

CNC with the Shopbot

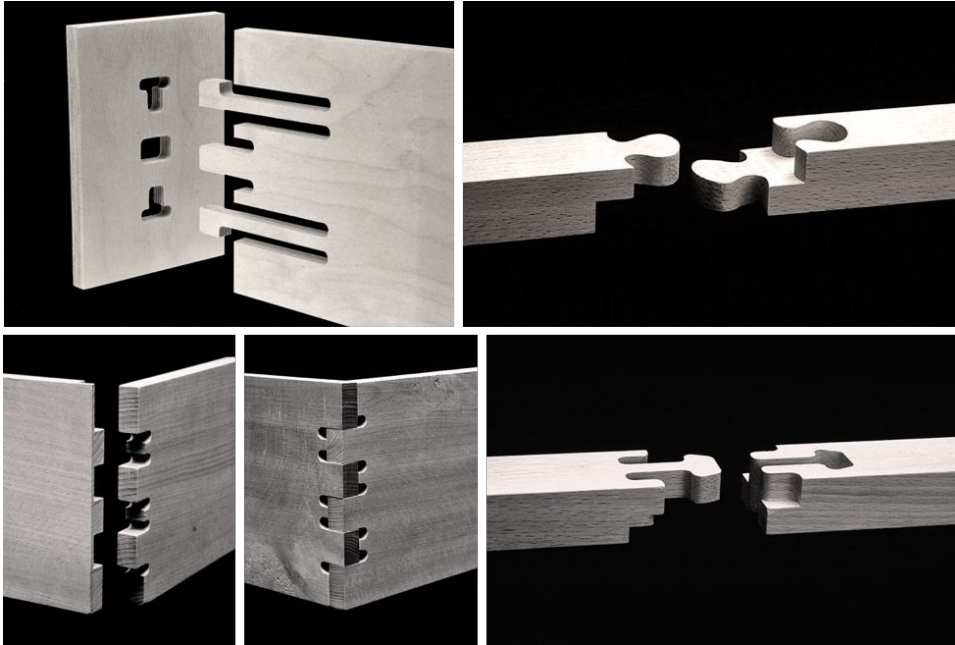
Introduction to Shopbot and V-Carve software

Prerequisite

Follow presentation “How CNC Machines Work”
<http://fablab.saul.ie/assets/downloads/cnc&gcode.pdf>

1. Principles & Hardware

WHAT CAN A CNC ROUTER DO ?



CNC routers use material like engineered boards (MDF and Plywood), solid timber, plastics, composite materials and *soft* metals.

The *Shopbot PRS Alpha 48"x96"*, is a 3-axis machine, that can take sheet material up to 2.44m x 1.22m.

The Shopbot is able to machine thicker material than the laser cutter, and control precisely its Z axis - it is possible to add additional axis with further machine attachments.

VIDEO - SHOPBOT ROUTER BASICS



This is a short video explaining the basics of CNC cutting with Shopbot router

<https://youtu.be/vu-zv3Laano>

From [Chad Stanton](#) Youtube Channel.

Video - Drill bits, get to know them !



Beside the parameters you set on the software, the drilling tools is essential. You have to know what job can be done with which drill to succeed.

Here is a video on the different drills

<https://youtu.be/GA73liT9QBE>

From [Mark Lindsay](#) Youtube Channel.

Video - How to choose your timber...



It is equally important to know what to cut (timber) as much as with what should you cut it (drills).

This short video unravel a bit of timber science.

<https://youtu.be/CZe-r5SP8KQ>

From [Doing it with Jason](#) Youtube Channel.

2. Design

MAIN FUNCTIONS



To design something for the CNC router, one have to think its project starting from it's wood planck

Then carving from top to bottom a series of line and pockets

You have full control over the depth of the line or the pocket

Drills choice is crucial, different drills will give different results

CNC routers mainly understand vectors

VIDEO - UNDERSTANDING VECTOR & RASTER



Vector VS Raster : Two key concept you need to understand for digital fabrication.

