “Domes” & “Vertical Dome”

## ➤ ADJUSTING THE HEIGHT & DEPTH

With the rectangular region selected, change the depth to “.5” and the height to “999”.

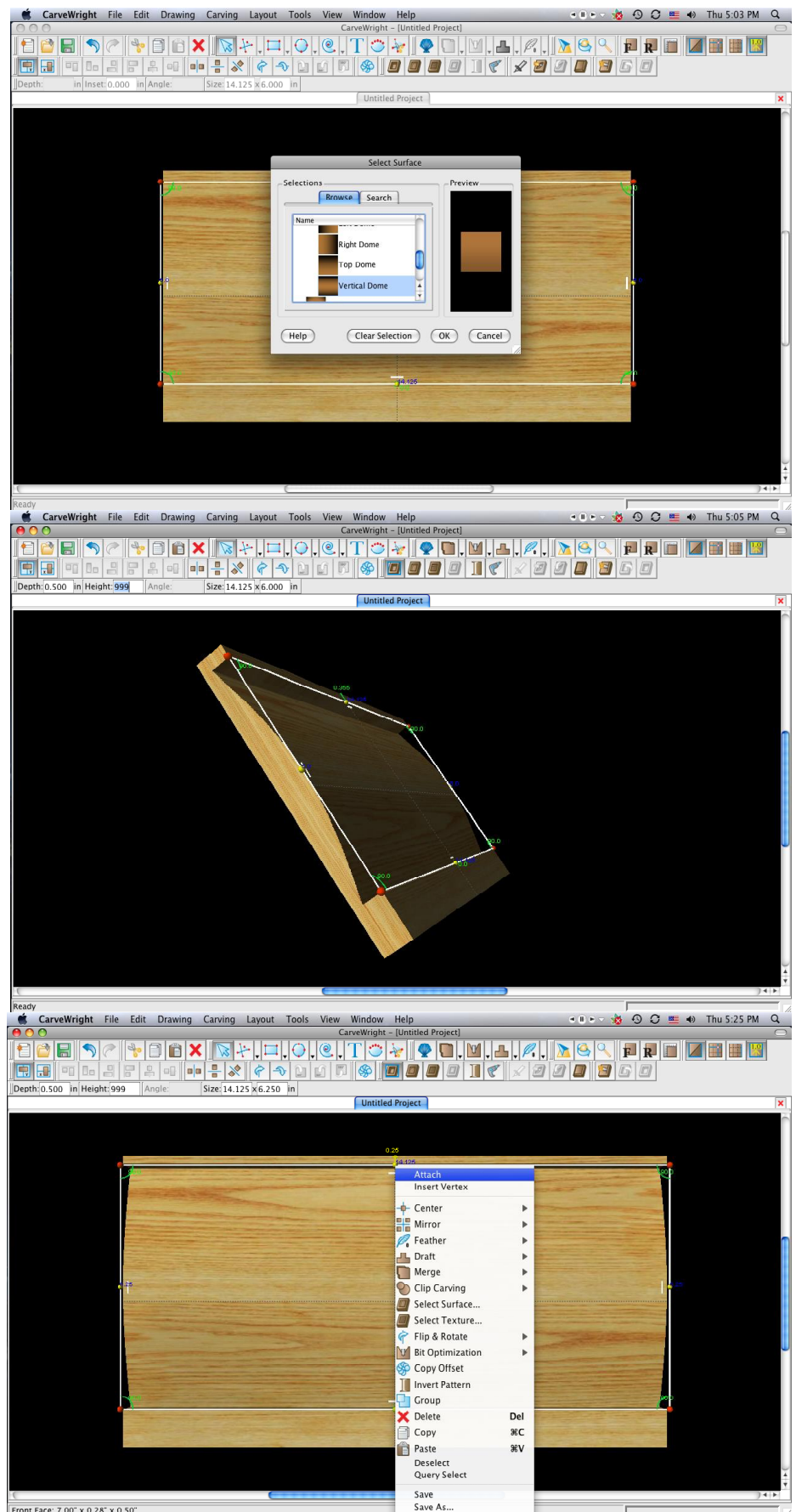
## ➤ MANIPULATING THE WORKPIECE



You will see the curve become much more defined if you rotate it and look from a side angle.

## ➤ CONSTRAINTS & ATTACHMENTS

Right Click the Yellow Node at the top of the rectangle and choose attach.



Attach it to the top edge of the board and type in “.25”. This locks the rectangle in place at a ¼ inch from the top border.

#### ✓ DRAWING TOOLS

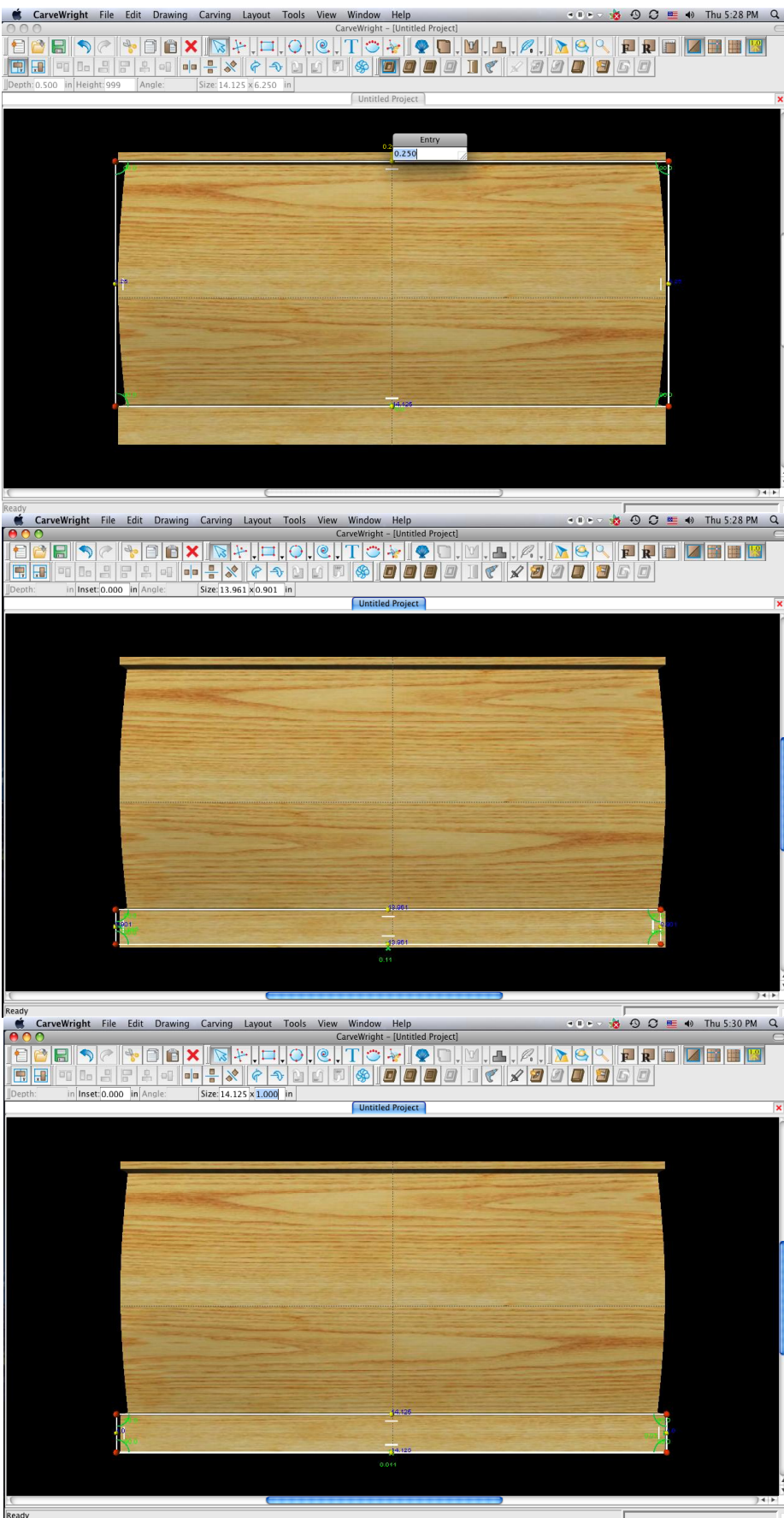


Select the “Rectangle Tool”.

Select rectangle tool again and draw another rectangle along the bottom of the board.

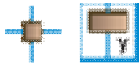
#### ➤ CONSTRAINTS & ATTACHMENTS

Set the dimensions to “14.125 inch x 1.25 inch”





## ✓ CENTERING



Right Click and select  
“Center”, “Center  
Horizontally”

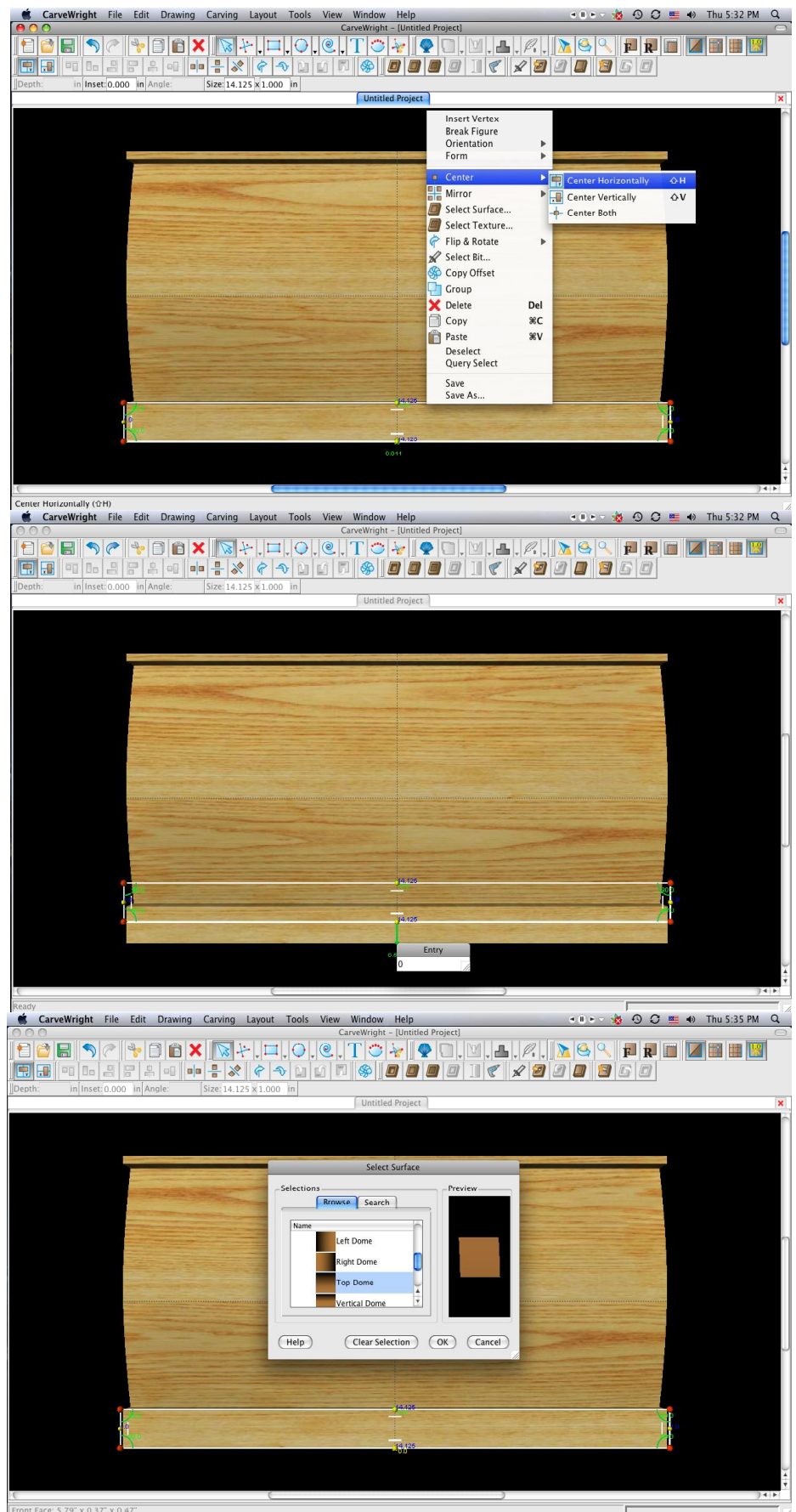
## ➤ CONSTRAINTS & ATTACHMENTS

Attach the box to the  
bottom edge of the board  
by setting the distance to  
“0”.

## ➤ SURFACES

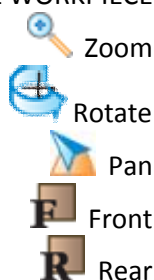


Choose Select Surface and  
select Top Dome under  
Domes.



Change the depth to .5"  
and the height to 999.

## ➤ MANIPULATING THE WORKPIECE



Again you can see how this changes the contour from a side angle.

## ➤ PATTERN PLACEMENT

Select the "pattern tool" to open the pattern library along the right side.

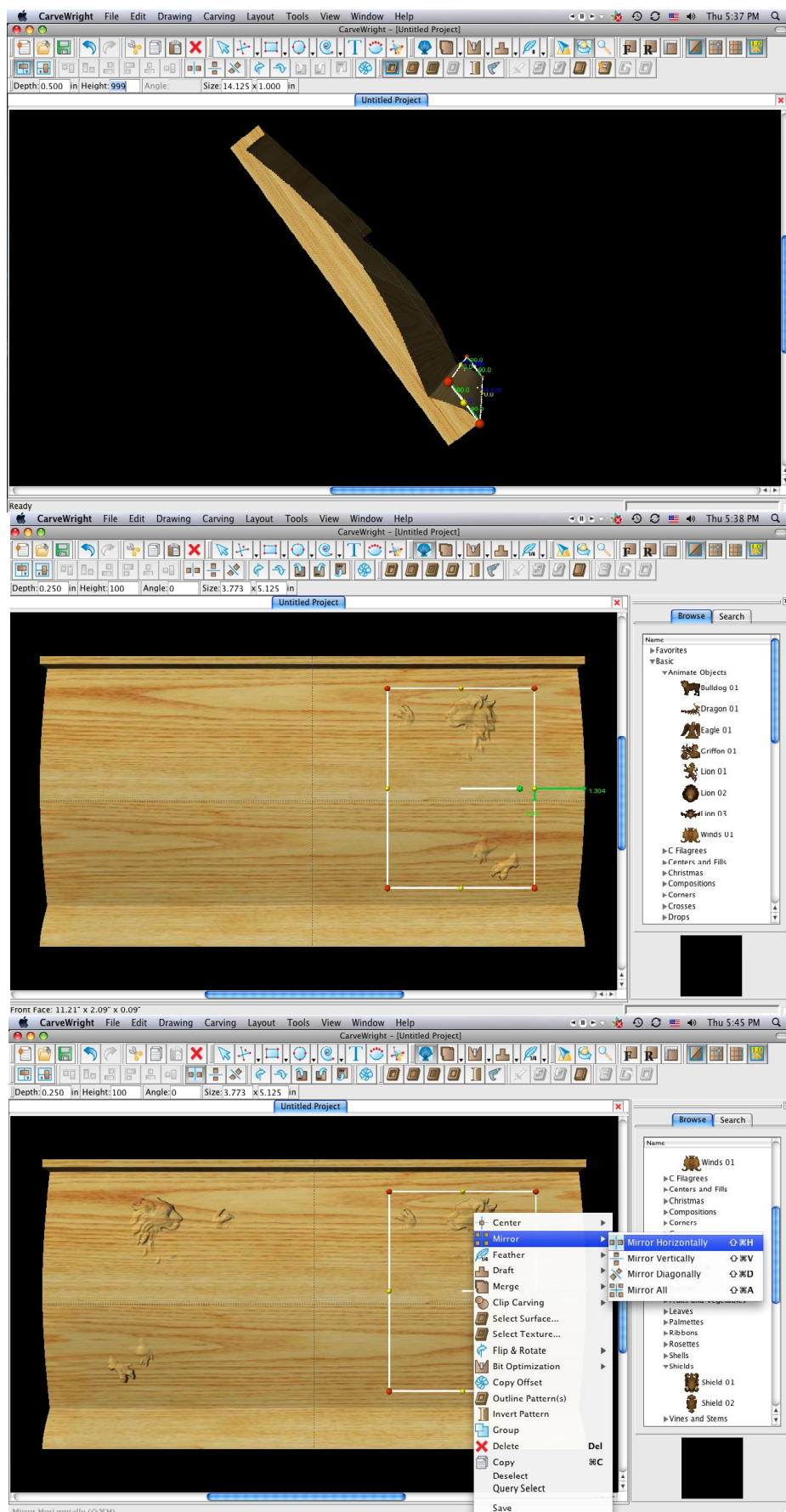
Select "Lion01" under "Animate Objects" and place on board by clicking or drag & drop.

Size to fit within the bigger rectangle dome.

## ➤ MIRROR



Right click on the lion and select "Mirror", "Mirror Horizontally".



Note: The patterns are not showing up all the way. We need to fix this by using our merging tools. Select the Carving list under View on the top menu bar.

## ➤ CARVING LIST



Select “View” and then  
“Carving List”

## ➤ MERGE



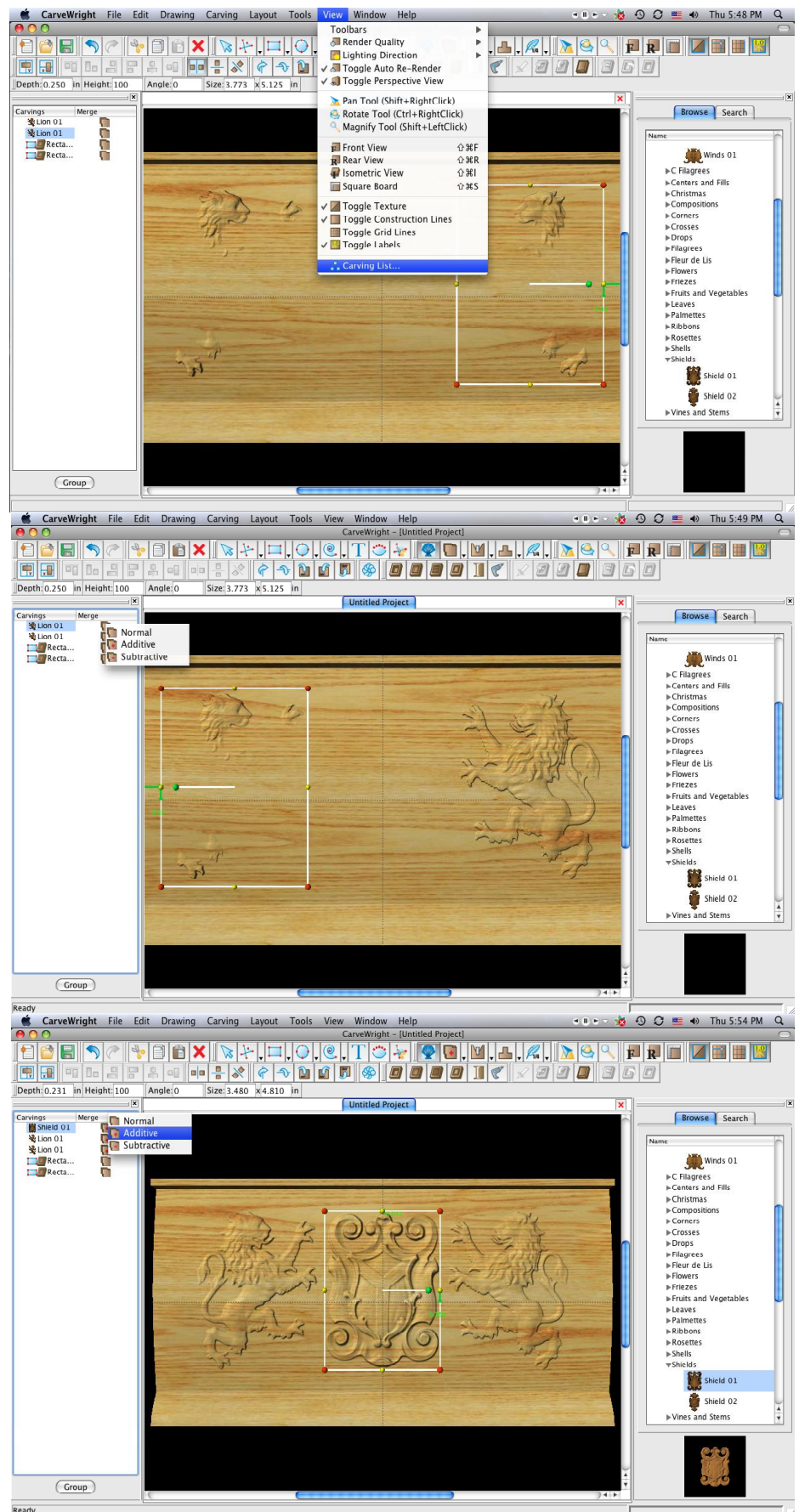
Select the “Lion” patterns  
in the carving list. Click on  
the merge style and select  
Additive.



## ➤ PATTERN PLACEMENT



Select “Shield01” under  
“Shields” and place in the  
middle of the board.





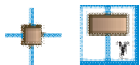
## ➤ MERGE



Select the “Shield” pattern in the carving list. Click on the merge style and select Additive.



## ✓ CENTERING



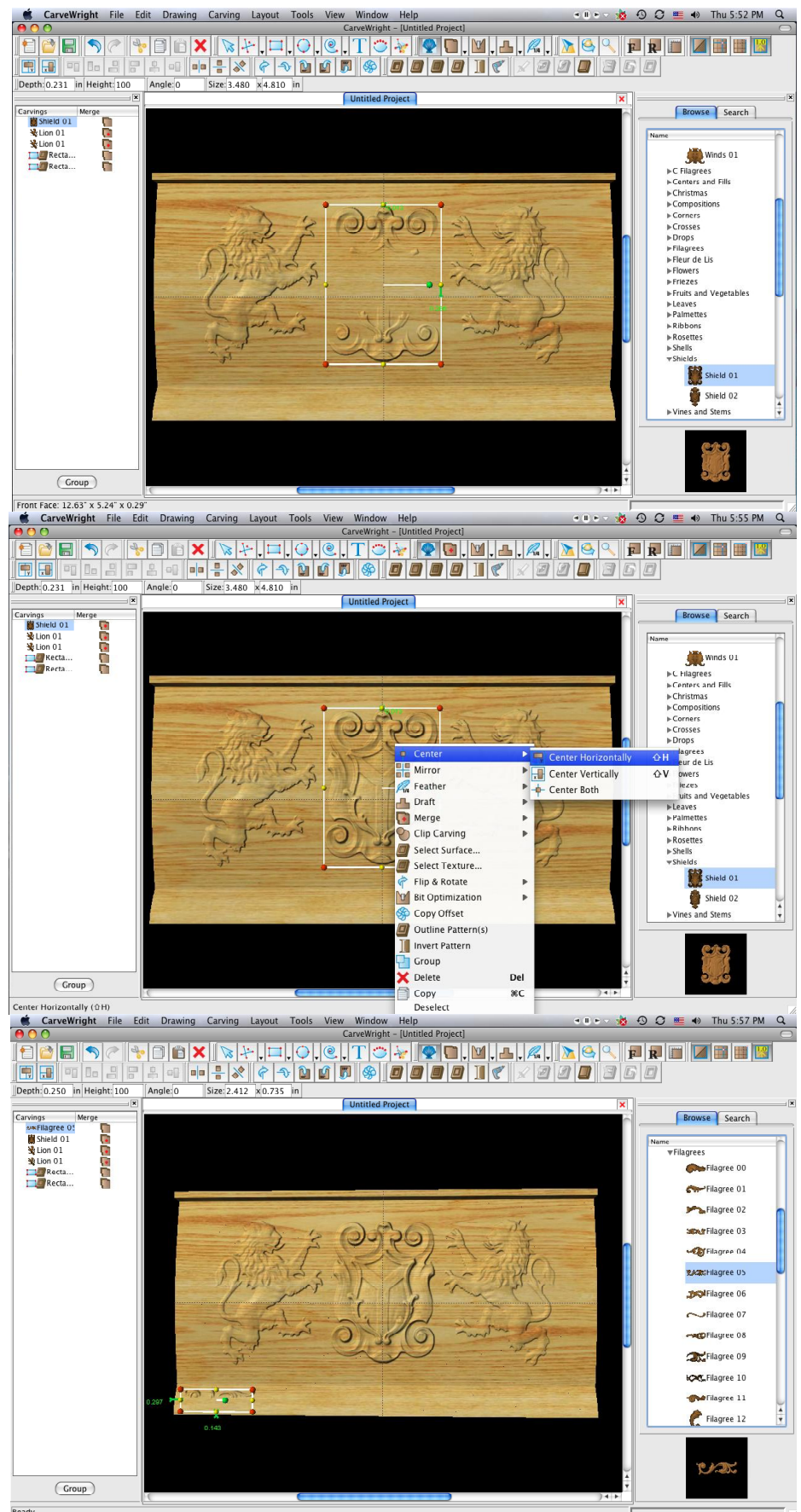
Select the “Shield01” pattern and select “Center”, “Center Horizontally”.

## ➤ PATTERN PLACEMENT



Under “Filagrees”, select “Filagree05” and place in the bottom corner of the board.

Size to fit within the smaller rectangle along the bottom.





## ➤ MIRROR



Right click on the hole and select “Mirror”, “Mirror Horizontally”.

## ➤ CARVING LIST



Select “View” and then “Carving List”

## ➤ MERGE



Select the “Filagree” patterns in the carving list.  
Click on the merge style and select Additive.

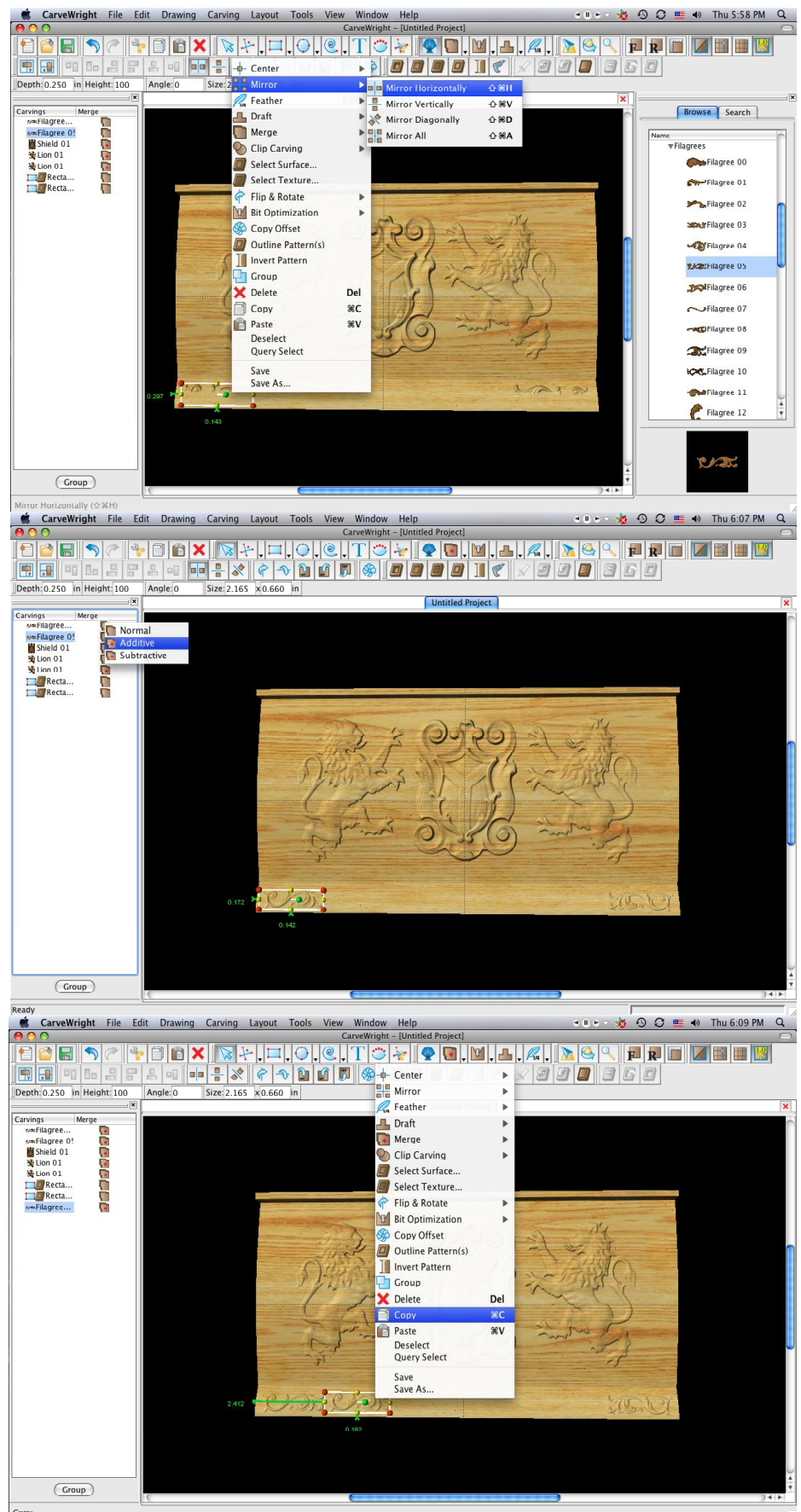
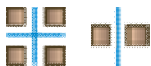


## ➤ COPY & PASTE



Right Click, choose “copy” and “paste” to put another filagree next to the existing filagree and again Mirror Horizontally.

## ➤ MIRROR



Repeat this step again so the pattern is mirrored across the entire bottom of the board.

## ➤ MANIPULATING THE WORKPIECE



Rotate and/or zoom your workpiece to see your design board more clearly.



Select “File”, “Save”

\*\*\*\*\*IMPORTANT\*\*\*\*\*

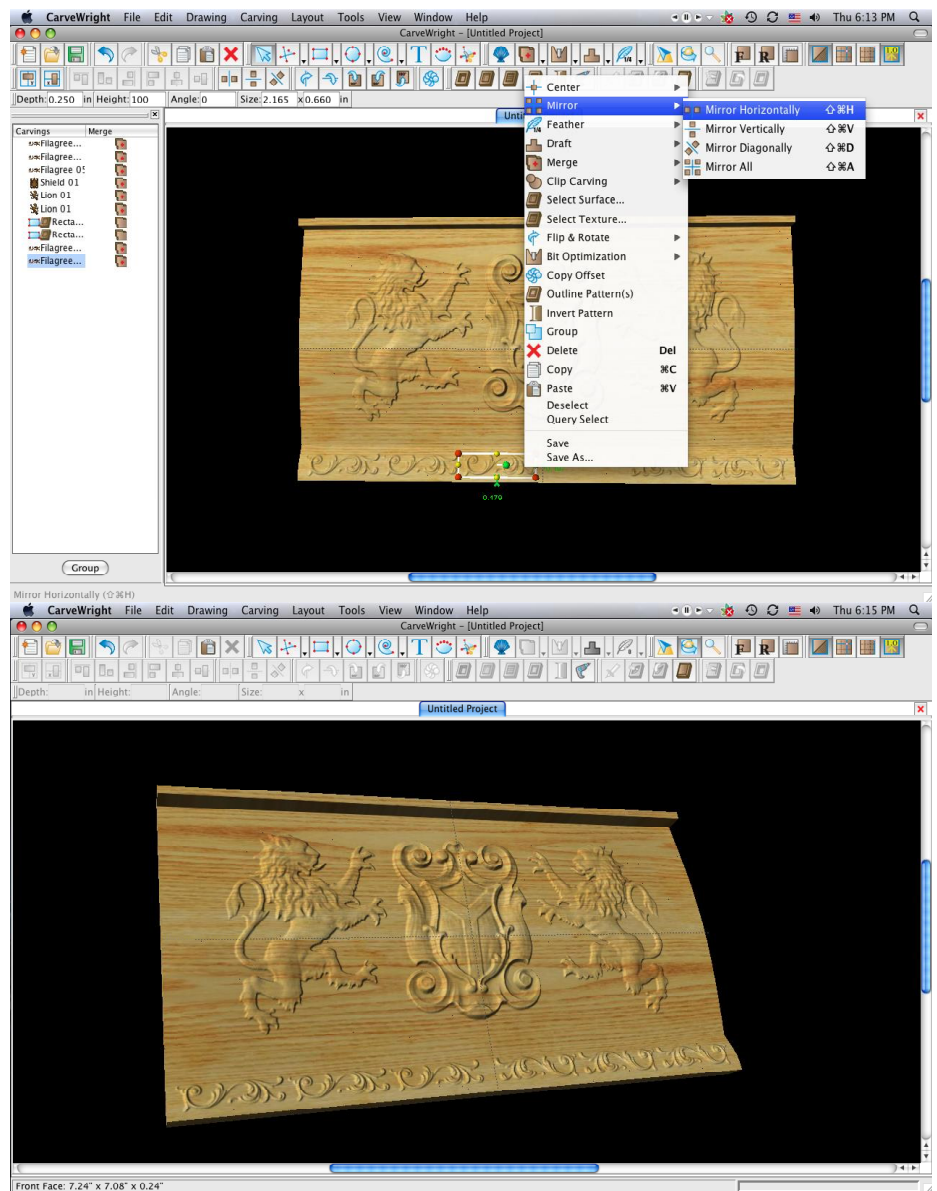
Name file and click “Save” to hard drive.

