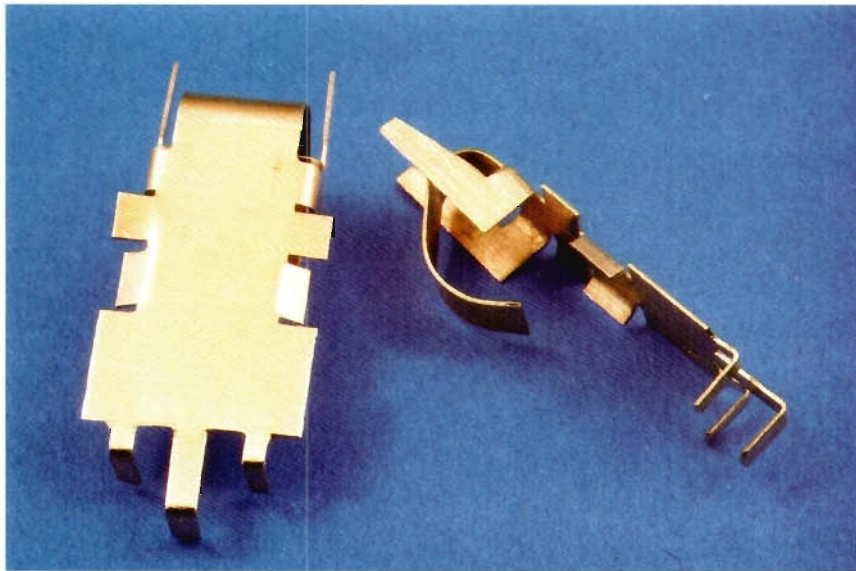


3-D WORLD

News For The
CADKEY
User

Fall 1992
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Two electrical contact springs .200-inch wide (left) and .100-inch wide (right), with maximum working deformation of .045 inch, designed by Geri Engineering for GRiD Systems, using CADKEY and CADKEY ANALYSIS.

One of the first applications of CADKEY ANALYSIS

Ger Engineering Helps GRiD Systems Get Palm Pad to Market on Schedule

GRiD Systems of Fremont, California, manufactures pen-based data-collection systems in addition to its computers. In May 1992, GRiD's engineers were ready to release a mobile, battery-powered data collector (Palm Pad™) from design into manufacturing, but they had a problem. They needed to design a spring that would maintain battery contact, under all kinds of shock and vibration, to allow the flow of electricity through the circuitry. This spring also needed to accept repeated removal and insertion of the Palm Pad's rechargeable battery packs. A workable design for this spring had proven to be very elusive, in spite of months of

effort. The printed circuit boards for the device had already been designed, manufactured, and assembled with all components. The Palm Pad's plastic housing had already been manufactured, as had the plastic shell for the battery pack. Everything was ready for final assembly, except for the spring. Now time had run out, and the spring did not yet exist, even as a workable concept.

On May 15, 1992, GRiD Systems turned to Geri Engineering, Inc. of San Carlos, California, for outside help. From May 15, to 20, engineers from Geri Engineering and GRiD Systems batted around ideas about how to solve the problem.

(Continued on page 2)

Cadkey to Host Technology Fair in Ypsilanti, Michigan

The Cadkey Technology Fair, a CAD/CAE/CAM Conference and Exhibition will take place on October 27-28, 1992, at the Radisson Resort and Conference Center, Ypsilanti, Michigan. This Technology Fair is a seminar; it is a trade show, and it is a CADKEY users' meeting all rolled into one event, free of charge.

Seminar

The Technology Fair is a seminar, actually a two-day program of seminars, focused on concurrent engineering and manufacturing, presented by industry experts. Our Keynote Speaker will be Tom Lazear, president of Archway Systems,

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Palm Pad

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To conform with the original design, the system needed two springs, one .100-inch wide and the other .200-inch wide. The total working deformation of the contact spring could be no more than .045 inch. "This is the worst possible situation for getting involved in a project," said Don Geri, President of Geri Engineering. "All of the dimensions were set. The tolerances were extremely tight. There was almost nowhere to move."

A Double Challenge

The first part of the challenge, as Geri Engineering saw it, was to design a spring that would have a deformation which would not exceed the stress limits. The second part of the challenge was to design a spring that could be manufactured to fit the existing physical configuration.

The design of GRiD Systems proprietary battery contact spring evolved into a leaf spring, with a hook-like, fishing-lure appearance when viewed from the side. "We designed the battery spring with CADKEY[®] and CADKEY[®] ANALYSIS in an iterative fashion," Don said. "We designed the part, then put the part through a two-dimensional plane elastic stress analysis. We modified the part design based on the results shown in CADKEY ANALYSIS, and then analyzed the design again. "CADKEY ANALYSIS typically took three to five minutes to give us 'quick look' answers, so we were able to try out a lot of possibilities that conformed to the dimensional constraints, because there was no freedom anywhere else."

For example, the spring's contact radius of .131 inch could not get much smaller because the contact had to slide over a .015-inch step in the battery

pack's plastic shell. After the analysis, the deformed shape was passed back to CADKEY to measure the deflection of the contact surface as well as the lateral movement of the contact point. This was the key to the analysis since the spring had not only to stay within the stress limits for the material used, but also had to maintain the geometric relationship of the extraction vector to preclude the spring locking the battery inside the Palm Pad.

"Only after we were satisfied with the spring geometry and the 'quick look' analysis data, did we increase the sensitivity of CADKEY ANALYSIS," Don said. Increasing the number of nodes on the model increased the accuracy of the solver. This was especially important because the material thickness of the spring was only .0075 inch. The increased accuracy also increased the run time for CADKEY ANALYSIS. "However, this was acceptable since the only purpose of this run was to confirm the final 'quick look' data."

Testing the contact spring's final design proved that the spring would be able to provide the required 2,500 insertion/withdrawal cycles, and reliable battery contact during shock and vibration. Testing also showed that the spring would protect itself by reaching its maximum stress limit only when the "fish hook" bottomed out. "This is an example of using an analysis system to optimize a design not only for geometry, but also for maximum use of material properties," Don said.

"CADKEY ANALYSIS made this project possible because it produced its results so quickly, usually in three to five minutes," Don added. "If we had been using finite element analysis, I estimate that each analysis cycle would have taken 30 to 45 minutes. CADKEY ANALYSIS cut days from our schedule with GRiD."

Manufacturing the Spring

Manufacturing the spring proved to be as much of a challenge as designing it. Since the spring's primary function was to serve as an electrical conductor, the choices of material were limited. The material selected was beryllium copper. The first springs were produced by stamping with a numerical-control punch. However, the chosen alloy, beryllium copper, required heat treatment for two hours at 600 degrees Fahrenheit to achieve the required spring properties. This meant that Geri Engineering had to consider the heat-treating fixture in the spring design.

On May 25, 1992, Peninsula Spring of Gilroy, California, fabricated the first engineering samples of the spring. After testing, some minor changes were made to the spring's geometry and initial positioning. Peninsula Spring then fabricated a second set of sample parts. Final testing was completed on June 5, 1992. Tooling for the first production run of 2,000 springs began. By June 10, the first round of manufacturing had taken place. This project took four weeks, May 15 to June 15, 1992. GRiD Systems' totally mobile, battery-powered Palm Pad went to market on schedule.

"Great companies use CADKEY."

Al Cowen
President and CADKEY user
Alton Boring Company
Livonia, Michigan

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Technology Fair

(Continued from page 1)

Inc. Mr. Lazear, one of the pioneers in the PC-CAD industry, brings a wide range of expertise in CAD, CAE, simulation, networking, and CASE technology to his presentation.

Some of the topics to be addressed by other speakers are:

- "Concurrent Engineering: Past, Present and Future;"
- "Paperless Design, An Approach to Reducing the Design Cycle;"
- "Data Management Systems (DMS): The Glue between Networked CAD/CAM;"
- "Simulated Paperless Design Production: A Demonstration of the Concept;"
- "Integrating CAD with CAM in the Sheet Metal Environment;"
- "Design Visualization Methods," and
- "Using Surfaces in the Concurrent-Engineering Process."

