



ENVIRONMENT

SAM2010

JULY ■ 1990

DEC

\$4.00 ■ VOL. 9, NO. 7

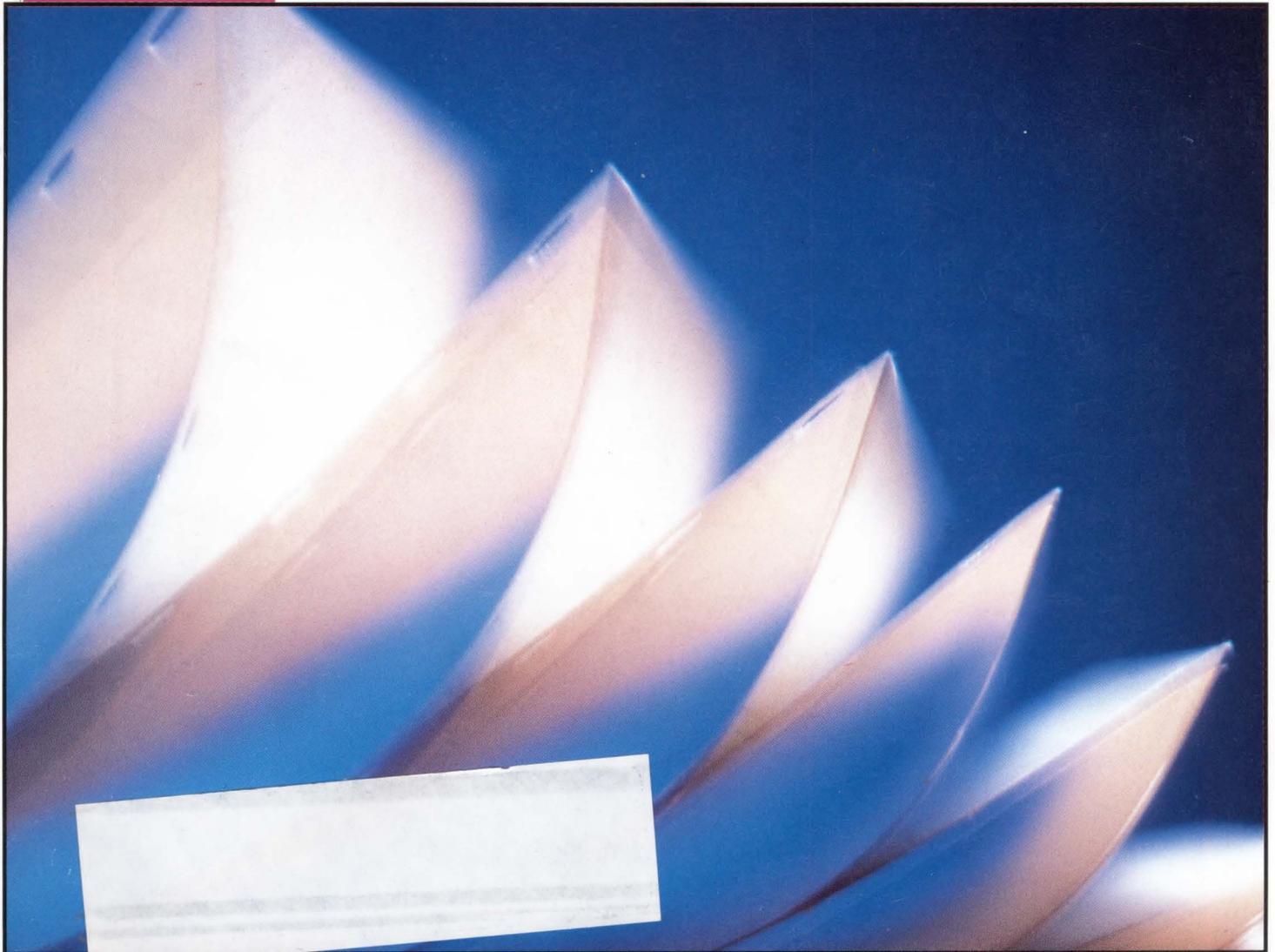
■ PostScript:  
It's Still The  
Standard

■ Harvesting  
Processor Power  
With NCS

■ EDI Gets Ready  
For Takeoff

# Professional

*An Independent Magazine from Professional Press*



**Output Devices**

## UPGRADE YOUR VAX COMPUTERS NOW!

With the new Digital/SmartStar cooperative VAX upgrade plan, you can upgrade both your hardware and software... and save thousands of dollars!  
Call 1-800-67-SSTAR for details



# Declare Your Database Independence With SmartStar.

No serious VAX developer should be handcuffed to a specific RDBMS. "Let the application drive the choice of database," they say, "the application should come first!" Until SmartStar, these were unfulfilled wishes.

With SmartStar as your SQL VAX application development environment, you are finally able to put first things first – your application. Now you can concentrate on creating your application *before* selecting the most suitable database.

In fact, as you move from prototype to production, you can change your database engine. The database options supported by SmartStar are implemented so that you can move data definitions, data, and complete applications without rework, recompilation, and the need to learn new language or syntax.

SmartStar has the unique capability to support Digital's standard RMS files with ANSI-SQL. Also supported are Rdb/VMS, ORACLE, ShareBase and Interbase, with plans underway for Sybase and Ingres.

**"Because SmartStar supports so many different databases, your developers can learn a single development tool and your users can become familiar with a single interface style, and that training investment can be preserved as you develop and acquire applications in other database systems."**

*Philip A. Naeker  
DEC Professional Magazine  
Vol.7, No. 10, October 1988*

### *For Real World Development*

SmartStar is the only 4GL that lets you fully incorporate compiled languages for serious, "real world" development. And SmartStar is a provider of standards, adhering to

ANSI-SQL and VMS conventions today, with DECwindows (and MOTIF), FIMS, ATIS and open connectivity on tap for tomorrow.

