The Ins and Outs of CAD Programs

By Bill Hylton

Best Bet: 3D Drafting Program

ALIBRE DESIGN XPRESS
Contact: *www.alibre.com*
Cost: Free
Type: 3D parametric modeling
Vehicle: 100 MB download
Sys. req.: Windows Xp, 800 MHz Pentium, 512 MB RAM
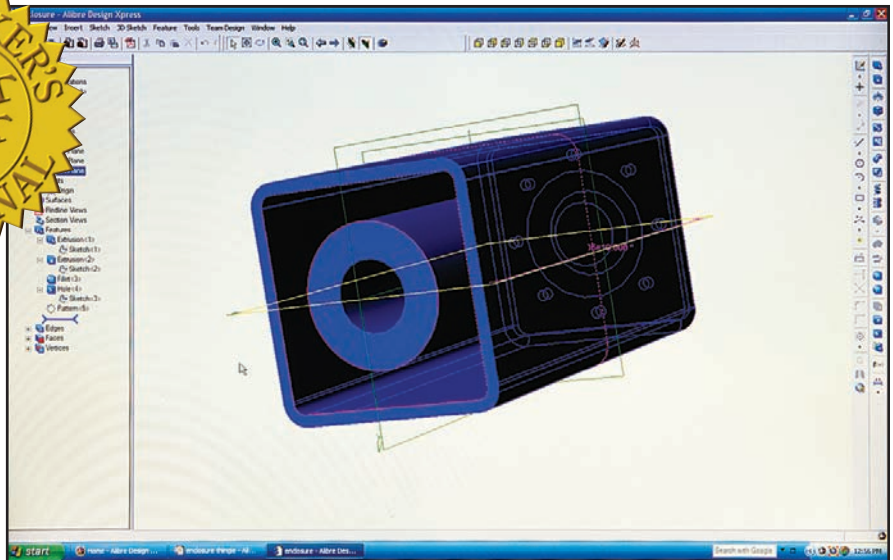**Documentation:** 601-page PDF
Demo: None
Tutorials: Introduction video, drawing exercises incorporated into software
User forum: www.alibre.com/xpress/forum/
Upgrades: Alibre Design Standard ($995), Professional ($1,495), Expert ($1,995)

For more info on the web: use our **QUIK-LINK**

Alibre Design Xpress is a free — but huge — download that has good tutorials with whiz-bang drawing samples you can spin and roll and turn. But hand-cutting dovetails may be easier to master than this complex program's many capabilities.

I don't draw well. I know what I want all right, but my fine motor skills are deficient. It's downright frustrating when I want to draw plans for a new project. My lines are inconsistent and wavering, always a hair too long or too short. I make so many little mistakes that my erasers disappear long before my pencils wear down. When I do get done, my designs usually need a little … uh … somethin'.

Something, of course, that means redrawing the entire plan.

Here's why I love computer-aided drafting (CAD):

In CAD …

- Lines are always straight, crisp and consistent.
- Drawings are always clean, free of blotches and eraser smudges.
- The scale is always precise, and accurate dimensions can be pulled off most anywhere.
- Dimensions and proportions can be altered quickly without redrawing everything.
- Elements of one drawing can be copied into a new one in seconds.
- Full-size patterns can be printed and used in the shop.

I've been using CAD for over a decade, though I certainly don't consider myself proficient. I figured out the basics, but my CAD skills are still where they were seven years ago. Determined to upgrade, I recently undertook a review of inexpensive CAD programs, meaning those priced under $150.

The affordability of CAD is striking to me. Bought at a big discount, my AutoCad LT98 cost about $350; the current version retails for $899. But for less than $150, I can get a different CAD program with far more features. And if I choose the right one, I'll be able to access and use all the drawings I've created since 1998.

To use CAD, here's what you need — besides a computer, of course:

Computer Savvy:
If you have a Windows-based personal computer or an up-to-date Mac and run the typical assortment of household or business software — word processing, bookkeeping, web browsing — then you surely have the requisite computer skills.

To use CAD programs, you need to be able to use the keyboard and the mouse. That's essential. You also need to

understand how to use drop-down menus and those buttons labeled with icons. (Wait 'til you get a load of CAD icons; talk about fleas on a mangy dog!)

Basic Drafting Know-how:
Traditionally, shop drawings, often called measured drawings, are two-dimensional and include two or three views, the latter usually being the front view or elevation, the top view and a side or profile view. Depending on the complexity of the object itself, additional views might be needed as well — a second profile, a back or bottom view, a section or details.

Each view depicts a single plane and, taken alone, it conveys little about depth or texture. Overall dimensions are shown, along with a selection of other dimensions that help the woodworker build the piece. Moreover, the views will be drawn to scale, so dimensions not called out can be determined by measuring the drawing and scaling up from it.

Missing from traditional shop drawings is a clear picture of what the object looks like. In life, we seldom see objects in only two dimensions. We see two or three faces from a single vantage point. The traditional solution is the pictorial drawing — an isometric, oblique or perspective view, all of which are really two-dimensional.

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My point here is that you've got to know what to draw. Without that, CAD won't benefit you.