Trade Show

The Cadkey Technology Fair is a private trade show produced explicitly for individuals interested in computer-aided design, engineering, and manufacturing technology. This unique event will bring attendees face to face with third-party software and hardware solutions in the areas of sheet metal fabrication, technical documentation, drawing

management, bills of material, engineering productivity tools, visualization tools, CAD overlays, portable computers, UNIX workstations, surfaces, mold design, and coordinate measurement. Cadkey, Inc.'s entire product family will also be demonstrated: CADKEY⁵, CADKEY⁺ ANALYSIS, CUTTING EDGE[™], and DataCAD⁺.

Users' Meeting

Users of CADKEY-related products are cordially invited to attend our first corporate-sponsored users' group meeting in the Great Lakes Region on Tuesday, October 27, 1992, at 6:30 p.m. The evening program will include product previews.

Outgrowth of International Distributors' Conference

This Cadkey Technology Fair grew out of the successful third-party private trade show that Cadkey held during our fifth annual International Distributors' Conference, August 3-7, 1992. Twenty international distributors from Europe, Asia, the Middle East, South America and Mexico, as well as twenty-one third-party developers who participated in the trade show strongly urged: "Cadkey should take this on the road!"

Registration

To register for the Cadkey Technology Fair, call (800) 654-3413, or make your reservation by fax to (203) 298-6401.

Cadkey, Inc. to Host Sixth CDE Seminar

Geared for both CADKEY⁵ and CUTTING EDGE[™] end users and developers, the next technical seminars on CADKEY⁵ Dynamic Extensions[™] will take place December 7-9, 1992, at Cadkey, Inc.'s international headquarters, 4 Griffin Road North, Windsor, Connecticut 06095-1511, U.S.A. This technical seminar for C-language programmers will address not only building custom applications in CADKEY, but also custom applications in CUTTING EDGE, using 386/486 based personal computers and UNIX workstations. To encourage interaction among participants, the seminar is limited to 30 people, on a first-come-first-served basis. The seminar fee of \$150 (\$75 for maintenance customers and third-party developers) provides participants with all documentation and sample disks, a freeware compiler to get you started, special pricing on the PharLap/Metaware "32-Bit Power Bundle," and a subscription to a new CDE developers' technical newsletter, **Fourth Dimension**, published by RW Engineering of Springfield, Massachusetts. (See the third-party news story, **Fourth Dimension: A Technical Newsletter for CADKEY Power Users**, on page 4.) To reserve a seat in this CDE Technical Seminar, call (203) 298-8888, ext. 7237.

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THIRD-PARTY NEWS

Fourth Dimension: A Technical Newsletter for CADKEY Power Users

RW Engineering of Springfield, Massachusetts, introduces its new, bimonthly technical newsletter for CADKEY users, for CADL programmers, and for CDE developers, **Fourth Dimension**. **Fourth Dimension** will provide in-depth articles about CADKEY customization topics, such as copious data, collective entities, reference functions, and dialog boxes. It will also present an ongoing series of tutorials on CADL[®] (CADKEY Advanced Design Language) and on CADKEY[®] Dynamic Extensions[™]. **Fourth Dimension** will feature a question-and-answer column and a readers' forum for letters to the editor. For additional information about **Fourth Dimension** and to request a complimentary free copy of the first issue, contact RW Engineering, 45-302 Willow Street, Springfield, Massachusetts 01103. Telephone: (800) 435-1582. Fax: (203) 623-8259.

CADKEY and Memory

In its September newsletter, CALCAD, a CADKEY Users' Group in California, requested a one-page description of memory utilization with tips and techniques.

Optimal utilization of memory is a complex subject at the very least. **Getting Started 386, "Memory ... I'm So Confused,"** pages 8-4 through 8-7, is a good place to start.

Technical Support Hours

Monday-Thursday: 8 a.m.-8 p.m.
Friday: 8 a.m.-5 p.m.

Telephone: (203) 298-8888.

Look for a Movie and a Story

CADKEY in Made-for-TV Movie

At a date and time to be announced, the CBS Television Network will broadcast a made-for-TV movie, **THE SWITCH**, in which CADKEY[®] plays a role. **THE SWITCH** is the story of Larry McAfee, a young man who led an active life until a motorcycle accident made him a quadriplegic, paralyzed from the neck down, and completely dependent on a ventilator to breathe. Part of Larry McAfee's rehabilitation, portrayed in the film, involves a voice-activated computer with CADKEY. One scene, in particular, focuses on the computer with Dragon Systems' DragonDictate[™] voice-activation software and CADKEY.

THE SWITCH is an Avnet/Kerner production with the technical assistance of Numotech, Inc., a CADKEY user that designs medical equipment for the handicapped. Numotech, Inc. of Sun Valley, California,

designed the specialized seating system for the unique wheelchair that Gary Cole, playing the lead role as Larry McAfee, used in the movie. Numotech's sister company, Jasco Products Incorporated, manufactured the seating system.

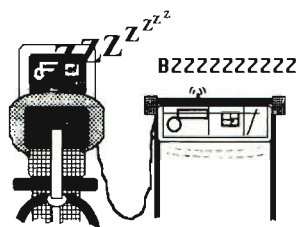
Look for an article about what Numotech and Jasco Products do with CADKEY in a future issue of **3-D WORLD**. And, watch your TV listings for **THE SWITCH**. "Now say '3-D,'" could become a very famous line.

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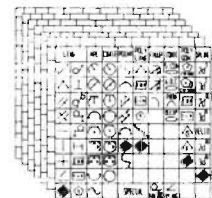
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You Can't Keep a Good Person Down !

Brad DeSouza of Vista, California, is a quiet relaxed fighter. After successfully running seven businesses since 1965, Brad and his wife Jan feel that they deserve to relax a bit. Because Brad suffers from Amatrophic Lateral Sclerosis, he has become a quiet tireless fighter for the handicapped. Brad's latest business venture, DeSouza Enterprises, is essentially a one-person shop that specializes in computer-aided design using CADKEY[®] with the BUG[®] Voice Command system by Command Corporation of Duluth, Georgia.

Brad DeSouza began using CADKEY in his free-lance design business in 1987. Two years earlier Brad had received a diagnosis from his doctor that he had Amatrophic Lateral Sclerosis (ALS), a progressively degenerative disease which is included in the group of diseases known as Muscular Dystrophy. ALS is also known as "Lou Gehrig's Disease." After the diagnosis in 1985, Brad began to learn how to use computers for word-processing and spreadsheet types of applications. His introduction to CADKEY gave him a whole new way of approaching his design work and productive employment for the handicapped. As the ALS progressed, severely limiting the use of his hands, Brad combined his design work on CADKEY with voice-recognition input using Command Corporation's BUG System. "I've spent the last five and a half years learning and developing how to do design work with voice input," Brad said. "In addition to CADKEY, I have adapted other CAD programs and public-domain utility programs to voice input. Of all the CAD packages that I have worked with, I keep emphasizing that CADKEY is

the easiest to use."

CAD = Opportunity for Handicapped

"I want every handicapped person to be able to earn a living, if he or she is able to work, and CAD offers fantastic opportunities," Brad said. Brad has worked actively with the San Diego Regional Occupational Program to develop and promote courses in high schools and colleges to train handicapped people in computer skills, especially computer-aided design using CADKEY. Since Brad can no longer drive a car, his wife Jan drives him wherever he needs to go to advocate for helping the handicapped to help themselves. "I want industry to work with handicapped people. We want to be productive. We make terrific employees. We are not vegetables. We make some of the most reliable employees that there are. The new federal law, the Americans with Disabilities Act, is a wonderful step in the right direction. I really hope that companies get positively, actively involved with it."

"My ALS has progressed to the point that now I cannot do much more than advise and advocate," Brad said. "In addition to voice input, there are now sip-and-puff, head-position, eye-gaze input, and other technologies that can be used with CAD. I have not yet used them with CADKEY."

Editor's Note: For additional information about the DOS-based BUG[®] Voice Command System or other UNIX-based voice command systems, contact Command Corporation, 3675 Crestwood Parkway, P.O. Box 956099, Duluth, Georgia 30136-9502. Telephone: (404) 925-7950. Fax: (404) 925-7924.