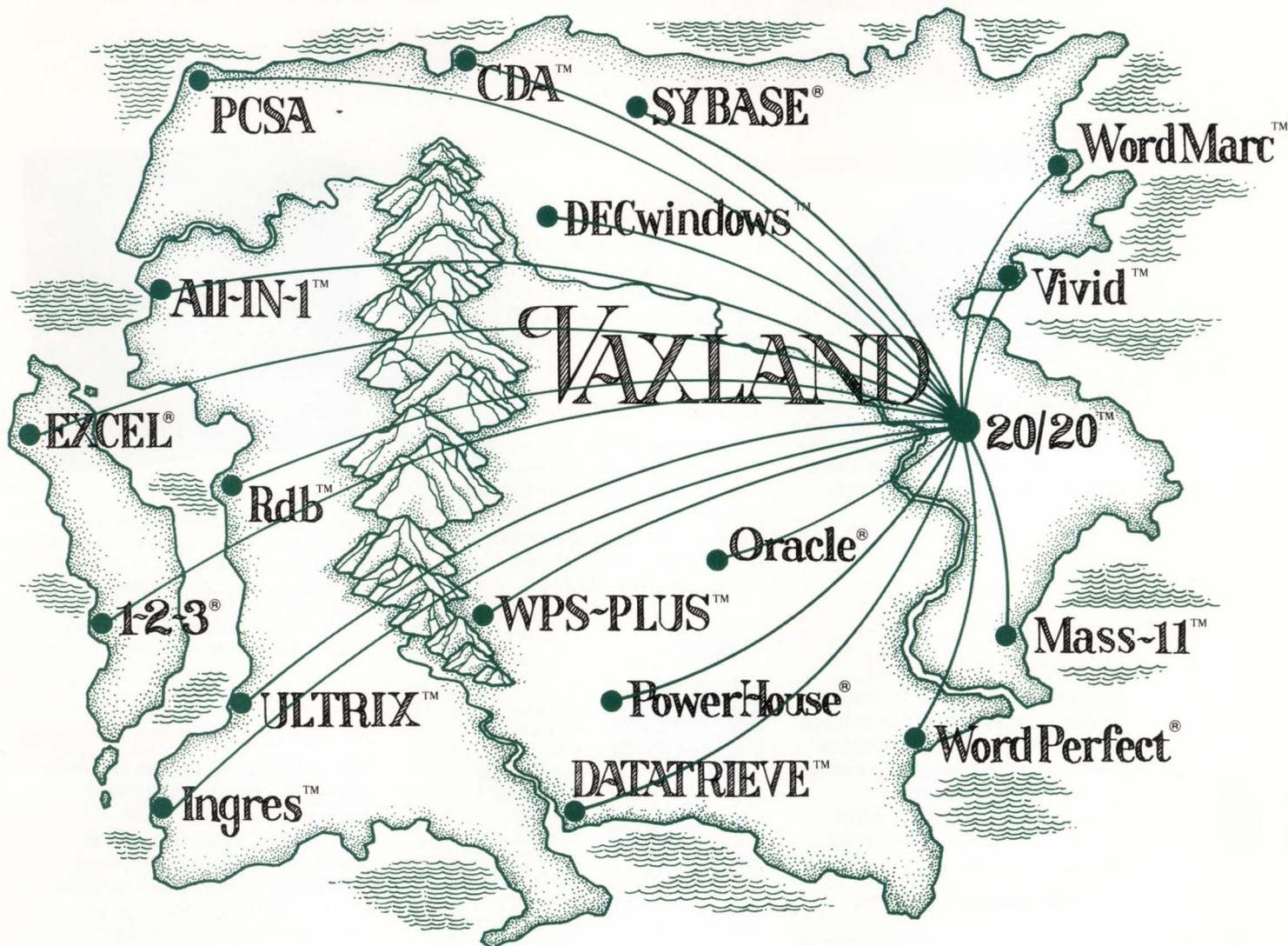
With all this, it should be no surprise that SmartStar is already one of the "big three," with more than a 25% share of the VAX 4GL market.

There are many more exclusive SmartStar features and benefits, and the best way to learn about them is to ask for a demonstration at your VAX site. Call this toll-free number today: 800-67-SSTAR.

 **SmartStar**<sup>®</sup>  
Digital-Based Application Development

SmartStar Corporation  
120 Cremona Drive  
P.O. Box 1950  
Goleta, CA 93116-1950  
(805) 685-8000  
(800) 67-SSTAR

CIRCLE 159 ON READER CARD



# Use 20/20, And There's No Telling Where It May Take You.

If success is a function of being well-connected, then the 20/20™ spreadsheet is success incarnate.

20/20 enables you to capture data virtually everywhere it resides in the VAX™ computer landscape—databases, word processing programs, ALL-IN-1™ Office Software, even PC spreadsheets.

That means you'll spend more time doing useful spreadsheet analysis and less time worrying about how to get critical data into the spreadsheet.

Using simple menus and prompts, you'll bring data from any number of databases directly into your spreadsheets—perfectly formatted, ready for analysis. Likewise, 20/20 makes it easy to incorporate spreadsheet data into your word processing

documents, and vice versa. Not to mention the fact that 20/20's consolidation capabilities let you perform spreadsheet roll-ups incorporating 20/20, Lotus 1-2-3® and Excel models.

And no spreadsheet integrates as tightly with ALL-IN-1, supporting all Gold Keys, file cabinets and electronic mail.

To arrange to receive a 20/20 Evaluation Kit, phone us at **1-508-655-9191**.

This may be the one time in your professional life when it actually pays to be all over the map.

**Access  
Technology**  
A CompuServe Company  
**20/20**

# Comparing LAT terminal servers? Equinox gives you MORE...



Only 3.5" high, the ELS-48 provides up to 48 ports, and runs 38.4 Kbps on all ports simultaneously. Fully LAT-compatible with extended DECserver command set, it offers unmatched performance at a low price.

## MORE ports

From our entry level ELS-48 terminal server priced less than DECserver 300, to our DS-15 with more than four times the capacity of a DECserver 550, Equinox has a LAT-compatible server that's right for you.

## MORE throughput

Thanks to our unique VLSI technology, the ELS-48 supports 48 users at 38.4 Kbps simultaneously, more than any other server, so it's ideal for graphics terminals. For larger applications, the DS-15 supports over 600 users simultaneously at 19.2 Kbps.



Ideal for sites with large user populations or applications where uptime is critical, the DS-15 features fully redundant Ethernet interfaces, central logic, and power supplies for auto-backup. Up to 1320 connections are supported in a package smaller than the DECserver 550.

## MORE than just LAT

If you're in a multi-vendor environment, it's easy to network your VAX terminals and PCs with non-Ethernet hosts, or share modems and printers. Connections to non-LAT devices are made transparently without packet delays, providing fast response even during peak traffic periods.

## MORE dependability

Maximum network availability is assured with our DS-15. Single point failures are eliminated with backup of all key components. In the event a failure is detected, switch-over to standby components is automatic, and hot plug-in board replacement avoids costly downtime.

## MORE wiring choices

Since 1984, Equinox has made over half a million connections worldwide with our clean and simple plug-and-play building wiring, using inexpensive twisted-pair cable. You can minimize cable requirements with our local multiplexers, and drive longer distances with our "LD" options.



The DS-5 connects from 48 to 192 terminals to Ethernet and non-Ethernet hosts in the most compact package available today.

## MORE user-friendly

In addition to full DECserver compatibility, an extended command set reduces keystrokes for server configuration and operation. Enhanced diagnostics and monitors simplify network management.

