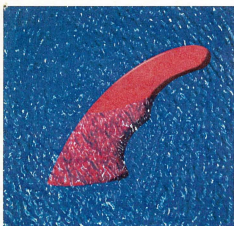


KEY SOLUTIONS

THE PROFESSIONAL JOURNAL FOR CADKEY & DATACAD USERS •

VOLUME 4 NUMBER 5 • JULY 1995



Fin Maker

CADKEY catches a wave

By S. J. Kyle

The following is the latest in a series of articles about CADKEY users in sports-related industries. Their products are diversified and yet all have been developed or improved as a result of the power, ease of use, and flexibility of CADKEY and products that work with CADKEY. The image above is the Ceterio wave fin, a popular template for windsurfboards.

The cinematic surfing saga "Endless Summer" created an indelible image on our collective brains: nomadic idealists on a never-ending search around the planet for the perfect wave. While it's still true there are some who spend much of their time actively pursuing the ultimate surfing (and windsurfing) conditions, those who create the tools of the trade are remarkably in tune with their design and manufacturing brethren in far more mainstream industries.

CADKEY_{in}WORK

Thad Miller is a CADKEY user who designs the directional fins used on surfboards, windsurfboards and sailboats. He is a designer for True Ames in Goleta, Calif., one of the largest fiberglass fin makers in the world. The firm's customers are worldwide and include the largest surfboard and windsurfboard makers in Japan, Europe, Australia and the United States.

Thad got his start when he took an AutoCAD class in the fall of 1993 at Santa Bar-

See WAVE, page 10 ➔

RP industry matures as system sales soar

By Terry Wohlers

The following excerpts are from Mr. Wohlers' presentation at the Society of Manufacturing Engineers Rapid Prototyping & Manufacturing '95 Conference in May.

The rapid prototyping industry is beginning to consolidate and mature as RP becomes a critical part of everyday business at many companies. In fact, 1994 was a pivotal year for the rapid prototyping (RP) industry—and it was the most progressive year in its history. More systems were sold in '94 than were sold in '92 and '93 combined. Many user companies purchased second and third systems, and a few companies now have as many as a dozen. Tens of thousands of RP

jobs were processed last year—more than ever before. Service providers also experienced a banner year, with record revenues and growth. After-market products and services began popping up regularly, a sure indication that RP is indeed an industry to watch.

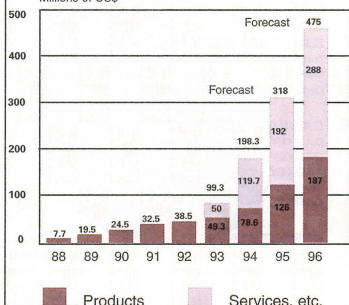
The picture is not entirely rosy. Some system manufacturers fail to offer RP products at price/performance levels that CAD/CAM users have come to expect. Others consume valuable company resources as they fight to protect their intellectual property. Meanwhile, the industry is beginning to consolidate and mature as RP becomes a critical part of business, particularly in the U.S.

Market Expansion

Unprecedented growth in revenue and unit sales is the big news of 1994. Revenue estimates from product sales and services grew by a whopping 92.7 percent in 1994, making RP an estimated \$198 million industry. If you add in the secondary tooling and duplicate

Rapid Prototyping Market Worldwide Revenue Estimates

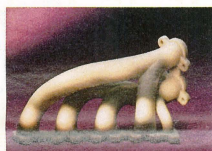
Millions of US\$



Products Services, etc.

"Products" includes systems, materials, and after-market products. "Services, etc." includes RP parts, maintenance contracts, education, training & consulting. It does not include any secondary tooling, duplicate parts or castings.

Source: Wohlers Associates, March 1995



This is an example of the intricate models produced by rapid prototyping. See RP, page 22 ➔

Housejoiners open a window to the past

By Claudia Martin

Windows and doors can be a real dilemma if you're restoring or maintaining one of the beautiful historic buildings that abound in the eastern United States. This is especially true when you want everything to look authentic and original. Windows may be a non-standard size and shape, so you can't just go down to the local hardware or building supply company and buy replacements or even the parts for repairing them. Sure, you can get modern custom-built windows, but they usually stick out like a sore thumb on a pre-Victorian Federal, Greek Revival or Georgian

DATACAD_{in}WORK

home. In addition, even if the originals are semi-intact, those elegant doors and windows were never designed to meet today's insulation standards and, in most cases, are not weather-worthy.

Starek Housejoiners is a small family business in New Hampton, N.H., that specializes in replacing, repairing and designing historic windows and doors. They also repair old windows and build inset-

See HOUSE, page 10 ➔

FREE CADKEY/DataCAD Utilities Disk!

with your one-year (new or extended) subscription to **KEY SOLUTIONS** Journal!



Here are just a few of the great features available on your FREE CADKEY/DataCAD utilities disk!

- Query and manipulate geometry, attributes, or pen number for plotting
- Create disk notes from files longer than disk note limit
- Create linear dimension in 3D isometric views
- Change levels
- Input position data from a text file
- And much, much more!

Mail or fax the subscription form on page 2 **TODAY!**

Fax: 509/928-4937



CONTENTS

JULY 1995

TRENDS & ISSUES

- 1 **Rapid Prototyping** Rapid prototyping industry expands with new system sales by *Terry Wahlers*
- 6 **Recycling PCs** American companies increase their hardware with recycled computers by *Les Stormes*

CADKEY and DataCAD at Work

- 1 **CADKEY Catches a Wave** CADKEY helps surfboard designer create the perfect fin by *S.J. Kyle*
- 1 **Housejoiners Open Window to the Past** Designers use DataCAD to work up historically accurate windows and doors by *Claudia Martin*

PRODUCT FOCUS

- 12 **REVIEWTOP VPMxNT**; QuikRuler
- 16 **A Grab Bag of Printers and Plotters** The latest and greatest by *Robert Martin*

DATACAD TECHNICAL

- 20 **DataCAD Tips** The best mouse
- 20 **DataCAD Productivity Tools** Creating 3D roof models
- 22 **DataCAD Tech** Internet Intercept

CADKEY TECHNICAL

- 7 **CADKEY Toolbox** CADL windowing routine by *John Frawley*
- 7 **CADKEY Tech Tip** Editing the STATUS.TXT by *Dana Seero*
- 9 **CADKEY LISP** Retrieving vertical vertices by *Ron Brumbarger and Scott Workman*
- 13 **CADKEY Productivity Tool** Power tools for 3D design by *Ken Stark*

DEPARTMENTS

- 2 **Advertiser Index**
- 4 **CADKEY Communicate**
- 14 **New Products**
- 18 **Solution Alert**

KEYSOLUTIONS

The Journal for CADKEY & DataCAD users
P.O. BOX 11978, SPOKANE, WA 99211-1978
(509) 928-5169 - FAX: (509) 928-4937

CHAIRMAN OF THE BOARD

Steve Radford

PRESIDENT/CEO

Jack Blidnerback

PUBLISHER

Robert Martin

EDITORIAL

Editor: Claudia Martin

Technical Editor: Robert Martin

Contributing Editors: Ron Brumbarger

Carol Buehrens

S. J. Kyle

Calvin Miller

Walt Silva

Scott Workman

PRODUCTION

Production Manager: Susan Cuff

Production Assistant: Sherry Dahl-Monted

Offer expires 9/30/95

101	131	160	190	219	249	278	308	337	367	396
102	132	161	191	220	250	279	309	338	368	397
103	133	162	192	221	251	280	310	339	369	398
104	134	163	193	222	252	281	311	340	370	399
105	135	164	194	223	253	282	312	341	371	400
106	136	165	195	224	254	283	313	342	372	401
107	137	166	196	225	255	284	314	343	373	402
108	138	167	197	226	256	285	315	344	374	403
109	139	168	198	227	257	286	316	345	375	404
110	140	169	199	228	258	287	317	346	376	405
111	141	170	200	229	259	288	318	347	377	406
112	142	171	201	230	260	289	319	348	378	407
113	143	172	202	231	261	290	320	349	379	408
114	144	173	203	232	262	291	321	350	380	409
115	145	174	204	233	263	292	322	351	381	410
116	146	175	205	234	264	293	323	352	382	411
117	147	176	206	235	265	294	324	353	383	412
118	148	177	207	236	266	295	325	354	384	413
119	149	178	208	237	267	296	326	355	385	414
120	150	179	209	238	268	297	327	356	386	415
121	151	180	210	239	269	298	328	357	387	416
122	152	181	211	240	270	299	329	358	388	417
123	153	182	212	241	271	300	330	359	389	418
124	154	183	213	242	272	301	331	360	390	419
125	155	184	214	243	273	302	332	361	391	420
126	156	185	215	244	274	303	333	362	392	421
127	157	186	216	245	275	304	334	363	393	422
128	158	187	217	246	276	305	335	364	394	423
129	159	188	218	247	277	306	336	365	395	424
130	189	219	248	278	307	366	396	425		

ADVERTISING

Sales
(509) 928-5169 Phone
(509) 928-4937 Fax

EDITORIAL POLICY: Key Solutions is an independent publication without obligation to any software or hardware dealer, vendor or distributor, except as indicated. Articles noted as news or features are written without knowledgeable bias. Articles noted as editorial represent the opinion of the author. Technical articles represent the opinion of the author and are selected by virtue of their educational value. SUBSCRIPTION CORRESPONDENCE: orders, change of address, etc.) should be directed to KeySolutions, P.O. Box 11978, Spokane, WA 99211-1978. Allow six weeks for processing.

EDITORIAL CORRESPONDENCE should be directed to Editor, KeySolutions, P.O. Box 11978, Spokane, WA 99211-1978. KeySolutions encourages readers to submit articles, letters, questions and technical tips.

KeySolutions, Copyright © 1995, (ISSN 1064-2145) is published monthly by Value Engineering Associates. Microsoft and Windows are registered trademarks of Microsoft Corporation. IBM is the registered trademark of the International Business Machines Corporation. CADKEY is the registered trademark of Cadkey, Inc. AUTOCAD and DWF are registered trademarks of Autodesk, Inc.

ADVERTISER INDEX

P#	Advertiser	Product/Service	Card #
22	AGS GmbH	CADKEY Win Dialogbox Simulator	241
20	Applied Production, Inc.	ProFad	212
18	Arcdraft America	Typefaces for CADKEY & DataCAD	303
12	Baystate Technologies	DRAFT-PAK	223
21	Cadkey, Inc.	DataCAD 6	201
3	Cadkey, Inc.	CADKEY for Windows	229
15	CAD Warehouse	Digitizers and Plotters	228
5	Computer Aided Technology	CADKEY Tech Support/Training Services	218
18	Consulting Services International	CADKEY and DataCAD training	410
16	Cutting Edge Technologies	CAM software with surfaces	211
24	Ergo Computing, Inc.	ThunderBrick 120MHz Pentium	202
23	FastSURF	FastSURF	209
18	FPLOT Corp.	Pen Plotter Emulator	312
18	GEI Technology, Inc.	CADKEY, DataCAD training	319
9	GTCO	3D modeling tool	222
10	Infogrip	One-handed keyboard	235
18	Innovative Design Consultants	MENU COMMANDER	306
18	Insight Development Corp.	PrintAPlot, Squiggle, RenderPrint	314, 315, 316
13	Krusc, Inc.	Krusc Central document management	213
18	Lindsay Design	MatWorks	331
18	Poolad Design Quorum	GEORGE	309
14	Quorum CAD Systems	POWERtation 90	315
18	Quorum CAD Systems	CADKEY Reseller	211
17	SURFWARE, Inc.	SURFWARE	216
8	Texas Instruments	Notebook computers	xxx
11	Uniter, Inc.	CADkey products and add-ons	207
6	XI Computer Corp.	200MHz CAD Pentium	213

IT'S SIMPLE, IT'S SMART & IT WORKS.

To place your advertisement in
KEYSOLUTIONS Journal, call us direct at
(509) 928-5169 or FAX (509) 928-4937

KEYMAIL

Dear KeySolutions:
I am trying to breathe some life into the local CADKEY users group and set up a form of resource library for Cadkey, featuring demo versions of various utilities (such as ParadeSign) and as much printed matter as I can locate. Any suggestions for appropriate

material would be warmly appreciated. I can be reached by voice or fax at 612/528-3984, or via Compuserve (ID number 1000355,1302).
R.H. (Rick) Mason
Masco Design Services,
Oyster Bay, New South Wales, Australia

SUBSCRIBE NOW! And receive your FREE CADKEY/DataCAD utilities disk. See Page 1!

to KeySolutions Journal (10 issues/year)

Payment enclosed (\$29.95 in U.S. or \$47.95 Int'l) New Renewal

Bill me for \$29.95 U.S. or \$47.95 Int'l (U.S. \$ only, please)

Visa Mastercard # _____ \$ _____
Exp. Date _____

Name _____
Title _____
Company _____
Address _____
City _____ State _____ Zip _____ Country _____
Phone _____ Fax _____

Please take a moment to answer the following questions:
What is your company's primary activity?
How many people are employed by your company?
What platform do you use? DOS Windows
Software used CADKEY DATACAD

CADKEY COMMUNIQUE

CADKEY IN THE NEWS

■ Peter Smith Rejoins Cadkey Inc.

Peter Smith, one of the original founders of Cadkey (along with the current president, Livingston Davies), rejoined Cadkey on June 9. In his new position, Smith will focus on establishing an Internet presence for Cadkey, including electronic support, distribution and sales. Over the last year, he has been at the National Center for Manufacturing Sciences in Ann Arbor, Mich., a \$120 million-a-year, not-for-profit consortium comprised of some of the major corporations in America. He led a project to develop Internet-based services for the center. Smith is a past president of Cadkey and chairman of the board and has worked on a number of technical projects for Cadkey, including Picture It.

■ Mark Madura New V.P. of A/E/C Systems

Cadkey Inc. announced the appointment of Mark Madura as vice president of its A/E/C Systems group. In this capacity, Madura will have responsibility for the company's award-winning DataCAD product line.

He previously was owner and founder of Madura Studios, a successful Boston-based value added resale (VAR) company, where he has focused on A/E/C sales and support since 1989. Madura studied engineering at Boston University and architecture at the Roger Williams College. He has been involved in the sales and marketing of A/E/C for the past six years.

Livingston Davies, president/CEO of Cadkey Inc. said, "I am pleased to have recruited a person with both marketing experience and direct knowledge of what our customers need. Mark's marketing experience and his passion for meeting the needs of DataCAD customers make him an excellent addition to our staff."

On joining Cadkey, Madura said, "DataCAD is a phenomenally successful product. With the recently released DataCAD Estimator, newly released high-speed graphics drivers, and groundbreaking object-oriented technology in development, I am taking responsibility for a product with a great history and outstanding potential. I am looking forward to the challenge of growing this business segment."