## ➤ UPLOADING TO MEMORY CARD



Select “File”, “Upload”  
Save to memory card.

Example:  
*lionboxside\_N\_45*  
*(recognizable*  
*name\_quality*  
*setting\_estimated time to*  
*carve)*



## LIGHTHOUSE WELCOME PT 1

This project covers the following design concepts:

- ✓ STARTING SOFTWARE
- ✓ DRAWING TOOLS
- ✓ CARVE REGION
- ✓ MERGE - SUBTRACTIVE
- ✓ TEXTURE
- ✓ CLIP CARVING – EXCLUSIVE
- ✓ TEXT TOOL
- ✓ CONFORMING VECTORS
- ✓ CUT PATH
- ✓ SAVE & UPLOADING TO MEMORY CARD



## INSTRUCTIONS:

### ✓ STARTING THE SOFTWARE

Open the CarveWright Project Designer Software

*The Welcome screen appears with project options.*

Select "New Project"

Set your project board dimensions.

Length: 14"

Width: 14"

Thickness: .75"

Click OK

### ✓ DRAWING TOOLS

Draw two circles using the drawing tool making one smaller than the other.

Center both circle on the board.

### ✓ CARVE REGION



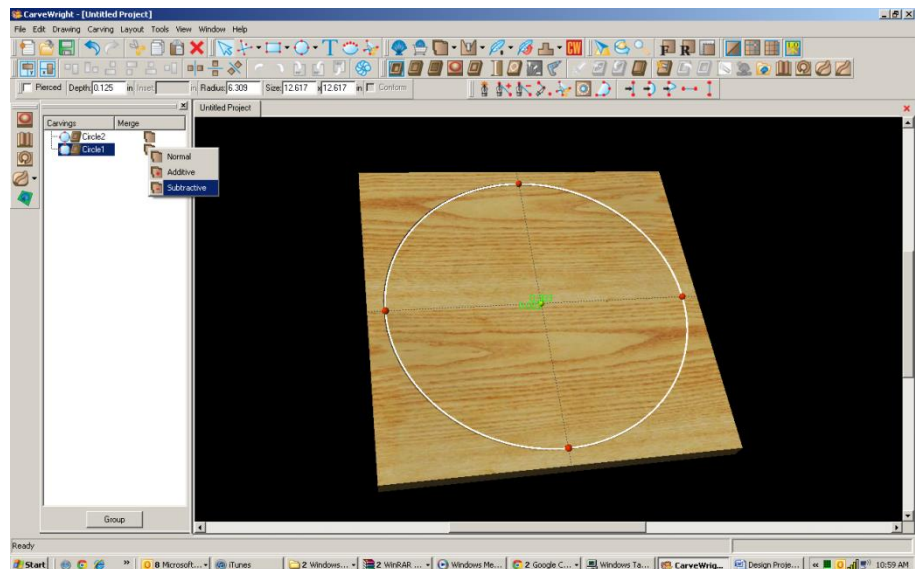
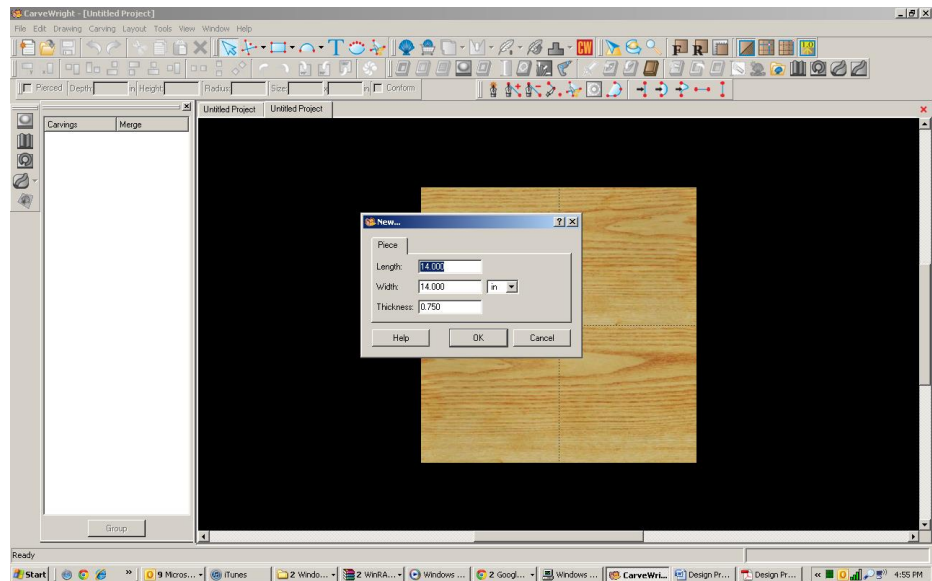
*You can make the carve region whatever depth you like.*

*I selected the following:*

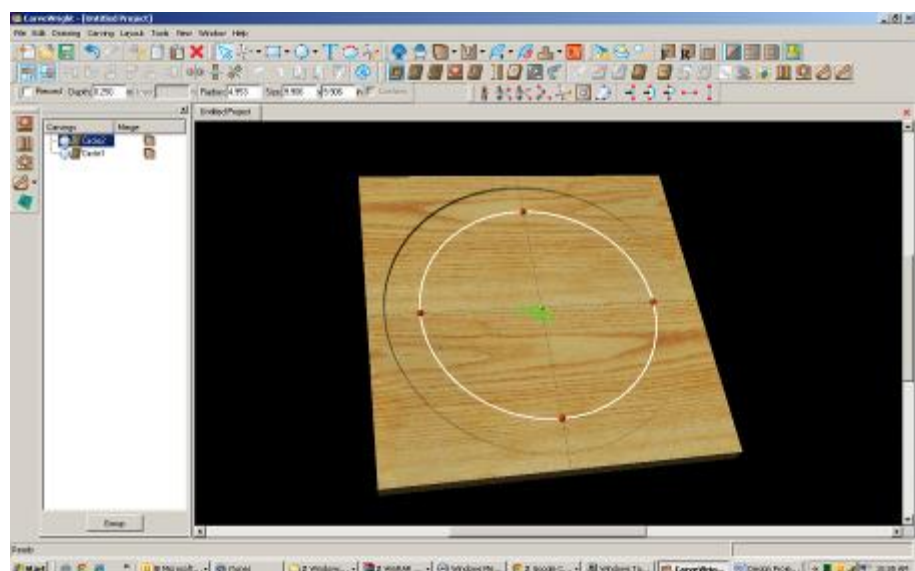
Larger circle depth: .125"

Smaller circle depth: .250"

*Notice that the center (smaller circle) does not show a carve region .250".*



tool



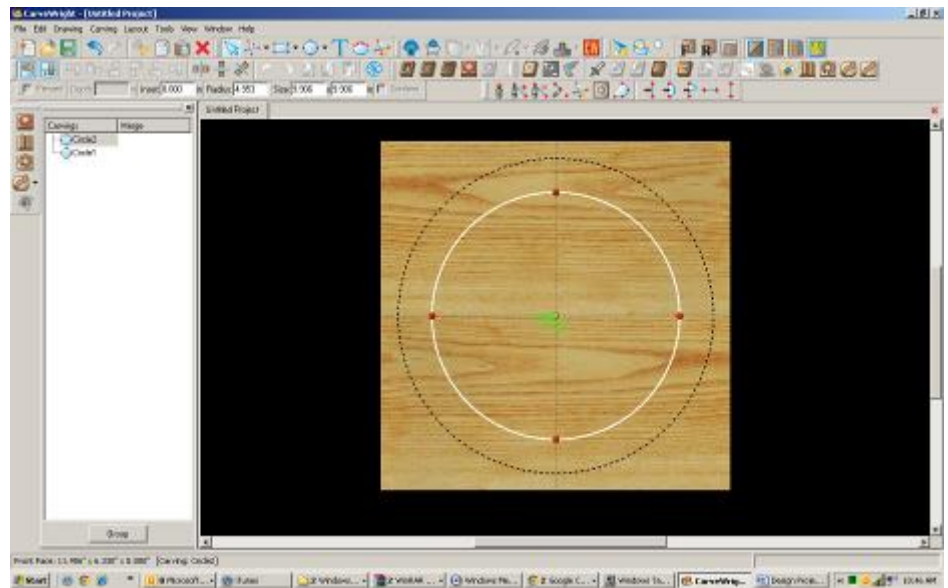
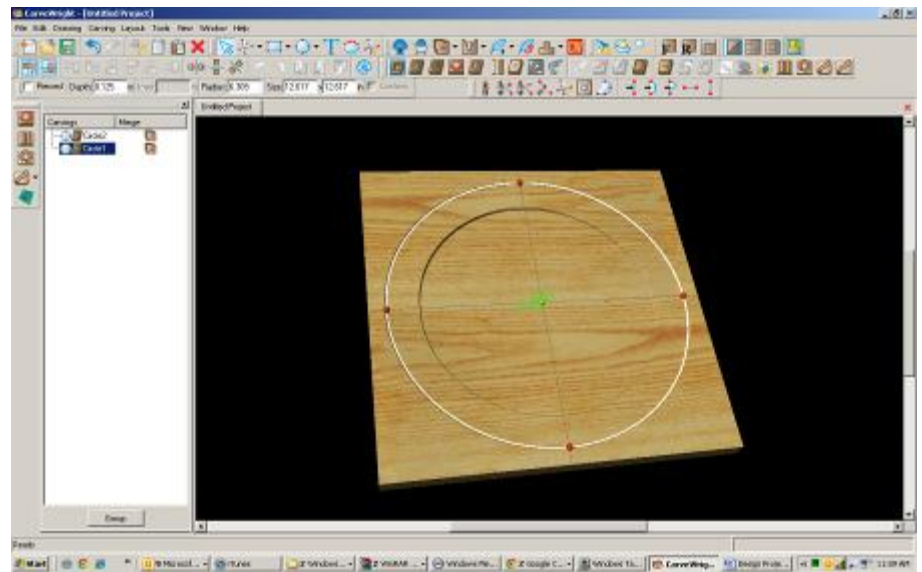
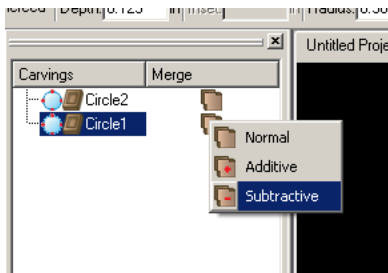
of



## ✓ MERGE - SUBTRACTIVE

Open your Carving List, if it is not by going to VIEW > CARVING LIST.

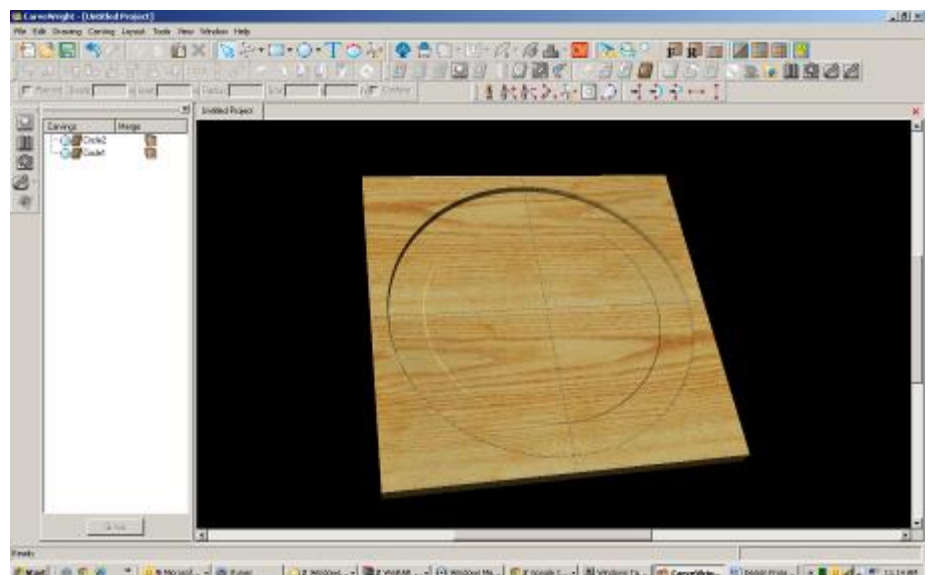
Select the outer circle, right click on Merge Icon and select Subtractive.



*Now you can see the inner circle with a slightly deeper carving depth.*

*Alternative uses of this same technique:*

*Both circles could actually have the same carving depth or the outer circle could have a deeper carving depth than the inner circle.*



## ✓ TEXTURES

Select "Texture" tool.

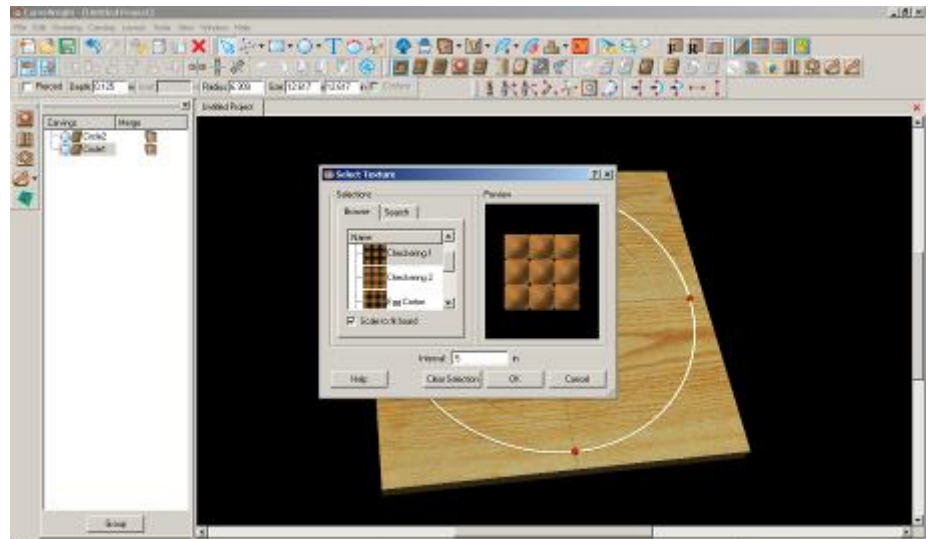


Texture dialog box appears displaying a variety of available textures.

Select "Checkering1" and change the interval to .5"

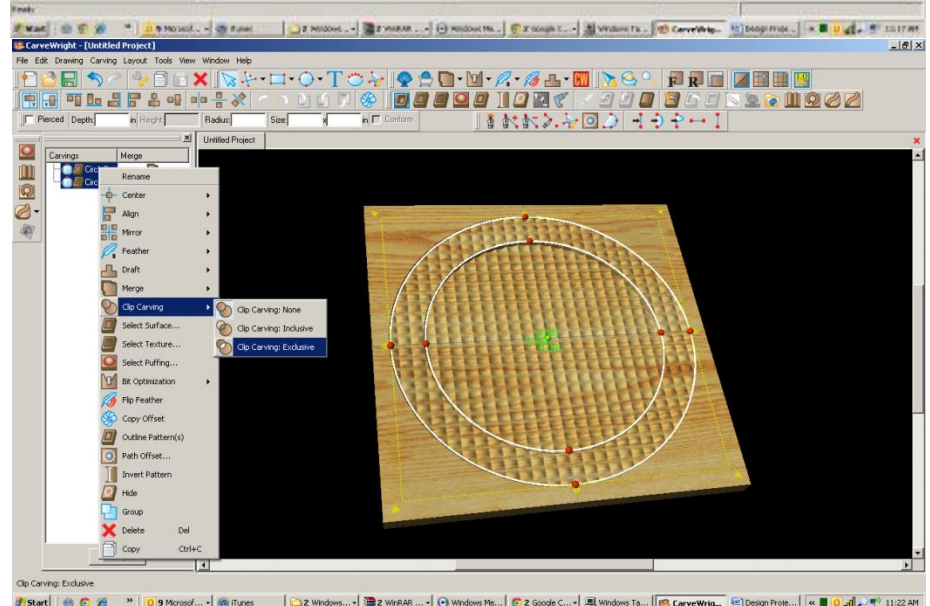
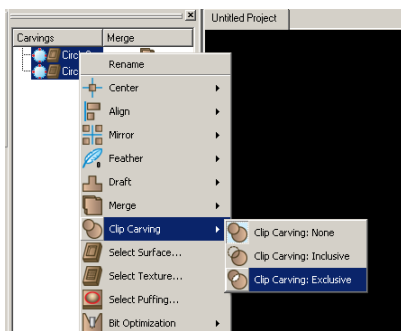
Click OK.

Notice the texture is applied to both circles.



## ✓ CLIP CARVING

Select both circles then apply Clip Carving – Exclusive



Now you have your circle inside a textured circle.

## ✓ FINE TUNING

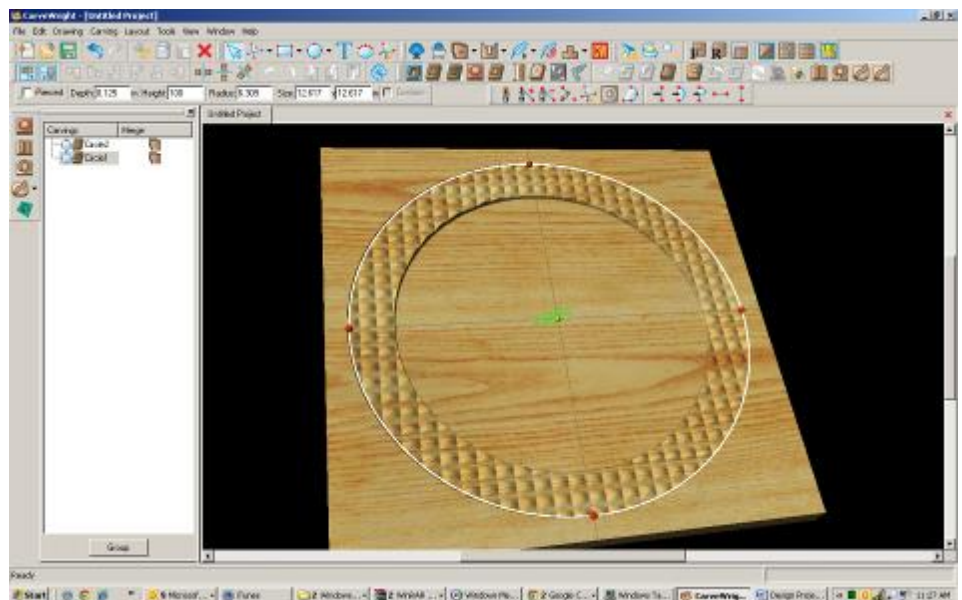
I would do a few other things to this project before carving.

### HEIGHT

I selected the following:  
Larger circle height: 40"

## ✓ GROUPING

Group these two circles.



## ✓ PATTERN PLACEMENT

*Place a pattern on the board. Not sure where I got this one, but it is nice.*

Select a pattern and place it on the board.

Resize to fit where you would like it.

Change depth to meet the inner circle  
- .250"

Change feather to NONE.

## ✓ CLIP CARVING - INCLUSIVE

With the pattern selected, right-click and select Clip Carving – Inclusive.

## ✓ TEXT TOOL

Open your Text Tool and make your selections.

*I used the following:*

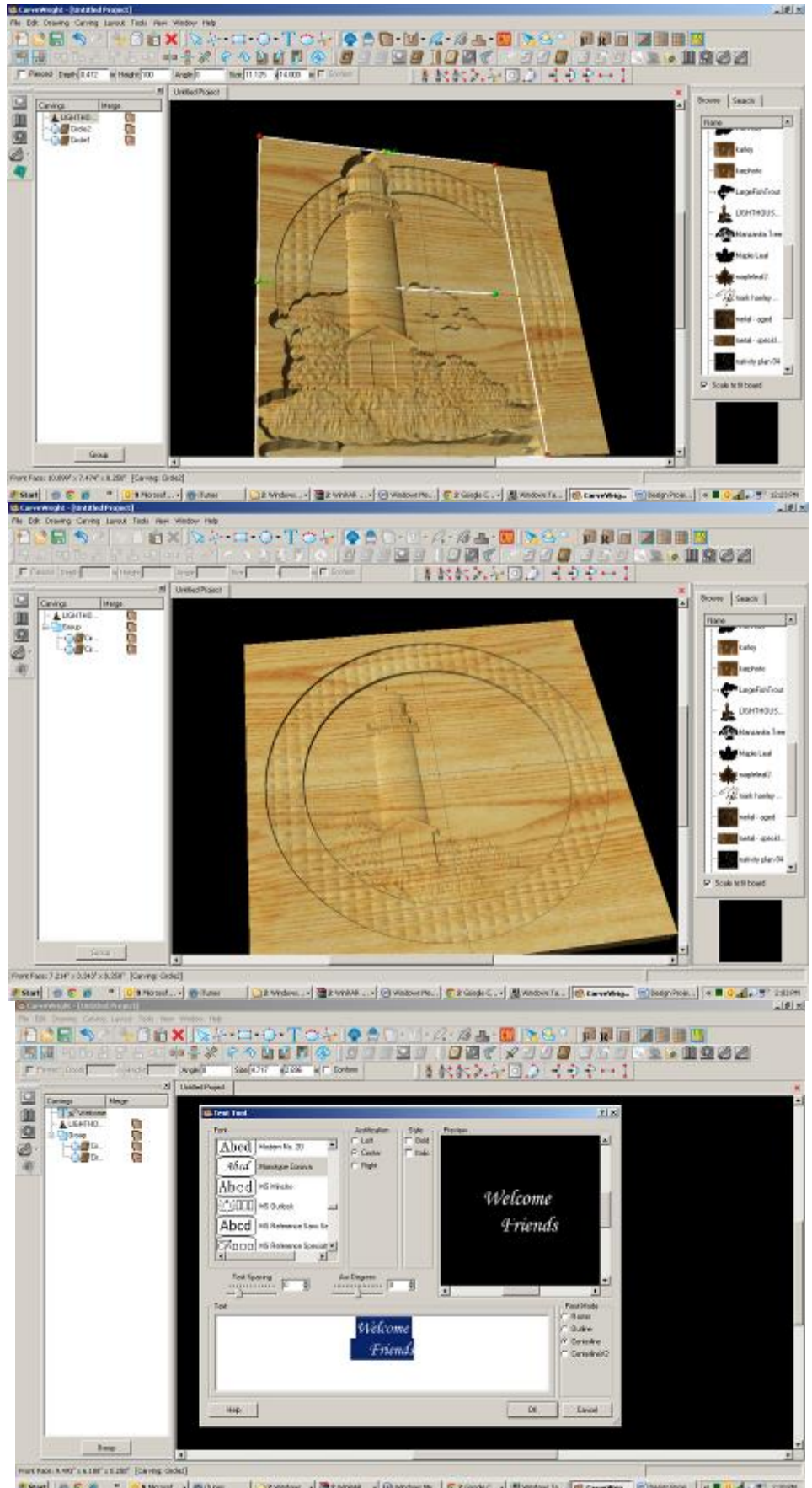
Font: Monotype Corsiva

Justify: Center

Rout Mode: Centerline

*I added both lines of text to one screen, but added spaces before the word Friends to offset it slightly. When using multiple lines, it may be easier to manipulate if you do them as separate items, however getting the fonts to the same size is a bit trickier.*

Click OK.





## ✓ CONFORMING VECTORS

*Because we are placing text over a carved region and Centerline by itself only works on the top surface of the board, I am applying Conforming Vectors. Centerline is a vector.*

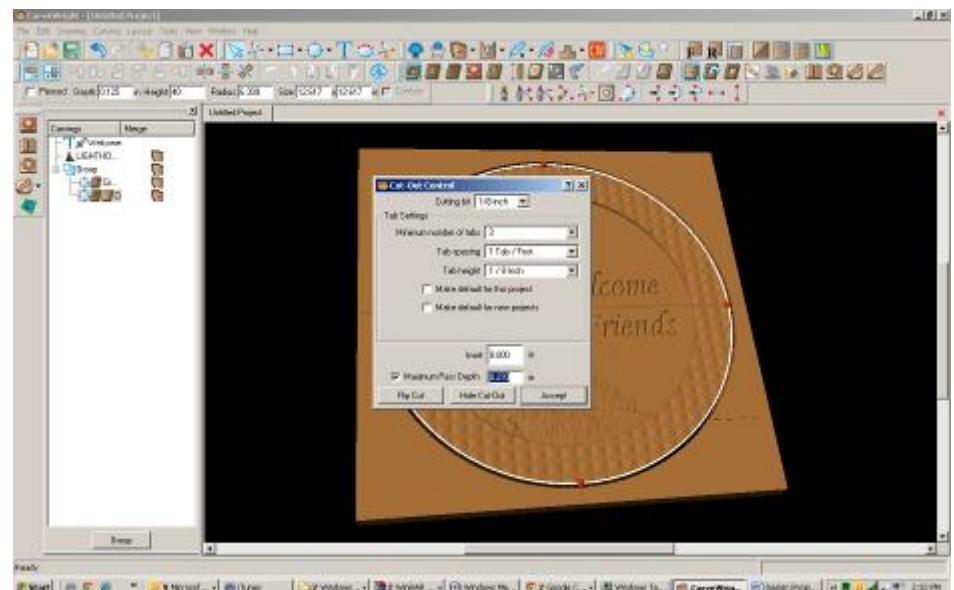
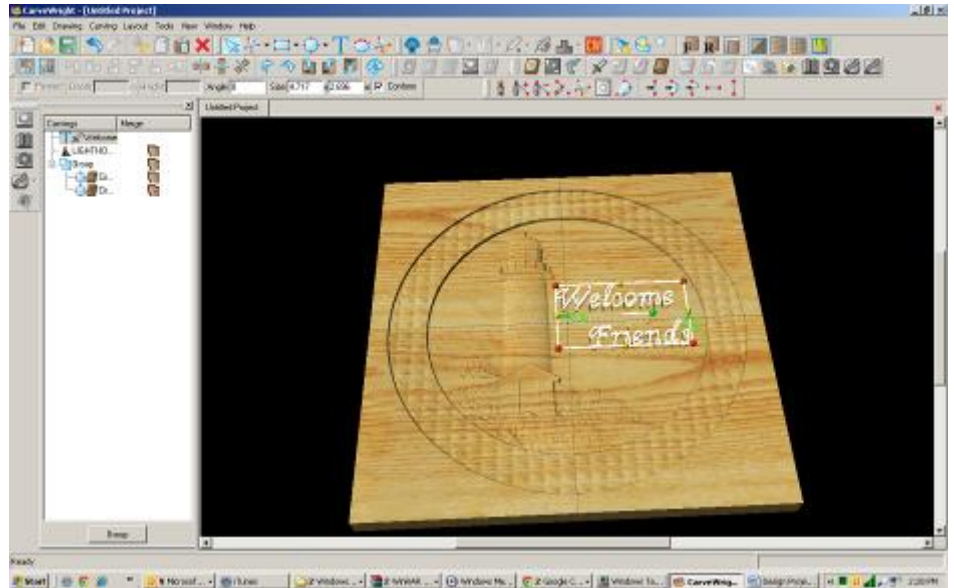
With the vector (Centerline) selected, click on the Conform box.

Resize and place where it looks best.

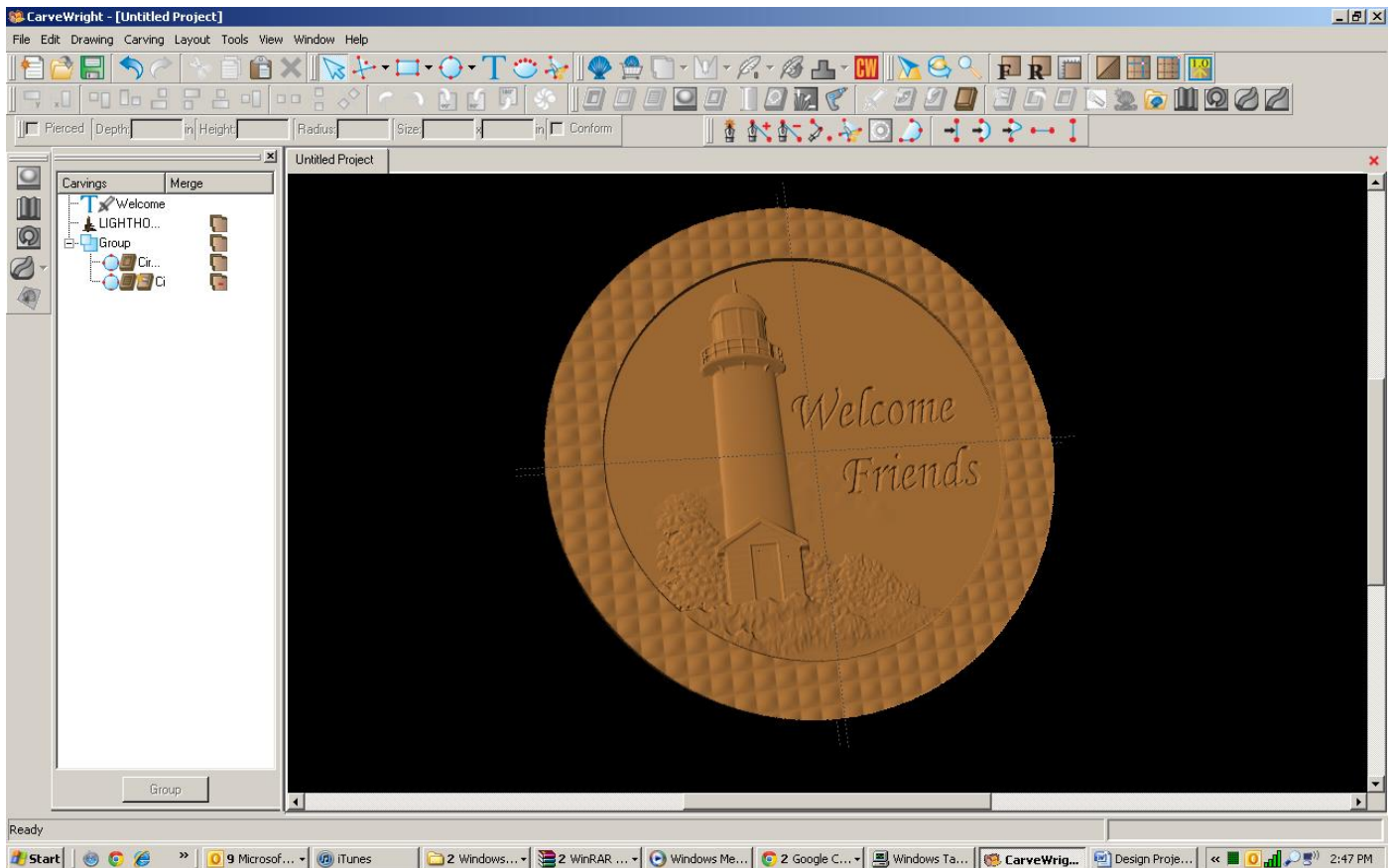
## ✓ CUT PATH

Select outer Circle and click on Cut Path Tool. Assign Maximum Pass Depth to .27" Flip Cut to cut outside of the path and Accept.

*I turned off my wood grain to see my project better.*







## ✓ SAVE & UPLOAD TO CARD

Select "File" > "Save"



### \*\*\*\*\*IMPORTANT\*\*\*\*\*

Once a project is uploaded to a memory card, it cannot be brought back from the memory card into the software. Always **SAVE YOUR PROJECT** on your hard drive. A Projects folder is recommended and you should know where you saved it.

## ✓ UPLOADING TO MEMORY CARD



Make sure your Memory Card & Programmer are properly attached via your USB port, Select "File" > "Upload" to save to your memory card.

Select Quality Setting

Name Your Project

Click "Upload"

## LIGHTHOUSE WELCOME PT 2

This project covers the following design concepts:

- ✓ OPEN PROJECT
- ✓ DRAWING TOOLS
- ✓ REVOLVE TOOL (PATTERN MODELING SUITE)
- ✓ CUT PATH
- ✓ SAVE & UPLOADING TO MEMORY CARD



## INSTRUCTIONS:

### ✓ OPEN PROJECT

Open the CarveWright Project Designer Software

*The Welcome screen appears with project options.*



Select "Open Project"

Browse to find the Lighthouse Welcome project.

### ✓ DRAWING TOOLS

Draw a circle that is slightly larger than the inside circle.

