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KEY SOLUTIONS

THE PROFESSIONAL JOURNAL FOR CADKEY & DATACAD USERS • VOLUME 4 NUMBER 7 • SEPTEMBER 1995

The CSI Building in Paducah, Ky. Paradigm created two views of the building with 8 different color, material, and dome studies. The end product was output to dye sub prints and photographs for Askew Nixon Ferguson Architects in Memphis.

ISDN promises power, speed for CAD users

By George Brostoff
CEO, Symplex Communications

For years, ISDN (Integrated Services Digital Network) was a technology without a home. There were no applications to run on it, no infrastructure to support it, and no customers clamoring to use it. Today, ISDN is not only a viable technology, but is hailed by many as the most significant advance in high-speed communications in the '90s because the transfer of bandwidth-hungry files is simpler and faster. A key element in ISDN's resurrection and U.S. acceptance has been the proliferation of devices that can tap into the power and speed of ISDN lines. Nowhere are the benefits of this marriage between equipment and ISDN technology more apparent than in CAD/CAM applications. CAD/CAM designers know firsthand the value of sending large amounts of digital data quickly and cost-effectively, and they have been among the first to embrace ISDN. To understand

See ISDN, Page 5 ⇨

Paradigm projects the future

Video animation begins with DataCAD

By Belinda Jones
Virtual Marketing

Television — MTV, in particular — and computer-animated motion pictures have raised the level of graphics sophistication to a higher point than ever before. Architects and builders now must tailor their presentations to much more technology-savvy groups of clients, tenants, government officials, investors and others. This Tennessee firm has found a way to let DataCAD help them present their ideas in a high-tech format.

An innovative group of architects has created a successful business by combining their talents in 3D design and animation with the needs of architectural firms for sophisticated presentation graphics.

Paradigm Productions, the brainchild of Charles Gaushell and Scott Carter, specializes in three-dimensional design and animation. Working from a 3D CAD model, Gaushell and Carter produce graphic presentation tools — everything from animated videos to photorealistic renderings — for the architectural field. They specialize in "virtual environments," which feature vivid structural interiors and exteriors. They can provide a client with a series of renderings and animations for approximately the same cost as those produced using traditional hand-drawn methods, but with greater flexibility, accuracy and reproduction capability.

Paradigm was contracted to produce its first video production for a fund-raising project in 1993. This type of production quickly grew in popularity; Gaushell and Carter recently completed their eighth such project. The productions have featured a community college, three church projects and a corporate building. The detailed, photorealistic video animations of the interior and exterior of a building literally give the viewers a "before" and "after" interpretation of a renovation or new building project.

Paradigm can simultaneously provide many conceptual renderings of a design. For one project, they provided eight different versions of a building with changes in color, material and dome

DataCAD AT WORK

studies. The process of construction, engineering, landscaping and interior design is captured right before the client's eyes.

An award-winning production featuring the Tennessee State Technical Institute Library in Memphis was created for Hnedak Bobo architects. The video was presented with several other proposed buildings plans to illustrate how the campus would look in the future under the school's master plan.

Paradigm also worked in conjunction with API Cine´ of Memphis in completing a promotional video for the library to be used for fund-raising and for recruiting students. The production was recognized by the Tennessee Professional Photographers Association as "Best of the Show in Electronic Imagery" in 1993.

Another animation was produced for a fund-raising drive for the Occonee Community Theater in South Carolina. The video was designed by architects

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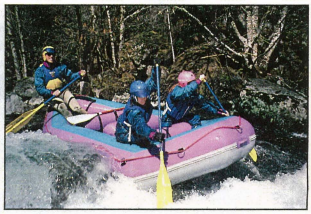

A Colorado Headwaters raft hits the water.

Sound Technology Keeps River Raft Builder Afloat

CADKEY AT WORK

Whitewater rafting conjures up many graphic images — swift-moving wild rivers — rafts crashing against jagged rocks and paddlers experiencing the ride of their lives. Around the world, people are assaulting their favorite rivers with a new breed of raft. Looking beyond the "thrill" of the sport, you will find unparalleled expertise and technology involved in the creation of a Colorado

See RAFT, Page 8 ⇨

KEY SOLUTIONS Special ...

WINDOWS ISSUE!!

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| | | |

CADKEY Communiqué

CADKEY In the News

CADKEY Professional for Windows Ships

CADKEY for Windows - Release 2, which began shipping this summer, includes several enhancements and powerful new tools that were not available for the original version shipped in the spring. New tools include FastLITE, a basic surfacing program from FastSURF; Advanced Drafting Module, an enhanced detailing CDE from Baystate Technologies; and the CKLisp CDE, a LISP interpreter from Bitwise Solutions.

A few of the other enhancements to the original release allow users to assign functions to mouse buttons and assign up to eight additional functions to a three-button mouse. CDEs that are no longer necessary can be closed to free up RAM. Users will be able to install and run the Windows version over a network or CD-ROM. Filling of True Type fonts now is possible. This will support both display and printing.

The update CD also will contain images of the 3.5-inch floppy install that can be used to manufacture a set of 3.5-inch disks for both the Windows and DOS versions of CADKEY.

Connecticut Vo-TechSchools Choose CADKEY and DataCAD

Cadkey Inc. today announced that the Connecticut State Department of Education has purchased site licenses for CADKEY and DataCAD for each of the 17 Connecticut vocational technical schools. The schools will receive CADKEY 7, CADKEY Analysis, and DataCAD 6 and CADKEY upgrades for one year with the option to renew. The purchase order was received by Frank Gregorio of Electronic Marketing Co., the authorized Cadkey Educational Dealer for Connecticut.

Seven of the vocational technical (VT) schools already are using CADKEY and/or DataCAD software and the other 10 will begin using the software in the fall. The State Department of Education had many reasons to choose Cadkey software. "It was affordable and allows for the matriculation of VT students to the many community colleges and universities in Connecticut that use CADKEY and DataCAD," said Gregorio. More importantly, according to Tom Thill at the State Department of Education, "It is important that the VT schools remain on the cutting edge."

For more information on Cadkey's Educational Programs, call the Cadkey Education Support Team at 800/338-2238 or by fax at 203/298-6590.

CADKEY Inc. Price List Effective through Sept. 30

U.S. / Canada Master Price List (U.S. Dollars)
To order, contact your local authorized CADKEY/DataCAD dealer

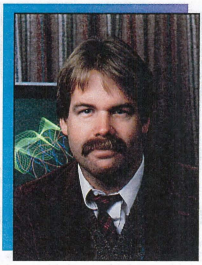
Product Name	*Suggested Retail Price*
CADKEY 7 FOR WINDOWS	
CADKEY / Windows (3-1/2" or CD ROM) – SRP	$795.00
CADKEY	
CADKEY 7 DOS (3-1/2")	$ 795.00
CADKEY Light 7	$ 99.95
Advanced Modeler (Windows/DOS)	$ 495.00
SOFTWARE FOR EDUCATION	
EduCAD America Program - DataCAD & CADKEY	
Call for Program Details/Costs	
(Contact: Pete Mancini, Cadkey Education Dept., 203-298-6420 or FAX 203-298-6590)	Call for Quote

Product Name	*Suggested Retail Price*
CADKEY UPGRADE CONTRACTS - (12 MO.)	
CADKEY Professional (Upgrades for CADKEY and Analysis, Advanced Modeler)	$ 350.00
CADKEY 7 DOS & WINDOWS	$ 250.00
DataCAD & DataCAD UPGRADES	
DataCAD 6 Professional (3-1/2" or CD ROM)	$ 149.95
Upgrades from DataCAD 5	$ 69.95
Estimator	$ 99.00
TOUCH-UP Macro	$ 49.95
BLOCKER Macro	$ 49.95

Correction

A story in the July issue of KeySolutions about RoofBuilder Tools from People Software contained incorrect telephone numbers for the company.

Readers may contact People Software at 800/647-3366 or fax at 503/317-0294.



President's Perspective

By Livingston Davies • President, Cadkey

Degrees of Excellence

I would like to extend my congratulations to the entire Cadkey staff and extended community for the recently announced industry awards earned by CADKEY for Windows! CADKEY for Windows has been selected as Product of the Year in two of the most prestigious journals of the CAD/CAM industry. Both CAE magazine and Machine Design have selected CADKEY for Windows as a premier, best-in-class product. I am proud both of the staff members who have worked many long hours to create such a masterpiece, and of the many thousands of dedicated CADKEY users who have contributed their advice and recommendations on the contents of this flagship product.

CADKEY for Windows is rightly recognized as having the best human interface of any Windows-based CAD product, bar none. Naturally, it conforms to Windows paradigms such as dockable icon-based tool bars, which allow you to put any number of tool bars anywhere you like; tool tips, which automatically describe an icon if you leave your cursor on top of it for a second or so; and on-line context-sensitive help. This makes CADKEY for Windows easy to learn for anyone accustomed to using MS Windows.

When you use Windows products, you want them to be consistent across that broad set of functions which are not application-specific. When you load a file or cut and paste using the clipboard, you want CADKEY to behave like any other Windows product. But more than that, you want to have application-specific CAD functionality just as easily and as intuitively accessible. And that is where CADKEY for Windows excels.

To mention one of the many user-sensitive features, CADKEY's scrolling history line provides built-in, natural customization that changes with your work focus. The system records your most selected functions, up to 10. The actual number depends on the graphics resolution of your computer display. The system assumes that you will want to continue doing more or less the kind of thing you have been doing recently. You may be doing geometry creation, detail drafting, stereo lithography file creation, or rendered image preparation.

Regardless of what you are doing, it is extraordinarily helpful both to have a reminder of what you have done and to have the opportunity to repeat it elsewhere with a click of your mouse button. Kind of like a cut and paste for CAD functionality!

Speed is another breakthrough of CADKEY for Windows. Its speed is remarkably close to that of the DOS version. And obtaining that speed was no mean feat. Other Windows CAD products suffer a speed degradation by as much as four times slower, compared to their DOS implementations. And CADKEY for Windows is fully compliant with Windows 95! If or when you move to Windows 95, CADKEY automatically changes its look and feel to that of a Windows 95 product.

CADKEY for Windows contains the best CAD human interface in the industry, an outstanding set of capabilities which you have helped to identify and create, remarkable speed, and an ideal framework for extending its functionality. And, thanks to our ever-growing customer base, we can continue to provide all this at the same kind of price you would expect to pay for Microsoft Office. Engineering automation is rapidly converging with office automation. We will help you get there.

CADKEY in Education

Gold Medal Winners

For the second consecutive year, Charles Borchert and Pat Newman have won gold medals in Mechanical CADD at the Ontario Skills Canada Competition.

Both students were the only competitors using CADKEY software. Borchert represented Waterloo Collegiate Institute in the secondary division and Newman represented Conestoga College in the post-secondary division. Borchert's teacher, Einar Carlsen, said, "CADKEY gave Charles and Pat a decisive advantage over the other competitors. CADKEY proved superior in both aspects of construction speed and three-dimensional images and representation." The other competitors used AutoCAD software.

Both competitors also competed in the Skills USA National Competition June 26 in Kansas City, Mo.

TSA CADD Winner

Kyle Moore, a junior technology student at Butler County High School in Morgantown, Ky., won first place in the Kentucky Technology Student Association (TSA) Architectural CADD competition.

Moore, using DataCAD 5, had no general drafting background and only nine weeks of DataCAD 5 instruction. Gregg Helmich, Moore's teacher, said, "Given a four-hour time slot, he was finished in only three hours and had time to edit and optimize, while other competitors were struggling to complete the problem. I think that this is an incredible testimony to the power of DataCAD as well as its user-friendly interface."

Kyle Moore also competed in the TSA National CADD Competition in Chicago in June.

Congratulations from Cadkey Inc. to all who competed in the VICA and TSA competitions this summer. and best of luck to those who will compete in the nationals.

For more information on the Vocational Industrial Clubs of America (VICA), call 703/777-8810. For more information on the Technology Student Association (TSA), call 703/860-9000.

3rd Prize for DataCAD Student

Drew Miller, a student at the Savannah (Ga.) College of Art and Design, won a third $1,000 prize in the 1995 Architectural RECORD competition, with his animation entry titled, "The Delineator."

Miller submitted an animation proposing that virtual reality makes possible a three-dimensional "architecture" of information through which the user can move. Using a whimsical soundtrack and some tongue-in-cheek imagery, the animation takes the viewer from a barely conventional concept of a library to a free-flowing spatial one, in which a design project's physical site is not only shown on maps of various scales but evoked through historical association. The site rises out of the maps. Program elements are expressed as volumes in space that reform themselves at the ground.

Miller used DataCAD 6.0, StereoCAD Realtime, 3D Studio, Adobe Photoshop, Microsoft Word and Excel on Pentium 90mHz notebook.

KeyTalk

Reflections on the quality of tech support

By Claudia Martin • Editor

I had an extremely pleasant and surprising experience while working with one of the printers we evaluated recently. I actually got the "royal treatment" from a technical support technician who didn't realize I was with KeySolutions and thought I was just an ordinary customer. I got to talk to a real live person (not a fax machine or voice mail) who sounded like he cared, who answered quickly without a l-o-o-n-g wait on hold, and who provided the answer I needed in a few minutes.