■ CADKEY Windows and CADKEY 8 Progress

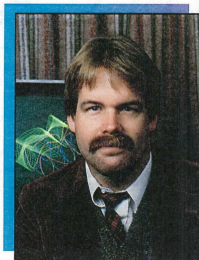
A second upgrade of CADKEY 7 for Windows is tentatively scheduled for late summer. It is expected to include the Advanced Drafting Module, FASTSURF for Windows and CADKEY 7.05. Cadkey also plans to release CADKEY x8 in the fall. CADKEY 8 will incorporate both DOS and Windows into one package. The user makes the decision which platform they wish to use. The CADKEY 8 release will include both DOS and Windows documentation.

■ DataCAD Printer Drivers Available

Per user request, the Epson Color Printer and Encapsulated Postscript drivers for DataCAD may be downloaded from the DataCAD Web home page. The site can be found at its permanent location: www.cadkey.com/datanet.

■ Vibrant, CADKEY Team for Windows Product

Vibrant Graphics Inc., a leader in CAD display technology, has delivered new display list technology for the recently released CADKEY 8 for Windows™ version 7. "The Vibrant display list technology provides CADKEY for Windows with unprecedented graphics performance which we are able to offer at a price point that is way ahead of everyone else in the industry," stated Gary Magoon, senior vice president of Cadkey Inc.



PRESIDENT'S PERSPECTIVE

BY LIVINGSTON DAVIES • PRESIDENT, CADKEY

Cadkey looks to the future

Levels. A few years ago, who would have anticipated that companies like Oracle and IBM would be toutting commodity pricing as a key strategy? We might have expected this from Microsoft, Borland, and perhaps Cadkey. But now, companies at the high end of large niche markets are seeing the handwriting on the wall. Changes in operating systems, pricing and distribution are presenting opportunities as well as challenges to all. The days are numbered for pricing CAD systems at thousands of dollars each.

Mark Madura is taking responsibility for one of the most successful commodity-priced AEC CAD products on the market today. Cadkey Inc. has sold more than 50,000 copies of DataCAD within the past two years and we believe this will continue to grow. Mark is in an outstanding position to grow this business segment, and our customers are correctly interpreting his assignment as an indication of Cadkey's commitment to the future of DataCAD. For the first time in years, the DataCAD effort will be led by someone with direct knowledge of architecture, hands-on experience in the use of DataCAD, and the marketing experience to

match. He has personal knowledge of what DataCAD can do to improve a person's productivity. Perhaps even more importantly, he knows what needs to be done to make DataCAD an even more useful tool. Cadkey already has begun building up our AEC product development staff and our staff level is now at an all-time high. We are in a better position than ever to address the changing needs of the AEC community.

Peter Smith is returning to Cadkey after spending a highly productive year at the National Center for Manufacturing Science (NCMS), an organization of which Cadkey is a member. He has been working in the exciting and high-profile field of electronic commerce via the Internet. He returns to Cadkey as a recognized authority and leading proponent of electronic commerce. Expect to see Cadkey grow rapidly in this area!

Having gone through a challenging time of corporate restructuring, Cadkey Inc. is now on an expansion track. Our first half year has had solid revenue and growing profits. It is fun to work for a successful company. Mark and Peter are going to help take us to the next plateau.

CADKEY INC. PRICE LIST EFFECTIVE THROUGH JULY 31

U.S. / Canada Master Price List (U.S. Dollars)

To order, contact your local authorized CADKEY/DataCAD dealer or call the CADKEY Sales Dept at 203-298-8888.

Product Name	Suggested Retail Price	Product Name	Suggested Retail Price
CADKEY 7 FOR WINDOWS		CADKEY UPGRADE CONTRACTS - (12 MO.)	
CADKEY / Window (3-1/2" or CD ROM) - SRP	\$795.00	CADKEY Professional (Upgrades for CADKEY and Analysis, Advanced Modeler)	\$350.00
CADKEY	\$1895.00	CADKEY 7 DOS & WINDOWS	\$250.00
CADKEY Professional 7 (3-1/2")	\$1895.00		
CADKEY 7 DOS (3-1/2")	\$795.00		
CADKEY Light 7	\$99.95		
SOFTWARE FOR EDUCATION		DataCAD & DataCAD UPGRADES	
EduCAD America Program - DataCAD & CADKEY		DataCAD 6 Professional (3-1/2" or CD ROM)	\$149.95
Call for Program Details/ Costs		Upgrades from DataCAD 5	\$69.95
(Contact: Pete Mancini, CADkey Education Dept., 203-298-6420 or FAX 203-298-6590)	Call for Quote	Estimator	\$99.00
		TOUCH-UP Macro	\$49.95
		Command Performance Macro	\$49.95

CADKEY IN THE MEDIA

Listed below are some recent and upcoming major stories on DataCAD and CADKEY in national publications:

DATACAD

May 1995 - COMPUTER-AIDED ENGINEERING, "Architects go on line" featuring DataCAD users Curtis Wayne Architects and Ed Wolfstein Architects. Cover photo and article.

June 1995 - COMPUTER GRAPHICS WORLD, user profile on home DataCAD user Bill Reinert (re-designed earthquake-shattered home)

July 1995 - AMAZING COMPUTING, Paradigm Productions uses DataCAD for rendering and animation. Cover photo/lead story.

July 10 - ENGINEERING NEWS RECORD, DataCAD user Paradigm Productions

July 1995 - MARKEE MAGAZINE, Tennessee video and production community (Paradigm Productions)

CADKEY

April 1995 - DESIGN NEWS - Diesel Technology designs with CADKEY

May 1995 - POPULAR MECHANICS, feature article on miniature scale vehicle design with CADKEY (InScale Design)

May 1995 - COMPUTER GRAPHICS WORLD, feature article and cover photo (InScale Design)

May 1995 - COMPUTER GRAPHICS WORLD, 3D Low-Cost CAD (CADKEY)

May 1995 - COMPUTER GRAPHICS WORLD, Architectural millwork designed with CADKEY (Russo Bros. Cabinetmakers)

May 1995 - DESIGN NEWS, CADKEY for Windows "feature product"

June 12, 1995 - DESIGN NEWS, Medical design featuring CADKEY users Biodes, Bio-Mireaux-Vitek and Ultimate Preci-

sion Metal Products (written by Paul Teague).

June 1995 - CAD SYSTEMS - 3 Cadkey users profiled (Kontech Plastics, industrial design firm Headwaters, and Micron)

June 1995 - PRODUCT DESIGN & DEVELOPMENT, CADKEY for Windows, cover spot

June 1995 - KEY SOLUTIONS, Apple Pattern, the "model" model shop. Also featured in MODERN MACHINE SHOP, January 1995.

June 1995 - CADD TIMES - CADKEY shaves time from the Truman Bed Buddy design cycle (tentative).

June 1995 - SOFTWARE SOLUTIONS, "How to build SLA models with Cadkey"

July 1995 - CONTROL, CADKEY for Windows roundup in "Microsoft Supplement on Windows Products"

American firms shop at the 'junkyard' for recycled computers

By Les Stormes

The biblical passage that asserts, "There's nothing new under the sun," applies as well to the computer business as to most other spheres of life. In fact, one facet of the usually cyclic computer business that is being experienced a continuous boom for the past decade is PC and PC parts recycling. The reason: Corporate computer buyers have grown increasingly reluctant to invest in new models for the millions of employees who use their machines mainly for word processing, record keeping and other routine tasks for which 386 and even earlier chips are adequate. Therefore, American business has been relying, more and more, on the estimated 3,000 companies that supply guaranteed, refurbished PCs and parts recycled from older computers.

Began as reconditioning centers

The refurbished computer parts business goes back about 20 years to the pre-PC period, when most large business computers were leased, rather than owned outright. The large computer leasing companies, most of them headquartered on the East Coast and in the Chicago area, had a continual need for parts for upgrades and reconfigurations. As a result, several so-called "recon centers" sprang up, mainly in New York, New Jersey, Pennsylvania and Chicago. However, with the emergence in the early '80s of the small and increasingly powerful DOS-based PCs, which quickly became a corporate necessity and an essential component in millions of home offices, the need for PC parts increased dramatically. Marketing of newer models, rather than parts supply, became PC manufacturers' main priority.

Moreover, IBM's decision to allow unfettered use of the DOS operating system by any and all manufacturers meant that young techies in college dormitories, like Michael Dell of Dell Computers, could literally build their own PCs for a fraction of the price of brand name PCs. This led to a virtual explosion of demand for new and used parts.

As a result, entrepreneurial computer dealers began to cannibalize discarded older computers, realizing that CPU components and other parts were far more valuable than the units themselves. They even found a ready market for black-and-white monitors, which were discarded in vast quantities when color monitors were introduced.

The "high-tech junkyards" capitalized on a major vulnerability of the computer manufacturers. Until recently, many of those manufacturers regarded parts supply as a cost center operation that kept corporate customers loyal to their brand rather than a profit center. Unlike their refurbished parts competitors, manufacturers were reluctant to accept obsolete PCs for recycling, causing them to gradually lose the business of used computer parts buyers. Service providers increasingly bought refurbished rather than new OEM parts from suppliers who were happy to accept obsolete products for recycling.

OEM parts often unavailable

Usually, computer service companies' contracts require them to replace worn-out parts with original equipment manufacturer (OEM) parts. However, OEM parts for many older computers are no longer available. Service companies generally trade in worn-out parts to the parts dealers who recondition them and then sell them back, in working order, to the service companies. In this respect, the used computer parts business is one of the world's most environmentally friendly operations.

Today, many of the thousands of dealers specializing in used computer parts operate as cottage industries. They advertise their wares in several specialized trade magazines and broadsheets, as well as on the Internet and other cyberhighways. These dealers' business is exploding because OEM parts, when they're available, are invariably far more expensive than warranted, refurbished parts.

But do large corporations with hundreds to thousands of PCs want to deal with poorly capitalized parts suppliers that operate from garages and basements?

Generally, purchasing managers deal only with well-capitalized, stable vendors that can supply quality computer parts quickly and steadily. However, some "mom and pop" firms have done well supplying corporate customers and will probably continue to do so, particularly with local and long-term accounts with whom they have satisfactory relationships.

Move toward larger firms

But the business is tending to coalesce among larger suppliers, some of which have gone public to raise capital. Others have been acquired by bigger firms that can supply the funds needed for improved inventory, testing and repair facilities, and expanded marketing.

DECEMBER 1994
BYTE
MOST EXPANDABLE
REWORKED PC
SYSTEM

DECEMBER 1993
BYTE
MOST EXPANDABLE
REWORKED HIGH PERFORMANCE
SYSTEM

1995
WINNER
EDITORS AWARD

1993
WINNER
EDITORS AWARD

Xi: 1995 Fastest AutoCAD Pentium!



95
G
The Xi P100 NTower turned in the fastest timing... a unified system that beats the rest of the field."
David Cohn, CACADYST June 1995

94
G
"The Xi P95 NTower turned in the fastest scores of all the machines..."
David Cohn, CACADYST May 1994

94
G
"The Xi 486 proved to be the fastest computer we ever tested."
David Cohn, CACADYST May 1993

93
G
"The NetServer 450 from Xi turned in the fastest results of all the machines we tested..."
David Cohn, CACADYST May 1992

FOR 4 YEARS IN A ROW Xi DELIVERS AWARD WINNING AutoCAD SYSTEMS:

<p>Xi P75 MTower SP PCI + ISA: \$1,759.00</p> <ul style="list-style-type: none"> - Intel Pentium 75MHz, 256KB WBCache - 4xPCI, 4xISA (1 Shared) Flash Bios - 8MB RAM 70ns 850MB 11ms H.Drive - Diamond Stealth 1MB PCI - 15" Flat Square Tube 28dq 1280x1024 - TEAC 1.44, 101 Keyboard, 3B Mouse - Xi 10Bays Mid-Tower Case 250W UL PS - MS DOS 6.2x, WFVG 3.11 	<p>Xi P90 MTower SP PCI + ISA: \$2,989.00</p> <ul style="list-style-type: none"> - Intel Pentium 90MHz, 256KB WBCache - 4xPCI, 4xISA(1 Shared) Flash Bios - 16MB RAM 60ns, 1.27GB 10ms Drive - Diamond Diamond 64Video 2MB PCI - 17" FST 26dq 1600x1280M 66Hz - TEAC 1.44, 101 Keyboard, 3B mouse - Xi 11Bays Mid-Tower Case 250W UL PS - MS-DOS 6.2x, WFVG 3.11 	<p>Xi P90 MTower DP PCI + EISA: \$3,989.00</p> <ul style="list-style-type: none"> - Dual Pentium® 90MHz, 256KB WBCache - 4xPCI, 4xEISA, FL-BIOS, RAM exp. to 612MB - 32MB RAM 60ns 1.056B 5ms FSCSI-2 PCHD - Diamond Stealth 64Video 2MB PCI - 17" FST 26dq 1600x1280M 66Hz - TEAC 1.44, 101 Keyboard, 3B mouse - Xi 11Bays Full-Tower Case 300W UL PS - MS-DOS 6.2x WFVG 3.11
---	--	--

MULTIMEDIA PRO KIT **MONITOR UPGRADES*** **100/120MHz UPGRADE**

Cr.LAB SB PRO 16, Quad, Spd. CD-ROM Drive, Labtec Spkrs, Choice of CD-Titles \$349. MS Office Professional 4.3.3 call

Viewsonic Microp. control, EPA "Green" 1600x1280M, 28/25dp 20"; \$599 21"; \$1,045

120MHz Pentium speed upgrade: \$ CALL
100MHz Pentium speed upgrade: \$ 199 -
X486-66 Workstation from \$ 1,190

Xi Certified for AutoCAD 13, CADKey, Microstation, Windows NT & 95, Novell, 100+ Options available, call for a free Custom Quote. Lease from \$68/month.

CALL TOLL FREE
USA & CANADA

1-800-432-0486

IN CA: (714) 498-0858
FAX: (714) 492-6571







Chile: +562-23 56 695
Costa Rica: +506-2-33 09 33
Sweden: +46-660-55 900
Switzerland: +41-91-56 15 78

Computer Corporation

980 Calle Negocio,
San Clemente, CA 92673

Warranty: THREE YEARS on most monitors. One year on systems. XI-ONSITE optional express free replacement parts shipping. 30 day money back guarantee. Life time Toll-Free HW Tech support.

* As reviewed in CACADYST, May 1993, 1994, June 1995. AutoCAD, Windows, XI-ONSITE DP comes standard with one CPU. *Monitor Upgrades from 17" All prices and specifications subject to change without notice. Prices do not include shipping. For more information on Xi products, a complete call or write to Xi Computer. Xi is not responsible for typographical or graphical errors. Xi, the Xi Logo, Workstation, NT Tower, MT Tower and NetServer are trademarks of Xi. Hardware of Xi Computer Corp. X486 & X486 Workstations correspond to Xi P90, X486-66 & X486-66. Xi NT Tower & Xi Tower systems are PCI class A. Internet for professional use only. Intel, IBM, Pentium and the Intel Inside logo are registered trademarks of Intel Corporation. All other trademarks of their respective companies. Copyright © 1995 Xi Computer Corporation. All Rights Reserved.