For information about other input technologies which Brad DeSouza has not yet had the opportunity to use with

CADKEY, contact the sources listed below. This list is by no means complete, but it is as complete as possible within time restraints for publication. **3-D WORLD** has received information that some of these products have already been used successfully with CADKEY.

Speech-Recognition Input: Dragon Systems, Inc., 320 Nevada Street, Newton, Massachusetts 02160. Telephone: (800) 825-5897 or (617) 965-5200. Fax: (617) 527-0372. Dragon Systems has informed **3-D WORLD** that its DragonDictate[™] Speech Recognition System has been used successfully with CADKEY.

Head-Position Input: Pointer Systems, Inc., One Mill Street, Burlington, Vermont, 05401. Telephone: (800) 537-1562 or (802) 658-3260. Fax: (802) 658-3714. Pointer Systems has informed **3-D WORLD** that its FreeWheel II[™] Optical Head Pointer has been used successfully with CADKEY.

Head-Position Input and Sip-and-Puff Input: Prentke Romich Company, 1022 Heyl Road, Wooster, Ohio 44691. WiViK Windows Visual Keyboard[®], HeadMaster[™], Pneumatic Switch. Telephone: (800) 262-1984. Fax: (216) 263-4829.

Eye-Gaze Input: LC Technologies, Inc. 4415 Glenn Rose Street, Fairfax, VA 22032. **Eyegaze System[™]**. Telephone: (703) 425-7509. Fax: (703) 323-4782.

For general information related to computers and the disabled, contact:

Trace **Research & Development Center**, Waisman Center & Industrial Engineering Department, University of Wisconsin - Madison, 1500 Highland Avenue, Madison, Wisconsin 53705. **The Trace Resource Book**. Telephone: (608) 262-6966. Telecommunications Devices for the Deaf (TDD): (608) 263-5408. Fax: (608) 262-8848.

IBM, National Support Center for Persons with Disabilities, P. O. Box 2150, Atlanta, Georgia 30055. **Resource Guide for Persons with Mobility Impairments**. Telephone: (800) 426-2133. TDD: (404) 238-4806.

RESNA Technical Assistance Project, 1101 Connecticut Avenue, Suite 700, Washington, DC 20036. Telephone (202) 857-1140. Fax: (202) 223-4579.

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CADKEY 5: New Features and Price / Performance Value

Editor's Note: This article and its illustrations were produced at CADPRO Chicago, they appear on pages 3-4 of the Fall 1992 issue of CADPRO's newsletter, **OUTPUT. 3-D WORLD** is publishing them with CADPRO Chicago's permission. For a complete copy of **OUTPUT**, which includes a table of the data used to generate the accompanying graphs, contact CADPRO Chicago. Telephone: (708) 640-1853. Fax: (708) 640-1868.

Cadkey, Inc. has just released its new CADKEY® 5 (version 5.02) software. There are many new features with version 5.02. Our staff has been testing and evaluating the software for several months. The following is an overview of what they have found with reference to features and performance.

CADKEY 5's most exciting new feature is Model-to-Drawing Associativity, which allows detail drawings to be automatically updated any time the 3-D model is changed. This ensures that the details reflect the actual design modifications.

CADKEY's new Drawing Layout Mode automates the generating of detailed drawings from 3-D models. Dimensioning "instances" are easily defined from the model and are associated with the model to streamline the documentation process.

CADKEY Dynamic Extensions

CADKEY® Dynamic Extensions™ (CDEs) let you link additional applications or special functionality written in C, designed by Cadkey, Inc.'s third-party developers or by your company, for seamless operation with CADKEY. The CDEs will now give third-party developers the ability to write applications that will run at, at least, 98% of core CADKEY speed. Keep a look out for developers who take advantage of this capability. — the sky is the limit!

In the hardware department, we have improved printing and plotting support. HPGLII, Encapsulated Color Postscript, and wide-axis plotting are now supported.

New On-line documentation now includes information about hardware set-up, off-line printing and plotting, on-line calculator, menus-and-prompts text files. CADKEY 5 (version 5.02) features an easy-to-use, windows-type user

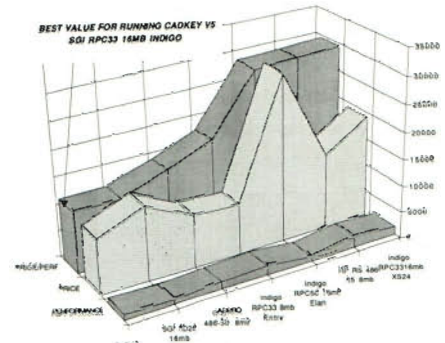
interface with mouse support. This also reduces the need for paper manuals for some topics.

CADKEY 5 has new dimensioning entities. Cross-Hatching now includes 18 types which you select from pop-up menus. A Bent Radius Dimension option lets you dimension without requiring you to use an arc's true origin for the origin of the leader line. Edge Diameter Dimensions allow you to dimension to the tangents of arcs and circles, with horizontal, vertical and key-in-angle options for placing a dimension. The Parallel Dimensioning options now allow you to specify the reference points (currently supported) by selecting two positions: the dimension vector or a key-in angle of reference to the dimension vector.

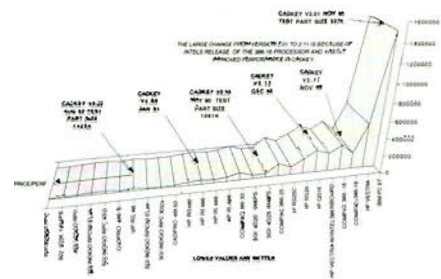
Also note small changes with the Change Text Position function. First of all, you can now make your selection by picking text anywhere. When you move dimensions which have leader characteristics, the leader side will change based on whether the leader becomes perpendicular to the definition point. You can now make labels with up to 5 leader/arrow lines. You can also define arrowheads in four different styles — slash and dot are styles 3 and 4. Automatic Chamfer Dimension entities now have two representations for syntax. You can now create Angular Dimensions in three positions. CTRL-N now serves as an immediate-mode toggle for associated dimensions that are not view dependent. This makes all dimensions appear in all views.

The UNDO function has been expanded into a one-level UNDO within several functions which lets you reverse the last operation that you performed. Now, you can also enable the UNDO function as a break-window option. Quick Fillet and Trim let you fillet or trim with one cursor selection. There is a new Status Window option. Splines can now include up to 200 nodes or knot points. This new spline functionality will show its real colors with surfacing and reverse-engineering applications.

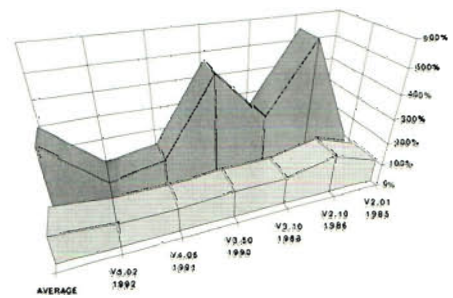
Our conclusion is that CADKEY 5.02 is a direct result of what CADKEY users world-wide have requested. We welcome written suggestions and opinions for future CADKEY releases by fax or by mail.



Graph showing CADKEY 5's New System Price/Performance Comparisons.



Graph showing Price/Performance curves comparing average CADKEY system price to the performance index for different CADKEY versions since 1985. Lower values are better. In a nutshell, what you are seeing is that your CADKEY system dollar has never bought you more than with today's version 5.02.



Graph showing the change in CADKEY performance together with the change in the cost of CADKEY upgrades since 1985. What we are saying is that upgrading has always been and still is an excellent value.

CADJET Master Templates for CADKEY®5

CADJET Master Command Templates are now available for CADKEY® Version 5. With the new CADKEY5 commands conveniently located on the template, users immediately begin to use CADKEY5's new features. Comes in 11x11 and 17x11 sizes. Upgrade kits for existing CADJET Template users available. Other CADJET Master Templates available for CADKEY Ver.3&4.