I found this experience really refreshing, compared to some of my other excursions into tech support Never-Never Land, but didn't think about it further. Then, a few days later, I received a well-designed follow-up questionnaire. It asked some simple questions about the support I had received. Nothing esoteric, just simple, straightforward things like how many times I called before I reached a technician; how long (in minutes) I waited on hold to speak to a technician; how many times did I call to get the problem solved; were my questions answered satisfactorily. I also was invited to rate the overall support in terms of accessibility, length of time to access, completeness of information, flexibility of policies, and my perception of the technician's interest in resolving my problem. The representative's name, the time of the call and a call code were on the questionnaire. I was also asked to rate the company's products in terms of ease of installation, ease of learning, functionality (features), documentation, performance, value (cost/performance) and overall product rating. I occasionally come across good tech support departments, but this was a first.

It was as if someone really cared! How sad that this is becoming more and more unusual. You know the typical scenarios all too well:

- Waiting on hold with an annoying computer voice telling you that you are the umpteenth caller and the wait will be approximately a jillion minutes. (You obviously have nothing better to do than sit and wait.)
- Or the message that "our representatives are currently busy, please leave your number and we will return your call." (In what century? you ask the machine, because sometimes they never do.)
- Or the eternal hold with the nauseous music or — worse yet — product spots.
- Or getting the answer that they don't know the answer without an offer to do further research or even consult with a supervisor. (If they don't know, who does?)

All tech support encounters (for hardware or software) should be like my recent one. Happy customers are the best advertising for any company or product. Superior technical support is a good way to create happy customers, especially out of the ones who may be experiencing frustration.

Hardware and software companies should not lose sight of the fact that many of the people who call for help are losing time on a project and need the product to function properly so they can get back to work. Waiting over 24 hours for a call-back is not acceptable. Good tech support costs money, but in the long run, it's surely worth it.

Many thanks to Pacific Data Products for the technical support I received when working with the ProTracer II inkjet printer.

ISDN from Page 1

the appeal of ISDN to CAD/CAM users, a *mini-primer on ISDN might be in order.*

ISDN 101

Before ISDN, all the different types of data flowing over the network had to take separate routes. Video, audio, voice, and data transmission required four separate networks: video was distributed on coaxial lines, audio over balanced lines, voice over copper cable pairs, and data services over coaxial or twisted pair cables. ISDN technology changed all that by integrating voice, video, audio and data services over the same network, without sacrificing quality in any area. It has the added capability for features such as on-demand networking, bandwidth on demand, and "on-the-fly" connectivity.

Advanced features like these are available, in large part, because ISDN is digital. Analog performance made sense when telephone service was limited to voice transmission, but it proved inadequate for data applications. Computers are digital devices and, in order to transmit data from computers, ways had to be developed to take the computer's ones and zeros and convert them to a series of analog tones. On the receiving end, a process called demodulation converted the tones back to their digital equivalents.

The first device designed to handle that modulation/demodulation process was the modem (for modulate/demodulate). While the modem process succeeded in opening the doors to digital communication, it had limitations of its own. Modem tones can be corrupted by noise, echoes and line spikes; bandwidth is limited; and modem speeds, unable to keep pace with the applications that proliferated around digital technology, are completely maxed out.

ISDN avoids the analog/digital conversion scenario. Therefore, it has moved to the forefront as the logical solution for networks needing high-speed connectivity. Like computer networks, ISDN is itself a digital network. Thanks to devices such as bridges or routers, ISDN users can output their digital signals directly to the network without converting them to analog tones. End-to-end connectivity results in higher speed connections and significantly reduced error rates.

Acronyms Abound

You'll hear a lot of talk about ISDN's two categories — BRI (Basic Rate Interface) and PRI (Primary Rate Interface). While these acronyms are spelled out below, it's important to realize that these definitions fall under the category of how things work, not why you'd want to use them. However, being conversant in the terminology will be helpful in ordering the service; after that you can concentrate on the benefits BRI and PRI bring to your application rather than the complexities of their makeup.

Not all applications have the same bandwidth requirements, so ISDN developers designed the technology to be built in different sizes. The basic building block of ISDN is the B (Bearer) channel. Designed for voice, video or data, the B channel can support data transfer rates up to 64 kilobytes per second and can be aggregated for higher bandwidth applications. The D (Delta) channel that makes up the remainder of the ISDN line is used for communications between the phone switch and the ISDN device.

The combination of these two channel types results in either Basic Rate Interface (BRI) or Primary Rate Interface (PRI) communication. Although BRI, with its two 64 KBps B channels and single 16 KBps D channel, is the smaller in capacity of the two ISDN options, it offers enough muscle to satisfy the requirements of the majority of today's ISDN applications. PRI is the economy-sized version. North American PRI service contains 23 B channels and one 64 Kbps D channel and is typically used in hefty applications requiring large amounts of bandwidth. However, all the user really needs to know is that the 2B + D you get with BRI will result in increased performance in sending files across the network. The key in all this is aggregation, and, as you'll see later in this article, bandwidth aggregation.

To determine whether you need BRI or PRI, look at your bandwidth requirements. A good rule of thumb is that if your files are a megabyte or less, BRI is your most cost-effective option. For files over a megabyte, you may want the robustness that PRI offers.

Coming Soon to a Network Near You

OK, so you know that ISDN is a good way to send digital audio, video and even voice data. You know what ISDN is made of and what it's superseding. As soon as you find out some specifics on the performance and cost, you'll be ready to order.

That may or may not be easy to do. While demand for the service is increasing, it's not exactly in the league with call-waiting as a checklist item on your phone service order form. ISDN service availability, prices, and installation requirements vary widely. Be aware that you'll need ISDN at your site as well as any remote sites to which you plan to connect. To find out if service is available in those areas, start with your local phone service provider; many providers have ISDN order centers that can provide information and rates for ISDN service in your area. Another resource for information is the router or bridge equipment ven-

See ISDN, Page 16 ⇨

Industry Briefs

Research Yields Mold Software

Moldflow, General Electric Plastics and Ford Motor Co. have completed phase one of a collaborative research program to develop a simulation software package for the injection compression molding process. The software simulates the controlled force compression process for both the polymer filling and packing stages. Injection compression is a technology widely used to create thin-walled parts and low-stress parts, especially in large molds. The process is similar to traditional injection molding, with the exception that the mold remains slightly open at the start of injection. A charge of polymer is then injected and the mold is closed to final dimension, simultaneously completing the filling and packing of the activity.

CAD in Fashion Design

A recent survey of 228 leading fashion designers, conducted by the National Knitwear and Sportswear Association and A. Grudier Consulting, reports that 76 percent of fashion designers use computer-aided design in their daily work. This figure escalated almost 10 percent from last year's CAD EXPO survey results, indicating that industry professionals are becoming increasingly aware of CAD's capabilities and necessity for the fashion industry.

Scitor and Solutions for Hunger

Scitor Corp. and the Second Harvest Food Bank have joined to create a program called Solutions for Hunger. As part of the program, Scitor Corp. will make a financial contribution to the Second Harvest Food Bank for each registered copy of its Process Charter or Project Scheduler software. The Second Harvest Food Bank network is comprised of nearly 200 food banks serving some 50,000 local charitable agencies in all 50 states. Second Harvest is the largest charitable source of food in the country. According to Linda Munsell, Scitor's director of human resources, "Every year, Scitor donates time and money to a number of different charities, but this is the first time we've established a program of this magnitude."

RevPoint 3D Systems

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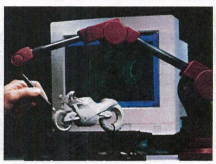

- Hand held Flexibility
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- Easy to use real time input and commands (of course it's fully compatible with Cadkey)

You'll be surprised at how affordable the RevPoint 3D System is. Call today for a free brochure and price list.

The RevPoint 3D Systems is a complete package that provides real time 3D input with all of the software you'll need for Reverse Engineering, Rapid Prototyping, 3D Modelling, or Design. As simply as you would use a tablet stylus, place the 3D probe on the surface of an existing part and you are now working in 3D.

SoftWorld INTERNATIONAL

The 3 Dimensional Solutions Company

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European office: SoftWorld Aps.
Tel.: 45 45 41 00 77 Fax.: 45 42 42 03 88

CIRCLE 244 ON PAGE 2 FORM

Storage Devices

FINDING SOLUTIONS TO STORAGE DILEMMAS

By Barbara Schmitz

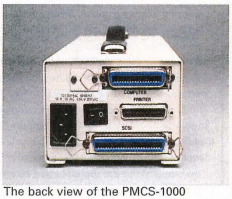
Today's CAD programs are disk-space eaters. Enormous drawing files quickly gobble up the once-sufficient hard disks of most users. So does the bevy of graphics-intensive software programs now lighting up the screens of computers everywhere. Can conventional disk drives keep up with the expanding demands of users? Or will the growing number of alternative storage devices become the storage solution of the future?

There probably isn't a clear answer. However, one thing is clear. According to a Frost & Sullivan report, standard storage configurations on PCs and workstations will expand from five to 15 times over the next five years to keep up with the seemingly insatiable needs of users. By 1996, the average storage configuration of stand-alone desktop PCs will reach nearly 1 gigabyte (GB) while file servers will boast an average capacity of 20GBs.

Choosing the Best Solution

Users' demands on storage devices are obviously diverse. Decisions vary according to a number of factors. Must the data be readily available? If so, how quickly must the data be accessed? Will the device be used for backup and archive only? And, of course, there are always cost considerations.

For many looking for a network storage solution, the answer may be a combination of devices. Storage costs can be reduced by migrating inactive data from more expensive hard disks to a low-cost mass storage alternative. Approximately 80 percent of network data is inactive and can be moved from valuable hard disk space to a less expensive, but slower access media, such as optical library units (jukeboxes) and tape libraries.



The back view of the PMCS-1000

There are three main factors to consider when choosing a storage device: capacity, performance (response time), and cost. Random access memory (RAM) is available in relatively small megabyte (MB) increments, but at a relatively high cost per megabyte. Magnetic disk drives (5.25-inch), which come in 100MB to 9GB capacities, offer access speeds in the range of 10 milliseconds, but at a much lower cost per megabyte.

For even cheaper storage of mass amounts of data, optical disk drives and storage libraries may be the answer. Optical disk drives, available in 1.3GB to 2GB capacities, offer access speeds in the 30-millisecond range at about one-third the cost per megabyte of magnetic disk drives.

Optical jukeboxes, so named because of the robotic arm used to exchange CD-ROMs between one or more drives, offer amazing storage capacities at a low cost per megabyte, but with much slower access times. These devices are used primarily in environments in which required capacity exceeds 100GBs.

Tape libraries are another option, if fast data access is not essential but low cost per megabyte is. Tape libraries, which are used primarily for backup and archive, offer tremendous storage capacity at a minimal cost per megabyte.

On-Line Versus Off-Line

Storage devices that respond in less than one second to a request are called on-line storage. Examples of on-line storage are magnetic hard disk drives and floppy disk drives.

A storage device that requires a relatively slow mechanical operation to be completed before media is accessible and data begins being transferred is called near-line storage. Examples of this kind of storage device are optical libraries or jukeboxes.

A device that requires a user to physically retrieve the medium from storage and load it onto the storage device before the start of transfer of data is called off-line storage. Examples of off-line storage would be tape libraries.

Another storage device variable that can affect data delivery speed is how quickly a device can get to data requested on the medium. This is referred to as direct access or sequential access.

Direct access storage devices,

See STORAGE, page 7 ⇨

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CIRCLE 213 ON PAGE 2 FORM

230MB Optical Drive

Magneto-optical storage is becoming the storage solution of choice for high-end applications because of its low cost-per-megabyte, portability and durability. In addition, the 230MB size has become an ISO standard, making the disks interchangeable among drives of varying brands. It also is backward-compatible (read, write, format) with earlier 128MB products.

Prices for 230MB optical drives and media have decreased more than 40 percent over the last year, while performance has improved. Street prices have dropped to about $20 each for a rewritable 230MB cartridge. Shipment levels for 3.5-inch and 5.25-inch form factor optical drives exceeded 600,000 units in 1994, and sales are expected to exceed 1 million units by 1996.

The new PowerMOtm from Olympus is the industry's first 3.5-inch 230MB optical drive with 4,500 rpm rotational speed. Engineered for high-end graphics, prepress, CAD and multimedia applications, the PowerMO subsystem offers 1MB of on-board cache memory (the only one in the industry to offer that feature) for easier and faster storage and retrieval of large files. According to Olympus, the PowerMO subsystem is about 25-30 percent faster than competing devices. The new PowerMO subsystem offers a sustained read data transfer rate of up to 1.84MB of user data per second (2.61MB all bus data) and an average random access time of 26 milliseconds.

Additional features include an ASCII LED indicator that allows users to diagnose breaks immediately in the SCSI chain, and a built-in digital-active SCSI termination, which also is switchable and monitors signal lines precisely.

