Low-Cost, No-Cost CAD

Despite giveaway prices, these CAD packages can help you create attractive presentations and get your clients, suppliers, and subs on the same page

by Joe Stoddard

If you have $1,000 or more to spend, there are plenty of good AEC-specific (Architecture-Engineering-Construction) computer-aided design (CAD) programs. But what if all you want to do is bang out some quick presentation drawings after work to close more sales or to show to your existing clients and subs? Are any of those "home design" programs useful for professionals? Or can any of the programs available for free online do the job?

The answer is yes, if you're willing to work around the limitations of low-cost CAD by combining different 2D and 3D products and willing to use an image-editing program to polish up the final work (see "One-Stop Imaging," page 54). There's one catch — this crop of 3D programs is best suited for straightforward jobs, such as basic kitchens, room additions, even simple new homes. High-end custom work is beyond the capability of this group. However, they all "draw" pretty much the same as many professional-quality programs. The techniques you learn, even if not exactly like the professional products, will give you valuable experience if you wind up needing a more advanced program down the road.

One Size Does Not Fit All

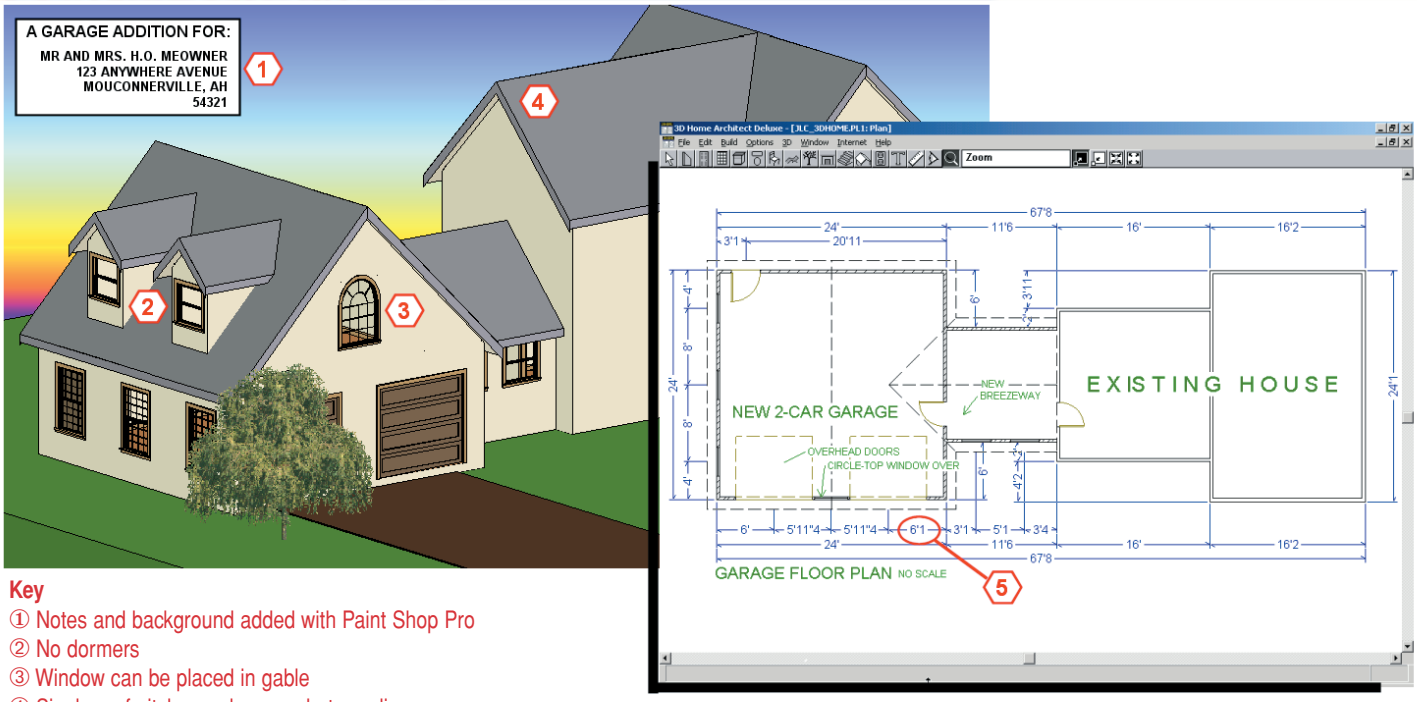
Anyone who has used a belt sander to sharpen a chisel knows there is nothing unusual about using standard tools in creative ways. CAD programs are no different. Low-cost 3D CAD programs are fast at creating a building shell but short on precision, detail, and flexibility.