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University Team Develops Specialized Corsets to Treat Scoliosis

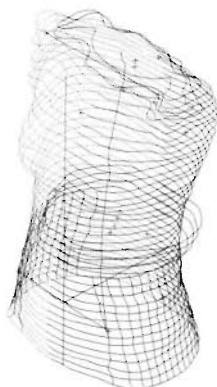
Editor's Note: This article is based on a report co-authored by five people in December 1991: P. Abellard, F. Belmajoub, J. Duplaix of the Laboratoire d'Automatique et d'Informatique Appliquées (Laboratory of Applied Information Technology) of the University of Toulon and Var, La Garde, France, and J.L. Conil and A. Delarque of the Service de Rééducation Fonctionnelle (Functional Reeducation Service) of the École de la Kinésithérapie (School of Motion Therapy), Institut Michel Salmon, Marseille, France.

Scoliosis means "crookedness" in Greek. In medicine, the crookedness identified as scoliosis is a lateral curvature of the spine. Scoliosis is one of those physical maladies that progressively and painfully gets worse. A standard treatment for scoliosis has been to use a corset to support the sufferer's upper body in a more correct posture. For some time, a team of medical researchers at the University of Toulon in France have been using CADKEY(r) to develop specialized corsets, custom-designed to fit each patient's individual needs for upper-body support, and to provide progressive, active correction of the deformity.

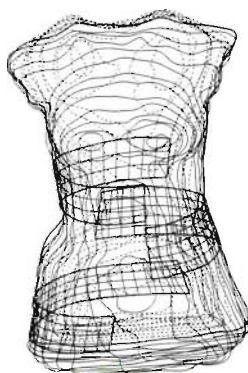
Scoliosis can occur as a scoliotic attitude in the spine's soft vertebral disks. This form of scoliosis is reversible. However, scoliosis can also occur as a permanent deformation of the spinal column, its disks and other elements of bone structure. This structural scoliosis can be treated, but a cure is very difficult to achieve.

Active versus Passive Treatment

The more well-known type of corset to treat scoliosis works on the principle of upper-body support, with passive correction of the deformity. The type of corset advocated by the team at the University of Toulon works on progressive correction of the deformity with the active



Model of a Scoliosis patient's upper-body data with a single-piece supportive-corrective corset (cross-hatch of splines).



Model of a Scoliosis patient's upper-body data with a three-piece corset (cross-hatches of splines).

participation of the patient.

Until now, these corsets have been created by starting with a plaster casting made of the patient's trunk. This plaster casting faithfully reproduces the current situation of the patient's lateral curvature of the spine. The physician and technicians manually design a corset to correct the condition. However, to indicate the corrective action that they expect the corset to produce, they have to chip away at the original plaster casting, thus at least partially destroying their original data. As the patient's treatment progresses, the process of making a plaster casting of the patient's upper body has to be repeated each time a new corset is needed. Moreover, this traditional method does not preserve a physical record of the models of different "corrected trunks" used

in attempting to correct the patient's scoliotic condition.

CADKEY and Corsets

Information technology, specifically CADKEY, provides solutions to numerous difficulties encountered at different stages in the design and manufacture of corsets to treat scoliosis: capturing three-dimensional data, creation of the model of the current state of the patient's upper body, corrections to the model, right-left inversion, and simulation.

The three-dimensional data of the trunk of the patient's body derives from stereoscopic digital images created through Computer Tomography (CT scan). The scanned image is, in reality, a series of slices, representing the contours of the patient's torso, taken at a specific distance from one another, and superimposed one on top of the other. The result, the final image, has the appearance of a topographical map of the patient. Using six points of reference, the computer generates three-dimensional point data which it saves as a file. This file of three-dimensional points serves as the input to CADKEY, to design a three-dimensional wireframe model of the patient's torso. Since the contours of the human body are really irregular curves, the points in the data file serve as nodes for three-dimensional splines, which together create the 3-D model of the patient's body. This CADKEY model allows the medical personnel to retain a permanent record of the original state of the patient's scoliosis.

Until quite recently (1991), the design of an individual corset to correct a particular patient's condition usually incorporated three pieces into a single unit. Now, the corset is most frequent-

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CADKEY Users' Groups in the United States and Canada

CADKEY users frequently request information about where and when a local Users' Group meets. Here is a listing of CADKEY Users' Groups for your convenience. Some users' groups have formal names; others do not. Members frequently host meetings at different locations. The address listed with the contact person's name is not necessarily the meeting place. If your CADKEY Users' Group is not included in this listing, please let us know.

State	Location/Contact	Meetings/ Serving	State	Location/Contact	Meetings/ Serving
Ala.	CIMPRO , Div. of I.C.T., Inc. 206 South 8th Street Opelika, AL 36801 Jeffrey Simon (205) 749-9705	Montgomery, AL; Atlanta, GA.	Md.	Chesapeake CADKEY Users' Group Catonsville Community College 800 S. Rolling Road Bldg. H, Rm. 329 Parking Lot D Catonsville, MD Tom Warner (410) 931-2152 (technical) Phyllis Schuman (410) 823-5007 (reservations)	Quarterly. Greater Baltimore, Md. and Washington, D.C. areas.
Ariz.	Arizona CADKEY Users' Group Acoustic Imaging 10027 South 51st St. Phoenix, AZ 85044 Dwayne Quatier (602) 496-6681	Quarterly. The state of Arizona.	D.C.	The Software Firm 4341 South Westnedge Av. Kalamazoo, MI 49008 Frank Lucatelli (616) 381-4527	Southwest Michigan.
Calif.	CALCAD Valley Group & Orange County Group (Meeting at various locations.) 1407 Morningside Dr. Burbank, CA 91506 James Moschenross (818) 361-0900 (818) 845-1235 CADKEY User's Group of San Joaquin Valley 7555 North Del Mar Suite 106 Fresno, CA 93711 Mark Arnett (209) 432-8099 Poelman's Design Service 42 W. Campbell Av. Suite 201 Campbell, CA 95008 Mike Poelman (408) 378-9980 3-D CADware 45690 Murfield Drive Temecula, CA 92592 Jim Neeley (714) 676-3223, (909) 676-3223	Monthly. San Fernando Valley area & Orange County area. Central California. Quarterly. Northern California. Quarterly. San Diego, Riverside, Orange Counties.	Conn.	Hartford CADKEY Users' Group meeting at Central Conn. State University 1615 Stanley Street New Britain, CT 06050 Peter Szkoda (203) 521-5325 Fax: (203) 521-0083 Southern Connecticut CADKEY Users' Group meeting at CIMTECH 1171 Main Street, #A5 Bramford, CT 06405 Steve Kidd (203) 488-3032	Bimonthly. Greater Hartford. Monthly. Southern Connecticut. Orlando, Daytona, Titan, Jacksonville.
			Fla.	METRA ELECTRONICS 460 Walker Street Holly Hill, FL 32117 Spence Quilling (904) 257-1186	
			Ga.	Georgia CADKEY User's Group CAD/CAM, INC./CADONE 6733-D Jones Mill Ct. Norcross, GA 30092 Pat Durkee (404) 449-5186	Central Georgia
			Ill.	CADPRO Chicago 2525 E. Oakton Drive Arlington Heights, IL Paul Bergetz (708) 640-1853	Semi-annually. Northern Illinois.
			Mass.	New England CADKEY Users' Group (Meets at various locations during year.) Dana Seero Jay Jacobs (617) 631-9662	Bimonthly. Eastern New England.
			N.H.		
			Maine		
			R.I.		
			Minn.	Minnesota CADKEY Users' Group Anoka-Ramsey Community College 11200 Mississippi Blvd. Coon Rapids, MN Tom Loftus (612) 427-2600	Call for schedule. Upper Mid-West.
			Mo.	St. Louis Area CADKEY Users' Group Ultra-Comp Corp. 3801 Ultra-Comp Dr. Earth City, MO John Lucas (314) 949-9710	Monthly Greater St. Louis area.
			N.Y.	American Training Center, Inc. 118-21 Queens Blvd. Forest Hills, NY Arkady Kleyner (718) 544-8100 (800) 273-ATCI (N.Y. only)	Monthly New York and New Jersey.
			N.J.		
			N.Y.	CADKEY Users' Group of Long Island (Meeting at various locations.) 81 Westbury Av. Suite 236 Carle Place, NY John Horcher (516) 623-9341 Central New York CADKEY Users' Group 148 Castleman Road Vestal, NY Douglas G. Miller (607) 721-4422	Long Island Semi-annually. Central New York: Binghamton, Troy, Syracuse.

