

Hi CNC Enthusiast,

Thank you for signing up for this course and welcome to the exciting world of CNC.

Before we start this course, I want to ensure you of one thing... YES! YOU CAN USE A CNC!

You do not need to be a machinist, a college grad, have tons of computer experience or be an expert in CAD. I promise! What you DO need, is to have some creative ideas, a slight amount of patience and a willingness to learn something fun and explore your creativity.

First things first - What is a CNC?

The term CNC, is short for "Computer Numerical Control". So what does that really mean? Basically, it means that it's a machine that requires a computer to run it. In many ways, you probably use a version of a CNC machine every day, like, for instance, your computer's printer or scanner.

A CNC machine, such as the STEPCRAFT, is actually a pretty simple device. The basic machine only has 3 directional motions (X - or right to left, Y - or front to back, and Z - up and down). The photo below shows how these axes are represented on the STEPCRAFT machine.



With all of this computer talk, you are probably wondering if you need to be a programmer to use the machine. The answer is NO! Our software allows you to draw or layout your idea and by pressing one button, it takes the visual design and turns it into the control code, known as

G-Code, to run the machine. Now, of course, if you are interested in learning G-Code, you are certainly free to do that and there are hundreds of books and resources on the internet to teach you. But, again, you have my word that no programming knowledge is necessary.

Terminology that you need to know

The most common terms of any CNC are:

Hardware

Y-Axis or Gantry

This is the part of the machine that usually moves in the direction between the front and back of the machine. The gantry is the large moving section of the machine, that moves along the Y-axis, is also commonly referred to as the Y-axis of the machine. It is the largest movable part of the CNC. The Gantry contains the X-axis, Z-axis and also holds the CNC's tool, which is often a router or a heavier duty version called a spindle.

X-Axis

The X-axis is the movement of the machine that goes side to side or left and right. It is part of the gantry and also has the Z-axis attached to it.

Z-Axis

The Z-axis moves up and down. It is attached to the X-axis of the machine and will have a tool, such as a spindle, drag knife, 3D printer, laser, or one of many others attached to it.

Spindle

In the CNC world, the motor that you mount your cutting bits in to cut and carve a project is called a spindle. On a STEPCRAFT CNC System, the spindle can be a basic rotary tool such as a Dremel or Proxxon. It can also be a Dewalt DW611 or a Bosch Colt router, which are two very popular spindle choices in the hobby CNC world. On the higher end, you can use a STEPCRAFT MM-1000 1000-watt spindle or the STEPCRAFT HF-500 500-watt computer-controlled spindle. If you are wondering which spindle you should choose, stay tuned for the email in Day 5, where I will explain this in detail.



STPCRAFT MM-1000 Milling Spindle (pictured above)

Machine Bed

This is the part of the CNC machine where you mount your workpiece. The machine bed can be the standard white table which comes with each STEPCRAFT, or you can install a solid aluminum T-slot table, which will give you many more flexible material holding options.

Spoil Board

A spoil board is a sacrificial piece of material that is commonly placed under your workpiece to allow the cutting bit to pass through your material and prevent it from damaging the machine bed.

End Mills

The cutting bits that you use on a CNC machine to cut material are called end mills. They can also be referred to as router bits, cutting bits, or simply just bits. It is important to mention that end mills are NOT the same as drill bits. A drill bit is meant to do its cutting on the tip in an up and down fashion whereas an end mill is designed to cut laterally with its side. More on end mill types in day three's email.



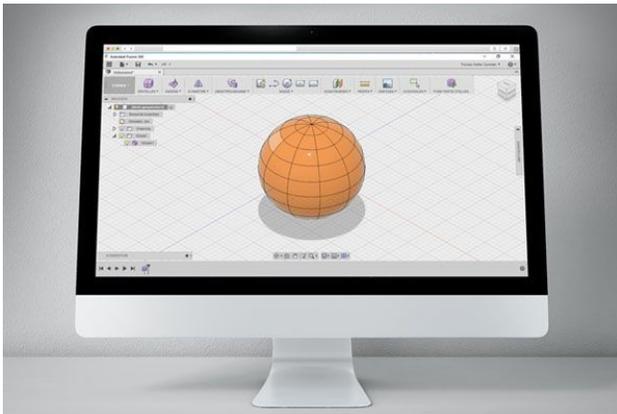
Software

G-code

While this may sound like a scary, cryptic computing language, it is actually defined pretty simply as a language that tells the CNC machine how to move in each direction, when to stop and start and other interactive movements or functions that are necessary for the CNC machine to function. The best part about G-code with a STEPCRAFT is that you DO NOT need to know anything about it to successfully use the machine.

CAD (Computer Aided Design)

Most people will think about programs like Solidworks, AutoCad or Sketchup when they think of CAD programs, however in the Hobby CNC world, the term CAD really means any program that you use to design your project. It could be 3D like Fusion 360 or 2D like Adobe Illustrator, Inkscape, or any other free or commercial vector design software. The simplest way to describe CAD, is that it is the program that you draw your design in.



A 3D sphere modeled in Fusion 360

CAM (Computer Aided Manufacturing)

The CAM program is used to turn your design into a format that the CNC machine can understand, which outputs all files as G-code. The CAM program can be separate from the CAD software or part of it like with Fusion 360 or any of the Vectric CAD programs commonly sold by STEPCRAFT. These programs are very powerful but are also very easy for a beginner to learn how to use. So no matter what you would like to create, Vectric has a solution that can make it possible.

Machine Control Software

The software that STEPCRAFT uses to process the G-code files and run the CNC machine is called UCCNC. This software is commonly known as "Machine Control Software". You will use this program to setup the starting points for your job and to load and run on the CNC machine.

Look out for tomorrow's email!

Thank you for reading this first email of the Beginner Course on CNC. I hope that you found it interesting and understand that this is a building block toward your goal of limitless creation. Now that the basics are out of the way, we can concentrate on more detailed aspects of CNC. Tomorrow's email will outline the 5 Simple Steps to turning your idea into a CNC project.

In the meantime, if you have any questions, please feel free to email me at info@stepcraft.us or simply hit reply to this email.

Sincerely,

A handwritten signature in black ink, appearing to be 'ER' with a long horizontal stroke extending to the right.

Erick Royer

Director

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