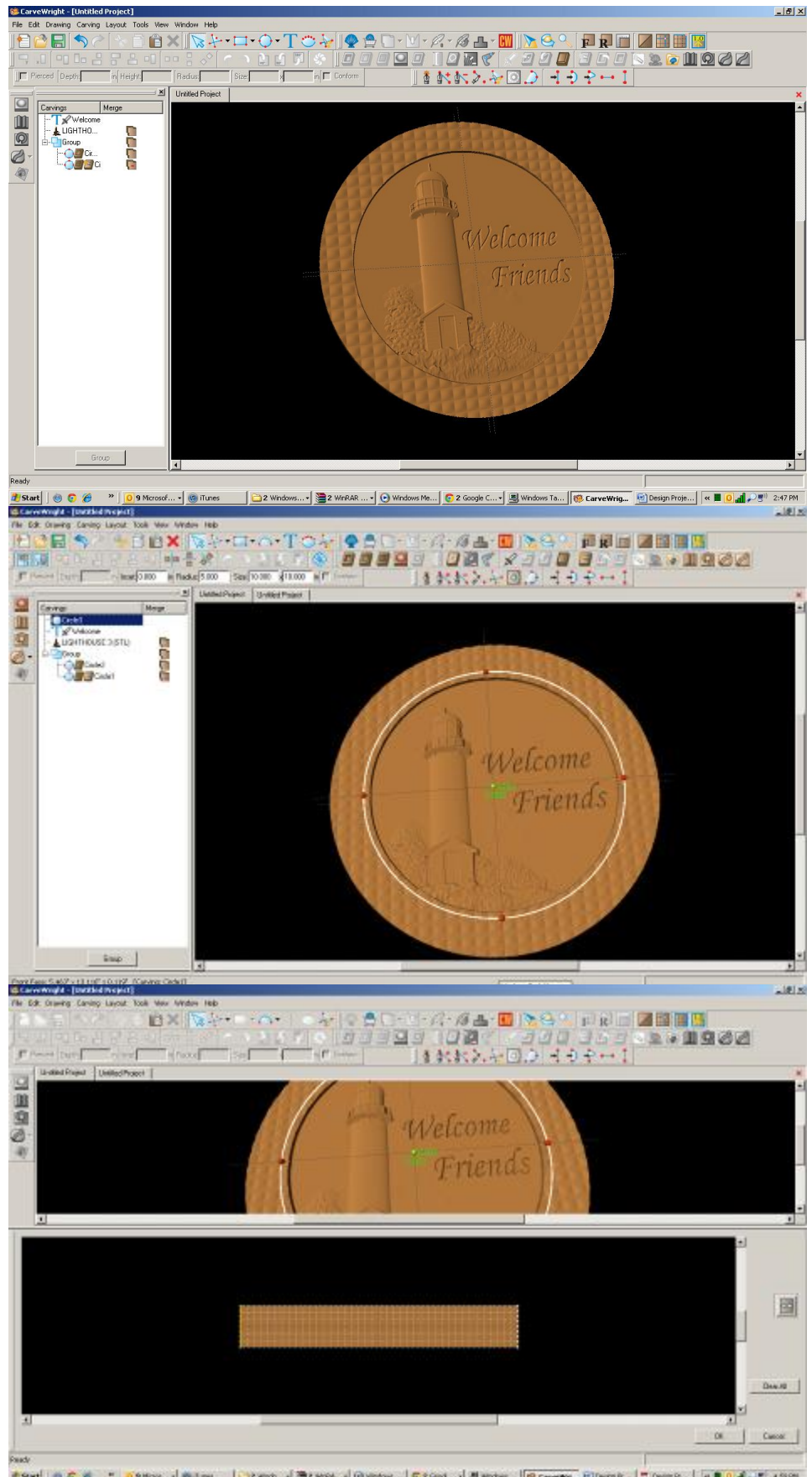
Center on the board.

### ✓ REVOLVE TOOL (Pattern Modeling Suite)

Select the Revolve Tool, which will open a window at the bottom of your screen.



*This is a slice of the circle with the right side being the outer portion and the left side being the center of your circle.*



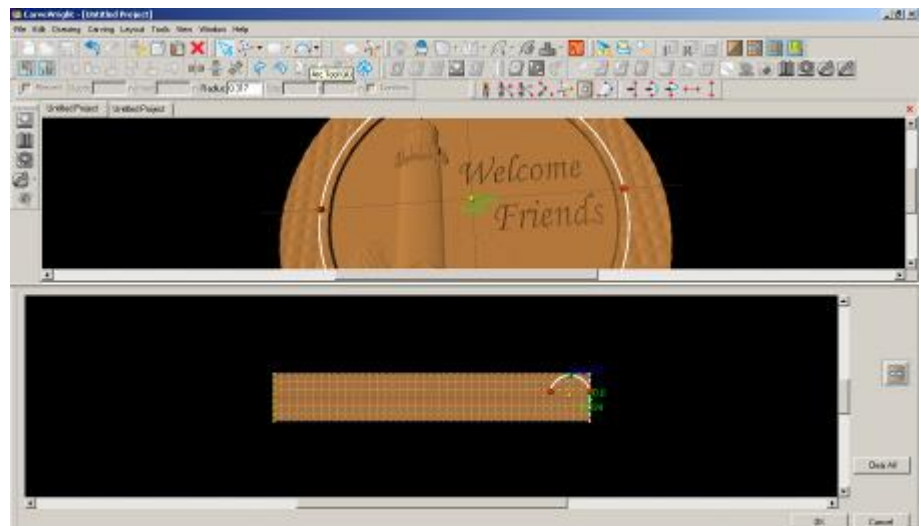
## ✓ ARC TOOL

Select the Arc Tool (drop down menu with Circle tool) and draw an arc on the far right side.

You will need to move the arc from the bottom to the top, by clicking on the yellow radius node and dragging upward. Place as desired or similar to as I have done.

Click OK.

Notice the result of the Revolve tool.

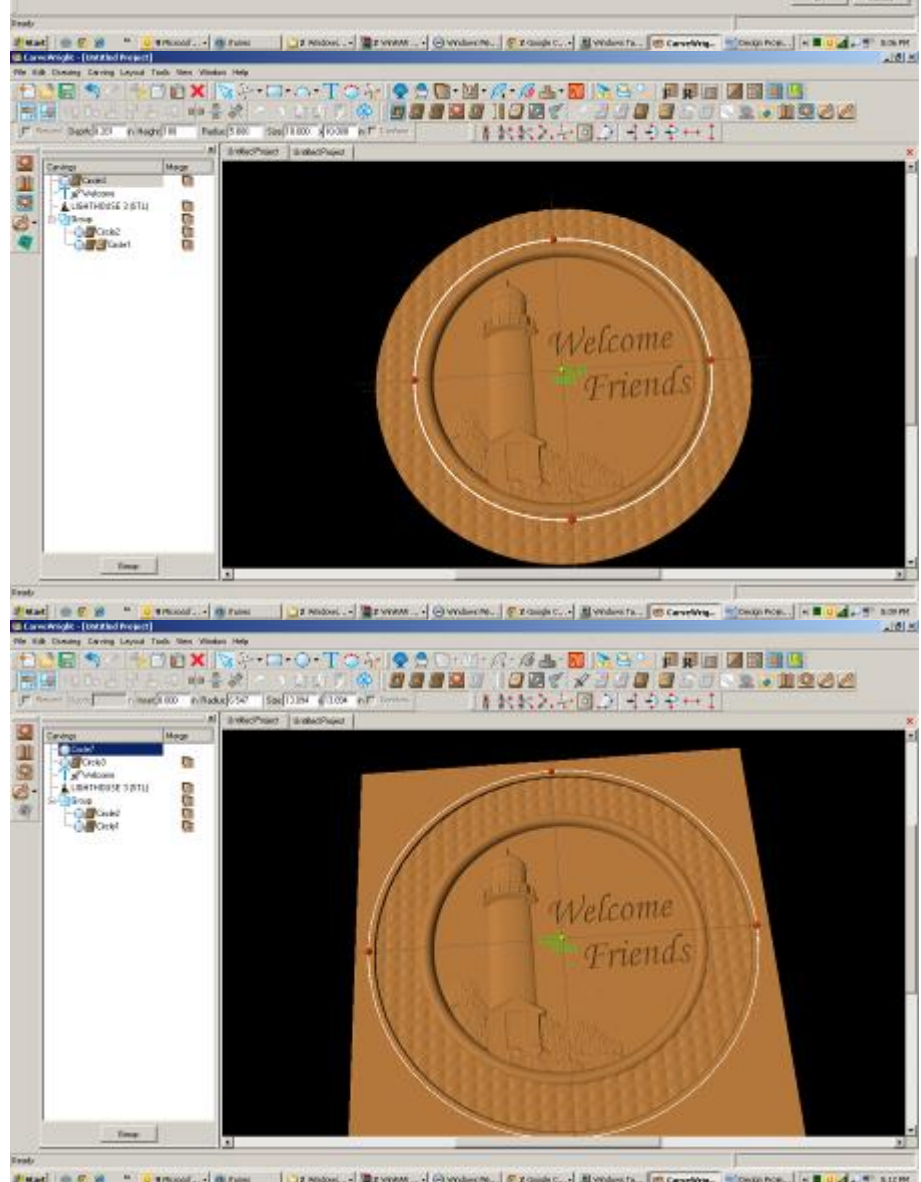


## ✓ TOGGLE OFF CUT PATH TOOL

I am then going to remove the Cut Path on my design by selecting the outside circle and clicking on the Cut Path tool again to remove it.

## ✓ DRAWING TOOL

Create a new circle that is slightly larger than the outside circle and center on board.

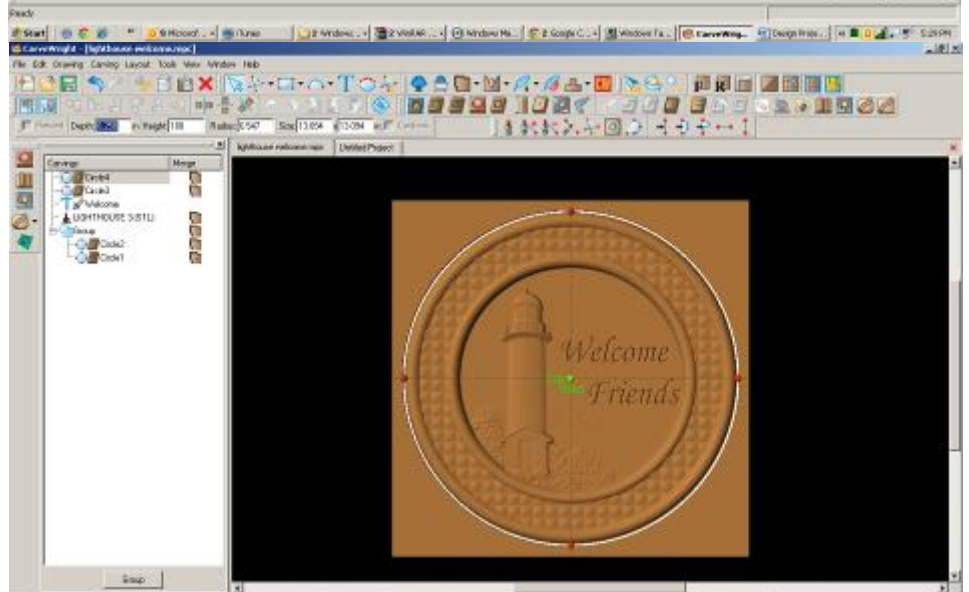
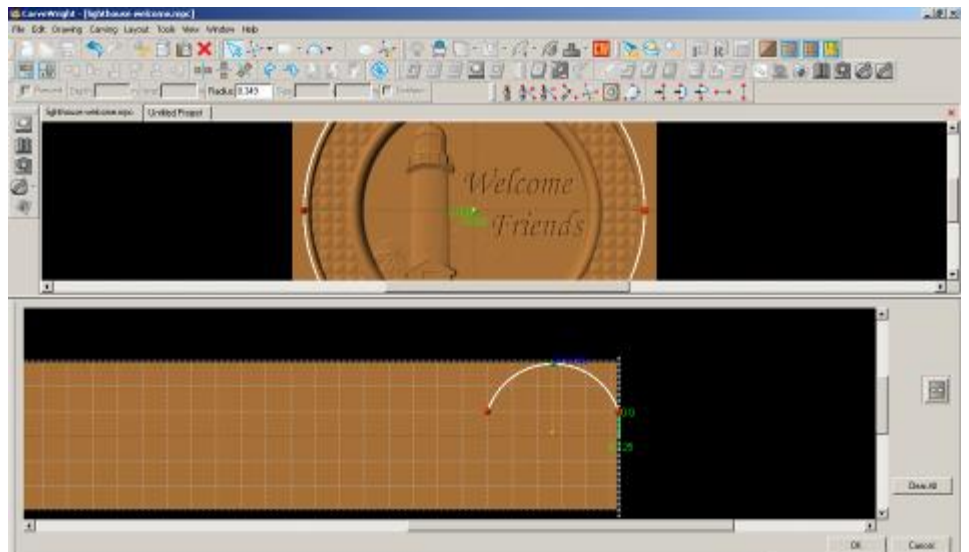




## ✓ REVOLVE TOOL

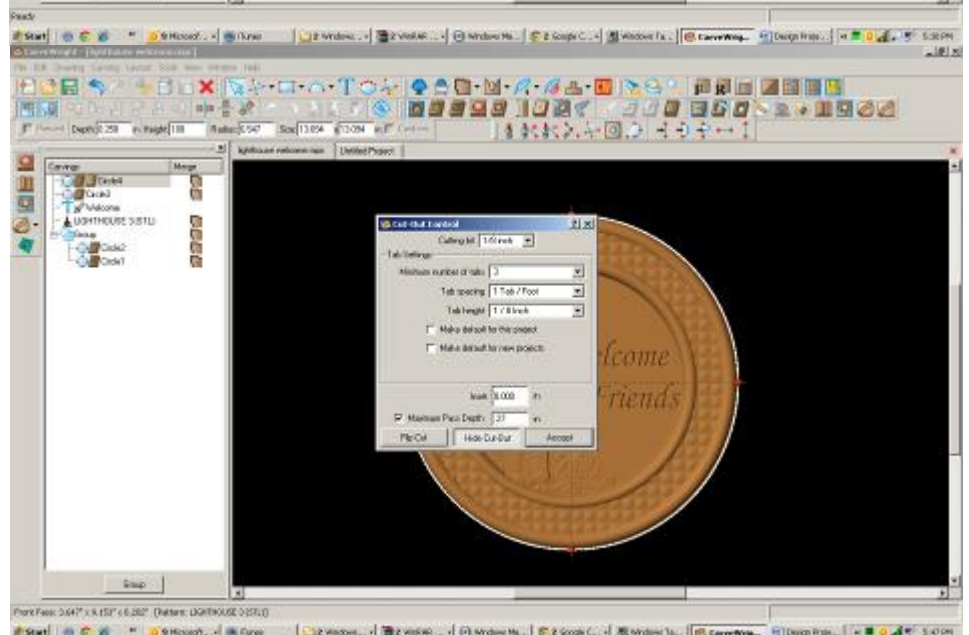
Repeat the arc on the outside circle.

Click OK.



## ✓ CUT PATH TOOL

Reassign cut path tool to new outer circle.





✓ SAVE & UPLOAD TO CARD

Select "File" > "Save"



\*\*\*\*\*IMPORTANT\*\*\*\*\*

**Once a project is uploaded to a memory card, it cannot be brought back from the memory card into the software. Always SAVE YOUR PROJECT on your hard drive. A Projects folder is recommended and you should know where you saved it.**

✓ UPLOADING TO MEMORY CARD



Make sure your Memory Card & Programmer are properly attached via your USB port, Select "File" > "Upload" to save to your memory card.

Select Quality Setting

Name Your Project

Click "Upload"



# CHAPTER 4 – PROJECT DESIGNER PRO

## *MATERIALS TOOL*



The **Materials tool** is like our **Textures tool** in that it applies a set background to the area selected but is much more advanced. This tool has several new background options that can be selected from and can be manipulated to fit each individual project.


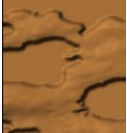


The **Materials Tool** can be used with any closed shape. If the new tool does not become available for a user created region, this typically can be attributed to end points not being connected.

The math behind the **Materials Tool** is based on Perlin Noise, created by Ken Perlin, which was originally created for the movie industry to generate realistic looking back ground textures. For more information on the techniques please click on the following link [http://en.wikipedia.org/wiki/Perlin\\_noise](http://en.wikipedia.org/wiki/Perlin_noise).



**BACKGROUND  
OPTIONS**

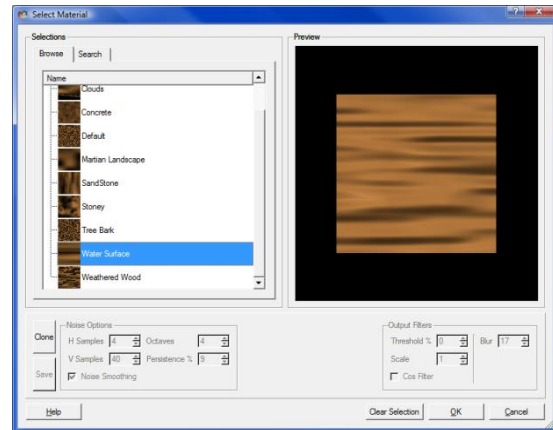
Currently there are ten default backgrounds:

- **Cloud Cover** 
- **Clouds** 
- **Concrete** 
- **Default** 
- **Martian Landscape** 
- **Sandstone** 
- **Stoney** 
- **Tree Bark** 
- **Water Surface** 
- **Weathered Wood** 

## MATERIALS MENU OPTIONS

The menu can seem a little daunting at first but through reading and understanding this manual it can be easily worked. There are several options that can be set on the backgrounds and they are **H Samples**, **V Samples**, **Octaves**, **Persistence %**, **Threshold**, **Scale**, **Blur**, **Noise Smoothing**, and **Cos Filter**. These options only become available on created backgrounds. To create a background, select the base background from the list of included backgrounds that best fits the project.

Once the background had been picked select the **Clone** option to create a new customizable option. Once the new background had been created it can be renamed so that it can easily be called from the list. After renaming the pattern it can be modified to fit the project. The rest of the options should be experimented with to gain an understanding of them.



## MAKE VECTOR GROUP

The Make Vector Group, introduced in Designer 3.0, is a tool that allows vector drawings to be carved with a V-bit which emulates the chip carving technique. These vector drawings can either be created in the Designer Software or imported DXF as files. To begin using the tool, first place the set of closed loop vectors on the board. All vectors must be closed and cannot intersect. If the regions intersect at any point, the tool will fail to open and an error message will be displayed (Members of a Vector Carving Group may not intersect). The intersecting vectors can be fixed or deleted in the Designer software and the Make Vector Group can be attempted again. If any vectors are open, the tool will be gray and not accessible. Select all vectors desired for the design and group them together using the **Group** function. Select the vectors in the newly created group and select the **Make Vector Group** icon. This will open a new window for the tool.

The first option to be set is the vector selection mode. This can be set to **Toggle**, **Alternate**, or **All**. **Toggle** allows each individual vector of the group to be selected or deselected, as needed. **Alternate** will select alternating vector loops, starting from the single vector loop selected by the user. **All** will select all of the vectors in the group. Use the **All** selection mode in conjunction with the **Toggle** mode to create custom vector configurations. When selecting vectors, check to ensure that

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the regions are not too close together, or too thin, to avoid chip-out in the finished carving. Once the carve areas have been set, a bit will need to be selected. The default bit is the 90° V-bit, but the 60° V bit can also be selected. With a bit selected, press the OK button to apply the bit and view the resulting carving on the board. If alterations need to be made, select the group from the carving list and click the vector group icon to re-enter the tool. It is important to note that it is required that the tool be opened every time a change is made to the vector group. The carving will not automatically update until the tool is opened.

## *PATTERN ALONG TRAJECTORY TOOL*



Similar to the **Decorate with Text Tool**, the **Pattern Along Trajectory** tool will apply a repeating pattern of carved elements to a selected path on the project board. This tool allows for the creation of many exciting projects that have been difficult or impossible up until now. It is important to note the two ways in which the word pattern is used in this document. First, the **Pattern Along Trajectory** tool implies a pattern of repeating and evenly spaced elements (or instances) along a path. The elements used in this repeating pattern can also be referred to as patterns. These are the same patterns that can be found in the libraries that are used in the Designer software.

### **CREATING A TRAJECTORY**

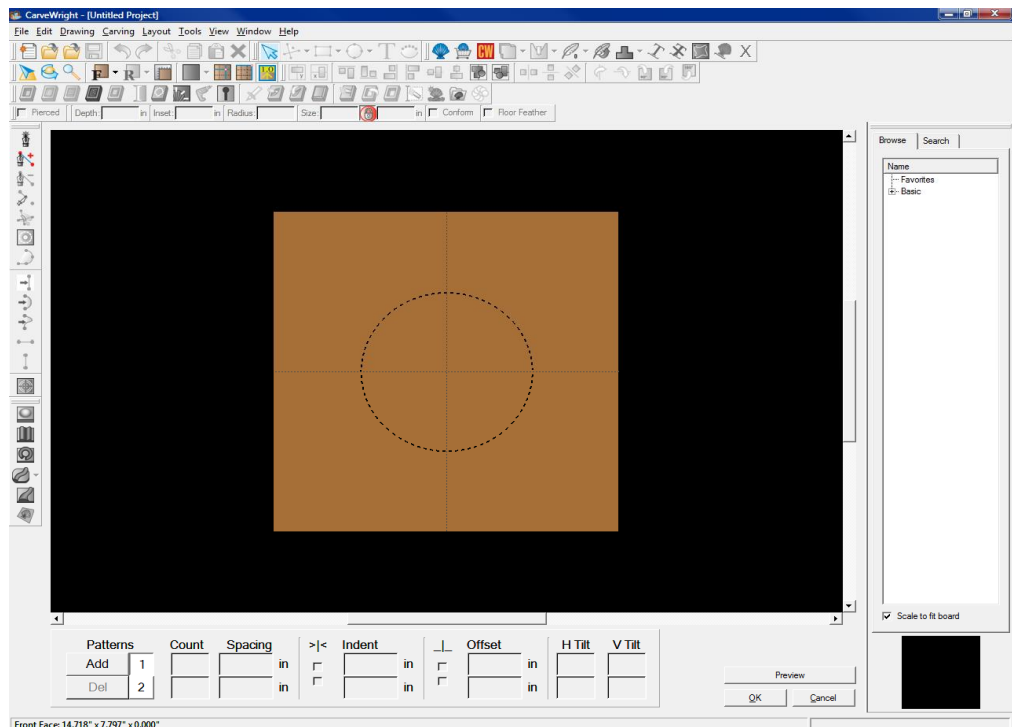
Conceptually this tool is very simple. First a path (or trajectory) is created and then up to two carvings are selected to be repeated along that path. The trajectory can be any line, spline, arc, circle, square, or path that can be drawn with the Designer tools. Trajectories do not have to be closed shapes or have straight lines. Start by drawing the shape or path that the repeating pattern is to follow. The trajectory can be modified at any time, but modifying the shape or size of the path after the patterns have been applied can lead to changes in the spacing of the repeated carvings.

When drawing the trajectory it is important to note and remember what point was drawn first. This first point will always be the **start point** of your trajectory and will be the point on which the first instance is placed. All indenting measurements will also use this point as reference. For example, if a straight line trajectory was drawn from right-to-left, the start point of the trajectory would be its right endpoint and the first instance would be placed there. Conversely, if the trajectory was drawn from left-to-right then the trajectory start point would be placed at the left end.

## APPLYING THE CARVING ELEMENTS TO THE TRAJECTORY

Once the path is drawn and selected, enter the select **Pattern Along Trajectory** tool by clicking on the tilted orange shell icon. Another window will open showing the board with a dashed line representing the trajectory. The controls for positioning and spacing the carved elements along the trajectory are displayed along the bottom.

From here there are several inputs needed in order to fully specify the final pattern. We will summarize them here and then discuss them in greater detail later in this document.



- 1) Select the pattern, or patterns, to apply to the trajectory from the pattern library.
- 2) Adjust the size of the pattern and the rotation angle.
- 3) Specify how many instances of each pattern will be placed on the trajectory. There are two ways of doing this. The first is by specifying the total number of instances and the second is by specifying the spacing between each instance. Given only one of these two inputs the software will calculate the other.
- 4) Specify where the final grouping of carvings should start along the trajectory. The options are to start the pattern at the trajectory start point or to center the entire grouping on the center point of the trajectory's length. This can be thought of like text justification, where left justify pushes a string of characters to the left margin of a column and center justify centers the string in the column.
- 5) Set an indent value. If the pattern is **not** centered then there is an indent control that allows the pattern to be moved along the trajectory away from the start point.
- 6) Apply an offset distance to the pattern grouping either above or below the drawn trajectory path. Both positive and negative numbers are allowed in this field and determine whether the pattern will move above or below the

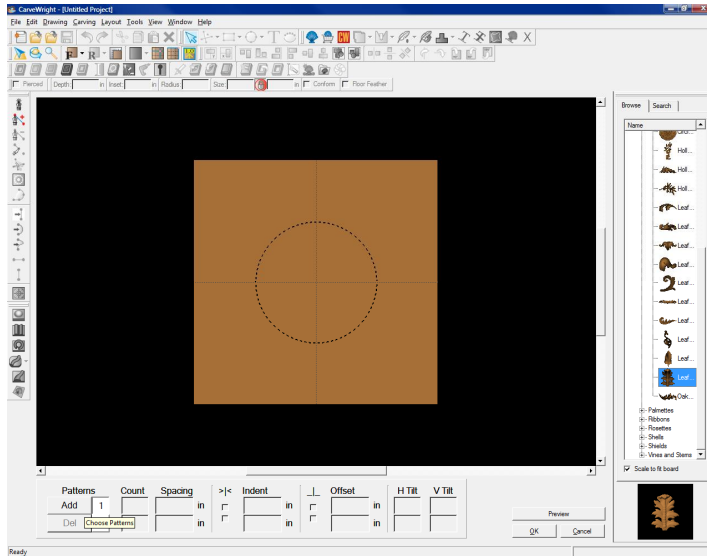


path. It is important to note that a negative number will not always move the pattern in the same direction for every trajectory (sometimes it may move it above the line and sometime below).

- 7) Decide how the offset distance should be determined. There are two modes that will be discussed below, one using the original trajectory and spacing to set the position of the offset pattern and the second using a internally generated offset trajectory.
- 8) Set the tilt of the carvings into and out of the board. This is similar to the tilt feature in the Designer software and allows for interesting layering options.

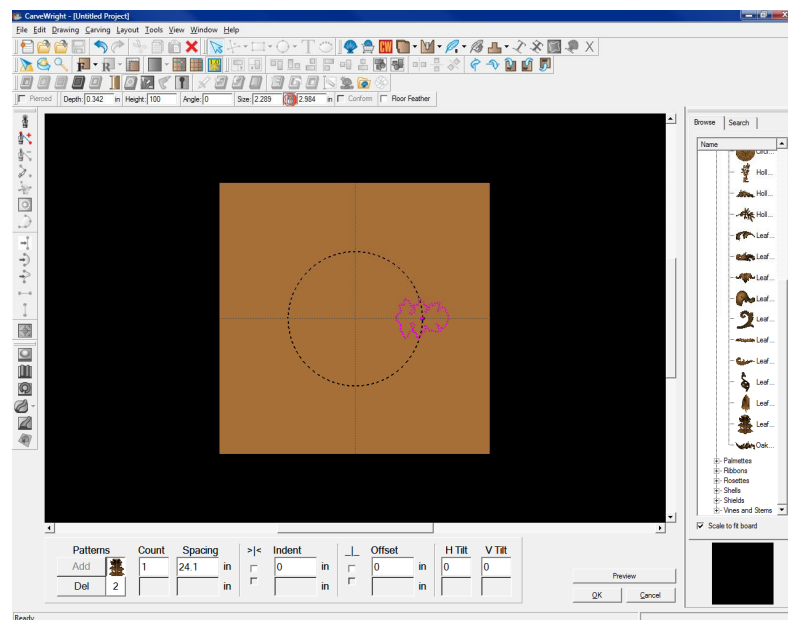
## APPLYING A PATTERN TO THE TRAJECTORY

Begin by finding and highlighting the carved pattern to be added onto the trajectory from the library (just as would be done if a pattern was placed on the board in a typical fashion). Once the pattern has been selected, click the **Add** button in the bottom left corner of the screen. A small picture of the selected pattern will now be displayed next to the **Add** button. You can add up to two patterns to the trajectory by selecting a second pattern and hitting **Add** again.



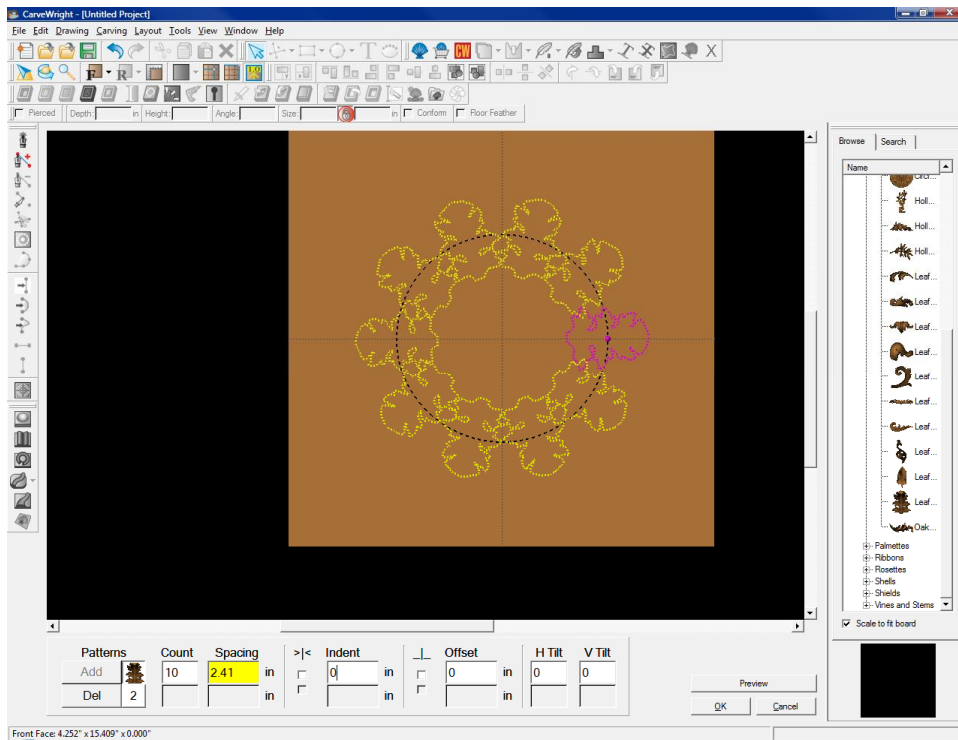
An outline of the pattern now appears along the trajectory. After the pattern has been added new options will become available. These options include **Count, Spacing, Center Patterns on Trajectory, Indent, Offsets Before Projection, Offset, H Tilt, and V Tilt.** Clicking and dragging the outline allows for

placing the first instance in any location along the trajectory (right/left as well as above/below). The **Offset** and **Indent** features can also be used to alter the position of the instances. The standard **Depth, Height, Angle,** and **Size** tools are also available but are discussed in other CarveWright documentation.

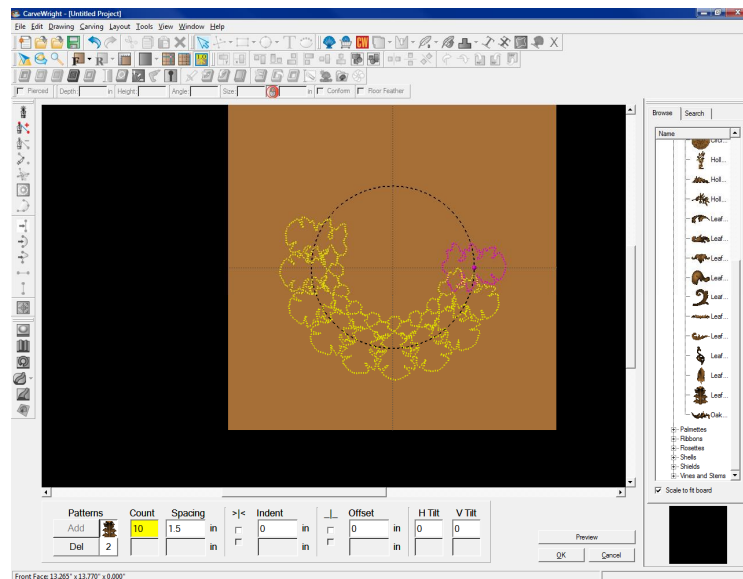


## SPECIFYING THE NUMBER OF INSTANCES IN THE PATTERN

The number in the **Count** input field determines how many instances of a pattern will be placed along the trajectory (including the initial instance). The software calculates the length of the drawn trajectory and automatically calculated the spacing based on the number of instances entered.