State	Location/Contact	Meetings/ Serving
N.Y.	College of Staten Island Sunnyside Campus 715 Ocean Terrace Staten Island, NY Changmin Kim (718)390-7524	Staten Island and surrounding areas.
	Rochester Institute of Technology 1 Lomb Memorial Drive Rochester, NY. 14623 Robert Hefner (716)475-2205	Quarterly. Buffalo & Rochester.
Ohio	Progressive Computing 6964 Spinach Drive Mentor, OH 44060 Karen Lorenzo (216)255-0460	Bimonthly. Ohio, Western Pennsylvania, & Detroit.
Ore.	CTR Business Systems 6420 SW Macadam Av. Portland, OR 97201 Anne McKasson (503)293-8627	Monthly. Portland & Vancouver areas.
Pa.	Micro Control 390 Middletown Blvd. Suite 604 Langhorne, PA 19047 Barry Bennett (215)752-5510	Quarterly. Pennsylvania, New Jersey, Delaware, Maryland.
N.J.		
Del.		
Md.		
Texas	MLC CAD Systems 5316 Highway 290 W. Suite 420 Austin, TX 78735 Michael Leesley (512)288-9126	Semi-annually. Austin, Houston, Dallas.
Utah	Mountain West Computer Systems 1290 South 550 St. Springville, UT 84058 Paul Findley (801)489-5497 Fax: (801)489-4828	Semi-annually. The state of Utah.
Wash.	Northwest CADKEY Users' Group (meeting at various locations) Redmond, WA Joe Brouwer (206)623-1403	Bimonthly. Greater Northwest.

State	Location/Contact	Meetings/ Serving
Wis.	CAD PROFESSIONALS 120 Bishops Way Suite 136 Brookfield, WI 53005 Mike Roberts (414)782-9199	Quarterly. Wisconsin cities.
CANADA		
Prov.	Location/Contact	Meetings/ Serving
New Brunswick	Manufacturing Technology Centre U. of New Brunswick P.O. Box 4400 Fredericton, N.B. Canada Evelyn Richards (506)453-3533	Quarterly. Fredericton, Moncton, Saint John, Bathurst, N.B.; Halifax, N.S.; Charlottetown, P.E.I.; St. John's, NFLD.
Québec	L'Association des Utilisateurs de CADKEY 170 Montée de Liesse Ville Saint Laurent Québec H4T 1N6 Canada Manon Dubé (514)465-0974	Every 6 weeks. Greater Montréal area.
<p>If your CADKEY Users' Group is not included in this list, please inform Danielle Cote at CADKEY so that we may publicize your meeting schedule. Telephone: (203) 298-6424. Fax: (203) 298-6401.</p> <p>If you would like to start a new CADKEY Users' Group in your area, please call Danielle Cote. A FREE CADKEY Users' Group Start-Up Kit is available to help you.</p>		
<p>The Winter 1993 issue of <i>3-D WORLD</i> will include a listing of CADKEY users' groups overseas.</p>		
<p>Time to Renew Your CADKEY Maintenance?</p> <p>Call Cadkey Sales at (800) 654-3413.</p>		

Scoliosis and CADKEY

(Continued from page 9)

ly designed as one piece. The corset's design takes place on different levels of a copy of the original patient-model file. Here, too, splines are particularly useful because, just like the patient, the corset also has irregular curves. The physicians and technicians can experiment, in a "what if" fashion, with different corset designs, to work at actively correcting the patient's specific scoliosis, by changing the location of the nodes of one or more of the splines in the corset and/or in the model of the patient.

After the medical team has defined the corset that they believe will obtain the desired results, the CADKEY part file of the corset serves as input to CNC manufacturing. The corset undergoes heat-treatment finishing for form and fit to the patient.

More Precise Study of Scoliosis

The sequence of CADKEY models of the patient's torso and of the corsets used to treat the scoliosis, done at regular intervals, provides the physicians and technicians with an ongoing up-to-date record of the evolution of their patient's condition and progress. On a larger scale, the data gathered from an increasing number of patients and of treatments constitutes an important database which makes possible a more precise study of scoliosis.

Editor's Note: For additional information about the technology for treating scoliosis described in this article, contact the Laboratoire d'Automatique et d'Informatique Appliquées de Toulon, Université de Toulon et du Var, BP132, 83957 La Garde, France. Telephone (from outside of France): 011-33-94-75-90-50. Fax: 011-33-94-08-14-32. Or, contact the Service de Rééducation Fonctionnelle, École de la Kinésithérapie, Institut Michel Salmon, 92 rue Auguste Blanqui, 13005 Marseille, France. Telephone (from outside of France): 011-33-91-48-14-40. Fax: 011-33-91-42-53-68.

ABCs of CDE ... Part II

by

Usman Rashid

In the Spring 1992 issue of **3-D WORLD**, I wrote about CADKEY® Dynamic Extensions™ (CDE), looking at the various models of implementation and their advantages. As you may recall from that article, the CDE mechanism allows functions to be added to CADKEY® at run-time. These functions, with their data, are encased in a CDE module. The mechanism for adding the functions to CADKEY are dynamic loading (CDE/DL), inter-process communication (CDE/IPC), and in the future, network connection (CDE/NET).

This article will show you how to create a CDE module that can be dynamically loaded in CADKEY. My example will be based on the 386 version of CADKEY, but it applies equally well to the other platforms. It will create a CDE module with a function that displays the "Hello, world!" message on the prompt line upon execution. With the information presented here, you will be able to create CDE modules which are more useful. The emphasis in this article will be on describing the process.

Requirements

Before you can create a CDE module, you need the following:

Software

1. **CADKEY Software Development Kit (SDK)** for version 5. The SDK contains the necessary executables, headers, and object files for establishing the CDE link.
2. **MetaWare High C compiler** release 2.31 or above. This is the C compiler supported by CADKEY.
3. **Phar Lap DOS Extender Kit** version 3.0 or above. This is also required as part of the development system.
4. **CADKEY 5** to load and run your CDE functions.

Hardware

The hardware requirements for a CDE application are the same as those for CADKEY. For detailed information, see the *System Requirements* section in the CADKEY **Getting Started Guide**.

Building a CDE Module

A CDE module is made out of source files for your functions, CDE definition files and CADKEY linkage objects. Here is how to generate each of these and how to process them to build a CDE module.

Source Files

Source files contain the code for your functions. If a function in your source file is making calls to CADKEY functions, that source file must include the appropriate header from the SDK. These *linkage headers* provide the necessary connections for making calls to CADKEY functions. The CADKEY functions that can be called are divided into logical groups, and each group has its own linkage header. These headers are:

CK_CDL.H	For CADL Library Functions
CK_DLG.H	For Dialog Box Functions
CK_SYS.H	For System Library Functions
CK_REF.H	For Reference Entity Functions

Note: There are additional header files supplied with the SDK which are necessary for creating CDE modules. All the SDK header files must be present in your include directory or you will not be able to successfully build CDE modules.

Listing 1 shows our source file HELLO.C. It includes the header "CK_CDL.H" since it calls `ck_pause`, a CADL Library function.

```
#include "ck_cdl.h"
void hello ()
{
ck_pause ("Hello, world!");
}
```

Listing 1: HELLO.C

Definition Files

In addition to the source files, you have to create a definition file for your CDE module. The definition file describes the functions and data in the CDE module. The contents of the definition file will depend on the complexity and usage of your application. As a minimum, it must contain the names of the function in your CDE module that you want to be accessible to the user. You can also provide information such as structure declarations, return types of the functions, parameters which each function takes, and the data types of these parameters. You can lock or hide functions for protection, group them for over-laying, or automatically execute them when the CDE module is loaded or unloaded. Our definition file HWORLD.DEF, shown in listing 2, contains the name of our function and its return type.

```
/*++  
** Hello World Function  
—*/  
  
void hello ()
```

Listing 2: HWORLD.DEF

Running CDEGEN

A definition file needs to be processed by the CDEGEN program before it can be used for building a CDE module. The CDEGEN program reads the information in the definition file and creates a C file. This C file contains data structures that encapsulate the information about functions. When CADKEY loads a CDE module, it deciphers the functions in that CDE module with these data structures. CDEGEN spares the developer the trouble of setting up these data structures. The definition file is run through CDEGEN the first time it is created and then every time it is modified. We run our definition file through CDEGEN with

```
cdegen hworld.def
```

which produces the HWORLD.C file.