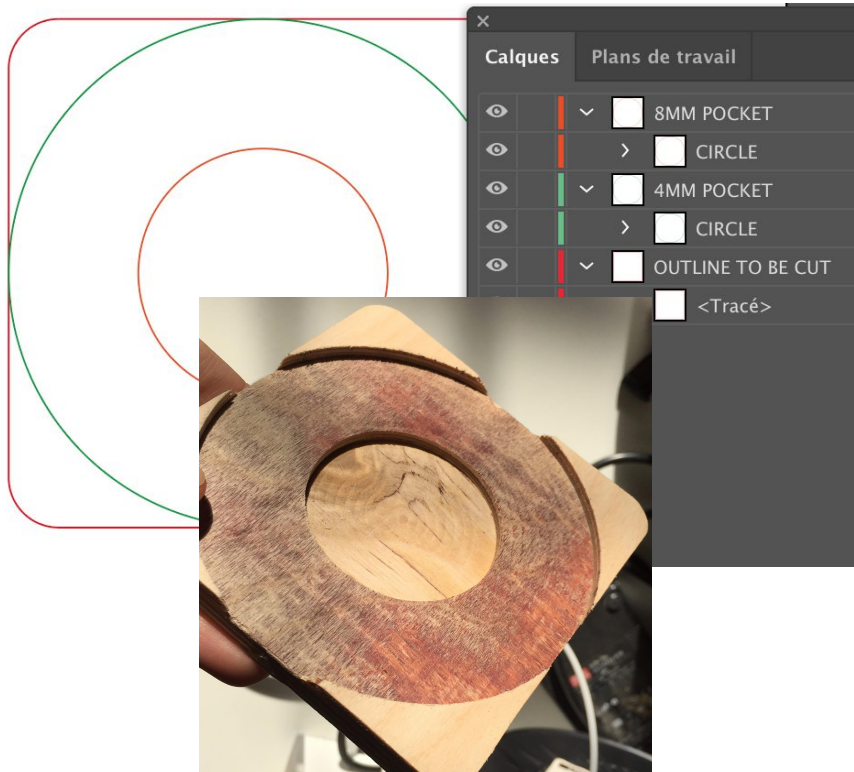
TRACING a Shape

PRINTING a Picture

https://youtu.be/p2thSkOa_Xg

From [Buddy Media](#) Youtube Channel.

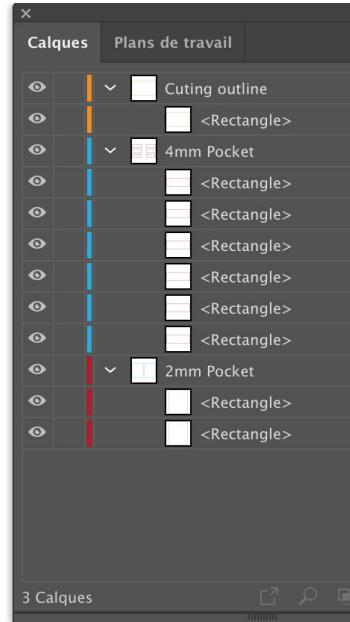
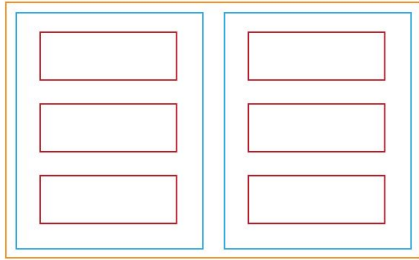
EXAMPLE - COASTER CASE



In this example, a 12mm plywood had been used :

1. The red line was cut
2. The green line was a 4 mm depth pocket
3. The Orange line was a 8mm depth pocket

ORGANISING YOUR FILE



- The machine do not use a color code, thought, a same parameter can be applied to a group of shapes
- The software used is named Vcarve
- Vcarve takes layers into consideration
- In the example, it would be possible to attribute the same parameters (type of drills, speed, depth, pocket or line, etc...) to a whole layer.
- THE COLOUR CODE IS NOT TAKEN INTO CONSIDERATION