Single unit street pricing for the PowerMO 230 is about $599 for the Macintosh platform, $689 for the DOS/Windows version. All models include driver/formatter software, a SCSI cable, one free cartridge and a two-year warranty. The DOS version includes a SCSI host adapter for a 16-bit ISA bus. The product is available through Olympus' network of authorized resellers and distributors.

For more information, call 800/503-1177.

2 GB Tape System

The PMCS-1000 from Parallel Storage Solutions (PSS) is a portable (or stationary) backup solution for desktop computers and notebooks. This 2GB 3.5-inch mini-cartridge tape system is housed in a shoebox size chassis, has an internal auto-sensing power supply, and connects to a computer via the parallel or SCSI port.

The PMCS-1000 Backup System includes the PMCS-1000 2GB portable parallel/SCSI tape system, mini-data cartridge, parallel cable, SCSI cable, Quickstart Users Manual and a software. PSS software packages are available for using the PMCS1000 with DOS, Windows, OS/2, NetWare, UNIX/XENIX and QNX. The PMCS1000 also can be used with third-party SCSI backup products. The software comes with unlimited licenses and no user restrictions.

The mini-cartridge system offers high-speed backup and fast data transfer (8-18 MB per minute through a parallel port and up to 36 MB per minute through a SCSI port). This provides a user with a backup and verification of 1GB of data in less than an hour through a parallel port. No data cartridge formatting is required and it features a single-pass backup/verify operation.

The read-after-write capability of the PMCS-1000 provides for single pass backup/verify and restore/compare operations, which saves the user critical time and guarantees data integrity. This compares to other drives that require a separate tape pass for backup, verify, restore and compare operations. Gentle media handling extends the drive's lifetime to a mean time between failure of 200,000 hours, putting it ahead of competing mini-cartridge systems. The PMCS-1000's retail price is $1,295.

Founded in 1992 and headquartered in Elmsford, N.Y., Parallel Storage Solutions manufactures portable parallel backup hardware and software, including quarter-inch cartridge (QIC) standard and mini-cartridge systems, and digital audio tape (DAT) systems with storage capacities ranging from 250 MB to 10 GB.

For information, contact PSS at 800/998-7839 or 914/347-7044.

STORAGE from Page 6

magnetic disk drives and optical disk drives can go directly to the data requested on the medium. By comparison, sequential access storage devices, such as tape libraries and optical tape, require that much of the tape be passed over the read/write heads before coming to the requested data.

The Hard Drive

Most users dream of a bottomless hard drive that would eliminate the possibility of storage shortages. But, in reality, can conventional hard drives keep up with the increasingly large demands of users?

A particular technology that may help hard drives stay one step ahead is the use of ultra-sensitive recording heads. These heads use an electrical phenomenon called magneto-resistance (MR) to pack data more densely on the disk. Pioneered by IBM, this technology has doubled the pace of storage capacity improvements since 1992. Today, most drive makers are experimenting with "giant MR," which could boost storage density thirty fold by the year 2000.

Redundance Arrays of Independent Disks (RAID) systems are made up of a series of hard disk drives in one array. RAID systems offer a high degree of data capacity, typically 6GBs, and are easily expanded by upgrading the disk drives or by adding modules to the system.

Another advantage of RAID systems is the high degree of data security and reliability they offer. With a RAID system, data can be accessed during disk failure, replacement or repair. Also, with multiple disks and redundant power supplies, the mean time between data loss for a RAID system can be in excess of 5 million hours.

With growing concerns regarding data security and effective disaster recovery, the future looks bright for this storage option. According to the International Data Corp., RAID shipments will grow from $335 million in 1994 to $1.1 billion by 1996.

Tape Libraries

As floppy drives lose ground in the battle to remain the dominant backup medium for PCs, many users are looking for other solutions. One option for disk backup and archive is the tape library.

According to a study by Freeman Associates Inc., demand for automated tape libraries will mushroom from $1.4 billion in 1994 to $1.8 billion by 2000. While these tape libraries are used primarily in multi-user and workstation environments, vendors in the market are targeting PC users in the battle with optical disk drive makers over users' storage dollars.

Libraries that use ((M2-in.??)) cartridges are most prevalent. Other tape options, including systems that use digital audio tape (DAT) technology and 8mm tape — the first form-factor tape used in an automated setting — are both expected to gain market ground in the future.

The main disadvantage of this method of storage is the time required to access data. Archived data stored on tape must be retrieved from the library unit and manually loaded for viewing. In addition, tape libraries are sequential access devices, so data cannot be immediately accessed without a search.

The advantage of tape libraries is the mass amount of data that can be stored. For backup and archive, where fast data access is not essential, this can be a good, cost-effective storage option.

There are also internal and external tape drives that can be used to increase the backup and recovery requirements of high-end workstations and small networks. Many of these tape drives are relatively low cost (under $500) and can store upwards of 700MB.

A new generation of tape backup systems now use DATs. Designed primarily for small- to medium-size network applications, these DAT backup systems offer storage capacity of about 4GBs.

Optical Disk Drives

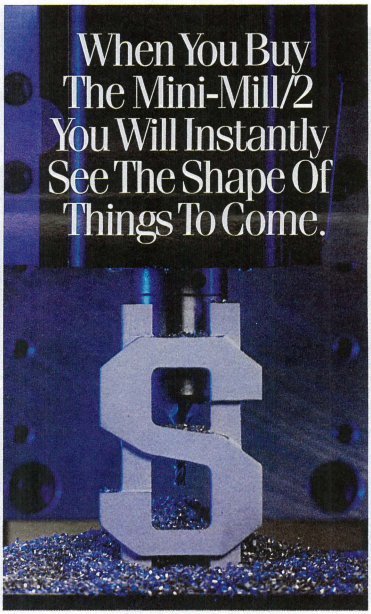
Though the fanfare surrounding the emergence of Compact Disk Read-Only Memory (CD-ROMs) in 1992 has subsided, the potential of using CD-ROM drives as a long-term storage solution is not only viable but probable. A market study by Frost & Sullivan reports that worldwide sales of optical disk drives and media will more than quadruple, from $2.6 billion in 1993 to $11.5 billion by the year 2000.

By the end of the decade, a projected 90 percent of PCs will ship with CD-ROM drives, compared to 40 percent in 1994.

Developed jointly by Phillips and Sony, CD-ROMs are lightweight and can hold approximately 600-650MB (approximately 460 times more than a conventional 3-inch by 2-inch floppy disk) of not only text, but audio, graphics, video and animations.

One advantage of CD-ROMs as a storage medium is their long shelf life. CDs are encased in a tough polycarbonate shell and offer an unbelievable life span of more than

See STORAGE, page 17 ⇨



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CIRCLE 234 ON PAGE 2 FORM

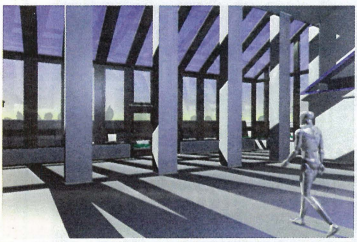
DataCAD from Page 1

Computer video productions can add many elements to a rendered image, such as people and backgrounds.

tured the viewer walking to the end of the room as the camera zoomed to a picture of the site plan on an easel. Paradigm Productions also created a video production for Shelby State Community College in Memphis. The video showcased the entire master plan and "highlighted" each building or area with color changes and narration. This video was developed to raise $70 million for the school and to solicit the state Legislature and Board of Regents. Paradigm soon realized another benefit of rendering and animation. By providing clients with an improved means to visualize a project, an architect can ensure the client understands each component of the building before moving on to the next phase of development. Digital prototypes are precise and offer a true sense of space. Whether examining an aerial or interior view of the building, the observer perceives the building as an existing entity. Realistic camera angles, colors, lighting, textures and materials all are used to achieve a visual reality so authentic many viewers assume they are looking at a photograph or actual film footage.

Beavers Smith Langford Mundiger of Memphis. A full-size rendering and an animated walk-through was created for this project.

The animation began with a view of the theater site. The viewer "flew" down and around the building, in the front doors and into the theater lobby. Once inside, the viewer took a seat. The house lights went down and the curtains came up. Spotlights danced across the stage, highlighting the project name. From there, the viewer "stood up" and strolled down a corridor into a multipurpose conference room. Movable walls opened to show the large space. The grand finale fea-



Video productions bring a static computer image to life for visual presentations.

Paradigm's prospective market widened when they began developing WLMT Channel 30's on-air animations and created custom screen transitions for the producer of the ESPN Fitness Pros program. For a recent political campaign advertisement, they created a key animation sequence featuring an obstacle course. Another project involved animating a series of massing studies for the Memphis Wonder series "Imperial Tombs of China."

Paradigm's extensive services have branched into new territory, such as theater design, video brochures and portfolios, training tapes, legal re-enactment, animated company logos and trademark designs, television commercials, and photo composition combining a photo of an existing site with computer images.

How They Do It

Paradigm Productions uses DataCAD to create the majority of the geometric 3D models used in rendering animation projects. Each material (glass, wood, mullions, roof, walls, etc.) is created on a different layer; a separate DXF file is output and can be transferred to an Amiga system. Using a high-density floppy drive and a program called CrossDos, the files are copied to the RAM drive on the Amiga where they are imported into the animation program. Paradigm Productions currently uses the 3D animation programs Imagine and Lightwave 3D. Both software programs convert the DXF format into their own proprietary object formats.

Once in Imagine or Lightwave, object attributes are generated to describe the surface characteristics of each material (i.e., glass is transparent with a hard glossy surface; brick is simulated with a repeatable texture map and the surface is diffused). The lighting then is added to the scene and the camera is located and sized (focal length). A few test renderings are run and modifications are made to the building material attributes, lighting, and camera position if needed. The test rendering is shown to the client for approval.

A final test rendering is output and printed on a Fargo PrimeraPro dye sublimation printer. This print is marked showing possible locations for entourage, or environmental details, such as trees, cars and people.

Depending on the scope of the job, Paradigm goes to varying extremes in modeling the site on which a building sits. Generally, they begin with a flat site which is pushed and pulled on points to simulate the changes in grade. Then, in DataCAD, a site plan is drawn (or modified from CAD files provided by the architect), which includes curb lines, sidewalks, and parking stall lines. This is output to a plot file, which is converted in Hijack Pro into a two-color bit map PCX file. The PCX file is transferred to the Amiga and loaded into AdPro (short for The Art Department). It is scaled by 75 percent (to get some anti-aliasing on the hard edges) and converted to a 24-bit IFF file. The IFF file is loaded into a full-featured 24-bit paint program called OpalPaint. Areas of the site are painted and filled in to look like asphalt, concrete, grass, etc.

Back in the 3D Amiga program, the finished site map is applied to the site object and added to the scene. A final ray-trace picture file is rendered with shadows and reflections. The sky is left black so that a real sky can be added in behind it. After compositing the sky, the picture is loaded into OpalPaint where touch-up and entourage are added. Trees are painted and people and cars are added from Paradigm's library of entourage pictures.

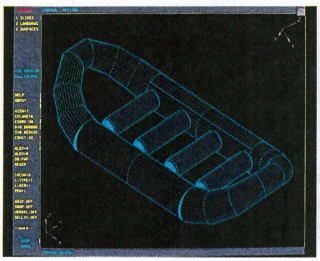
Final output is sent either to a dye sublimation printer or to a studio where a photo negative is produced for slides or photographs. Animations are output to videotape via a Sony EVO9650 Hi-8 video deck and dubbed to VHS or any other format.

RAFT from Page 1

Headwaters river raft.

Chris Pearson III, co-founder of Colorado Headwaters Inc., a commercial raft-building company in Denver, was uniquely qualified to enter this business. Pearson has been designing, manufacturing, testing and marketing inflatable products since 1968. He began his career designing life rafts and escape slides for commercial airlines. This background would prove to be the launching pad for two high-profile government projects. Pearson developed the emergency escape slide for the NASA Space Shuttle and received awards for his design. He also devised an inflatable flotation system for the 70,000 lb. Bradley Fighting Vehicle. Another accomplishment includes research and testing of inflatables for the U.S. Army at the U.S. Naval Academy Hydrodynamics Lab in Annapolis, Md. Early in his career, he co-founded Maravia Corp., a manufacturer of white water rafts still in business today.

With uncompromising dedication to craftsmanship, Colorado Headwaters stormed onto the river-running scene with unrivaled design capabilities and the strongest raft outside the military market. Pearson gives us an intimate look at Colorado Headwaters and what it takes to meet the demands of his customers. You'll discover how he combines innovative design techniques, advanced materials and CAD technology to redefine high-quality inflatables.



A wireframe drawing of a Colorado Headwaters raft.

Colorado Headwaters had a rather unassuming beginning. In late 1989, Pearson custom-built a 14-foot self-bailing white water raft for a friend to use on weekend trips around the Colorado Mountains. Word began to spread about the unusual raft and, as a result of the response, Pearson began building rafts full-time. In 1993, he joined forces with neighbor and financial executive Dan Vork and incorporated Colorado Headwaters Inc.

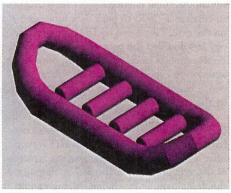
"Right from the beginning, our goal was to enter the market with a product totally unprecedented," Pearson says. "We were not interested in being a 'me too' company."

