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FUTURE TRENDS

Computer-aided Design

Significant CAD power is coming for desktop microcomputers

by Rik Jadrnicek

Computer-aided design (CAD), drawing and designing with the aid of a computer, promises to change our lives dramatically. Not so long ago, we stumbled into air-conditioned computer centers with boxes of keypunch cards and a desire to "see" what would happen. Now all that power sits on our desktops, and as a result pencils, erasers, and perhaps even paper face the prospect of obsolescence.

Today, word processors conquer mountains of text, electronic spreadsheets master number manipulation, and business graphics translate the results into charts, graphs, and slide shows worth a thousand words. And the increasing number of electronic pictures in turn creates the need for a graphics editor—a picture processor similar to a word processor. That way, we can create and edit graphics images, cutting and pasting our way through letters, numbers, and pictures.

The age of computer graphics is finally here. A hardware/software configuration exists for everything from painting illustrations with a color brush to designing and automating the production of a pipe valve. Software tools can manipulate both two-dimensional and three-dimensional images, tools that enable us to create geometric models worth a thousand pictures.

But increased capability and falling prices raise serious questions. What hardware and software do you need? What is available? How do you compare packages? What do the terms mean? Whom do you contact? Should you wait to buy? Unfortunately, the pattern is far too familiar.

This article charts a path through the jungle of hardware and software considerations you face when choosing a CAD package. In it I focus on some of the software and hardware available for your desktop computer.

What Is Computer-aided Design?

Computer-aided design has many potential applications, among them graphics design, illustration, flowcharts, block diagrams, forms design, mapping, printed-circuit board/electrical design, space planning, architectural design, mechanical drafting, and product design. A discussion of solids modeling with shading, animation, and image synthesis on microcomputers is a little premature, but several powerful wire-frame-type three-dimensional modeling packages are available along with some exciting painting software (see photos 1 and 2).

Computer-aided engineering (CAE) ties together such diverse interests as pictures (schematics, assembly and maintenance drawings), cost analyses, structural analyses, production

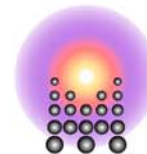
process plans, material specifications, tool design, and quality control. During this process, CAD graphics interface with a variety of analysis packages through compatible data files.

Computer-aided manufacturing (CAM) uses CAD and CAE criteria to produce a product such as a valve, a tool, or another item. Soon we'll be able to design, analyze, document, and organize the actual manufacture of a product from the original drawing. Both CAE and CAM operations are in their infancy on desktop micros.

With CAD, you draw or edit by entering data through a keyboard or a variety of input devices such as digitizers, mice, light pens, touch pens, trackballs, and image digitizers. The graphics software records the drawing within a world coordinate system and saves its database description. You edit the database and view the results on a monitor, which sends the image you create to a variety of hard-copy output devices including printers and plotters. You can network the database and send it out via modem or create an interface with such programs as Bill of Materials, Stress Analysis, or a variety of CAE/CAM applications.

What Is Available?

Historically, computer graphics started with the early Teletype and



Microflow

Full text of article
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