

3-D WORLD

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CADKEY/DataCAD
User

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Michael McMahon, Process Engineer, manipulates geometric data on CopyCAD system at MICRO SWITCH in Freeport, Ill.

Reverse Engineering at MICRO SWITCH Minimizes Time and Costs for Maintaining Dies

The MICRO SWITCH Division of Honeywell, Freeport, IL, is using CopyCAD™, the PC-based reverse-engineering system developed jointly by Brown & Sharpe Manufacturing Company and CADKEY, INC. to reconcile the differences between the actual dimensions of tooling components and the ones shown on the drawings. As a result, the amount of time required for repairing or rebuilding a worn tool has been reduced significantly.

MICRO SWITCH maintains a large, captive fabricating operation that supplies parts for the various switches and electrical components made at MICRO SWITCH and some other Honeywell locations. Typical parts include levers, springs, housings, and terminals. Michael McMahon, Process

Engineer at MICRO SWITCH, explained that the die makers, in rebuilding a tool, have been taking the dimensions from the component itself rather than from the original drawing. This is because the dimensions have changed over the years as various modifications and repairs have been made.

He explained that there are a number of reasons why the print may not reflect the current dimensions of the part: "Some of our dies go all the way back to 1940. In the past there may have been a die maker who was under pressure to get a job out. So he quickly made tooling modifications to meet production requirements, and never followed up to get the prints changed."

Furthermore, McMahon said that when these components were made largely on manually

operated machines, there were always certain dimensions which did not really have to conform exactly to the drawing. Dowel holes, for example, were inserted after the die components were located. As long as they conformed to each other accurately, there was no practical need for them to conform exactly to the print until the company started using numerical-control (NC) manufacturing equipment.

Today, when using the wire Electric Discharge Machine (EDM) to cut a replacement die or punch, for example, there is no opportunity for manual alignments. So if the location of a dowel hole on the print is off by .0007 of an inch from the actual part, it will cause problems in getting the tool to work right. Taking measurements directly from the part resolved some problems, but it caused others.

Each toolmaker seemed to have his own method of measurement,

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and if his particular method of establishing reference points was not clearly communicated to the wire EDM operator, an inaccurate part would result. Another frequent source of inaccuracy when measuring replacement components as transposition errors made by the toolmaker in measuring the part, or by the EDM operator in programming the machine from the toolmaker's hand sketch. And of course, traditional methods for measuring the components were time consuming.

To resolve the accuracy problems, a procedure was developed which involved setting up a part on a jig-bore machine and locating key features. This, however, was relatively slow, tied up valuable machining time on the jig bore, and still resulted only in a hand-drawn sketch from which the EDM was to program the part.

Big Savings In Time And Accuracy

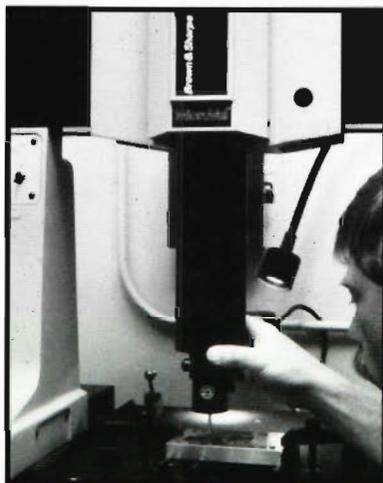
These problems have been resolved by the application of reverse engineering, a technology that uses a coordinate measuring system to collect three-dimensional data from a part for which the drawings are inadequate or no longer exist. The data is down-loaded to a CAD system where the drawing is reconstructed.

Although no one will argue about the usefulness of reverse engineering in theory, this concept has, to date, at least two significant problems—cost and complexity. Mechanical equipment, minicomputer hardware, and software for the large reverse-engineering systems being developed within the aerospace industry cost hundreds of thousands of dollars, and can be programmed only by the *computer literate*. However, the new PC-based CopyCAD reverse-engineering system

selected by MICRO SWITCH has neither of these problems.

The CopyCAD system uses Brown & Sharpe's advanced MicroVal™ personal Coordinate Measuring Machine (CMM) as the front-end digitizer. All CAD functions are performed on CADKEY 3™. The two systems are linked by way of PC-based CADDInspector™ software.

The CopyCAD system allows the user to digitize parts quickly (prototype, lost, broken, worn, etc.). This data is immediately transferred to the CAD environment and used for creating 3-D wire-frame images and to generate high-accuracy



Jerome Banz, a technician at MICRO SWITCH, enters point data from a part with CopyCAD.

data for NC part programs. In addition to reverse engineering, the CopyCAD system can be used in such applications as: prosthetic development, mating-part development, comparison studies of changes in parts due to wear, and design of new parts starting with the captured dimensions of existing parts.

McMahon said that the use of the CopyCAD system has resulted in significant improvements in the time spent measuring die components and overall accuracy. He saw the CopyCAD system at a national trade show in Chicago and immediately recognized the potential of this system for

verifying the true location of component features. "We had been measuring parts and dies in our tool shop and trying to update our prints in die design by the hand method. It will take forever. With the CopyCAD system, measurement time has been reduced by half, and instead of a sketch, we have a finished drawing. We will get a payback on this system in a matter of months." McMahon estimates excellent savings to date, based both on increased inspection productivity and the elimination of tool work outsourced.

Accurate and Easy to Use

McMahon said, "We can take a die component or a whole die and very quickly locate features to within tenths of thousandths." It took a short time for McMahon to gain confidence in the MicroVal CMM's accuracy. Often the measurements generated by the CMM were not what the operators expected as a result of having previously taken measurements with a comparator or hand tools. He verified the accuracy of the MicroVal by a performance gage repeatability/reproducibility study on gage blocks of known dimensions until he was sure that the MicroVal CMM was indeed accurate to within "tenths."

"We discovered that our methods of measuring were creating some problems, not the CMM. The blocks we cut our dies from are not always perfectly square. Therefore, measurements taken from different reference points on a component could differ by one or two thousandths, and that is not acceptable for the kind of work we are doing. The ability to make fast accurate measurements with the MicroVal CMM gave us an opportunity to see how we could improve what we were doing by establishing some rules concerning how we

were going to measure a part, and how we were going to cut it."

The CopyCAD system at MICRO SWITCH is used primarily by the wire EDM component cell team. While the EDM is cutting a part, the CopyCAD system can be used to construct two-dimensional drawings of parts sent by the die makers. The operator can now dimension a die component in about a quarter of the time it was taking to the job with a jig bore.

Points are taken directly from a free-standing component on the CMM, and the points coordinate system is established on the CAD system. Therefore, time-consuming fixturing of the part is eliminated. Dimensioning of the part is done quickly on the screen, and a drawing, indicating the appropriate reference points for machine set-up, is printed on the screen. McMahon said that his EDM operator was productively operating the CopyCAD system after a day's basic training in how to use the computer's file directories.

Proof Under Pressure

Recently, the tool and die department had the opportunity to test the CopyCAD system in the face of an emergency. The stripper plate of a progressive die dislodged during operation, resulting in the destruction of the punches and chipping some of the die blocks. Tooling was needed immediately to fulfill the requirement of a rush order.

A decision was made to rebuild the die using reverse engineering to generate all of the geometry from the damaged die components. It was estimated that the job would take 130 man-hours to complete. Rebuilding the die actually took only 100 man-hours. And, the CopyCAD system was so accurate in reconstructing the dimensions of the tool that the rebuilt die worked on the first trial!