Pearson's original raft was used as the prototype design. During the 1993 rafting season, the pair built 15 rafts and demonstrated their product to outfitters throughout Colorado. The response was very positive, including feedback from Paddler Magazine, which tested one of the 1993 model rafts.

Pearson and Vork further refined their design and built 120 rafts during the 1994 season. At the same time, they applied for a patent for their raft design.

All Colorado Headwaters rafts are produced exclusively of a 1050 denier, ballistic-woven nylon fabric coated with a specially formulated Dupont HypalonX rubber. It provides long-term service without becoming porous. Particularly vulnerable areas are armored with a highly abrasion-resistant urethane coating. Lighter in weight than conventional abrasion patches, this material provides maximum protection. A similar fabric has been used in the manufacture of a flotation collar for armored tanks and was selected for its toughness and durability.

The company uses aplain weave fabric, in which equal numbers of fibers run in both directions of the material and provide an extremely high tear strength of 150-180 lbs. per inch, well above the industry standard. This ballistic woven material was developed to military specifications and put through rigorous testing. River rafting requires a tough craft. If a raft is punctured by a rock, the material does not continue to tear. Air chambers keep the raft afloat until the outfitter can guide the raft to the riverside and make repairs. Although the cost of the fabric is significantly higher than materials used by other raft manufacturers, Pearson says, his boats are competitively priced and are warranted against defects in material and workmanship for five years. The 14-foot raft weighs in at just 110 pounds.



A rendered image of a Colorado Headwaters raft, completed in CADKEY.

Colorado Headwaters then began searching for ways to automate the tedious and time-consuming process of raft design and pattern-making.

While at a fabric convention in Denver in late 1993, they saw an exhibitor using CADKEY 3D to create 3D models, then flattening the part to derive patterns. Pearson's son, Chris, the company's in-house computer and graphic design specialist, traveled to MCAD Design in Lakewood, Colo., to meet with Bill Boland, a Value-Added Reseller for CADKEY.

The demonstration included designing and surfacing a three-dimensional model of the Colorado Headwaters raft. A feature vital to the company's work, Unwrap, was used to flatten the wireframe model to produce a pattern. A plot file was output and delivered to the plotting service, where patterns were cut and transferred to material. The resulting patterns were very accurate, Pearson says.

Several factors go into designing a new prototype. It begins with a rough drawing for a quick visual. Decisions must be made about the boat's length and breadth, tube diameters and their effect on wind resistance and interior space,

See RAFT, Page 9

Digitizers

CalComp DrawingBoard III - The Next Generation of Digitizer

By Bob Martin

CalComp's "improved" digitizer, the DrawingBoard III, is just that. It adds enhancements to the DrawingBoard II it replaces and has slick new Windows functionality. For example, this digitizer worked great with the DOS version of CADKEY, and just as great when I switched to Windows applications. In Windows, I was able to define the active area to something manageable. Instead of having to go to the far edges of the tablet to pick the File Menu and then the vertical scroll bar, I could restrict the range of "mouse" motion.

The fully automatic installation was easy. I oriented the tablet immediately to the software packages I use with no difficulty. DrawingBoard III works automatically with various hardware and software, allowing quick switching between applications without resetting parameters. This digitizer also has macro capabilities and a removable menu strip available for custom commands.

This device is flexible. The four-button or 16-button cursors and standard pens can be used with or without a cord; pressure-sensitive pens are cordless only. The pressure-sensitive pen has a full range of dynamic sensing capabilities such as tilt, pressure and proximity. A button on the digitizer's tablet surface lets you set and lock pen pressure (256 levels supported).

The Drawing Board III is available in six tablet sizes ranging from 12-inch by 12-inch (A size) to 44-inch by 60-inch (J size) and provides high resolution (up to 2540 lines per inch) and accuracy (+ 0.005 inch). DrawingBoard III is compatible with all leading CAD, graphic arts, desktop publishing and other software applications. Software drivers are available that provide automatic Sun, Microsoft Windows, UNIX, Autodesk Device Interface (ADI) and Microsoft Mouse emulation compatibility.

You can adjust the tablet to the way you prefer to work. The tablet's surface menu includes 18 user-recordable macro blocks plus up to 16 additional user-recordable macro buttons from the cursor or pen. Up to three sets of operational formats can be saved and recalled by a single menu selection from the tablet.

The prices are very competitive. Suggested retail prices are $355 and $??? for the 12 x 12-inch size (corded and cordless versions respectively); $710 and $??? for the 12 x 18-inch size. The price includes the tablet, interface kit, cables, manual, power supply and choice of transducer. In addition, all prices include a lifetime limited warranty and support in the form of built-in diagnostics, help screens and a toll-free technical support hotline.

For more information, contact CalComp at 602/948-6540 or 800/458-5888 or by fax at 602/948-5508.

CalComp's DrawingBoard III

RAFT from Page 8

floor placement and the overall geometry of the craft . At any point, images can be shaded for a quick look at how the new raft is shaping up, Pearson says.

Each boat is made up of 100-150 components, Pearson said. All of them — from D-rings to thwart tubes — have been modeled in 3D in CADKEY.

"Using CAD technology has literally changed the way we do business," Pearson says. "We have reduced a 12- to 15-hour process to 2 hours to design a boat and produce the patterns. CADKEY proved to be a verification tool as well. With greater visualization capabilities, we can easily spot potential problem areas in a new design."

The 3D prototypes also are valuable in creating promotional materials to market the company's 22 different raft designs, he says.

Colorado Headwaters boats have been highly successful in raft competitions, which have helped increase the company's market share.

Dee Holladay, owner of Holiday River and Bike Expeditions based in Salt Lake City, Utah, says Colorado Headwaters and CAD have helped meet his need for a durable, high-performance raft.

"With the particular raft we want to use, the side and end tubes are of different diameters, and the sections must blend perfectly. This design gets quite complex," he says. "If we want to experiment, CAD saves us a lot of time, expense and frustration."

Colorado Headwaters now is targeting outfitters worldwide and hoping to obtain government contracts.

"Whatever we become involved in, our goal is to be truly unique, state-of-the art and ultimately beneficial to the end user," Pearson says.

With the implementation of a successful marketing strategy and CAD technology, the company's size has doubled. The entire product line of Colorado Headwaters is designed and manufactured in the U.S. and all base materials are purchased in the U.S. By keeping the business at home, they maintain total quality control, Pearson says.

As their customers succumb to the call of the great white waters, Colorado Headwaters truly provides sound technology behind the "rush" of river rafting.

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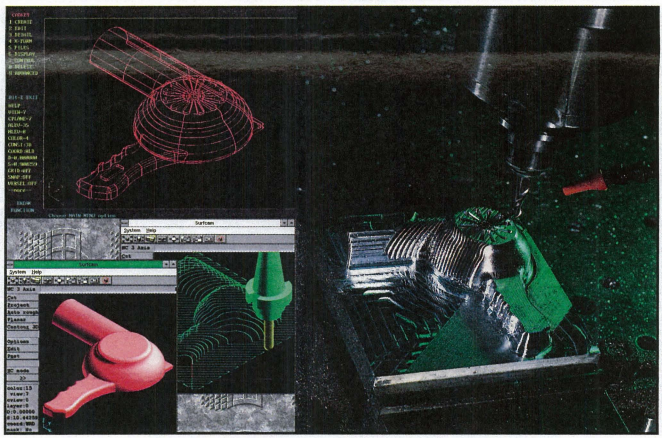

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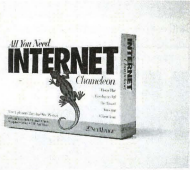
Software

Internet Chameleon™

Internet Chameleon 4.5 is a comprehensive suite of 18 applications for exploring the Internet. Included in the package are ECCO Internet AddressBook, NEWTShooter, WebSurfer, e-mail, Gopher, FTP and Archie, NEWTNews reader, Telnet terminal emulation and BBS access, Finger, WhoIs, Name Resolver, and Ping tools and diagnostics, TALK for real-time chats, and NEWTView and NEWTSound file viewers. Chameleon also includes the Automatic Internet application which provides online access to several national providers; sign-up and configuration are integrated for easy Internet access. Internet Chameleon 4.5 is available for $125, with version 4.1 upgrades priced at $50.

Contact NetManage at 408/973-7171 or fax 408/257-6405 or on the Internet at sales@netmanage.com.



Internet Chameleon

LapLink for Windows

The new updated version of LapLink for Windows allows users to remotely control and transfer files between Windows 3.x and Windows 95. New features include outbound modem pooling, improved performance with 386s, and updated modem strings and modem support for more than 300 modems.

Contact Traveling Software at 206/483-8088 or fax 206/487-1284.

Ray Dream Designer 3 for Windows

Ray Dream Designer is a comprehensive graphics application for creating full-color, high-resolution 3D images, combining modeling, scene composition, and rendering in a single, integrated interface. Ray Dream Designer provides Bézier-based drawing tools, 3D Paint, Modeling Wizard, and cross-platform compatibility with Windows and Macintosh. Some of the features of Ray Dream Designer are Shadows Browsers, a catalog of color and texture characteristics which can be applied to objects by using drag-and-drop; Virtual Trackball, which allows users to orient objects in 3D space by rotating to any orientation with mouse clicks; Lighting, which gives the user control over every characteristic of the light including color, brightness, range, distance, and shadows, and gels for theatrical lighting; G-Buffer which stores multiple channels of geometric data. Suggested retail price is $349.

Contact Ray Dream Inc. at 415/960-0768 or fax 415/960-1198.

Developers Toolkit for DWG/DXF files

DXE, an application programming interface for reading, writing, and displaying DWG and DXF files, is available from Tailor Made Software. DXE can be used for DOS, Windows, Windows 95, Windows NT, and UNIX applications. A standard DXE license gives developers the tools for building their own input and output translators, 20 hours of consulting services per year plus all software updates. Consulting services include training, customization, customer-specific enhancements, program design service and programming support.

Contact Tailor Made Software Ltd. at 800/732-2585 or fax 513/576-0423 or e-mail 75017.1764@compuserve.com.

ECCO Pro 3.03

ECCO Pro 3.0

ECCO Pro 3.0's interface resembles familiar information management tools. Version 3.0 has more than 100 new features, including workgroup collaboration; Internet integration; Internet address book with more than 2,000 sites; AutoAssign, an automatic information organizer; notepads for outlining; Rolodex card interface for contact management; desktop calendar; customizable colors; tabs for view switching; revised menus and dialogs; and balloon help.

The Correspondence Manager will send faxes, e-mail, and letters to multiple contacts at once; ECCO will dial phone numbers and keep a phone log with date and time stamp; built-in Print Formats allow the user to print formats for DayRunner, DayTimers, Franklin, Priority Management, Avery, or your own design.

ECCO Pro 3.0 has a special introductory price of $175, and upgrades are priced at $49.95 (ECCO Pro purchasers since April 19, 1995, may upgrade for $14.95 plus shipping/handling).

Contact NetManage at 206/869-9600 or fax 206/885-0127 or e-mail at normam@netmanage.com.

Pulsar for Windows

Software Shop Systems Inc. announces a late summer 1995 release for the new Windows version of the Pulsar estimating software. Pulsar is a comprehensive estimating software for facilities construction, remodeling, maintenance and job order contracting. Upgrades in the new Pulsar version include estimate comparison reports, user-definable fields for coefficients, and multiple trade rate files, and support for trade files.

Contact Software Shop Systems, Inc. at 908/938-3200 or fax 908/938-363.

Hardware

Optiquest Value Line Monitor

The Optiquest 1769DC Value Line Monitor by ViewSonic offers plug-and-play compatibility to support Microsoft Windows 95.

When used with a compatible video card, the 1769DC supplies an interface for automatically configuring the graphics controller.

The Optiquest monitor offers .28mm dot pitch, a maximum non-interlaced resolution of 1280x1024, Invar Shadow mask for enhanced image quality, Opti-Green software for programmable power-down, 28 programmable memory modes for automatic screen adjustment, Advanced Color management, on-screen programming, overscan capabilities, tilt-and-swivel base and anti-glare and anti-static glare coating.

The suggested list price is $795, and the monitor is backed by a three-year limited warranty on parts and one year on labor.

Contact ViewSonic at 909/869-7976 or fax 909/468-3756.

Tri-CAD 133 SuperSystem

Built around the newest Intel Pentium processor, the 133mHz Tri-CAD SuperSystem comes standard with 1.6GB hard drive, 32MB of Enhanced Data Out RAM, 256K CADCache', Dual-Channel 32-bit EIDE controller, ELSA' Winner Pro/X with 8MB of VRAM, 21-inch ViewSonic monitor, HEX-speed CD-ROM drive, and 28.8 internal fax/modem.

Contact Tri-Star at 602/731-4926 or fax 800/800-7668.