6 KEY SOLUTIONS • JULY 1995

CIRCLE 213 ON PAGE 2 FORM

See RECYCLED, page 22

CADL WINDOWING ROUTINE

By John Frawley

In my continuing effort at making my work easier, here is a windowing routine I like. When zoomed in on an area in a large drawing, you sometimes want to check another area. You have two choices: zoom back to the previous area, or do a "zoom all" and then zoom into the spot you want to see. The programs presented here, WIN.CDL and ZOOM.CDL, work together to provide more choices.

With these files in the CDL directory, go to the menu (F5) files (F4) cadl, (F2) execute, and type win. The menu gives four choices, Win 1, Win 2, Win 3, Win 4. Make a choice and digitize diagonal corners for the window. You immediately zoom to that area. The coordinates stay

in memory. You can return to that same area at any time with ZOOM.CDL. Menu choice Zoom 1, 2, 3, and 4 correspond to the Save 1, 2, 3, and 4.

You can program any number of windows, but four will suit most applications. Any more and you lose track of where they are. I sometimes specify the quadrants when starting a new drawing. This way, I have instant access to each corner. My digitizer has an area named "Windows." Four macro boxes labeled "Save," and four labeled "Restore." A macro does the work and all I do is click in the box.

Note: It sure is nice to know that others are using my programs. And thanks to George Winton in Norcross, Ga., for writing. Yes, there was an error in the reprint of LCHG.CDL. "Defatte" came out as "defatree."

WIN.cdl

This program will ask for screen picks for a window. The coordinates are used to return to that area any time in the program "ZOOM". NOTE: The coordinates are not cleared. They remain in memory and will be confusing unless re-defined in the next drawing.

```
menopt = 1
getmenu "Choose from menu (%s)", "Win 1", "Win 2", "Win 3", "Win 4"
if (@key == 1)
  goto win1
if (@key == 2)
  goto win2
if (@key == 3)
  goto win3
if (@key == 4)
  goto win4

:win1
getpos "csave window- 1st Corner", menopt
if (@key == -1)
  goto exit
menopt = @key
axv1 = @xview
ayv1 = @yview
getpos "2nd Corner", menopt
menopt = @key
axv2 = @xview
ayv2 = @yview
window axv1, ayv1, axv2, ayv2
goto exit

:win2
getpos "csave window 2> 1st Corner", menopt
if (@key == -1)
  goto exit
menopt = @key
bxv1 = @xview
byv1 = @yview
getpos "2nd Corner", menopt
menopt = @key
bxv2 = @xview
byv2 = @yview
window bxv1, byv1, bxv2, byv2
goto exit

:win3
getpos "csave window 3> 1st Corner", menopt
if (@key == -1)
  goto exit
menopt = @key
cxv1 = @xview
cyv1 = @yview
getpos "2nd Corner", menopt
menopt = @key
cxv2 = @xview
cyv2 = @yview
window cxv1, cyv1, cxv2, cyv2
goto exit

:win4
getpos "csave window 4> 1st Corner", menopt
```

```
if (@key == -1)
  goto exit
menopt = @key
dxv1 = @xview
dyv1 = @yview
getpos "2nd Corner", menopt
menopt = @key
dxv2 = @xview
dyv2 = @yview
window dxv1, dyv1, dxv2, dyv2
goto exit
:exit
redraw -1

***
```

ZOOM.cdl

This routine will restore windows that were previously specified by the program WIN. NOTE: The (WIN)coordinates are not cleared. They remain in memory and will be confusing unless re-defined in the next drawing.

```
menopt = 1
getmenu "Choose from menu (%s)", "Zoom 1", "Zoom 2", "Zoom 3", "Zoom 4"
if (@key == -1)
  goto exit
if (@key == 1)
  goto zoom1
if (@key == 2)
  goto zoom2
if (@key == 3)
  goto zoom3
if (@key == 4)
  goto zoom4

:zoom1
if (@key == -1)
  goto exit
window axv1, ayv1, axv2, ayv2
goto exit

:zoom2
if (@key == -1)
  goto exit
window bxv1, byv1, bxv2, byv2
goto exit

:zoom3
if (@key == -1)
  goto exit
window cxv1, cyv1, cxv2, cyv2
goto exit

:zoom4
if (@key == -1)
  goto exit
window dxv1, dyv1, dxv2, dyv2
goto exit

:exit
redraw -1
```

By Dana Seero, president
Computer Aided Products
Marblehead, Mass.

You can add immediate mode commands to the Status window. The problem is that you must know the keyword used for the immediate mode command. For instance, if you would like to add Ctrl-Q (immediate mode Single Delete), you need to know the internal keyword CADKEY uses. This list is available from CADKEY, but there is a simple (though convoluted) way to find out what it is and add it to the Status windows. The following instructions use the Ctrl-Q function as an example.

1. Create a macro which has the Ctrl-Q command sequence in it.
2. Do a Text Out of the macro.

3. Read the file just created (it's an ASCII text file) and locate the command for Ctrl-Q (it should be something reasonably descriptive of the immediate mode Delete, like Immdl). Edit the STATUS.TXT file and add a line where you want the command to appear. You can leave out the More lines and CADKEY will divide up the commands onto pages by filling each page up completely.

Editing the STATUS.TXT

The only reason you need More lines is to break up Status pages that are not completely filled up. Add the line as follows:

KEYWORD, "DESCRIPTOR" where Keyword is the keyword for the command and Descriptor is the text descriptor to appear in the Status field.

You can't display variable data in the Status field (like View=n) with the

ones you add. All you can do is add the command and a descriptor. If you prefer Status window selects as opposed to using the keyboard, this provides a convenient way to add immediate mode commands to the Status windows that are bound only to keys with basic, non-personalized CADKEY.

You can also edit the STATUS.TXT file to rearrange commands you use most often. First, copy the file to STATUS.BAK (in case you ever want to go back to where you started). Next, bring the file into a text editor such as Edit or Brief. Move the lines. Once you have the order the way you want it, save the file. The next time you boot up CADKEY, the status window will be in the order you want it.

CADKEY TECH TIP

Retrieving Polyline Vertices

By Ron Brumberger and Scott Workman

This article is a continuing series covering various aspects of the CADKEY LISP programming language. This month, we will discuss one method of retrieving the vertex points of a polyline. If you have suggestions or an idea about areas we should cover in these articles, leave a message via CompuServe - Connect ID: 72730,3154 or via E-mail: scotr@bitwiz.com

Introduction

In past articles we discussed how to retrieve and work with the DXF codes of geometry. The concept of DXF codes is a fundamental concept of programming in CADKEY LISP. We will assume that the concept of DXF codes and the methods of working with DXF code lists has been adequately covered at this point. You may want to review past articles if working with DXF codes is still unclear. We will continue to use DXF codes heavily, but will offer only sparse explanations of DXF codes directly.

This month, we will take a look at the structure of polylines. A polyline is a single entity that is made up of two or more vertex points. The vertex points are grouped together as one entity so that any editing operations occur on a single entity. We will take a look at how polylines differ from entities we have dealt with up to this point.

Polyline Vertices

The concept of a DXF code implies that there is a unique code for every attribute value of an entity. However, polylines have a dynamic number of vertices and it would be impossible to assign a different recognizable DXF code for every vertex in a polyline. To circumvent this problem, polylines in CADKEY LISP behave as a set of individual entities even though it appears as one entity to CADKEY.

The polyline contains a DXF code list for the whole polyline called the polyline header. The DXF code list for a polyline header is returned whenever the information for the entity name selected with the polyline is requested. The attributes of the polyline header contain information applicable to the polyline as a whole, such as color, layer and line type. Besides storing the general attribute information for the polyline, the polyline header acts as a type of bookmark for the rest of the polyline data.

The entities that sequentially follow the polyline header are the vertex points for the polyline. Each vertex is represented by a separate entity name. Following the last vertex is an entity with a type of SEQEND to mark the end of the polyline vertices. Each vertex is a VERTEX entity type and contains a DXF code 10 to represent the coordinates of the vertex location.

The CADKEY LISP function, `entx`, is used to step sequentially through the entities in the parts database. The function is passed a known entity name and it returns the next sequential entity in the database. For the case of polylines, vertex points will always follow the polyline header in the database and the SEQEND entity will follow the vertex entities. The first step in retrieving the vertices of the polyline is to select the polyline and retrieve any polyline header information needed. The next step is to loop through each vertex using the `entx` function until a SEQEND entity is found.

Program Specifiers

The program presented this month will separate selected polylines into individual line segments. The vertices of each polyline are retrieved and a line is created between each pair of vertices. After the line segments are created, the polyline is deleted so that the drawing is left only with the individual lines. The line segments created contain the same attributes as the polyline such as color, layer and line type. It would be a trivial matter to modify the program to separate all polylines in the drawing without user interaction.

The program starts out by allowing the user to select the polylines to separate. The simple `ssget` syntax is used to allow the user to select objects by using the pre-defined selection commands. After the polylines have been selected, a repetition loop is set up to modify each polyline in the selection set. The entity name for each polyline in the selection set is removed from the selection set and passed to the `breakpoly` function.

The `breakpoly` function first retrieves the DXF codes for the polyline header. The polyline header is represented by the name passed as the function parameter. The attribute information needed to duplicate the polyline is retrieved from the polyline header. The attributes that are duplicated are the color, layer and line type attributes.

The `entx` function is then used to set the "vname" variable equal to the entity following the polyline header. The entity following the header should be a VERTEX entity. The point coordinates of the vertex are retrieved and stored in the "p2" variable. A line is created between the p1 and p2 points only if p1

```

;
; KS0695.LSP
;
; CADKEY LISP example presented in Key Solutions
; Magazine, June 1995.
;
; Allows the user to select a set of polylines and
; breaks each polyline
; into separate line segments. This program demon-
; strates the method
; of 'stepping' through the vertex points of a poly-
; line.
(defun c:polybrk ( / ss len l name cnt )
  (princ "\nPolyline separation routine.")
  (setq cnt 0
        ss (ssget))
  (if (/= ss nil)
    (progn
      (setq len (sslength ss)
            i 0)
      (repeat len
        (setq name (ssname ss i)
              i (+ i 1)
                    cnt (+ cnt (breakpoly name))))
      (ssfree ss))
    (princ "\nNothing was selected.))
  (redraw)
  (princ "\n")
  (princ (itoa cnt))
  (princ " polyline(s) separated.")
  (princ)
)
;
; Given the name of an entity, make sure it is a poly-
; line, then
; step through the vertices.
;
; Create a line given a starting point of p1 and using
; the attributes
; and ending point of the vertex description.
;
;
; Create a line ( p1 p2 clr lyr ltyp / dxf )
; (setq dxf (list (cons 0 "LINE") (cons 10 p1)
                 (cons 11 p2)
                 (cons 8 lyr)
                 (cons 62 clr)
                 (cons 6 ltyp)))
; (entmake dxf)
;
; (princ "\nType 'polybrk' to separate polylines.")
; (princ)

```

exists. By setting p1 equal to nil at the beginning of the function, we are guaranteed to not draw a line until at least two vertex points have been retrieved.

In order to continue to step through the rest of the vertices, the "vname" variable is set to the next entity following the vertex point that we just retrieved. The DXF code list for the new vertex is retrieved and the loop repeats. This operation of retrieving the next vertex point one at a time will continue until an entity is retrieved that does not have an entity type of VERTEX.

The `mklne` function simply builds a DXF code list from the given attributes and uses the `entmake` function to create the line. After all of the line segments have been built for a polyline, the polyline entity is deleted leaving the individual lines. Note that the program calls the `redraw` function before exiting to redisplay the lines that may have disappeared when the associated polyline was deleted.

Conclusion

The program this month shows the typical manner in which to retrieve each vertex point of a polyline. The concept of multiple entities representing one polyline may seem a bit awkward at first, but when viewed from the perspective of DXF codes, it is a logical concept.

In the next article we will continue to study polylines and the method used to create them.

Source Code Availability

The source code in this article

can be downloaded from the CADKEY library of the CAD/CAM/CAE Vendor forum on CompuServe. Go CAD-DVE to access the forum.

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

NEW! Save Time & Money...

3D Digitizer For:

- Rapid Prototyping
- Reverse Engineering
- Design
- Modeling/Animation
- Measurement/Inspection

Most Versatile and Affordable:

- Large Digitizing Volume – up to 16" x 8" x 8 feet
- Digitize any material – including metals
- Hand-held Flexibility
- Portable



FREEPOINT 4D
Real Time 3D Modeling Tool!

FREEDOM TO DIGITIZE IN 3 DIMENSIONS

Broad Software Compatibility:
Works with most leading 3D CAD software, including CADKEY.

Call for a **FREE** brochure or demonstration!
203-381-1350


SCIENCE ACCESSORIES
NEW DIMENSIONS TO DIGITIZING
60 PERRY BLVD. STAFFORD, CT 06457 FAX 203.381.1350

bara City College while pursuing his engineering degree. After earning an internship that was being offered at a local CADKEY and DataCAD dealership, Navare Engineering of Santa Barbara, he learned to use CADKEY. Six months later, he heard that True Ames had purchased CADKEY 6 from Navare and needed someone to run their CNC waterjet machine and utilize FlowCAM, a specialized version of SmartCAM.

Thad decided that real-world opportunities such as this were worth pursuing and won the job. It has been a little over a year since he started, and things are humming at True Ames, from design through manufacturing.

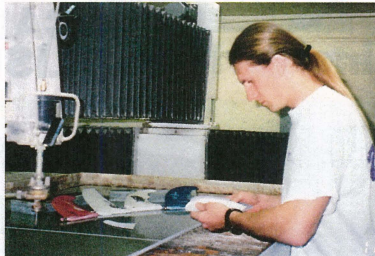
Surfboard fins provide the directional stability much as the keel does on larger vessels. Surfboard and sailboat fins essentially are foils, and share much of the design characteristics used in airplane wing design. They are a combination of fiberglass layers bonded together with resin, and fabricated to conform to a shape and foil specific to an individual's needs and preferences.

The contrast between today's application of aero- and hydrodynamic principles and state-of-the-art manufacturing techniques couldn't be further from the early methods of surfboard design and manufacture. Excluding the ancient methods of the first Hawaiian boards, even early modern efforts were still exclusively manual, utilizing wood-working tools to shape and finish both the board and the fin.

"The way our fins are manufactured starts with lamination," Thad explains.

"The fiberglass panels are laminated into 30x31-inch rectangles, varying from 1/8-inch to 1-inch thick. We also use G-10 fiberglass that is made elsewhere. The appropriate materials are given to me to cut into specified shapes."

Thad digitized all of the catalog shapes into CADKEY 6 and nested them



Thad Miller works on a surfboard fin model.

to fit the specific sheet size. "I find that spline entries offer the best results for making the free-form shapes. The splines are also useful when designing new shapes, due to the ease of moving nodes to change the spline's shape. When the shapes are perfect, I calculate the area and aspect ratio in CADKEY."

