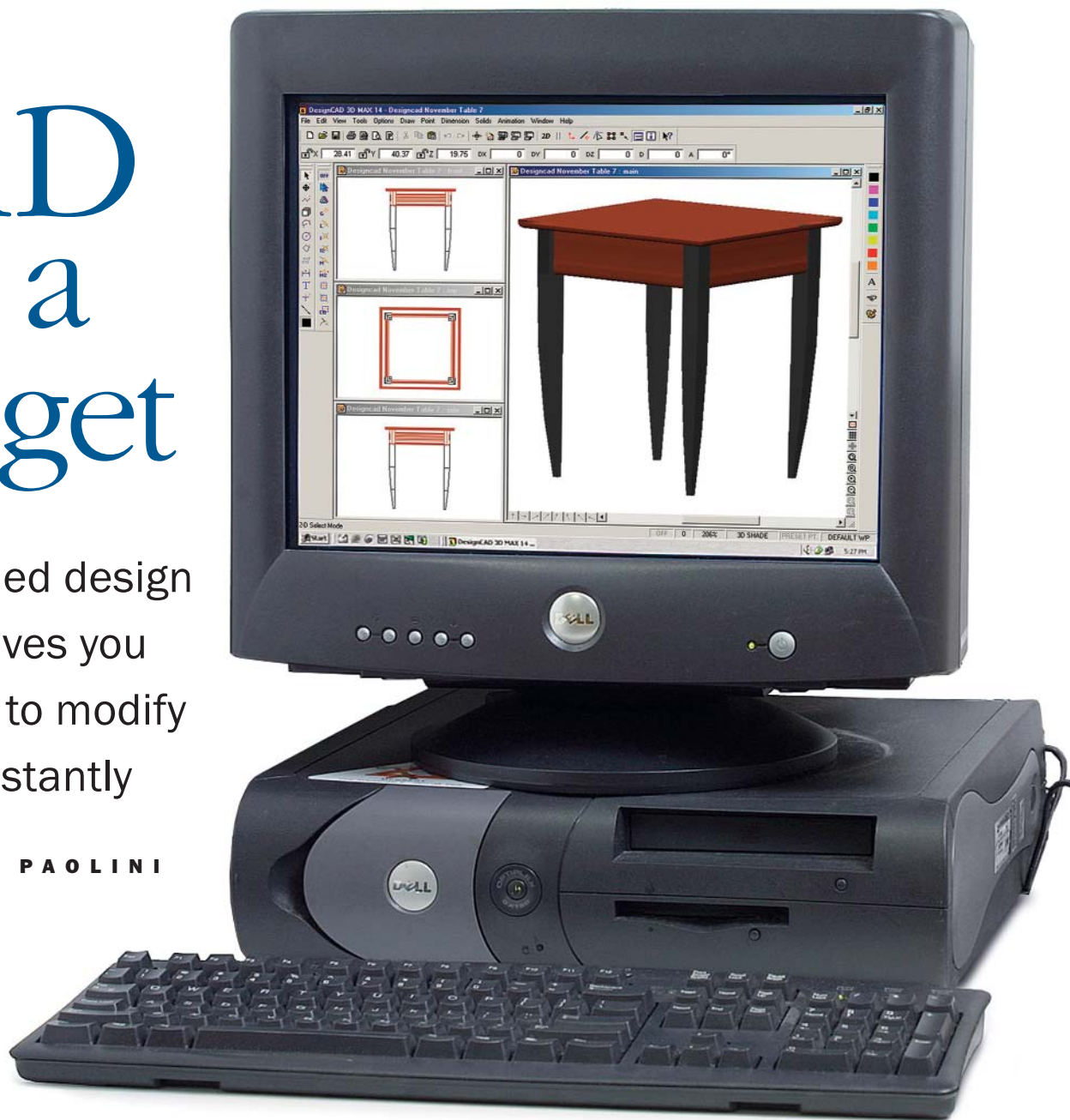# CAD on a Budget

Computer-aided design software gives you the flexibility to modify designs instantly

BY GREGORY PAOLINI

The November Table.
Paolini drafted one of his tables using five affordable CAD programs and then compared the results.