McMahon said, "We took the exact dimensions off the punches. If the original dowel hole was supposed to be .250 inch, and the reading of the MicroVal unit was .2507 inch, that was what we made it. The die makers reported that the dowels in this die fit better than ever. As a result, we were able to complete our production run a week earlier than we expected after losing our die."

Just The Beginning

MICRO SWITCH is also beginning to discover quite a few simple applications that are helping die makers save time. For example, the CopyCAD system has been used to digitize the dimensions of the die pocket so that shims used for bringing cutting inserts back to the pass line after resharpening, could be made in advance to the exact dimensions required. Now, instead of spending a lot of time trimming the width of the shim to fit, they slip snugly into place on the first try.

At present, MICRO SWITCH is using just the two-dimensional aspect of the CopyCAD system, but McMahon feels that CopyCAD is also applicable to the division's three-dimensional mold-making operations. In the near future, the CopyCAD system will be linked via a translator to a CAD system for programming the wire EDM machine. Data will be transmitted over the company's existing Ethernet™ network. Similar capabilities exist for generating the cutting-tool paths for NC milling machines. Such systems will save additional time and eliminate all transposition errors.

"Before too long," McMahon said, "I envision that our reverse-engineering system will be the hub of our various machining operations for replacement components which do not have a CNC program established."

Another CADKEY First!

CADKEY RENDER™ Shown At AUTOFACT

CADKEY, INC. demonstrated CADKEY RENDER™ at AUTOFACT in Detroit, Michigan, on October 31, 1989. CADKEY RENDER uses CADL™ (CADKEY's Advanced Design Language) to integrate geometric data created in CADKEY 3™ with the Pixar PhotoRealistic RenderMan™ rendering software. CADKEY 3 communicates with Pixar's rendering software through the RenderMan[®] interface. RenderMan is the 3-D, photorealistic, scene-description, software protocol developed and marketed by Pixar of San Rafael, California. "This is a real feather in CADKEY's cap," said Bill Kolomyjec, Pixar's RenderMan evangelist. "At least six CAD software companies have announced plans to develop rendering software using the RenderMan interface. CADKEY[™] is the first to introduce a commercial product."

Using **Computer Graphics World's** definition (July, 1988, and July, 1989 issues) the RenderMan interface is a collection of procedures for transferring scene descriptions from a modeling program to a rendering program to produce photorealistic output. "The RenderMan interface allows a CAD company to make its own advanced-imaging product," said Bob LaRochelle, CADKEY RENDER's Project Manager. "RenderMan's photorealism is another reason for true 3-D."

In addition to applications in art, animation, architecture, marketing, engineering, and science, RenderMan can contribute significantly to manufacturers of consumer products. "The manufacturer can see a photorealistic model of

a product," LaRoche continued. "The manufacturer gets to make decisions about materials, colors, and textures before incurring the expense of building a prototype." "This form of pre-visualization," Bill Kolomyjec added, "is really a soft prototype. It cannot be done in 2-D. 3-D is essential."

"Together with CADKEY 3 and CADKEY SOLIDS™," Clive Thomas, CADKEY RENDER's Product Manager, said, "CADKEY RENDER provides an effective PC solution for industrial design at a small fraction of the cost of a workstation-based alternative. The same part files created during the design process can be used as the basis for machining operations, using products from CADKEY's third-party developers."

You Would Not Believe...

WLDSYM™ Improves Productivity For CADKEY User

John Sexton, a drafter in the Woven Products/Fibrex Division of National Standard Company, Corbin, Kentucky, uses WLDSYM™ to produce welding symbols in his CADKEY™ part files. He has been using WLDSYM for approximately six months. "You would not believe how much time it saves," John said. "Drawing a complex welding symbol without WLDSYM can take two or three minutes for each one. When you have to do a lot of them, it can take hours."

National Standard manufactures wire-mesh products for a wide variety of applications in screening, in filtration products, and in batteries.

WLDSYM is the welding-symbols utility program, written in CADL™ (CADKEY Advanced Design Language) to integrate

with CADKEY 3, developed by HLB Technology of Blue Ridge, Virginia. When using CADKEY 3, WLDSYM can work from on-screen menus, as a sub-template on a CADJET™ Master Template, or as a standalone template on a digitizer. John Sexton has installed WLDSYM as a macro in CADKEY 3.

"You can create the symbol as you are deciding what type of weld you want to use," John added. "You actually build each welding symbol from the WLDSYM menus."

WLDSYM has a sequence of five menus. Its main menu offers eight basic choices from which to begin: filled weld, groove weld, spot weld, seam weld, plug weld, back weld, flange, or surface. After proceeding through the second, third, and fourth menus defining the arrow and the placement of the symbol, the fifth menu offers supplementary welding symbols: all around, fill weld, melt through, contour, and done. "You can pick as many of these supplementary symbols as you want, and then select *done*," John continued. I would like to find more third-party programs that are done as well as WLDSYM."

Editor's Note: WLDSYM and CADJET are trademarks of HLB Technology. For additional information, contact HLB Technology, P.O. Box 527, Blue Ridge, VA 24064, (703) 977-6520, FAX: (703) 977-6531.

AutoSwap™: A Very Useful Utility

AutoSwap™, a memory management utility integrated with CADKEY 3™ (Version 3.5), allows users to run other DOS-based application software without leaving and restarting CADKEY 3. AutoSwap is integrated with CADKEY 3 through the CONTROL-SYSCMD function (F7, F8, F4) or through the CADL™ EXEC command.

When executed, AutoSwap makes available approximately 500 kilobytes of Random Access Memory by transferring CADKEY 3 to a user-specified hard-disk directory or to a virtual disk. Once in the DOS shell the user can then run editors, word processors, spreadsheets or other numerical-computation programs, or CADKEY-related third-party programs.

When the user exits from this application, AutoSwap returns to CADKEY 3 at the exact point at which the swap had taken place.

One-man Company Proves That CAD/CAM Works For Small Enterprises

by Ilpo Koskinen

Camtools, a one-man company in Heinavesi, Finland, owned and operated by Jouni Hottinen, has proved that a company does not have to be big to use a CAD/CAM system effectively. Camtools uses CADKEY® and Mastercam™ on 286 and 386-class personal computers, to design and manufacture molds used for injection-molding processes. Jouni Hottinen founded Camtools in March 1989, to serve as subcontractor to Heinaveden Tuotantolaite, a neighboring company that manufactures plastic-injection molds.

Jouni Hottinen creates a 3-D model of a mold on CADKEY and generates a Numerical-Control toolpath program for the mold on Mastercam. To manufacture the molds, Camtools has acquired a 16-tool DAHLIN MCV 610™ turning center that uses a Fanuc 10M™ controller. Hottinen uses the turning center to produce the graphite and copper electrodes needed in mold making.

Using Mastercam, the process of machining a mold can proceed unmanned for long periods of

time. That substantially increases the productivity of this one-man company. In addition to speed and quality, CAD/CAM allows Camtools to produce molds that could not be manufactured in any other way. For example, Jouni Hottinen produced a shell-shaped plastic case for a marketing campaign by the Shell Oil Company. Without CAD/CAM it would have required tremendous amount of manual labor and hand filing of graphite to produce this difficult geometrical shape.