Ergo's CD-Brick Notebook Computer

Featuring a 90MHz Pentium 3-volt processor, 256K cache and up to 40MB RAM, the Ergo CD-Brick also includes a removable 525MB hard disk with local bus interface, a Chips and Tech 65545 accelerated graphics with 1-2MB video RAM which supports up to 16 million colors, and 10.2-inch Active Color or 10.4-inch Dual Scan Color LCD. An internal 2x CD-ROM drive is accessible under the keyboard, and can be combined with optional MPEG motion video playback module and CD-quality audio with two front-mounted speakers. There are two PCMCIA type II expansion slots, plus ports for external SVGA monitor, serial port, EPP/ECP parallel port, SCSI port, keyboard, audio line in, microphone in, and speaker out. All Ergo systems feature a four-year warranty with 24-hour, seven-day toll-free tech support.

Contact Ergo Computing at 800/723-0778, code 2140.

Impression 960 LCD Projector

Impression 960 LCD Projector

ASK LCD Inc. introduced the Impression 960 XGA active matrix Liquid Crystal Display projector designed for presentations from PCs, workstations, and video equipment. The Impression 960 can provide full-screen projection on images ranging from 640x480 pixels to 1280x1024 pixels, with up to 16.7 million colors on a True 24-bit color palette. The Impression 960 measures 12.7 inches by 9.6 inches by 25.1 inches, and weighs only 27.5 pounds. The Impression 960 installs itself and BatMouse, an infrared remote mouse, controls the computer from anywhere in the room. Available in September, it carries a suggested retail price of $18,000.

Contact ASK LCD at 800/275-5231.

30-bit Single-pass Flatbed Scanner

Tamarack Technologies Inc. has just released a new 30-bit single-pass flatbed scanner. The Z1-600, which uses advanced ASIC technology, can distinguish over 1 billion colors and 1,024 shades of gray, with a maximum of 2400 dpi (300x600 dpi optical resolution). The Z1-600 features a scanning size of 8.5 inches by 11 inches, and can produce a 300-dpi 30-bit color letter-size scan in 35 seconds. It is available with optional transparency adapter and an automatic document feeder. Built-in SCSI port easily connects it to both 486+ PCs and Macintosh II+ systems. The suggested list price is $699.

Contact Tamarack Technologies Inc. at 714/744-3979 or fax 714/744-4582.

SMILE International color monitor

SMILE International is introducing the CB-1716CL, a PC and Macintosh compatible 17-inch color monitor with a screen resolution of 1280x1024, .28mm dot pitch, and a screen refresh rate of 100Hz. The new monitor features a VESA DPMS for low power consumption, image adjustments such as parallelogram, trapezoid, and rotation, Invar Shadow Mask, three-stage dynamic focusing, anti-reflection and anti-static coatings. The 17-inch CB-1716CL is available for $795, and is backed by a three-year warranty.

Contact SMILE International at 714/546-0336 or fax 714/546-0315.

MISC

Quick Link™ Information Services

Quick Link Information Services is a service bureau that can obtain, develop, and maintain fax lists for target marketing. It also provides other enhanced fax services such as broadcast fax. Broadcast fax can be used as a marketing, sales, and advertising tool for small- to medium-sized businesses.

Contact Stephen Solenzio at 800/299-3773.

Polka-disc™

Polka-disc labels from Polka dot Products Inc. are designed for easy removal. They have adhesive only in a few circular areas on the label back. Polka-disc labels are available in a variety of formats and sizes for diskettes, VCR, and other data storage objects.

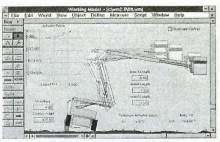
Contact Polka dot Products, Inc. at 612/824-1760 or fax 612/824-7917.

Engineering

VISI-CAM™ version 2.5

3D Technology Inc. recently introduced VISI-CAM SURF5. New features include 4-axis contouring, 4-axis pocketing, helicoidal machining, semi-automatic 2nd cut and 5-axis (SWARF) side machining. Surfaces and wire-frame geometry can be created or imported via a wide variety of translators; 2D geometry can be used to form machining boundaries; 3D surfaces can be created using 2D curves without manually re-orienting the curves; complete 2.5 axis milling capability includes 2.5 axis pocketing, contouring, face milling, drilling cycles, parametric shapes with associative toolpaths; and optional integrated MILL-TURN capability for 4-axis synchronized turning.

Contact 3D Technology Inc. at 203/371-8500 or fax 203/371-6300.



Working Model 3.0

Working Model™ version 3.0

Working Model version 3.0 incorporates five major improvements: parametric design capabilities that allow users to analyze hundreds of designs in a fraction of the time; a powerful scripting language for user customization and development of third-party tools; ease-of-use features that increase productivity; a faster and more robust dynamics engine; and more file export choices.

Contact Knowledge Revolution at 415/574-7777 or fax 415/574-7541.

POINT3 Quality Control Software

POINT3 quality control software with a Windows interface includes features such as drag-and-drop, icon/toolbar buttons, and user options. POINT3's viewing and redlining utilities can highlight dimensions and overlay text notes on CAD drawings, digital photographs, or scanned drawings without changing the original. Tools included with POINT3 are Design Access Tools, Manufacturing Tools, Quality Engineering Tools, Continuous Improvement Tools, Statistical Process Control Charting, Cause and Effect Tools, Process Flow Charting, and Print Template Designer.

Contact Baystate Technologies at 508/229-2020 or fax 508/229-2121.

CADKEYTECH — Getting Started With CADKEY: Using the QuikSnap cursor

By Claudia Martin

CADKEY 7 includes a quick-snap cursor option that works much like the object snap function found in some CAD software. It gives you new and easy ways to position entities using the cursor. You can snap to different locations including a horizontal line, vertical line, end point, line at an angle, mid-point of an entity, perpendicular to an entity, and tangent to an entity. The QuikSnap function only works when the Cursor option is selected in the Position Menu.

Step 1: If you configured the QuikSnap cursor CDE to load on starting CADKEY, choose Applic from the Main Menu and click on QuikSnap Cursor in the dialog box. Or, if the CDE was not loaded on startup, select Files, CDE, List/Opn, and then select Cursor from the CDE Load dialog box. (After the CDE is loaded, it is available through the Applications dialog box.)

Step 2: The Set Options dialog box shown in Figure 1 is displayed. The lower left corner of the dialog box contains the Normal cursor and Toolbar selection boxes. When these options are checked, they are on; when they are blank, they are off. When Normal cursor is Off (blank), the QuikSnap cursor is active. Turn the Normal cursor option Off and the Toolbar option On. When it is on, the Toolbar option displays seven snap settings that can be turned On or Off using a horizontal toolbar near the bottom of the display. It allows quick access to the QuikSnap options. When more than one snap option is On, the system will snap to the location nearest the cursor when the left mouse button is pressed.

Step 3: The Snap options also can be set from the Set Options dialog box. Using either method, turn the **End Point** option On, and turn all other **Snap Settings** to Off. Then click OK.

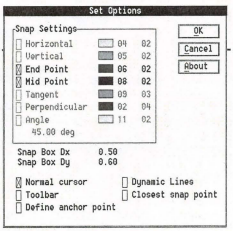


Figure 1

More About the Set Options Dialog Box

- The letter S is a hot key that opens the Set Options dialog box. Remember, this works only when the Cursor option is selected in the Position Menu.
- The Snap Box Dx and Dy settings let you adjust the size of the hidden trap box surrounding the cursor. Making these values smaller requires the cursor to be closer to the target to activate a QuikSnap option.
- When Dynamic Lines is turned On, a temporary line will be drawn between the current anchor point and the snap point.
- The first column to the right of each Snap Setting option shows the color (and color number) for the color of the dynamic line associated with the snap setting.
- The second column shows the numeric value of the line style used for dynamic lines.

The best way to become proficient with the various QuikSnap options is to experiment with the various settings and play.

Step 4: Draw a few random lines and circles to use as we experiment with the QuikSnap cursor. Then move the cursor around the display. When the cursor gets near the end point of an entity, a marker indicates that the cursor is in range for a QuikSnap

Step 5: Draw lines between the endpoints of several lines by clicking the left mouse button when the cursor is near enough to an entity to activate a marker. (Select **Create, Line, Endpts, Cursor** first).

More About the QuikSnap Toolbar

The first seven letters in the QuikSnap tool bar show the status of the seven snap options. The uppercase letters show that an option is active. For example, v E m p t a n c shows that end point is active. Lowercase letters indicate inactive options. If you are binding macros to various keys, and if you will be using the QuikSnap cursor, you should avoid using the S H V E M P T or A keys for macros.

The letter n switches between the Normal [N] and QuikSnap [n] cursor. The letter c toggles the Closest snap point option On [C] or Off [c]. When the Closest snap point option is On, you can only place points at QuikSnap locations. When it is Off, you can place points either at QuikSnap locations or at the current Cursor location.

As you move the cursor close enough to an active entity, the Toolbar also shows the coordinates of the snap point, the entity type, and a short line with a colored mark in the center.

Step 6: Click on the letter E in the QuikSnap Toolbar to turn the End Point option Off. Then click on the m to turn the Mid Point option On. Create several lines using the Mid Point option. Then click on the Toolbar so that both End Point and Mid Point are selected. Create a few lines. Observe the Toolbar as you move the cursor around the display.

Hints and Tips

There are several things to keep in mind when you are using the QuikSnap cursor:

- Turn on the Display List Driver to make QuikSnap operation faster and easier.
- When using the Display List Driver, make sure you turn the XOR Mode option on instead of the Raster option.
- Don't bind the Snap Settings keys (S, H, V, E, M, P, T, A) to macros.
- If you have trouble snapping to specific snap point, turn off all the Snap Settings except the one you want.

CADKEYTECH — Productivity Tool

New Tools For Windows Users

By Claudia Martin

An excellent set of new learning tools has just been released by Microcomputer Education Systems Inc. They are "The CADKEY for Windows Workbook" and two related video tapes. The workbook is designed to introduce mechanical CAD through the use of the CADKEY Windows software and is aimed at new CADKEY users. Although the material was designed especially for students in technology education, "tech prep," or introductory-level mechanical CAD courses, it is also appropriate for industrial users who are just starting drawing and designing with CADKEY.

The format is excellent and clear. It conveys a sound foundation for CADKEY use, without bogging the beginner down in details. Students will learn what they can do on their own once they complete the eight projects in the workbook.

The carefully crafted drawing and design projects are developed to help new users explore both two and three-dimensional mechanical design and drafting. Paragraphs of information between the steps explain why each process is used. This technique has proven very effective and popular in earlier architectural and mechanical CAD instructional materials produced by Microcomputer Education Systems.

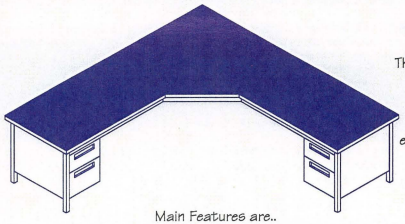
The two related video tapes contain nearly four hours of instructional content. Most of the video content is devoted to real-time demonstrations of completing the workbook projects. A voice-over narrative describes the techniques used and provides additional tips for designing with CADKEY.

The "CADKEY for Windows Workbook" provides a quick introduction to designing in 3D using World Coordinates and CADKEY Model Mode to create 3D wire-frame models. Models are created both by extrusion and revolution. Other 3D construction methods demonstrated include construction planes, and normal and skewed projections. Some projects demonstrate how to use CADKEY Layout Mode to create traditional dimensioned detail drawings. The CADKEY Picture It visualization aid is featured in a number of projects.

The workbook shows how to incorporate rendered images along with orthographic views in dimensioned detail drawings. The workbook projects use both part and pattern files. One project shows how to create a pictorial exploded assembly drawing (that would take hours using conventional drawing tools) in just a few minutes using CADKEY.

The "CADKEY for Windows Workbook" retails for $19.95. Video tapes (tape A or tape B) are offered separately for $115 each. A complete set of tapes A and B with a copy of the Workbook is $195.

For more information, call Microcomputer Education Systems Inc. 614/793-2730 or fax 614/761-0489.



CADesk

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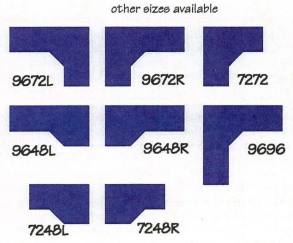

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CIRCLE 242 ON PAGE 2 FORM

LISP Balloons

USING CADKEY LISP

By Scott Workman

This article is a continuing series covering various aspects of the CADKEY LISP programming language. This month, we will use the CADKEY LISP language to program a small utility that will draw detail balloons. If you have suggestions or an idea about areas we should cover in these articles, leave a message via CompuServe - Cserve ID: 72730,3154 or via E-mail: scottw@bit-wise.com

Introduction

Last month we finished our discussion on manipulating polylines. This month, rather than concentrate on a specific feature of the CADKEY LISP language, we will focus on writing a small utility program. The program presented this month will draw single, split or multiple detail balloons. The CADKEY LISP language is ideally suited to writing utility programs such as this. We hope that by presenting such utility programs in these articles, we will spawn new ideas for you to try using CADKEY LISP.

