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Plasma cutter at work on CNC table built by Wilson and Carlson.

Build Your Own CNC

By Jim Ruen, Contributing Editor

Building your own low-cost CNC (computer numerical control) machine is easier than ever, thanks to free software available today, according to Jim Wilson and Gregg Carlson, retired extension educators. They've built CNC plasma torch tables and a CNC-guided wood lathe.

"When I look at FARM SHOW subscribers, I expect 15 to 20% could build a CNC table and make a business out of it," says Carlson. "Anybody with a farm shop could fabricate a table. Whether salvage or new, a CNC table will cost you less than $200."

"The stepper motor, controllers and power supplies run less than $300 for the CNC itself," says Wilson. "Compared to a commercial CNC machine, that's chicken feed. The things you can do with it are incredible. The cost is almost nothing. CNC tables need to be available to any maker."

When Wilson and Carlson aren't using their own CNC machines, they teach vocational agriculture instructors how to build and operate their own, and they pass on their knowledge.

Carlson got the bug when he bought a small, commercially available CNC router more than 15 years ago. It impressed him enough that he decided to build his own table. Along the way, he discovered how inexpensive the components are, how to access free software online, and helpful paid software packages.

"I use both free and paid software, but you can build all kinds of things with free software," says Carlson. "The first thing is to assemble and build the hardware. The second concern is learning the software."

Carlson has assembled a series of PowerPoint "cookbooks" that outline the steps to follow. He and Wilson are seeking ways to make them available for download in digital format.

One example of the simple components needed for one of their tables is roller skate bearings.

"They're the heart and soul of the table," says Carlson. "We built a frame for them to run on."

The bearings allow the tool to move back and forth across the table and up and down along its length.

The hardware needed for the CNC consists of an Arduino microcontroller ($10 to $26), a stepper motor, and a converter and controllers. The controllers tell the stepper motor how far to turn (travel on the table), in millimeters or thousandths of an inch, for accuracy.

When a friend asked whether they could adapt CNC for his wood laser, they responded, "Why not?" It's since been used to produce spiral legs for Wilson's new dining room table and wood gears for an all-wood clock.

"Using a freeware program, I wrote a program to cut the wooden sprockets," says Wilson.

"That's the kind of stuff you can do with this," says Carlson. "It's so powerful. With free software like Library CAD, you can take an idea and put it into code."

Wilson and Carlson haven't stopped at CNC for routers, plasma cutters or lathes.

"We each just bought CNC-ready laser engravers for only $130," says Wilson. "The resolution is phenomenal. A lot of this stuff can be done very inexpensively."

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CNC-controlled lathe.

Search For Vintage Tractors Led To A Blue Ox

Like a hunting dog on the hot trail of a game bird, Jesse Henderson has been scouring the countryside for big farm-built 4-WD tractors for more than 25 years. A 2015 search led him to the farm in Red Lake Falls, Minn., of Vern Schindler, who, along with his brother-in-law John Schafer, had built 4-WD tractors modeled after the Steiger 105 in 1960 and 1961.

"Schafer and Shindler wanted to buy Steiger 105s," Henderson says, "but Doug and Maurice had only built three and didn't have any to sell them. The brothers-in-law decided to build their own tractors because they were mechanically inclined and had warm shops during the cold winter months. The Steiger brothers, who were neighbors farming nearby, helped them by supplying the transfer cases, hydraulic components and forming sheet metal for the tractors."

In 2015, Henderson learned the backstory behind those builds during a visit to Vern Schindler, who was in poor health. Vern still clearly recalled how he and Schafer built the tractors.

"Vern said he and John each bought a decommissioned North Dakota snowplow truck, which supplied them with 3-71 Detroit engines, 5-speed Clark transmissions, radiators and engine gauges. They modified axles from WC Allis-Chalmers tractors and built their own wheels, with 3/4-in. thick center sections welded into 24-in. rims. Those accommodated 16.9 x 24 tires."

Modeling their tractors after the 105, Henderson says they built front frame sections from 1/4-in. steel plate and used 1/2-in. plate for the rear frames. They also made 100-gal. fuel tanks mounted in front of the rear wheels and 10-gal. hydraulic reservoirs.

Blue Ox 4-WD tractor was modeled after a Steiger 105 and is being restored to running condition.

Schafer's tractor was completed in 1960 and proved its worth in the fields that year. Schindler's rig was finished in 1961. Both 4-WDs worked for nearly 40 years without major mechanical problems. They were also easy to recognize in the field.

"Vern told me that he and Schafer wanted their tractors to be a distinct color," Henderson says. "They mixed equal parts of white, John Deere green, and Ford blue. That mixture created a bright turquoise final coat that definitely stood out."

Schindler named his tractor the Blue Ox in honor of Paul Bunyan's legendary companion, Babe.

Both tractors logged hundreds of field hours before being retired, but the legendary Blue Ox still lives on. Henderson acquired the rusted turquoise relic from Schindler's farm in 2024.

"Vern's son and daughter were both excited for me to get their dad's tractor so it could be restored in his honor," Henderson says.

"The Blue Ox was a sorry sight because it had sat outside for many years," Henderson says. "I got the engine to turn about a quarter of a revolution, then it locked up. I pulled the blower and found that one of the rotors was cracked. That couldn't be repaired, so I put on a different blower, and the engine was still bound up."

In the winter of 25-26, Henderson pulled the head, worked on the valves, and performed a minor engine overhaul.

"The engine started and runs well. I still have to repair a few other things, get the operator station fixed up, and locate different tires. I hope to have it completed this summer and might even try to mix up those three different paint colors and make it look like it did more than 65 years ago."

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