This shell project illustrated another clear advantage of CAD/CAM technology in mold making: later on, a copy of the shell, twice as large as the original, was quite easy to produce. Using CADKEY and Mastercam, Hottinen produced a new mold in a flash — he increased the scale of the design twice its original size and created a new tool path. Easy scaling also provides other advantages. Injection molding uses a wide variety of plastic materials. Diverse plastic materials shrink differently as they cool. Scaling makes it easy to calculate and implement changes required in the size of the mold due to the percentage of shrinking that will take place.

Jouni Hottinen started Camtools because there was a need to produce 3-D molds that would have been extremely difficult, if not impossible, to manufacture without CAD/CAM tools. The company has reached a stage where it can offer its services to a larger number of customers. Camtools now provides services as a toolmaking company and as an ordinary turning center.

Editor's Note: Ilpo Koskinen's article first appeared in the newspaper, **Tekniikka & Talous**, Helsinki, Finland, on August 16, 1989. Silver Puhk, a member of CADKEY's Technical Support Group, translated the article from Finnish.

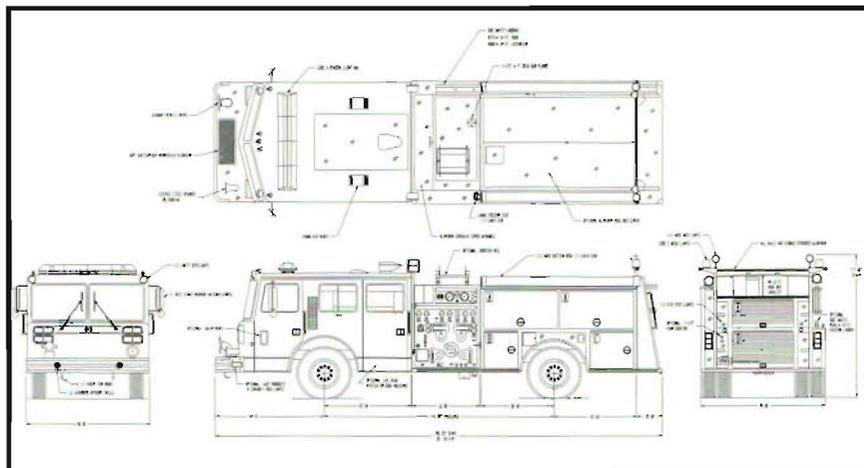
MAXIM Designs Customized Fire Trucks With CADKEY 3™

Screaming sirens! Blurs of red or yellow fire trucks! There goes CADKEY[®]? Yes, if they're MAXIM fire trucks!

MAXIM, INC. of Middleboro, Massachusetts, has been building custom-designed, motorized firefighting equipment for municipalities throughout the United States and Canada since

engine will fit."

MAXIM has a wide variety of functional components for fire trucks with different sizes and shapes. These functional components range from sirens, lights and wheels to entire chassis pre-engineered to hold eight different engines, depending upon what the



*Top-assembly drawing of a MAXIM pumper.
Part file created in CADKEY3 by Theresa Ivester.*

1914. In March 1988, at one hundred years old, MAXIM changed from drafting boards to CADKEY 3™ for engineering and manufacturing their high-tech fire trucks.

"The beauty of CADKEY," said Roger Race, Engineering Manager at MAXIM, "is that we can design everything at full scale. This is important, especially for older fire houses with narrow short doors." A fire truck is typically 29 feet long overall, but tolerances in sheet metal (for example, the extruded aluminum body) are frequently 1/16th of an inch or less. "We take measurements of the fire house doors to verify that the

customer needs and wants. MAXIM's engineers create the components as CADKEY pattern files. "Pattern files are an especially useful feature of CADKEY," Roger continued. "They allow us to mix and match components very quickly to meet a particular customer's specific needs. Pattern files are really a form of modular design."

MAXIM builds a customer's fire truck on the computer before the customer has agreed to buy it. "When a Fire Chief comes for a pre-contract design meeting, he frequently requests changes," Roger said. "We make the changes right then with the Chief present."

In June 1989, Bill Gonsalves, Executive Vice President and General Manager, wrote in MAXIM's newsletter **Update**, that the top-assembly drawings of a whole fire truck created in CADKEY 3 "must look impressive as several Chiefs have requested extra copies for framing purposes."

MAXIM does all of its design and manufacturing in Middleboro, Massachusetts, the town where Carlton W. Maxim started his business in 1888. Carlton Maxim was a renowned craftsman of finished wood interiors and a volunteer firefighter in his home town, Middleboro. He served as Fire Chief for eight years.

At the turn of the century, Maxim was one of the first owners of a motorcar in the area. He became an automotive entrepreneur: selling and servicing motor vehicles manufactured by Autocar, Corbin, E.M.F., Flanders, Studebaker, Overland, Willys-Knight, McFarlan, Dodge, and Plymouth.

In 1912, the Middleboro Fire Department purchased a Knox Motor hose car. When the Fire Department needed a second motorized unit in 1914, Maxim was convinced that he could build a better piece of equipment. The town accepted his proposal. Approximately 60 days later, on May 12, 1914, Maxim delivered the first Maxim F hose car. It was a four-cylinder chain-drive apparatus with pneumatic tires that cost \$2,500.

In 1989, UTDC, Inc. (Urban Transport Development Corporation) of Kingston, Ontario, Canada, a subsidiary of Lavalin, Ltd. of Montreal, purchased MAXIM, INC. MAXIM is now the Firefighting Equipment Division of UTDC.

Yes, this headline is correct...

CADKEY User Designs TV Transmitters With CADKEY[®] (Version 2.02)!

Dean Stoffel of Picture Perfect Systems, Finleyville, Pennsylvania, uses CADKEY[®] (Version 2.02) to design television transmitters and the architecture of stations that house these transmitters.

(Yes, you read that sentence correctly. Version 2.02 is not a typographical error. Picture Perfect bought its CADKEY software on July 22, 1986. Dean said that he has chosen to stay with his original version of CADKEY because..."It gets the job done.")

Picture Perfect Systems uses CADKEY for all phases of its design work. The average size of a part file is 300K. Near the end of a design project, however, a part file is usually about 500K in size.

Redefining Level of Efficiency

The company's TV transmitter measures 10 feet x 3 feet x 6.5 feet, takes in 110,000 watts of AC electrical current, and puts out a radio frequency signal of 50,000 watts. One of Picture Perfect's goals is to redefine the industry-standard level of relative and actual efficiency expected from TV transmitters.

Most TV transmitters currently have a relative efficiency of about 17%, and an actual efficiency of 12% or even 8%. These percentages mean that an average transmitter uses at least 300,000 watts of incoming AC current to produce an output signal of approximately 50,000 watts. Because Picture Perfect Systems' TV transmitter produces a 50,000-watt output signal using 110,000 watts of incoming current, its transmitter achieves a relative efficiency of

50%. In fact, the company's transmitter achieves an actual efficiency of 53%.

Mechanical / Electrical / Architectural Design

"Designing a transmitter," Dean said, "involves mechanical design, electrical design, electronic design of the system's control components, and architectural design of the transmitter's cabinet and of the building in which it is to be located."