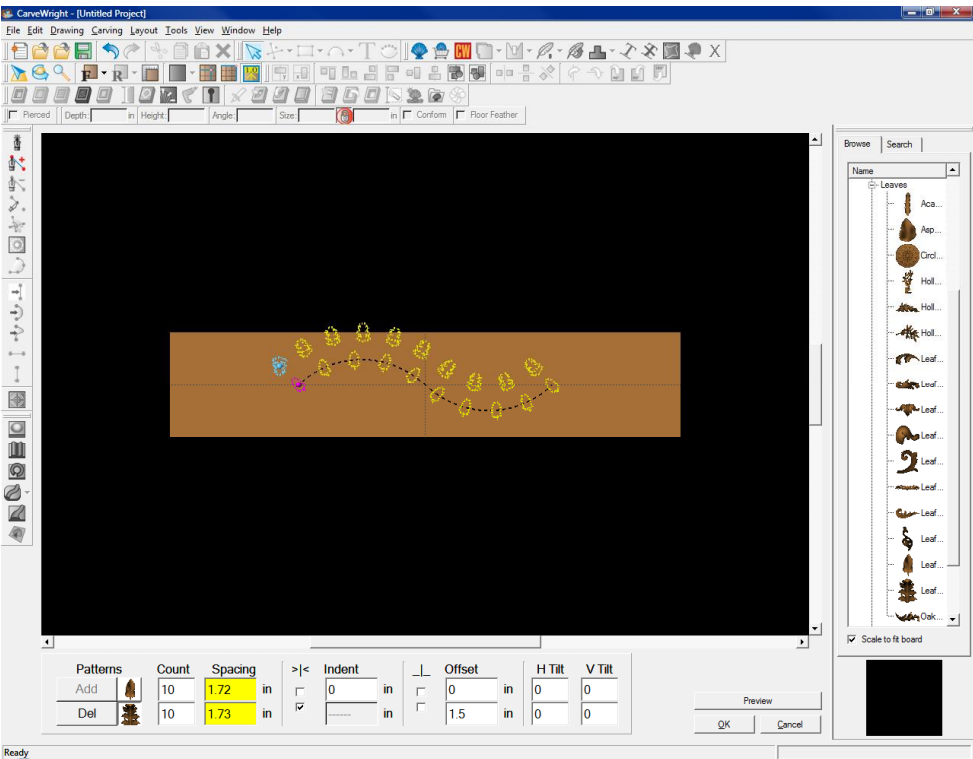


Conversely, if a number is entered into the **Spacing** input field, the number of pattern instances is adjusted based on how many can fit on the trajectory length with the given the spacing. The spacing can also be adjusted if a count is entered without altering the count as long as they can all fit on the trajectory (i.e. smaller spacing).

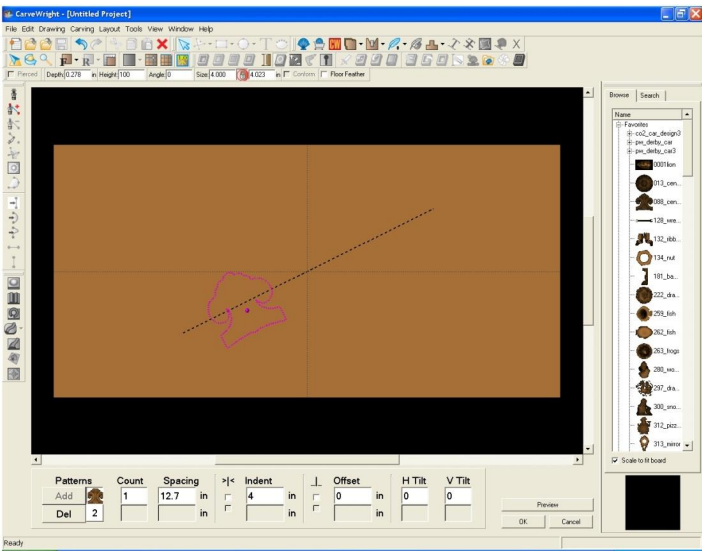


**SPECIFYING  
WHERE THE  
PATTERN GROUP  
IS PLACED ON  
THE  
TRAJECTORY**

The **Center Patterns on Trajectory** checkbox allows for the pattern group to be centered along the length of the trajectory. Normally the box is unchecked and will align the instances to start point of the trajectory. If however centering the instances on the trajectory is desired, simply check this box. This function also works when the instances are placed above or below the trajectory.

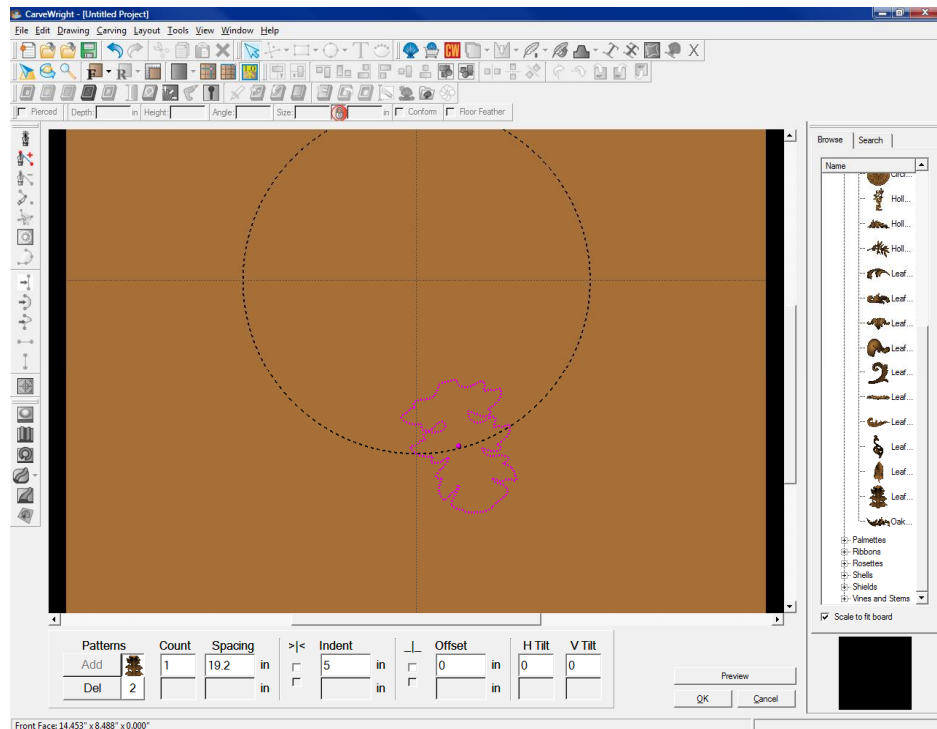


If the grouping is not centered, **Indent** allows for moving the pattern group along the trajectory. If the trajectory is open (e.g. a line or spline) the center of the first instance is placed on the starting point of the trajectory. Indenting the object will shift the pattern along the curve in the direction of the trajectory end point. Only positive numbers are allowed in the indent field.





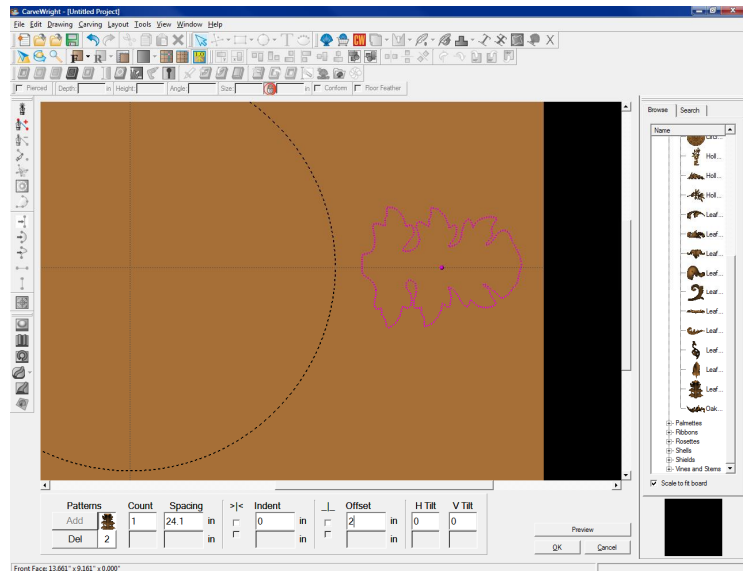
On a circle, the initial instance will be positioned at three o' clock, and as the indent is increased the pattern moves clockwise around the circle.



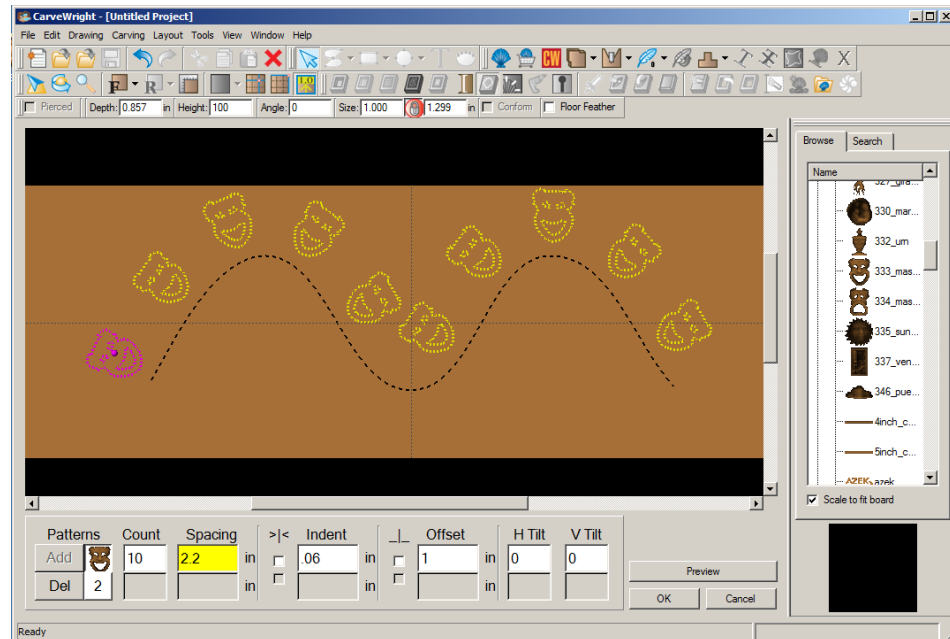
## SPECIFYING THE PATTERN GROUP POSITION ABOVE OR BELOW THE TRAJECTORY

The **Offset** field determines how far the center of the pattern lies above or below the trajectory path. Positive and negatives number are allowed in this field. In the case of an open trajectory (one with beginning and ending points), if an instance resides on either

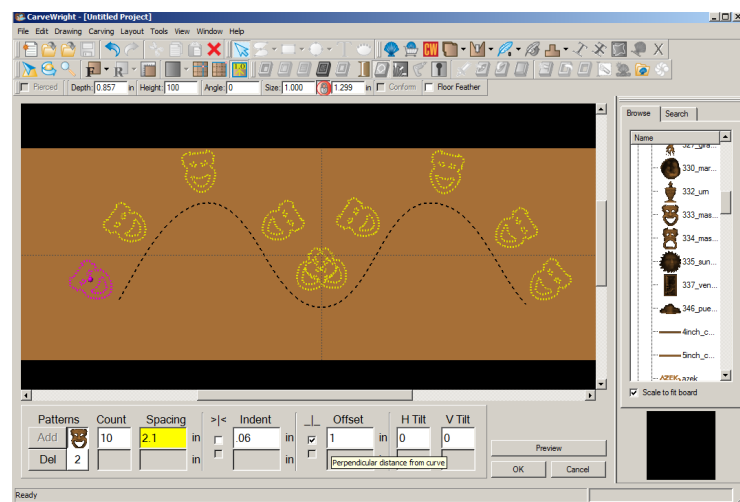
endpoint it can flip orientation if it is offset. If this happens simply indent the instance or change the spacing.



The **Offsets Before Projection** checkbox lets the user choose how to position of offset instances. Normally, the box is unchecked. In this case the software creates a new hidden trajectory path offset from the drawn trajectory by the entered amount. It then calculates the length of this new path, calculates the new spacing given the Count, and places the center of each instance along this path with the new spacing. As you can see the instances follow a perfectly offset path and have equal spacing.



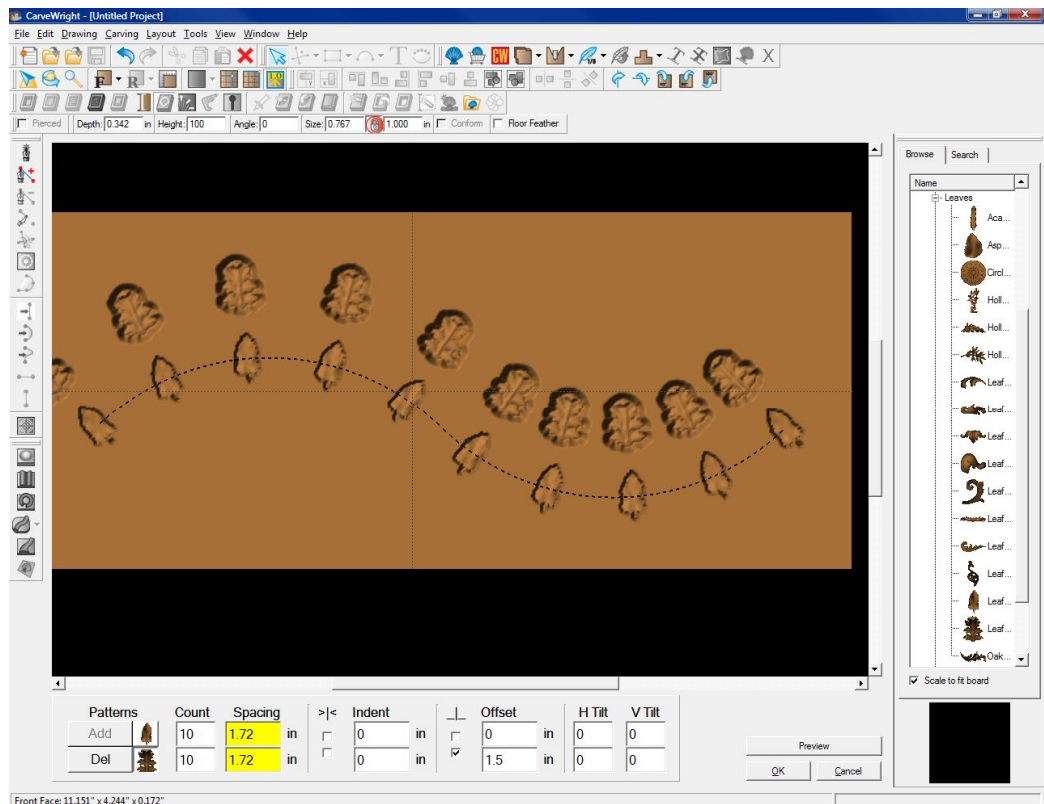
If the box is checked, the software simply moves along the drawn trajectory to the point determined by the spacing, calculates a normal to the path at this point and then moves exactly the offset distance along that normal to place the center of each instance. In this case you can see that in the parts of the trajectory with tight curvature, the instances are placed in different locations because of the slope normal to curve at the location points.



The difference between these two offset methods is usually only seen when the trajectory is very bumpy and folds back on itself. We encourage you to experiment with all of these options in as many different and interesting ways as you can.

The screenshot shows the CaveWriter software interface. The main window displays a brown background with a green circle and a pink outline. The top menu bar includes File, Edit, Drawing, Carving, Layout, Tools, View, and Window. The top toolbar contains various drawing and editing tools. The bottom toolbar includes Pattern, Count, Spacing, Indent, Offset, H Tilt, and V Tilt. The right sidebar shows a list of patterns and a preview area.

The **Preview** button will show the patterns being assigned to the trajectory as they will look when carved. This helps with spacing when considering feathering.



The **Depth**, **Height**, **Angle**, and **Size** tools will function the same as they would with a standard pattern addition. Once the patterns are set click the OK button and the pattern will be applied to the project and be ready to carve. To edit any part of the **Pattern Along Trajectory** parameters simply select one of the instance on the board and click the icon again.



# CHAPTER 5 – THE IMPORTERS

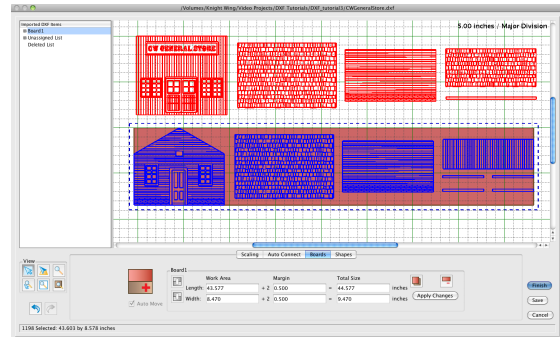
There are two additional importer options for Project Designer sold separately as add-on modules. These are the DXF Importer, and the STL Importer. This section will cover the use of both of these. First, let's learn some basics about the files that these importers work with.

## *DXF IMPORTER*

### **DXF FILE FORMAT**

DXF (Drawing eXchange Format) is a vector graphic file format typically used with AutoCAD software. It can, however, be read and exported from most

vector drawing programs, such as Adobe Illustrator and CorelDraw. DXF files contain only vector line/path information, which enables these drawings to be imported into Designer as drawn lines, rather than pattern shapes.



### **GETTING DXF FILES**

DXF files can be generated by most vector drawing software. There are many that can be found online by searching for DXF files or any other vector formats. Vector clip art is readily found online for free and can always be converted to DXF format.

### **MAKE YOUR OWN DXF FILE**

If you are working in another vector drawing program, any vector file format, such as EPS, AI, and CDR files, can be opened in their respective packages and converted by using the export or save as functions.

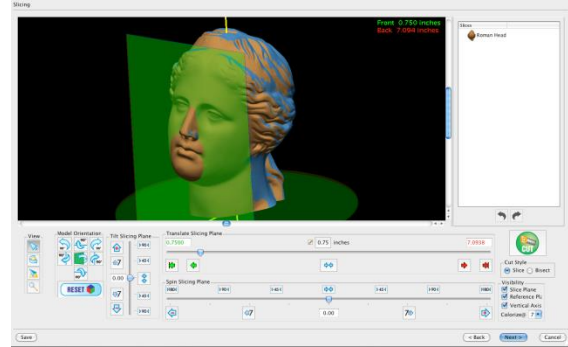
To learn how to use the DXF Importer, it is easiest to watch the tutorial videos available online here: <http://www.carviewright.com/add-on-modules/DXF-importer/>

## *STL IMPORTER*

### **STL FILE FORMAT**

STL (STereoLithography) is a 3D file format supported by most 3D software packages. It is the standard file format for 3D printing and other forms of computer aided

manufacturing. Any 3D file can be exported or converted to an STL format.



### **GETTING STL FILES**

STL files can be generated by most 3D design software. There are many that can be found online by searching for 3D models or visiting model sharing sites. 3D files that are not in STL format can be converted using a conversion program.

### **MAKE YOUR OWN STL FILE**

If you are designing your own 3D files, the software you are using should have an export to STL option. If you are finding models online and wish to convert them, there are free conversion programs that can convert from most formats.

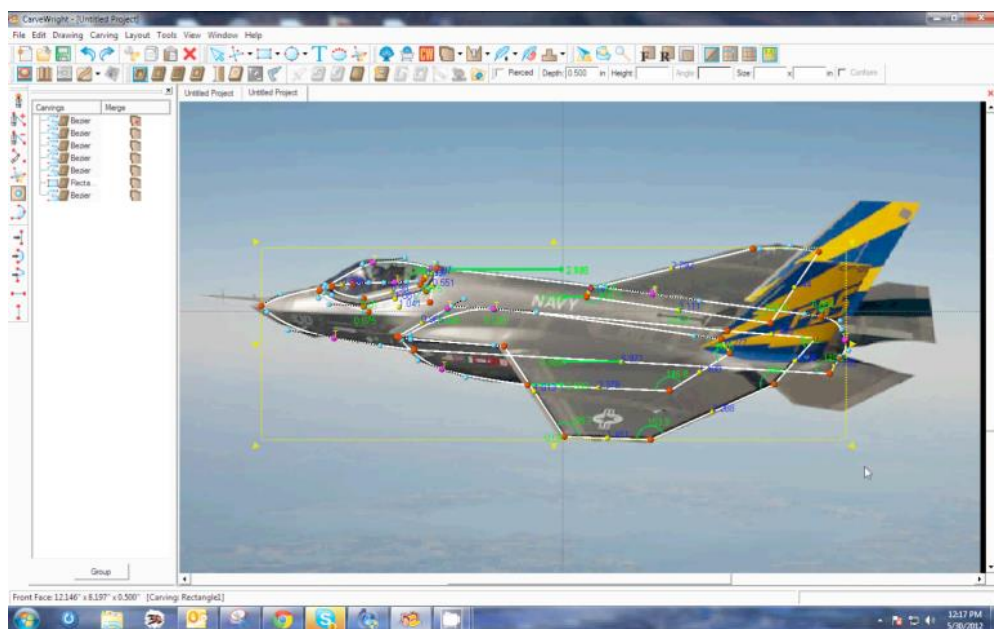
To learn how to use the STL Importer, it is easiest to watch the tutorial videos available online here: <http://www.carviewright.com/add-on-modules/STL-importer/>

# CHAPTER 6 – THE SUITES

There are two additional tool bar suites for Project Designer sold separately as add-on modules. These are the Vector Drawing Suite, and the Pattern Modeling Suite. This section will cover the use of both of these.

## *VECTOR DRAWING SUITE*

The Vector Drawing Suite (2D Advanced) is a tool bar add-on for Project Designer that expands the drawing and vector manipulation capabilities of the software. Define vector paths quickly, trace images, trim and merge vectors together, and many other features that assist in creating your own drawings.



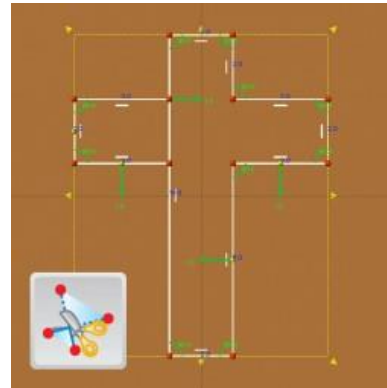
## **SMART SPLINE**



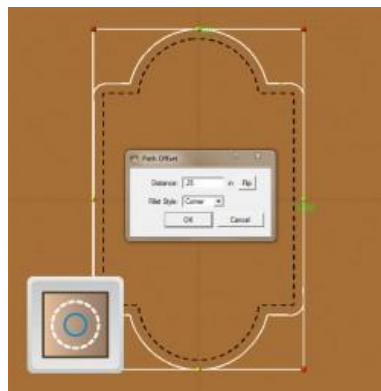
The Smart Spline tool is the most powerful drawing tool available to Project Designer. It allows you to quickly define a shape by placing points, or vertexes, along a path, while on-the-fly designating the segments between as either lines or curves.

## TRIM TOOL

The Trim Tool serves as a way to merge intersecting vectors by allowing you to delete overlapping segments and join closed vector shapes together. As an example, to make a cross, you could draw 2 rectangles overlapping, and then use the trim tool to remove the interior lines to create one continuous cross shape.



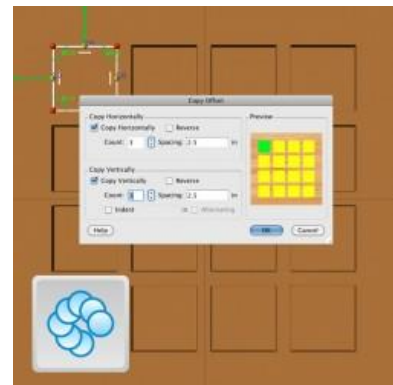
## OFFSET PATH



The Offset Path tool is used to generate a path either inside or outside of a closed vector path at a specified distance. So, for example, if you wish to create an outline around a shape you've drawn, but you want it a half an inch larger all the way around, this is the tool you would use.

## COPY OFFSET

The Copy Offset tool allows an object on the board to be copied either vertically or horizontally a given number of times with a given spacing. If you need to make multiple's of a pattern, or even a tiled repeating pattern, this tool makes it quick and easy.



## IMPORT TRACING IMAGE

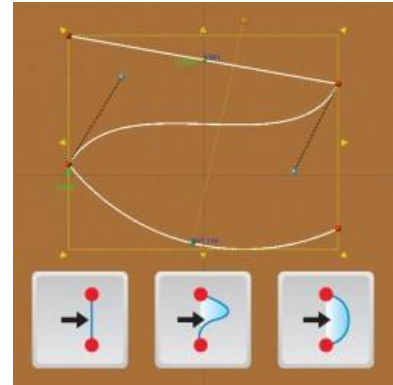


Import Tracing Image allows for an image file (jpg, png, gif, bmp) to be imported and placed on the design board to be used as a pattern for tracing with the drawing tools. The image can be cropped and scaled during the import process to suit your needs and can be toggled on and off to better view your drawing.

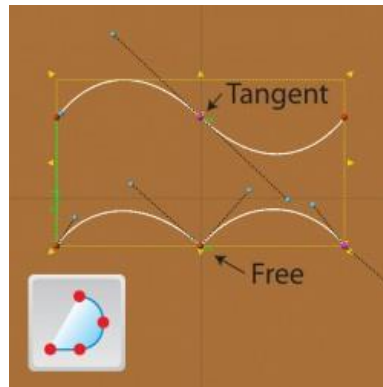


## CHANGE FORM SELECTORS

The drawing tools offer several types of segments, including; line, spline (curve), and arch. The Change Form selector tools allow you to quickly change segments to the selected form by simply clicking on them. Select the Change to Line Tool and click on any spline or arch and it will change to a line, or vice versa.



## CHANGE TANGENCY SELECTORS

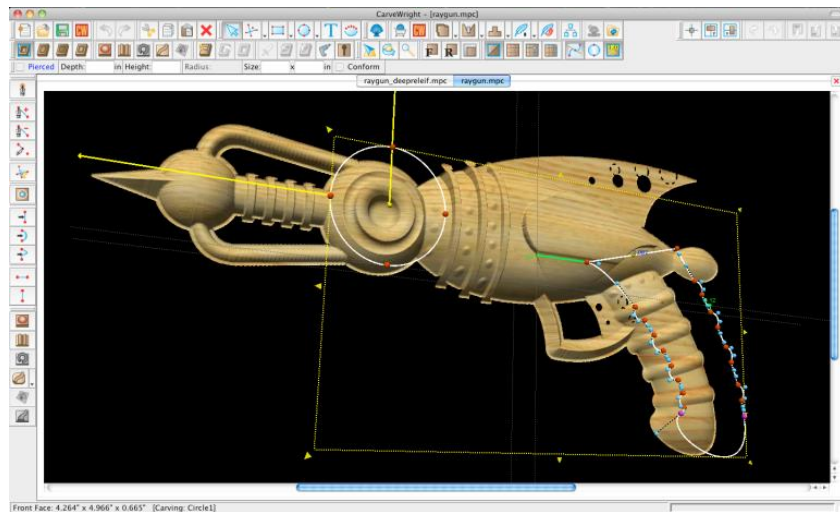


The points (vertexes) between the segments have two states, either tangent or free. Tangent means a curved segment on either side of a point will be locked into the angle of the segment on the other side. The “free” state means the segments are not locked into the previous segments influence. This tool allows for quickly changing those states for more control over defining your drawings.

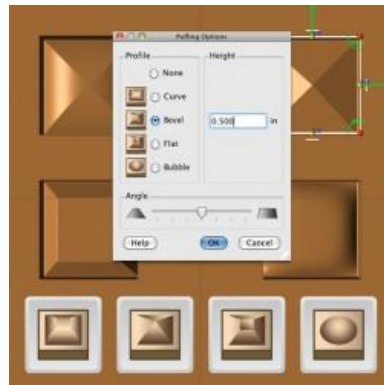
To see how to use all of the tools from the Vector Drawing Suite, watch the videos available online here: <http://www.carviewright.com/add-on-modules/vector-drawing/>

## PATTERN MODELING SUITE

The Pattern Modeling Suite (3D Advanced) is a tool bar add-on for Project Designer that enables modeling of 3D relief patterns. Extrude, sweep, and puff shapes into dimensional creations. These tools are easy-to-use and they make your own custom pattern designs fun and simple.



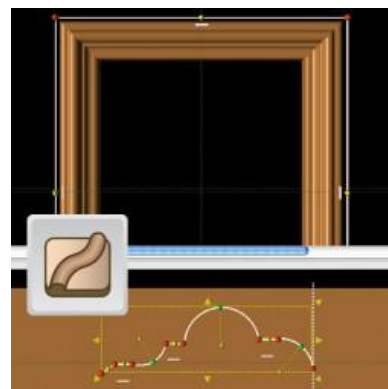
### PUFFING TOOL



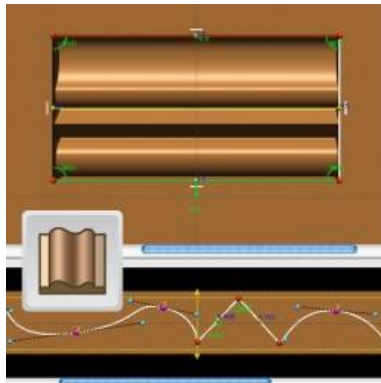
The puffing tools allow closed vector shapes to be raised up or puffed in four different styles; Curve, bevel, flat and bubble. The steepness of the sides and depth of puffs can be adjusted to suit.

### SWEEPS

The Sweep tools will allow a drawn profile to be swept along a single vector path. This means the profile will follow the line along its entire length. There are two types of sweeps, rounded, which will round corners, and corner, which leaves sharp corners.



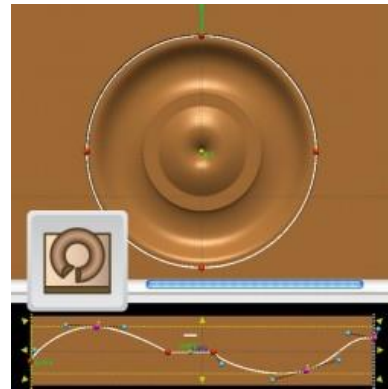
## EXTRUDE



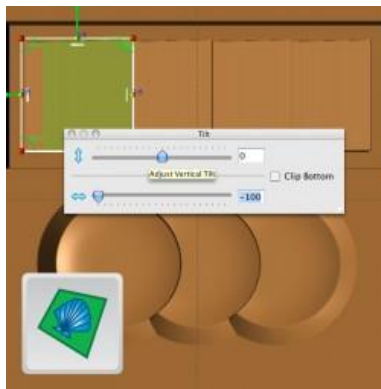
The Extrude tool allows a profile to be extruded along the inside of a closed vector shape. The angle of the extrusion can be adjusted by setting horizontal, vertical, or setting a custom angle.

## REVOLVE

The Revolve tool will rotate a profile around the center-point of a circle. The revolve tool only works with circles.



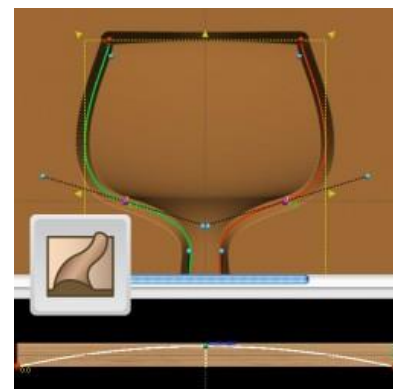
## TILT TOOL



The Tilt tool allows a pattern to be tilted vertically, horizontally, or a combination of both can be used to achieve different angles.

## SWEEP WITH RAILS

The Sweep with Rails tool is a more dynamic sweep in that it uses two curves (rails). These two curves define the two edges of the surface. Then a profile is defined for the surface's cross sections.



To see how to use all of the tools from the Pattern Modeling Suite, watch the videos available online here: <http://www.carviewright.com/add-on-modules/pattern-modeling/>

# CHAPTER 7 – PATTERN SCULPTOR

Pattern Sculptor is a creative sculpting and editing tool for 3D relief carving patterns. Quickly and intuitively smooth, smudge, and add or remove details to prepare patterns for carving.

## USES FOR PATTERN SCULPTOR

### CLEAN UP PATTERNS

Whether it's a scan made with your Scanning Probe, a pattern made with the Modeling Suite, or an image or pattern imported from elsewhere, these tools allow for quick and seamless editing to correct or alter the original artwork.



### ADD OR REMOVE DETAILS



Sometimes, there are details you need in a pattern that you just can't get with the existing tools in Designer or other packages. With Sculptor, those details are a few mouse clicks away. Sculpt in fine details, raise and lower specified areas, erase parts you don't need, and so much more.



## **MAKE 3D TO RELIEF**



With so many free 3D files available these days, it's nice to be able to transform them into useable relief patterns. With the Sculptor tools, we can make a 3D model flat and enhance it to bring out the important details.

