

SIGGRAPH 2011

Studio Proposal (1 page abstract)

Authors: Taylor Hokanson and Chris Reilly
Project: DIYLILCNC

Computer Numerical Control (CNC) technology, previously limited to large industrial applications, is slowly making its way into the hands of individual artists and designers. Much of this shift in accessibility can be credited to the profusion of inexpensive personal computing equipment and open source software solutions. Every step in digital file preparation necessary for computer-aided manufacturing (CAM), from design to tool-pathing to post-processing, can now be achieved with free and open-source Linux-based software. CNC hardware, however, presents the largest remaining barrier when it comes to CAM for the small-scale or amateur maker.

A wide variety of do-it-yourself (DIY) CNC hardware designs can be found online. These plans all vary in size, complexity, accuracy and cost. In the interest of accessibility, we decided to work from an existing design posted on instructables.com. We discovered that these free plans, while perfectly functional, tend to lack the continued refinement and technical support one might find in a funded research project. Free plans also require a fair amount of interpretation and technical ability on the part of the reader, as it is the finished design (and not its codification as an instruction set) that is the goal of the author. With this in mind, we created thorough print documentation and a companion website where the DIY CNC community could both benefit and participate in communal project development and expansion of the field in general.

The DIYLILCNC design can be built for approximately \$700 (compared with commercial CNC machines that can cost in excess of tens of thousands of dollars). DIYLILCNC is constructed from laser-cut panels of Masonite and measures about 24" x 30" x 30". Perfect for tabletop use, the device is easily demonstrated for an all-ages audience. Participants will see a modified version of the device, with an open body construction that clearly reveals the engineering of its motion components. We've also created a variety of attachments for the gantry, allowing for both 3D milling and 2D pen plotting (which has the advantage of being quick and also produces samples that are easy to give away).

When we presented DIYLILCNC at SIGGRAPH 2010, the project was in its infancy. Thanks to wide publication (including Make Magazine, Maker Faire, the Open Source Hardware Summit, etc.), international participation (US, Canada, South Africa) and planned institutional adoption (DePaul University, Chicago), we've decided to establish a L3C (or a "low profit", mission-based LLC) in support of continued research into DIY CAD/CAM education. After an extended period of research, we'll be ready to present the updated DIYLILCNC design (version 2.0) at SIGGRAPH 2011.

In addition to our presentation, we'll be putting out a call to all of the makers that have completed a DIYLILCNC of their own. We hope to include at least one or two additional builds/builders in our booth, further demonstrating the power of free information, distributed authorship and computer-aided fabrication.