The nests are sometimes made directly in the CAM software, which creates the numerical code for the CNC machine to read. After the tool path is created, the nests are saved on 3.5-inch disks and filed for future use. When an order is received, he sends the appropriate nest to the Allen Bradley controller.

"Area, span, chord and aspect ratio are terms that the surfboard and windsurf industries use to describe the functional shape of the fins," Thad says. "A fin is described by basic theories used on aircraft wings, since its shape is very similar and the foil comes from a standard wing section (NACA 63A010)."

The designs are sent directly from CADKEY to a CAM program which, in turn, prepares the shape to be cut by

the CNC. Then they are further processed into the finished product. This means that the shape made in CADKEY is what actually comes out in the end, since all of the further processing depends on the profile. Therefore, the fin can be designed and accurately measured in CADKEY to give

the desired area, aspect ratio, span and so forth."

Each step of the process is carefully considered, according to Thad. "The area of a fin is calculated by CADKEY—something which would be more difficult using other (less sophisticated) means. The area of a fin is very important to its performance. It shows how many square inches will be in the water maneuvering a board, and it is used to find the aspect ratio (the span squared divided by the area)."

"The lift and drag coefficients, with angle of attack, are strongly affected by aspect ratio. A windsurfer racer would want a fin with a high aspect ratio for speed. A windsurfer riding waves (in Hawaii, for example) or large chops (such as might be found at the Gorge on the Columbia River on the Oregon/Washington border) would want a low aspect ratio for quick turning.

Someone that is wanting speed and maneuverability would want an aspect ratio that is in between. The size of the sail, person, and board also come into account. CADKEY allows for very accurate measuring to calculate the desired equation and ease of manipulation to fit assigned values."

After the area, span, chord and aspect ratio are at the optimum settings for the design, the fin is foiled and sanded smooth to a finish. It is then time for the

actual water test. The fin is tested in the water conditions for which it was designed.

True Ames' CNC is a waterjet machine that pumps a water stream through a .03-inch orifice at 55 thousand PSI. An abrasive, resembling sand, is mixed with the water in a chamber to allow a sharper cut. The system makes incision-like cuts in the material and follows the pattern developed in CADKEY.

"I can cut almost any material, from soft foam 8 inches thick, all the way up to hard materials such as glass, marble, metals, even titanium 2 inches thick. The accuracy of the CAD, CAM, and CNC machine allow very intricate shapes to be cut in a 4- by 8-foot area. I can cut the fiberglass at 50 inches per minute."

After the fiberglass is cut into its shape, no further profile shaping is needed from the sharp edge of +/- .005 inches tolerance. The fins are foiled by experts using routers and grinders into an aircraft wing shape. Some fins are glossed, and silk screen logos are put on. The final fins are packaged and then shipped out. "Thanks to CADKEY 6 and the waterjet machine, we have deleted our speed and accuracy," Thad says.

While business is brisk at True Ames, Thad takes advantage of the fact that the folks at Navare Engineering allow him to still come in and use the latest version of CADKEY Pro, and practice Fast-SURF for his future surfacing goals. "I have kept up with CADKEY and its improvements through Navare," he says. "Michael Gersten, sales manager, and the staff at Navare are great and help me and other customers with their design objectives. Having a local dealer this helpful is important for future updates and improvements."

Thad still finds some time to test what he designs, though. A recent trip to the island of Kauai in Hawaii confirmed what he has known from the beginning. There is nothing like the freedom of riding a wave—whether it's generated by Mother Nature, or the latest in technology from CADKEY.

Contact Thad Miller, True Ames Sailboard Fins, 53 Aero Camino, Goleta, CA 93117, phone (805) 685-8341



ONE-HANDED KEYBOARD

- Fully functioning keyboard—uses all of the functions of an extended keyboard with just one hand.
- Frees your other hand to work with a mouse, trackball, digitizer or stylus.
- Ergonomically designed—comfortable hand position and less finger movement.
- Increases productivity with ChordEasy™ software—program macros and WordChords™.

For more information call
(800)397-0921

Infogrip, Inc.

1141 E. Main Street • Ventura, CA 93001

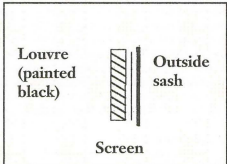
HOUSE from Page 1

ble storm windows and doors that do not detract from the original style of the building. Husband and wife team Bill and Pat Starck do it all—from sales, design, manufacturing and installation. The business was purposely downsized from a larger operation in the '80s when they were doing commercial rehabs. They like the smaller operation because it lets them be in touch with all aspects of a project and respond more quickly to customer needs. It also gives them a lifestyle that is slower, more manageable, and in a word, sane.

Their historic replacement windows combine the beauty of 18th century divided light windows with the practicality of the 19th century inventions, such as the screen and storm sash and the energy efficiency of 20th century low-E insulating glass.

Bill and Pat handcraft each of the windows and doors. Their goals are authentic appearance, quality and durability. Each window is designed to look as much as possible like the original windows. Muntin bars are prominent in both exterior and interior views, with E insulating glass correspond to original muntin dimensions. They can even supply wary, slightly imperfect restoration-type glass or install the original glass in the new sash to preserve this link to a homes past. There are no plastic parts, such as runners that scream "Bad Taste!" or "Not original." Doors are made of hand-forged hardware. The storm windows and doors blend in so well that they don't even show.

Bill has been using DataCAD more and



By placing the storm sash and screen on the outside, the louvres become invisible.

more. In general, he appreciates the convenience of drawing electronically, but what he likes best of all is being able to show customers what their projects will look like in advance. He's learned the hard way that just talking about what something will look like doesn't always match a customer's mental image and expectations. When he has drawings to show, no one is surprised or disappointed with the results.

He is now expanding into new (old-style) house plans and doing remodeling and additions that fit with the existing historic architecture. One of his latest projects involves a way to conceal the modern attic vent louvers added to historic buildings (they didn't have such vents in the old days) behind a fascia. When he tried to explain the vent louvers, they nodded their heads, but they had glassy eyes. When he showed a 3D drawing, they understood.

VPmaxNT

Raster-to-vector conversion quick and easy

By Bob Martin

VPmaxNT is a new software program that automatically converts scanned drawings into CAD vectors in the fraction of the time it takes to do it manually. VPmaxNT features a four-step process to convert scanned drawings to CAD: raster editing, automatic vectorization, automatic post-processing and post vector editing.

VPmaxNT runs on Windows 3.1+ or Windows NT 3.5. It is based on 32-bit code that lets scanned drawings be converted to vectorized DXF/IGS files in seconds or minutes. It also has automatic text recognition (OCR), symbols recognition, hatch recognition (a first) and raster overlay digitizing.

The Post Vector editing features surpassed other software of this type. Instead of quitting and exiting after the conversion, VPmaxNT displays the vector results above the raster image, which helps you edit or "clean up" vector entities without having to refer to the paper drawing. Using this raster-vector overlay mode, you can interactively correct text, close, extend, trim, join lines, change line types, change layers, create new layers, create blocks and perform other actions with just a few clicks of your mouse from the icon tool bar. Small circle recognition is another feature not found in other conversion software.

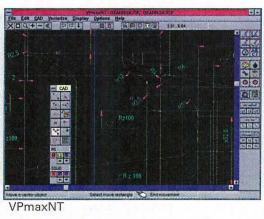
The program is available in three versions with three prices to fit different needs. Top-of-the-line VPmaxNT is for E-size and oversized drawings. In addition to the features listed above,

it has post-vector editing featuring CAD Tool Box and intelligent vector editing icon commands. VPliteNT is for those who want to convert up to C-size drawings affordably. Priced at \$1,490, it does not include symbol recognition or rubber sheeting. VPeditNT includes raster editing to E-size drawings without automatic vectorization.

You can order a demo disk that will let you go for a conversion test drive. To receive the disk, call 1-800-44-VPMAX or fax your request to 512/288-2606 (fax requests please include your company voice phone number). The demo also can be downloaded from CompuServe GO ACAD under the Utilities library or search for the keyword "raster."

Contact Safelec USA, 800/44-VPMAX or 512/288-2606.

CIRCLE 134 ON PAGE 2 FORM



VPmaxNT

QuikRuler

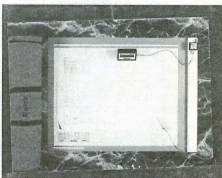
GTCO workstation measures up

By Bob Martin

Taking accurate measurements off drawings and blueprints can be messy and tedious. Now GTCO Corp. has come up with a tool that simplifies the process. The QuikRuler Measuring Workstation includes a GTCO Roll-Up digitizer, pointing device, measuring menu and LCD display with an easy-to-use, yet sophisticated, measuring program. However, it is different from most digitizers because it can be used stand-alone or connected to a PC.

It's really easy to use. It takes only a couple of minutes to be able to start measuring. Even people without computer training could use it with no trouble. For example, to measure an area, you position the drawing on the digitizer, select Area from the menu and then trace or touch points on the drawing along the perimeter of the area with the pointing device. The results of each point are shown in the LCD and the numerical data can be put automatically into programs like Microsoft Excel[®], Lotus 1-2-3[®], and construction estimating programs. QuikRuler has all the functions necessary to measure lengths and even irregular areas on drawings. It works in any scale or unit of measure, can count items on drawings, and perform standard calculator functions.

The QuikRuler is available in three



QuikRuler Measuring Workstation sizes: 20x24-inch (A2), 30x36-inch (A1-), or 36x48-inch (A0). For offices with limited working space or if you need to transport it, the roll-up digitizer is the best thing since sliced bread. It stores or carries easily in the optional carrying case.

The simplicity of this tool is classic. GTCO, an established presence in the digitizer and tablet market with many high-quality products, has ingeniously adapted the digitizer to some special applications. The QuikRuler can significantly improve productivity in many professions, including construction estimating, map making, surveying, agricultural and forest planning, tax and insurance appraisal and design.

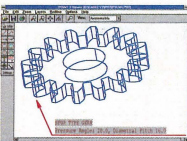
Contact GTCO Corp. at 410/381-6688

CIRCLE 133 ON PAGE 2 FORM



Other products available from Baystate Technologies:

- Bill of Materials Database Generator
- Professional Tablet Overlay
- 2D Mold Designer
- POINT 3™ Continuous Improvement Software



VIEWER/REDLINER

View and redline notations in CADKEY (.prt) files and raster files without having to install CADKEY and without changing the original part files! Runs in Windows™ so there's no need to know CADKEY to run it. Users can copy and paste data to other applications for more efficient communication of changes back to the designer. Ideal for customer service reps, shop floor people, sales engineers, and technical support applications.

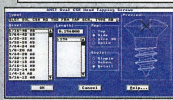
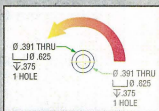


DRAFT-PAK

The Machine Design Handbook for CADKEY.®

Created by Mechanical Designers, DRAFT-PAK Productivity Software dramatically accelerates routine design and drafting operations and reduces the burden associated with tight deadlines and short design cycles. **It's like having a Machine Design Handbook in your computer!**

- Dynamic, WYSIWYG Interface
- Dynamic Move / Edit
- 2D & 3D Parametric Geometry
- Dimensioning & Detailing
- Drawing Layout Enhancements
- User-Programmable Libraries
- Productivity Routines
- Work-Smart Utilities



To order or to inquire about our other products, contact your local authorized CADKEY/DRAFT-PAK dealer. For dealer referral in USA/CANADA call:

1 (800) DRAFTPAK / 1 (800) 372-3872



33 Boston Post Road West, Suite 420
Marlborough, MA 01752 USA
(508) 229-2020 • Fax (508) 229-2121

DRAFTPAK is a registered trademark and POINT 3 is a trademark of Baystate Technologies, Inc. CADKEY is a registered trademark of Cadkey, Inc. WINDOWS is a trademark of Microsoft Corp. All products sold separately.

PRODUCTIVITY TOOLS POWER TOOLS MEET 3D DESIGN CHALLENGES

By Ken Stark, Testor Corp.

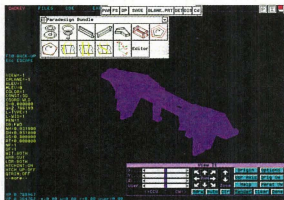
Here at the Testor Corp., we design plastic scale model kits. Because we deal with plastic injection molded parts for 100 percent of each product, drafted sides, filleted rounded corners, and wall thickness turn even the simplest-looking part into a real challenge. Doing 3D design is a special thing by itself, but start throwing in all those not-so-straight edges and you have just entered the frustration zone.

CADKEY helps us create a shorter R&D production time span, but we need to be power designers. The tool we use to enhance CADKEY is the Power Tools Bundle from Paradise-sign. It is reasonably priced, but was created specifically for designers who must deal with all the design considerations involved in molded parts.

The Bundle contains Parapath, a general feature creation program that extrudes a path of lines and arcs with draft, fillets, rounds and wall thickness. Here's an example of what it does: Take a rectangle and extrude it to some depth, but at the same time give it all the features just mentioned. Using Parapath, it is just a matter of entering a few numbers and picking the rectangle. Pretty slick, huh? Wait, there's more.

The Bundle also contains easy-to-use and very powerful parametric feature programs that are dialog-box driven and defined. It is as simple as knowing the basic size of the feature you want to create, then entering these parameters into the feature's dialog box. Features such as circular boss, counter-sinks, counterbores, full radius slots, and rectangular ribs can be created quickly just by entering some numbers. All the math is done for you. What more could you ask for? When the current version 3.0 came out, three different "thru" features were added: round, square, and full radius slot, plus a powerful option to create rectangular shell features.

The best feature of the new release is the ability to create features that can be edited and changed later. That's right, parametric features that carry with them information about their parameters, feature type, location and construction plane orientation. A built-in editor starts the correct dialog box once the feature has been selected. The dialog box displays all the appropriate parameters entered in their respective places, ready to be changed. The feature also may be moved relative to one of nine points at the base of the feature. Other programs in the Bundle include: a path change and file searching option to help you keep track of files; a path fillet program and offset program for offsetting the path of lines and arcs as well as 2D splines with depth, draft, and



A screen sample from Paradesign's Power Tools Bundle.

join options; and a distance measurement utility to give you dx, dy, and dz distances.

Special mention must be given to View It'. With ViewIt, you can perform true X, Y, and Z world axis view rotations. No more uncontrollable rotating by guessing, or top-in and top-out moves. Now you can rotate by specific increments and change the origin of the rotation axis. Pan and zoom options are as easy as a pick of a button. You can also start Picture It from within the ViewIt dialog box. This allows you part to be rotated and rendered until the perfect view is achieved.

Enhancements are in the works for future releases, even an automatic FastSURE™ surface creation over the wireframe. If you need a tool that will help you make the transition into 3D or improve your current 3D activities, at \$325, the Power Tools Bundles one of the best bargains out there. It will definitely free you from doing all those tedious calculations and give you more time for perfecting your design. View It is available separately for \$20.

Contact Paradise design voice/fax: 619/484-8396.