On the other hand, a generic 2D CAD program might have all the precision in the world, but trying to draw an entire house with one can be like digging a foundation with a teaspoon. High-end design programs attempt to combine the best of both worlds. But if you're going the low-buck route, you'll probably need to learn more than one program: a 3D package for modeling, a conventional CAD package for line-drawing, and a generic drawing/imaging program for adding the final touches.

If that sounds like a lot of effort to save a few bucks, maybe it is. But remember, no computer program — even the most expensive ones — will do it all, just as no one saw or drill will handle every kind of material.

Narrowing the choice. There are a dozen or more home design packages at the local software store, but experience has taught me that most are worthless for the trade pro. With that in mind, I went looking for AEC-specific 3D CAD programs that had enough features to do useful work and were capable of exporting to other programs as necessary.

3D Home Architect, Design Apprentice, and PUNCH! Super Home Suite are the three that floated to the top. In the 2D department, anyone who thinks you can't get



Key
① Notes and background added with Paint Shop Pro
② No dormers
③ Window can be placed in gable
④ Single roof pitch per plan, no photo-realism
⑤ Odd-ball dimensions can't be edited individually

Figure 1. 3D Home Architect can't produce photo-realistic renderings, but it can convey a lot of information about a project in a hurry and should be part of every contractor's toolbox. The roof editor makes dormers possible; plus, it's the only program in this article capable of placing a window in the gable end of our sample project. Once the model is generated, title blocks, notes, and background can be added in Paint Shop Pro. Accurate dimensioning, however, is not part of the equation for low-cost 3D CAD. All of the 3D packages reviewed produced odd-ball dimension numbers.

"something for nothing" will be pleasantly surprised. I found TurboCAD 2D and IntelliCAD 2000 (actually 2D/3D), both professional-quality offerings that are absolutely free for the downloading.

Windows 2000 users beware. All the packages installed easily and pretty much ran as expected on our Windows 98 test computer — a run-of-the-mill desktop unit with 64 MB of RAM and a 4MB video card. A Windows 2000 laptop didn't fare as well — all the 3D programs had at least some problem with the new operating system, either failing during installation, crashing unexpectedly, or refusing to exit smoothly, damaging drawings in the process.

As Microsoft and the product publishers get their respective acts together, this problem will probably be resolved.

Putting cheap 3D to work. This crop of point-and-click 3D CAD is tailor-made for "pre-sale" — when you want to add some snap to your presentations but don't want to invest much time in a project you may not actually get to build. To try out the packages, I created a sample project — a garage/breezeway that would be attached to the side of an existing L-shaped two-story farmhouse. My goal was to provide a prospective client with a rough idea of what the project might look like using a 3D model plus a simple floor plan, generated in under an hour. I have also rated some aspects on a scale of one to five, five being the best.

3D Home Architect

Unchanged since 1998, 3D Home Architect 3.0 ($49.00 list) is starting to show its age, but it still gets the job done better than anything else for many kinds of projects (see Figure 1). This program is actually an earlier version of the much more powerful product Chief Architect, with some advanced features disabled. Like Chief Architect, it has the unique ability to move and resize windows, doors, cabinets, and other 3D entities in 3D, while the floor plan is automatically updated, making it ideal for a live "show and tell" with clients. The roof editor is the most flexible of any in this article, allowing individual editing of roof segments and overhangs. 3D Home Architect is also fast — the kitchen in Figure 2 took only a couple of minutes to create. Cabinet objects can be modified while in 3D; you can remove doors, add shelves, and so forth. In fact, many high-volume kitchen/remodeling salespeople use it to design and sell jobs while meeting clients — a testament to 3D Home Architect's usefulness.