While I enjoy drawing plans by hand, I've come to embrace the benefits of designing furniture on my computer with computer-aided design (CAD) software. A nice CAD program can cost less than a set of basic drafting tools, and design mistakes can be fixed with just a click of the mouse.

With CAD, you can change a design quickly without redrawing the entire piece. You can draw a furniture part, such as a table leg, one time and copy and paste it to create matching parts. Tasks such as adding a drawer, increasing the height of a piece, even changing styles can be performed with a few keystrokes. Also, you can print variations of a design to compare with the original.

In addition, everything you draw is in proportion; the computer scales the drawing to fit your screen so you know what the piece will look like before ever stepping foot in the workshop. And if you're inclined, you can take the CAD file to a printer and have it plotted full size.

For this review, I looked at the five popular CAD programs that are available for less than $100. Due to my background in mechanical design, I at first was concerned that my knowledge of drafting and CAD would affect my judgment. I trained on AutoCAD, the industry standard in design

software, and worried that my familiarity with the program would make an objective review difficult. But to my surprise none of the programs shared AutoCAD's concepts and commands, including the two programs that were made by the same software manufacturer. As a result, I faced each program with the same learning curve.

2-D or 3-D?

Because of their low cost, right off the bat I knew that the software wouldn't be as powerful as the industrial-strength programs that typically cost between $500 and $3,500. When choosing from this affordable field of software, you need to ask yourself what you ultimately want to accomplish. Are simple 2-D black-and-white sketches adequate? Or are you planning to plunge into the world of 3-D drawing?

With 2-D software, you are able to design a piece from three views: the front, top, and side. If you are interested in making only measured drawings that you can use in the shop, you won't go wrong with basic 2-D software.

The more advanced 3-D programs allow you to draw a piece not only in the front, top, and side views but also in perspective. However, because you are adding depth to each piece, there is a lot more to 3-D drawing. For example, in 2-D software, a roundover on a tabletop is depicted with a horizontal line and a vertical line joined with a quarter circle. However, in 3-D, you have to tell the computer to draw the roundover along the entire length of the object. All of the 3-D programs have the option to design in 2-D until you are more comfortable with the concepts. Make the decision between 2-D and 3-D up front, because switching software later on can mean learning a new program all over again.

You also must make sure that your software of choice is compatible with your computer. I used a semi-outdated personal computer with the bare minimum requirements for running these programs: A Celeron 500-MHz processor, 256 MB of RAM, running the Windows 2000 operating system. It performed fine rendering 2-D drawings, but it slowed down considerably when rendering the 3-D drawings.

Put to the test

To evaluate each program, I chose one of my table designs as the test subject (see the bottom photo on the facing page). The

2-D CAD PROGRAMS
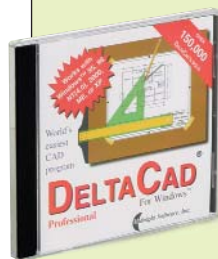
DELTACAD PROFESSIONAL

I was skeptical about DeltaCad Professional when it arrived. The software was packaged in a regular CD case, and the only printed documentation was a sheet showing keyboard shortcuts. After a painless installation, I began my first built-in tutorial, which took about an hour, where I was instructed how to draw a calculator. Another hour later, I had finished my drawing of the test table, complete with dimensions.
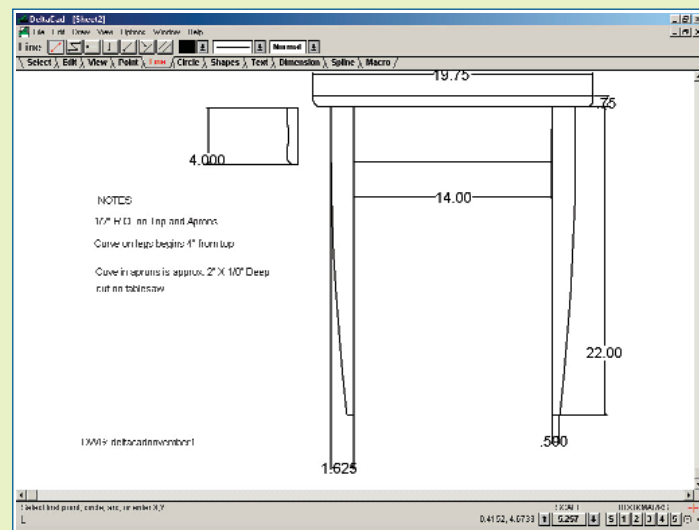