## MORE space-saving

Equinox is well known in the industry for innovative design, squeezing more ports into smaller packages than any other vendor. Save space in your computer room or wiring closet, with a choice of tabletop, rack, or wall mounting options.

## MORE networking features

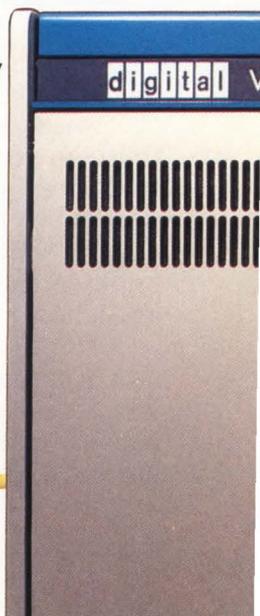
SwitchLAN, our PC software for printer sharing, file transfer, and terminal emulation, increases PC users' productivity. Dialback Security can protect all hosts from unauthorized callers. And T1 wide area connectivity lets you build bigger networks with more connections in more places.

## MORE value

When you compare our long list of features, reputation for reliability, high performance, and expandability with our price advantage (as low as \$135 per port), why buy another DECserver?

Call 1-800-328-2729

today for  
information  
on our 30 day  
evaluation  
program and  
compare for  
yourself.



# EQUINOX

ETHERNET TERMINAL SERVERS • DATA SWITCHING SYSTEMS • MULTI-USER PC UNIX BOARDS

14260 SW 119 Avenue • Miami, Florida 33186 • (305) 255-3500 • FAX (305) 253-0003



# C

# ontents

JULY 1990

VOL. 9, NO. 7

## OUTPUT DEVICES

### 38 COMPUTER DEMOCRACY

*Evan Birkhead*

VAX-based client/server networks are efficient managers of peripherals. Easy access to distributed printing and communications devices is at the core of the DECnet™ and VAX/VMS philosophies. Now that distributed, departmental computing is becoming the norm, the next step is to link dissimilar networks to improve resource-sharing. The technologies needed to do this efficiently, which include client/server and third-party solutions, are multiplying quickly.

### 46 FOREVER POSTSCRIPT

*Kevin G. Barkes*

With the introduction of competing technologies from Apple and Microsoft, it appeared that PostScript and its parent, Adobe Systems, were in serious trouble. But PostScript is firmly entrenched, and nothing short of a revolutionary breakthrough in imaging technology will wrench it from its dominant position. When the 21st century arrives, the smart money may still be riding on PostScript and its direct descendants.

## FEATURES

### 54 STANDARDS: EDI: READY FOR TAKEOFF

*Brian O'Connell*

Electronic Data Interchange (EDI) is a set of automated business communications standards that enable companies to send and receive documents electronically. As EDI aims for the sky, the days of exchanging business records by mail are numbered. Is this a ride you can afford to miss?

*Continued on page 4.*

**ON THE COVER:**  
*Comstock, Inc./*  
*R. Michael Stuckey*

*This magazine is not sponsored or approved by Digital Equipment Corporation. "DEC" and "VAX" are registered trademarks of Digital Equipment Corporation, which is the owner of the trademarks "DEC" and "VAX" and the source of all "DEC" and "VAX" products. For other trademarks of Digital Equipment Corporation, see page 6.*



## CONTENTS

Continued from page 3.

## DEPARTMENTS & COLUMNS

<b>Publisher</b>	
<i>Carl B. Marbach</i>	
The People Problem .....	10
<b>Editorial</b>	
<i>Dave Mallery</i>	
VUPs For Sale.....	14
<b>Workstations</b>	
<i>David W. Bynon</i>	
System Management On The Desktop, Part 2.....	98
<b>Networking</b>	
<i>Bradford T. Harrison</i>	
Harvesting Processor Power With NCS.....	102
<b>The Mac Connection</b>	
<i>Al Cini</i>	
VAXshare In DEC LanWORKS™ For Macintosh.....	110
<b>Field Service</b>	
<i>Ron Levine</i>	
Expert Systems: From Promise To Reality.....	116
<b>ULTRIX™</b>	
<i>Philip E. Bourne, Ph.D.</i>	
Debugging And Profiling.....	120
<b>UNIX™</b>	
<i>Elaine L. Appleton</i>	
The ULTRIX Dream.....	128
<b>DCL Dialogue</b>	
<i>Kevin G. Barks</i>	
DCL Trivia.....	134
<b>Back End</b>	
<i>John C. Dvorak</i>	
The Name Game.....	160
<b>Letters</b> .....	16
<b>ARISTALK</b> .....	20
<b>Product Watch</b> .....	24
<b>Bookshelf</b> .....	96
<b>Products</b> .....	136
<b>Used Equipment</b> .....	154
<b>Product Showcase</b> .....	156
<b>Classified</b> .....	157
<b>Advertisers Index</b> .....	158



### From The Lab A Server To Suit

*David W. Bynon*.....64  
Datability Software Systems' Vista Network Protocol Translator card and LAT-TCP/IP Network Interface Card expand terminal server range through multiprotocol compatibility.

### Tool For The I/O Trade

*David B. Miller*.....68  
Identifying performance bottlenecks is part and parcel of the system manager's job. Touch Technologies' I/O Plus lets you pinpoint performance problems.

### An Ounce Of Prevention

*Ron Levine*.....76  
The SAM2010 Disaster Prevention System from Intra Computer is an automated monitoring device that prevents loss of data and damage to your computer hardware.

### Taking AIM At UNIX Resources

*Barry Sobel*.....82  
Braintree Technology's AIM Resource Accounting package runs on a variety of machines and flavors of UNIX, including ULTRIX.

### Building From The Core

*George T. Frueh*.....88  
Cortex's CorVision I-CASE tool lets developers create production applications through software diagramming and painting tools.

The lab seal indicates that the product reviewed has been tested by one of our experts in our Laboratory and Testing Center.



The ARIS/BB symbol on an article indicates that the program segments are available electronically on our Automated Reader Information Service. The download file name is indicated below the ARIS/BB symbol. Dial (215) 957-1000; Southern California (818) 577-9100; Northern California (415) 873-2135; Massachusetts (617) 863-5010.

We will consider for publication all submitted manuscripts and photographs and welcome your articles, photographs and suggestions. We cannot be responsible for loss or damage. All materials presented are believed accurate, but we cannot assume responsibility for their accuracy or application. DEC PROFESSIONAL Magazine ISSN 0744-9216 is published monthly, except twice in September, by Professional Press, Inc., 101 Witmer Rd., Horsham, PA 19044. Printing and binding by R. R. Donnelley & Sons Company. Subscriptions are complimentary for qualified U.S. and Canadian sites. Single-copy price, including postage, \$4. One-year subscription rate \$30 in the U.S. and Canada, \$60 foreign. All orders must be prepaid. Second Class postage paid at Horsham, PA, and additional mailing offices. POSTMASTER: Send all correspondence and address changes to DEC PROFESSIONAL, 101 Witmer Rd., Horsham, PA 19044. For subscription information and address changes, call (215) 957-1500. COPYRIGHT © 1990 by Professional Press, Inc. All rights reserved. No part of this publication may be reproduced in any form without written permission from the publisher.