CIRCLE 132 ON PAGE 2 FORM

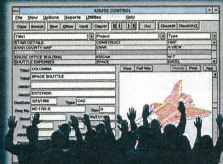
Free Cadkey Viewer Now Included

The easiest to use document management software for all types of engineering drawings and documents now includes a PRT Cadkey viewer at no additional cost. Now Purchasing, Production or any other department who needs it can view up-to-date and accurate Cadkey files (as well as 74 other formats) at their workstations without the application software.

Still Just \$99.

12 Out of 12 Engineers*

Chose Kruse Control To Start
Managing Drawings Electronically



*In over 18 of the world's top 500 design groups, less than one had not called from the time until released. Kruse Control works so well because it was designed by engineers for engineers.

Call now for a copy of Kruse Control or for your nearest Kruse Control dealer.
VISA • AMERICAN EXPRESS • MASTERCARD ACCEPTED.
800-272-5659 FAX 610-269-1004

©1995 Kruse Inc. Kruse Control is a registered trademark of Kruse Inc. Windows is a registered trademark of the Microsoft Corporation.

Cadkey engineers everywhere are choosing Kruse Control because it has all the functions they need and it's easy to get started. Here's what they are saying:

"This really works, right away, and it's simple to understand." (Open-architecture Windows™ software)

"It was easy to learn and took almost no time to implement." (Free step-by-step guide shows you how to get started in just two weeks with no loss in productivity.)

"Views all my files." (75 different formats)

"I can now attach letters and spreadsheets to my drawings, too." (Kruse Control is a total document management system that can grow with you.)

"Simple to use!" (Kruse Control was designed by engineers who work with drawings every day, not programmers.)

"You should charge twice as much — it's worth it!" (At \$99, this is one of the greatest values in CAD-related software.)



KEYSOLUTIONS



The following products provide key hardware and software solutions for architecture and engineering. They are additions to the list published in June and were selected on the basis of quality, uniqueness, and price/performance.

CAM

SurfCAM - powerful, easy-to-use CAM tools
SurfWare, Inc.
818/361-5605 Fax 818/361-1919

CADKEY Support

Draft-Pak - software accelerates design and drafting operations in CADKEY
Baystate Technologies
508/229-2020 Fax 508/229-2121

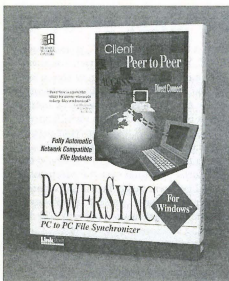
DataCAD Support

DataCAD Training Videos - revolutionary video learning
Keystone Learning Systems Corp.
800/748-4838 Fax 801/373-6872

Hardware

High speed parallel ports and I/O solutions
FarPoint Communications -
805/726-4420 Fax 805/726-4438

SOFTWARE



PowerSync 2.0

PowerSync 2.0

Designed for use with notebook computers, PowerSync 2.0 makes it possible to update files when the notebook computer is docked. PowerSync 2.0 automatically synchronizes the most current version of any user-selected files, and copies missing files from PC to PC. This new version of PowerSync contains QuickSync, a feature that allows the user to automatically open and synchronize files and directories at preset times. The software is compatible with most applications that work with Windows 3.1.

Contact LinkPro at 800/449-7962 or fax 714/833-3301.

Circle 104 on page 2 FORM

Customer Support using LapLink

Traveling Software Inc. announced that Compaq Computer Corp. will bundle a host-mode version of LapLink for Windows™ with future desktop computers. The remote control capabilities of LapLink will support a new customer service program, as well as allow Compaq's technical support staff to remotely take control of a computer for diagnosis and problem resolution. Initial studies show up to a 50-percent reduction in technical support call time using remote diagnosis. LapLink has a suggested price of \$199.95.

Contact Traveling Software Inc. at 206/483-8088

Circle 102 on page 2 FORM

MasterMind 2.4

QStar Technologies announced the newest version of MasterMind storage management software. MasterMind 2.4 includes support for the latest optical, tape, and CD-ROM technologies and features, and several feature enhancements including a Magnetic Caching File System and space relocation. MasterMind Access provides basic jukebox enabling while Server, WorkGroup, and Enterprise offer full-featured HSM capabilities. MasterMind Backup & Restore has automated, centralized client- and server-level disaster/recovery functionality. Network Attached Peripheral offers increased network operating system connectivity. MasterMind software takes least-accessed data and archives the information according to preset parameters based on each customer's file system, ensuring that client/servers never run out of magnetic disk space.

Contact QStar Technologies at 301/762-9800 or fax 301/762-9835.

Circle 103 on page 2 FORM

HARDWARE

Voice Interactive Fax/Data Modem

Logitech Technology has released the 14V14HV internal and the 14V14XV external voice interactive fax/data modem. These modems incorporate data, fax, and voice with an auto-detect feature that distinguishes between incoming faxes or voice messages. The 14V14 Series records, saves, and plays back messages for up to 999 users, and mailboxes are password-protected to ensure privacy. Only one telephone line is required. The complete Hayes AT Command set is supported, along with a variety of other protocols. The internal modem lists for \$159 and the external lists for \$189. Logitech modems are available in PC or MAC configurations, and feature lifetime free technical support and warranty.

Contact Logitech Technology Inc. at 805/338-9000 or fax 805/338-8991.

Circle 108 on page 2 FORM

F/Printer Board for LANs

FarPoint Communications introduced F/Printer version 2.0, a high-speed network printer package consisting of a high-speed, half-size parallel port add-in board and network software. F/Printer can transfer data at rates up to 800,000 characters per second for rapid PC-to-printer file movement. Printing throughput can be increased by up to 20 times, depending on the printer and file type. F/Printer's TSR program appears to the network as the NetWare RPRINTER program, providing full NetWare remote printer support with no need to modify the user application. F/Printer is available for \$299 and features a three-year warranty.

Contact FarPoint Communications at 805/726-4420.

Circle 109 on page 2 FORM

Ultima II Digitizers

GTCO Corporation has introduced the Ultima II digitizer family which features automatic installation for various hardware and software configurations, including DOS, Windows, all leading CAD, graphics, and publishing software, plus SUN Microsystems and UNIX workstations. In Windows applications, the Ultima II offers Dynamic Windowing, which lets users switch between applications and make more use of the entire tablet.

Contact GTCO Corporation at 410/381-6688 or fax 410/290-9065.

Circle 106 on page 2 FORM

Multi-Host Laser Printer/Plotters

BGL Technologies' newest laser printer/plotters are the LaserLeader 9516 and the LaserLeader 9508. These 11x17-inch, multi-host printers print at 600x600 dpi or at 1200x600 dpi with BGL's HighResPac option. The LaserLeader 9516 can support up to four input cassettes of up to 1,050 sheets of paper, and the LaserLeader 9508 can support up to three input cassettes totaling 800 sheets of paper from 5x7.5 inches to 11x17 inches. The printers support up to five interfaces simultaneously, support incoming jobs on the 270MB hard disk drive, and automatically detect and

switch to the proper emulation. The 9516 has a suggested list price of \$4,495 and \$4,995 for the Pentium™ model; the 9508 has a suggested list price of \$3,675 and \$4,295 for the Pentium model.

Contact BGL Technologies 805/987-7305 or fax 805/987-7396.

Circle 111 on page 2 FORM

Thunderbolt64 Graphics Accelerator

Technology Works Inc. has released the Thunderbolt64 PCI graphics accelerator cards designed to add speed and color to IBM compatible PC monitors. The Thunderbolt64 product family includes support for ISA, VL, and PCI graphics buses, and all 1MB versions can be upgraded by the user to 2MB. Thunderbolt64 works with monitors from 13 inches to 21 inches and PCs from 286 to Pentium™. Thunderbolt64's unique panning function allows the user to move around large spreadsheets or drawings without using scroll bars. Thunderbolt64 lists for \$129 for the 1MB version, and \$179 for the 2MB version.

Contact TechWorks at 800/688-7466.

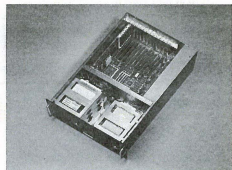
Circle 110 on page 2 FORM

ARTIST 200i Display Controller

ARTIST Graphics announced the 2000i display controller series, including ARTIST HighFocus, which allows operators to change resolution on the fly to 1800x1440. HighFocus also adds clarity, definition and detail, allowing users to place more information on the screen. HighColor Photo Rendering, also available on the 2000i, offers 24-bit photo at 8-bit and 16-bit color depths to produce high-quality display images, and users can display multiple color photos and documents simultaneously. 2000i delivers an 85Hz refresh rate at 1600x1200 resolution, with VRAM in units of 2MB or 4MB. Prices start at \$395.

Contact ARTIST Graphics at 612/631-7849 or fax 612/631-7802.

Circle 112 on page 2 FORM



ProRACK server

ProRACK rack-mount server for mass storage

The ProRACK 5/120 iPCI features a dust-proof steel casing and shock mounted drive bays and is equipped with a single 120 MHz Intel Pentium® PC processor that can be upgraded to dual P546 processing. The six 5.25-inch half-height drive bays can be configured with a variety of storage devices, including hard disk, tape backup, CD-ROM, floppy, and optical drives. The server permits the use of add-in boards designed for EISA, ISA, and PCI. Other features include a universal power supply that can be auto-switched, on-board IDE and floppy drive controller, and 4MB on-board SIMM that can be expanded to 384MB. The ProRACK 5/120 iPCI also can be configured with 256KB or 512KB secondary cache memory. The single unit list price for the ProRACK 5/120 iPCI in standard configuration is \$4,500.

Contact CSS Laboratories at 714/852-8161 or fax 714/852-0410.

Circle 116 on page 2 FORM

MountainGate Data's Grand Prix drives

MountainGate Data Systems Inc. has announced the integration of Quantum Corporation's Grand Prix hard drives into its

Finally - A book to help you decrease your time to market and increase development productivity using CADKEY techniques "Effective Product Development"

By Walter Silva

- ▶ conceptual modeling
- ▶ sound modeling concepts
- ▶ images in documents
- ▶ high-speed construction techniques
- ▶ rapid error-free wireframes

Save \$\$\$ with your pre-paid order!

Pre-paid: \$21.95 Retail price: \$29.95 plus \$4.95 shipping/handling

Release date: August 31

Via/Mastercard

To order, call or fax:
Value Engineering Associates
509/928-5169 fax 509/928-4937

Quannon PowerStation 90 with CADKEY 7

- 90 MHz Pentium™ CPU; 16MB RAM; 256 Cache
- Speed PCI Graphics Accelerator w/2 MB DRAM
- 17" Flat Screen Monitor
- 4 PCI and 2 VESA Local Bus Slots; 2 ISA Slots
- 515 MB Enhanced IDE Hard Disk and 1 Floppy Drive
- One Year Parts/Factory Labor Warranty
- Custom Configurations Available

Available Now!

Leading CADKEY Reseller since 1985. "We know what a system needs to make CADKEY fly!"



Quannon CAD Systems, Inc.
(800)467-3467 or (612)935-3367



existing lines of removable data storage systems. Grand Prix drives will be available for MountainGate's VideoGig, IncreMeg, and DataShuttle product families. Grand Prix offers 7,200 RPM performance in high-end storage solutions with a capacity of 4.2 GB. The Grand Prix family of drives is available for a list price of \$3,550, including desktop docking station and removable cartridge with an installed 4.2GB Grand Prix hard drive.

Contact MountainGate Data Systems Inc. at 702/851-9393 or 800/556-0222.

CIRCLE 114 ON PAGE 2 FORM

Supra launches Plug-and-Play fax modem

Supra Corporation announced a new line of fax modems that deliver plug-and-play simplicity with or without Windows 95. Users running a legacy system (Windows 3.1 or 3.11) will need only to plug in the modem, run the Setup utility, and the fax modem is configured and ready. The SupraExpress 144 iPaP delivers 14,400 bps at a price of \$89.95, and the SupraFAXmodem 288 iPaP offers 28,800 bps, SilentAnswer for fax/voice linesharing, Flash ROM for upgrades, and Caller ID for identifying incoming calls, at a price of \$219.95.

Contact Supra Corporation at 360/604-1400 or fax 360/604-1401.

CIRCLE 115 ON PAGE 2 FORM

nVIEW Presenter 101

nVIEW Corporation announces nVIEW-PRESENTER 101, an active-matrix LCD projection panel. nVIEW PRESENTER 101 makes the presentation of live computer information to large groups a single plug-and-play process when used in conjunction with a standard overhead projector.

The PRESENTER 101 projects graphics and text in more than 185,000 colors, and can be used to display full-motion video with the optional video adapter. The nVIEW PRESENTER 101 is available for \$2,795.

Contact nVIEW Corporation at 800/736-8439.

nVIEW Presenter 101

CIRCLE 107 ON PAGE 2 FORM

ENGINEERING

CAMCAD For Windows™

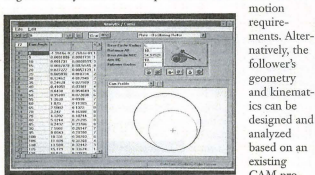
Router Solutions has released CAMCAD for Windows, a Windows-based view, print, compose, and convert program for PCB graphic formats. The compose feature allows the user to create composite drawings from multiple drawings in different formats. Output options include PCB CAD formats such as Gerber, DXF, HPGL, Ariadne, Cadence, Calyx, Mentor, Pads, P-CAD, Procel, Redac, Tango, top-CAD, and Zuken.

Contact Router Solutions at 800/766-1230.

CIRCLE 123 ON PAGE 2 FORM

Analys/Cams™

Saltire Software has announced the release of Analytic/Cams, a software package that allows mechanical engineers to synthesize CAM profiles based on the follower's



Analys/Cams screen

motion requirements. Alternatively, the follower's geometry and kinematics can be designed and analyzed based on an existing CAM profile. This Windows™ based package can be used as stand-alone software or integrated with Saltire's Analytic™ mechanical design and simulation software. Analytic/Cams lists for \$595; bundled with Analytic it lists for \$1,395.

Contact Saltire Software at 503/520-7800 or fax 503/520-6998.

CIRCLE 121 ON PAGE 2 FORM

STARDYNE™ for Windows™

RSR Software offers four configurations of STAR-DYNE analysis software for Windows. The 3000 Node Introductory Package includes all analysis modules; the Basic Linear Package adds linear static and s-s heat transfer; the Total Package includes linear static, dynamic response, nonlinear dynamic response, s-s heat transfer, transient heat transfer, soil analysis, fatigue analysis, and AISC code check; and the Workstation Combos have additional functionality. All packages include 180 days of support. A 300-node demo is available.

Contact RSR Software at 916/344-3900 or fax 916/344-3800.

CIRCLE 120 ON PAGE 2 FORM

Try-Before-You-Buy CDs

EvalWare CDs contain more than 80 fully functional software packages divided into four categories: data analysis and visualization, symbolic and numerical math, electro-magnetic analysis, and neural networks. The applications include commercial, shareware, and NASA COSMIC programs. The user can fully test the software before purchase. Once the buyer purchases the applications via telephone and downloads from the CD, the manufacturer

ships the retail package and documentation. The introductory price is \$29.95 and is refunded with the first software purchase from the CD.