Caution: Be careful about what you name your definition file. Do not use the name of any of your source files. Since the C file produced by CDEGEN has the same name as the definition file, it will overwrite an existing source of that name. You can also avoid this collision by using the '-o' option:

```
cdegen -o newname hworld.def
```

This will generate NEWNAME.C file instead of the HWORLD.C file.

Compiling

The C file output by CDEGEN is treated as one of the source files for the application. All source files are compiled using the MetaWare High C compiler to produce object files. Use the '-c' (compile-only) flag on the compiler command line so that the compiler does not try to link it into an executable program. Our module will be linked by the CDE loader in CADKEY. For our example, the command line will be

```
hc386 -c -l/ckdev/include hello.c hworld.c
```

This step will yield the object files HELLO.OBJ and HWORLD.OBJ. Note that the HWORLD.C file is compiled just like any other source file.

Note: The above command line assumes that the CADKEY SDK and the High C compiler have already been installed and the path for the SDK include files is "/ckdev/include."

Object Files

The last step in building a CDE module is combining our object files with the SDK object files into a library that can be loaded by CADKEY. I use the 386LIB utility from the Phar Lap DOS Extender Kit for this step. The SDK object files follow the same pattern as the linkage headers. Each function group has its own object file. These files are:

```
CK_CDL.OBJ For CADL Library Functions  
CK_DLG.OBJ For Dialog Box Functions  
CK_SYS.OBJ For System Library Functions  
CK_REF.OBJ For Reference Entity Functions
```

You only need to compile the object files for the function which you are calling.

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ABCs of CDE ... Part II

(Continued from page 13)

The function in this example calls `ck_pause` from the CADL Library. Therefore, it will combine `CK_CD.L.OBJ` with our object files:

```
386lib hello.cde -create hello.obj hworld.obj ck_cd.l.obj
```

To keep the command line short, this example assumes that the `CK_CD.L.OBJ` has been copied from the SDK object directory into the current directory. Executing this command line will create your CDE module `HELLO.CDE`. This module is ready to be loaded into CADKEY.

Running the CDE Module

To run your CDE module, first copy it into the default CDE directory. This way, you do not have to type the full path for loading the CDE module. Start up CADKEY and go to the FILES menu. Choose the CDE option from the menu. You will see the following options. The first four options open and close CDE modules. The last two options execute functions within open CDE modules.

- OPEN** Opens a CDE module and makes its functions available for execution. You can load multiple CDE modules at the same time.
- LST/OPEN** Displays a list of CDE modules in the current CDE sub-directory. If you have selected the VERBOSE mode for listing, the listing shows the names of the modules, their sizes and the dates of their creation. You can open a module by selecting it from the list.
- CLOSE** Closes a CDE module and removes its functions from the list of available functions.
- LIST/CLS** Displays a list of CDE modules currently opened. You can close a module by selecting it from the list.
- EXECUTE** Invokes a function from an opened CDE module. Only those functions that do not take arguments can be executed.
- LIST/EXE** Displays a list of CDE functions currently available for execution. You can invoke a function by selecting it from the list.

Note: The behavior of some of the operations listed above can be slightly different if there is more than one CDE modules open at the same time.

For this example, load `HELLO.CDE` with `OPEN` or `LST/OPEN`, and then execute the `hello` function. This will display the "Hello, world!" prompt on the prompt line. To close the CDE module, choose `CLOSE` from the menu and type in `HELLO`, the name of the CDE module.

The Next Step

Now that you have successfully created a "Hello, world!" CDE module, you can start on functions you need. The steps described above will work for creating any CDE module. Happy programming !

Editor's Note: Usman Rashid is Group manager of Applications Development at Cadkey, Inc.

THIRD-PARTY NEWS

KEY SOLUTIONS: An Independent Magazine about Concurrent Engineering

Value Engineering Associates (VEA) of Cusick, Washington, published the first issue of its new third-party magazine, **KEY SOLUTIONS**, in September 1992. The primary editorial emphasis of **KEY SOLUTIONS**, according to Dr. Bob Martin, President of VEA, is concurrent engineering, and each issue will include in-depth

coverage of concurrent-engineering topics ranging from philosophies and national issues to design, manufacturing, problem-solving methods, and tools. The content of **KEY SOLUTIONS** also focuses heavily on Cadkey because VEA has determined that Cadkey's integrated products represent the direction

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KEY SOLUTIONS

(Continued from page 14)

in which manufacturing enterprises ought to go in order to create a concurrent-engineering environment.

KEY SOLUTIONS is being produced independently of Cadkey, Inc. Although there is no formal agreement between Cadkey and VEA, Cadkey's Marketing Publications, will cooperate with Value Engineering Associates, particularly in reviewing and approving articles that have appeared in **3-D WORLD**, or in some other Cadkey publication, for re-publication in **KEY SOLUTIONS**. The four-color, glossy magazine will be published six times per year, and subscriptions are free of charge to qualified applicants. For additional information about **KEY SOLUTIONS**, contact Value Engineering Associates, P.O. Box 207, Cusick, WA 99119. Telephone: (509) 445-1748. Fax: (509) 445-1146.

THIRD-PARTY NEWS

Need to Work on AutoCAD DWG Files in CADKEY? → DraWinG Direct!

DraWinG Direct®, the first product in the Shuttle Series™ by SAGG Computers and Electronics of Forest Hills, New York, provides CADKEY users, especially those who work in a mixed-CAD environment, a means to work directly with CAD files in AutoCAD®'s DWG format. Written in the C-programming language as a CADKEY® Dynamic Extension™ (CDE), DraWinG Direct runs seamlessly in CADKEY® 5. SAGG Computers will demonstrate DraWinG Direct at the Cadkey Technology Fair in Ypsilanti, Michigan, October 27-28, 1992.

The Shuttle Series contains two modules: DraWinG Direct Read and DraWinG Direct Write. Each module can be purchased individually, or they can be purchased together. The Shuttle Series allows you to read and

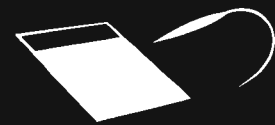
write DWG files directly in CADKEY. When reading a DWG file, CADKEY displays the file as if it were a native CADKEY part file. Lines are lines; circles are circles; text is text; blocks are blocks, and dimensions are dimensions. Everything can be edited in CADKEY as if it had been originally created in CADKEY. User interaction takes place through pop-up menus with mouse and keyboard support.

For additional information about the Shuttle Series, contact Arkady Kleyner, SAGG Computers and Electronics, Inc., 118-21 Queens Boulevard, Suite 310, Forest Hills, NY 11375. Telephone and Fax: (516) 938-6422.

Editor's Note: AutoCAD is a registered trademark of Autodesk, Sausalito, CA.



ANNOUNCING The CADJET Template Customization Kit for CADKEY®



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You get 200 Peel & Stick Cadkey Commands, Preprogrammed Macros, Software and Instructions.

Now, lay out your template the way you want and have access to all CADKEY's 500 Commands.*

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DISPLAY
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TO USE:

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2. Use CADKEY's TEXT or the MACRO NAME (Library Entry) to create the CADKEY COMMAND. In the MACRO NAME, use the name of the File and add your initials.

3. In new TEMPLATE, use the COMMAND to your Tablet.

File - Macro - Shading - Tablet - There type in the MACRO NAME - Macro. You will then be permitted to edit.

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We Make CADKEY Even Better!

Achieve Better Control: ABC Part Manager Is Here !

ABC Part Manager™ from Alton Boring Company of Livonia, Michigan, allows CADKEY users to organize the geometric data in their part files, on levels, completely by color and by user-defined sets or collections of related entities. Written in the C-programming language as a CADKEY® Dynamic Extension™ (CDE), ABC Part Manager is programmed to install itself completely and correctly in CADKEY®5. Alton Boring will demonstrate ABC Part Manager at the Cadkey Technology Fair in Ypsilanti, Michigan, October 27-28, 1992.