Determination:
Learning to draw with a CAD program can be frustrating and exasperating. The programs are enormously complex. Documentation tends to be either sketchy or opaque. In a few cases, it is virtually nonexistent. You have to be determined and persevering.

Pigeonholing CAD Programs
Let's sort the programs into types first.

2D programs: About half of the programs I looked at are 2D exclusively, and only one can be upgraded to a package with 3D capability. But don't look past them. Any 2D program enables you to create traditional measured drawings. Remember that every museum-preserved piece of furniture was built from plans drawn in two dimensions.

Unlike pencil-and-paper drafting, CAD gives you the ability to draw a two-dimensional view of your design, then experiment with it. You can quickly (and reversibly) alter the dimensions and proportions. You can add features like doors and drawers, decorative moldings or embellishments, then quickly remove them. You can reconfigure legs or feet. You can transform an elevation or profile view into a section view, slicing through your project to reveal joinery and otherwise hidden features.

Using a 2D program, you also can create pictorial views, such as isometric and oblique views. While they aren't 3D, they do show more than one face of the project, and they can be very helpful in conveying what the project will look like.

This is a solid foundation for anyone new to CAD. The general skills you master in 2D will carry into 3D, even if switching to a 3D program forces you to learn new terms and tools.

2D/3D programs: Just the idea of 3D is intoxicating. The attraction is obvious. You can see what the project will look like. The best 3D programs allow you to "orbit" the project in real time, circling around, above and below it. They allow you to print views from various viewpoints. Thus, you can show your design to a spouse or client and get their approval before cutting a single board.

Three of the this bunch give you all the features and functions of 2D programs, and they transition to 3D as well. Their benefit

is that you can focus initially on mastering the basic functions and features of CAD in the 2D realm. You'll learn the program and get measured shop drawings at the same time. When you're comfortable navigating the 2D realm, you can segue into 3D.

My suspicion is that, once you are comfortable using the 3D modeling features available in this level of program, you'll want to upgrade to more powerful (and costly) versions. Happily, the affordable 2D/3D programs have upgrades that dramatically expand the speed, features and capabilities of their baseline version.

3D parametric modeling programs:
Parametric modeling is at the high end of the CAD spectrum. The end product is, I think, what a lot of people envision as 3D CAD. It's pretty daunting to tackle, especially if you have no CAD experience whatsoever. Thanks to Alibre's freeware version of its Design software, you can have a look.

Here's an overview: Suppose you are making a table. You draw one leg, one long apron, one short apron, the tabletop and one button for attaching the top to the stand. Again, each unique part is a separate drawing.

To "draw" the table in 3D, you open a new file and insert each part. You copy parts as needed to methodically assemble the table. "Join" a long apron and a short apron to a leg. Copy the leg and the long apron, and join these copies to the assembly. Copy the leg twice more and the short apron once, and use these copies to complete the base. Insert the tabletop and the button into the assembly drawing. Make as many copies of the button as you need, and use them to mount the top to the base.

If you want to alter the length of the table, you go into the long apron drawing and alter the dimensions. The program will update the assembly drawing, and it will point out that you also need to alter the tabletop dimensions.

It's a lot of work to create the drawings for all those parts and it takes practice to assemble the parts accurately. Advocates of this level of CAD argue that in the long term, it's easier and faster to develop projects because you can reuse old parts in new assemblies.

It is an intriguing concept, but from my perspective, the learning curve looks awfully steep.

An oddball program that fits here is Design Intuition. It isn't a conventional drafting program, but rather it focuses specifically on creating 2D/3D plans and cutting lists for cabinetry.

While I don't recall "parametric" being used in any of the documentation, Design Intuition certainly has parametric characteristics. It draws shapes, and though those shapes appear two-dimensional on the computer monitor, they're really three-dimensional. Each shape you draw has to be named and given that third dimension. As you do this, you create a parts list. Changing a dimension on the parts list triggers a cascade of other changes to associated parts in the assembly.

The promise is seductive, but the program has its limitations. You can create boxes and cylinders but not lines or arcs. Zooming and panning as you work is cumbersome. The program shows dimensions of individual parts but not assemblies.

In any case, give it a trial run. You can download the program without cost and test it. However, until you pay the license fee and register the program, you won't be able to save anything you draw.

Shopping Suggestions
You have a lot of decisions to make. Here are some tips that I hope will help. First, I've put a "Best Bet" symbol on several programs that are on the short list of candidates to replace my AutoCAD LT98 (or at least to supplement it).

Second, visit the program web sites. Many allow you to download a PDF of the user manual. Do that, open it in Acrobat Reader and judge for yourself the features and how well they are explained.

You likely will find a link to a user's forum (I've provided web addresses to them as well). Visit them, even if you've got to register with the company to gain access. The questions asked and the responses given tell you a lot. A lack of activity says something, too, as does the lack of a forum.

A trial version of the program is likely to be available for download. I can't recommend downloading every available trial program; you'll be overwhelmed. But, do try before you buy.

CAD software should improve your drawing process, not create a nightmare. A good program can make designing a project as much fun (almost) as building it.