DRILLS MATTERS

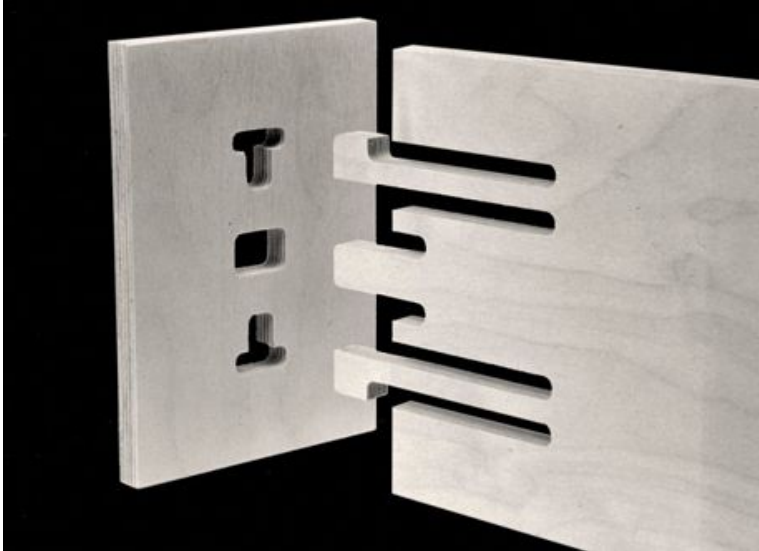


The router bit chosen for a given shape, a given toolpath, a given depth, a given speed, etc, very different results

You may have to change drills several time during a single job

TAKE THEM INTO CONSIDERATION
AT THE VERY BEGINNING

INSPIRING EXAMPLES - JOINTS



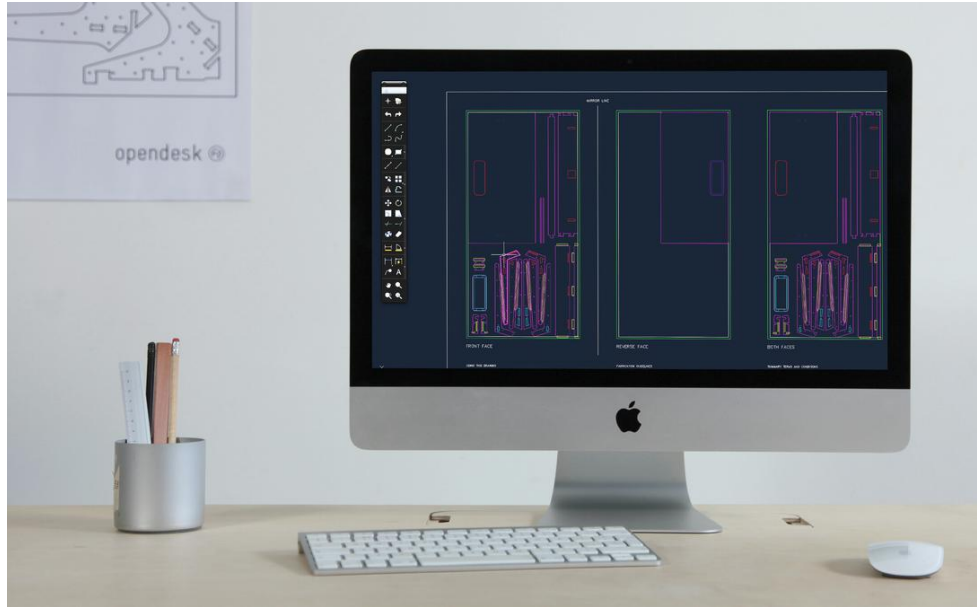
'50 Digital Wood Joints' (left) by Jochen Gros. Demonstration and testing by [UFSOA](https://furniturefab2013.files.wordpress.com/2013/09/joints.pdf) students:

<https://furniturefab2013.files.wordpress.com/2013/09/joints.pdf>

Or, this MakeZine article, 'CNC Panel Joinery Notebook' by Sean Michael Ragan:

<https://makezine.com/2012/04/13/cnc-panel-joinery-notebook/>

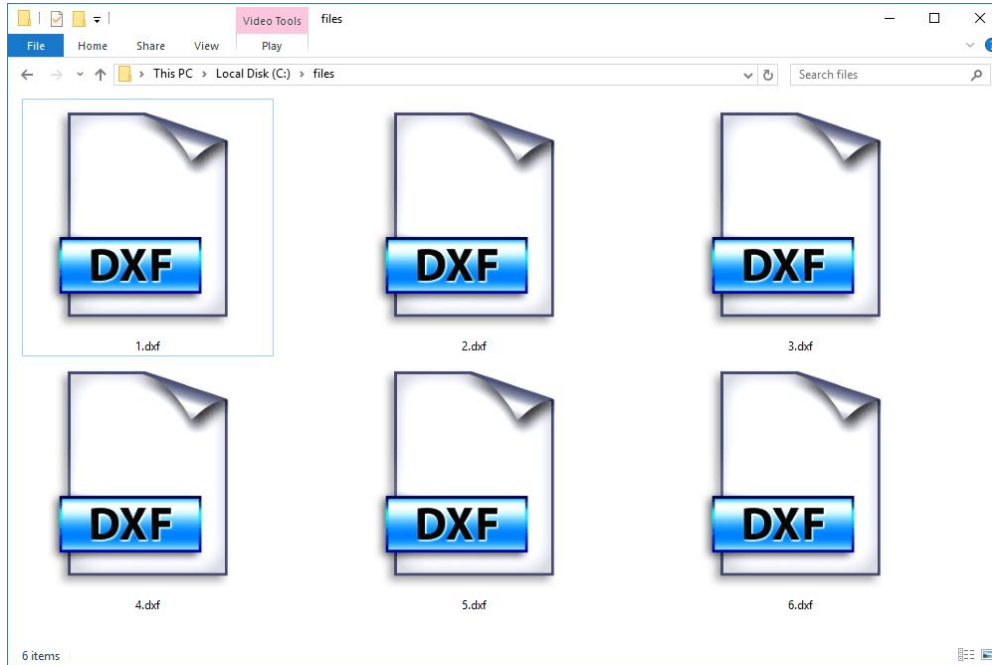
INSPIRING EXAMPLES - FURNITURES



Example of Open Source furnitures
can be found at the following
address :

<https://www.opendesk.cc/designs>

FILE FORMAT



Export your production as DXF for best compatibility with VCarve.

VCarve can read other vector format but won't necessarily take layer into considerations

3. Exercise:
Design & Prepare your File

EXERCICE

This practical exercise will allow you to :

- Experience the difference between raster and vector
 - Help you set your file for CNC shopbot router
 - Help you create a part of the project you will realize on the training day
-
- 1) Download and install Inkscape, or use the vector editing software you are already using.
 - 2) Download the following files and start working, the tutorial lay within the file :
xxxxxxx.

4. Carving

FROM DESIGN TO THE SHOPBOT



How to jump from your design, to Vcarve, to carving with a shopbot !

https://youtu.be/r_kH74HT-bc

From [Beauty and the Bolt](#) Youtube Channel.

5. Resources

ONLINE RESOURCES, BLUEPRINTS, DESIGN, ETC

UntoThisLast.co.uk

Opendesk.cc

sketchchair.cc

AtFab

obrary.com

<http://www.akerkits.com>

<https://www.instructables.com/class/CNC-Class>

See you at Fab Lab Limerick for the
hands-on tutorial!

If you have any other questions try <http://fablab.saul.ie/how> - for various tutorials and other information