As a TV channel's output power changes, parts inside the transmitter change in size. These changes affect the transmitter's requirements for air circulation and for cooling. Some components are water cooled; that involves plumbing. "A major, water-cooled component that produces thermal energy at the rate of 60,000 watts must be able to disperse the equivalent of 56.88 BTU's (British Thermal Units) per second into water," Dean continued. Consequently, his work includes designing heat exchangers, coolant systems, pumps, and high-voltage controllers both inside and outside of the transmitter's cabinet. "Picture Perfect Systems' control circuits are state of the art, as that art presently exists," Dean said. "But, further improvements are possible. Future developments will create greater accuracy."

Changes inside the transmitter require architectural changes outside the transmitter.

The radio-frequency output that a TV transmitter generates led Picture Perfect Systems to use 11-gauge steel to enclose its transmitter. Eleven-gauge steel

is approximately 1/8 inch thick. The cabinet has three doors for access to the interior. By itself the cabinet weighs 2,000 lbs. Picture Perfect Systems' cabinet is the only transmitter cabinet made of 11 gauge steel. Most transmitter cabinets are made of sheet metal.

Radio Output Powerful

Radio-frequency output is powerful, and it can be destructive. If a TV transmitter's antenna is not properly tuned to the transmitter, the radio frequency that a transmitter generates at 50,000 watts output is capable of physically burning a steel-tube antenna, 12 inches in diameter, 50 feet long, made of 1/2-inch-thick steel. Picture Perfect Systems has had direct experience of the power of radio-frequency emissions. Dean mentioned that on one occasion an aluminum pipe connecting a steel antenna to a transmitter was correctly tuned; it did not burn. However, the steel antenna itself was not correctly tuned; it did burn. "It did not melt; it burned!!" he emphasized. This experience has made the company very safety conscious in order to prevent such an accident from happening inside a building. Picture Perfect Systems puts sensors inside and outside the transmitters it designs.

Dean has been actively working with personal computers since 1978. His first PC was a Tandy-Radio Shack Model 1. He was 12 years old at the time. He participated in a pilot program sponsored by the state of Pennsylvania to investigate how much a student could learn about computers in one year. Dean developed some extremely useful skills with computers during that year (especially the ability to write different types of interface drivers), which have served him in good stead since.

In 1986, Picture Perfect had originally purchased another PC-based CAD product for its design work because it claimed to be three dimensional, and because it appeared to be an industry standard. Three months later, Picture Perfect returned the product, got its money back, and bought CADKEY because... "It gets the job done."

!! Contest !! CADKEY / DataCAD !! Contest !!

Wouldn't you like to win a vertical-application advertisement, featuring your company, that will appear in a major trade publication? This is an excellent chance to publicize your company and your products in a high tech trade publication.

To enter, write two or three paragraphs about how your company uses CADKEY or DataCAD to bring your products or services to market quickly, easily, and more efficiently. Explain, in your own words, how using CADKEY or DataCAD has given you an advantage over your competition.

Please include a copy of your best part file or drawing file, along with a photograph of your product or your building project. The file must be of a clear and original design. Please submit a small description of your product or building project, the name of your CADKEY/DataCAD dealer, and your name, company address, and telephone number.

These advertisements will run during 1990 and will appear in national trade publications targeting the following application areas:

Aerospace
Architecture
Automotive

Building & Planning
Business Equipment
Commercial & Consumer Appliances
Computers & Peripherals
Construction
Fabrication
HVAC
Machining
Plastics

If your entry is chosen for an advertisement, you will receive a CADKEY or a DataCAD product worth up to \$1000. As a way to say thank you for participating, CADKEY, INC. will give each entrant a free CADKEY mug and poster.

All entries become the property of CADKEY, INC., with authorization for their use in promotion and advertising worldwide, in all languages. A credit line to acknowledge the use of your material will appear in the conventional form unless otherwise indicated.

Please send your entry to: Mary Beth Staron, Marketing Communications Manager, CADKEY, INC., 440 Oakland Street, Manchester, CT 06040-2100. For any questions, please call (203) 647-0220.

Welcome New CADKEY[®] & DataCAD[®] Users' Groups

CADKEY	DataCAD
<u>Location:</u> Quebec	<u>Location:</u> Southeastern New England
<u>Date:</u> Every 6 weeks.	<u>Date:</u> Monthly.
<u>Place:</u> (Varies) U. of Montreal Ecole Polytechnique	<u>Place:</u> Entre Computer Center 385 S. Main St. Providence, RI
<u>Contact:</u> Manon Dube 347 rue Putney St. Lambert Quebec	<u>Contact:</u> Carlos Kiamco Peter Ashton Diane Carlino (401) 831-7280
(514) 465-0974	

THIRD-PARTY NEWS

CATTRAN™ Translates Bi-directionally:

CATIA™ - CADKEY 3™

CATTRAN™, developed by ML Software GBR of Stuttgart in the Federal Republic of Germany, provides bi-directional, direct translation of design data between CATIA™ (Version 3) and CADKEY 3™ (Version 3.5).

CATIA is the mainframe-based, 3-D CAD software developed by Dassault-Breguet, a French aerospace firm, and marketed by IBM. ML Software is a CADKEY dealer and an authorized complementary marketing agent with IBM in Germany.

CATTRAN integrates with CADKEY 3 through CADL™ (CADKEY Advanced Design Language). CATTRAN uses CADL's file format for transferring geometric data. CATTRAN translates all of CADKEY 3's entities into the equivalent CATIA entities. However, there are CATIA entities that CATTRAN cannot translate into CADKEY entities.

CATTRAN contains a PC-based sender/receiver program (CATTRAN 1P) and a host-based sender/receiver program (CATTRAN 1H) for IBM workstations (IBM 6150, IBM 9370I, and IBM 30xx) running the VM or the MVS operating system. The software installed on the IBM workstation must also include CATIA (Version 3) Base, CATIA (Version 3) Drafting, CATIA (Version 3) 3D-Design, and FORTRAN (VS-Fortran) Run-Time Libraries.

CATTRAN also works with UNIX on the IBM 6150 workstation running the AIX operating system.

During CATTRAN's development, IBM's German-language newsletter for CAE-applications developers, **CAE Brief**, of May 22, 1989, took

note of ML Software's CATIA-CADKEY bi-directional translator in a lengthy article entitled, "CAE Systems and Their Interface Offensive Through Openness."

The union between CADKEY on the PC side and CATIA on the workstation or mainframe-computer side, CAE Brief wrote, would be exactly the right thing. "So we were motivated to find out if there was a chance to link CADKEY and CATIA through a binary interface," recalled Reiner Merz of ML Software GBR in Stuttgart. The idea: a way to CATIA and a way back to CADKEY. They searched for a way — and in December 1988, they actually found the way in the depths of the CATIA interfaces CATGEO and CAT/MSP.

(**Editor's Note:** CATGEO and CAT/MSP are geometrical-entity programs and mathematical-subroutine programs internal to CATIA. CATGEO contains the libraries, Base, Drafting and 3D-Design, mentioned earlier in this article.)

CAE Brief continued: *The CAE experts of ML Software will use both of these interfaces to be able to offer, later this year, a first version of a direct interface for data exchange between CATIA and CADKEY.*

ML Software's production release of the full-featured, PC-to-workstation version of CATTRAN became available on October 23, 1989. The mainframe-based version of CATTRAN is scheduled for production release on February 1, 1990. A demonstration disk of CATTRAN is available.