A great entry-level program. DeltaCad is easy to learn and has many of the features available on more expensive programs, such as layering.
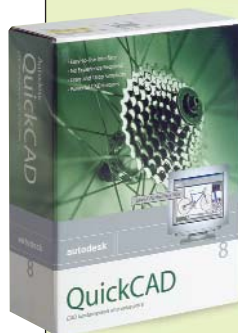
QUICKCAD 8

"Impressive" was my first thought when I picked up QuickCAD 8 and studied all of the features touted on its cover. However, when I delved into the program, my opinions changed. The instruction manual was extensive and featured about 20 "Fast Track" tutorials that teach the basic commands. While it gave me an idea of how to draw squares and circles, it never really explained how to combine all of these entities into one drawing. QuickCAD could have benefited from a better tutorial.
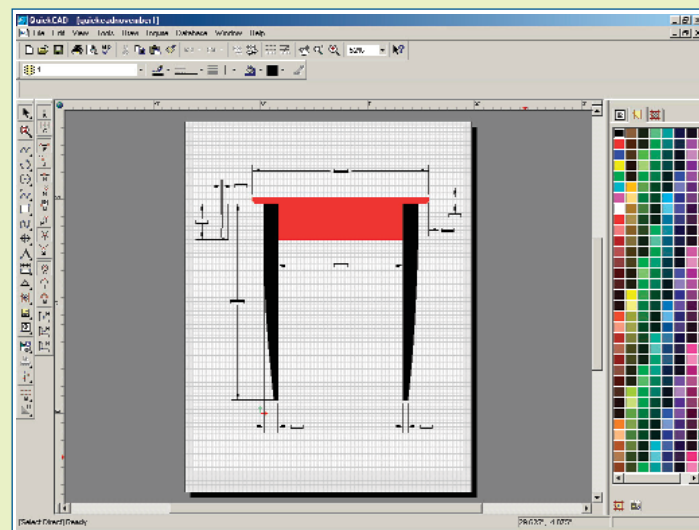
Takes time to master. Quick-CAD is a very powerful program, but be prepared to put in some study time.

AUTOSKETCH 8

AutoSketch 8, made by the same company that makes QuickCAD, is almost a carbon copy of its counterpart. It comes in similar packaging, offers the same level of instruction, and sports the same user interface. The only difference, besides the price, is that Auto-Sketch features 3-D effects. It allows you to draw 3-D shapes; however, you cannot render a 2-D drawing in 3-D. I spent about 30 hours over the course of a month trying to use the feature, and the only thing I had to show for it was a few more gray hairs. I threw in the towel and came to peace with the fact that I was not going to draw the table in 3-D.

Difficult. Paolini was unable to master the 3-D effects feature even after an exhaustive evaluation of AutoSketch.
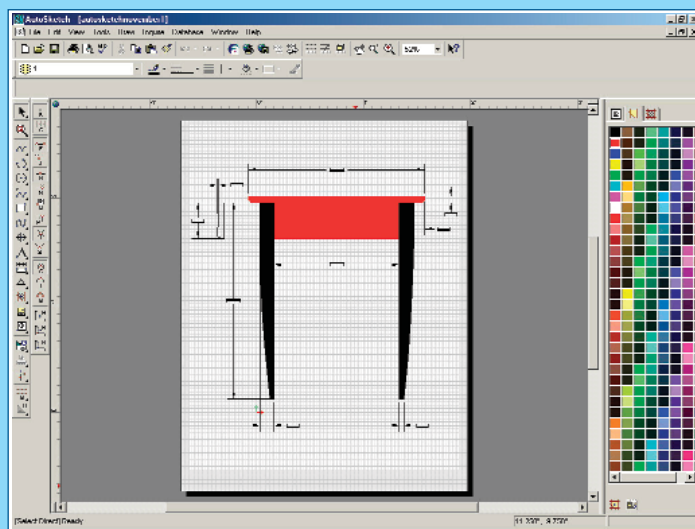
table incorporates curves and coves, which I felt would make for a more challenging test. Over a period of four months, I put the programs through their paces.