To learn how to use the Pattern Sculptor Tools, watch the videos available online here: <http://www.carviewright.com/add-on-modules/pattern-sculptor/>

## CHAPTER 8 – ACCESSORIES

### *SCANNING PROBE*

The CarveWright Scanning Probe opens up the world of 3D scanning to anyone. Now you can reproduce original pieces, repair antique furniture, even copy trim and moldings with ease. Almost any material can be scanned, even soft materials, such as clay or wax. Just plug the probe into the CarveWright, set the desired scan area, and watch the CarveWright go to work.

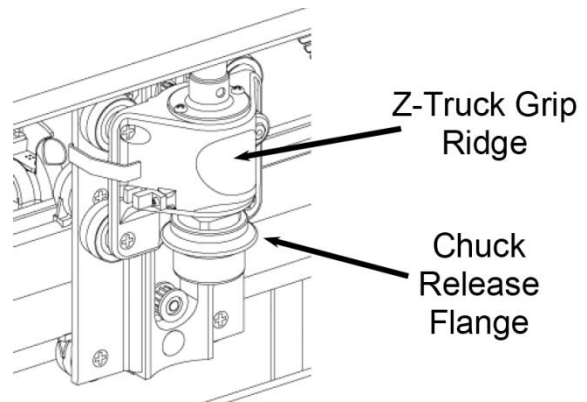


### **INSTALLATION**

The Scanning Probe can be used with either the Quick Change Chuck (QC) or CarveTight Spindle system. For the CarveTight, simply insert the straight bushing all the way into the machine spindle and tighten the grab paw just like you would when using a 1/2" shank bit. If you have upgraded to the CarveTight spindle, remove the tapered adapter and press the straight bushing down to within 0.25" of the probe body (See Figure 3).

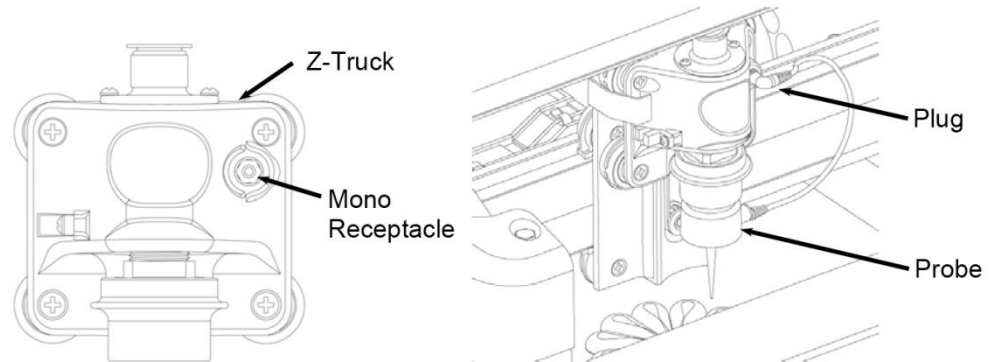
If you have a QC the Scanning probe will install just like any other bit with a tapered adapter. Please follow the directions described below. Before installing the scanning probe into the QC, lift up the front safety cover and make sure that there are no other bits installed. Next, make sure that the quick release chuck is cocked and ready to accept the adapter mounted to the probe.

To cock the chuck, place a thumb on the Z-Truck Grip Ridge and two fingers on the Chuck Release Flange. Press up on the chuck release flange as far as possible and release (See Figure 4). The flange will snap and stay up when the chuck is prepared to receive the probe assembly. Any time difficulty is encountered inserting the probe, simply pull up on the flange to insure the chuck is cocked. Press the probe assembly into the chuck until a slight snap is felt. The probe is now secure in the quick change. There are two



**FIGURE 4: QUICK RELEASE CHUCK FEATURES**

possible connector locations for plugging in your scanning probe depending on the configuration of your machine. For most machines that have an A-series Serial Number, the probe plugs directly into the Z-Truck mono receptacle.



**FIGURE 5: PLUGGING IN THE PROBE IN MOST A-SERIES MACHINES**

All C or B-series Serial Number CarveWright machines, and any A-series Serial Number machines that have been reconfigured, will plug into an accessory connector found on the left side of the head cover as shown below. Reconfigured A-series machines have the homing sensor board removed or unplugged. This configuration requires that a jumper cable be used to span the distance from the probe cable to the cover connector. A cable clip is loosely attached to the cable to manage the cable during the scanning operation. This cable and clip are now provided with the probe at the time of purchase but you may need this cable if; 1) you have an A serial machine, 2) you purchased your probe before November 1, 2008, and 3) the machine has been reconfigured by removing or unplugging homing sensor board.

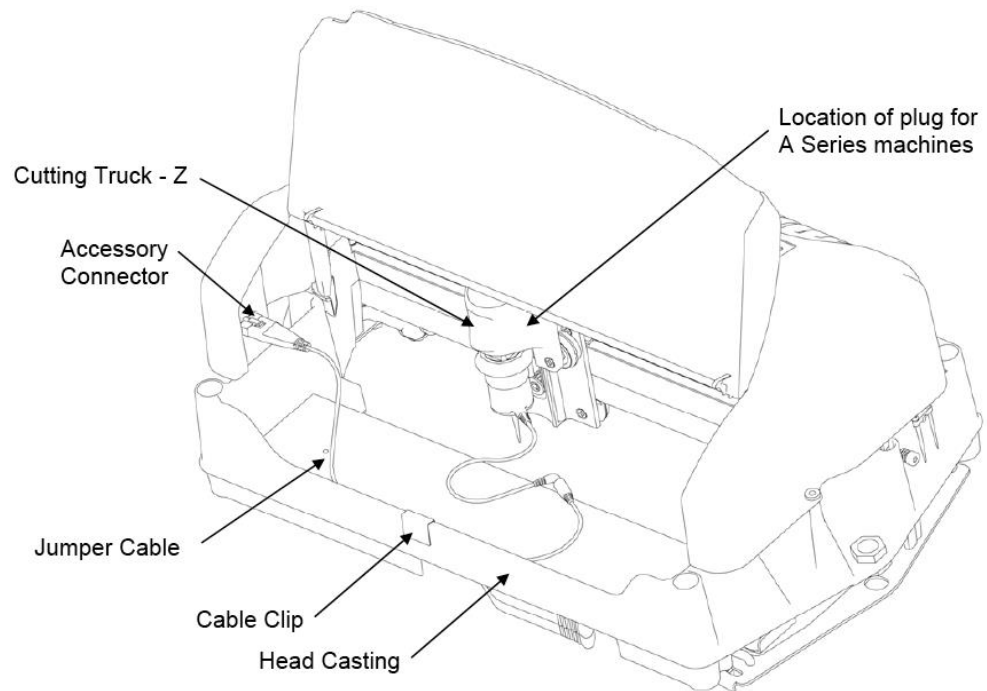


FIGURE 6: PLUGGING IN THE PROBE IN MOST B-SERIES MACHINES

To install the probe using the cover connection, simply plug the jumper cable into the cover connector and slide the cable clip over the front lip of the head casting. The clip needs to be approximately centered left to right in the machine. Next, plug the probe mono jack connector into the other end of the jumper cable. Make sure that the cable clip allows enough slack for the probe to move fully left to right by pushing the truck to the left/right sides of the machine with your hand. The probe is now installed.

Since there are two possible locations to connect the probe, the connection location must be set in the machine's memory via the Options menu through the machine keypad. The B-serial number CarveWright machines are configured to the correct setting at the factory, but this setting must be changed if the homing sensor board is eliminated or unplugged from the reconfigured A-series machines. If this setting is not changed, "Scan Area" will be displayed on the LCD screen even though there is no probe connected. To change this setting, do the following:

1. Insert the card and turn on the machine. "Scan Area: should appear on the LCD screen.
2. Press the "0" (Options) key on the keypad.
3. Using the up/down arrows, scroll down to the number 5, "User Options" menu item and press ENTER. You can also simply press the "5" key when the first option appears.



4. Scroll down to Scan Probe. Make sure it is on “Cover” instead of “Z truck”. Press ENTER to toggle between the options.
5. Press stop until you get back to main menu. It should say Project Menu.

Insert the probe plug into the jack located on the Z-Truck. If the probe is correctly installed the CarveWright machine will recognize it when the cover is closed and power is turned on. The scanning functionality can now be accessed through the keypad.

Once the machine is configured and turned ON, it will search to see if the scanning probe jumper cable is plugged into the accessory connector. If it is, the machine assumes that the user has inserted, or will insert, the scanning probe into the quick release chuck and disables the spindle motor from spinning. Pressing **ENTER** at the “Scan Menu” will move the spindle to the home position. Once at the home position, the machine will check to see that the probe is plugged in and operating correctly.

When the probe is at rest (not touching anything), it should be in the electrically **Closed** position. If the probe is operating correctly, the LCD will prompt you to “Jog to the Starting Corner”. If however, the machine detects that the probe is not in the **Closed** position, the LCD will prompt you to “Check Probe and Connection” and will show you the current state of the probe as **Open**. In most cases this simply means that the probe is not plugged into the jumper cable correctly. Check all connections and move the tip of the probe around watching to see if the state displayed on the LCD changes to **Closed**. If you cannot resolve this issue by plugging and unplugging, please call CarveWright service at 713-473-6572.

When removing the jumper cable remember to depress the release latch before pulling it free. On some machines the latch may be on the bottom of the connector.

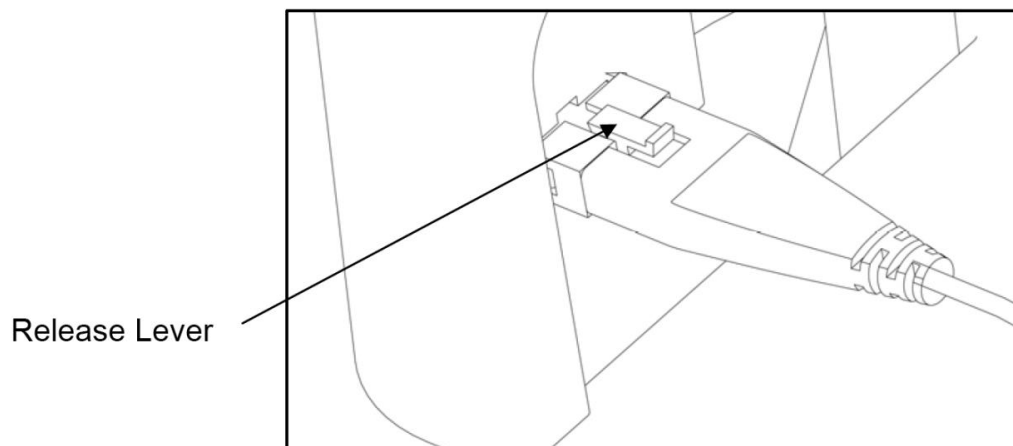
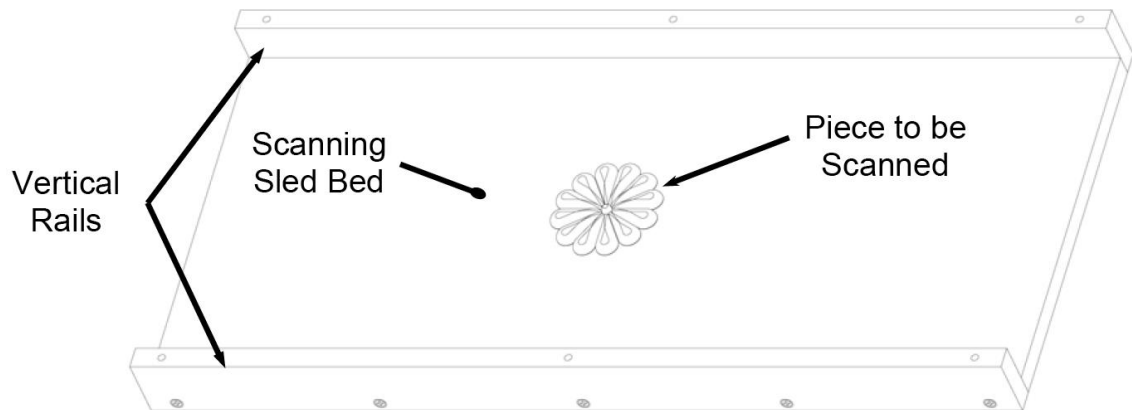


FIGURE 7: PLUGGING IN THE PROBE JUMPER CABLE

**Important Note:** It is recommended that you unplug your flexshaft from the spindle if you are doing significant scanning. It makes for more consistent scans. Be sure to always follow the directions when reassembling the flexshaft so that you do not bind the flexshaft core and damage the machine.

## **PLACING OBJECT ON A SCANNING SLED**

Because most objects that will be scanned are not suitable for scanning directly they will have to be placed onto a fixture called a scanning sled before proceeding (not included with purchase). The scanning sled should be designed so that the CarveWright can easily feed it through the machine and so that the scanning probe has the proper clearances to function.



**FIGURE 8: SCANNING SLED**

The dimensions of the sled can vary but the maximum width is 14.5" and the maximum depth is 2.25" from the mounting surface to the top of the rails. There is no maximum length but any sled over 3 feet long will require additional stand-alone outfeed support rollers. The support rollers should be adjusted properly to avoid letting the sled sag or rise, as any transition going on and off the rollers will be reflected in the scan data.

The vertical rails must be at least as high as the object being scanned. If the object is taller than the vertical rails the machine or object can be damaged.

The maximum height that the scanner body can clear is 1 inch. If the object to be scanned is taller than 1 inch in any location, check for possible interferences between it and the probe body. Interference is possible if there is a 1 inch tall point in the object within 1 inch of a portion of the object that lies at a depth near the mounting surface.

The scan object can be mounted to the sled with any number of adhesives. Hot glue works well, as does double sided tape. It is important that the scan object be rigidly mounted. Any movement during scanning will produce poor scan data. It is also suggested that the mounting surface of the sled be very smooth and hard (like Formica). This hard surface makes mounting and removing the scan objects quick and easy.

The CarveWright will require that the sled be kept under rollers at all times so make sure that the object being scanned is at least 3.5 inches from either end of the sled. The scan object must also be at least 1 inch from either vertical rail to clear the body of the probe.



Adding a grid pattern to the mounting surface of the sled surface makes positioning the scan object very easy.

## INSERTING THE SCANNING SLED

For the purposes of this manual we will assume that all pieces being scanned will be mounted to a scanning sled. Proper installation of the scanning sled is critical to the performance and continued operation of the scanning probe. To properly insert the sled:

1. Press down on the sliding guide plate release lever and move the sliding guide plate to the right so that it will clear the width of the sled.
2. Check the bottom of the sled for features that will make it unusable in the machine. The bottom surface of the sled where it contacts the squaring plate must be flat and level for a width of at least 3/8 inches along the bottom edge to allow the Board Tracking Sensor to accurately calculate the position of the workpiece at all times (see Figure 7).
3. Lay the sled on the traction drive so that it is centered lengthwise under the head.
4. Push the sled firmly up against the squaring plate.
5. Gently push the sliding plate up against the inside edge of the sled. **DO NOT** push the sliding plate against the sled with significant force. The sliding plate is used to guide the sled and is not intended to lock the piece in position.
6. At this point it is critical that you assure that the sled can travel freely in and out of the machine along its entire length without binding or

encountering significant drag. Do this by moving the sled in and out of the machine by hand, while laying flat on the traction drive.

**WARNING: Do not attempt to load a sled that varies in height by more than 1/16" along its entire length. This condition could bind the machine and damage the traction drive.**

**WARNING: Do not attempt to load a sled that does not have parallel sides. This condition can bind the machine and damage the traction drive.**

7. Lower the head by turning the head crank handle counter-clockwise until the clutch clicks several times (at least 5 clicks recommended). The clutch is intended to load the sled against the traction drive with consistent force.

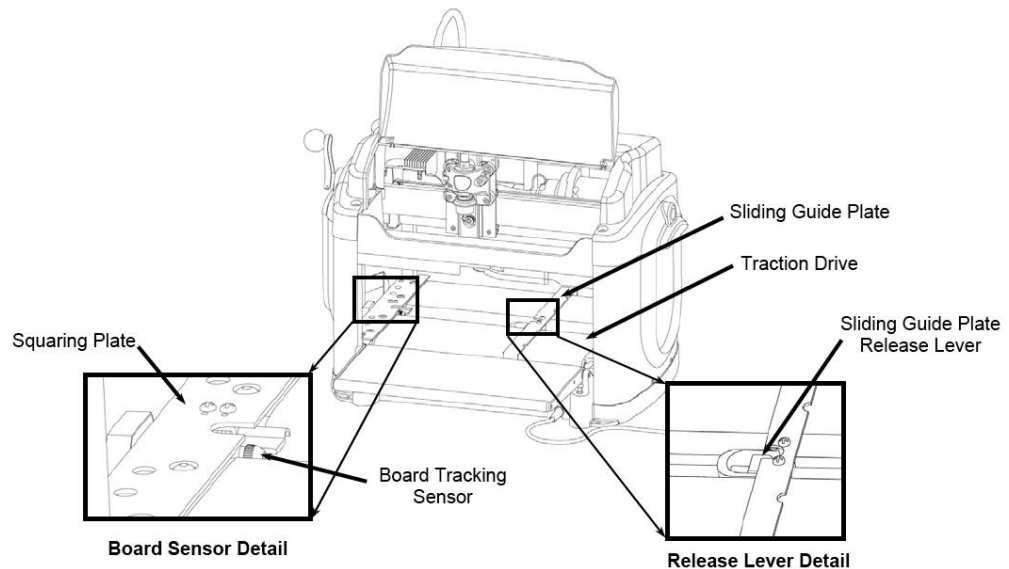


FIGURE 9: SCANNING SLED  
INSERTION DETAILS

8. Rotate the head-locking lever outward into the locked position. The sled is now secure.
9. Make sure that the top safety cover is closed before proceeding.



## JOGGING THE SCANNING PROBE

Before the CarveWright can begin to function, the CarveWright memory card must be installed. With the power off, push the memory card gently into the memory card slot until it stops, making sure the label is up. Once the sled is installed and the cover is closed, proceed to turn the machine on.

At this point, control is accessed through the Keypad and LCD Display. The scan utility will automatically sense the scanning probe and will display the *Scan Area* menu item.

**FIGURE11:** CARVEWRIGHT  
INPUT KEYPAD



## SETTING THE SCAN AREA

When the *Scan Area* item has been selected from the display menu, the CarveWright will send the head to the home position. The display will then prompt for the user to specify the starting corner of the scan area.

The scan area is determined by specifying any two diagonal corners of the scan object. The user will need to jog the probe tip to the first corner point using the arrow keys. This is accomplished using the **up and down arrows** on the keypad to move the truck across the width of the sled (near to far), and the **left and right arrows** to move the sled along its length (left or right).



**Holding an arrow key down results in a fast movement. Precise final positioning is accomplished using short bumps on the key.**

Once the probe tip has been jogged to the desired corner location press **ENTER**. The probe tip will now slowly lower until the tip touches the surface. Verify that this is the correct location and press **ENTER** again. You can continue to tweak the tip location if it is desired before pressing **ENTER**. Repeat these steps for specifying the second corner.

## **SETTING THE SCAN OPTIONS**

Once both corners have been specified the display will show the *Scan Options* menu. The current scan quality will be shown in parentheses. The *Scan Options* menu has three options: 1) Proceed with Scan, 2) Change Quality, and 3) Set Max Depth. If you wish to continue with the scan at this point select option one, *Proceed with Scan*.

If you wish to change the quality setting select option two, *Change Quality*. Use the **up/down arrow** keys to find the desired quality and select **ENTER** to confirm. These quality modes affect the step size for each point measurement taken. The higher the quality mode selected, the smaller the step size. The *Best* setting step size is .010", the *Normal* setting step size is .020" and the *Draft* setting step size is .040". It is recommended that scans be performed at the highest possible quality setting if time permits.



The machine will check the memory card to verify that there is enough space to store all of the scan information. An empty memory card can hold approximately 2.2 ft2 of **Best** quality mode scan data. If the message *Scan Too Large For Card* appears on the display then there is not enough room to store the proposed scan. Options to correct this situation are to reduce the size of the scan area or delete existing information on the card using the Flash Manager in the CarveWright Design Software.

After the quality mode has been confirmed the CarveWright display will show the *Scan Option* menu again. There are instances where the maximum depth of the scan will need to be limited. For example, in some scanning probe, this can cause the body of the scanner to impact the object and stall the scan. The *Set Max Depth* option allows the user to put a floor on the depth that the probe tip will reach. The procedure for setting the max depth works very similar to setting the corners of the scan area. Identify the desired max depth on the scan object surface. Jog the probe tip to a point directly over this location and press **ENTER**. At the chosen location the probe will lower until it makes contact with the surface. By default this depth will now be the maximum scan depth. If this depth is acceptable select **ENTER** otherwise reposition the probe tip and repeat.

Once a max depth has been confirmed the display will prompt the user to Use Selected Depth or Apply Offset. If the Apply Offset option item is chosen, the user is prompted to input a numeric offset using the keypad. Select **ENTER** to proceed or **STOP** to cancel the offset. The entered offset will be added to the already confirmed max depth. Once the desired settings have been set, proceed with the scan by selecting *Proceed with Scan*. The CarveWright will begin to scan the object. The scanning probe tip will follow along the object contour, mapping the 3-D coordinates of the surface as it proceeds. The height map information is stored onto the memory card for future retrieval by the scanning software. A real time scanning completion estimator will be displayed on the LCD and provides an estimate of how much of the current scan is completed.



At any point during operation the CarveWright machine can be stopped by pressing the **STOP** key or by lifting the cover. If desired the machine can be restarted by closing the cover and pressing **ENTER**. The machine will resume scanning at the point where it was stopped. If you press the stop button a second time the scan will be aborted so be careful when restarting your project.

**WARNING: Never remove the memory card from the machine while it is on. Doing so can result in damage to the workpiece.**

## **ACCESSING THE SCAN DATA**

When the scan is completed the LCD Display will show a prompt to set another scan area. If you do not wish to produce another scan, turn off the machine, lift the top safety cover, release the head lockdown lever, and crank the head up to free the sled. The sled can then be removed.

## **GENERAL TIPS AND HELPFUL REMINDERS**

Remove the CarveWright memory card and place it into the CarveWright memory card programmer. Open the CarveWright Design software and access the scan data by selecting the *Download Scan* menu item on the File menu.

**MAXIMUM SCANNING DEPTH** is 1.0 inch. Scanning objects deeper than this can damage the probe or produce poor quality scans.

**ALL MOTORS ARE DISABLED** when the front safety cover is open. The cover must be closed before the machine can proceed.

**USE A SUPPORT FOR LONG PIECES TO BE SCANNED AND ALSO FOR SCANNING SLEDS.** To minimize the risk of over stressing the machine, use sturdy roller stands (not included) for support when scanning long pieces more than 36 inches in length.

**WHEN LOADING THE PIECE TO BE SCANNED**, there are several critical checks to make before proceeding.

- Do not attempt to load a piece to be scanned (or sled) that has a significant taper to the sides. A tapered workpiece will bind between the sliding plate and the squaring plate and will damage the traction drive.
- Do not attempt to load a piece to be scanned (or sled) that varies in thickness by more than 1/16" along its entire length. Using a workpiece with a larger thickness variation than 1/16" can lead to damage to the machine.
- Always make sure the Board Tracking Sensor that contacts the bottom of the workpiece (or sled) has a smooth, even surface to follow. This means that the bottom edge area of the workpiece adjacent to the squaring plate is clean, smooth, and even for a width of at least 3/8 inch along the full length of the workpiece.
- Warped, bowed, or cupped pieces should be used only if this condition is minor and if the Board Tracking Sensor can follow it.

**MAKE SURE THAT THE HEAD LOCKING LEVER IS RELEASED** after finishing the scan. If the locking lever is not released the head will not move up and down. The lever is in the locked position if it is rotated out from the face of the machine. It is in the released position if it is flush to the front face of the head.

**SMALL PIECES TO BE SCANNED MUST ALWAYS USE A SCANNING SLED.** Any piece to be scanned smaller than 1.5 inches wide x 0.25 inches thick x 7 inches long will require it to be placed on a scanning sled.

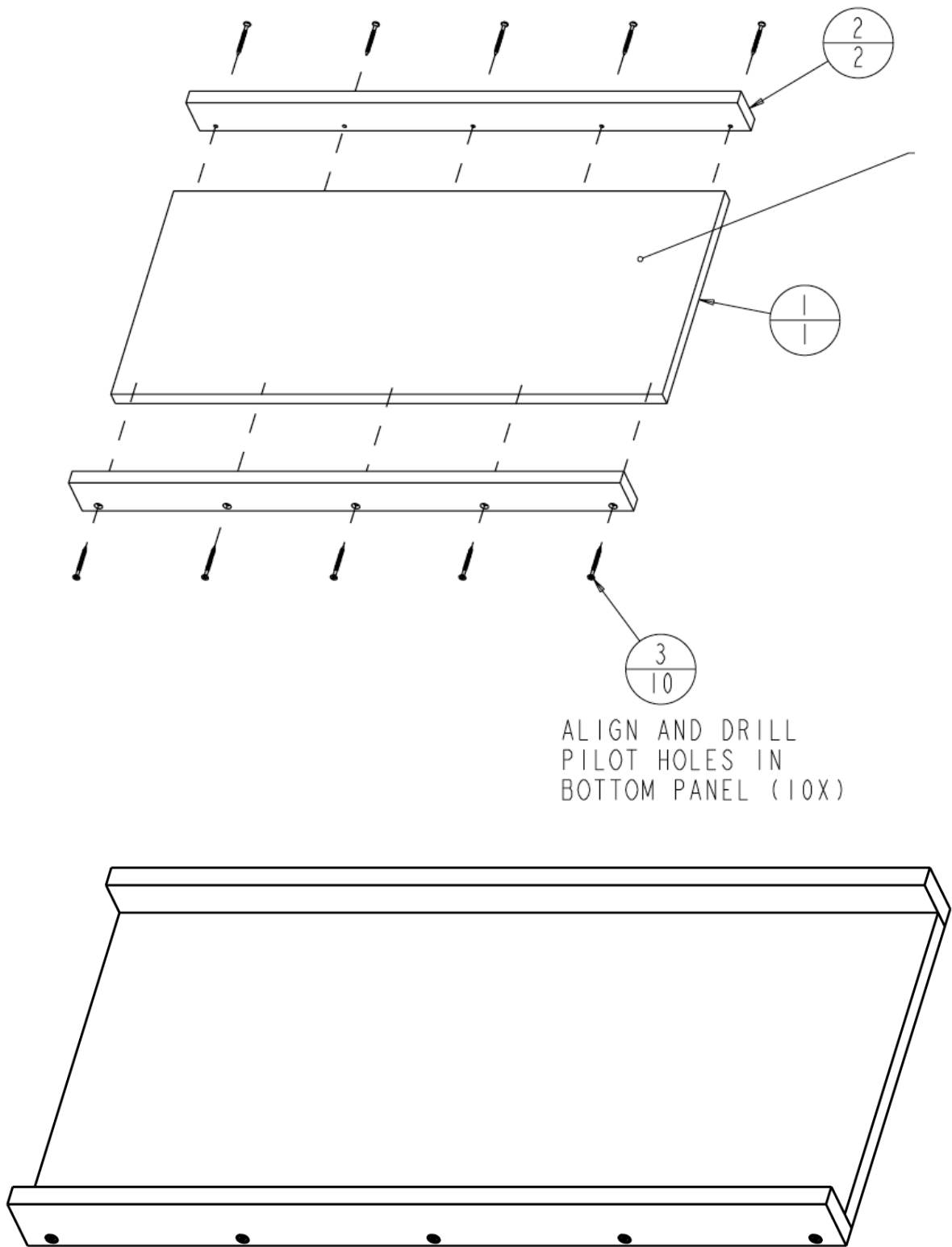
**TO LOCATE THE MACHINE TOTAL SCAN-TIME**, use the Options shortcut key on the keypad to access the information.

**TO LOCATE THE SERIAL NUMBER**, use the Options shortcut key on the keypad to access the information.

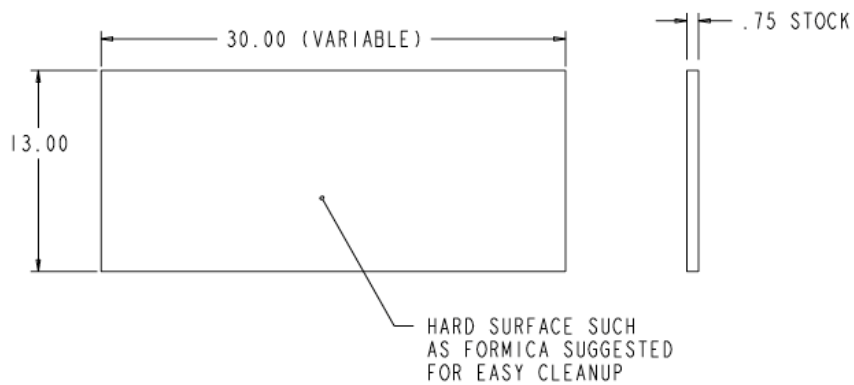
**UNPLUG THE FLEXSHAFT**, for more consistent results.

**BUILDING A  
SCANNING SLED**

Use these drawings to build a scanning sled.



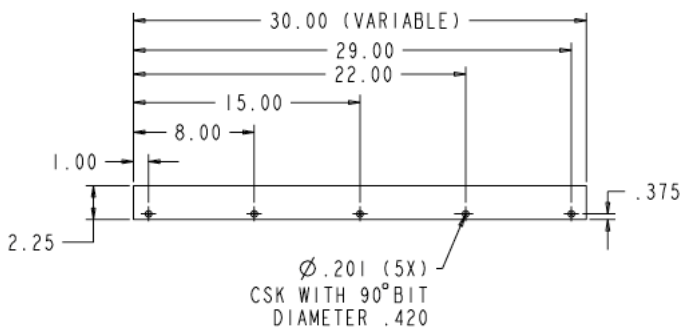




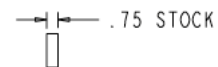
SUGGESTED MATERIAL:  
HIGH DENSITY PARTICLE  
BOARD WITH FORMICA VENEER



ISOMETRIC VIEW  
REFERENCE ONLY  
SCALE 1/4



SUGGESTED MATERIAL:  
HIGH DENSITY PARTICLE  
BOARD WITH FORMICA VENEER

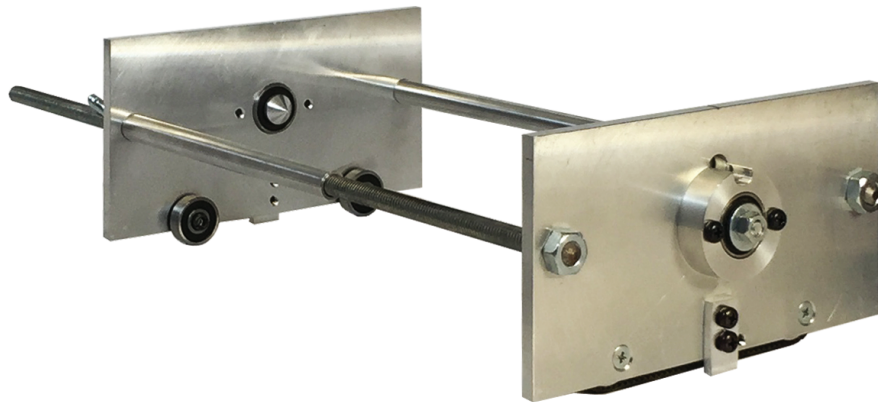


ISOMETRIC VIEW  
REFERENCE ONLY  
SCALE 1/4

## *ROTARY JIG*

### CARVING IN THE ROUND: A REVOLUTIONARY IDEA

The Rotary Jig, and accompanying software, enables the design, import, and carving of turned projects. It's like a lathe, but with carvings. The rotary software, included with purchase of the jig, shows the carved round piece along side a flat board where the design is manipulated. The jig is simple to use. Load your material in, calibrate the jig, and carve your pieces in the round. With the STL Importer add on, you can even import STL's directly into the rotary format. Now this is truly revolutionary.



Follow the guide on the following pages and watch the tutorial videos online for more information.

<http://www.carviewright.com/accessories-page/rotary-jig/>

### Rotary Jig Basic Instruction

### ROTARY CARVING!

## Rotary Jig and Material Setup

Rotary Carving Accessory for CarveWright™ CNC Machines

Congratulations on your purchase of the Rotary Jig accessory for your CarveWright machine. We hope you will enjoy your new capability of carving in the round!

This document outlines the basic setup and use of the Rotary Jig for rotary carving. Visit [carvewright.com](http://carvewright.com) to view "how-to" video tutorials for creating your own custom rotary projects using the Designer software and software add-on enhancements.