Don't think you're getting Chief Architect for $39, however — 3D Home Architect lacks most of the refinements of its $900 big brother. No matter how hard I tried, the program would not create consistent dimensions, but added an inch here or there randomly (a problem shared by all the 3D programs reviewed). 3D Home Architect lacks the advanced rendering capability of its counterparts and has no 2D CAD tools or any way to create custom 2D or 3D symbols. Luckily, it's easy to export a .dxf (drawing exchange format) file to one of the 2D CAD programs to add detail for working drawings (Figure 3).

Shortcomings aside, 3D Home Architect should be part of every CAD user's bag of tricks. It's the old, comfortable, leather-handled hammer you'll grab time and time again even though there's something fancier in your toolbox.

Overall Power: 3
Ease of Use: 5
Learning Curve: 5
Import/Export: 4
Bang for the Buck: 5
Time to Create Model: 30 minutes

Design Apprentice

The first time I saw a photo-realistic rendering from Design Apprentice, I thought I was looking at output from a $3,995 program, not a $39.95 program. That's because the computer code behind it was originally developed for CADSOFT's professional products. If you have a video card that supports ray tracing and radiosity (advanced computer rendering methods), you'll be able to generate output that looks like that in Figure 4 (next page) by simply building your drawing/model and sending it through the built-in rendering program.

Working in Design Apprentice is similar to working in the other 3D programs in this article. Starting in 2D, you draw walls by clicking and dragging

Figure 2. 3D Home Architect is especially good at modeling projects quickly. This kitchen 3D took just minutes to produce.

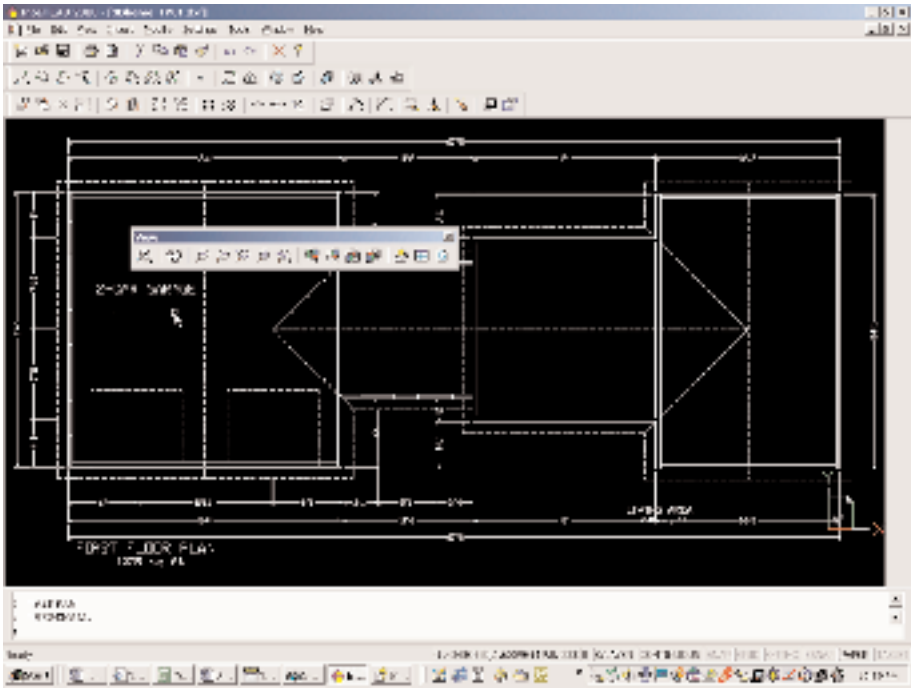


Figure 3. If more complete working drawings are necessary, all three of the 3D packages reviewed can export files in .dxf, which can then be opened in a 2D CAD package for detailing.

