

EZCNC

Automated

Accuracy



Alan Goodsell *tests*
the technology of the
EZCNC

PHOTOGRAPHS BY TOM ROUNDS

Routers are probably one of the most advanced power tools available, because they are so versatile, and with a selection of jigs and templates it is possible to carry out many functions with one. Numerous routers have a separate motor unit, which is a valuable resource as it can be used in different bases for handheld use or in a table for a more stable platform. The function for the motor we see used here is the most advanced application in woodworking, and involves fitting it into some extremely sophisticated hardware.

The CNC routing system I am trying out gives the router motor body, and subsequently it's cutting bit, an extremely accurate three-dimensional guidance system that is controlled by a computer. This CNC (computer numerical control) machine is manufactured by EZCNC out of Texas, and comes in a variety of sizes. I chose to look at their benchtop model as it compact enough for most shops, even though the larger sizes will prove to be more popular.



Selecting The Machine

Ordering a machine from EZCNC is a pleasant experience as you will get to speak with the company owner, John Lepkowski, and he will guide you to make the correct purchase for your requirements. There are a variety of different sizes of machine available ranging from the 20" x 30" bed version we are looking at here up to the 60" x 120" version, you can even order a custom size. John has a tremendous knowledge of

CNC and will readily answer any of your questions, no matter how obscure. When you have decided which machine to purchase, it will be delivered to you fully assembled, with just a few tweaks required to get it running. You get what is called a turnkey system, which means that it is ready to go with no, or little, setup, just turn the key to start, although in reality there is no key. You will however, need to be familiar with computers, or be prepared to commit to a



left The machine is solidly built from high quality materials

relatively painless crash course, but I suspect anyone in the market for a CNC machine will have computer skills already.

Construction

The chassis of the machine is nicely made from heavy-duty $\frac{1}{2}$ " thick aluminum that is epoxy coated for toughness. Sturdy aluminum extrusions fit in between the chassis, and the machine incorporates standard high quality components that are readily available either from EZCNC or other outlets. Obviously the easiest place is from EZ but John likes to point out that your CNC purchase is not dependant on him for spares, just in case. The machines are a complete package and come with not only the machine fully assembled, but also includes the Porter Cable 691 router motor, desktop computer and the software required to drive the machine. The linear slides are hardened and will provide years of service, and the lead screws on this benchtop machine are nicely made but are soon to be replaced with the rack and pinion system that is found on the larger EZ machines. Stepper motors that drive all three axes are industrial quality that power the slides run smoothly and quietly and a neat cable management system keeps all the wires tidy. A sacrificial board needs to be attached to the bed to protect the machine's parts as well as the tips of the router bit, and I would thoroughly recommend the optional dust hood to eliminate dust from the air, as I had to use it without one so we could do the photography,

then spent quite some time clearing up, actually John was kind enough to do that. He will also provide unlimited tech support as well as onsite training for very reasonable prices.

Getting Cutting

The first thing you have to do is to generate a drawing of the project or parts that you want to create. This can be done in a variety of programs such as CorelDraw, AutoCad, IntelliCad, or any other software that will output a file in .DXF format. The software on the machine's PC will also create drawings, but as it is not designed for this purpose there are only basic drawing functions included. To try out the machine from EZ, I decided to resurrect a project that I had created some years ago, that is ideal for a CNC project. It is a wine rack that is cut from sheet material, in my case