You will need to own the CarveWright 1/8" Long-Reach Carving Bit for use with your Rotary Jig. This bit is specifically designed for the rotary jig and for deep carving of "flat" projects. (fig. 1)



fig. 1 1/8" Long-Reach Carving Bit

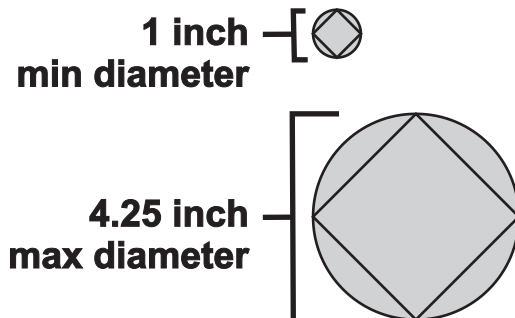
### Jig Material Size Requirements

#### Material Diameter Specifications

The jig requires material with a minimum diameter size of 1" up to a maximum of 4.25" diameter. (fig. 2a, 2b)

#### Material Length Specifications

The jig requires material with a minimum length of 5.5" to a maximum length of 13" (fig. 2c)



Stock shape can be:

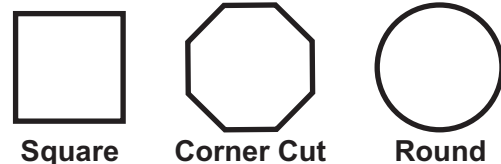


fig. 2a



For outer diameter, measure from the corners

(outer dia. never to exceed 4.25" nor be less than 1")

fig. 2b

### IMPORTANT:

Measure across the widest diameter of your stock. This OUTER diameter is what you will need to remember when it comes time to input the diameter measurement at the machine during project runs.

(cont.)

# Rotary Jig and Material Setup

(cont.)

## Jig Material Size Requirements (cont.)



fig. 2c

## Mounting the Material Into the Jig

Cut your material to the appropriate length, then mark the center-point on both ends. A clear plastic center marking template is handy for this (especially for round stock), but not absolutely necessary. (fig. 3a, 3b)

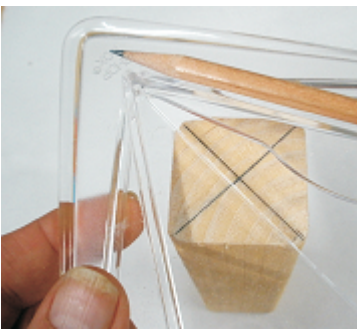


fig. 3a



fig. 3b

Drill holes at the center mark on each end about  $\frac{1}{2}$ " deep using a  $\frac{7}{32}$ " drill bit. (fig. 3c)



fig. 3c

Thread the stock onto the screw chuck. (fig. 3d)

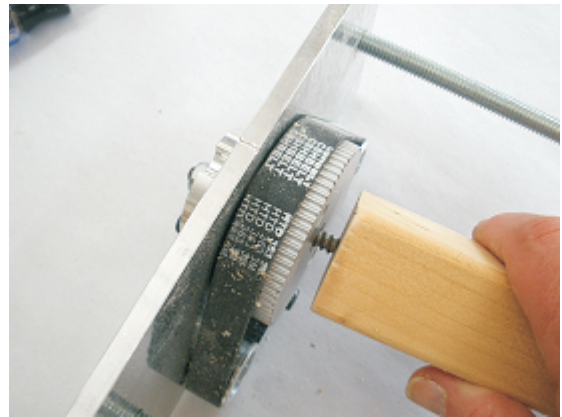


fig. 3d

Slide the end panel to the stock and align the tailstock point into the drilled hole. (fig. 3e)

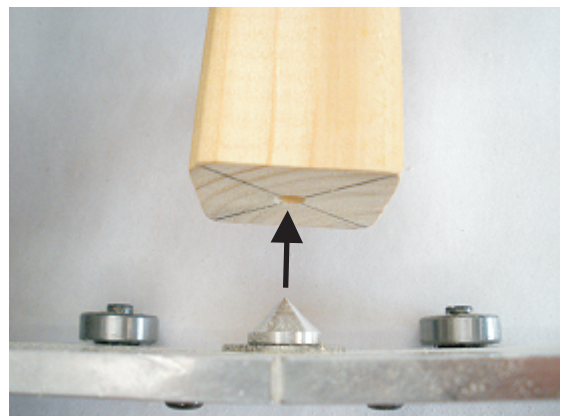


fig. 3e

Tighten the wing nuts "finger tight" so it holds the stock snugly, but can still rotate freely. (fig. 3f)



fig. 3f



# Rotary Jig and Material Setup

(cont.)

## Mounting the Material Into the Jig (cont.)

On the belt drive end of the jig, you will see a trough on the outside metal hub. This allows access to two countersunk holes and the end of the material. Rotate the material to line up with one of the holes. (3f)



fig. 3g

Drive a #6 x 1 1/4" coarse-thread screw through this hole and flush with the countersink. (fig. 3h)

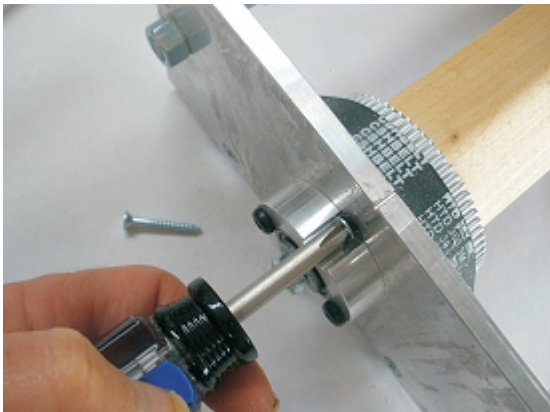


fig. 3h

Rotate the material again to line up the second hole. Drive in another screw. These screws secure the material from slipping during the carving process. Check that the material rotates with no binding of the screw heads against the plate.

Confirm the secured stock and mechanism rotates with no binding after driving in both screws

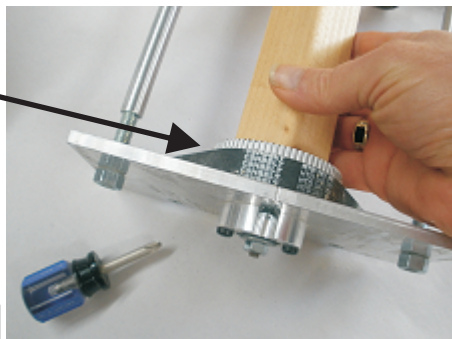


fig. 3i

## Placing the Jig Into the Machine

The jig has two tabs extending from the bottom of each end panel. These tabs fit into the U-shaped slots of the stationary squaring plate (keypad side of the machine) and the moveable sliding plate. (fig. 4a)

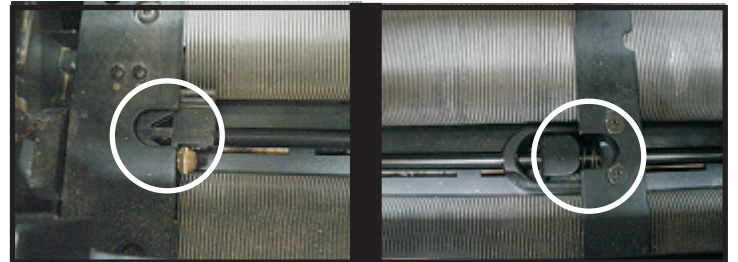


fig. 4a

The jig's tabs fit into the two plate slots

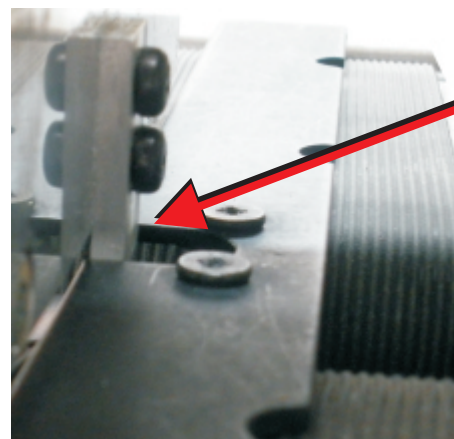
Move the sliding plate all the way to the right, then raise the head just enough to be able to maneuver the jig into the machine. Don't raise the head too high or it will lock in place and you'll need to manually lower it. (fig. 4b)

Raise head and place the jig into the machine with the gear drive on the keypad side of the machine



fig. 4b

Position the jig so the tab rests in the stationary plate slot. Move the sliding plate against the jig so that the other tab rests inside that slot, as well. The sliding plate edge should be right up against the jig roller bearings which rest on the traction belt. (fig. 4c)



Each tab fits into a plate slot on each side of the machine

(this photo shows the tab resting in the sliding plate slot)

fig. 4c

(cont.)

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# Rotary Jig and Material Setup

(cont.)

## Aligning the Jig

With the jig properly placed (the jig side panels are elevated slightly ABOVE the guide plates of the machine) crank down the head of the machine to hold the jig securely. You will notice a groove on top of each side panel of the jig. These are alignment references. (fig. 5a)

Alignment  
Groove



fig. 5a

Insert a bit into the chuck. To check alignment, carefully lower the chuck/bit to each mark on both sides of the jig by hand. The tip of the bit should be in alignment with both grooves. (fig. 5b)

Carefully lower the  
chuck/bit by hand  
into the groove on  
top of each jig side  
to check alignment

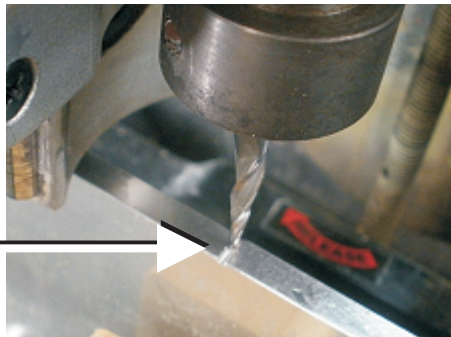


fig. 5b

If the bit doesn't line up with the marks, take note of how much it is "off" and remove the jig. Adjust one or both of the metal tabs on the side panel(s) by loosening the screws and repositioning the tab(s). Reinsert the jig into the machine and check alignment again. Repeat the process, if necessary, until the jig marks are aligned with the tip of the bit. (fig. 5c)

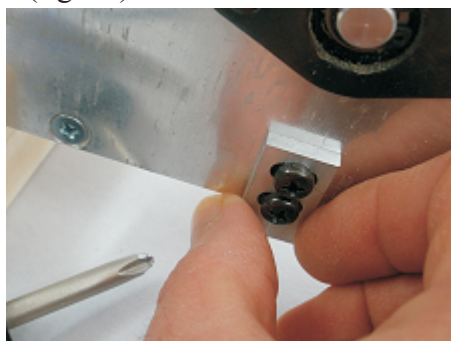


fig. 5c

## Calibrating the Jig

The jig must be calibrated before each rotary carve. Load your stock into the jig and insert the jig into the machine, check alignment, then follow these steps:

- Insert the carving bit and close the cover.
- Turn on the machine and press "0" on the keypad to access the Options Menu, then press "6" to access the Configuration Menu, then press "7" to access the Rotary Cal
- To begin calibration, press the green "Enter" button (there will be a brief Homing routine, then the Jog To Touch menu appears on the LCD panel)
- Use the arrow keys on the keypad to jog the bit to your chosen location on the stock. The side-to-side arrows rotate the stock. The up/down arrows move the bit across the stock. (fig. 6a)



fig. 6a

- Now, open the cover, then "jab" the chuck/bit up and down by hand into the stock to create a visible divot mark. After a clear divot mark is made, raise the chuck/bit back up out of the way of the jig. (fig. 6b)

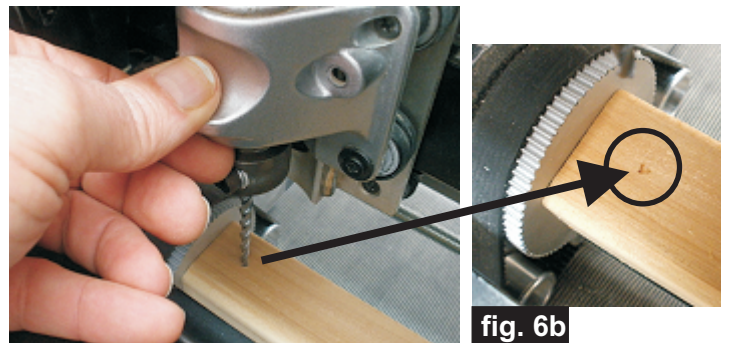


fig. 6b

This divot mark will be used for the next step of the calibration.

# Rotary Jig and Material Setup

(cont.)

## Calibrating the Jig (cont.)

- Now that you've made your reference divot mark and raised the bit up out of the way, go ahead and press the green "Enter" button. The machine will rotate the stock three times and then stop. You should see your divot mark. Lower the chuck/bit by hand to see whether the tip of the bit is still centered with your mark. (fig. 6c)

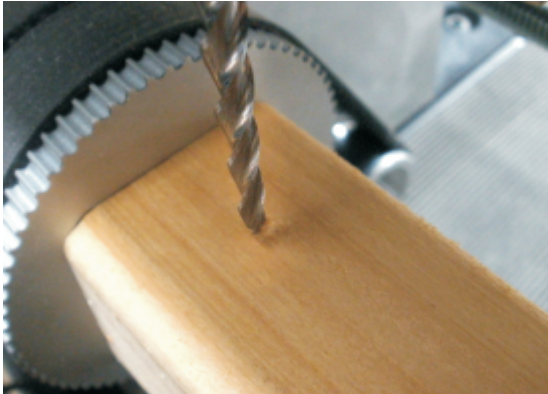


fig. 6c

If they do not line up, use the arrow keys to reposition the bit to match the reference mark (and lower the bit by hand, to confirm alignment). Once aligned, press the green "Enter" button again. The LCD screen will now display the "old" and the "new" settings, and the option to **1) Keep** or **2) Abort**. You want to press "1" to keep the new setting. The stock will rotate again and you can observe if the bit aligns with the mark this time. (6d)

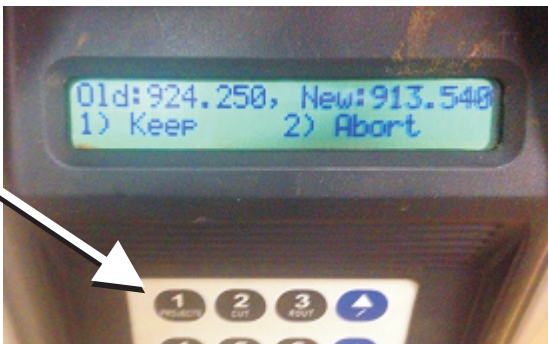


fig. 6d

It is advised to run the calibration at least twice in order to ensure a consistent result. If the results are still inconsistent (i.e., the bit and mark won't align), then it's most likely the machine's head pressure is too low or the jig is not positioned properly. Sometimes a little extra "push" with your hand while cranking down the head can increase the head pressure enough to get a good calibration, so try that first.

Once calibrated, you are now ready to run your project.

## Running A Rotary Project

- From the Project Menu, select your rotary project, then press "Enter"
- The machine will measure the length of your stock to make sure it is long enough for your project
- Next, the machine will prompt you to input the stock's diameter (the initial number displayed is simply the minimum diameter required for the project). The stock's **OUTER** diameter is what you need to specify. (see pg. 1, fig. 2b)
- Use the up/down arrow keys to select the stock's **OUTER** diameter. Select the next higher diameter if there is no exact match. Aside from the initial diameter display, the diameter choices are in .25" increments. Press ENTER after making your selection.

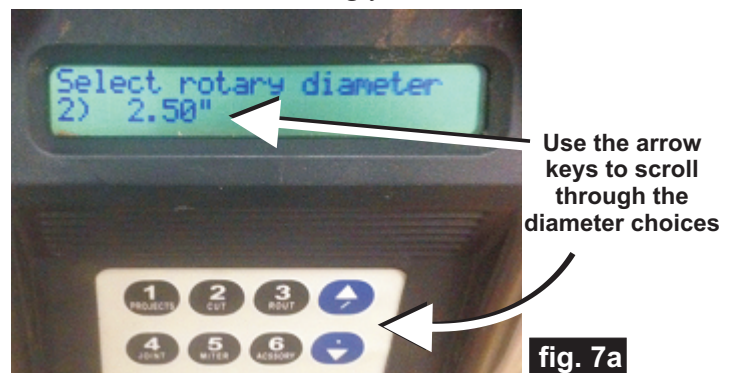
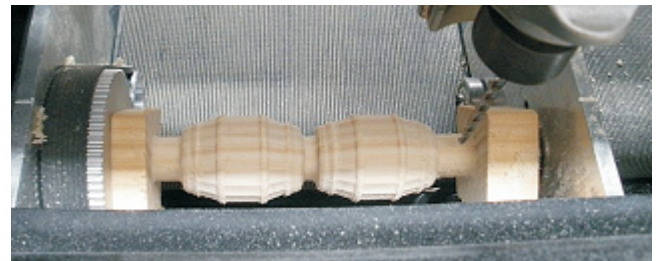


fig. 7a

- You will then be prompted for the bit, as usual. Insert the bit and press ENTER. The machine will proceed with Homing/Bit Find and then run your rotary project!



For additional information and resources, please visit: <http://www.carviewright.com/support-page/getting-started/tutorials/>

There are also several Rotary sections available at the CarveWright Community Forum you may find helpful. Please visit: <http://forum.carviewright.com/forum.php>

(cont.)

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[www.carviewright.com](http://www.carviewright.com)

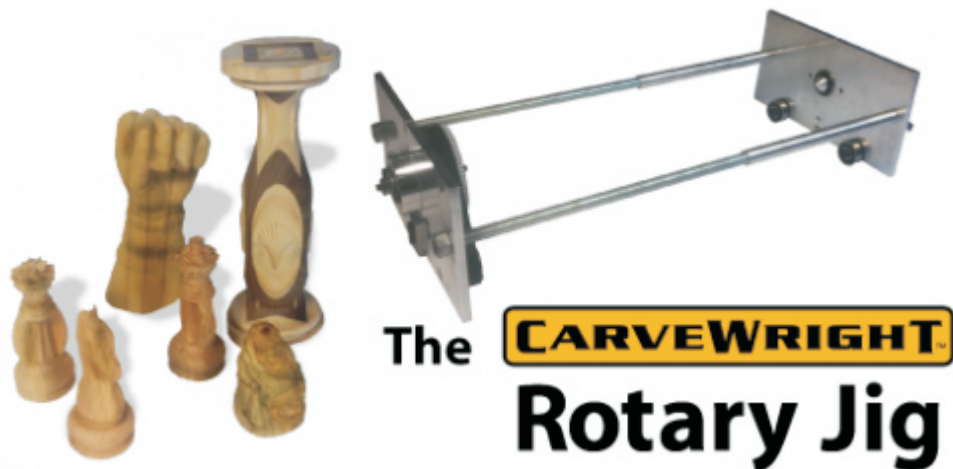


# Additional Resources

## RESOURCES...

There are numerous resources for the CarveWright/CompuCarve owner to make their experience with these machines much more enjoyable.

Every owner should join the CarveWright User Forum (<http://forum.carviewright.com/forum.php>) where fellow users share their experiences and knowledge with these machines on a daily basis. It is a FREE service that you will surely appreciate. A handy Search Feature helps you find answers to any questions you may have.



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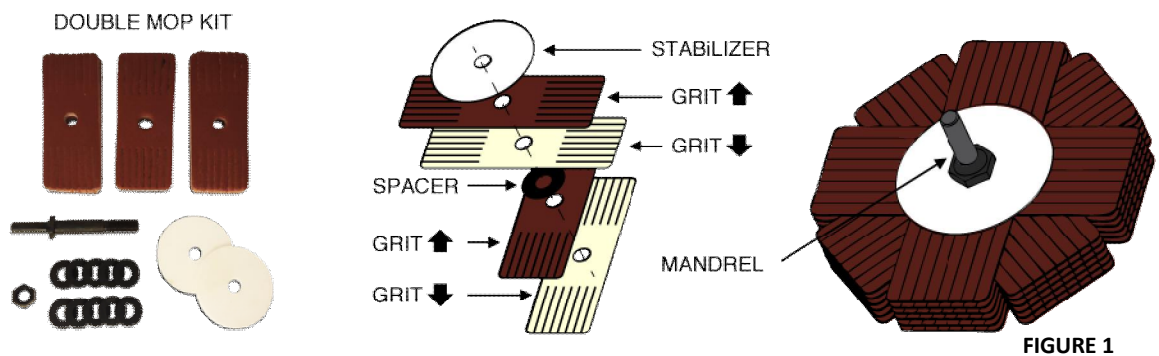
## *SANDING MOPS*

Sanding mops are a great way to speed up and simplify the sanding and cleaning of your carvings. Attach it to a drill press or another high speed motor, and quickly polish your projects without removing your carved details. It will literally save you hours of tedious, hand sanding work. With two grits and two sizes, no matter the project, we've got you covered. We also have sandpaper refills for when you wear them out from all the great projects you are making.



### **ASSEMBLY**

The CarveWright sanding mop is very easy to assemble into a number of different configurations to best suit the job at hand. By adding spacers between the layers you can change the "softness" and "aggressiveness" of the sanding. Fundamentally, the sanding mop is made up of sets of top and bottom facing strips of sandpaper that are set 45° from each other. No matter which size of mop you have purchased, you will want to start by building sets of two sanding strips lined up with the grit sides facing away from each other. Then you will want to take two of these sets and place them at 90° to each other to form what is called a sanding unit (Figure 1). Each sanding units are then assembled on to the mandrel at 45 degrees to the last sanding unit. Continue crisscrossing sanding units (Fig. 1) until you reach the mop thickness you desire.



**FIGURE 1**

The stiffness and aggressiveness of your sanding mop can be varied by changing the way you assemble the supplied stabilizers (thin white plastic disks) and the unit spacers (black rubber washers) into the sanding units.

**For Maximum stiffness:** Use the stabilizers only (with the sanding units in between). This configuration is useful for sanding routed edges.

**For Medium stiffness:** Use the stabilizers in addition to the spacers. This will reduce the aggressiveness and stiffness of the sanding mop, allowing it to get into the carved detail more efficiently. **Note:** If you wish to use the spacers on the small sanding mop place a spacer on the mandrel after every two sanding units (8 sanding strips) as opposed to after every sanding unit as done on the large sanding mop.

**For Minimum stiffness:** Use only the spacers to further increase the softness of the sanding mop. This configuration works very well when sanding fine details in deep carvings.

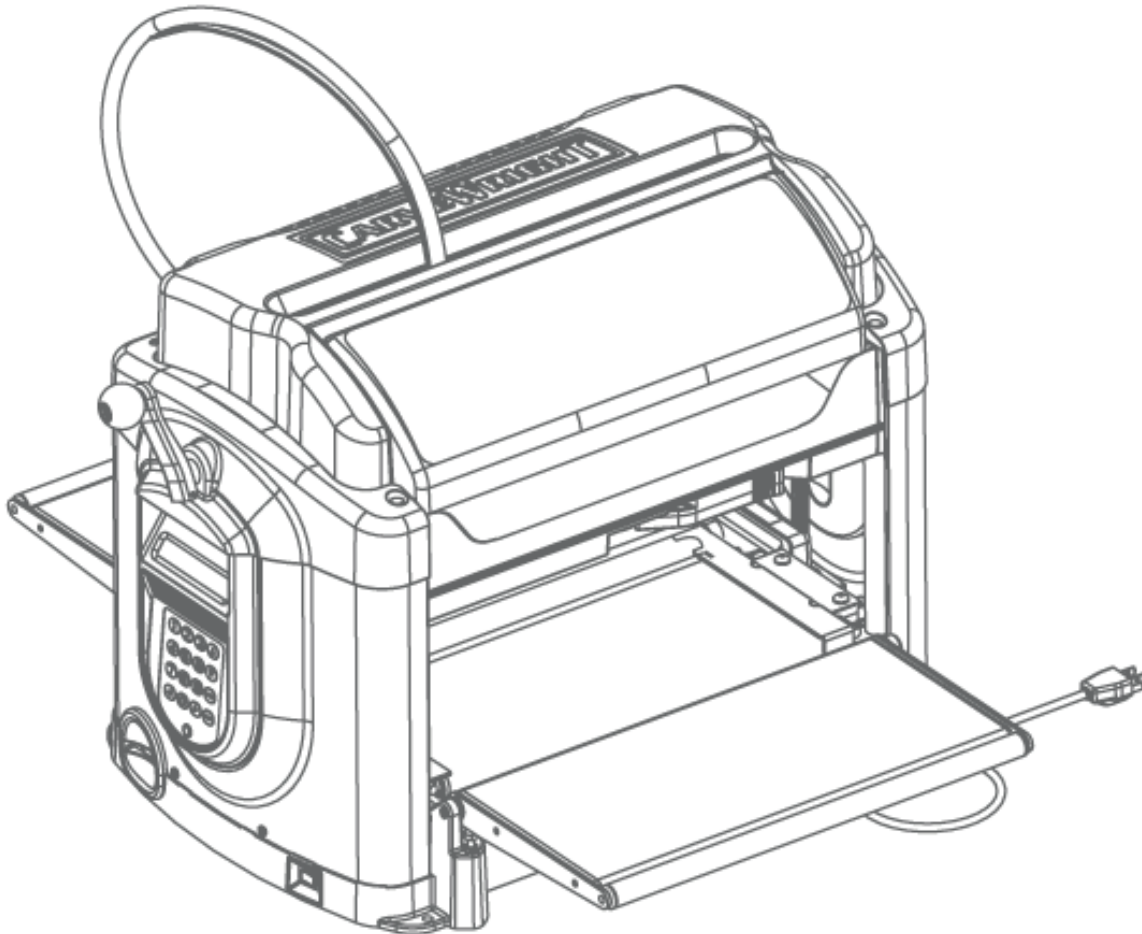
If you wish to use the stabilizers in your configuration, begin the assembly by placing one stabilizer on the mandrel and end the assembly by placing the remaining stabilizer on the mandrel directly before the nut(s). Tighten the nut and place the sanding mop securely in a drill, drill press, lathe, bench grinder. Before you begin using your sanding mop you must separate the splits in the sanding strips by pressing a corner of a piece of hardwood in to the sanding mop while it is spinning.



## **CHAPTER 9 – TROUBLESHOOTING AND MAINTENANCE**

# Troubleshooting Guide

Rev 1.07



Please note that this guide has been generated to help users identify machine issues and diagnose certain common causes. It is not a repair guide and should not be treated as such. Any repair to your CompuCarve or CarveWright machine must be at the direction of a trained CarveWright service technician in order to satisfy all warranty conditions. Also note that the issues listed below are compiled from all machine configurations from the beginning of production and many of them will not apply to your machine configuration.

**The carvewright support website has a searchable knowledgebase with much of this information in video format. We recommend using this resource along with this guide.**

<http://support.carvewright.com/>

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## **Board Too Thick to Cut Message**

### **Description of Issue**

The “Board Too Thick to Cut” message appears on the LCD screen when the machine measures the inserted board thickness and determines that it is thicker than the cutting bit can cut all the way through. This message will only appear if there is a cutting operation in the project.

### **Possible Causes**

The causes can be: a sliding plate that is not slid all the way over against the board, the wrong bit is inserted into the machine, a case where the user is using a jig on a project that has a cut-out in it and the height of the jig does not allow the bit to touch the board sensor during homing, or a damaged board sensor.

### **Troubleshooting Steps**

1. Verify that the board is NOT over 1” thick.
2. Check that the sliding plate is slid over against the edge of the board.
3. Verify that the correct bit is inserted and correctly assembled.
4. Check hole in the board sensor. Check for a hole on the board tracking sensor - Look on the plastic bar of the board tracking sensor for hole. If there is a hole, place a dime on top of that and run the machine. Machine should run normally after that. You also obtain a clip (Board Position Encoder touch plate - P1323) to cover the hole.
5. Check Tracking Roller" error message. This error is shown because of out of limit numbers when measuring the length of the board.
6. Run a project and watch where the error occurs and what the machine is attempting to do.
7. Consult CarveWright.

## **Check Cut Motor Message**

### **Description of Issue**

The machine can report a Check Cut Motor message when the sensors are not reading the expected cut motor RPM. This cut motor message can be disregarded if the user desires. The motor will run without the sensor feedback but may run fast.

### **Possible Causes**

Causes include: a cut motor that is not spinning (various reasons), a bad cut motor sensor, a faulty cut motor sensor magnet, or a faulty X termination board.

### **Troubleshooting Steps**

1. Check to see that the cut motor is spinning when it should be spinning. If the cut motor is not spinning see the section titled “Cut Motor Not Spinning”.
2. Check to see that the cut motor sensor is recording the shaft as it spins. To check the status of the cut motor sensor, go to the CarveWright Main Menu->Configuration->Sensor Check menu. Use the arrow keys to find the item titled “Cut Sensor” on the bottom line of the display. Spin the spindle as fast as possible by hand and see if the count on the display changes. If the count is not changing the magnet and/or the cut sensor is bad.
3. If the cut motor RPMs are fluctuating during the project (readily heard), check the leads on the large brown capacitor on the X termination board for breakage. Replace the X termination board if necessary.
4. If none of the above steps solves the issue consult CarveWright.

## Check Tracking Roller Message

### Description of Issue

The “Check Tracking Roller” message appears on the LCD screen when the machine is seeing out of limit numbers when measuring the length of the board at the beginning of the project. Typically the board will progress out one end of the machine and just off the tracking roller before stopping.

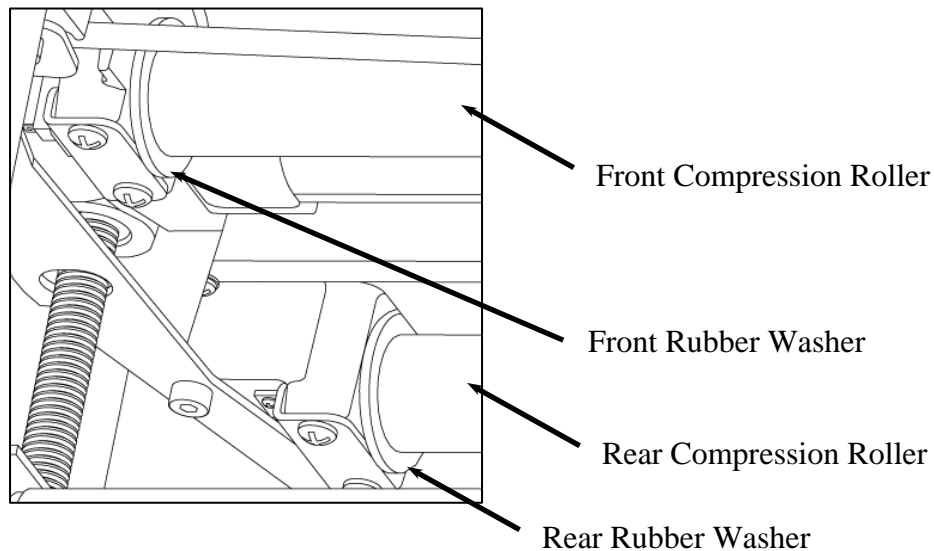
### Possible Causes

The two main causes of this error are: 1) there is a stuck compression roller and 2) there is some issue with the board tracking sensor. The most likely cause is stuck compression roller. When measuring the length of a board, the machine waits until the roller closest to that end it is measuring drops to signal that it should start to look for the edge of the board with the board sensor. Usually this message is caused when one of the compression rollers fails to switch from “Compressed” to “Released” when it falls off the end of the board and the board continues to move out of the machine until the board tracking sensor stops rotating. The cause is almost always dust in under the end of the compression roller that prevents the roller sensor from seeing the drop.

Issues that will cause a board tracking roller to indicate this error are: board defects, rolled up belt, low head pressure, damaged or missing o-ring on the board tracking sensor, dust in the board tracking sensor, improperly set/loose sliding plate, missing damper spring under the board tracking sensor, incorrectly adjusted outfeed trays, or a board that is thinner than .5”

### Troubleshooting Steps

1. Check the roller state in the sensor check menu. Remove the workpiece, turn the machine ON, and navigate to the Configurations Menu from the CarveWright Main Menu by using the up/down arrows or pressing the “0” (Options) key on the keypad. Navigate to, or select key “7”, Sensor Check. Use the up/down arrows to find menu items titled Front Roller and Back Roller. With no board inserted they should both read “Released”.
2. Lift up on the left end of each roller and blow air underneath the rubber washers that shield the end of the roller. Verify that the rollers now both read “Released” when there is no board present.



3. Check the board for defects (existing carvings, warping, holes, rounded edges, etc.) and make sure it is inserted correctly into the machine. For a detailed discussion on the board requirements please see the “Inserting a Board” section in the CarveWright Owner’s manual.
4. Verify that the board is thicker than .5”.
5. Check that the sliding plate is tight and up against the board. A board that is not captured by the sliding plate will allow the board to walk slightly from side to side. This small amount of walking can lead to a wide variance in measured lengths.
6. Check to see if the squaring plate (where the tracking sensor is attached) is loose. This is a rare issue but it can happen. If the square plate is loose, it will not measure the board right and could give the Edge Detection error, possible board removal, or give a wrong measurement for the board. Re-tighten the 2 screws that hold the squaring plate.
7. Verify that the board sensor rotates freely.
8. O-ring on the board tracking sensor is in place and not damaged.
9. Verify that the head pressure is within correct limits.
10. Verify that neither of the belts are damaged or rolled up.
11. Verify that the damper spring is still under the board tracking sensor.
12. Check to see that the outfeed rollers are not adjusted too high. If they are high they can lift the board off of the board tracking roller during operation and cause it to lose track of the position.
13. Check for dust in the board tracking sensor.
14. If none of the above steps solves the issue consult CarveWright.