I had planned to give each piece of software equal playing time, but the simple 2-D programs required significantly less time to learn than the 3-D programs. So I decided to make the best drawing I could with each program while keeping notes on the process along the way.

All of the programs I tested require basic knowledge of the Windows operating system, but they don't require you to know the general concepts of CAD. That's where the software's tutorials and instructions come in handy. You also may purchase additional books and tutorials that can help you learn how to use some of these programs.

A few important CAD features are available in each program. Each allows you to draw in layers, useful when drawing plans with a multitude of parts and dimensions. Layers allow you to hide, manipulate, or delete individual parts without affecting the rest of the drawing. (They are much like transparencies layered on top of each other.) When drawing in CAD, you can use one layer for the basic drawing, another layer to list all of the dimensions, and a third layer for joinery. You then can hide individual layers if the drawing gets cluttered.

With each program you can sketch lines arbitrarily, and then dimensions are added automatically. You also can make lines by first typing in their dimensions. I prefer to employ the latter method and do my sketching ahead of time with a pencil and some paper.

Program	Manufacturer	Price	Supported file formats	User manual	Difficulty level	Training and design time	Overall rating
2-D CAD PROGRAMS							
DELTACAD PROFESSIONAL	Midnight Software 206-361--0796 www.deltacad.com	$39.95	DXF	None, but built-in tutorials were very useful	Beginner	Two hours	Good
QUICKCAD 8	Autodesk 800-440-4198 www.autodesk.com	$49	DXF, DWG, JPG, BMP, WMV	"Fast Track" tutorials teach the basics, and some help features are integrated into the software	Intermediate	10 hours	Good
3-D CAD PROGRAMS							
AUTOSKETCH 8	Autodesk 800-440-4198 www.autodesk.com	$99	DXF, DWG, JPG, BMP, WMV	"Fast Track" tutorials teach the basics, and some help features are integrated into the software	Advanced	30 hours	Poor
DESIGNCAD 3D MAX V14	IMSI 800-833-8082 www.imsisoft.com	$99.95	DXF, DWG, WMV	Extensive manual and three training CDs that practically hold your hand through the learning process	Beginner	Nine hours	Excellent
TURBOCAD DELUXE V9.2	IMSI 800-833-8082 www.imsisoft.com	$99.95	DXF, DWG, JPG, BMP, WMV	Extensive manual and basic built-in tutorials, but plan on putting in some hours to learn 3-D	Intermediate	22 hours	Good
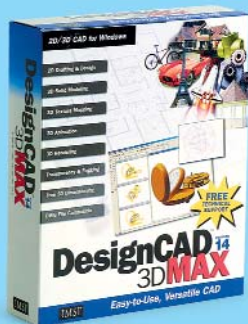
DESIGNCAD 3D MAX V14

I liked everything about DesignCAD 3D MAX V14, from the tutorials to the final renderings it produced. It came with an inch-thick manual in addition to three training CDs that cover CAD fundamentals, 2-D drawing, and 3-D rendering. The interactive training CDs were incredible, and after a few hours I was very comfortable drawing in the program. I spent about nine hours with DesignCAD and was very pleased with the results of the table I drew. It left nothing out and was a very complete representation of the actual piece.


Solid performer. *DesignCAD features wood graining, multiple views on one screen, and realistic 3-D renderings.*
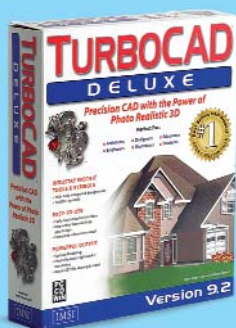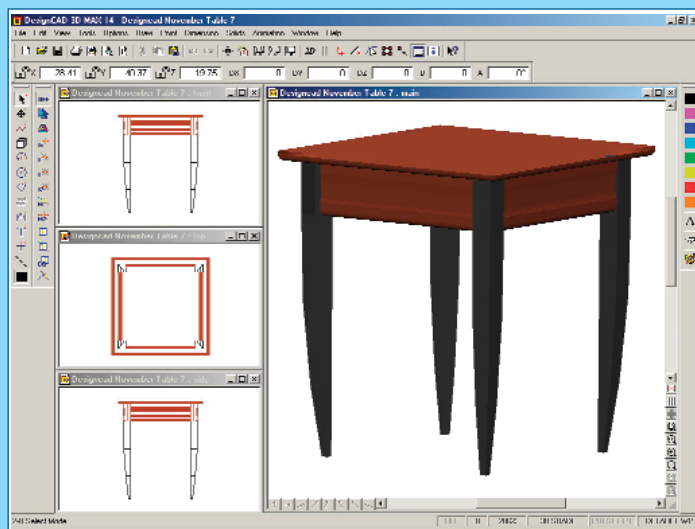
TURBOCAD DELUXE V9.2