ABC Part Manager assists you in managing, tracking, checking, and moving multiple component assemblies of any complexity through point-and-click buttons and icons, while viewing the part in real time. When you load the ABC Part Manager from inside a part file, it automatically scans the part file's database and displays on the screen a grid of 240 squares (15 rows by 16 columns). This is the LEVELGRID. Each square in the LEVELGRID represents a level between 1 and 240 (levels 241 through 256 are reserved).

After completing its scan of the part file's database, ABC Part Manager displays boxes in the squares in the LEVELGRID which correspond to the levels of the part file on which there are geometric entities, notes and/or dimensions. The 15 rows represent user-definable sets or collections of related entities, and the user can give an individual name to each of these 15 rows. The first 14 columns from the left edge of the LEVELGRID represent colors. The fifteenth column represents notes, and the sixteenth column represents dimensions. There is no longer any need to remember where data is located in the file. All you have to do is look at the LEVELGRID. You know where the geometric entities are. You know what color the entities are. You know where notes and dimensions are. ABC Part Manager also sorts all of this data according to color.

A button, labeled Screen, is displayed above the LEVELGRID. Highlighting the Screen button with the mouse allows you to toggle between the LEVELGRID and the part file to display only those entities in the part file which you have selected

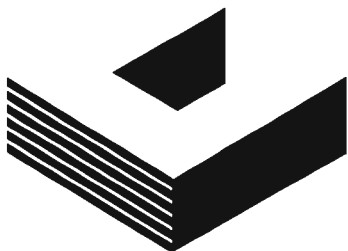
for a particular action, either DELETE or MOVE.

Flexibility

To organize the geometric data in your part file, you can assign a set or collection of related entities to the squares of a single row among the 15 rows in the LEVELGRID. For example, an automotive designer can assign the entities related to a subassembly of the wheel into the squares of a single row. In a similar fashion, the colors from your CADKEY system's color palette are assigned to the first 14 columns (from the left) in the LEVELGRID.

ABC Part Manager allows you to perform two types of actions on geometric data that you select: MOVE or DELETE. At any time you can see a display of the entities that you have selected for moving or deleting by highlighting the Screen button with the mouse. When you press the ENTER key, ABC Part Manager processes your entire selection. If you choose to move entities from one column to another column, the color of the entities that you move changes from their original color to conform to the color assigned to

CADKEY®



Neu in deutscher Sprache:

CADKEY5 - CADKEY Solids - CADKEY Surfaces - CADKEY Light - CADKEY Unix - EuroBOM, Zeichnungs- und Stücklistenmanagement - EuroTAB, Tabletoberfläche - Mechanic Tools 1-3, DIN-Bibliotheken Maschinenbau - PROFOLD, Blechabwicklung - CADKISS, Kinematik - HASCO Normalien - VDAFS - Profilworker, Profile - Typoworker, Fonts & Logos - Pipeworker, Rohre - zylindrisch, konisch.

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the column into which you move them. However, ABC Part Manager also includes MIX COLOR and OVERRIDE COLOR options to provide flexible user-definable control.

ABC Part Manager provides feedback lights for each row and each column in the LEVELGRID. The feedback to the user falls into four categories: (1) Levels contain no entities. (2) Levels contain entities, but none are selected for the current action. (3) Levels contain entities; some are selected for the current action. (4) Levels contain entities; all are selected for the current action.

Automatic Back-up

You can create part files and pattern files at any time. You can give these files new names, or you can use the current filenames. ABC Part Manager does not allow you to overwrite an existing file. ABC Part Manager automatically moves existing files with duplicate names into a special subdirectory, and it numbers these back-up copies sequentially, with 001 always being the most recent back-up copy.

For more information about

ABC Part Manager, contact Alton Boring Company, Inc., 30950A Industrial Road, Livonia, MI 48150.

Telephone: (313) 522-9595.
Fax: (313) 522-1655

Recommendation from CADKEY User in California: Do Not Load a TSR While in the DOS SHELL !

Peter Malinen, a member of CALCAD, a CADKEY users' group in California, recently had the experience of having terminate-but-stay resident (TSR) software do damage to his hard disk drive. Pete documented his experience in the August 1992 issue of CALCAD's newsletter. *3-D WORLD* is quoting the story with Pete's permission and with CALCAD's permission.

"I had finished a small drawing and had sent it to the network printer. Because of the distance, I decided to go into the SHELL and pull up the NETWORK ASSISTANT to monitor the printer's progress. I found that I had not loaded NETWORK ASSISTANT before starting CADKEY, so I went ahead and loaded it. When I saw that the my printer was done, I exited the NETWORK ASSISTANT, and proceeded to exit the SHELL. That's when everything went blank. I thought, 'Oh, it (the system) locked up.' Nope, IT DIED. Tried to reboot; nothing happened."...(Peter got technical assistance)... "We finally came to the realization that we were going to have to reformat (the hard disk), but when we tried, it came back with 'BAD TRACK 0,' and no matter what we did, it would not reformat. We finally sent it out for warranty repair, since it was only two months old, and they were able to reformat the disk, but I have noticed some more bad track errors lately. So, the moral of this story is: DO NOT LOAD A TSR WHILE IN A SHELL, or if you do, do not exit the shell; just shut the machine off."

A summary explanation of the problem, provided in CALCAD's newsletter, is that a memory conflict apparently arises when invoking one TSR program from inside another TSR program.

Editor's Note: Cadkey, Inc. has not experienced such a cataclysmic event as Pete Malinen has described, but we recommend that you NEVER load a TSR program while in the SHELL of ANY software program.

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
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





FAST INSTALLATION: Fasten the Tablet Overlay to your digitizer, run the install program, pick two points and you're done. No more math or calibration.

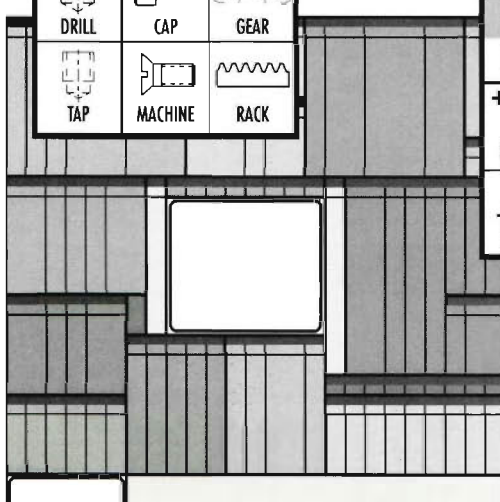
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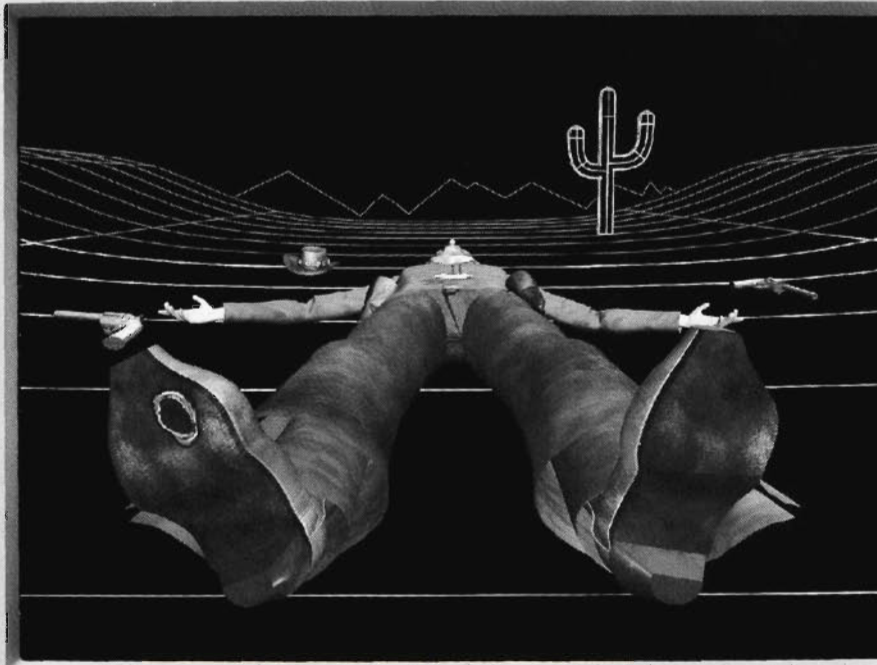
CREATE

LINE	ARC	
 END PTS	 TAN-PT	 CTR + RAD
 STRING	 TAN-TAN	 CTR + DIA

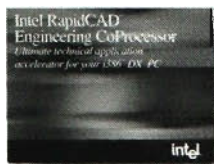


For more information, contact your authorized CADKEY/DRAFT-PAK dealer.