Drawing Balloons

For simplicity, the balloon program uses the command interface for all drawing functions. A polyline is used to draw the leader and arrow head. The balloons are made up of circles and text. This program illustrates how easy writing a utility in CADKEY LISP can be when using the command interface for drawing. The program obtains input from the CAD operator for the position of the arrow head on the leader and for the center point of the balloon. The leader is drawn with a bend in it so that the leader always enters the balloon at a horizontal direction.

The user has three choices of balloons. The first balloon type is a single balloon which is a single circle at the end of the leader with text centered in the circle. The second balloon type is a split balloon which is the same as a single balloon except that two different pieces of text are placed inside the balloon and a horizontal line splits the balloon in half. The final balloon type is a multiple balloon which is a series of single balloons stacked vertically. If the center of the first balloon is above the point for the arrow head, the balloons are stacked starting at the bottom and proceeding in the positive direction on the Y axis. If the selected center point is below the arrow head position, the balloons are stacked from the top down. The operator enters the quantity of balloons to stack and then enters the text individually for each balloon. Balloons may continue to be stacked until the quantity of balloons entered is zero or the Enter key is pressed with no input.

Program Specifics

The program starts out in the c:balloon function by turning off the command echo variable. This makes the program run radically faster and produces a cleaner output by not scrolling all of the command prompts on the screen. Since the program supplies all of the responses to the command prompts, it is not necessary for the operator running the utility to see all of the command prompts flash by.

Next, the operator is prompted to enter the point for the location of the arrow head on the end of the leader and then the center point of the balloon. If either point is not supplied, the program exits without drawing anything. The radius of the balloons then is looked for in the global variable called "bradius." If the variable does not exist, the user is asked to supply the radius of the balloons and the global variable is set. The variable "bradius" is made global by not including the declaration for the variable on the function declaration. The global variable can by used by any routine in the program and will still be set to the same value the next time the program is run.

After the points have been supplied, the leader function is called to draw the leader of the balloon. The type of balloon to draw at the end of the leader must then be supplied by the operator. The value of 1 on the initget function forces the operator to supply an answer — no default exists. The appropriate drawing function is then called, depending on the type of balloon to be created.

The leader function creates the arrow head and leader using a single polyline. To do this, the function first must calculate the location for each vertex of the polyline. The leader contains a bend to direct the leader to the balloon in a horizontal direction. The X coordinate of the balloon center point is compared to the X coordinate of the arrow head location to see if the horizontal line is to be drawn from left to right or from right to left. The end of the leader touching the balloon also must be calculated so that the leader stops at the edge of the balloon instead of being drawn clear to the center of the balloon. Finally, the points to be used to draw the arrow head are calculated by locating points at 30 degree angles on each side of the leader. The PLINE command is called specifying each of these points in the proper order to draw the three sides of the arrow head, the leader line and the horizontal line touching the balloon.

The single function is used to draw the single balloon type. The text to be placed inside of the balloon is obtained from the user. A circle then is drawn at the center point specified at the beginning of the program and the "bradius" global variable is used to determine the size of the balloon. The text entered by the operator is then created using a justification of middle which centers the text both horizontally and vertically at the center of the circle.

The split function draws the split balloon type and is similar to the single function. The text for both the top and bottom must be obtained from the operator. Points used to draw the horizontal line splitting the balloon and points used to locate the text are then calculated. Since two different pieces of text need to be located, the text points must be calculated by moving vertically in both directions half of the distance between the center point and the edge of the balloon.

The multi function is used to draw the multiple balloon type.

The balloons are drawn by repeatedly calling the single function to obtain the text for each balloon and drawing each balloon individually. The direction to stack the balloons is determined by comparing the Y coordinates of the arrow head point and the balloon center point. The user is asked for the number of balloons to draw. The value of 7 in the initget function forces the operator to enter a value that is not zero and is positive. This is used before the loop starts so that a quantity must be entered the first time. The following times through the loop the operator may exit the routine by entering a quantity of zero or by pressing the Enter key with no value. The repeat statement is used to call the single function for the quantity of balloons entered. The operator may continue to enter quantities of balloons to continually stack balloons until all balloons have been drawn.

The program can be run by loading the LISP file and typing BALLOON on the command line. The execution of the program is self-explanatory by following the prompts of the program.

Conclusion

We have presented a useful utility program to demonstrate the ease with which mundane tasks can be automated by using the CADKEY LISP language. Using the command interface, geometry creation can occur in a fashion that is similar to the interactive process, making the programming of the utility easier to understand. We will continue to focus on different types of utilities that may be useful in the everyday tasks of the CADKEY operator.

Source Code Availability

The source code presented in this article can be downloaded from the CADKEY library of the CAD/CAM/CAE Vendor forum on CompuServe. Go CADDVE to access the forum.

Scott Workman is director of technology for BitWise Solutions Inc. BitWise Solutions offers software products and services specializing in the CAD/CAM, Internet and multimedia markets.

```
; ks0995.lsp
;
; CADKEY LISP example presented in Key Solutions Magazine, September 1995
;
; This LISP program will draw detail balloons.  Three different types of balloons may
; be drawn: 1) single balloon, 2) split balloon and 3) multiple balloon.  Each type of
; balloon will have a leader with an arrow on the end.  The global variable
; 'bradius' defines the radius of the balloon (if it is not set, then ask for size).
;
(defun c:balloon ( / arpt blpt type oldcmd )
  ; Turn off command echo
  ;
  (setq oldcmd (getvar "CMDECHO"))
  (setvar "CMDECHO" 0)

  ; Get the two required points.
  ;
  (setq arpt (getpoint "\nArrow head point: ")
        blpt (getpoint arpt "\nBalloon center point: "))
  (if (or (= arpt nil) (= blpt nil)) (exit))

  ; See if the balloon radius variable is set and ask for it if not.
  ;
  (if (= bradius nil)
    (progn
      (initget 0 "")
      (setq bradius (getdist "\nBalloon radius (0.5): "))
      (if (= bradius nil) (setq bradius 0.5))))

  ; Draw the leader with the arrow head
  ;
  (leader arpt blpt)

  ; Ask which type of balloon
  ;
  (initget 1 "SIngle SPlit Multiple")
  (setq type (getkword "\nBalloon type: SIngle/SPlit/Multiple: "))
  (if (= type "SIngle") (single blpt)
    (if (= type "SPlit") (split blpt)
      (multi arpt blpt)))
  (setvar "CMDECHO" oldcmd)
  (princ)
)

; Draws a leader at an angle towards the balloon and adds a horizontal line
; to connect to the edge of the balloon.  Draws an arrow head on the end
; of the line.
;
(defun leader ( arrowpt blnpt / bendpt endpt ar1 ar2 dir )
  (if (>= (car blnpt) (car arrowpt))
    (setq dir pi)
    (setq dir 0.0))

  (setq bendpt (polar blnpt dir (* bradius 2.0))
        endpt  (polar blnpt dir bradius)
        ar1    (polar arrowpt (+ (angle arrowpt bendpt) (/ pi 12)) 0.25)
        ar2    (polar arrowpt (- (angle arrowpt bendpt) (/ pi 12)) 0.25))

  (command "pline" arrowpt ar1 ar2 arrowpt bendpt endpt "")
)

; Asks the user for the balloon text and then draws a circle with the text
; in the middle of the circle.
;
(defun single ( ctrpt / btext )
  (initget 1 "")
  (setq btext (getstring "\nBalloon text: "))
  (command "circle" ctrpt bradius)
  (command "text" "j" "m" ctrpt (* bradius 0.625) 0.0 btext)
)

; Asks the user for the top and bottom text for the split balloon and
; then draws a circle with a horizontal line splitting it.  Draws the
; top and bottom text centered in each half of the balloon.
;
(defun split ( ctrpt / atext btext p1 p2 )
  (initget 1 "")
  (setq atext (getstring "\nTop Balloon text: "))
  (initget 1 "")
  (setq btext (getstring "\nBottom Balloon text: "))
  (setq p1  (polar ctrpt 0.0 bradius)
        p2  (polar ctrpt pi bradius)
        tpa (polar ctrpt ( / pi 2) (/ bradius 2))
        tpb (polar ctrpt (/ (* pi 3) 2) (/ bradius 2)))
  (command "circle" ctrpt bradius)
  (command "line" p1 p2 "")
  (command "text" "j" "m" tpa (* bradius 0.375) 0.0 atext)
  (command "text" "j" "m" tpb (* bradius 0.375) 0.0 btext)
)

; Draws multiple balloons stacked vertically on top of each other.  Calls
; the (single) balloon function to draw each individual balloon.  Balloons
; may be continuously added until the ENTER key is pressed.
;
(defun multi ( arpt ctrpt / qty dir )
  (if (> (cadr ctrpt) (cadr arpt))
    (setq dir (/ pi 2))
    (setq dir (/ (* pi 3) 2)))
  (initget 7 "")
  (setq qty (getint "\nNumber of balloons: "))
  (while (and (/= qty nil) (> qty 0))
    (repeat qty
      (single ctrpt)
      (setq ctrpt (polar ctrpt dir (* bradius 2)))
    )
    (initget 4 "")
    (setq qty (getint "\nNumber of balloons (ENTER quits): "))
  )
(princ "\nType BALLOON to start this program.")
(princ)
```

An Integrated Bid and Quoting System

Estimator is an estimating, bidding and quoting system that has been popular in more than 240 industries since 1978. It currently has a user base of more than 40,000. As a tool, it can help eliminate forgotten bid items, increase flexibility, produce twice as many bids in the same amount of time, and transfer budgets to a Job Costing system to produce "actual vs. estimated" costs. It does all this quickly and accurately.

The combination of Estimator with CAD is hot, and Estimator now can be integrated with DataCAD and several financial packages. Accounting programs supported include DacEasy Instant/Accounting/Job Costing, ISS Job Costing, EasyTracker, Quicken, QuickBooks, and Microsoft Ez Money. This means a DataCAD drawing can be estimated in seconds without re-typing and the budget that is developed can be tracked by Quicken or several other accounting programs. Accuracy, flexibility, elimination of forgotten items, and the speed of more quotes in less time mean more profits.

General Estimator Features

"What-if" changes are a breeze! — Instantly see the effects of changing costs or quantities, or substituting a different item. Make extensive changes to the bid and recover alternate versions of the bid, or even reload your original Price Book costs.

Speed — The system calculates all totals instantly. Change the cost of an item and see the results immediately, instead of two minutes after printing a report.

Point-and-Shoot Mouse Interface — Pull-down menus and extensive help assures that even an occasional Estimator will be able to use the system.

Bid Total Alwasy Displayed on Screen — The total cost and price for the bid can be displayed on the screen for instant results.

Item Selection — See Divisions, Subdivisions, and Items on the screen all at the same time. Click the mouse on Division 1 and all Items in Division 1 appear in the Item window. Tag the Items you need, then click on the next Division or Subdivision you want to see.

Customizable Reports — Preview the report before printing. You can select the fields and their widths. You can find, sort, and tag Items to be displayed. You can select whether to show your costs or your price to the customer.

Extensive Tagging Features — Group items together to delete, copy, do "What if" changes, increase costs by a percentage, etc.

Recalculates Bid Totals Automatically — Estimator keeps all calculated totals up-to-date for instant display on the screen.

Fast Totals and Finds — Find and total all subcontracted Items in the Bid and show only the Items with a zero takeoff quantity.

Extensive Help System — Suggestions, tutorials, Key Guides, and electronic on-line manual are available.

Fast Searches — Quickly find any Item by typing in a partial description, quantity, partial Item number, or cost type.

Changes All Items in a Bid to Meet a Certain Goal — Add or subtract a total dollar amount to or from any group of Items. For example, increase only labor costs by $5,000. All Items in the group will be adjusted according to their percentage of the group total.

Sort by Any Field — Sort the Bid by Item number, description cost, cost type, or any other column of information.

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Bid Local Items and Costs — Change the cost of an Item for a particular bid only. The change won't affect your master Price Book unless you want it to. Great for fast price changes. Add a customized "one-time-only" Item to the bid with or without adding it to your master Price Book.

DataCAD Estimator is available from Cadkey Inc. or your local dealer.

ISDN from Page 5

dor whose product you'll be using to connect to the ISDN line. A few vendors have liaison teams in place that have established relationships with the telephone companies across the country and can help pave the way for a smooth installation.

ISDN rates vary within states and regions in North America. That makes it difficult to predict what ISDN will cost in a given location. The table below shows some typical ISDN costs in three selected cities. (Usage charges not included.)

Location	Installation	BRI Monthly
Cambridge, MA	$100	$31
Detroit, MI	$150	$37
San Francisco	$100	$27

Of course, such numbers in isolation mean very little. What's more meaningful is to look at the alternatives to ISDN network connections and do a performance comparison to see what you're getting for your money with ISDN.

ISDN is part of a connection service category known as switched digital service, sometimes called dial-up service. Typically, its alternative is a dedicated line. A quick comparison of the two types of connections will serve to demonstrate ISDN's advantages. With switched digital and dial-up services, a computerized telephone switch creates a temporary circuit between two points. At call termination, the circuits are available for someone else's call. A dedicated leased line is a connection between two points that stays active — and billable — regardless of whether it is being used. On the other hand, switched digital lines such as ISDN mean that the user pays only for the connection actually made and avoids the ongoing costs of maintaining leased lines.