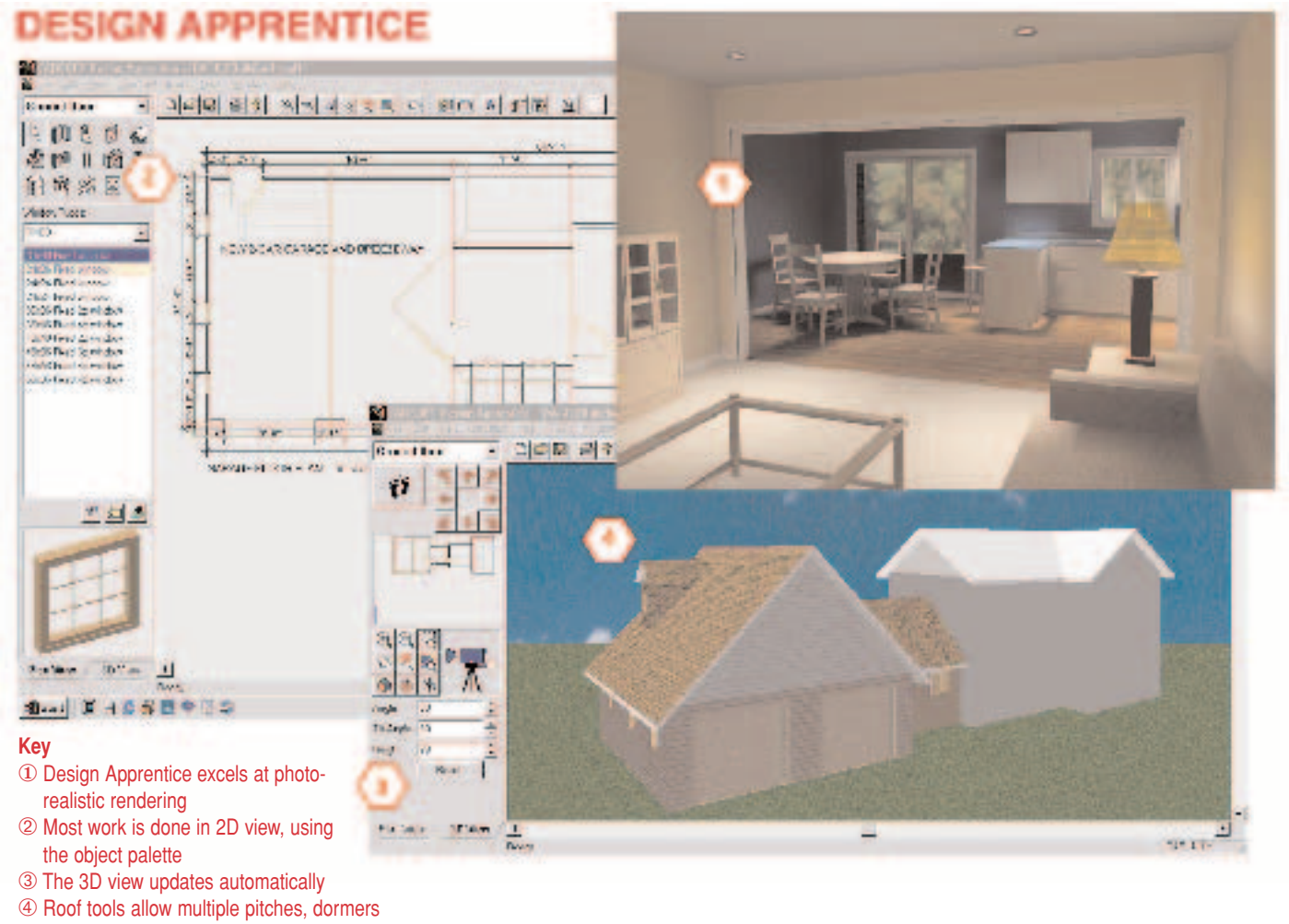


Figure 4. Design Apprentice started life as a development effort for CADSOFT's pro products. Its photo-realism rivals programs that cost thousands of dollars. The object pallet and split interface keeps drawing tools at hand, and 3D views update automatically in response to changes in the 2D drawing. The roof editor allows multiple pitches and dormers, but doesn't allow windows to be placed in the gable end.