Contact InfoNow Corporation at 800/842-4669.

CIRCLE 122 ON PAGE 2 FORM

MISC

Non-Fading Color Bond

Occ-Burning Supplies has introduced Copy-Bright FCB, a fluorescent white-form, plain-paper copier bond that sustains its color in heat and direct sunlight. Copy-Bright is coated with a permanent heat- and ultraviolet-resistant color that makes it an inexpensive alternative to using vinyl materials for posters, banners, window signs and retail displays. Additional benefits are increased toner adhesion with fibers that are treated with a special coating to ensure evenly filled toner areas, and the ability of users to incorporate different levels of gray areas in the design.

The 24-lb bond is available in "Piquant Pink," "Hello Yellow," "Glowing Green" and "Flame Orange."

Contact Occ-Burning at 800/233-4227.

CIRCLE 119 ON PAGE 2 FORM

CAD Warehouse

A Summagraphics Company

VALUE ADDED DIRECT MARKETING

One Of The Nations Largest Authorized Dealers Of Digitizers & Plotters

1-800-487-0485

Customer Service 216/468-1468 - Fax 216/468-1937 - 8515 Fremont Drive - Macedonia, Ohio 44056

When Checking Our Competitor's Ads For Prices Please Check The Fine Print For Handling Charges And Credit Card Surcharges

HP

Digitizer Tablets

220 Model "T"	1995
220 Model "T2"	2550
600 Model "T2"	4095
600 Model "T2"	4925
630C Color "T2"	5699
630C Color "T2"	6399

TRI-STAR

COMPUTER CORPORATION

Pentium \$2509

M0752604iZ Available

100MHz Processor	16MB RAM
256K Cache	540 MB Hard Drive
3 1/2 Floppy	101 Key Keyboard
2MB PCI Graphics Card	

Canon Innovate Notebooks

COLOR System Includes 32 Bit Pentium Processor technology. The system has a 256m trackball built in along with a 2.5" floppy, 640x480 resolution, 2 color display and heavy duty rechargeable battery, 250x400MB.

Canon 486D2-50	2299
Canon 486D2-50	2399

Notepad 486-50 130MB, 9.5LD 16GB Cache, Canon Trackball!

Drawing Board III \$215.00

Ask about colorless option!

Summa Sketch III \$215.00

12 x 12 Digitizer W/ Cursor

Calcomp 12418 DBIII Color/Gerbers	399
Calcomp 2436 DBIII	1195
Calcomp 3448 DBIII	1950
Calcomp Ent-Mat 3036	1090
Summa III 0218	399
Summa II Pro SmartPen 486/486D2/32	329
Summa 610 IV 2436	899
Summa 610 IV 2448	999
Summa 610 IV 4440	1850
Kern 610 IV Flatbed Colorless	276
Hiltek 12412 /485	280
Wason 12412 /485	280

HP

Digitizer Tablets

220 Model "T"	1995
220 Model "T2"	2550
600 Model "T2"	4095
600 Model "T2"	4925
630C Color "T2"	5699
630C Color "T2"	6399

TRI-STAR

COMPUTER CORPORATION

Pentium \$2509

M0752604iZ Available

100MHz Processor	16MB RAM
256K Cache	540 MB Hard Drive
3 1/2 Floppy	101 Key Keyboard
2MB PCI Graphics Card	

Canon Innovate Notebooks

COLOR System Includes 32 Bit Pentium Processor technology. The system has a 256m trackball built in along with a 2.5" floppy, 640x480 resolution, 2 color display and heavy duty rechargeable battery, 250x400MB.

Canon 486D2-50	2299
Canon 486D2-50	2399

Notepad 486-50 130MB, 9.5LD 16GB Cache, Canon Trackball!

Summagraphics

Guaranteed Lowest Prices!

3 Year Warranty	1899
HP Plot 7100-IMB	1499
HP Plot 7200-IMB	1810

Summagraphics

Guaranteed Lowest Prices!

DMP1480-1 Pen/Stand	1379
DMP1480-1MB	1299
DMP1480-2MB	1799
DMP1628-4 Pen	3100

Novell

In Stock

3 1/2"	560
10 User 3.5"	1249
10 User 3.5"	1849
10 User 3.5"	2469
15 User 3.5"	2995
25 User 3.5"	3995
50 User 3.5"	5995
SMC Ultra 16	1695

Summagraphics

Guaranteed Lowest Prices!

3 Year Warranty	1899
HP Plot 7100-IMB	1499
HP Plot 7200-IMB	1810

Summagraphics

Guaranteed Lowest Prices!

DMP1480-1 Pen/Stand	1379
DMP1480-1MB	1299
DMP1480-2MB	1799
DMP1628-4 Pen	3100

Novell

In Stock

3 1/2"	560
10 User 3.5"	1249
10 User 3.5"	1849
10 User 3.5"	2469
15 User 3.5"	2995
25 User 3.5"	3995
50 User 3.5"	5995
SMC Ultra 16	1695

Summagraphics

Guaranteed Lowest Prices!

3 Year Warranty	1899
HP Plot 7100-IMB	1499
HP Plot 7200-IMB	1810

Summagraphics

Guaranteed Lowest Prices!

DMP1480-1 Pen/Stand	1379
DMP1480-1MB	1299
DMP1480-2MB	1799
DMP1628-4 Pen	3100

Novell

In Stock

3 1/2"	560
10 User 3.5"	1249
10 User 3.5"	1849
10 User 3.5"	2469
15 User 3.5"	2995
25 User 3.5"	3995
50 User 3.5"	5995
SMC Ultra 16	1695

Calcomp Plotters

Design Mats Series

Design Mate 3024	1269
Design Mate 3036A	1539
Design Mate 3036	1149
Design Mate 3036M	1979

Calcomp Plotters

Roll Feed

Calcomp 4825	2425
Calcomp 3000P	4550
Calcomp 3000P	5350

Printers

Calcomp 22400 - 600 DPI

HP 11 x 17 - HP8101 - PS - 16MB	
---------------------------------	--

Calcomp Plotters

Design Mats Series

Design Mate 3024	1269
Design Mate 3036A	1539
Design Mate 3036	1149
Design Mate 3036M	1979

Calcomp Plotters

Roll Feed

Calcomp 4825	2425
Calcomp 3000P	4550
Calcomp 3000P	5350

Printers

Calcomp 22400 - 600 DPI

HP 11 x 17 - HP8101 - PS - 16MB	
---------------------------------	--

Calcomp Plotters

Design Mats Series

Design Mate 3024	1269
Design Mate 3036A	1539
Design Mate 3036	1149
Design Mate 3036M	1979

Calcomp Plotters

Roll Feed

Calcomp 4825	2425
Calcomp 3000P	4550
Calcomp 3000P	5350

Printers

Calcomp 22400 - 600 DPI

HP 11 x 17 - HP8101 - PS - 16MB	
---------------------------------	--

Calcomp Plotters

Design Mats Series

Design Mate 3024	1269
Design Mate 3036A	1539
Design Mate 3036	1149
Design Mate 3036M	1979

Calcomp Plotters

Roll Feed

Calcomp 4825	2425
Calcomp 3000P	4550
Calcomp 3000P	5350

Printers

Calcomp 22400 - 600 DPI

HP 11 x 17 - HP8101 - PS - 16MB	
---------------------------------	--

Calcomp Plotters

Design Mats Series

Design Mate 3024	1269
Design Mate 3036A	1539
Design Mate 3036	1149
Design Mate 3036M	1979

Calcomp Plotters

Roll Feed

Calcomp 4825	2425
Calcomp 3000P	4550
Calcomp 3000P	5350

Printers

Calcomp 22400 - 600 DPI

HP 11 x 17 - HP8101 - PS - 16MB	
---------------------------------	--

Calcomp Plotters

Design Mats Series

Design Mate 3024	1269
Design Mate 3036A	1539
Design Mate 3036	1149
Design Mate 3036M	1979

Calcomp Plotters

Roll Feed

Calcomp 4825	2425
Calcomp 3000P	4550
Calcomp 3000P	5350

Printers

Calcomp 22400 - 600 DPI

HP 11 x 17 - HP8101 - PS - 16MB	
---------------------------------	--

Printers and plotters

A grab bag of enhanced drawing tools

By Robert Martin

The old gray mare just "ain't what she used to be" and, thank goodness, neither are the tools with which we plot and print drawings. Every year brings a new crop of enhanced output devices with more speed, higher resolutions, and all kinds of whistles and bells designed to enhance productivity. Here's a closer look at a few of the latest and greatest from different technologies (inkjet, laser, etc.). The pros and cons of these technologies are not discussed

here. We simply present the best features of each and let you be the judge for your situation.

D/E-Size Plotters Accujet Series from Mutoh

The D- and E-size plotter market is dominated by two giants and, in terms of market share, Mutoh is one of the smaller guys. However, in terms of product quality and performance, Mutoh is truly a giant. Their products are definitely worth serious consideration by those shopping for a dedicated large-format

plotter. Mutoh's pencil/pen plotter is an incredibly wonderful machine and they have again lived up to their reputation (high-quality plotters, reliable and well-engineered) with their first inkjets. Recently, we had the pleasure of evaluating the D-size, monochrome Accujet.

The Accujet was easy to set up and use. It supports HP-GL, HP-GL/2, and DM/PL vector formats, so plotting CADKEY drawings was a snap. It also supports HP RTL and CALS group 4 raster formats. The plots looked great. There is a final mode for highest quality and a



Mutoh Accujet

draft mode for quick check plots. The actual resolution is 300x300 dpi in both monochrome and color modes. In draft mode, to speed the plotting process, images are plotted at 300x300, but only every other dot is plotted. The Accujet D-size monochrome plotter can produce a complex plot (5 percent coverage) in about five to six minutes.

One feature that most people will appreciate, I think, is that cut-sheet and roll capabilities and the stand are all part of the base unit and price. Most companies have stands and/or roll paper capability, but because they're optional, "that'll cost ya!" Another impressive feature of the Accujet is its dual ink cartridge system. This design allows monochrome models to be easily and inexpensively upgraded to color. The optional upgrade kit includes cabling, memory and firmware. The Accujets' liquid ink cartridges are refillable, which saves significantly on consumable costs. Cartridges can be refilled 10 times before they need to be replaced.

The new Accujet does everything an inkjet should and more, but the very competitive price tag should make it affordable for nearly all. The D-size monochrome retails for \$2,995 (color or \$3,295), the E-size monochrome is \$3,695 (color \$4,195). Contact Mutoh at 800/99MUTOH (800/996-8864).

CIRCLE 128 ON PAGE 2 FORM

B-Size Printer/Plotter LP 180 HighRes™ Laser

Laser printers are often a good choice in situations not requiring large format (D- or E-size) output. They're fast, have excellent resolution and can "wear many hats," printing everything (including drawings) the average A/E/C office can put out. Our evaluation time with the new LP 180 from JRL Systems was a very positive experience. I quickly plotted complex 11x17 drawings of an airplane I'm working on that were crisp and clear at 600 dpi. Both the PostScript and HP-GL modes performed well.

The heart of this machine is JRL's See PRINTERS, next page >



JRL Systems' LP 180

LET'S FACE IT!

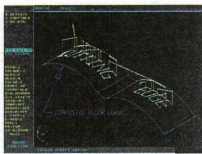
If you use CADKEY and need a CAM program to machine surfaces at a price you can afford, you need ALL the facts and CUTTING EDGE SURFACES!

CUTTING EDGE SURFACES has:

- all the geometry of CADKEY
- surface modeling of FASTSURF
- complete tool path editing
- a library of over 100 post processors

No other CAM package has:

- 100% CADKEY data base compatibility
- 100% CADKEY human interface
- a complete CDE & CADL environment
- general NURBS surface machining
- CADKEY IGES capabilities

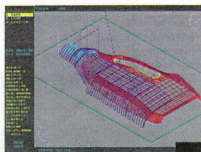


CUTTING EDGE SURFACES can be used as a stand alone CAM system for 3-axis milling, drilling, boring, reaming, slotting, pocketing, tapping and contouring. Immediate verification of the tool path before cutting reduces material waste.

CUTTING EDGE SURFACES is fully integrated into Cadkey's desktop engineering tools. Now you can manufacture your designs directly from CADKEY part files with 100% failure-free data transfer. NO TRANSLATION needed! You can also transfer other CAD files using IGES, DXF, and CADL.

CUTTING EDGE SURFACES offers ease of use unparalleled in the CAD/CAM world, an outstanding customization environment, general surface machining, and the ability to bring surfaces from any CAD system that supports IGES.

If you don't have a blue print or a CAD design, we can help with that too. Ask about the reverse engineering ability of CADInspector.



Call your CUTTING EDGE dealer or Cutting Edge Technologies, Inc.

CUTTING EDGE Technologies

4 Griffin Road North Windsor, CT 06095 ■ (203) 298-6433 Fax: (203) 298-6490

24 Hr. Automatic Fax Info 1-800-778-0202 Code 124808

CIRCLE 121 ON PAGE 2 FORM

new sophisticated RISC-based controller and the reliable Canon LBP PX II engine. It can generate resolutions of 300, 400 or 600 dpi at speeds of up to 16 pages per minute, depending on the input. The controller enables the LP 180 to accept any of the eight commonly used input formats including vector, PostScript, raster and compressed raster data. It also enables the printer to accept tiled and untiled data. All formats can be scaled and rotated to the available paper size. Different types of data can be overlaid on the same page to create new composite drawings and documents.

The LP 180 features a long duty cycle life (7500 8 1/2x11 prints at 4 percent coverage) and an engine duty cycle of 450,000 prints (estimated at 10,000 per month). It reminds me a little of the Energizer Bunny. The serious side of these features is that you save money on consumable and maintenance costs.

The LP 180 also had some user-friendly features that we liked. Its warm-up time was much faster than the lasers of old where you could go get coffee and catch up on the office gossip while the printer got ready. The front panel controls were easy to set. The whole unit was compact without trays or paper catchers hanging out for the user to run into.

If you're looking for a laser capable of B-size output, the JRL LP 180 is a solid machine that will serve you well for years. It retails for \$3,995.

Contact JRL at 512/288-6750.

CIRCLE 129 ON PAGE 2 FORM



Pacific Data Products ProTracer

C-size

ProTracer II & II GL

Handy, compact, versatile, quiet, and fast with high-resolution C-size output. That's a good description of the ProTracer monochrome inkjet from Pacific Data Products.

Thrifty is another good description because the basic (without HP-GL) ProTracer II retails for \$995. With HP-GL, it's \$3,699. That's a fantastic buy for a unit that can produce C-size plots.

The basic ProTracer II provides resident Epson LQ-1050 and IBM Proprinter XL24E emulations, 512K memory, ADI drivers for AutoCAD release 10-13, and a C-size driver for Windows 3.1. Each of the cut-sheet paper bins holds up to 100 sheets of paper. For continuous fan-fold paper, the plotter includes a standard adjustable tractor feed and the roll-feed option allows to print 16-inch continuous, non-perforated paper.