It's important to note, of course, that ISDN isn't the whole story. Without the appropriate equipment to capture the power and speed of ISDN, you won't be able to take advantage of the cost and performance savings the technology offers. The table below illustrates the performance differences between a variety of file types and sizes sent over typical transmitting solutions. While columns 3 and 4 illustrate transfer speeds using standard routers on other dial-up and leased line configurations, column 5 represents the performance difference that using ISDN with the proper access device can make.

File Type	File Size	Dial up at 28.8	Leased Line 56K	ISDN
E-mail, MS Word	1-90 KBs	15-40 secs.	.14-12.8 secs.	3.1 - 14.2 secs. (64 KBps)
Graphics File	3 MBs	14.1 mins.	7.14 mins.	26 secs. (1024 KBps)
CAD Bulk File	37-400 MBs	2.8-30.8 hrs.	1.47 - 15.9 hrs.	4.8- 52 mins. (1024 KBps)

Note: Bulk files of the type CAD/CAM users send offer a significantly higher performance opportunity than do Word documents or e-mails. Therefore, the larger the file, the more good ISDN will do you.

However, to get the most for your money with ISDN, you'll want to look into getting equipment that adds bandwidth on demand so that your large CAD/CAM file doesn't get caught in a bandwidth bottleneck — a network traffic jam that not only slows transmission, but extends the length of time you pay for the connection. Such a device, known as a Wide Area Network (WAN) Switching Router, works with ISDN and applies switching concepts to improve bandwidth efficiency for transfer of large files. Switching routers provide WAN solutions for LAN-to-LAN, remote LAN-to-LAN, and remote user-to-LAN connectivity.

Coming Attractions

Complex as this background information has been, using ISDN in CAD/CAM applications is a fairly straightforward operation. In Part Two of this article I will examine a typical installation and offer an analysis of some other technologies that compete with ISDN as suppliers of high-speed connectivity. Stay tuned to find out who is using ISDN now, how they went about getting the service, and what it's done for them.

Headquartered in Ann Arbor, Mich., Symplex Communications develops, manufactures and markets innovative internetworking solutions designed to optimize LAN-WAN connectivity. In 1983, Symplex was a pioneer with the industry's first synchronous data compression device and has remained a forerunner in the development of data transmission enhancement solutions. With the introduction of its DirectRoute product line in 1994, Symplex applied its expertise in advanced data compression and alternative routing technologies to improve communications for internetworking.

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CIRCLE 246 ON PAGE 2 FORM

CIRCLE 245 ON PAGE 2 FORM

PROJECT: POWERFUL, SO PROCEED WITH CAUTION

The Southern California-based CALCAD User Group produces an excellent monthly newsletter packed with tips on how to use CADKEY. Larry Maldarelli, editor of CALCAD Newsletter, shares two of his personal tips from the June and July issues.

Using PROJECT

Project: Move (Join, Copy) are some of the most powerful and useful tools in CADKEY, but there are some cautions you must observe to derive the most benefit from their use.

Project will do its thing to any defined plane, wherein lies the first caution. An example of what happened to me will make this clear.

I was constructing an ear on a machined part. I defined the cross section of the ear which was near the middle of the part. The ear was to contain a large hole that extended all the way through. This cross section was in an orthogonal plane (View 5) as was the rear of the part. Since the ear was to extend from the middle of the part to the rear surface, I used two of the lines that defined the rear surface to define the plane for **Project.**

However, a problem arose because one of the lines that I used from the rear surface was skewed ever so slightly out of the View 5 plane. I'm talking one or two millionths of an inch. Normal CADKEY tolerances, for double precision math. Not a problem for **Picture It** as far as the flat surface was concerned, but the arc that defined the other end of the hole wasn't a circle; it was a conic and not in the same plane as the ear surface. Net result: **Picture It** left the hole out even though you couldn't see anything out of the rear plane even at maximum magnification. I found the problem when I did a **Control: Verify: Attributes** and discovered the conic instead of the expected circle.

So you do have to be a little careful of **Project.** Remember that **Project** will only generate a conic when the planes that define the ends of a bar or hole are skewed relative to one another. Even if parallel planes are not in an orthogonal plane themselves, a circle in one of them will **Project** as a circle in the other.

Project also can be used to clean up a flat plate full of holes and cutouts that refuses to process through **Picture It.** Here's how:

Switch to a view where the plate is on edge and do a **Delete : Select : Window: Partin** and window one face of the plate. This will get rid of the face and all the connect lines that define the thickness of the plate.

Now switch to an off-axis view (i.e., View 7) and do a **Project : Move : All : Displayed : All** and select one of the arcs as the entity to define the plane of the plate. Check that the periphery of the plate and any cutouts are connected and do a **Xform : Delta** to the thickness of the plate.

If the plate is not in an orthogonal plane, **Rotate : Copy** one of the straight elements 90 degrees and use this element to do a **Xform : Old-New : Join : Alongl** to complete the plate.

View Coordinates: When to Use Them

We are frequently asked when to use **VW** vs. **WLD** coordinates. The simplistic answer is when in 3D, use **WLD** coordinates, but there are specific cases where **VW** coordinates are required.

For example, suppose you have a surface on a part that does not align with any standard orthographic view. To work on this surface, you would set your C-Plane to this surface using a pair of lines or an arc/circle entity. Then you would switch to **VW** coordinates and set the depth by selecting one of the entities in the surface. You can them work on this surface from any view that is convenient.

Conversely, when you are working on the rest of your part from some convenient off-axis view like VW 7, you will go nutso working in **VW** coordinates.

Always remember: when you are working in 3D, the part is rigidly fixed in space. When you change views, you are merely wandering around this fixed entity and viewing it from different perspectives. It never moves. When you **Rotate** your part, you aren't rotating it at all; you are changing your viewing attitude.

STORAGE from Page 7

100 years. That longevity makes them an ideal medium for archival storage of data that must be kept for long periods of time.

Another advantage of CD-ROMs is their compatibility with any platform that can use a SCSI device. In addition, because all data on CD-ROMs are indexed and cross-referenced, any data can be located and displayed immediately.

When first introduced, CD-ROMs and their drives were very expensive. However, plummeting prices have put them within the reach of most users. Today, prices range from under $100 for CD-ROM drives and under $2,000 for low-volume CD-ROM recorders. When purchased in volume (500 units), the disks themselves cost less than $1 each.

Another initial complaint about this technology was the snail speed at which CD-ROMs ran. Single-speed CD-ROM drives read data at 150KBs per second, far slower than magnetic disk drives. However, double-speed and quad-speed drives now are quickly replacing their predecessors and are narrowing the speed gap between hard disk drives and CD-ROM drives.

Optical jukeboxes can hold as few as six CDs and a single drive to as many as 1,400 CDs and 32 drives. Because of the mass amount of storage capacity, these devices compete primarily with tape libraries and RAID systems.

One disadvantage of adopting a CD-ROM-based storage system is the rather steep up-front cost of scanning and digitizing paper-based documents for storage on CD-ROMs. Scanning services are usually performed by service bureaus that charge approximately 13 cents per page for scanning and 25 cents to $2 per page to index. When you include the cost of the jukebox, a PC server, and SCSI drivers, the costs can seem prohibitively high.

However, once that initial expenditure is made, storage costs are relatively low — approximately 20 cents or less per gigabyte. For companies or departments that must retain a permanent record of project databases on a regular basis, CD-ROM-based systems can be a good, cost-effective option.

Barbara Schmitz is associate editor of Computer-Aided Engineering. This article first appeared in the July 1995 issue of Computer-Aided Engineering and is reprinted with permission.

CIRCLE 203 ON PAGE 2 FORM

DATACAD KEYBOARD MACROS

By Rick Gleason and Michael Tardiff

Several years ago, Rick Gleason wrote the definitive text on creating custom keyboard macros, which he presented at a DBUG meeting. I recently revised that text, with Rick's permission, to provide more information for new users and to bring the terminology up to date with DataCAD 6. The revised article was presented at a meeting of MaD-Cad, the Morristown (N.J.) Area DataCAD User Group. — Michael Tardiff

What is a keyboard macro?

A keyboard macro is a set of keys (usually two) which, when pressed simultaneously, start a series of commands that have been pre-set by the user. In DataCAD, the first key pressed to initiate a keyboard macro is the Alt key, followed by one of the alphanumeric keys (e.g. Alt-A, Alt-I, etc.).

What is an interrupt?

An interrupt is a type of command which takes precedence over the current procedure being performed. Keyboard macros permit the user to interrupt a previous command and change to a different command through the use of the Alt key, which initiates the preset series of commands that the user has programmed for the macro. However, keyboard interrupts will not interrupt commands which require a text response from the keyboard at the line prompt (e.g., when the command requires that a numerical distance be entered). When this occurs, the user should escape from the previous command before executing the keyboard macro.

Where is keyboard macro information stored?

Keyboard macros are defined by the user as ASCII text files with the extension *.mcr. CADKEY already has defined the default macro as DCAD.mcr. The file resides in the C:\DCAD5 (or DCAD6)\SUP subdirectory. Whenever an Alt key is pressed, together with a alphabetic character, DataCAD interrupts the current command, looks for the appropriate alphabetic character in the DCAD.mcr file, and executes the new command string which has been defined for that alphabetic character.

In order to fully understand the remainder of this article, it would be helpful to print a copy of the content of the DCAD.mcr file. This can be done by opening the file using the Edit function of MS-DOS 6.0 or higher, or by using another ASCII text editor. If you are unfamiliar with Edit, begin at the DOS prompt by changing directory to the C:\DCAD5(or DCAD6)\SUP subdirectory, then type EDIT DCAD.mcr. You can then select File, Print from the menu at the top of the screen. If you are lucky, your printer will print the ASCII characters correctly. If not, you will have to write them in by hand on your printed copy.

If you are not in the correct subdirectory and you type EDIT DCAD.mcr, DOS happily creates a new file in that subdirectory of the same name, and the content of the file as displayed on the screen will be blank. I am told this is a feature, not a bug, but it would be nice if Edit prompted you with: "this file does not exist; do you wish to create it?" This is a common "error" for users who are using DOS Edit for the first time. Don't be alarmed. Simply exit the file without saving it and go to the correct subdirectory.

How to program keyboard macros

Each *.mcr file contains a separate line for each alphanumeric key. The line begins with the alphabetic character followed by the function key commands that the user desires. The carat (^) should separate each function key used in the string of commands. The semi-colon (;) is used to indicate Edit Menu and the colon (:) is used to indicate Utility Menu.

You will notice that there are some funny looking ASCII characters at the beginning and end of some of the keyboard command sequences that look something like letters from the Hebrew alphabet. These characters simply turn the display of the menus and prompts off and on again at the end of the command sequence. Turning the intermediate menus screens off speeds up the macro and eliminates the annoying high-speed flicker of the menus as the command is executed, but is not necessary for the macro to work properly. You should first program the keys without turning the menu screens off, then test the file in DataCAD. Once every command is working properly, then edit the file to add commands to turn the screens off and on.

The steps for programming the keyboard macros are:

1. Make a copy of the DCAD.mcr file, saving it as DCAD60.mcr in the SUP subdirectory, for archive purposes. Because DataCAD will search only the contents of the file called DCAD.mcr for the instructions to execute the keyboard macros, your new keyboard macros must be contained in that file.

2. Saving the file as DCAD60.mcr creates a record copy of the original DataCAD keyboard macros, which you can restore at a later date. You also can create multiple sets of keyboard macro files, giving them unique names, and swap them in and out using a batch file (before loading DataCAD) or a DCAD macro (from within DataCAD). More on that later.

3. First, write down the sequence of commands that you wish to program for each key, using the function keys to record the particular command. For example, to access the change text, contents command manually, the sequence would be: edit menu; F0, S8, S2. Decide which letter will perform that particular function. Note that the number of keyboard macros is finite, from A-Z, so you have to decide which of the existing DataCAD keyboard macros you want to give up. It's not a difficult decision; a number of them are quite useless.

4. Edit the DCAD.mcr file using MS-DOS Edit or another ASCII text editor, changing the commands of the particular letter to match the sequences you wrote down in Step 2. Remember that the first letter of each command line is the alphabetic character corresponding to that particular key. Program your new key commands without entering the ASCII code for turning menus off and on. Make sure there are no blank spaces at the end of each line of text. These blank spaces can cause problems with the execution of the command.

5. Enter DataCAD and start a new drawing called TEST.dc5. Test each of the macros (A-Z) to see if they work properly.

6. Re-edit DCAD.mcr to add the ASCII characters to turn the menu screens off and on. To turn off a menu screen type the following in Edit at the appropriate place in the command: ^(Alt-183)^(Alt-200)^. Hold down the Alt key and type the numbers shown on your numeric keypad with Num Lock turned OFF. This will produce the ASCII characters. To turn on the menu screen at the end of the command, type: ^(Alt-184)^(Alt-201). Note that for some commands, putting the "turn on" sequence at the end of the command causes it to work improperly. It's a mystery. If you look at the macros in the DataCAD-supplied *.mcr, which you now have named DCAD60.mcr, you will see one or two commands with the turn on screen ahead of some of the designated keystrokes. If you run into this problem, experiment with moving the "turn on" sequence back in the line, one command at a time, and test it each time until it works. If all else fails, use the command without the "turn off" and "turn on" sequences.