For additional information about CATTRAN, contact Reiner Merz or Gerald Laengerer, ML

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DRAFT-PAK™ Gives Three CADKEY Users Dramatic Productivity Gains

DRAFT-PAK™, the first third-party software developed as a CADKEY™-integrated, productivity-enhancement package, allows users to design instantly with high-level features: fasteners, mechanical elements, detailing symbols, etc., using parametric programs. Martin Taylor, Robert Schauer, and Carl Marchetto number among many CADKEY users who have documented dramatic productivity gains using DRAFT-PAK with CADKEY 3™.

Martin Taylor, Vice President of Taylor Industrial Products, Plainville, Connecticut, designs and produces gauges for Fortune 100 manufacturers. Martin stated that since installing DRAFT-PAK he has seen an eight-fold increase in his design productivity. "DRAFT-PAK really turned me on to 3-D designing with CADKEY."

A typical design project for Taylor Industrial Products involves a wire-frame model of a component designed on a client's mainframe CAD system, output in IGES format, and translated into CADKEY 3 format. The fixture and gauge components are designed around the part. Since Taylor uses the client's part file directly, the gauge components are built to exact specifications using DRAFT-PAK to generate automatically such features as drilled, tapped and counterbored holes. Significant time savings occur because the

(Continued on page 15.)



Photograph of the model of the Marathon-IBM Tower

DataCAD^(R) Plays Key Role in Major Construction Project in Montreal

An eight-page feature story in the August 1989 issue of **Informateur-Logiciel**, a French-language information-technology magazine, describes a major construction project currently underway in Montreal, Quebec, Canada: a 45-story office complex, officially identified by its address: 1250 Boulevard Rene-Levesque, but more well known in the city as the Marathon-IBM Tower. The architects are using DataCAD^(R).

Written by Jean Patenaude, a staff member of **Informateur-Logiciel**, the article describes in some detail the participation of various companies in this joint project between IBM and Marathon Development. When completed, the glass and granite Marathon-IBM Tower will rise to a height approximately six feet lower than Mount Royal, the most prominent landmark in Montreal.

IBM selected the award-winning architectural firm of Kohn Pederson Fox of New York to design the building. Marathon Development, a Toronto construction company and

subsidiary of Canadian Pacific Corporation, selected the architectural firm of Larose, Petrucci and Associates of Montreal to turn Kohn Pederson Fox's artwork into reality. Magil Construction is the general contractor for the project. The building's construction was begun in October, 1988, with completion and occupancy by IBM Canada scheduled for May, 1991. Larose, Petrucci and Associates uses DataCAD^(R). In fact, the only CAD software mentioned in Jean Patenaude's article is DataCAD.

The rest of this article is a translation of the section of Jean Patenaude's story describing Larose, Petrucci and Associates' contribution to the Marathon-IBM Tower.

Gilles L. Larose is personally directing this project with the assistance of Charles Lamy, an associate who serves as liaison between Kohn Pederson Fox in New York, Marathon, and the various subcontractors in the project. He works with some

twenty consultants in lighting, exterior facing, security, etc. Michael Lamontagne, another member of Larose, Petrucci, coordinates the production of plans and specifications according to the schedule set by the general contractor, Magil Construction. Lamontagne is also responsible for quality control in the execution of the work.

Two and a half years to construct such a building is stretching performance almost to its limits. The Larose, Petrucci company has, on the average, one week's notice to prepare plans for advancing the construction! They do not see this kind of lead time as any reason to panic. It was written in black and white in the contract: everything must be completely ready when IBM goes to move into the site in 1991. A short visit to the construction site allowed us to verify the speed at which the work is progressing, and how well its phases are being coordinated. On the southern side of the construction site, the building has reached the street level; while in the northern section, the site excavation has recently been completed.

Larose, Petrucci's office entered the computer age smoothly in 1986. Equipped now with two 386 microcomputers, each of which has a 60 megabyte hard disk and a high-resolution monitor, the architects use DataCAD for computer-aided design. The company's management foresees acquiring two additional systems.

Louis Racine is responsible for the company's data-processing operations. He spends the majority of his time creating plans on a high-resolution monitor and modifying them on demand. There is hardly any uncertainty for him: with the computerized system, he does

(Continued on page 10.)

TRAINING SCHEDULE AT CADKEY, INC.

We have Training dates scheduled through January, 1990. Please call Lisa Varvelli in the Product Support Department to register (203) 647-0220.

Course	Nov.	Dec.	Jan.
Introduction to CADKEY	6-8	4-6	8-10
Advanced Geometric Modeling	9-10	7-8	11-12
Introduction to CADL		11-13	15-17
CADKEY SOLIDS	20-21		18-19

CADKEY^(®)/DataCAD^(®) Training In U.S. & Canada

Many authorized CADKEY and DataCAD Training Centers have scheduled courses in addition to the training available at CADKEY's world headquarters here in Manchester, CT. The following is a list of who is doing what, where and when:

State	CTC	Location/Contact	Course	Dates
Ala.	Jacksonville State University	Jacksonville, AL Dr. P.S. Yeh (205) 231-5781, 5229	<i>Intro. to CADKEY</i>	Dec. 11-13
Ariz.	Yavapai College, S.M.E. Chapter 119	1100 E. Sheldon St. Prescott, AZ Dr. Larry Strom (602) 776-2255	<i>CADKEY and DataCAD Workshop</i>	Jan. 18-19
Calif.	CAD Micro-Systems	11936 W. Jefferson Blvd. Culver City, CA Monica Hunter (213) 391-7226	<i>Intro. to CADKEY</i>	Nov. 15-17
			<i>Advanced CADKEY</i>	Dec. 5-7
			<i>CADKEY</i>	Nov. 1-2
			<i>CADKEY SOLIDS</i>	Dec. 13-14 Nov. 28
	Evergreen Valley College	3095 Yerba Buena Rd. San Jose, CA Loren Fromm (408) 274-7900	<i>Intro. to CADKEY</i>	Jan. 8-10 Apr. 9-11
	Golden West College	15744 Golden West St. Huntington Beach, CA John North (714) 895-8209	<i>Intro. to CADKEY</i>	Nov. 17-19
	Poelman's Design Service	901 Campisi Way, #360 Campbell, CA Mike Poelman (408) 377-3585	<i>Intro. to CADKEY CADL</i>	Dec. 5-9 Nov. 6-10
	Conn. Central Connecticut State University	1615 Stanley Street New Britain, CT Paul Resetarits (203) 827-7262	<i>Intro. to CADKEY</i>	Jan. 8-10
<i>CADKEY</i>			Mar 19-21 May 21-23	
<i>Advanced CADKEY</i>			Jan. 11-12 Mar 22-23 Apr 24-25	
<i>Intro. to CADKEY</i>			Nov. 13-17 Dec. 11-15	
	DataMat Programming Systems	9 Mott Avenue Norwalk, CT Matt Rueben (203) 855-8102	<i>Intro. to CADKEY</i>	Nov. 13-17 Dec. 11-15

DataCAD Plays Key Role...

(Continued from page 9.)

the work of an entire team of technicians in a minimal amount of time. And he adds, "At least for a limited team, it would be almost impossible, without data processing, to produce plans on one week's notice. Because, the decision about which section of the construction site must be worked on next is made practically from week to week."