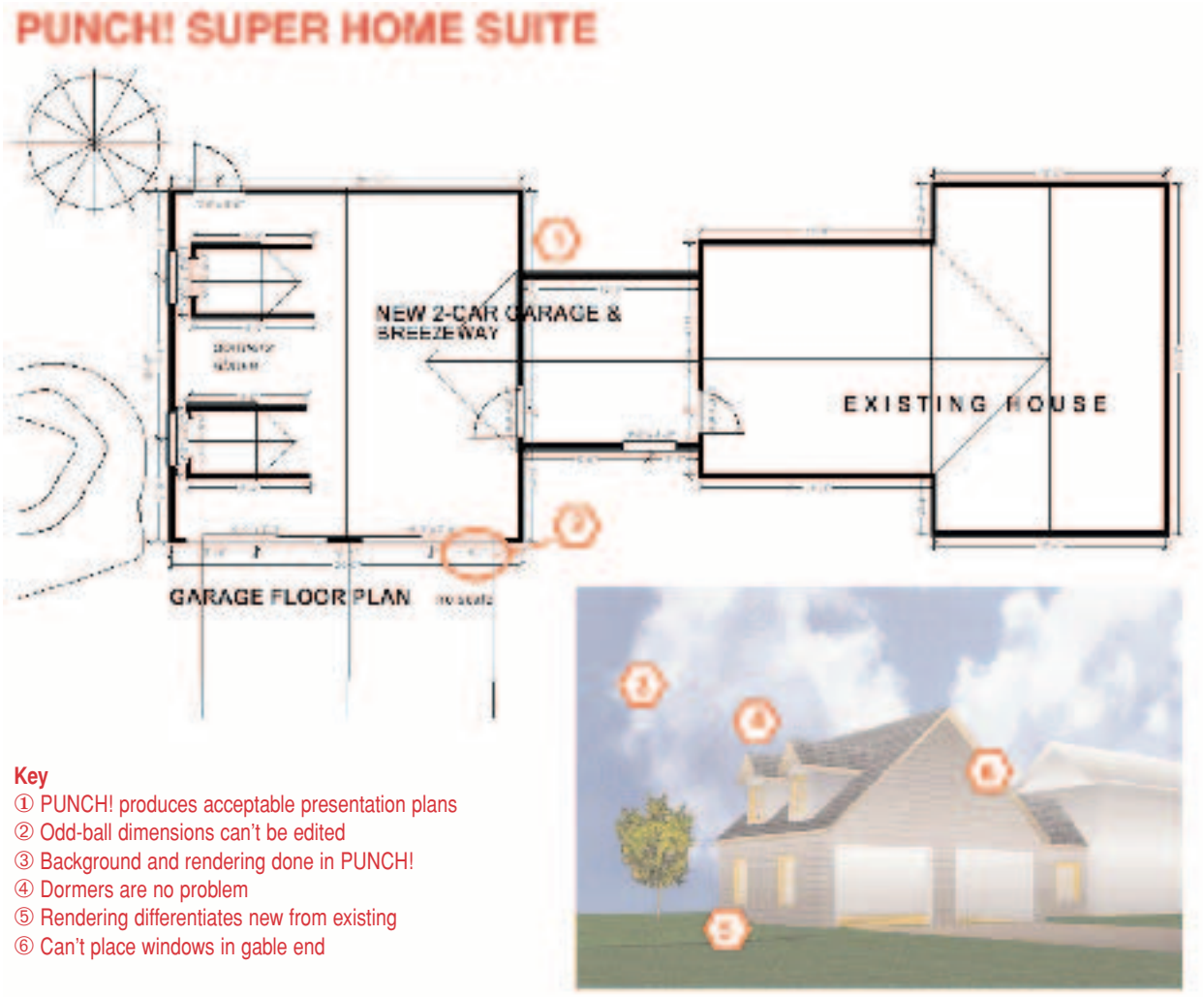
the mouse. Windows and doors and other interior and exterior objects are added by selecting them from a library. It has an intuitive point-and-click interface that puts all your tools, objects, and the view camera in plain sight. You switch between 2D and 3D with a single click, and the 3D model updates automatically from changes on the floorplan.

Design Apprentice's roof editor allows each edge of every roof section to be edited individually, allowing different pitches and overhangs on the same plan. Dormers are no problem, but because gable ends are part of the roof definition, there is no way to insert a window in the gable end of the sample garage. Problems like that are why you need an external image editor like Paint Shop Pro at your disposal. In terms of importing and exporting files, Design Apprentice exports 2D plans in .dxf format, which can be picked up in the 2D CAD programs and 3D images as Windows bitmaps (.bmp). Bitmaps then can be opened in any image editor.