7. Note that if Cadkey moves any menu items around in subsequent versions of DataCAD, your macros will not work properly. Several of your macros may have to be reprogrammed between DataCAD versions.

8. Once your new keyboard macros work properly, make a copy of the file by saving at as NEWKEY.mcr or some other appropriate name. This way your new file will be preserved in the event that the DCAD.mcr file is accidentally overwritten. It is also wise to make a backup copy of the file on some other media.

Now you can make a number of keyboard macro files to use for different purposes. For example, it might be handy to have another set of macros for use in 3D. You then could write a batch file or a DCAL macro (or buy one already written; see below) that would swap different sets of keyboard macros. Ivan Berezinicki Associates Inc., in Cambridge, Mass., uses a DCAL macro to change from 2D to 3D keyboard macros.

The DCAL macro is part of the ALT-Z keyboard macro in each set, which, in addition to changing the keyboard macro file, also flips you in and out of 3D.

Editkey - DCAL macro to Edit a selected Keyboard Macro

Editkey is a DCAL program written by David Pendery of HMFH Architects, Cambridge, Mass., which permits the user to edit a selected *.mcr file and a selected key macro within the file from within DataCAD. This utility is great for modifying macros on the fly. Check your Cheapware listings to see if this is available.

Newkeymc - DCAL macro to change current Keyboard Macro File

Newkeymc is a DCAL program written by David Pendery which permits the selection of a *.mcr file as the "default" DCAD.mcr. The program copies the current DCAD.mcr to OLDMACRO.mcr and then copies the selected *.mcr to DCAD.mcr as the current macro, all within DataCAD.

Check your Cheapware listings for availability.

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CIRCLE 101 ON PAGE 2 FORM

A Potpourri of Ideas From DataCAD Users

Advice on Drawing Curves

"Can you draw curved walls or driveways in DataCAD? How?"
Jon Gamble of Helio Tech Designs

"With Walls activated, draw a short segment. Then just go Curves, Tangents and pick the end from which you want to begin the curved segment. Everything functions then just as it would if you were drawing straight wall segments. I use this all the time for walkways, flex-ducts, etc."
Oran Woody

"Try using geometry offset, but remember to compensate for the width of the driveway when dealing with curves. Example: Driveway is 12 feet wide with a two compound curves of 16 and 22 feet. For the straight part of the drive way you offset 12 feet, but for the curves you add or subtract 12 feet to the radius of the curve, so 16 - 12 = 4 and 22 + 12 = 34. This also applies to handrail returns or any other parallel lines that curve.
R. Morse

System Freezes - Why?

"Our new (April) workstation with DataCAD 6 crashes about 50 percent of the time when we exit DataCAD. Even an accidental tapping of the cancel button on the mouse at the dead menu will freeze the system and give us a blank screen. This happens regardless of how we exit (alt q, select Exit or Cancel at menu). We must then reboot with the reset button (Ctrl-Alt-Del does not work). We were hoping that the new S3_924 driver would take care of the problem, but it has not. The biggest issue is that the workstation in question is the server for all drawing and document files on our network. When this workstation goes down, we effectively shut down the office until the server is back on line and the other PCs have been rebooted onto the network. (They sometimes disconnect from the network when the server goes down.)"
Bill Harris WHarrisAIA@AOL.com

"Regarding the new ck_924.exe, S3 driver and DataCAD. From my experience with the updated drivers so far, I can conclude that there are still bugs that need to be worked out. I will forward a copy of your message to our quality control department to pursue a fix. The only work around at the moment is to switch to VESA mode operation which offers slower video performance than the S3 drivers."
Mark F. Madura VP AEC Product Group maduram@cadkey.com

Quick Shader Questions?

"Can you save Q-Shader images as views, so you can show them in a sequence to your client on your computer without having to generate them every time? I managed to save them as POF files, convert them into TGA files and capture them via a video output card onto a video tape — quite a tedious task and no video image can compete with a 21-inch monitor image. On the computer I always lose the shaded image and the views are just retained as wire frames."
Dirk Arnold Brisbane, Australia darnold@ozemail.com.au

"Here is a tedious way to view those images in sequence. Rename the TGA files in sequence such as view1.tga, view2.tga, view3.tga, etc. and use the RenderStar viewer to view them from DOS. Do it like this:

"From c:\dcad6\rstar2\bin use RS2SVGA with the -cnqs switch.

"Example:
C:\DCAD6\RSTAR2\BIN\> RS2SVGA -cnqs view1

"This will show view1, then view2, then view3, and so on, while you hit the spacebar. If you type RS2SVGA -h you will see all the available switches. Maybe others will suit you more. If you type RS2SVGA -T it will show you the available modes/resolutions you can use. For example, RS2SVGA -cnqsM3 will display these files in sequence at 1024x768 resolution. If this doesn't work with TGA files, just convert them to GIF format and that should do it for sure. This is the only way I know of by using DataCAD's resources and not buying anything extra!"
Nick Korosi

"What I've done is use the POF file converted to TGA files (or PCX) and then import them into Microsoft's PowerPoint. Admittedly, this requires more software, but for presentation purposes, PowerPoint is pretty good. Some features (are) all images are in one neat file and can be played back on your machine or via playback-only software on a client's machine; you can view the images full-screen at various resolutions; you can create many transitions from image to image ("slide" to "slide" in PowerPoint lingo) including dissolves, wipes, fade through black, etc.; you can port presentations to MAC or IBM PowerPoint formats; you can play back a presentation on a laptop, or make 35mm slides and handouts for clients.

"If presentations are a major part of your architectural practice (as they are mine), then it would certainly be worth investing in a presentation software package. Others worth considering: Persuasion by Adobe or CorelShow by Corel Systems (part of CorelDraw suite; no Mac version for Corel yet)."
Ed Wolfstein Wolfstein Architecture ewolfste@together.net

A DataCAD Book for Beginners?

"Is there a "DataCAD 6 for Dummies" or some manual that "walks" a novice through some of the drawing capabilities? The bundled books are great dictionaries, but don't help much when the Frame-It macro won't recognize the entry door, although it does get all the others."
TIA G.R. Arms

"DataCAD for Architects and Designers" by Carol Buehrens is a good beginners workbook, but it barely mentions features such as the Frame-It macro or RenderStar. I still find it useful, but for the cost, $39.95, it should include some of these other items as well."
Mark Ellis - Creative Redwood Designs Los Gatos, CA

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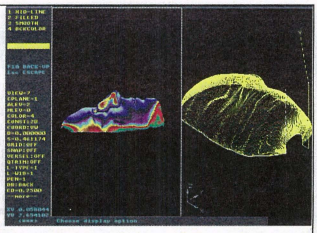

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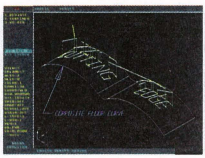
- CADKEY IGES capabilities



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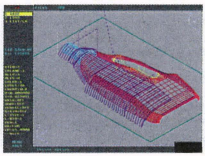

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CIRCLE 211 ON PAGE 2 FORM

By Carol Buehrens

This month, we'll streamline the steps it takes to set up dimensions for different architectural scales (such as 1/4-inch and 1/8-inch). We will create "dimension setup icons" that will provide an easy way to switch scales within the same drawing file or to set up a new file. Here's an example of why this can be handy. What do you do if you have created a 1/4-inch scale floor plan and now need to clip out 1/2-inch details, and want to keep the details within the same drawing file? Without "dimension setup icons," you need to follow all the tedious steps in changing the dimension styles for 1/2-inch to dimension your details, and perhaps back again to 1/4-inch if you need to add a dimension on the floor plan. But, if you create a macro icon using this tutorial, you simply pick the appropriate tool on your tool bar and the dimension setup is instantly changed!

Since dimension setup occurs infrequently, I created a tool bar just for this purpose. I can turn it on when I need it and then turn it off again. I called my dimension tool bar file DIMSETUP.KEY

Creating the Macro in DataCAD

Creating the DIMSETUP tool bar is as simple as programming the "Alt" keys, which we did in the June issue of KeySolutions. First, you create a macro of your DataCAD steps, using quick keys and function buttons. I used the following steps to set up my dimensions for 1/8-inch scale. The appropriate quick keys and function buttons I used are enclosed in brackets:

Dimension setup

[:] Utility menu, **[F8]** Dimensions, **[F1]** Linear, **[S3]** Text Style, **[F1]** Text Size, .8 (eight inches), **[Enter]** **[F9]** Text Offset, .6 (six inches), **[Enter]** **[S5]** Font Name, ROMAN2, **[Enter]** **[S0]** Exit, **[S4]** Dimension Style, **[F4]** Dimension Offset, 1 (one foot), **[Enter]** **[F5]** Overlap, 1 (one foot), **[Enter]** **[F7]** Overrun, 1 (one foot), **[Enter]**.

Of course, details need notes, so here are the steps I followed to set up the text for 1/8-inch scale. Of course, you'll want to make a note of the appropriate sizes you use for 1/8-inch scale.

Text setup

[:] Edit menu, **[S6]** Text, **[F1]** Text size, 1 (one foot), **[Enter]** **[F7]** Font Name, ROMAN2, **[Enter]**.

The "Icon" tool bar support files are found in the DCAD6\SUP\MENUPOF directory and have .KEY extensions. Several come with basic DataCAD, but you can easily create your own by making a copy of an existing tool bar file to a new name and then editing the copy. For example, you might want to copy the DCAD.KEY file. This way, you still have the original to use and one to customize for yourself. To edit the .KEY file, you can use the DOS Editor, Windows' free text editing program called "Write," or another program of your choice that allows ASCII file text editing.

What To Do in DOS

Make a copy of the DCAD.KEY file. At the DOS prompt, enter **cd\dcad6\sup\menupof**, then enter: **copy dcad.key dimsetup.key**. To use the DOS Editor, enter: **edit dimsetup.key**. The new file will be displayed, ready to edit.

Familiarize yourself with this file before editing it. The first two lines are for the program setup, and they start with an exclamation mark (!) and an asterisk (*). DON'T erase or change these lines!

All other lines in the file can be edited. You'll also notice many vertical bar (|) characters, also called pipe symbols. (The key that corresponds to this character can be found on your keyboard as two little vertical lines on top of each other. On my keyboard, it's the same key as the backslash.) These bar symbols must remain in the correct columns in order to run the program. The vertical bars must be located in columns 2, 5, 14, 23, 104 and 185. The nice thing about using the DOS editor is that it lists the column number that your cursor is on (see lower right side), so you can check the placement of the vertical bars.

I suggest just typing over the existing icon lines, being careful not to erase or move any of the vertical bars. However, if you do move one by mistake, you can easily insert lines or delete lines to move it back, or type it in again!

Between the vertical bars there are six "fields" of information. They are the action code, empty field not used, menu string level, icon file name (tool picture that will appear in bar), command field, and message string. To run a macro, you'll use the action code **A** to "Activate" a macro. I used the dimension and text tool bar pictures for the icon file name, but you can use whichever you want.

This is just like programming quick keys (see KeySolutions, June '95). You use ASCII characters to turn off and on the message and menu displays to make your macros run faster. I'll show these noted as (Alt + the number), simply because it's easier. As an example, to create the ASCII character noted as (Alt+183), hold down the Alt key, type in the numbers 183 using the number pad then release the Alt key and the character will appear. Also, each step in the macro must be separated by a caret (^). This symbol is found on the same key as the number 6 above the letters on your keyboard.

Press the **[Insert]** key to turn off the "insert type" default and turn on "overwrite" (large blinking rectangular cursor). This will allow you to type over the existing text in the line without moving the vertical bars. To create the macro for setting up 1/8-inch scale dimensions, edit the third line in your file, which is the first programmable line, to read the following:

```
A! !Dmension!DIMENSION!(Alt + 183)^(Alt +
200)^:^F8^F1^S3^F1^.8^$^F9^.6^$^S5^ROMAN2^$^S0^S4^F4^1^$^F5^1^$^F7^1^$^:^(Alt +
184)^(Alt + 201) !Setup 1/8" Scale Dimensions !
```

Do not add spaces in the command field and put it all on the same line. Your line should look like the "Dmension" line shown in figure 1. You'll find you pretty much run out of space on that line, which illustrates the fact that you can run out of room for a long macro. But, when I run out of room, I just split the macro into two icons and call them part 1 and part 2!

Now, to create the text setup macro, change the fourth line in the file to read the following:

```
A! !Text !TEXT !(Alt + 183)^(Alt + 200)^:^S6^F1^1^$^F7^ROMAN2^$^:^(Alt +
184)^(Alt + 201) !Setup 1/8" Scale Text !
```

Check that each vertical bar is in the correct place by lining them up with the first two lines in your file, as illustrated in figure 1. You'll want to delete the remaining lines in the tool bar (using the cursor to tag and the **[Delete]** key), so that only the first two program lines, the dimension and text setup lines appear. Your file should now look like Figure 1.

```
!! |     |     |                                                
```