However, he hastens to add, "One must not forget that by its very nature, an architectural plan is never something finished. It is refined right up until the day the builder gets to work. Until then, the work is often put back on the table. It's at these times that data processing works wonders. It erases the obsolete." For example, a mechanical engineer can indicate that a ventilation conduit needs to be modified. This modification appears to be simple, but it can require hours on a drafting board. As Louis Racine tells it: "If we need to make such a modification through the building's core in which a staircase is concealed next to the air-flow conduit, then it means that the stairway must be moved to a new location. With the traditional method, several hours will be required to produce the corrections. With DataCAD, no problem. Using a mouse, I can move the staircase on the screen. A matter of a few minutes at most."

Another advantage of this type of software is the ability to create typical floors, at least in the case of 1250 Boulevard Rene-Levesque. In fact, several floors are actually identical. Therefore, instead of designing them one by one, a simple command will allow the computer to carry out the task. Afterward, each floor will most likely have its own adjustments in detail, but the basic work will have already

been done. Again, Louis Racine gives an example: "I was recently asked to design different types of ceilings. The layout of the supports for the concrete slabs covering it (the ceiling) can translate into kilometers of metal supports. Well, in one afternoon, I was able to produce six proposals for a plan. Without the computer, it would have taken three weeks!."

The software provides the user with a vast array of symbols specific to architectural design: windows, doors, stairways, etc., all little details. At least they appear to be little details, but in reality they take a lot of time to design. Once the dimensions are established and the standards determined, the user only has to call for the symbol to appear and to insert it into the design.

The building has been designed to handle 12,000 to 15,000 people, almost 400 people per floor for the IBM offices and 200 people per floor for the other offices. According to Montreal's building code, Larose, Petrucci must create a certain number of spaces for toilet facilities for men, women, and handicapped people. There are myriad details that the architects must consider and for which they must design space. Just thinking about the number of stairways and the dimensions required for them to conform to safety regulations can be a real headache...

At Larose, Petrucci, information technology has acquired very high status now. The workstation that Louis Racine uses cost approximately \$15,000, including software. But, people in the office do not see this purchase as an expense. On the contrary, they see it as an intelligent investment.

Editor's Note: Informateur-Logiciel is published by Information-Logiciel, Montreal, Quebec, Canada.

CADKEY/DataCAD Training in U.S. & Canada (continued)

State	CTC	Location/Contact	Course	Dates
D.C.	University of D.C.	4200 Connecticut Av. NW Washington, DC Harold Goldstein (202) 282-7349	<i>Intro. to CADKEY</i>	Dec. 18-20
	Republic Research Training Center	1911 N. Ft. Myer Dr. Arlington, VA Gregg Kendrick (703) 525-9014 (800) 476-4454	<i>DataCAD I DataCAD II DC Modeler DCAL</i>	Schedule made on request.
Fla.	Gateway Computers	10901 Roosevelt Blvd. St. Petersburg, FL Patricia Murphy (813) 576-0549	<i>Intro. to CADKEY</i>	Nov. 15-17
			<i>Advanced CADKEY</i>	Dec. 13-15
			<i>CADKEY SOLIDS</i>	Nov. 20-21
			<i>CADKEY SOLIDS</i>	Dec. 20-21
				Scheduled on request.
Ill.	Triton College, Employee Development	2000 Fifth Av. River Grove, IL Peggy Hosty (312) 456-0300, x539	<i>Intro. to CADKEY</i>	Nov. 14-16 <u>Wednesday:</u> Nov. 22 to Dec. 20
La.	Louisiana Technical University	Ruston, LA Robert Kelso (318) 257-3056	<i>Intro. to CADKEY</i>	Nov. 20-22
Mass.	Springfield Technical Community College	1 Armory Square Springfield, MA William White (413) 781-7822	<i>Intro. to CADKEY</i>	Jan 10-12
	Worcester Polytechnic Institute	100 Institute Rd. Worcester, MA Pat Scavone (508) 831-5633	<i>Intro. to CADKEY</i>	Mar. 6-7
Md.	Catonsville Community College	800 South Rolling Rd Catonsville, MD Tom Barrett (301) 455-4298	<i>Intro. to CADKEY Advanced CADKEY</i>	Jan. 22-26 Feb. 19-21 Dec. 4-8 May 23-25
Me.	University Southern Maine	37 College Avenue Gorham, ME Andrew Anderson (207) 780-5440	<i>Intro. to CADKEY</i>	(Tuesday evenings) Jan. 16 - May 1
Mich.	Future Solutions	35455 Schoolcraft Livonia, MI Paul Zwart	<i>Intro. to CADKEY</i>	Nov. 14-16 Jan. 9-14 Feb. 6-8
	Grand Rapids Junior College	1234 Ball Ave. NE Grand Rapids, MI Frank Conner (616) 456-4274	<i>Intro. to CADKEY</i>	Dec. 6
	Lansing Comm. College	419 N. Capital Ave. Lansing, MI Jim Perkins Steve Pohl Jerry Flore (517) 483-1356	<i>Intro. to DataCAD Advanced DataCAD</i>	Jan. 6 to Mar. 23 Mar. 31 to Jun. 15 Mar. 31 to Jun. 15

CADKEY/DataCAD Training in U.S. & Canada (continued)

State	CTC	Location/Contact	Course	Dates
Minn.	Albert Lea Technical Institute	2200 Tech Dr. Albert Lea, MN Larry Gilderhus (507) 373-0656	<i>Advanced CADKEY</i>	Nov. 4, 11, 18 (Sat.)
	Anderson-O'Brien	2575 N. Fairview Ave. St. Paul, MN Gail Lenzmeier (612) 636-2869	<i>Intro. to CADKEY</i>	Nov. 6-10 Dec. 4-8 Jan. 8-12 Feb. 5-9
	Anoka Ramsey Comm. College	11200 Mississippi Blvd. Coon Rapids, MN George Heron (612) 427-2600	<i>Intro. to CADKEY</i> <i>Advanced CADKEY</i>	Evening classes scheduled on request
	Northeast Metro Technical College	3300 Century Av. White Bear Lake, MN Jeffrey Jahnke (612) 770-2351, x323	<i>Intro. to CADKEY</i> <i>Advanced CADKEY</i>	Jan. 9 to Mar. 13 (Tues. eve.) Nov 19-21 Nov. 9-11
	St. Paul Technical Institute	235 Marshall Av. St. Paul, MN Michael Haffner (612) 221-1307	<i>Intro. to CADKEY</i>	Call for schedule
Mo.	Country Computer	810 East Marshall St. Charleston, MO Bill McNeary (314) 683-3383	<i>Basic DataCAD</i>	Dec. 13-15
	University of Missouri at Rolla	Rolla, MO Terry Lehnhoff (314) 341-4632	<i>Intro. to CADKEY</i>	Nov. 16-17
Mont.	Montana Tech	West Park Street Butte, MT Dick Johnson (406) 496-4452	<i>Intro. to CADKEY</i>	Nov. 1-3
N.C.	Rockingham Comm. College	P.O. Box 38 Wentworth, NC Jim Putnam (919) 342-4261	<i>Intro. to CADKEY</i>	Feb. 7-9 Mar. 21-23 May 2-4
	Wake Technical Comm. College	9101 Fayetteville Rd. Raleigh, NC Brian Matthews (919) 772-0551, x172	<i>Intro. to DataCAD</i> (11-week, eve. course)	Fall, Winter, Spring, Summer.
N.J.	Glassboro State College	Glassboro, NJ John Humbert (609) 863-6203	<i>Intro. to CADKEY</i>	Nov. 6-8 Feb. 12-14 Apr. 23-25
	Entre Computer Center	400 Route 17, South Ridgewood, NJ Pat Neary (201) 445-6333	<i>DataCAD, the Basics</i>	Nov. 13-17 Dec. 4-8 Jan. 15-19
N.Y.	Onondaga Comm. College	Onondaga Hill Campus Syracuse, NY Paul Rice (315) 469-7741, x520	<i>Intro. to CADKEY</i>	Nov. - Dec. (evenings) Jan. 8-10 Apr. - May (evenings.)