# ALL THIS AND A WHOLE LAT™ MORE.

New SmarTerm® 340 is precisely what its name suggests: our top-of-the-line color graphics terminal emulation designed to bring top-of-the-line dedicated VT340® terminal performance to people sitting in front of PCs.

That's a lot without mentioning LAT.™ But we must. SmarTerm 340 and SmarTerm 340 for File Servers include an implementation of LAT™ Protocol

Technology fully licensed from Digital® Equipment Corporation.

We designed it to Digital specs provided by Digital engineers. Added support for most popular network boards. Gave it full Novell® compatibility. Reduced its memory requirements. Then decided to make it irresistible.



Our licensed LAT is included free as part of every copy of SmarTerm 340. Without strings. Loopholes. Fine print. Or disclaimers. Which, considering its value, could save you quite a lot.

What you pay for in SmarTerm 340 is worth every cent of your investment. Full 16 color emulation for ReGIS® images. Scrolling sixel graphics. Page memory in text mode. Precise VT340 escape sequences. Status Line display. Plus an array of fast new drivers for graphics and color printers.

A menu driven interface, softkey language, and on-line help make it easy for PC users to get SmarTerm 340 up-and-running. Free technical support makes sure things will stay that way.

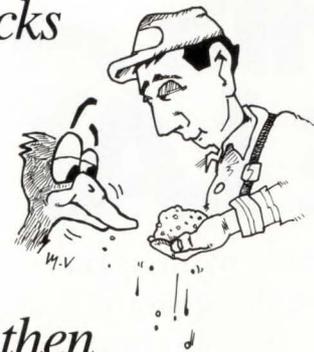
If the need for high performance has a familiar ring, we're here to answer the call. Don't whistle. Just phone 1-800-EMULATE.

**persoft®**

**ACCESS THE POWER YOU NEED.™**



Do you feed the ducks  
on office time?



... then  
why feed  
the fax?

**VAX-to-FAX adds  
3 million printers  
to your applications**



Yes! 3 Million fax machines are as close as your VAX Terminal, and DMG/FAX is the LOW COST way to reach them... from ALL-IN-1, VMSmail, MASS-11, WordPerfect & WORD-11.

Sending faxes from applications is easy too, so you can start thinking of those 3 million fax machines as your own VAX printers.

# DMG/FAX

## VAX-TO-FAX FOR SERIOUS BUSINESS

**AUSTRALIA**  
Network Computer Software  
6 Cunningham Street  
Sydney 2000  
Australia  
Tel: (02) 211 2322  
Fax: (02) 211 0256

**U.S.A. & CANADA**  
D.M.G.  
4711 Yonge St., Suite 600  
North York, ON M2N 6K8  
Canada  
Tel: (416) 225-7788  
Fax: (416) 224-1915

**UNITED KINGDOM**  
Dektat Ltd.  
108 Manchester Rd.  
Chorlton, Manchester  
M21 1PQ U.K.  
Tel: 061-881 0831  
Fax: 061-862 9169

DMG/FAX is a registered trademark of Digital Management Group Ltd. & Danville May Group Inc. VAX, VMS, ALL-IN-1 & VMSmail are registered trademarks of Digital Equipment Corporation. WordPerfect is a registered trademark of WordPerfect Corporation. MASS-11 is a registered trademark of Microsystems Engineering Corporation. WORD-11 is a registered trademark of Data Processing Design, Inc.



CIRCLE 290 ON READER CARD

# DEC Professional

Founded in 1982

PUBLISHER: Carl B. Marbach  
EDITORIAL DIRECTOR: R.D. Mallery

### EDITORIAL

- MANAGING EDITOR Lou Pilla
- SENIOR TECHNICAL EDITOR David B. Miller
- SENIOR EDITOR Evan Birkhead
- EAST COAST EDITOR Brian O'Connell
- ASSISTANT EDITORS/ ARTICLES Pamela F. Fullerton, Eric Schoeniger
- ASSISTANT EDITOR/ PRODUCTS Nadina R. Chapman
- BACK END EDITOR John C. Dvorak
- C EDITOR Rex Jaeschke
- DCL EDITOR Kevin G. Barks
- FIELD SERVICE EDITOR Ron Levine
- MACINTOSH EDITOR Al Cini
- NETWORKING EDITOR Bradford T. Harrison
- TECHNOLOGY EDITOR Philip A. Naecker
- ULTRIX EDITOR Philip E. Bourne, Ph.D.
- UNIX EDITOR Elaine L. Appleton
- WORKSTATIONS EDITOR David W. Bynon
- EDITORIAL ASSISTANT Lea S. Smith (Buyers Guide)

### DP LABORATORY & TESTING CENTER

- MANAGER David B. Miller
- TECHNICAL EDITORS George T. Frueh, Charlie Simpson
- ASSISTANT LAB MANAGER Anne Schrauger
- REVIEW EDITORS John Burke, Tom Davis, Miles B. Kehoe, Joel Martin, Joe McGinn, Barry Sobel
- MIS SOFTWARE MANAGER Bonnie Auclair
- MIS SYSTEMS MANAGER Kevin J. Kennelly

### DESIGN & PRODUCTION

- DESIGN/PRODUCTION MANAGER Ruth Ann Leiby
- DESIGN/PRODUCTION ASSOCIATE Pat Messina
- DESIGN/PRODUCTION ASSISTANT Kim Macheski
- ADVERTISING TRAFFIC MANAGER Lori Goodson
- TYPE/PRODUCTION COORD. MaryEllen Coccimiglio
- PROMOTIONS MANAGER Timothy M. Kraft
- GRAPHIC DESIGNERS Mike Cousart, Thomas Owen, Sue Ann Rainey

### CIRCULATION

- CIRCULATION DIRECTOR Carrie Eisenhandler
- CIRCULATION MANAGER Betsy Ellis
- FULLFILLMENT MANAGER Margie F. Pitrone
- CIRCULATION DBA Rebecca Schaeffer

### MARKETING

- DIRECTOR OF MARKETING Mary Wardlaw
- MARKETPRO NEWSLETTER EDITOR Colleen Rogers
- SENIOR PROMOTION WRITERS James Jordan, Lori Solomont
- TRADE SHOW MANAGER Peg Schmidt