Design Apprentice gives you good value for $40, but I have a couple of minor complaints. First, as mentioned, it refused to run reliably under Windows 2000, and it also had a few video problems on our Windows 98 test when trying to produce high-resolution renderings; so check your hardware compatibility before purchasing. It would also be nice if the included library items were more standardized and the textures reorganized to make more sense. It took me a long time to figure out that if I wanted clapboard siding on my building, I had to set the exterior material to "painted metal" and then drill down to find the siding textures. I don't know too many contractors who install "painted metal clapboards."

Design Apprentice is also sold by IMSI as FloorPlan 3D Design Suite. There's a good users' forum online at www.floorplan.com.

Overall Power: 5
Learning Curve: 3
Ease of Use: 4
Import/Export: 4
Bang for the Buck: 5
Time to Create Model: 50 minutes



PUNCH! Super Home Suite

As its name suggests, PUNCH! packs a lot of punch for $70. To use it, you select what you want to add to your drawing from the component icons in the top row, and then drag the specific item (or texture) from the right of the screen with your mouse to the drawing (or 3D) window. The 3D model can stay visible all the time in a separate window and updates automatically when the floorplan changes (Figure 5).

The ability to render only selected walls made it easy to differentiate the "new" part of the project from the existing part, and PUNCH! also produced a nice presentation floorplan. The roof editor, while not professional quality by any means, got the job done. Dormers are not

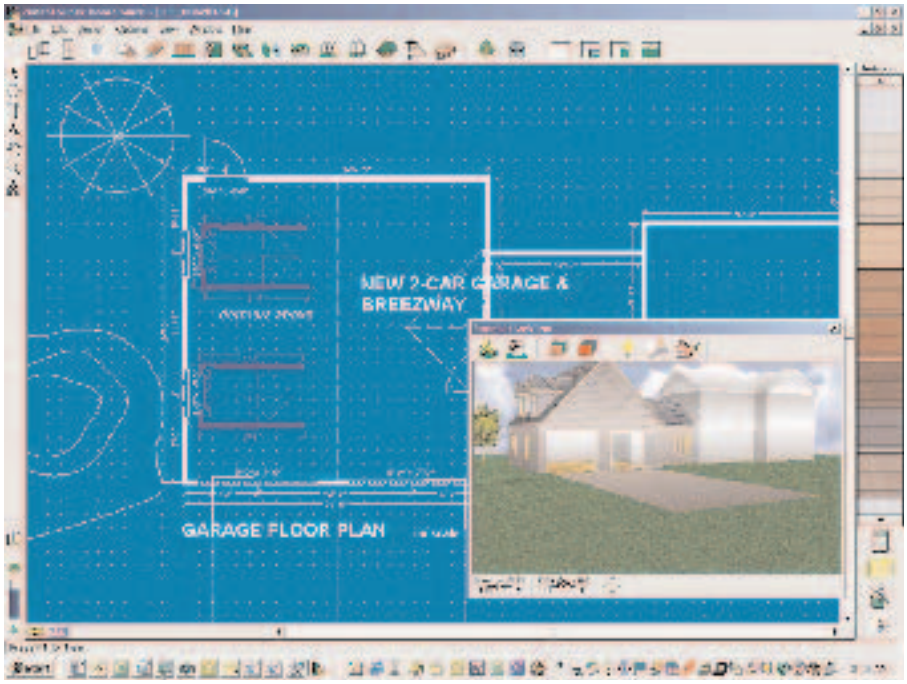
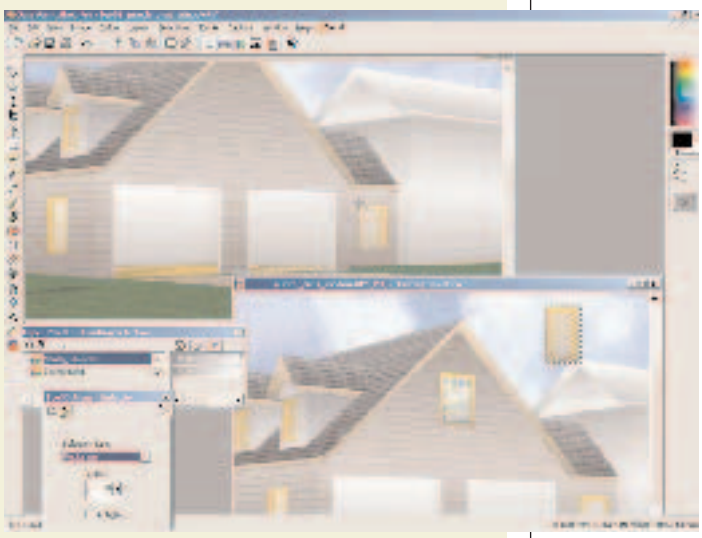