THIRD-PARTY NEWS

BLOCKER™ Calculates Space Requirements Automatically

by Rosemarie Gingras

BLOCKER saves time in quantifying space requirements for architectural designs in DataCAD™. Developed jointly by Casco Computer Systems of Freeport, Maine, and Whitcomb Associates of Danbury, Connecticut, BLOCKER integrates with DataCAD through DCAL™ (DataCAD Applications Language).

As a user defines rooms with DataCAD polylines, BLOCKER automatically calculates the square footage and room dimensions. BLOCKER analyzes these dimensions as associative, just like DataCAD's associative dimensions. Stretching or enlarging a room changes the square footage that BLOCKER reports. The process of studying and reporting space usage can be done quickly, accurately, and visually right on the drawing and on the final printout. BLOCKER will assign room numbers to the spaces. Then, given interior and exterior wall thicknesses, BLOCKER will automatically generate double-line floor plans from the single-line space layouts.

"BLOCKER gives you total, dynamic control over the portioning of space within a design," said Roger Whitcomb, principal of Whitcomb Associates. BLOCKER ensures that both the designer and the client gain a better understanding of how much space is being proportioned to each part of the design.

For additional information about BLOCKER and other available DataCAD macros, contact Casco Computer Systems, Inc., 317 U.S. Route 1, South, Freeport, ME 04032. Telephone: (207) 865-4399. Fax: (207) 865-0523.

THIRD-PARTY NEWS

Two New DCAL Macros Enhance DataCAD[™]

Super Shell to DOS[™] and Enhanced Bill of Materials[™], developed by CADsoft, Inc. of Point of Rocks, Maryland, offer DataCAD[™] users two new functionalities. DCAL[™] (DataCAD Applications Language) integrates both macros with DataCAD.

Super Shell to DOS allows a user to run a variety of programs and utilities without leaving DataCAD. Super Shell to DOS frees most of the memory used by DataCAD to enable other software, e.g., word processing, database management, estimating programs, utilities, to execute while DataCAD is on hold. After completing the other operation, the user exits and returns immediately to DataCAD exactly where he/she left the drawing.

Now DataCAD users can create a text file or extract information from a database program to be imported into a DataCAD drawing.

Enhanced Bill of Materials allows the DataCAD user to extract information from symbols entered into a drawing from different DataCAD templates to create a single bill of materials.

Most drawings have multiple templates. It is no longer necessary to have a specific template, or any template at all, displayed on the screen while creating a bill of materials. Enhanced Bill of Materials allows the selection of symbols by means of Area, Fence, All, Layer Search, or by any Selection Set that the user has defined beforehand. The speed of Enhanced Bill of Materials' performance increases when the user does not display any DataCAD template.

(Continued on page 14.)

CADKEY/DataCAD Training in U.S. & Canada (continued)

State	CTC	Location/Contact	Course	Dates
	Rochester Institute of Technology	1 Lomb Memorial Dr. Rochester, NY Bob Heffner (716) 475-2205	<i>Intro. to CADKEY</i> <i>Advanced CADKEY</i>	Nov. 6-7 Nov. 8-9
Ohio	CAD CAM, Inc.	2844 East River Rd. Dayton, OH Stephen Bishop (513) 293-3381	<i>Intro. to CADKEY</i> <i>Advanced CADKEY</i>	Nov. 13-15 Dec. 11-13 Dec. 18-20 Nov. 16-17 Nov. 23-24 Dec. 14-15 Dec. 21-22
Ore.	CTR Business Systems	825 SW 14th Av. Portland, OR Matthew Van Dyke (503) 227-2414	<i>Intro. to CADKEY</i> <i>Advanced CADKEY</i>	Nov. 8 Dec. 6 Nov. 22 Dec. 2
Pa.	Lafayette College	Easton, PA J.V. Poplawski (215) 250-5400	<i>Intro. to CADKEY</i>	Nov. 7-9
	Micro Control Inc.	390 Middletown Blvd Langhorne, PA Marion Homan (215) 250-5400	<i>Intro. to CADKEY</i>	Nov. 14-17 Dec. 12-15
	Penn. State Univ. at Erie, Behrend College	Station Road Erie, PA. Pat Espin (814) 898-6103	<i>Advanced CADKEY</i> <i>CADL</i> <i>SOLIDS</i>	Dec. 14-15 Mar. 1-2 May 31 - June 1
	Wilkes College	Stark Learning Center Wilkes-Barre, PA Michael Petyak (717) 824-4657	<i>Intro. to CADKEY</i>	Nov. 14-16 Jan. 9-11
R.I.	Entre Computer Center	385 S. Main St. Providence, RI Carlos Kiamco (401) 831-7280	<i>Intro. to CADKEY</i> <i>Intro. to DataCAD</i>	Nov. 6,8,13,15 Dec. 4,6,11,13 Nov. 7,9,14,16 Dec. 5,7,12,14
S.D.	Northern State College	Box 705 Aberdeen, SD Jerry Sauer (605) 622-2571	<i>Intro. to CADKEY</i>	Nov. 17-18 Feb. 16-17 May 28-29
Texas	MLC CAD Systems	5316 Highway 290 West Austin, TX Pat Stutz (512) 892-6311	<i>Intro. to CADKEY</i>	Nov 22-24 Dec 27-29 Jan. 24-26
	Texas A&I University	Campus Box 203 Kingsville, TX Herchel Kelley (512) 595-2608	<i>Intro. to CADKEY</i>	Jan. 3-5 Mar. 14-16
	Texas Tech University	P.O. Box 4200 Lubbock, TX Mary Bentancourt (806) 742-3451	<i>Intro. to CADKEY</i>	Jan. 9-11 Mar. 20-22 May 15-17 Aug. 21-23

CADKEY/DataCAD Training In U.S. & Canada (continued)

State	CTC	Location/Contact	Course	Dates
Utah	Salt Lake Comm. College	4600 S. Redwood Rd. Salt Lake City, UT Gary Poulsen (801) 967-4303	<i>Intro. to CADKEY</i>	Dec. 13-15
Va.	Virginia Tech	144 Smyth Hall Blacksburg, VA Allen Bame (703) 231-6480	<i>Intro. to CADKEY</i>	Nov. 19-21
			<i>Advanced CADKEY</i>	Mar. 12-14
Wash.	Everett Community College	801 Wetmore Avenue Everett, WA Dave Utela (206) 259-7151	<i>Intro. to CADKEY</i>	Dec. 18-20
	WallaWalla College	204 S. College Av. College Place, WA Robert Noel (509) 527-2082	<i>Intro. to CADKEY</i>	Mar. 19-21
Wis.	North Central Technical College	1000 Campus Dr. Wausau, WI Michael Clark (715) 675-3331	<i>Intro. to CADKEY</i>	Dec. 27-29 May 29-31
Wy.	University of Wyoming	3085 Engineering Bldg. P.O. Box 3295 Laramie WY Donald Polson (307) 766-6450	<i>Intro. to CADKEY</i>	Jan. 10-12 May 23-25 July 25-27 Aug. 20-22