### PROFESSIONAL PRESS, INC.

- PRESIDENT Carl B. Marbach
- VICE PRESIDENT R.D. Mallery
- VICE PRESIDENT Peg Leiby
- VICE PRESIDENT Helen B. Marbach
- DIRECTOR OF SALES Jeffrey Berman
- EXECUTIVE EDITOR Linda DiBasso
- EXECUTIVE DESIGN DIRECTOR Leslie A. Caruso
- CONTROLLER Thomas Breslin
- PERSONNEL MANAGER Robin L. Bordelon
- ASSISTANT TO THE PRESIDENT Jan Krusen

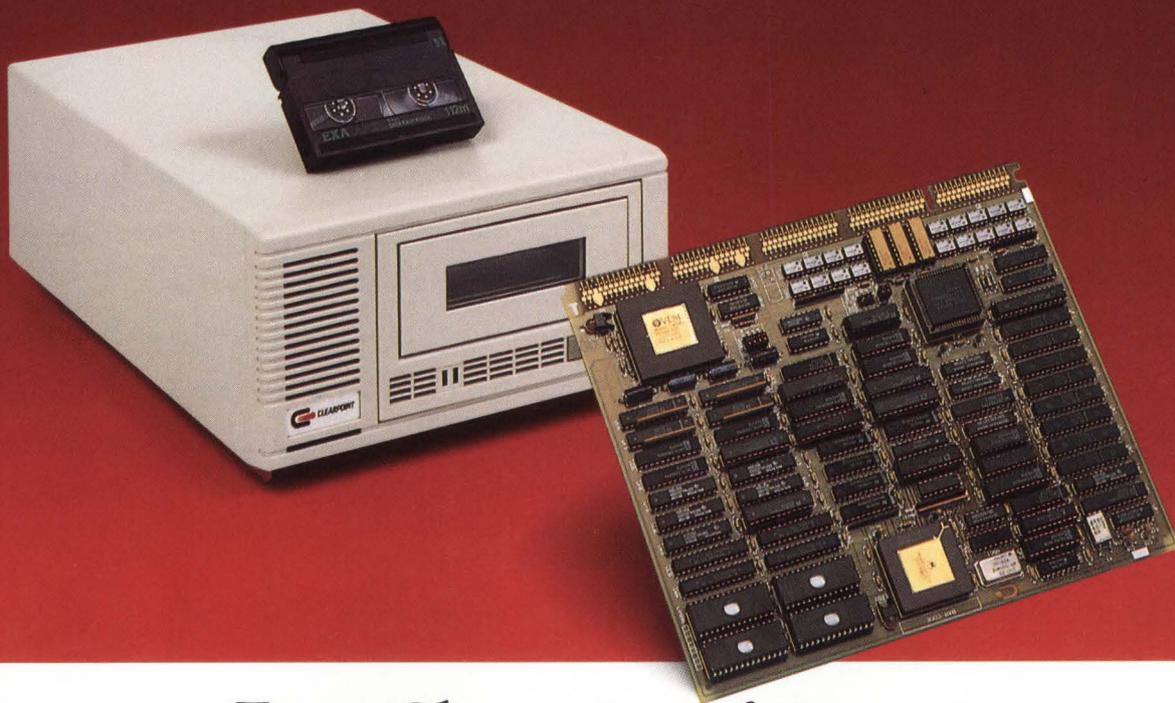
For information on how to contact your sales representative, see page 158. Editorial, Advertising Sales and Executive Offices at 101 Witmer R.d., Horsham, PA 19044 (215) 957-1500. FAX (215) 957-1050. ARIS/BB (215) 957-1000; Southern California (818) 577-9100; Northern California (415) 873-2135; Massachusetts (617) 863-5010. UUNET: To reach staff listed on the masthead, send MAIL to: name@propress.com (name is the last name of the person you wish to contact). Additional Editorial Offices: New England at 238 Bedford St., Ste. 3, Lexington, MA 02173 (617) 861-1994; Northern California & Northwest at 903 Sneath Ln., Ste. 220, San Bruno, CA 94066 (415) 873-3368; Southern California & Southwest at 1010 E. Union St., Ste. 101, Pasadena, CA 91106 (818) 577-5970.

The following are trademarks of Digital Equipment Corporation:

A-to-Z	DECconnect	DECsystem	DNA	LA50	PDP	VAX
ALL-IN-1	DECgraph	DECUS	Eve	LA100	Q-bus	VAXBI
CDD	DECmail	DECwindows	FMS	MASSBUS	Rainbow	VAXcluster
DATATRIEVE	DECmate	DELNI	HSC	MicroPDP-11	RdbExpert	VAXELN
DEC	DECnet	DEQNA	LAN Bridge	MicroVAX	Rdb/VMS	VAX LISP
DECcalc	DECstation	DIBOL	LAT	NAS	ReGIS	VAX SCAN
					RSTS/E	VAXserver
					RSX	VAXstation
					RT-11	VMS
					ThinWire	VMSmail
					ULTRIX	VT
					UNIBUS	WPS

UNIX is a registered trademark of AT&T in the U.S.A. and in other countries.  
MS-DOS is a trademark of Microsoft.  
CP/M is a trademark of Digital Research, Inc.  
Macintosh is a trademark of Apple Computer, Inc.  
X Window System is a trademark of MIT.  
NFS is a trademark of Sun Microsystems

# VAXBI USERS: Unattended Backup with Three Significant Advantages



## From Clearpoint, of Course!

1.

### Flexible configuration and field upgradability

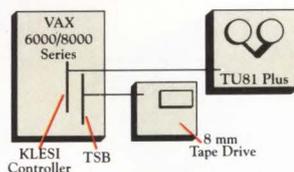
The Clearpoint TSB Tape subsystem offers the most in configuration flexibility. Use a single 8 mm helical scan tape drive to provide 2.3 GB of reliable backup. Or take advantage of the TSB Tape Controller's full capabilities—supporting up to seven tape drives for 14 GB of storage!



2.

### Parallel operations with TU81 Plus and TSB tape devices

Clearpoint's proprietary gate array, with TMSCP emulation, provides users with the only VAXBI direct-attachment subsystem available today. TSB allows users the benefit of simultaneous operation of the TU81 Plus and Clearpoint's tape drive.



The TSB subsystem conforms to CSA, UL, EEC, and FCC standards, as well as other agency approvals.

3.

### More comprehensive diagnostics

The diagnostic RS232 port is a standard feature, providing complete uninterrupted control and key maintenance information:

- ECC error correction rate to determine whether the tape quality is satisfactory
- Amount of unused tape (in MB) to determine if the amount of remaining tape is sufficient for backup
- Menu-driven, user-friendly diagnostic routines to assist users and service personnel with problem isolation

### The Clearpoint Difference

Each Clearpoint TSB subsystem must pass through the industry's most stringent QA tests; both pre-configured systems and custom-designed test equipment are used to insure quality and compatibility.