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CADL CORNER

EDGEVIEW.CDP: A Useful Viewing Utility for 3-D Modeling

by Craig Storms

EDGEVIEW.CDP is a program to create and display a view normal to any arc or circle definition view. It is useful in cases where viewing arcs and circles on-edge is helpful in the design process. It reads the arc view matrix and creates a new view rotated 90 degrees, essentially looking down the arc Y-View axis associated with the selected arc/circle.

To compile the program, place the files CCOMP.EXE CCOMP1.EXE and CCOMP.TXT in the CDL directory with a copy of EDGEVIEW.CDP, and type the command: "CCOMP EDGEVIEW," to create the file EDGEVIEW.CDX. Run this file by choosing FILES:CADL:BINEXEC on the CADKEY menu, and enter the name: "EDGEVIEW."

```
#define pi 3.1415926536
local arcID, entype, sysview
array arcvw[9]
array newvw[9]

:start
set mask, 3
getent "Select arc or circle to view on edge", entype, arcID
if (@key== -3)
goto end

/** Get Arc View from definition of Arc or Circle ***/
getview @intdat[8], arcvw

/* swap axes for new view definition: ZVnew gets -YVarc */
newvw[2]= -arcvw[1]
newvw[5]= -arcvw[4]
newvw[8]= -arcvw[7]

/* XV remains unchanged */
newvw[0]=arcvw[0]
newvw[3]=arcvw[3]
newvw[6]=arcvw[6]

/* YV new aligns with ZVarc */
newvw[1]=arcvw[2]
newvw[4]=arcvw[5]
newvw[7]=arcvw[8]

/* That's it ... now define it, if system lacks this view it is added to db*/
VIEW 1, newvw[0], newvw[1], newvw[2], newvw[3], newvw[4], newvw[5], \
newvw[6], newvw[7], newvw[8]

/* Identify the CADKEY system view */
call cdv2sysv, 1, sysview
sprint $prmt, "Normalized view is View %d, Choose option (VIEW)", sysview
getmenu $prmt, "VIEW", "CPANE"
switch (@key)
{
case -3
goto end
case -2
goto start
case -1
goto showview
case 1
:showview
set view, sysview, 1
prompt "Redrawing Primary Viewport Display "
cls 1
auto 1
redraw 1
goto end
case 2
set cview, sysview
goto end
}
:end
clear arcvw, newvw
```

Editor's Note: Craig Storms is Training Manager at Cadkey, Inc.

Look for the new revision of *Discovering CADL* to be published in the Fall 1992.

University-level Courses Using CADKEY-related Technology

Correspondent Study

Oklahoma State University has announced an Independent and Correspondent Study Program for CAD users: Engineering Design Graphics with CAD. This three-credit correspondence course (Catalogue Number: GENT 1153) will involve students in engineering drawing to ANSI standards using CADKEY. The course will include 18 assignments and three exams. For additional information, contact Independent and Correspondence Study, 011 Classroom Building, Oklahoma State University, Stillwater, OK 74078-0404. Telephone: (800) 522-4002 (inside Oklahoma) or (405) 744-6390. Fax: (405) 744-7793.

Structural Engineering

The University of Colorado at Denver offers a graduate-level course in Computer-Aided Structural Engineering in both its Fall 1992 and Spring 1993 terms. This course features hands-on solutions to analysis problems using both personal computers and mainframes. This evening course will present a good overview of the strengths and limitations of the Finite Element Method of analysis. Dr. Andreas Vlahinos is the instructor. For additional information, contact Jean Smith, Civil Engineering Department, University of Colorado at Denver, Campus Box 113, Post Office Box 173364, Denver CO 80217-3364. Telephone: (303) 556-2871. Fax: (303) 556-2368.

BEM

Worcester Polytechnic Institute is offering introductory and advanced courses in the Boundary Element Method of analysis. Introduction to the Boundary

(Continued on page 22)

University Courses

(Continued from page 21)

Element Method is taking place during the Fall 1992 term. Dr.

Joseph Rencis is the instructor. Advanced Boundary Element Method will run during the Spring 1993 term. Dr. Anil Gupta is the instructor. For additional

information contact the Mechanical Engineering Department, Worcester Polytechnic Institute, 100 Institute Road, Worcester, Massachusetts 01609. Telephone: (508) 831-5236. Fax: (508) 831-5680.

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Worcester Polytechnic Institute will also host BEM 15, the 15th Boundary Element International Conference, August 10-12, 1993, in Worcester, Massachusetts. The theme of the conference is Boundary Element Tools for the Year 2000.

Cory Jackson and DataCAD Did It Again

Cory Jackson, completing his freshman year at Elizabeth High School, Elizabeth, Colorado, won first place honors, using DataCAD®, in the Architectural CADD Competition held at the Technology Student Association's Annual Conference in Richmond, Virginia, June 19-23, 1992. The Summer 1992 issue of *3-D WORLD* reported on Cory Jackson's achievements and other students' achievements in the Regional TSA Competition for the State of Colorado in May 1992. (See "Elizabeth High School, CADKEY and DataCAD Lead TSA Competition in Colorado," *3-D WORLD*, Summer 1992, page 20.)

Because Cory was a first-year student in high school, he competed in Level II of the TSA competitions.

The Technology Student Association has some 60,000 members nationwide. Approximately 3,000 TSA members participate in the 1992 annual conference. The TSA national competitions are divided into Level I and Level II based on years in secondary school. Students in junior high school compete in Level I. Students in senior high school compete in Level II.

The Architectural CADD Competition gave the participants four hours in which to solve the problem of a two-story house which required the addition of a master bedroom on the first floor and an expansion of the garage. The students had to produce, at least, the floor plan of the first floor and the front elevation. The students received general room sizes as the starting point for their work.

Cory Jackson, now a sophomore at Elizabeth High School, had a one-

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semester course in CADKEY® and a one-semester course in DataCAD during his freshman year. He won the right to compete at the national level by winning the statewide TSA competition in Colorado.

The Mechanical CADD Competition also gave the participants four hours in which to solve a problem. The task was to create two sectional drawings of a round complex part. All of the entrants received a front view, a back view with three section lines, and one sectional view of the round complex part.

3-D WORLD has received the names of all four of the first-place winners (Levels I and II) of the TSA national CADD competitions. However, with the exception of Corey Jackson, 3-D WORLD has not been able to obtain information

about which CAD software these individuals used in the competition.

TSA Architectural CADD Competition:

Level II Cory Jackson, Elizabeth High School, Colorado.

Level I: Todd Muzzio, State College Area School, Pennsylvania.

TSA Mechanical CADD Competition:

Level II: Che Hale State College Area School, Pennsylvania.

Level I: Paul Showalter South Junior High School, West Virginia.

Look for these Articles in the Winter 1993 Issue of 3-D WORLD

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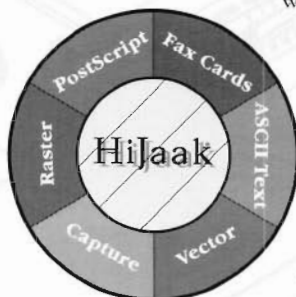
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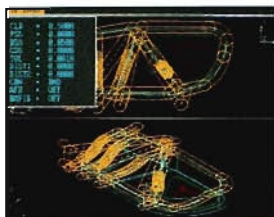
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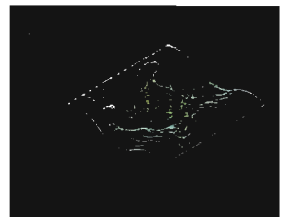
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