Figure 5. PUNCH! Super Home Suite is a consumer program with some professional features. Its presentation plans are surprisingly good looking, even while suffering from odd-ball dimension syndrome. Unlike 3D Home Architect, PUNCH! renders the background. Also of note, dormers are no problem. Rendered walls and roof differentiate new work from existing. Unfortunately, there is no way to place a window in a gable end.

One-Stop Imaging

In addition to the CAD programs, you'll also want a generic drawing/imaging package to touch up images and add notes. Adobe PhotoDeluxe, Microsoft PhotoDraw, and Corel Custom Photo will all do the job for under $100, but my favorite is Jasc's Paint Shop Pro (952/934-8888, www.paintshoppro.com) because it includes every graphics tool you'll ever need. Paint Shop Pro allows you to capture and manipulate images using screen shots, scanners, and digital cameras. You can then add notes and touch up your 3D models for presentation, and import/export using a host of different file formats, including .gif and .jpg for the Internet. Finally, it comes with a handy thumbnail viewer.

A typical job for Paint Shop Pro is creating features in your presentations that the original CAD program left out, such as a gable-end window.



No gable window? No problem. An image editor like Paint Shop Pro can make up for shortcomings in the CAD program of choice by cutting and pasting features from another drawing. The last step is adding sky reflection using the clone tool in PSP.

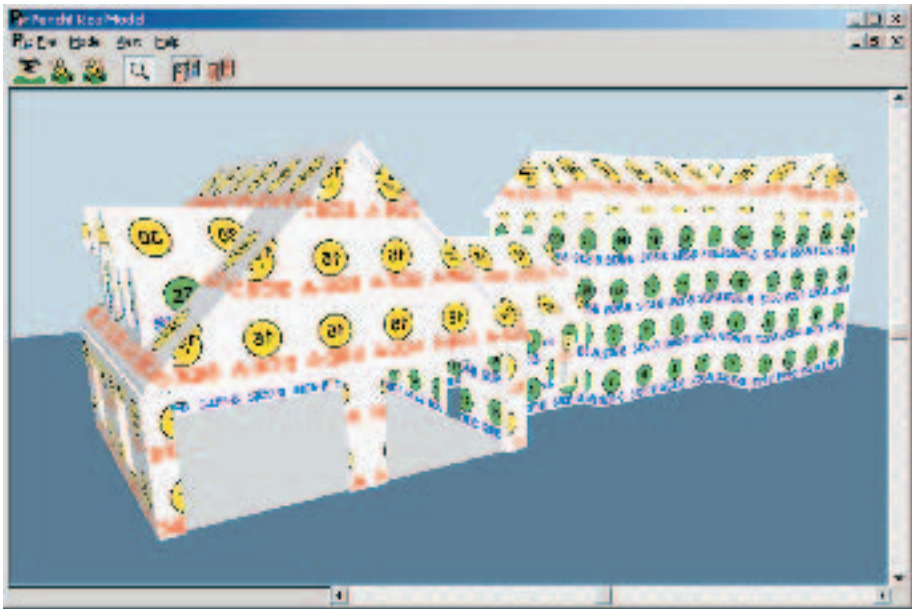


Figure 6. 3D RealModel prints out templates of the 3D model that can be traced onto solid material to create an architectural model.

a problem, and individual roof sections can be edited for overhangs and pitch. Like Design Apprentice, the gable end is part of the roof instead of the wall below, making it impossible to place a window in the gable end of the sample garage. There are even some rudimentary 2D CAD tools — not exactly AutoCAD, but maybe enough to dress out your presentation drawings without needing to export to a separate package.