#### Call or write to receive:

- Product/Services Catalog
- Subsystem Spec Sheets
- Pointers 7 Newsletter on the SCSI interface



**CLEARPOINT**

Clearpoint Research Corporation 35 Parkwood Drive Hopkinton, MA 01748 (508) 435-2000

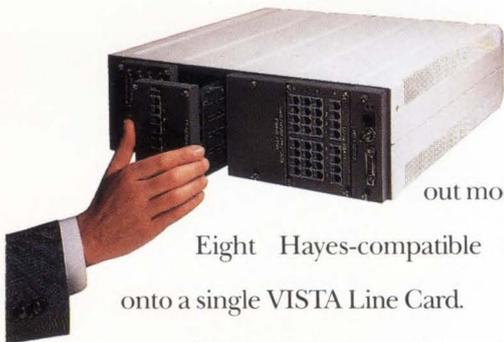
VAXBI, TU81 Plus, and TMSCP are trademarks of Digital Equipment Corporation. Clearpoint and TSB are trademarks of Clearpoint Research Corporation.

CIRCLE 181 ON READER CARD

# What, no

Say goodbye to the clutter and wiring chaos you've had to live with all these years.

With the revolutionary, new VISTA Modem Line Card, Datability premieres network-based dial-in/dial-out modems.



Eight Hayes-compatible modems are packed onto a single VISTA Line Card.

Eliminated are the cables and equipment that used to connect modems to Local Area Networks - because our state-of-the-art modems are internal to our VISTA Terminal Server.

Configure four VISTA Modem Line Cards in a single VISTA Server and you harness the full power and functionality of 32 network-based modems. Witness a single VISTA Server taking the place of an entire rack of network equipment. Configurations are kept absolutely clean and simple throughout.

Each VISTA Modem Line Card provides eight fully Hayes-compatible auto-baud-detect modems, operating at speeds from 300 to 2400 baud.

Each modem can automatically switch between dial-in and dial-out service on an as-needed basis.

A sophisticated dial-back option has been implemented to provide maximum security when required.



# spaghetti?

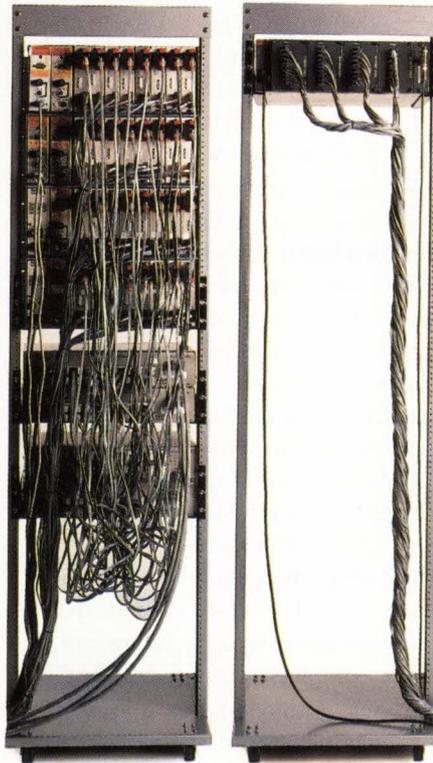
Additionally, system administrators can even create LAN services with predefined telephone numbers that correspond to remote computer systems.

Without knowing a single telephone number or entering a single modem command, any LAN user can access remote systems as easily and transparently as they can now access systems on their own network.

Direct access to network resources is provided through VISTA's Network Interface Card (NIC).

This NIC gives full TCP/IP and 100% LAT-compatible protocol support, so users are free to connect to UNIX or DEC systems without regard to the protocols required.

The VISTA Server is an expandable, modular platform, able to meet all your networking needs. A single VISTA Server can support up to four VISTA Line Cards,



FROM CHAOS TO CALM.

all within a 5 1/4" high, free-standing or rack-mountable unit.

Datability provides it all at prices that will astound you - and through a Value Added Reseller channel that actually adds value. Wouldn't it be refreshing to talk with highly-trained resellers that do more than just quote prices?

Best of all, VISTA is ready for tomorrow. Our modularity assures that future technologies will work side by side with existing strategies. New line cards and options will protect the investment you make today.

*Purchase a VISTA Modem Line*

*Card on a full 30-day trial and, if you are not completely satisfied, return it without any further obligation. That's Datability's 100% Customer Satisfaction Program.*



© Copyright, 1990. Datability Software Systems Inc.  
All product names are registered trademarks of their respective manufacturers.

**CIRCLE 115 ON READER CARD**

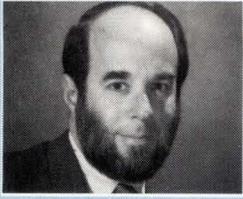
**TELL ME HOW I CAN GET 8 MODEMS ON A SINGLE SLIDE-IN EXPANSION CARD**

Name \_\_\_\_\_ Title \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City/State/Zip \_\_\_\_\_ Telephone \_\_\_\_\_ DP 7/1/90

322 Eighth Avenue, New York, NY 10001. Atlanta · Boston · San Francisco · Chicago · London

CALL US TOLL FREE:  
**1-800-DIAL-DSS**  
In NY: 212-807-7800  
FAX: 212-463-0459.

**DATABILITY™**  
**THE POWER TO CHANGE**



## PUBLISHER

**Carl B. Marbach**

# The People Problem

While it's true that the price/performance of computer systems continues to improve, new productivity tools are announced with regularity and computers are common in primary schools, there's still dissatisfaction with these devices — with what they do and how much it costs for them to do it.

When people find out that I'm from a computer publication, I feel like the computer doctor. They tell me all their ills. The stories are almost all the same: "I have this computer system — it costs too much and does too little; projects come in late and over budget; and I've become dependent on a resource I can't control or understand."

How many of us have participated in a project that came in late — that may have taken even twice as long as estimated? Did you ever work on a system that, when it was finished, wasn't quite right — that just didn't do the job the users thought it would do? Have any of you implemented a complicated system that required a systematic conversion from something else — and the users just couldn't understand how to get from here to there?

At Professional Press, we recently converted to a new accounting system. The conversion took a highly talented, experienced and hard-working person about one year to complete and required the cooperation of the entire accounting department and the understanding of almost everyone else. I'm convinced that a lesser person would have failed or required a huge amount of consulting time from the vendor, most of which would have been unbudgeted. The accounting software is solid. So why was

it so hard to get this done?

When we print *DEC PROFESSIONAL*, our printer requires exact specifications, down to the last detail. He needs these because he programs the printing process. He leaves nothing out. Can you spell out everything that needs to be done to accomplish a task?