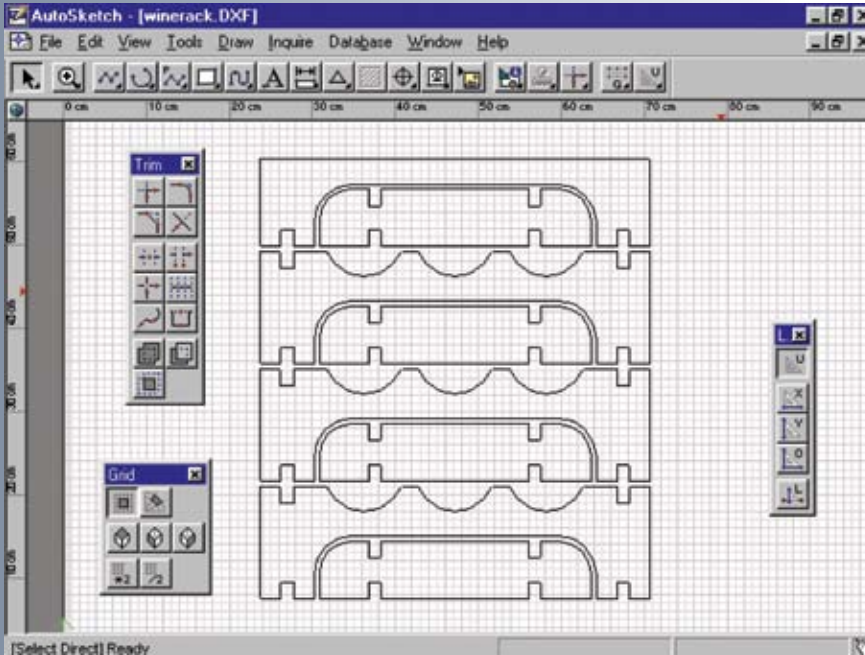


above The cutting head is mounted on a sturdy assembly

MDF, and the parts are designed to be cut economically from a sheet as they more or less fit within each other. The wine rack parts slot together to make the rack, and the more components you make the bigger the wine rack. I tracked down my original drawing files, and using either those or new ones, which when completed need to be imported into the software on the CNC machine, so it can compile the code it needs to drive the router. When the design is imported it will show onscreen and it need to be positioned within the blue line that defines the cutting area. To make an accurate cut, the lines that make up the drawing will then need to be

right John shows how to set up the machine





above Create an original drawing and save it in .DXF format

below Once the drawing is imported it is shown on the machine's PC screen



below Fire up and watch the bit cut, note the downcut bit keeps dust to a minimum

offset by half the diameter of the bit so it cuts to the original line. This is an easy process as the software has the offset function built in, simply tell it by how much and it will create the new line. Before work can begin, the bit needs to know where it is in the world, so the x, y and z parameters need to be set, again, this is easy to achieve with the software. Then the bit needs to know how deep to cut and this is another software function. It is also worth setting feed speeds but this will be best judged after making a trial cut, and will depend on the type of bit, type of material being cut and its thickness. The recommended type of bit for CNC is a solid-carbide, downcut spiral that will give a clean cut on the top edge of the workpiece and keep dust to a minimum. These types of bit have different geometry from manufacturer to manufacturer, so some experimentation will be needed with different company's bits to get one that suits your purposes.

In Use

Now the machine can be fired up and the cutting will start. The bit is guided by the software and first plunges to depth then moves in a logical way around the design, the progress can all be seen on screen too. It is pretty exciting to see the machine in action and reminded me of the first time I saw a pen plotter working, as it is a similar process. Once the machine has done all it's cutting, the components are removed, and then the machine is ready for more work. There is some experimentation required to get things running perfectly, and a few tweaks here and there will be required to get it cutting right. This is to be expected in this kind of machine, but once set up you will be able to repeat the process many, many times.

We did experience some difficulties at first

but this was due to the selection of router bits, feed speeds, and a slight problem with components of the projects moving in the last part of the cut. Usually the dust will hold them in place but my design incorporated small components, so



“The bit is guided by the software and first plunges to depth then moves in a logical way around the design”

this didn't happen. Either a vacuum bed or leaving tags in the design could eliminate the problem, but I found that I could just hold parts in place with my finger – not ideal for mass production though. Hopefully my wine rack will appeal to millions of people, and just a reminder that the wine rack design is copyright, in case any of you thought of mass-producing it. I don't mind the odd one or two for personal use though.