In addition to the base package, the PUNCH! Super Home Suite includes several other programs and features worth mentioning:

Floorplan Trace allows you to load a scanned image — for instance, a hand-drawn floorplan sketch from a client — and digitize it to scale using a "virtual ruler." Then you can trace over it with the drawing tools to create your 3D model. CAD beginners and those interested in starting with existing plans will like this feature (just be careful of copyright issues).

Ultimate Deck. Hardly ultimate, the deck module does let you visualize some basic designs. It has no structural design, though, and is not very flexible.

3D Landscape. The obligatory landscape design program. It's way more fun to draw a landscape than it is to actually plant one.

AutoFraming. Strictly a 3D view of project framing — no panel diagrams and no flexibility. No value for professionals.

3D Furniture Workshop. Here's a tool that alone is worth the price of the package. 3D Furniture Workshop is in reality a 3D solid modeler. Using primitive shapes, you can create and render a model of just about any object — not just furniture. Better yet, you can open any of the 3D objects

included in the base package, edit them, and save them as a 3D .dxf file that can be opened in any CAD program supporting the format. Users of professional CAD packages, take note: Here's an easy way to add to your 3D object libraries.

3D RealModel. If a picture's worth a thousand words, a real model is probably worth ten thousand. This unique utility allows you to print out templates of your model that can be used to cut out cardboard or foam board (available at artist supply shops) to construct a physical model of your design (Figure 6).

On the downside, despite the great interface, PUNCH! is a little harder to use than it should be. Tools did not always react as expected and selecting individual items often proved frustrating. While you can create and modify furniture and appliance objects, there is no facility to add to or modify window and door libraries. The opening libraries are probably the weakest piece of PUNCH! — for example, the garage doors render only as cased openings (no actual door).

PUNCH! also maintains a support website where additional components are posted, and users can discuss the program and share library objects they've designed.

Overall Power: 4
Ease of Use: 3
Learning Curve: 3
Import/Export: 4
Bang for the Buck: 5
Time to Create Model: 40 minutes

IntelliCAD and TurboCAD 2D

A couple of years ago Visio tried to convince big corporations they could use newly developed $300 IntelliCAD instead of the $3,000 AutoCAD in their drafting departments. Unfortunately, it was not completely compatible and the idea never took off. Turn the clock ahead: Visio is now owned by Microsoft, and IntelliCAD is owned by a consortium that makes it free to anyone who wants it (I tested the version free at www.cadopia.com; the version with developer tools costs $149). The best part is that, to a great extent, IntelliCAD now works like AutoCAD and reads AutoCAD files. If you want to learn the principles of AutoCAD but don't want to spend $3,000 for a license or nights at your community college, this is the way to go.

IMSI's TurboCAD has had an equally hard time catching fire. The PRO version is a full-featured 2D-3D package with some interesting AEC-specific features, so the argument could be made that getting good on the free 2D version (free at www.imsisoft.com) could have lasting benefit if you have your eye on PRO. The latest edition, Version 7, is being released this month for $399.

For our purposes of massaging presentation plans into working drawings, either program does the job. I was able to open any file saved as a .dxf in the other programs, save it as a .dwg (native AutoCAD format), add lines, blocks (symbols), and notes, and manipulate layers — all the "CAD" stuff you'd ever want to do. And, if you don't want to do it yourself, you can use these free 2D packages as dandy conversion utilities to hand your work off to your neighborhood engineer or designer working in AutoCAD-compatible programs.

Overall Power: 5
Ease of Use: 3
Learning Curve: 2
Import/Export: 4
Bang for the Buck: 5

Joe Stoddard, *a certified professional building designer and former homebuilder, is a contributing editor at* The Journal of Light Construction *and moderator of the JLC Online Computer Solutions forum. He can be reached at the forum at www.jlconline.com/forums/.*

CAD Sources

The Learning Company/Broderbund
504 Redwood Blvd.
Novato, CA 94948
800/331-2912
www.totalhomenetwork.com/3dha/
3D Home Architect 3.0

CADSOFT
649 Scottsdale Dr., Box 12
Guelph, Ont., N1G 4T7 Canada
888/223-7638
www.cadsoft.com
www.designapprentice.com
Design Apprentice

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www.intellicad.org
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www.imsisoft.com
www.floorplan.com
FloorPlan 3D Design Suite
TurboCAD 2.0