The ProTracer II GL offers the same standard features as the ProTracer II, but also has resident HP-GL/2 and HP-GL emulations and 2MB of memory. This is the configuration recommended for CADKEY or DataCAD users. However, you start with the basic unit and buy upgrade units as you need or can afford them. HP-GL and PostScript capabilities and additional memory can be added easily by the user. You just plug a card into an external slot on the top of the unit. We accidentally got a unit that didn't have enough memory, so we added it, and I am here to tell you it was a very simple and painless operation.

The ProTracer is fast. Plotting time for complex B-size drawings is only two minutes, and C-size plots can print in as little as two and one-half minutes in bidirectional High-Speed Mode. None of this means that this printer/plotter stints on quality output. We found the plots printed very well at 360 dpi.

Settings can be changed from the computer

via the included software or from the easy-to-use front control panel. This one rates high in price/performance. The price is low enough for everyone to have their very own personal plotter. For what it's worth to you, the documentation with this plotter was truly the best, clear and understandable.

Contact Pacific Data Products at 619/552-0880.

CIRCLE 130 ON PAGE 2 FORM

Seiko Label Printer

This printer is not for CAD drawings, but it may help solve a problem that exists in a lot of offices. Sometimes it's the little things, the small frustrations, that drive you nuts. For instance, single labels can be a pain in the printer. You have to change media. Then the labels don't always feed right. If you give up on the printer, your choices still aren't great. You can hand write them or find a (shudder at the word) typewriter. Seiko's Smart Label Printer Pro (SLP) neatly solves the problem.

This dedicated label printer can be hooked



Seiko Label Printer

to your computer via an available port or an A/B box with your regular printer. It can produce a standard address label in little as six seconds and prints in laser quality with fonts and

graphics. Other label sizes that can be used include 3.5-inch disk labels, the face and spine of videocassettes, and a label size for 35mm slides, file folder tabs and for identifying and archiving smaller items. The labels are specially made for the printer, regular Avery (or other) labels don't work. The Seiko labels are a little more expensive, but if you label in moderate quantities, the hassle they save is worth the price.

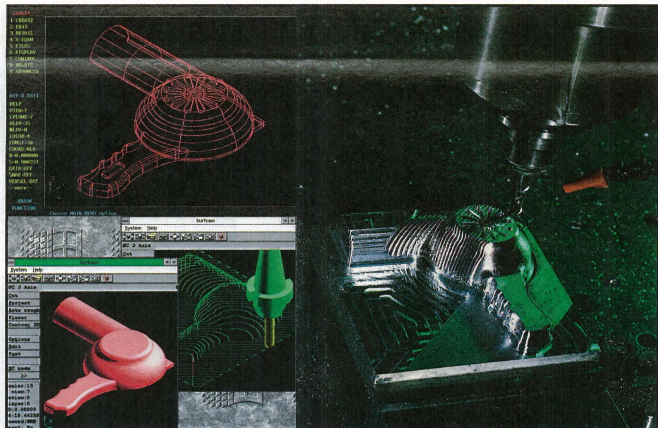
The SLP software (we tested the Windows version, but DOS is available) lets you create and print labels from within Windows applications. It also has automatic address capture from most Windows applications and automatic return addressing. Another automatic feature is the POSTNET bar code approved by the US Postal Service that will help your mail be delivered faster.

At a retail price of \$299, this could be a valuable addition to the busy office.

Contact Seiko Instruments at 408/922-5900.

CIRCLE 131 ON PAGE 2 FORM

YOU DESIGN IT, SURFCAM CUTS IT.



If you're creating a design with CADKEY, SURFCAM will cut it. Because SURFCAM's bi-directional translators move designs to manufacturing with 100% data integrity.

Similar menus and construction concepts make it easy to move between systems.

Plus you can work with SURFCAM's true surface models to generate optimized tool paths with automatic gouge avoidance.

And create or import trimmed NURBS surfaces for one-step, gouge-free surface cutting. Contain tool paths within cutter boundary splines to guarantee gouge-free cutting up to adjacent surfaces.

Powerful 2, 3, 4 and 5 axis systems for CNC mills, lathes, wire EDMs, lasers, waterjets, routers, digitizers

and CMMs, including support for simultaneous 4 and 5 axis machining. All SURFCAM systems ship with both DOS and 32 bit windows versions.

Call us today. Demo disk is \$15 in VISA/MC.

800/488-3615

SURFCAM

SURFCAM INCORPORATED
421 Park Avenue SN Fernando, CA 91340
818/361-5605 Fax 818/361-1919

© 1993 SURFCAM INCORPORATED. All rights reserved. SURFCAM is a registered trademark of Software Incorporated. All other product names are trademarks or registered trademarks of their respective companies.

Notebook computer saves the day

Ergo PowerBrick

The office heads for the beach with a speedy, powerful, portable machine

By Carol Buehrens

A phone call can change your life, even if only temporarily. Sitting in my darkened office in Wisconsin with 6 inches of snow on the ground, I was longing for my previous California home, where sunny-all-the-time days are in stark contrast to long, cold Midwest winters. Tapping the keyboard and intermittently showing the mouse from one spot, I watched the DataCAD screen blink from the 2D Edit menu to the new Est-Link macro options with little interest.

Then the phone rang and my job assignment changed from dreary, cloudy afternoons to warm, bright, tropical Hawaii. A well-known architect (and good friend) needed an extra DataCAD operator to meet a deadline. This was an invitation to work on the Big Island, in Kona, where sunshine is taken for granted in this "playground of the Hawaiians." DataCAD in "paradise"—how could I refuse?

An offshoot of Murphy's law is that everything hits at once. Software that I had been waiting for was ready and I needed to write a user manual for it in two weeks; my friend's DataCAD for Architects and Designers, needed a quick change before going to print the same week; and two magazine articles had to be completed on deadline. I needed a plan that would allow me to work in Hawaii, yet attend to my other assignments. The alternative was—dare I say—no go at all.

The only possible solution was a notebook computer, which I didn't own. A notebook would let me make every opportune moment productive—time on the plane, nights in the hotel, lunches basking in the sun, evenings picnicking at the beach. I needed something powerful and fast that would handle DataCAD, PageMaker, Word for Windows, large drawings and a document with more than 600 illustrations embedded—and I needed it right away.

It was a Thursday and I needed the computer to have software loaded, files intact and be ready to leave with me for the airport by 6 a.m. Tuesday. Impossible? The challenge was on! I started calling the four computer manufacturers I considered.

I called the first company, which advertised Pentiums, 75, 90, or 100 megahertz. Sounds fast. But each week, they couldn't ship until April, a month too late. I immediately called the second and third companies. All I got was voice mail on their 800 numbers and I had to leave a message. When I tried their direct lines, I received the same frustrating electronic recording. (The second company never called back, and the third left a message on my voice mail two days after I left to Hawaii. The message was that they couldn't ship for another two weeks!)

As I dialed the fourth company, I began to panic, thinking that my plan was a pipe dream. To my surprise, their 800 number was immediately answered by a real voice, a live person! I explained my predicament and the support consultant, Tom Drake, wrote down my list of system requirements, adding that he would call back seeing what could be done.

In less than 10 minutes Ergo's president,



Carol Buehrens makes the most of a day at the beach.

Tom Spaulding, was on the line. He appreciated the spot I was in and assured me a PowerBrick would be in my door the next day, Saturday morning. Later, Drake called back to make sure I was getting everything I needed. What service! That Saturday felt like Christmas. By 10 a.m., a PowerBrick was running DataCAD in my kitchen. Ergo even included a linking cable so I could easily move my files from my "big" computer to the new one.

The PowerBrick pulled through, with a hefty 486 running at 100 megahertz, configured with 8MB RAM as expanded memory. I was able to quickly pull up a 6.2-megabyte drawing and work on it with no problem. Operating much faster than my own 486-33, this notebook

was barely outrun by the Pentium 90s used by the architect in Hawaii.

The colors on the Active-Matrix 9-inch color monitor are rich and I really didn't mind working on the small screen because of its high-resolution. (I'll admit it was hard to see in the direct Hawaiian sun, but it worked great in the shade under a palm tree while I sipped on guava juice. If you need to work at the beach, or construction site, buy a monochromatic screen.)

The PowerBrick has a built-in fax board and modem, which is extremely important on the road. In fact, I used this feature on eight different occasions in the one month I was "remote." But, having a modem is essential in the office also. For example, I used the PowerBrick to download a new driver for another computer's graphics card

from the manufacturer's bulletin board, as well as a new BIOS file for one of the Pentiums.

Twice I connected the PowerBrick to a large monitor while I worked and found both screens could display simultaneously. By turning the larger monitor around, the designers could check on the drawing's progress without me leaving my seat. I also had the opportunity to compare the speed of the PowerBrick's Active-Matrix color screen to another brand of notebook running a Pentium 100, but with Dual-Scan color. It costs more for Active-Matrix, but the speed difference makes it worth it. The Dual-Matrix was slow and the reaction sluggish, actually "out-of-sync" behind my hand movements. In short, it drove me crazy.

The portability of a notebook forced me to rethink the uses of a computer in communications. At times I picked up the PowerBrick and moved it to the designer so that he could fully communicate a point. He didn't have to move from his work and I didn't even have to turn the computer off. In fact, I moved the PowerBrick on several occasions for one thing or another, and got so used to this that it's hard now to work on a desktop computer because I have to leave it at the desk.

Another benefit of the notebook communications: talking to prospective clients at their office; at a lunch meeting, showing well-prepared, colored-shaded presentations anywhere without setup problems; pulling out your computer to address a point at any meeting—the list is endless. And, getting your notebook computer more into communications and technological advantage over competitors.

Then, just when I thought I was ahead and could indulge in some precious "tan time," an emergency arose. Over 500 drawings needed to be moved from one of the desktop Pentium computers to another and there was no "network" in place. This particular Pentium was experiencing bad sectors and hard drive problems, and needed reformatting. It became exciting when the tape backup software on this computer refused to work. Time also was an issue as the deadline was approaching. The problem was compounded by the fact that each of these drawings were five to six megabytes, and wouldn't even "PKZIP" to less than two (besides the fact that PKZIP makes a new file that could possibly be corrupted). The PowerBrick saved the day! We quickly connected the link cable and the easy-to-use software copied the drawings over in batch mode, in less than 10 minutes. I got my tan time after all.

Well, I survived Hawaii, got a little tanner, worked on some great drawings and finished all of my writing assignments. But, I'm convinced that notebook computers aren't only for those on the road. Portability provides true productivity, and a notebook computer quickly moves from the office to the conference table, from the detailer's board to the designer, and can become a major player in contractor's meetings. I personally found I could spend more time with my family, since I could take it from room to room as needed. (It's amazing how much work can be done at the kitchen table while I'm cooking and helping with homework.)

In short, I'm sold on notebook computers and I can't imagine a professional office without one. And, you can't bear Ergo for proven support.

A closer look

Ergo PowerBrick

By Carol Buehrens

System tested: PowerBrick 486/100 notebook computer with Active-Matrix color monitor, 16MB RAM, 525MB hard drive, internal fax/modem, two PCMCIA Type II expansion slots (one Type III). Cost of tested system: \$4095

Ergo's PowerBrick is available in 486/33, 66, or 100 megahertz models. The 100 rivals the speed of the Pentium 90. The display of the Active-Matrix TFT color 9 1/2-inch monitor is rich and bright and clear at 640x480. With an external monitor, resolutions to 1024x768 are possible. At 6.3 pounds, the PowerBrick is a little heavy for a notebook, but this is partially due to the Active-Matrix color monitor. It also has a built-in fax board and modem.

The keyboard's full-sized keys are well-laid out. It has a built-in trackball, but CAD users will want to hook up a real mouse or a digitizer/menu tablet. The NiMH battery lasted over two hours when running Windows, DataCAD or CADKEY continuously, and audible "beeps" warn of low battery conditions.

You don't buy a notebook for its case, but it's worth noting that the "Briek Bag" is nicer than most. Listed at just

\$49, this tote is designed with large pockets, extra compartments, hand grips and a shoulder strap with pad, and in most circumstances, will replace having to carry an additional briefcase.

The PowerBrick 100 is on the high side of the average price range for notebooks, but its speed, flexibility and productivity are superior. Company support also is crucial and Ergo delivers. First, Ergo support personnel answer their telephones promptly. Each computer is tested and loaded with DOS and Windows prior to shipment. Also, Ergo promises a "15-day, money-back guarantee," and a policy of "60 days and you're happy or we'll take it back," which gives you full credit to trade-even or trade-up.

One of Ergo's intriguing features is the four-year GE warranty, which covers everything. The optional "Rescue Me!" plan includes overnight delivery of parts, or a whole new loaner system by 10 a.m. the next day. Simply unscrew two connections to take a "sick" hard drive out of a computer and slip in a new one. The PowerBrick is no toy and performs serious tasks without problems, and Ergo's no-nonsense company which stands behind its product. Thumbs up!

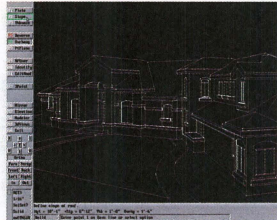
Contact Ergo Computing Inc., One Intercontinental Way, Peabody, MA 01960 800/633-1925; fax 508/535-7512

PRODUCTIVITY TOOL: CREATING 3D ROOF MODELS

If you have ever tried to create a complete 3D model using DataCAD, you know how confusing and time consuming it can be. RoofBuilder Tools is a bundle of four powerful macros that lets you quickly and easily create 3D models of roofs, walls, windows and doors while in a plan (Ortho) view mode without learning the complexities of the DataCAD 3D modeler.

What makes RB Tools different from other DataCAD 3D modeling macros is its ability to handle complex shapes. For example, CADKEY's Roofit automates the roof and wall modeling process, but restricts your ability to control the look of your model. RB Tools creates both simple and complex 3D models and allows you to "mold" the look. This gives you total control when creating 3D presentations for clients and laying out 2D elevations for production.

As a rule, if you can draw in 2D, then you are already on your way to being an expert in 3D models with RB Tools. For this example, simply create or turn on three separate 2D layers in DataCAD. The first layer you need is the roof outline, which



RoofBuilder Tools

typically shows the ridge, valley, hip and overhang locations. The second will be either a building outline or floor plan, showing the location of exterior or interior walls that you want to model. The third layer needed shows the 2D windows and doors.

RB Tools creates models from the roof downward, so first you simply snap over all the roof boundaries in your 2D plan view.

By defining the slope, thickness and beginning and ending of each into your 3D boundary, RB Tools calculates all the necessary heights in your 3D roof and creates a roof slab (or Smart Roof). Each roof boundary or surface can hold up to 36 vertices, so you can imagine the possibilities. Other features like PLine, Edit Roof, RoofUser and SlopeCalc make roof modeling seem effortless.

Once the roofs are established, the 3D walls are constructed using the second macro called BidWall.