A very powerful 3-D rendering program, TurboCAD could have benefited from training CDs or more in-depth tutorials. The software has built-in help features that guided me through the basics of drawing and CAD, but it required a big investment of my time to learn. I spent about 22 hours with the program before I was pleased with the results of the finished 3-D drawing. My 500-MHz processor fell short of the recommended system requirements, so it took a little longer to load than it should have. Fully rendered 3-D views taxed my outdated computer, but it performed fine in 2-D.

Views in 3-D (left) and 2-D (right). *TurboCAD also integrates Web tutorials and some prerendered parts, such as screws and bolts.*
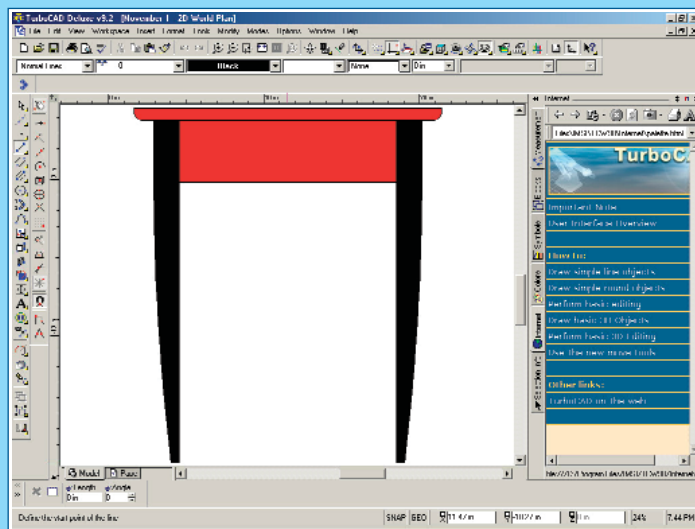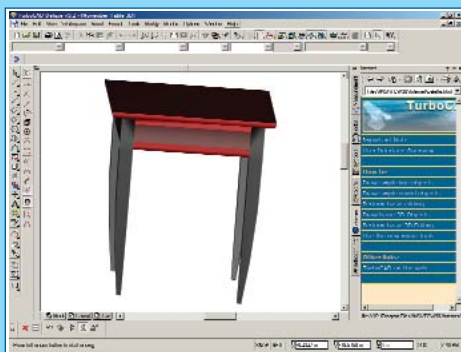
Besides 3-D capabilities, the major differences between the programs lie in the learning curve and in the manuals that came with each program. Other differences were in the details. For example, DesignCAD 3D MAX allows you to color the parts with wood grain. The programs also differ in the variety of file formats in which you can save your projects. The more file formats available, the easier it is to share and transfer files. For instance, many printers can plot a full-size CAD drawing if the file is saved in a DXF file format compatible with the industry standard AutoCAD.

Pick of the litter

Without question, my favorite program was DesignCAD 3D MAX V14. The folks at DesignCAD not only made a powerful design program but also intended on making sure their customers could use it to its fullest potential.

However, if you never plan on moving into the 3-D world, DeltaCad offers an easy-to-use interface, with enough built-in training to accomplish your 2-D goals. It also has many of the same features found in more expensive software packages.

CAD is like any other tool in your shop—the more you use it, the better you'll get at it. Practice, and before long you'll be making professional drawings and expanding your design horizons. □

Gregory Paolini makes Arts and Crafts-style furniture in his workshop in Buffalo, N.Y.