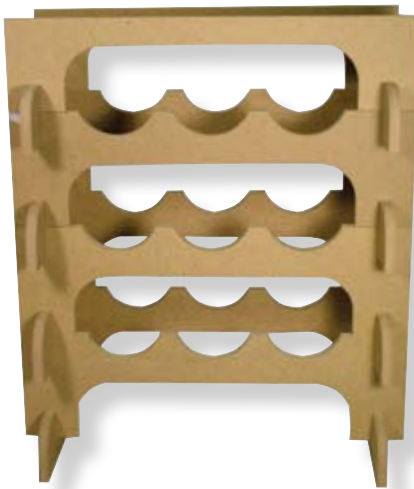
Conclusion

This is a very nicely put together machine, which is in a constant state of development;

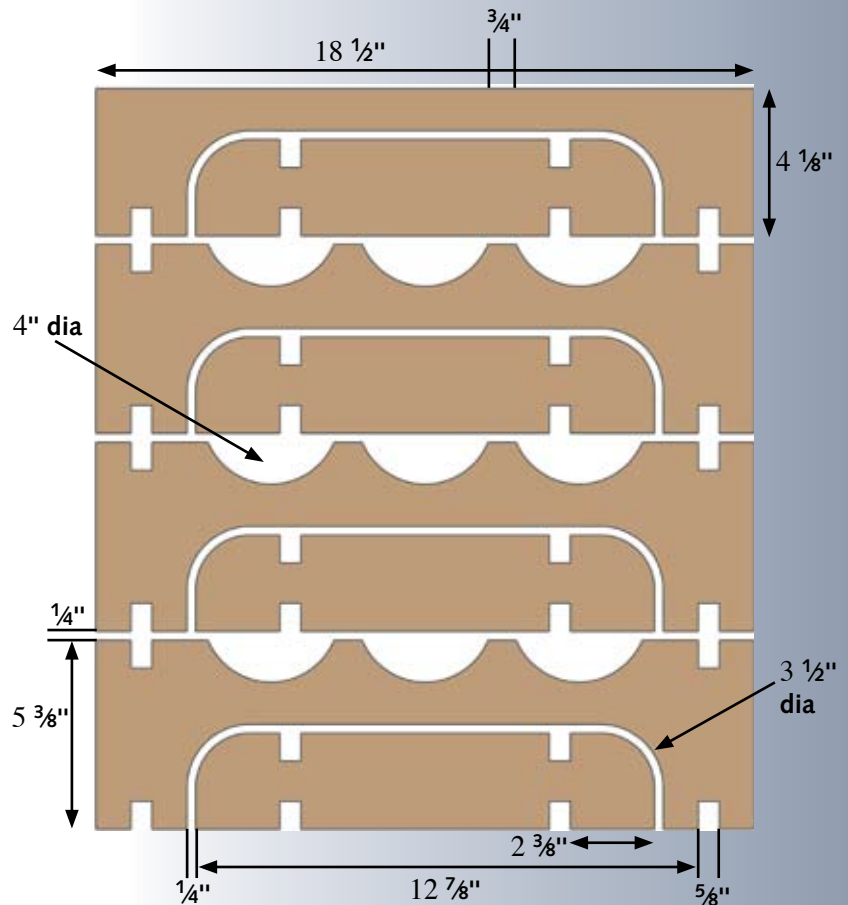
as soon as improvements are thought of they appear on the machine. At the \$6,000 starting price point CNC isn't going to appear in every shop anytime soon, but the price is going in the right direction. This machine will appeal to the commercial or enterprising woodworker with specific needs for accurate and repeatable cutting that will justify the cost but they will probably go for the larger bed versions. I thoroughly enjoyed using the machine, and new ideas popped into my head every minute as to what I could use it for; most involved making money!



above The machine keeps cutting until the job is complete



above The finished wine rack



above For those without a CNC router these dimensions will help to make the wine rack

SPECS

- 20" x 30" bed machine as tested: \$6,000
- 24" x 48" bed machine: \$9,000
- 48" x 48v bed machine: \$11,000
- 60" x 120" bed machine: \$18,500
- Upgrade to laptop: \$200
- Dust hood: \$50
- Welded steel frame base: \$200

- Unlimited support: \$free
- ON site training anywhere in continental USA: Flat \$400
- Contact EZCNC: Phone: 214-924-0314 or Website: www.ezcnc.com