## Edge Detection Failure Message

### Description of Issue

The edge detect failure occurs when the board sensor gets bad data when looking for a board edge during the initial measuring and homing part of the project.

### Possible Causes

Causes include: a low board sensor reading, a very dark color workpiece, sawdust on the sliding plate, a hole in the board, or board tracking issue that confuses the board sensor when looking for an edge. These tracking issues can include: board defects, rolled up belts, low head pressure, dust in the board tracking sensor, improperly set/loose sliding plate, missing damper spring under the board tracking sensor, or incorrectly adjusted outfeed trays.

### Troubleshooting Steps

1. Determine if the error is occurring when measuring the edge in the Y direction (left to right across the machine) or in the X direction (in and out of the machine). If it occurs when measuring in the Y direction, proceed with Step 2. If it occurs when measuring the X direction, skip to Step 8.
2. Check the board sensor reading when the Y truck is pushed all the way over to the left side of the machine (off the board). It should read less than 10. Then move the truck over a light colored board and verify that the reading is greater than 100. If either of these values is not met please refer to the “Please Clear Board Sensor” document.
3. Verify that the color of the workpiece is not too dark by making sure that the board sensor is reading at least 100 while over a light colored workpiece.
4. Check the board for defects (existing carvings, warping, holes, rounded edges, etc.) and make sure it is inserted correctly into the machine. For a detailed discussion on the board requirements please see the “Inserting a Board” section in the CarveWright Owner’s manual.
5. Check that the sliding plate is tight and up against the right side of the board and clear of sawdust.
6. Next check and see if there is dust in the Y encoder that is causing it to lose track of position. Check the Y encoder readings in the sensor check menu. Turn the machine ON and navigate to the Configurations Menu from the CarveWright Main Menu by using the up/down arrows or pressing the “0” (Options) key on the keypad. Navigate to, or select key “7”, Sensor Check. Use the up/down arrows to find menu items titled Y Position. Record the encoder readings for the far left and right positions as you move the Y truck. The total Y travel should read between 15.5” and 16”. Move it back and forth several times checking to see that the values at each side do not change. Replace the motor pack if these readings do not match up.
7. If none of the above steps solves the Y edge detection failure, consult CarveWright.
8. Check to see if the squaring plate (where the tracking sensor is attached) is loose. This is a rare issue but it can happen. If the square plate is loose, it will not measure the board right and could give the Edge Detection error, possible board removal, or give a wrong measurement for the board. Re-tighten the 2 screws that hold the squaring plate.



9. Verify that the head pressure is within correct limits.
10. Verify that neither of the belts are damaged or rolled up.
11. Verify that the damper spring is still under the board tracking sensor.
12. Check to see that the outfeed rollers are not adjusted too high. If they are high they can lift the board off of the board tracking roller during operation and cause it to lose track of the position.
13. Check for dust in the board tracking sensor.
14. If none of the above steps solves the issue consult CarveWright.

## **Error Loading Size: 28 Message**

### **Description of Issue**

The machine will tend to show this error message during the beginning process or starting a carving when it cannot access the memory card data.

### **Possible Causes**

The machine displays this error message when the project on the memory card has been corrupted. It improperly loads the incorrect project size, resulting in the error message.

### **Troubleshooting Steps**

1. Take the card back to the computer and reformat the memory card. Overwrite the firmware on the card. This is very important even if the version is the same.
2. Load the project again and try running the project.
3. If the problem persists, email the project file to CarveWright support for analysis.

## **Please Clear Board Sensor Message**

### **Description of Issue**

This error appears when the sensor used to find the edges of the workpiece is not seeing reading within its operational limits. The sensor system consists of an infrared LED and an infrared detector. The board sensor works by reflecting infrared light off of the board and reading the intensity of the reflection. When the board is underneath the sensor, the reflected intensity is high and when the sensor is off the edge of the board, the intensity is low. The LED and detector are mounted behind a clear window in a plastic case at the bottom of the horizontal moving Y-Truck.

### **Possible Causes**

There are several reasons why the machine will prompt the user to “Clear Board Sensor” including:

1. There is dust obscuring the sensor lens.
2. There is dust piled in the machine to the right of the board that looks like a continuation of the board to the sensor.
3. There are existing features on the workpiece, like holes or other carved features, which prevent the sensor from tracking the top surface.
4. The material is too transparent or reflective.
5. The board is positioned incorrectly in the machine; usually the board is installed on top of the squaring plate instead of up against it. It will also give this error if the board is placed in the middle of the machine and not slid up against the strongback.
6. The environmental temperature is below 40 degrees Fahrenheit.

### **Troubleshooting Steps**

The following steps only touch on the most likely causes of this issue. For an in-depth troubleshooting procedure please consult the detailed trouble shooting document titled “Please Clear Board Sensor”

1. Clean the Board Sensor. The most common reason for this issue to occur is that the sensor is obscured by dust. To clean, simply blow low-pressure compressed air (<80 psi) onto the sensor window or wipe with a clean cloth. It is recommended that this sensor be cleaned after every project. If using pressurized canned air make sure to keep the can vertical. If the can is tipped upside down it will eject a stream of freezing liquid instead of air. This will usually damage the sensor.
2. Verify that the temperature is above 40°F.
3. Verify that the board is pushed up against the squaring plate and not riding on top of it.
4. Check to see that there is no dust piled on the squaring plate that may trick the sensor.
5. Verify that there are no existing features on the workpiece, like holes or other carved features, which trick the sensor into thinking that it has found the edge and preventing it from seeing the entire top surface of the board. Use masking tape to hide these features from the sensor.
6. Verify that the material is not too transparent or reflective. Since the sensor works by using reflected light to determine the board edge, any material that is very light in color or

very dark in color cause it to get a reading that is out of its normal limits. This can be fixed by placing a piece of masking tape on the surface of the workpiece along the line that the sensor traces while measuring. This generally requires placing tape across the width and length of the workpiece.

7. If the board sensor error cannot be resolved by doing the above checks you will need to check the sensor readings directly to see if it is working properly. To check the status of the board edge sensor, go to the CarveWright Main Menu->Configuration->Sensor Check menu. Use the arrow keys to find the item titled “Board Sensor” on the bottom line of the display. Do the following checks:
  - a. Load a pine or similar colored board, lower the head, and check the reading displayed on the LCD when the sensor is over the board. Anything reading over 90 is acceptable. Anything under 90 requires a new sensor.
  - b. Check the reading displayed on the LCD when the sensor is not over a board by moving the cutting head all the way to the left. The correct reading should be less than 10 and ideally 0.
  - c. Raise the head, so that a small board can be easily place underneath the Board Sensor. Move it up and down so as to cause the Board Sensor reading to go greater than 50. Quickly remove it from under the sensor. The reading should drop immediately to less than 10 and ideally 0. If it does not drop immediately the sensor is faulty and needs to be replaced.
8. If none of the above steps solves the issue consult CarveWright and the detailed trouble shooting document titled “Please Clear Board Sensor”.

## **Please Close Cover Message**

### **Description of Issue**

The “Please Close Cover” message appears once the project begins even though the cover is closed. The machine has two switches that check to see that the cover is down before cutting. The left one reports the cover state to the electronics and the left one connects the power circuit to the cut motor which allows it to run when the cover is down. If the left one is not showing “Closed” then the machine will show this message.

### **Possible Causes**

Causes include: a faulty cover switch (or full of dust), a loose cover or switch, a bent cover that does not allow the cover to fully actuate the switch, or a disconnected cover cable on the head termination board (seen especially right after servicing where the cover was removed).

### **Troubleshooting Steps**

1. Check the state of the cover switch in the sensor check menu. Turn the machine ON and navigate to the Configurations Menu from the CarveWright Main Menu by using the up/down arrows or pressing the “0” (Options) key on the keypad. Navigate to, or select key “7”, Sensor Check. Use the up/down arrows to find menu items titled Cover Switch. With the cover up it should say “Open” and with the cover closed it should say “Closed”. Open and close the cover and see if the switch changes state for “Open” to “Closed”.
2. Check that the left cover hinge cover is not loose and that the switch is not loose. If either is loose it can affect the actuation of the switch button by the finger on the clear cover.
3. Verify that the connectors to the switch are in place and tight.
4. Take a small implement and manually depress the switch button by hand. If you can get the LCD to switch to “Closed” then there is something wrong with the cover that is preventing it from depressing the switch far enough. Resolve this cover issue.
5. Also listen for a clicking sound as you depress the switch by hand. If the connector is seated and the clicking can be heard without the cover showing “Closed” then most likely the switch has dust in it or is bad. Blow out the switch and test again.
6. If the error occurs during carving then check the cover engagement with the switch. It is possible that the vibration lifts the cover enough to release the switch momentarily. In this case it usually happens with regularity. Adjust the cover so that the switch engagement is positive
7. If the machine has recently been serviced and the cover was removed it is very possible that the switch cable was not plugged in correctly. Verify that the cover cable is correctly plugged into the head termination board. Unplug and re-plug if the seating is unsure.
8. If none of the above steps solves the issue consult CarveWright.



## **Please Load Bit Message**

### **Description of Issue**

The “Please Load Bit Error” message occurs during homing when the machine is unable to verify the position of the bit tip. The machine uses surfaces on the board tracking sensor (in the cutout of the strongback at the far left of the bit travel) and the swinging bit touch plate (at the far right of travel) to locate the position of the bit tip. Failure to touch these surfaces results in this error.

### **Possible Causes**

Causes include: no bit loaded into the machine, outdated firmware, incorrectly assembled bit, a malfunctioning bit plate, or a damaged board sensor.

### **Troubleshooting Steps**

1. Verify that the correct bit is inserted, correctly assembled, and not loose.
2. Check that the Y/Z trucks are not loose.
3. Verify that the card has the latest firmware version.
4. Check for damage (usually a hole) on the board tracking sensor body. The damage will be on the plastic bar of the board tracking sensor where the bit touches during homing at the far left of its travel. If there is a hole, temporarily place a dime in the triangular recess of the board sensor over the hole and run the machine. If this fixes the issue, add the Board Position Encoder Touch Plate (P1323) instead of the dime.
5. Run a project and watch if the bit plate is swinging out far enough for the bit to touch when it moves down. The bit should touch on the flat surface of the plate and not on the edge. If the plate is not swinging out far enough clean and lubricate the bit plate pivot post and spring. Clean the plate mechanism with compressed air and spray WD40 on the spring. Crank the head all the way up to the top and spray upward at the pivot shaft. Actuate the bit plate several times to let the WD40 penetrate the mechanism.
6. Re-tension the Y belt. A loose belt can decrease the force that the Y-truck uses to swing the bit plate out.
7. If the bit is touching the swinging bit plate on the flat surface and still getting the error, rotate the bit plate all the way and push down, slightly bending the plate down. This will slightly bend the plate and increase the depth measurement.
8. If the bit is still not touching the bit plate then proceed to the "Bit Not Touching the Bit Plate" section.

## **Please Load Board Message**

### **Description of Issue**

The “Please Load Board” message comes up when the machine begins to measure the board and senses that there is not a board in the machine. It checks that both compression roller sensors are reading compressed to verify that a board is loaded into the machine.

### **Possible Causes**

Causes include: no board loaded into the machine, a board loaded only under one roller, the head is not cranked down, a warped board, a board with features carved all the way across the width of the board, a board that is too thin, low head compression, or a bad compression roller sensor.

### **Troubleshooting Steps**

1. Check that a workpiece is in the machine (and under both rollers) and that the head is cranked down properly.
2. Verify that the board is not thinner than 1/2".
3. Check for major features on the board that would cause one roller to compress and the other to be released. The workpiece needs to be flat, smooth and without warps or significant thickness change.
4. Verify that the head pressure is within correct limits. This is especially important when carving wide material because the rollers do not compress as much the wider it gets.
5. Check for a stuck or defective compression roller. Please review the section titled “Stuck Compression Roller” in this troubleshooting guide.
6. If none of the above steps solves the issue consult CarveWright.

## **Please Set Sliding Plate Message**

### **Description of Issue**

The “Please Set Sliding Plate” message comes up when the machine is unable to locate the sliding plate with the tip of the bit, usually when measuring the bit before doing a cut-out operation. The tip of the bit goes below the bottom plane of the board during the cut-out operation and uses the sliding plate as a depth reference so as not to damage the machine.

### **Possible Causes**

The causes can be: a sliding plate that is not slid all the way over against the board, a case where the user has put the wrong bit into the machine and it is too short to reach the sliding plate, or a case where the user is using a jig on a project that has a cut-out in it and the height of the jig does not allow the bit to touch the sliding plate.

### **Troubleshooting Steps**

1. Check to see that the sliding plate is set up against the board.
2. Check and double check that the bit that is inserted is in fact the bit that the machine is calling for. As noted usually this happens when trying to do a cutout.
3. Check to see if the user is using a jig. Some jigs can be too high for the cutout function to work properly.
4. If none of the above resolve the issue, set up a project and watch exactly the sequence of events and where the error occurs. Then bring this information to a CarveWright for consultation.

## Possible Board Problem Message

### Description of Issue

The Possible Board Problem message occurs when the board tracking sensor is unable to closely track the board with respect to the commanded motion of the drive motors.

### Possible Causes

Cause can be: board defects, rolled up belt, low head pressure, damaged or missing o-ring on the board tracking sensor, dust in the board tracking sensor, improperly set/loose sliding plate, missing damper spring under the board tracking sensor, incorrectly adjusted outfeed trays, a board that is thinner than .5", or excessive backlash in the X-drive gears.

### Troubleshooting Steps

1. Check the board for defects (existing carvings, warping, holes, rounded edges, etc.) and make sure it is inserted correctly into the machine. For a detailed discussion on the board requirements please see the "Inserting a Board" section in the CarveWright Owner's manual.
2. Verify that the board is thicker than .5".
3. Check that the sliding plate is tight and up against the board. A board that is not captured by the sliding plate will allow the board to walk slightly from side to side. This small amount of walking can lead to a wide variance in measured lengths.
4. Check to see if the squaring plate (where the tracking sensor is attached) is loose. This is a rare issue but it can happen. If the square plate is loose, it will not measure the board right and could give the Edge Detection error, possible board removal, or give a wrong measurement for the board. Re-tighten the 2 screws that hold the squaring plate.
5. Verify that the board sensor rotates freely.
6. O-ring on the board tracking sensor is in place and not damaged.
7. Verify that the head pressure is within correct limits.
8. Verify that neither of the belts are damaged or rolled up.
9. Verify that the damper spring is still under the board tracking sensor.
10. Check to see that the outfeed rollers are not adjusted too high. If they are high they can lift the board off of the board tracking roller during operation and cause it to lose track of the position.
11. Check for dust in the board tracking sensor.
12. If none of the above steps solves the issue consult a CarveWright.

## **Possible Board Removal Message**

### **Description of Issue**

The “Possible Board Removal” message occurs when the head is cranked up unexpectedly. Both compression roller switches would have to be showing released during the project which the machine interprets as no board being present.

### **Possible Causes**

Possible causes are: the head is cranked up in the middle of the project, there is a fault in one or both compression roller switches, or one of the rollers falls when the board is only under it.

### **Troubleshooting Steps**

1. Verify that the head was not cranked up during the project.
2. Check that there are no features going all the way across the board that would cause one roller to drop and go “Released”.
1. Check the roller state in the sensor check menu. Remove the workpiece, turn the machine ON, and navigate to the Configurations Menu from the CarveWright Main Menu by using the up/down arrows or pressing the “0” (Options) key on the keypad. Navigate to, or select key “7”, Sensor Check. Use the up/down arrows to find menu items titled Front Roller and Back Roller. With no board inserted they should both read Released.
3. If none of the above steps solves the issue consult CarveWright.



## **Power Fluctuation Message**

### **Description of Issue**

The machine displays the Power Fluctuation message when it encounters an under-voltage condition on the 5V power supply. The machine shuts down and safes all operations.

### **Possible Causes**

There are four main causes for the under-voltage condition, a faulty power supply, a loose connector, a drawdown on the circuit, and a short somewhere in the machine.

### **Troubleshooting Steps**

1. Check that there are no other machines or devices on the circuit that can draw down the 110V to the machine. Also make sure that the machine is not on a power strip or extension cord which can be a large in line resistive load.
2. Check the power connections to the electronics for looseness. UNPLUG THE MACHINE and remove the bottom cover. Check the seating of all of the connectors to the power supply, controller, and ON/OFF switch.
3. Most likely if the fluctuation is randomly appearing, it is the result of a faulty power supply. Consult CarveWright and see if the Power Supply (A2038) should be replaced.
4. If the new power supply does not work have the machine returned for repair.

## **SRAM Message**

### **Description of Issue**

During initial power up, the LCD screen displays the CarveWright banner and “SRAM followed by numeric characters”. It will not let you proceed from this screen.

### **Possible Causes**

The cause is a defective controller board (A2065).

### **Troubleshooting Steps**

1. Replace the controller board (A2065).

## Stuck Compression Roller Message

### Description of Issue

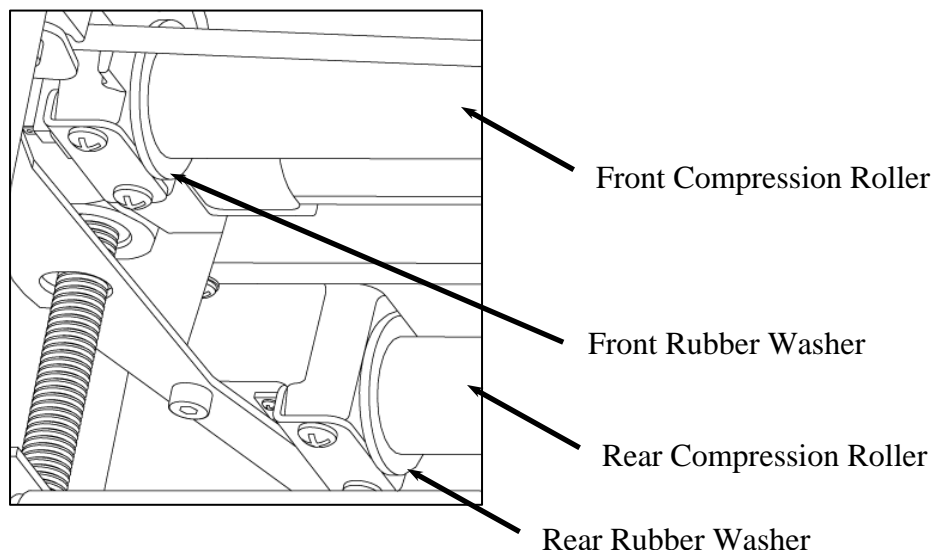
During operation machine can report that one of the two sprung loaded compression rollers is stuck. This occurs when the sensors that monitor the compressed/released state of the roller is reporting an unexpected state. See a detailed description of this mechanism in the Troubleshooting section of the CarveWright Operator's manual.

### Possible Causes

The stuck roller error can be caused by: dust preventing the roller from returning to the released state, a twisted or warped board, a misaligned roller sensor, a board that is thinner than .5", or even a bad roller sensor.

### Troubleshooting Steps

1. Verify that the board is thicker than .5".
2. Check the roller state in the sensor check menu. Remove the workpiece, turn the machine ON, and navigate to the Configurations Menu from the CarveWright Main Menu by using the up/down arrows or pressing the "0" (Options) key on the keypad. Navigate to, or select key "7", Sensor Check. Use the up/down arrows to find menu items titled Front Roller and Back Roller. With no board inserted they should both read Released.
3. If one of the rollers says Compressed even with no board loaded, reach into the machine through the open cover and lift and release each of the rollers by hand watching to see if the LCD screen indicates that the state of the roller has changed. A faint clicking should be heard as the roller goes from Released to Compressed. Blow air underneath the rubber washers that shield the end of the roller.



4. If none of the above steps solves the issue consult CarveWright.

## **System Error (81). Please Contact CarveWright Message.**

### **Description of Issue**

At startup the machine reports this error.

### **Possible Causes**

The serial number stored on the controller electronics is corrupt.

### **Troubleshooting Steps**

1. Verify that the serial number is corrupt by turning the machine ON and navigating to the Configurations Menu from the CarveWright Main Menu by using the up/down arrows or pressing the “0” (Options) key on the keypad. Navigate to, or select key “4”, Show serial Number. If it is corrupt it will show it here.
2. Contact CarveWright support and they will email you instructions on restoring the serial number in the machine.

## **Bit Not Touching the Bit Plate**

### **Description of Issue**

The machine uses the top surface on the swinging bit touch plate (located at the far right of travel) to locate the position of the bit tip during its homing routine. Failure to touch the top surface of the bit plate results in a “Please Load Bit Error” discussed above.

### **Possible Causes**

Causes include: a bit plate that is not swinging all the way out, obstacles that prevent the Y-truck from moving far enough to the right during the bit touch on the bit plate or a bit plate that is bent out of position.

### **Troubleshooting Steps**

1. Clean and lubricate the bit plate pivot post and spring. Clean the plate mechanism with compressed air and spray WD40 on the spring. Crank the head all the way up to the top and spray upward at the pivot shaft. Actuate the bit plate several times to let the WD40 penetrate the mechanism.
2. Make sure that there are no obstacles to the Y-truck moving far enough to the right to actuate the swinging bit plate. Turn the machine off, position the Y-truck on the left near to the keypad, and move Y-truck all the way to the right side of the machine. Pay attention to see if the Y-truck is getting stuck somewhere along the travel. Check for wires or interference with the cover that prevent the Y-truck from moving far enough right. Also check that the screws holding the Z encoder cap are not hitting on the cover at the far right side.
3. Make sure that there are no obstacles to the Z-truck moving far enough down to touch the top surface of the bit plate.
4. If none of the above steps solves the issue consult CarveWright.



## **Carving Edge Shifts in the Y Direction**

### **Description of Issue**

This issue occurs when the edge or boundary of a carving starts to gradually (or even radically) shift in the side-to-side direction unexpectedly.

### **Possible Causes**

Causes include: a loose Y belt tensioner, dust in the Y encoder, a Y belt missing teeth, or a loose encoder wheel on the Y encoder. The situation can be revealed or made worse by high force operations like vector cuts with large bits.

### **Troubleshooting Steps**

1. Check tension on the Y-belt. A loose belt can lead to skipping which may cause this error, especially on the Y axis. Loosen the Y-belt tension bracket screw, re-tension the belt, and re-tighten the screw. Also make sure that there is a star shaped lock washer under the head of the screw to lock the tension bracket in place.
2. Next check and see if there is dust in the Y encoder that is causing it to lose track of position. Check the Y encoder readings in the sensor check menu. Turn the machine ON and navigate to the Configurations Menu from the CarveWright Main Menu by using the up/down arrows or pressing the “0” (Options) key on the keypad. Navigate to, or select key “7”, Sensor Check. Use the up/down arrows to find menu items titled Y Position. Record the encoder readings for the far left and right positions as you move the Y truck. The total Y travel should read between 15.5” and 16”. Move it back and forth several times checking to see that the values at each side do not change. Replace the motor pack if these readings do not match up.
3. Check for missing teeth on the Y belt.
4. If none of the above steps solves the issue consult CarveWright.

## **Carving Gets Shallower Going Side to Side**

### **Description of Issue**

In rare cases we have seen unexpected carvings where the depth becomes shallower as the bit moves from right to left (as seen facing the machine) doing a raster pattern.

### **Possible Causes**

Causes include a loose bit, a board that varies in thickness from side to side, a cupped board or a machine with an unlevel head.

### **Troubleshooting Steps**

1. Check that the bit is not loose in the holder.
2. Verify that the board is not thicker on one side.
3. Check the board for major cupping on both the top and bottom surfaces. A cupped board can result in depth variations in the side-to-side direction.
4. If none of the above steps solves the issue consult CarveWright.

## **Carving Increases in Depth**

### **Description of Issue**

The machine can unexpectedly begin to carve deeper as the carving progresses.

### **Possible Causes**

Causes include: a loose bit, dust in the Z encoder, a loose Z belt clamp on the back of the Z-truck, or a loose encoder wheel on the Z motor. The situation can be revealed or made worse by high force operations like vector cuts with large bits.

### **Troubleshooting Steps**

1. Make sure that the bit is held tightly in the bit adapter and the spindle. Because of the spiral flutes, a loose bit will then to be pulled out of the adapter during carving.
2. Rapidly move the Z truck up and down seeing if you can get the belt to skip on the pulley or within the clamp that holds the belt onto the back of the truck.
3. Next check and see if there is dust in the Z encoder that is causing it to lose track of position. Check the Z encoder readings in the sensor check menu. Turn the machine ON and navigate to the Configurations Menu from the CarveWright Main Menu by using the up/down arrows or pressing the “0” (Options) key on the keypad. Navigate to, or select key “7”, Sensor Check. Use the up/down arrows to find menu items titled Z Position. Record the encoder readings for the up and down positions as you move the Z truck. The total Z travel should read between 2.5” and 3”. Move it up and down several times checking to see that the values at each extreme do not change. Replace the motor pack if these readings do not match up.
4. If none of the above steps solves the issue consult CarveWright.

## **Carving of an Imported Image is Very Rough**

### **Description of Issue**

Users sometimes report very unsatisfactory results when carving imported images or graphics. Be aware that carving an imported picture is very difficult to make look right in wood. The reason why is that the machine is trying to carve every single detail of the picture and there is a limited amount of information contained in a photo.

### **Possible Causes**

Low resolution on the imported images causes rough carving.

### **Troubleshooting Steps**

Use high resolution photos and graphics. Use the pattern editor tools in the software to clean up the images, especially around the edges. There are several Tips and Tricks articles on the Learn section of the CarveWright website that detail these tools.

## **Clicking Sound Heard During Homing or Carving**

### **Description of Issue**

A clicking sound is heard from the machine during homing or carving, especially when the Y truck is moving to the right of the machine. The clicking can also precede a Y/Z stall or even a skipping in the raster pattern.

### **Possible Causes**

Causes include: a loose Y/Z belt tensioner, a frozen Y/Z belt pulley, or a loose Y/Z belt clamp on the back of the Y-truck/Z-truck. The situation can be revealed or made worse by high force operations like vector cuts with large bits.

### **Troubleshooting Steps**

1. Verify that the Y/Z pulleys are free to rotate. Use compressed air and WD40 to get them rotating freely if needed.
2. Check tension on the Y and Z belts. A loose belt can lead to skipping which may cause this sound, especially on the Y axis. Loosen the Y-belt tension bracket screw, re-tension the belt, and re-tighten the screw. Also make sure that there is a star shaped lock washer under the head of the screw to lock the tension bracket in place.
3. Rapidly move the trucks back and forth seeing if you can get the belt to skip on the pulley or within the clamp that holds the belt onto the back of the truck.
4. If none of the above steps solves the issue consult CarveWright.



## **Cut Motor Changes Speed in the Middle of the Project.**

### **Description of Issue**

The cut motor audibly changes pitch during a carving. This is indicative of the sensor losing track of the RPM and defaulting to a pre-programmed speed.

### **Possible Causes**

The cause of this change is most likely a faulty board sensor or sensor magnet.

### **Troubleshooting Steps**

1. Check to see that the cut motor sensor is recording the shaft as it spins. To check the status of the cut motor sensor, go to the CarveWright Main Menu->Configuration->Sensor Check menu. Use the arrow keys to find the item titled “Cut Sensor” on the bottom line of the display. Spin the spindle as fast as possible by hand and see if the count on the display changes. If the count is not changing the magnet and/or the cut sensor is bad. This message can be ignored and the motor will run on a default setting or the motor can be brought in for repair.
2. If the above step does not solve the issue consult CarveWright.

## **Cut Motor Not Spinning**

### **Description of Issue**

The cutting motor does not turn on at the beginning of the carving.

### **Possible Causes**

Causes include: a faulty switch, a loose connector, a faulty X-termination board, a pinched wire in the cut motor, a loose power wire, a head cover that is not engaging the AC motor switch, or a bad controller.

### **Troubleshooting Steps**

1. Check that the right clear cover hinge cover is not loose and that the switch is not loose. If either is loose it can affect the actuation of the switch button by the finger on the clear cover.
2. Verify that the connectors to the switch are in place and tight.
3. Verify that the cut motor switch (the one on the right side of the cover) is working by listening for the click as the cover is lowered.
4. Take a small implement and manually depress the switch button by hand. If you can hear the click when you do it by hand but not when the cover is lowered then there is something wrong with the cover that is preventing it from depressing the switch far enough. Resolve this cover issue.
5. UNPLUG THE MACHINE and remove the bottom cover. Check the seating of all of the connectors to the power supply, controller, X-termination board, and ON/OFF switch.
6. Check the AC motor brushes for excessive wear.
7. Check traces on the X-termination board for signs of a burnt trace.
8. If none of the above steps solves the issue consult CarveWright.

## **Flexshaft Core Breaking at the End**

### **Description of Issue**

In rare cases, the flexshaft core will be broken anywhere from 1" to 1 1/2" from either end. This will usually happen within one hour of use.

### **Possible Causes**

A burr has been raised on the inside of the flexshaft sheath that cuts into the core.

### **Troubleshooting Steps**

1. Change the flexshaft assembly (A2045)

## **Flexshaft is Overheating or Melted**

### **Description of Issue**

The flexshaft sheath temperature should be cool enough that you can hold it in your hand even after long periods of operation. If the flexshaft core becomes hot enough it can melt the outer rubber sheath. A melted flexshaft sheath requires the immediate replacement of the entire A2045 flexshaft assembly. In the case of an overheating flexshaft diagnose the issue before permanent damage can occur.

### **Possible Causes**

Flexshaft overheating (and eventual melting), is usually caused by incorrectly assembling flexshaft core when putting the machine together. If the flexshaft is assembled such that the steel core (the rotating part) is subjected to compressive forces then it will quickly overheat. Overheating can also be caused by insufficient or incorrect lubrication, a sheath that is not kept within the wire guide, a non-free floating flexshaft core, a bad flexshaft core, or even by a damaged spindle assembly.

### **Troubleshooting Steps**

1. Verify that the sheath is staying within the wire guide while carving. The wire guide maintains the proper bend radius on the sheath to assure that it does not kink.
2. Verify that the core can slide in and out of both the motor end and spindle end freely. Sometimes rust or a frayed wire can prevent it from floating in the hole. The flexshaft must be free to float within the sheath as the cutting head moves up and down and left and right.
3. In the simple case of overheating, check that the flexshaft is assembled correctly. Disengage the flexshaft, remove the core and look for any damage or discoloration. Grab the core at each end with your fingers, pull taut, and twist. A good flexshaft will have little rotational movement ( $<90^\circ$  of rotation). Replace any bad flexshaft core by following the service instructions CarveWright Owner's Manual.
4. Check for any play in the spindle by moving it side to side. You should not be able to feel any slop or play in the spindle.
5. If the flexshaft is still running hot, lubricate it. The lubrication that you should use is "Chain Lube with Moly". You can find it at any hardware, automotive or home improvement store and the instructions are also found in the CarveWright Owner's Manual or online.
6. If none of the above steps solves the issue consult CarveWright.

## **Head Will not Lower**

### **Description of Issue**

The head fails to lower when using the crank. Usually it sits in place and the crank clutch continues to click.

### **Possible Causes**

Causes include: the red locking lever is engaged, the head is raised to the top of travel and stuck, the lowering mechanism needs lubrication, the crank handle is not engaging, the head is not level, the vertical guide posts are out of alignment, or there is damage to the cranking mechanism.

### **Troubleshooting Steps**

1. Check that the head is not already at the top of its travel (up against the side stabilizers). Cranking the head beyond its highest useable height can result in it locking in a position where the head crank cannot lower it. Releasing from this locked position it is very easy. The right side threaded leadscrew needs to be manually turned and can be accessed from the inside of the machine. There is a hole in the leadscrew just above the traction belts. Insert an Allen wrench or similar tool and rotate it in the clockwise direction to unlock it. For detailed instruction and pictures, consult the Troubleshooting section of the CarveWright Operator's Manual.
2. Verify that the red head locking lever is not engaged. To unlock, make sure it is pushed back flat against the head casting.
3. Verify that the crank is engaging the clutch mechanism when rotating it. It should be very hard to turn if the head is not moving down.
4. Clean and lubricate the four vertical guide posts and the two lead screws. Clean the guide post and the lead screw with a dry rag and add liberal amounts of white lithium grease to these parts. Crank the head up and down to work the grease into the parts. Make sure that the head pressure is within limits before proceeding.
5. Check the level of the head by measuring from the top of the head casting to the underside of the plastic stabilizers on all four corners. If there is more than 1/32" difference the head will need to be leveled. Note that there is always a reason for the head to become unlevel and this cause will have to be found and fixed before the issue can be closed. There are two problems that can cause the head to lose level: a loose leadscrew nut or a loose/damaged gear on the tierod. Please consult the document Titled Head Pressure – Adjusting the Head Level on the CarveWright website for detailed instructions. This is not an easy procedure and can be very difficult for a customer to do in some cases and should be a last resort and only at the direction and supervision of a CarveWright support technician.
6. If none of the above steps solves the issue consult CarveWright.