Using your wall outline layer as a reference, you just snap to each endpoint of your wall in plan view and then tag Smart Roofs above and/or below. The wall then automatically trims itself to the tagged entities. For example, at a gabled end, BidWall created a sloping 3D wall extending itself to the underside of the roof. Although your input in 2D is entered in a 2D mode, you may view your model in 3D at any time during the building process.

The third macro, called WinDoor, inserts 3D windows and doors into your 3D walls using two methods. Depending on the shape and detail of your opening, you can use the Quick or the Custom method.

You can model irregular-shaped windows, doors or openings using the Custom method. This method takes an object drawn flat in 2D, as though you are looking at it in elevation view, converts tints and voids it into your 3D wall. Just before conversion, the macro looks to see if there is any detail within the boundary, such as window mullions or door paneling. If such elements are found, they are included in the conversion.

Once your model is complete, RB Tools provides an option to automatically create hidden 2D elevations for you. The last macro, AutoE, will sequentially view every side of your model and perform a hidden line removal. It then will save each image to a separate 2D layer. This entire process is done in one simple step. These can then be edited as separate 2D drawings.

RoofBuilder Tools retails for \$49. Contact People Software at 800/647-336 or fax 510/317-0294.

DATA CAD

TIPS

The Mouse Connection

What is the Best Input Device for DataCAD?

One of the charms of Internet forums is that the active ones are a little (no, a lot) like a bunch of guys sitting around shooting the breeze. Everybody shares their knowledge and opinions freely. It's casual, but there's a lot to learn. Here is one of the interchanges from May that revolved around Sean Flanagan's age-old question, "Am I considering an alternate input device. So, what's everybody using? Mice or digitizers?"



"I don't know of anyone who uses a digitizing pad, and only a few who like trackballs for DataCAD. My mouse of choice is the (CR) Logitech MouseMan—it's fairly good-sized and the switches have an excellent touch. It also comes with some really nice software for Windows that takes full advantage of the three buttons, among other cute features. The latest models are available in a bunch of cool colors and textures, but I prefer the older models for their shape. I have a fairly large hand and prefer a boxier unit to the heavily tapered ones they make now. Although it might seem awkward

at first, it's worth the effort to train yourself to use three fingers on the mouse. You get to be real fast that way. I tried a cordless mouse and promptly stuck it in the drawer (with my TrackMan). It just had too much of a response lag."

KB



"Over the past 10 years, I haven't found anything that beats the Logitech Mouse, not that I haven't tried. Logitech will fix their mice for a reasonable price, but under heavy use, they will break. The ball/roller system is particularly suited to picking up grunge and depositing it where it is hard to remove (Swiss Army Knife toothpick is a good tool for this). The newer versions (1993-94) seem chancier than the previous productions, but for now I won't switch. Using a digitizer has an advantage in that you can move the puck to a new location while the previous pick is computing, but overall, the tablets are a drag to configure and use because they don't have acceleration control, which means either lots of arm movement or little control."

W. Edward Blockley, Architect

Internet: weburk@bcm.com



a weekend, and see if you like it. Also, mice are getting cheap, so even if you don't like a particular model after a while, it's no great hardship buying another one here & there."

Ed Wolfstein, AIA

Internet: ewolfjfc@getnet.net



"Our office has been using DataCAD since 1987. We started out with the 3-button optical mouse from Mouse Systems. That changed. The optical innards of each and every mouse we had went bad in less than two years. The symptoms: without touching the mouse the cursor would jump across the screen. At first we thought the pads were dirty, so we cleaned them. (It still jumped). Then we sent them back to Mouse Systems; they replaced the main circuit board (\$35 each). We have since replaced all of our mice with the Logitech MouseMan, both I and II, (20 CAD Systems). These are the most comfortable to use, after you get used to the shape. Someone posted that they had problems with a cordless version. So did we. They rely on batteries. When the battery starts to die, the mouse does act weird. We had a hard drive that was failing (and it interfered with the cordless mouse and the stereo system on the CAD operators desk. The best thing to do is buy a name-brand mouse; there are a lot of cheap three-button mice, key word being CHEAP. Logitech has set a top to their price of \$50 for the MouseMan, so that will always be my choice."

Randy Jack

Internet: rjjack@tsbbs.com

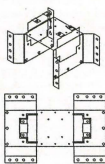


"The best mouse (reliable, low-cost, and easiest to use) has to be the Logitech three-button mice. Logitech offers several flavors of mice. The cheapest three-button is the DEXXA mouse for about \$12 and under heavy wear load tends to die after about six months. The other cheap mouse from Logitech is their OEM mouse (find a dealer who can sell you one), which costs around \$20; the other alternative in the same price range is the Logitech First Mouse at about \$30. These two mice endure usually at least one to two years of use under heavy conditions. The best mouse is the Logitech MouseMan, which is currently called MouseMan II; it has loads of good software for allowing you to configure the buttons, as well as a good warranty. This mouse costs about \$45."

Patrick J. Shoaf, systems engineer, SCR Associates
scr@infotek.com



Flat Pattern Development



ProFold works within CADKEY and AutoCAD saving hours of manual calculations while developing accurate flat blank layouts. Menus within CADKEY and AutoCAD prompt you through the unfolding process. ProFold eliminates errors inherent in manual calculations and uses double precision arithmetic to ensure accurate results.

ProFold unfolds and folds your CAD parts correctly compensating geometry on each flange. Bend allowance is calculated for each bend area or you may specify the compensation.

- Easy to use - Minimal input requirements
- Automatically adds thickness to folded parts
- Handles bends of any angle
- User has full control of the bending operation
- Part may be drawn with or without thickness

Applied Production, Inc.

200 TechnCenter Drive, Suite 202

Milford, Ohio 45150 USA

Tel: (513) 831-9800 Fax: (513) 831-1236

Draining Doors in DataCAD

By Carol Buehrens

If a door is available as a symbol, it's a simple matter to place it in a drawing. (See "Doors as Symbols" in the September 1994 "KeySolutions.") However, if you need a custom door or want to add a new door to your Door Symbol template, you may draw the door from scratch. The following method may be used to draw a simple door in the wall of an existing drawing or for use as a symbol.

Getting Ready

1. Open your drawing.
2. Press A to go to Architect.
3. Make Walls and Centers active. (Pick until the option is green.) Draw or target the wall into which the door will be placed. If the door is being created as a symbol and is not currently part of an existing structure, you can draw just a horizontal wall about 10-feet long by picking two points. Make sure Orthomode is ON by pressing the O and reading the message around your screen.
4. Pick DoorSwing.

Setting Options

5. Make Sides, CntrPnt, Cntout, InWall and Single active. This allows you to define doors by hinge side and strike side, and set a single-leaf hinged door.
6. Pick Lyrch (to read), hatched, and color. Do not use multiple layers at this point.
7. Press K until the desired color for your

door is active (green).

8. Press Insert once, twice or more until the coordinate setting reads "relative Cartesian x, y." Now you can use coordinates to type in for our example.
9. Press the - reference key.

Placing the Door

10. Hold the cursor by the left-most end of the wall. Object snap by pressing the middle mouse button reads "Relative."
11. Press the Space Bar to invoke coordinate type-in mode.
12. Type # for the X-distance of 4 inches. Press Enter.
13. Leave 0 for the Y-distance. Press Enter.
14. Notice the hinge line is connected to your wall 4 inches from the left end. Press the Space Bar again.
15. Type 2 for the X-distance of 2 feet, 8 inches (or whatever is appropriate for your custom door). Press Enter.
16. Leave 0 for the Y-distance. Press Enter.
17. Pick above the wall for the swing direction.
18. Pick below the wall for the other side of the wall. Your door will be drawn. Other options on the DoorSwing menu allow you to create double, bifold or sliding doors. You also can customize the angle, height and thickness from this menu.

DataCAD Home Page progresses:

Livingston Davies, president of Cadkey Inc., posted the following:

"Cadkey Inc. is in the process of putting together DataCAD relevant WWW material. Your comments, suggestions, and contributions would be much appreciated. We would like to use this to help the DataCAD community. To that end, we are making a variety of these downloadable. Right now, we have started with some graphics drivers and some .GIF files from archives. Please let me know if you think anything presented should not be presented. Please also let me know what else you would like to see there. We may also be able to use this to help publicize design shops which use DataCAD. As many of you know, getting found on the Web is a major issue. Putting up a Home Page, and after done, I turn that layer on. This adds detail to the QShaded image

been discussing is to provide hypertext links to perhaps half a dozen DataCAD user home pages. We would probably do this on a monthly rotating basis if there is significant demand for references. Is anyone interested?"

"Please check the work in progress on the DataCAD Home Page. Right now it can be found (as a work in progress) at: www.cadkey.com/~ldavies Some time soon, it will be moved to a definitive DataCAD location." davies@cadkey.com

QuickShader Tips

"Here is a small trick I use to add detail to QShade rendering. I use touchup to hatch the faces of the entities I can see from the ISO or pre-view, then change their color and move the hatch to a new layer and turn it off. Now I run QShade and after done, I turn that layer on. This adds detail to the QShaded image

"Do the QuickShade; go to DataCAD 2D; go to File/0; pick Picketout; pick ToPol; exit DataCAD; change directory to the Pof directory; and type p2pcx dwgname.poc dwgname.pcx. Start Windows-Paintbrush; open DCAD5(6).poc\dwgname.pcx, and play with the painting tools to give blue sky and spray can white clouds, plantings etc. Experiment with intensity and margins and then print. It looks good in black and white but try a color Canon BJ4000 and the results are magic. You can also photograph the screen."

Ken Clare
kclare@ncnet.gcn.nz

RECYCLE from Page 6

Two recent examples point out the coming of age of the refurbished computer parts industry. Earlier this year, Aurora Electronics of Irvine, Calif., stunned the industry by paying \$33 million, most of it in cash, for Century Computer Marketing of Marina del Rey, largest of the high-tech junkyards. Century posted 1993 revenues of \$39.4 million.

Century's management told the press that the acquisition would enable them to provide customers with one-stop shopping for new and used parts, depot repair services, inventory management and recycling of trade-in computer equipment.

And in March, PC Service Source Inc.

of Carrollton, Texas, another high-tech junkyard that had expanded dramatically through aggressive marketing, easily raised \$9 million in an initial public offering (IPO). Commenting on the IPO, Stephen Schweich, a security analyst with the San Francisco-based stock broker Robertson, Stephens & Co. said, "The smaller companies in this industry are going to be hard-pressed to compete." And Dataquest computer industry analyst Steve Clancy told the press that the industry still has a "Wild West image," although mergers and acquisitions will benefit customers through lower costs and more consistent service.

What has made the larger computer

parts resellers attractive to their corporate customers, and thus to investors, is their ability to provide more than just service. They are positioning themselves as full-service recycling, service and repair businesses at a time when corporate America faces a critical need to cut computer costs and recycle non-functioning, outmoded equipment that is using up valuable storage space.

However, in spite of this move toward larger computer parts companies, many of the "mom-and-pop" operations are doing well and will probably continue to prosper because they are specialized and have established excellent relations with their customers. These relationships are based on

their ability to supply needed parts quickly because these dealers know their customers well and anticipate their parts demands.

The comprehensive, constantly renewed bank of information that dealers maintain enables them to recommend less expensive, yet compatible, parts for units or applications for which these parts weren't originally intended, but where they work perfectly. This kind of knowledge obviously helps customers save money. It also helps dealers to anticipate the parts their customers will need, and therefore keep them in inventory for immediate future delivery.

Les Storms originally wrote this article for the May 1995 issue of *AutoCAD World*.

RP from Page 1

parts that come as a result of RP, the industry mushrooms to an estimated \$280 million, conservatively.

Unit sales. This group grew by a potent 84 percent, from 183 units sold in '93 to 336 sold in '94. In the first quarter of '95, the installed base of RP systems surpassed the 1,000 unit milestone.

Product sales. For most U.S. vendors, sales are on the rise. 3D Systems led the pack in 1994 with 94 systems sold, followed by Helixys which sold 76 systems. 3D's accumulated unit installations remain ahead of Helixys by a margin of more than 4-1.

Globally, revenue from product sales grew by an estimated 59 percent compounded annually, which is 23 percent

points higher than what Wohlers Associates conservatively predicted for '94 at this time last year. In '93, system manufacturers sold an estimated \$49.3 million worth of RP products (materials included). In '94, product sales added up to an estimated \$78.6 million. Product sales for the last three years ('92-'94) grew, on average, 35 percent per year.

3D Systems' installed base represents half of all systems installed. The remaining 15 system manufacturers share the other half. With an installed base approaching 500 systems, a major portion of 3D's revenue now comes from non-system sales, such as resins, maintenance agreements and services from their technical centers. Main-

tenance agreements and services add up to about \$14.5 million, which accounts for one-third of the company's '94 revenues.

Service business. The list of RP service bureaus has grown from 105 to 155 in one year, according to CAD/CAM Publishing Inc. (San Diego, Calif.) which publishes the Rapid Prototyping Report. That's an increase of 47.6 percent. Also, established RPs have expanded their operations by adding more machines and people as the demand for RP parts and related services have increased. All of this adds up to a business of considerable size.

Laserform Inc. (Auburn Hills, Mich.) once again teamed with Wohlers Associates to determine the approximate size of the

RP service business. Conservatively, we found that the worldwide RP part-making business has exceeded \$118 million in 1994. This figure does not take into account the secondary tooling and duplicate parts that result from RP patterns.

Add in an estimated \$83 million for this segment of the business. At this time last year, Laserform and Wohlers Associates estimated the '93 RP business to be in the \$40-60 million range (excluding secondary tooling and duplicate parts), another conservative assessment.

Over their revenues in the RP industry come from maintenance contracts and service agreements, educational programs, training, and consulting services. In 1994, revenues from these sources added up to an estimated \$24.8 million. Wohlers Associates did not break out this segment of the market prior to '94.

Forecast for 1995-96

The near-term future for RP is bright. Based on recent growth trends, Wohlers Associates forecasts the '95 market to exceed \$118 million, up from 1994's \$198 million. Furthermore, Wohlers Associates expects the market to reach \$475 million in 1996. These forecasts include the sales of RP products and services, but they do not include revenues generated from secondary tooling and duplicate parts. Unit sales should hit the 1,500 mark by the end of '95, with as many as 540 units sold this year. account the secondary tooling and duplicate parts that result from RP patterns.

Wohlers & Associates, a Fort Collins, Colo., consulting firm.

\$69 DIALWIN.CDE \$69

The CADKEY WIN DIALOGBOX-Simulator!

Runs your CML, CDX, CDE Programs
under CADKEY WINDOWS.

Pricing: User \$69/seat Developer \$499/application

Accepted: Mastercard/VISA/American Express

AGS GmbH • Mollenbachstr. 37 • D-71229 Leonberg Germany

Phone (49) 07152/42081 • FAX (49) 07152/74166 • Computerse 100145,351 Internet Info @ags.de

DEMO Version on BBS EuroBox (49) 7152 977141