For example, can you tell me how to brush my teeth exactly? Let's see — pick up the toothbrush (which end should I pick up?); open the toothpaste (where's the toothpaste?); put toothpaste on the brush (how much should I put on?); put the brush in your mouth (did I open my mouth first?); and brush (should the bristles point down or up?). You get the idea. We aren't used to specifying things in the detail necessary for any automatic process. The possible number of paths in any small program can be huge — in the millions — and a large, complicated program has astronomical permutations.

While computers have gotten faster, cheaper and (some say) better, people, sadly, haven't kept up. In "Educating The Next Generation" (January 1990), I complained that our schools aren't properly training the next generation of computer programmers. But it goes beyond the programmers. The implementers and users have to take responsibility to "get the job done." If it doesn't work one way, then they have to find a way to make it work: Control the numbers in a conversion, work extra hard when changing from one system to another and, finally, understand what they're doing. The final job in any system is installation, training and support. This is usually accomplished by nonprogrammers.

In "Keep It Simple" (June 1990), I told you about a friend who'd rather return to a roomful of people with green eye shades and quill pens than continue to feed money into a computer operation

that doesn't seem to accomplish anything. At least he could understand and control the cadre of pencil pushers. Does he sound like a candidate for a fancy new network?

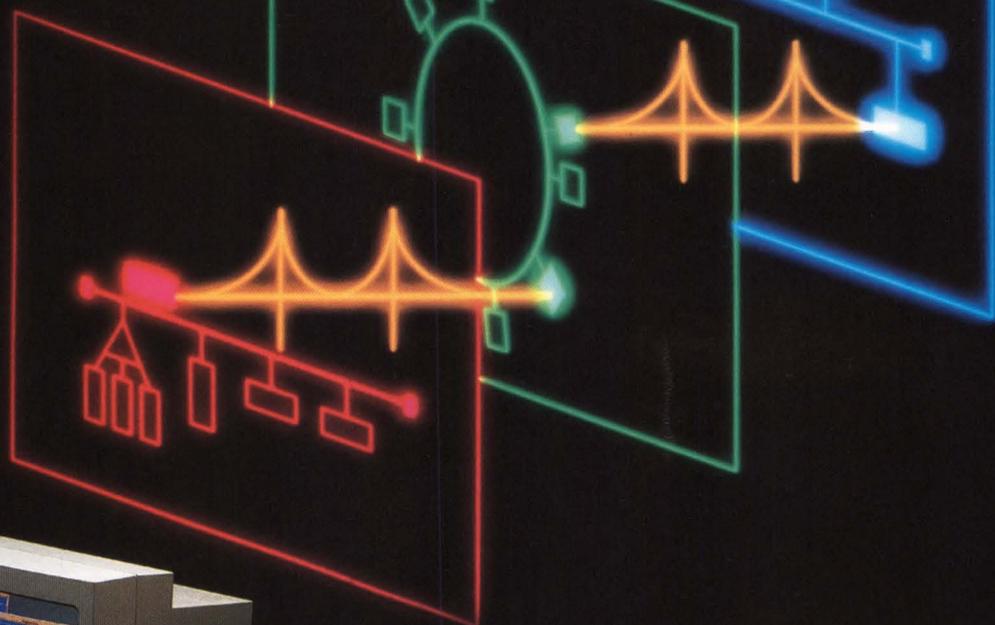
Unless we fix our trade, we could face a revolution that could change our workplace. We simply *have* to fix these problems.

There are, of course, projects that come in on time, cost less than planned and do what was envisioned. There are professionals in our business who know how to plan, manage and implement systems. We need to increase the portion of the professional population that can do these things. Strive to be professional, work hard, concentrate, and keep learning. Take courses or attend professional trade shows where you can learn from the seminars. Insist on periodic training. Learn how to manage yourself, your projects and others.

While there are applications for which a computer always will be the obvious choice, there are others in which a group of accountants with green eye shades and quill pens *could* do the job. I recently saw a chart in which the cost of computer power between 1960 and 1990 was compared to the cost of an automobile during the same time period. If cars had improved as much as computers have in those 30 years, a Rolls Royce today would cost \$500 and get 300 miles per gallon. Unfortunately, we have the same drivers we had in 1960.

In the computer business, people have become the weakest link. It's time to work on that problem.

# When It Comes to Network Management,



## We See through Bridges

Imagine seeing all your network activity from one segment through to another and beyond. That's total network-wide visibility through bridges, routers and TIs. That's what you need for effective management and control. And that's what LANCE™ gives you.

### Industry Standard?

Absolutely! LANCE™ is a true SNMP-based Multi-segment Network Management System—not just another “enhanced” hardware monitoring system. LANCE communicates directly via SNMP with distributed probe collectors and other SNMP-based agents. Now and in the future, you can monitor your entire diverse, multi-vendor environment. No problem!

### Alarm Options?

All of them. LANCE keeps you informed of

all network activity with several alarm notification options. User defined alarm criteria insures the system advises you before the user complains.

### Long-term Trend Analysis?

Of course! Operating conditions, traffic flow, peak load demands—LANCE lets you see all the information you need from a single workstation point-of-view, presented in either DEC windows or X-windows. So now you can visualize your entire network through any time selectable period. Analysis of a single network node to full and inter-segment network activity. Now you can be proactive!

### LANCE and you.

Network troubleshooter? Use LANCE to diagnose and fix problems. Network administrator? Foresee needs and prevent

any problems. Information Officer? Measure effectiveness and optimize your network's ROI. LANCE does it all!