## **Head Will not Raise Up**

### **Description of Issue**

The head fails to raise-up when using the crank.

### **Possible Causes**

Causes include: the red locking lever is engaged, the head is raised to the top of travel, the crank handle is not engaging, the head is not level, or there is damage to the cranking mechanism.

### **Troubleshooting Steps**

1. Check that the head is not already at the top of its travel (up against the side stabilizers). Cranking the head beyond its highest useable height can result in it locking in a position where the head crank cannot lower it. Releasing from this locked position it is very easy. The right side threaded leadscrew needs to be manually turned and can be accessed from the inside of the machine. There is a hole in the leadscrew just above the traction belts. Insert an Allen wrench or similar tool and rotate it in the clockwise direction to unlock it. For detailed instruction and pictures, consult the Troubleshooting section of the CarveWright Operator's Manual.
2. Verify that the red head locking lever is not engaged. To unlock make sure it is pushed back flat against the head casting.
3. Verify that the crank is engaging the clutch mechanism when rotating it. It should be very hard to turn if the head is not moving down.
4. Check the level of the head by measuring from the top of the head casting to the underside of the plastic stabilizers on all four corners. If there is more than 1/32" difference the head will need to be leveled. Note that there is always a reason for the head to become unlevel and this cause will have to be found and fixed before the issue can be closed. There are two problems that can cause the head to lose level: a loose leadscrew nut or a loose/damaged gear on the tierod. Please consult the document Titled Head Pressure – Adjusting the Head Level on the CarveWright website for detailed instructions. This is not an easy procedure and can be very difficult for a customer to do in some cases and should be a last resort and only at the direction and supervision of a CarveWright support technician.
5. If none of the above steps solves the issue consult CarveWright.

## **Inconsistent Board Measurements or Tracking Issues**

### **Description of Issue**

This occurs when the machine measures differently in the length (or X) direction in seemingly similar situations. For example, you measure two similar colored and conditioned boards and the machine comes up with widely varying lengths.

### **Possible Causes**

Cause can be: board defects, rolled up belt, low head pressure, damaged or missing o-ring on the board tracking sensor, dust in the board tracking sensor, improperly set/loose sliding plate, missing damper spring under the board tracking sensor, bent roller on sandpaper belt tray, incorrectly adjusted outfeed trays (adjusted too high or too low), or a broken X-drive gear (you can hear a cyclic “chirp” when a tooth is missing or damaged as the board moves in and out).

### **Troubleshooting Steps**

1. In the case where the board is measuring off in a consistent and predictable way it is recommended that the user calibration routine be run on the machine so the internal offsets can be adjusted.
2. Check the board for defects and make sure it is inserted correctly into the machine. For a detailed discussion on the board requirements please see the “Inserting a Board” section in the CarveWright Owner’s manual. Place your test board on a flat surface (for example, a bench or the floor). Scan the edges next to the floor making sure the board touches the floor all around. Press down on the 4 corners of the board to make sure the board does not ‘pop up’ on the opposite corners. Press down in the center, making sure the board does not bow.
3. Check that the sliding plate is tight and up against the board. A board that is not captured by the sliding plate will allow the board to walk slightly from side to side. This small amount of walking can lead to a wide variance in measured lengths.
4. Verify that the board sensor is rotating freely.
5. Verify that the damper spring is still under the board tracking sensor.
6. Verify that the head pressure is within correct limits.
7. Verify that neither of the belts are damaged or rolled up.
8. Check to see that the outfeed rollers are not adjusted too high. If they are high they can lift the board off of the board tracking roller during operation and cause it to lose track of the position.
9. Check to see that the outfeed rollers are not adjusted too low or that the workpiece is supported well when it comes out of the machine. If the rollers are too low and the workpiece is long and/or heavy then it could lift off the Board tracking Sensor early and cause a faulty measurement. For long boards (over 36”) or for heavy boards make sure that they are supported by additional outfeed rollers.
10. Check to see if the machine has been recently upgraded from sandpaper to rubber belts. If so, the sprung idle roller on the tray may have been bent during installation. If the belt is removed it is very easy to see if the roller is bent.
11. Check for dust in the board tracking sensor.

### **Additional Tests to Help Pinpoint the Problem**

12. Run the project on a different board and see if the problem is repeatable.
13. Measure several boards with the machine and compare to dimensions found using a tape measure.
14. Place masking tape on the bottom edge nearest the keypad and run a measure board routine. If you cannot see the indentations all the way along the tape then there is something wrong with the workpiece that is keeping the tracking roller from engaging.
15. Remove the o-ring on the Board Tracking Sensor and re-run the project.
16. If none of the above steps solves the issue consult CarveWright.

## **LCD is Blank**

### **Description of Issue**

The LCD screen shows nothing when the machine is turned on.

### **Possible Causes**

Cause include: the machine not plugged in, the machine not turned on, the contrast knob on the keypad turned down very low, an improperly inserted memory card, a corrupted memory card, a disconnected wire to the power supply, a faulty display, or a faulty power supply.

### **Troubleshooting Steps**

1. Verify that the ON/OFF switch is in the proper position.
2. Verify that the memory card is properly seated.
3. Check that the power-strip is ON and functioning.
4. Verify that there is power to the outlet (have them plug it in somewhere else).
5. Check that the contrast knob on the keypad is not turned all the way down (to the left). Rotate the knob to the extremes in both directions looking for the menu text.
6. Check to see if power is getting to the machine even though the display is blank. Turn the machine completely OFF, wait 30 seconds, and the move Z-truck up and down and the Y truck left and right while noting how much resistance there is to moving them. Then turn the machine ON and feel the resistance again. If resistance is greater than it was before but still nothing shows up on the LCD, first check that the ribbon cable going to the display is plugged in (on both sides) and is not damaged. If the cable appears functional, replace the Control Panel Assembly (A2043).
7. Hit the “7” (Measure) key on the keypad to see if it begins the homing routine. If it begins to move then the LCD screen is faulty.
8. If the motor resistance is the same when the machine is both ON and OFF there is no power to the machine. UNPLUG THE MACHINE and remove the bottom cover. Check the seating of all of the connectors to the power supply, controller, and ON/OFF switch. Plug in the machine and do the test in Step 6 again. If the motor resistance is still the same replace the power supply.
9. If none of the above steps solves the issue consult CarveWright.

## **LCD Shows Black Squares**

### **Description of Issue**

The LCD screen shows nothing but black squares when the machine is turned on. There is no way to proceed through the menus.

### **Possible Causes**

Causes include: no memory card inserted in the machine, the contrast knob on the keypad turned too high, a faulty memory card, a faulty controller electronics board, or an electrical short in the machine.

### **Troubleshooting Steps**

1. Check that the memory card is inserted. Slide it out and re-insert.
2. Check that the contrast knob on the keypad is not turned too high. Rotate the knob to the extremes in both directions looking for the menu text.
3. Check for an electrical short in the machine. Turn the machine off and unplug. Take the bottom panel off the machine and unplug the largest of the two ribbon cables from the bottom of the enclosed controller box (the controller is what the memory card slides into) and the 10 pin cable going to the X termination board. Turn the machine ON and see if the black squares vanish to reveal the menu text. If so, there is most likely an electrical short in the machine. Have the machine sent in for repair.
4. If black squares still appear on the LCD screen it means that the memory card or controller electronics are probably faulty. Unfortunately it is impossible to tell which one it is unless the user has an extra card. Send a Memory card (CWMC1) first and if that does not work then send a controller (A2065).



## **LCD Shows Random Characters**

### **Description of Issue**

During initial power up, the LCD screen displays a series of random characters.

### **Possible Causes**

The cause is either a defective controller board (A2065) or a faulty LCD cable.

### **Troubleshooting Steps**

1. Send the machine in for repair.

## **Machine Reboots at Random Times**

### **Description of Issue**

The machine loses power at random times and reboots to the main menu.

### **Possible Causes**

Causes include: other machines are on the same power circuit (including unexpected items like AC units, compressors, refrigerators, and sump pumps), a faulty power supply, a faulty controller, a faulty power switch, or a short somewhere in the machine.

### **Troubleshooting Steps**

1. Check to see that the machine is plugged into a dedicated circuit and is also not on an extension cord. Try another outlet somewhere else in the house to verify that the circuit is not the issue.
2. Check and see if there are any common variables in the random reboots (position in Y or Z, location in the project, etc.)
3. UNPLUG THE MACHINE and remove the machine's bottom cover. Check the seating of all of the connectors to the power supply, controller and ON/OFF switch. Plug in the machine and test again.
4. The next likely candidate is a faulty power supply.
5. If none of the above steps solves the issue consult CarveWright.

## **No Power to the Machine**

### **Description of Issue**

The machine appears to have no power because nothing is displayed on the LCD screen when the machine is turned on.

### **Possible Causes**

Machine not plugged in, no power to the outlet, machine not turned on, contrast knob for the LCD turned too far down, faulty LCD display, faulty power supply, faulty power-strip, cut wire, loose wire

### **Troubleshooting Steps**

1. Verify that the ON/OFF switch is in the proper position.
2. Check that the power-strip is ON and functioning.
3. Verify that there is power to the outlet (have them plug it in somewhere else).
4. Check that the contrast knob on the keypad is not turned all the way down (to the left). Rotate the knob to the extremes in both directions
5. Check that the memory card is inserted.
6. Check to see if power is getting to the machine even though the display is blank. Turn the machine completely OFF, wait 30 seconds, and then move Z-truck up and down and the Y truck left and right while noting how much resistance there is to moving them. Then turn the machine ON and feel the resistance again. If resistance is greater than it was before but still nothing shows up on the LCD, go to “LCD is Blank” troubleshooting section. If the resistance is the same when it is both ON and OFF we are not getting power to the machine.
7. Hit the “7” (Measure) key on the keypad to see if it begins the homing routine. If it begins to move then the LCD screen is faulty
8. UNPLUG THE MACHINE and remove the machine’s bottom cover. Check the seating of all of the connectors to the power supply, controller and ON/OFF switch. Plug in the machine and test again.
9. If none of the above steps solves the issue consult CarveWright.

## **Random Errors Caused by Board Being too Thin**

### **Description of Issue**

There are several issues that can be caused by inserting a board that is below the .5" minimum required thickness into the machine. These errors are all associated with other problems too so sometimes it is hard to diagnose unless you check the board thickness right away.

### **Possible Causes**

A thin board can cause a "Check Front Compression Roller", "Y-axis stall", "X-axis stall", "Please Load Board", or "Possible Board Problem" messages.

### **Troubleshooting Steps**

1. Verify that the board is always at least .5" thick.

## **Random X, Y, or Z-Axis Stall Errors**

### **Description of Issue**

A random x/y/z-stall is defined as a repeated stoppage during a project where the LCD shows an X-Axis Stall, Y-Axis Stall or Z-Axis Stall seemingly with no pattern.

### **Possible Causes**

This issue is usually caused by an intermittent power supply voltage, an obstacle that is preventing movement or a something that is limiting the ability of the cutting bit to remove material (i.e. the bit is spinning slowly or not spinning at all when the machine starts to cut).

### **Troubleshooting Steps**

1. See document titled Random X, Y, or Z-Axis Stall.



## **Sandpaper Belt is Torn**

### **Description of Issue**

When a sandpaper belt becomes torn it is imperative that the root cause be determined before the belt is replaced. If you do not diagnose the issue, the machine may continue to tear them. Also consider upgrading to the super tough Rubber belts

### **Possible Causes**

The three main causes of sandpaper belts tearing are: the head pressure is too high, the board is binding in the machine, and there are imperfections in the board.

### **Troubleshooting Steps**

1. Imperfections such as knots, fasteners, warp-age, or changes in board thickness can cause the belts to tear. The belts could get caught on the imperfections or be overstressed due to warp-age or thickness changes.
2. Check that there are no pieces of material under the belts.
3. Check the head pressure. The head pressure should be between 75 and 85 lbs of pressure. To bring the head pressure down to the proper range, you will need to make sure that the clutch is properly greased. You should use white lithium grease.
4. Check that the workpiece is not binding in the machine. A board that is not straight can get caught in the machine, causing the belts to tear. The board should be perfectly straight.
5. If none of the above steps solves the issue consult CarveWright.

## Sandpaper Belt is Rolling Up

### Description of Issue

A sandpaper belt roll-up can be the cause of many machine errors like board tracking issues, measuring errors, and even damage to the X drive gears. The errors appear when the rolled-up sandpaper belts lift the workpiece off of the board tracking sensor that tracks the position of the board. It is often not noticeable at first glance so make sure to inspect the edges of the belts for the telltale hump, especially on the keypad side of the machine (see photos below). It is very important that the root cause of the roll-up be addressed before sending replacements belts so that the same issue does not happen immediately to the new belts. Also consider upgrading to the super tough Rubber belts that do not roll up.

### Possible Causes

In almost every case, the cause of a sandpaper belt rolling up is that the head pressure is too low. Very skinny boards (in the width) can also contribute to belts rolling up.

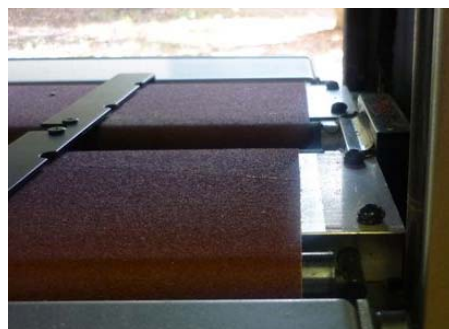
### Troubleshooting Steps

1. If the user is seeing repeated belt rollups during carving of skinny boards (<3”) then recommend the rubber belts to eliminate this problem.
2. Check and adjust the head pressure. Please refer to the document titled “Checking and Adjusting the Head Pressure” found on the service section of the website to resolve the low head pressure issue. Usually a simple lubrication of the vertical guide posts and lead screws will bring the pressure into range.
3. Check that the belt guides on the bottom of the belt trays are in place and are not significantly worn. Check wear against the other guides as a reference.



#### Example of good sandpaper belt

This picture is looking at the rear belt tray up next to the squaring plate on the keypad side of the machine. Notice that you can see the whitish edge of the belt and that there is no bump where it has rolled under itself. Also notice that there is a little of the roller visible.



#### Example of a rolled up sandpaper belt

The picture above-left is looking at the front belt tray up next to the squaring plate on the keypad side of the machine. You can see (and feel) the bump where the belt has rolled under itself. Also notice that the rolled up side is shifted to the end of the roller. You can see the shift if you look at the opposite end of the belt as seen in the right picture.

## **Scan Area Message Appears Instead of the Main Menu**

### **Description of Issue**

The machine is turned on and the LCD screen shows “Scan Area” menu instead of the CarveWright Main menu. This menu appears because the machine thinks that the scanning probe is installed.

### **Possible Causes**

Causes include: scanning probe plugged in, old firmware, or the incorrect user setting telling the machine where to look for the scanning probe plug.

### **Troubleshooting Steps**

1. Verify that the scanning probe is not plugged in.
2. Verify that the jumper cable (even without the probe) is not plugged in
3. Verify that the firmware on the card is the latest release. If not update the CarveWright software first on your computer and then update the memory card firmware through the CarveWright software.
4. Check to see that the machine is looking for the scanning probe plug at the correct location. A series machines can be plugged into the Z-truck whereas B and C series machines will always be plugged into the connector on the head cover. This procedure can be found in greater detail in the Scanning Probe Operator’s manual found on the CarveWright website on the support page.
  - a. Insert the card and turn on the machine. “Scan Area: should appear on the LCD screen.
  - b. Press the “0” (Options) key on the keypad.
  - c. Using the up/down arrows, scroll down to the number 5, “User Options” menu item and press ENTER. You can also simply press the “5” key when the first option appears.
  - d. Scroll down to Scan Probe. Make sure it is on “Cover” instead of “Z-truck”. Press ENTER to toggle between the options.
  - e. Press STOP until you get back to main menu. It should now say Project Menu
5. If none of the above steps solves the issue consult CarveWright.

## **X Gears Broken or Striped**

### **Description of Issue**

Broken or stripped X drive gears will be evident when the board stops moving through the machine when it is commanded. Usually, this stoppage will be accompanied by a grating noise from the X- gear enclosure on the right side of the machine. Once the gears are broken or stripped they will have to be replaced. But before replacing them and running the machine, it is imperative that the root cause be determined so that it does not happen again immediately.

### **Possible Causes**

Broken X-drive gears can result from excessive head pressure, rolled up sandpaper belts, a wedged board, a board that has a significant thickness taper to it, a gear set that has too much slop in it, a slow running cut motor, or a gear set that is out of alignment.

### **Troubleshooting Steps**

1. Check to see that the sandpaper belts are not rolled up. This will have the same effect as the varying thickness board. This is almost always the case so double check it.
2. Check to see that the board you were carving was not wedged in the machine (it will wedge if the width of the board varies significantly along its length). Do this by slightly cranking up the head and moving the board in and out of the machine along its length looking to see if it wedges between the squaring plate and the sliding plate.
3. Check to see that the board you were carving does not vary in thickness over its length. If it does it will wedge between the upper compression rollers and the belt drives and overload the X gears.
4. Check that the head pressure is between 75 to 85 lbs. If the head pressure is lower than 75 lbs or higher than 85 lbs, it could well make the x-gears to stripe or brake. Please see the “Checking the Head Pressure” document on the CarveWright website for continued troubleshooting of this issue.
5. Check the spacing of the metal gear on the X belt drives. When the machine is apart to replace the X gears make sure that the spacing on the metal drive gear attached to the belt tray roller is correctly spaced out from the end of the tray. You can see instructions for checking this in the document titled “Replacing the Sandpaper Drive Belts”. In place of the spacer mentioned in that document use a stacked penny and dime.
6. Verify that the cut motor is not getting bogged down or stopping during the project. If the bit is not cutting it will cause increased force on the gears.
7. If none of the above steps solves the issue consult CarveWright.

## **Z-Truck Overheating**

### **Description of Issue**

The temperature of the Z-truck should stay below 60 degrees Celsius (140 degrees Fahrenheit) at all times. As a rule of thumb, if you cannot hold your hand on the surface of the truck for more than 5 seconds it is too hot. There is a run-in period with a new machine where the temperature will be slightly higher than normal as it wears in its bearings, but even then it should never get above 60C. Certain operations, like cutting or routing with large bits, will also increase the temperature of the Z-Truck over that seen under normal operating conditions.

### **Possible Causes**

If the Z-truck is running hot, it is most likely an issue with the spindle (bearings, tolerance rings, or quick change). A bad or improperly installed flexshaft or a dull or loose bit can also cause the Z-truck to heat up. Adding any sort of lubrication to the flexshaft other than the prescribed Chain Lube with Moly will get into and destroy the bearings.

### **Troubleshooting Steps**

1. Check to make sure the cutting bit is not dull. This is especially important when using the larger decorative bits.
2. Check to see if the flexshaft has been lubricated lately and if so verify that it was Chain Lube with Moly applied in the proper way.
3. Verify that the flexshaft is properly seated into the spindle. Please see instructions in the CarveWright Owner's Manual.
4. Check for any play in the spindle by moving it side to side. You should not be able to feel any slop or play in the spindle.
5. Check to make sure that the bit is not loose in the spindle or holder.
6. If none of the above steps solves the issue consult CarveWright.



## Consolidated Error Codes

Machine errors are now in the form: Exx-yyyy. The number "xx" is one of the numbers listed below. The number "yyyy" is the line number in the code. (Note: This only applies to machines running the firmware 1.175 or later). When an error is encountered make sure that you record the error number exactly as it will greatly assist in troubleshooting. All of the following errors are non-recoverable meaning that the project will need to be restarted after the issue is fixed.

### **E02 - Exception stack fault**

Cycle the machine power and retry the project. If the error persists, record the seven digit error code and contact CarveWright customer support.

### **E03 - Board edge detection failure**

This error is shown when STOP is pressed after the "Clear Board Sensor" message is displayed. See the "Clear Board Sensor" troubleshooting section for more details. The "Clear Board Sensor" error occurs during the length (or X) edge find. After the roller releases the board sensor was not able to find the edge within approximately 4". Can also occur when the board sensor did not detect a large enough transition to define an edge (usually happens when the material is very dark or there is dust on the sliding plate).

### **E04 - X axis stall**

#### **Description of Issue**

An "X-Axis Stall" will happen when the machine is not able to move the board in and out of the machine when commanded.

#### **Possible Causes**

An "X-Axis Stall" can result from excessive head pressure, rolled up sandpaper belts, a wedged board, a board that has a significant thickness taper to it, a gear set that has too much slop in it, a slow running cut motor, or a gear set that is out of alignment.

#### **Troubleshooting Steps**

1. Check to see that the sandpaper belts are not rolled up. This will have the same effect as the varying thickness board. This is almost always the case so double check it.
2. Check to see that the board you were carving was not wedged in the machine (it will wedge if the width of the board varies significantly along its length). Do this by slightly cranking up the head and moving the board in and out of the machine along its length looking to see if it wedges between the squaring plate and the sliding plate.
3. Check to see that the board you were carving does not vary in thickness over its length. If it does it will wedge between the upper compression rollers and the belt drives and overload the X gears.
4. Check that the head pressure is between 75 to 85 lbs. If the head pressure is lower than 75 lbs or higher than 85 lbs, it could well make the x-gears to stripe or brake. Please see the "Checking the Head Pressure" document on the CarveWright website for continued troubleshooting of this issue.
5. Check the spacing of the metal gear on the X belt drives. When the machine is apart to replace the X gears make sure that the spacing on the metal drive gear attached to the belt

tray roller is correctly spaced out from the end of the tray. You can see instructions for checking this in the document titled “Replacing the Sandpaper Drive Belts”. In place of the spacer mentioned in that document use a stacked penny and dime.

6. Verify that the cut motor is not getting bogged down or stopping during the project. If the bit is not cutting it will cause increased force on the gears.
7. If none of the above steps solves the issue consult CarveWright.

#### **E05 - Y axis stall (Normal)**

##### **Possible Causes**

A Y-axis stall is caused when the difference between the commanded distance becomes much more than the actual distance over the allotted time interval. An easy example of this would be putting your hand on the cutting truck and preventing it from moving during an operation. The computer is commanding it (and expecting it to move a certain distance in a given time interval) but your hand is preventing it from moving; or stalling the movement. A stall does not have to be a physical obstacle to movement. For instance if a power lead to the motor was broken then the motor would not move when commanded and the computer would record a stall.

##### **Possible Causes**

Causes include: obstacles blocking the movement of the cutting head, outdated firmware, faulty electrical circuit in the shop, and electrical short in the machine, a loose connector, a faulty power supply, or a cut motor that is not spinning.

##### **Troubleshooting Steps**

Consult the troubleshooting document titled “Y-Axis Stall” for detailed diagnosis instructions.

#### **E06 - Z axis stall (Normal)**

##### **Description of Issue**

A Z-axis stall is caused when the difference between the commanded distance becomes much more than the actual distance over the allotted time interval. An easy example of this would be putting your hand on the cutting truck and preventing it from moving during an operation. The computer is commanding it (and expecting it to move a certain distance in a given time interval) but your hand is preventing it from moving; or stalling the movement. A stall does not have to be a physical obstacle to movement. For instance if a power lead to the motor was broken then the motor would not move when commanded and the computer would record a stall.

##### **Possible Causes**

Causes include: obstacles blocking the movement of the cutting head, outdated firmware, faulty electrical circuit in the shop, and electrical short in the machine, a loose connector, a faulty power supply, or a cut motor that is not spinning.

##### **Troubleshooting Steps**

Consult the troubleshooting document titled “Z-Axis Stall” for detailed diagnosis instructions.

#### **E09 - Homing fault (Low)**

Cycle the machine power and retry the project. If the error persists, record the seven digit error code and contact CarveWright.

**E10 - No Bit Detected (Low)**

This error message occurs when STOP is pressed when asked to reload the bit. Restart the project.

**E14 - Cutter arm fault (Low)**

If cut motor is activated while a probe is inserted, or when it is activated when cut motor is not enabled. Remove probe when doing a project.

**E16 - Bit Selection Error (Low)**

Bit selection part of the project data is corrupted. Format the memory card and reload the project.

**E17 - Board find range (Low)**

This error message occurs when STOP is pressed when user is told to set the sliding plate properly. Restart the project.

**E32 - Tracking Sensor Fault (Low)**

This error occurs only during the initial homing and measurement routine before the carving. It occurs when the measured backlash on the X-drive is too large or movement was not detected. It most likely occurs when there is an issue with the board that causes tracking problems. Go to the "Possible Board Problem" message section above to troubleshoot.

**E33 - Front Roller Fault (Normal)**

While searching for the front edge of the board, the machine is waiting for the front roller to release and then activate the board sensor to find the edge. The "Front Roller Fault" occurs when the back roller releases before the front roller indicating that the front roller is actually stuck. Go to the "Stuck Compression Roller" message section above to troubleshoot.

**E34 - Back Roller Fault (Normal)**

While searching for the back edge of the board, the machine is waiting for the back roller to release and then activate the board sensor to find the edge. The "Back Roller Fault" occurs when the front roller releases before the back roller indicating that the back roller is actually stuck. Go to the "Stuck Compression Roller" message section above to troubleshoot.

**E37 - Cut Motor Motor Sensor Fault (Low)**

This error message occurs when STOP is pressed when prompting to check the cut motor. Restart the project.

**E44 - User calibration failure (Low)**

During the user "Sensor" calibration, the board cut/edge test failed to perform within its tolerances. The machine is told to cut a small (0.050" or so) slice from the notches it puts in the board with the 3/8" bit. The board sensor re-reads the slice and checks if the machine cut the proper amount. If the test cannot get within 0.005" & 0.003" in 3 cuts, you get this error.

**E45 - Settings value out of range (Never)**

This error is replaced by the "Calibration Range Error" message during user calibration if a number that is too big is input. Make sure to follow the direction for user calibration precisely.

**E46 - Attempting to call pure virtual method (Never)**

Cycle the machine power and retry the project. If the error persists, record the seven digit error code and contact CarveWright.

**E47 - Probe Detected (Never)**

Cycle the machine power and retry the project. If the error persists, record the seven digit error code and contact CarveWright.

**E48 - Waiting on motion while servoing disabled (Low)**

Motion was requested in software when the X/Y/Z servos were disabled. The machine will report "motion flush w/o servo", then throw error E48 to the screen when the user presses a key. Cycle the machine power and retry the project. If the error persists, record the seven digit error code and contact CarveWright.

**E49 - Tracking roller failed (Low)**

This error occurs only during the initial homing and measurement routine before the carving. It occurs when STOP is pressed during "Check Tracking Roller" error message. This error is shown because of out of limit numbers when measuring the length of the board.

# **CHAPTER 10 – QUICK TOOL REFERENCE GUIDE**



# PROJECT DESIGNER - TOOL QUICK REFERENCE GUIDE

## File Menu



### **New Piece/Project**

Select this button to launch the New Dialog to create a new piece or project.



### **Open Piece/Project**

Select this button to launch an operating system File Open Dialog to recall a piece or project previously saved to disk.



### **Open with Preview (Designer PRO)**

Option to open a preview of patterns or projects. This function must create a database first. It can be turned off.



### **Save**

Select this button to launch an operating system Save Dialog to save a work currently in progress.

### **Save As**

Allows you to place it in a new location on your computer and/or change its name.

### **Flash Manager**

Accesses your memory card where you can manage card space and firmware, reformat the card, download scan, access and manage quality settings and estimated time.



### **Upload**

Select this button to upload a project to the flash card.

### **Download Scan (Pattern Editor)**

Accesses scans from memory card.

### **Download Scan from file (Pattern Editor)**

Accesses scan files from location on your computer.

# PROJECT DESIGNER - TOOL QUICK REFERENCE GUIDE



## **Import**

Used to bring in artwork and images created in various other programs and additional software maybe required depending on the format the piece was created in.



## **CW Racing Dragster (CO2 Dragster Software)**

This add-on feature allows use of the CW CO2 Dragster Jig.



## **Import Tracing Image (2D Vector Drawing)**

Import Tracing Image allows for an image file (jpg, png, gif, bmp) to be imported and placed on the design board to be used as a pattern for tracing with the drawing tools. The image can be cropped and scaled during the import process to suit your needs and can be toggled on and off to better view your drawing.



## **Import Image**

Select this button to import an image into your pattern library.



## **Import DXF File (DXF Importer)**

This advanced feature allows the import of 2D vector drawing saved in the DXF format.



## **Import STL File (STL Importer)**

This advanced feature allows the import of 3D models saved in the STL format.

## **Launch Pattern Editor (Pattern Editor)**

This add-on feature allows scanned and imported patterns to be edited on a pixel by pixel basis.

## **Launch Pattern Sculptor (Pattern Sculptor and Designer PRO)**

This advanced feature allows patterns to be edited with powerful sculpting tools.



## **Print**

Select this button to print a paper copy of the workpiece.

## **Exit**

Closes out the program. (WINDOWS)

# PROJECT DESIGNER - TOOL QUICK REFERENCE GUIDE

## Edit Menu



**Undo**

Select this button to undo the last edit operation.



**Redo**

Select this button to redo the last undone edit operation.



**Cut**

Select this button to cut the currently selected carvings or figures and place them onto the clipboard.



**Copy**

Select this button to copy the currently selected carvings or figures onto the clipboard.



**Paste**

Select this button to paste any carvings or figures currently on the clipboard onto the board.



**Select all**

Select this button to select all items on the board.



**Delete**

Select this button to delete highlighted items from the workpiece.

**Preferences**

Manages general behavior of software, measurement preference, cache and 3D graphics.



**Board Settings**

Allows management of board size, pattern bit, and virtual representation of wood type, stain and finish.

# PROJECT DESIGNER - TOOL QUICK REFERENCE GUIDE

## Drawing Menu



**Pointer Tool**

Select this tool, then left-click on the board to select carvings for manipulation. You may hold down the SHIFT key to select or de-select additional carvings. You may also click and drag to draw a wire-box to select multiple carvings.



**Line Segment Tool**

Select this tool, then left-click on the board to begin a line segment. Left-click again to end it. You may also click and drag to create a segment.



**Connected Lines Tool**

Select this tool, then left-click on the board to begin a line segment. Each successive left click ends the previous segment and begins a new one. To end the segments, you may either double-click to place a final segment, click on the last vertex placed, press the ESC key, or click on the first vertex to create a closed loop.



**Spline Tool**

Select this tool, then left-click on the board to begin a curved segment. Each successive left click ends the previous segment and begins a new one. You need to create two or more connected segments to see the curve effect. To end the segments, you may either double-click to place a final segment, click on the last vertex placed, press the ESC key, or click on the first vertex to create a closed loop.



**Smart Spline Tool (2D Vector Drawing)**

Allows the ability for free form draw with multiple points either as tangents or line segments.



**Square Tool**

Select this tool, then left-click on the board to start a square, and then left-click again to end it. You may also click and drag to create a square. Squares will maintain their square aspect when manipulated.



**Rectangle Tool**

Select this tool, then left-click on the board to start a rectangle, and then left-click again to end it. You may also click and drag to create a rectangle.



**Circle Tool**

Select this tool, then left-click on the board to place the center of the circle, then left-click again to end it. You may also click and drag to create a circle. Circles will maintain their circular aspect when manipulated.

# PROJECT DESIGNER - TOOL QUICK REFERENCE GUIDE



**Oval Tool**

Select this tool, then left-click on the board to place the center of the oval, then left-click again to end it. You may also click and drag to create an oval.



**Arc Tool**

Select this tool, then left-click on the board to place one end of the arc, then left-click to place the other end. You may also click and drag to create an arc. Either way you need to click and drag the Green Control Point to change the radius of the arch.



**Text Tool**

Select this tool, then left-click to place text. See Placing Text for more information.



**Rout Tool**

The rout tool allows for adjusting the pivot point of a depth profile.



**Trim Tool (2D Vector Drawing)**

Select this tool to trim intersecting line segments. To use this tool, select at least two intersecting line segments. Then select this tool and left-click the portion of the line segment or segments you wish to keep.

## Carving Menu



**Pattern Tool**

Selecting this tool will display the pattern selection window. Select a pattern from the list, view it in the thumbnail view window beneath the pattern list, and then left-click on the board to place the pattern. See the Placing Patterns section for more information.



**Feather**

This sets the degree of feathering applied to the highlighted pattern on the workpiece. This angle is projected from the base of the pattern's outer edge. Used for creating a transition from the top surface of the board to the base of the carving.



**Feather None**

Removes any feather settings.



**Feather 1/8**

This sets the degree of feathering to 1/8"