CANADA

Prov.	CTC	Location/Contact	Course	Dates
New-found-land	Marine Institute	Ridge Rd., Box 4920 Newfoundland Andy Fisher (709) 778-0513	<i>Advanced CADKEY</i>	Dec. 1-3
New-found-land	Memorial University	St. John's, Newfoundland John Allen (709) 737-7473	<i>Advanced CADKEY</i>	Nov.30 to Dec. 2
Nova Scotia	Technical University of Nova Scotia	P.O. Box 1000 Halifax, N.S. Gary Bustin (902) 420-7764	<i>Intro. to CADKEY</i>	Jan. 29-31
			<i>Advanced CADKEY</i>	Mar. 26-28 Feb. 5-6 Apr. 2-3
Ontario	C.A.T.E. Ryerson Polytechnical Institute	350 Victoria St. Toronto, Ontario Brian Whelpton (416) 979-5106	<i>Intro. to CADKEY</i>	Nov. 9-10 Feb. 15-16 Apr. 26-27
	JB Marketing Associates	82 Spruceside Cresc. Fonthill, Ontario John Bradford (416) 892-8025	<i>DataCAD I</i> Call for <i>DataCAD II</i> schedule.	

Two New DCAL Macros...

(Continued from page 13.)

Enhanced Bill of Materials allows the user to generate all existing, DataCAD-supplied report forms and all user-created, customized report forms in exactly the same manner as DataCAD does.

Super Shell to DOS and Enhanced Bill of Materials sell as a package for \$149. Site licenses are available. CADsoft, Inc. distributes the package through ASP, Inc. of Kinnelon, New Jersey. For additional information, contact ASP, Inc., 214 Kinnelon Road, Kinnelon, N.J. 07405, Telephone: (201) 838-2447.

DataCAD 128~ Unveiled at DataCAD Dealers' Conference

CADKEY, INC. expanded its involvement in CAD-related education by introducing DataCAD 128~ at its First National DataCAD Dealers' Conference at International Headquarters, Manchester, Connecticut, September 11-12, 1989.

DataCAD 128 is a fully functional version of DataCAD (Version 3.6e) with a maximum drawing-file size of 128K bytes. DataCAD 128 includes a fully functional copy of DC Modeler and several macros, such as Viewmaster, that do not exceed 128K in size. DataCAD 128 does **not** include the DataCAD AEC macro or its associates symbol libraries, with the exception of the Furniture symbols such as Table and Chair.

DataCAD 128 is a product intended for educational or trial use. It is offered **as is**, without warranty, technical support, or program updates. DataCAD 128 is shipped with a copy of DataCAD For The Architect only. Site licenses are **not** available for DataCAD 128.

DRAFT-PAK With CADKEY

(Continued from page 8.)

design engineers do not need to refer to drafting handbooks for such things as tap sizes and counterbore head depths. They simply choose the desired size component or feature from the DRAFT-PAK menu.

Robert Schauer, Design Engineer with Mechanical Design Consultants, Inc., Costa Mesa, California, has found that DRAFT-PAK substantially increases accuracy, and therefore productivity in mechanical design. "Our firm provides a complete design service for the automotive, aerospace, medical, and marine industries. We have discovered that DRAFT-PAK significantly reduces the design and detailing time for our CADKEY design projects. This facilitates bringing new products to market more efficiently. Our lead time to production is markedly reduced."

Carl Marchetto, Group Supervisor of the Inertial Sensors and Actuators group at the Jet Propulsion Laboratory in Pasadena, California, also speaks enthusiastically of DRAFT-PAK with CADKEY 3. "We design and manufacture guidance systems for spacecraft, and we have found DRAFT-PAK to be a comprehensive addition to CADKEY. Having parametric features, fasteners, mechanical elements, and detailing symbols integrated directly into the CADKEY menu makes the system easy to use. In addition, the DRAFT-PAK documentation is complete and very well written."

Editor's Note: DRAFT-PAK is a product of Baystate Technologies, 30 Westview Road, Worcester, MA 01602, (508) 755-1172, FAX: (508) 795-1301. For information about DRAFT-PAK contact your CADKEY/DRAFT-PAK dealer.

CADKEY Training in Australia

State	CTC	Location/Contact	Course	Dates
New South Wales	Advanced Manu-facturing Technologies	1 Boundary Rd. Northmead, NSW Alistair McLachlan (02) 683-4033	<i>Intro. to CADKEY</i> <i>Advanced CADKEY</i>	Nov. 7-10 Dec. 5-8 Nov 14-16 Dec 12-14

TRADE SHOW UPDATE

See CADKEY 3 and DataCAD at these trade shows in 1989 and 1990:

COMDEX / FALL '89, Nov. 13-18, Las Vegas Convention Center, Las Vegas, NV, Booth #W0148.

MTAG/IMIP '89, Nov. 27 to Dec. 1, Washington Hilton and Towers, Washington, DC, Booth #327.

American Vocational Association (AVA), Dec. 1-5, Orlando County Convention Center, Orlando, FL, Booths #1148-11153.

National Home Builders Association, Jan. 19-22, Georgia World Congress Center, Atlanta, GA, Booth #3850.

National Design Engineering Show (NDES '90), Feb. 26 to Mar. 1, McCormick Place, Chicago, IL, Booth #218.

Call Danielle Provencio, Trade Show Manager, for the availability of discounted admission tickets one month before the show.

Dealers Present CADKEY 3 / DataCAD

at Specialized / Regional Trade Shows

Northwestern Technical Institute, Nov. 7, Wausau, WI, CADD Professionals.

Tennessee Industrial Show, Nov. 14-15, Chattanooga Convention Center, Chattanooga, TN, Booth #1001-1002, Soft Touch Systems.

Build Boston '89, Nov. 15-17, Bayside Exposition Center, Boston, MA, CADDVision.

Dayton Industrial Exhibition, Dec. 5-7, Dayton Convention Center, Dayton, OH.

CADKEY 3 / DataCAD at International Trade Shows

Robotica / Metromatica '89, Nov. 14-18, Zaragoza, Spain, Fhecor.

ACS, Nov. 16-18, Wiesbaden, Fed. Rep. Germany, SOFT-TECH.

SIMO '89, Nov. 17-24, Madrid, Spain, Fhecor.

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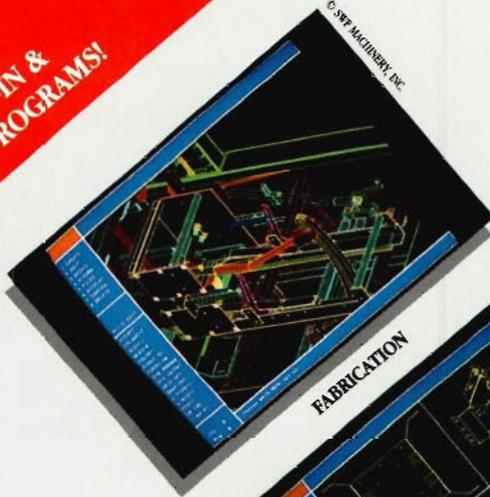
Mail coupon to: CADKEY, INC., Customer Service Department, 440 Oakland Street, Manchester, CT 06040-2100.

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