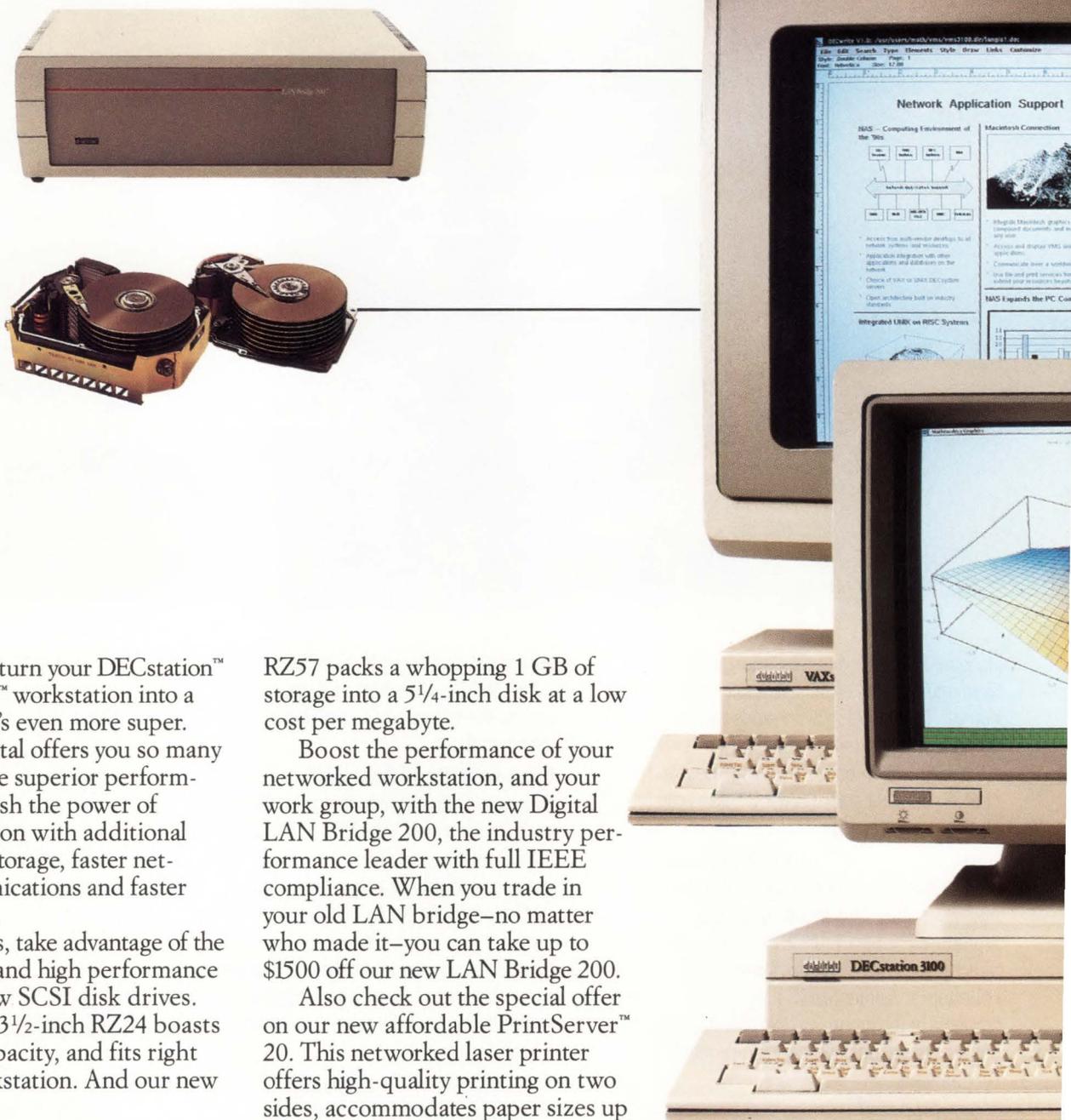
For a closer look at the one Multi-Segment Management system that lets you see the whole picture, call **Micro Technology**, the leader in designing and manufacturing enhancement products for the VMS and UNIX environment at (800) 999-9MTI.



## Micro Technology

5065 East Hunter Ave., Anaheim, CA 92807  
**(714) 970-0300 or (800) 999-9MTI**  
European Headquarters:  
Munich, West Germany Tel: 089 470 8191  
**CIRCLE 143 ON READER CARD**

# Turn your Digital a super



It's easy to turn your DECstation™ or VAXstation™ workstation into a computer that's even more super. And only Digital offers you so many ways to achieve superior performance. So unleash the power of your workstation with additional memory and storage, faster network communications and faster print services.

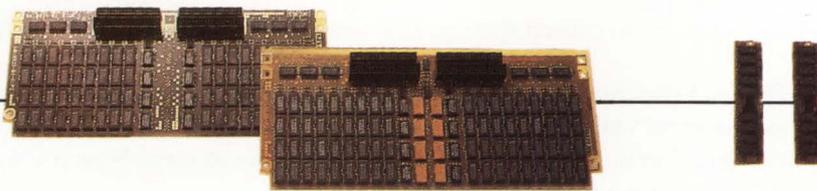
For starters, take advantage of the high capacity and high performance of Digital's new SCSI disk drives. Our compact 3½-inch RZ24 boasts 209 MB of capacity, and fits right into your workstation. And our new

RZ57 packs a whopping 1 GB of storage into a 5¼-inch disk at a low cost per megabyte.

Boost the performance of your networked workstation, and your work group, with the new Digital LAN Bridge 200, the industry performance leader with full IEEE compliance. When you trade in your old LAN bridge—no matter who made it—you can take up to \$1500 off our new LAN Bridge 200.

Also check out the special offer on our new affordable PrintServer™ 20. This networked laser printer offers high-quality printing on two sides, accommodates paper sizes up

# workstation into computer.



Do more with your workstation today.  
1-800-343-4040. Ext. 197.

to 11 x 17, and features PostScript\* from Adobe Systems. Order before June 30, and you'll receive free PrintServer software, a \$1300 value.

These are just a few of the many ways Digital makes it easy to do more with your workstation. We even make it easy to learn what solution is best for you.

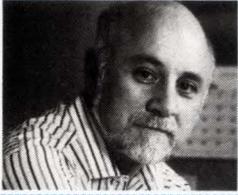
Simply call Digital's Technical Consulting Center at 1-800-343-4040, ext. 197. A Digital workstation system consultant will evaluate your

precise needs and recommend the right solution.

And with our FASTship service, we'll have your solution on its way to you by the next business day. At no additional cost.

So start doing more with your workstation. Call 1-800-343-4040, ext. 197 today.

**Digital**  
has  
it  
now.



## EDITORIAL

**Dave Mallery**

# VUPs For Sale

---

As I've been saying for the past several months, the crash of the VAX 8000 line has created amazing bargains. The new VAX 4000 line may squeak in under the \$10,000-per-VUP mark, but the newly devalued 8000s shatter it! If you've been underpowered, you can cure your problem now and still stay ahead of the cost-per-VUP of the 4000.

We turned on our "million-dollar" VAX 8800 (which we acquired for \$85,000, or \$6,500 per VUP) in May, and amazing events took place.

First, it took only about six hours to convert from an 8350-based LAVc to an HSC/CI-based 8800/8350 cluster.

Second, we have millisecond response time. I haven't experienced that since the first few months of my 11/70 in 1975 — and never on VMS, until now.

Third, closet users came out. Our normal pre-8800 peak load was about 65 users. Now it's 78, and it stays there. An available computer is a utilized computer.

Fourth, we've seen real productivity gains. Our circulation department reports *double* the transactions per hour.

One of the hidden gems in this transition is the HSC. At \$11,000, it's one of the greatest bargains I've ever found. It has astounding capacity and has liberated us from the four-drive tyranny of the KDB50. We're adding spindles as fast as we can by converting our newer vintage SMD interface drives to HSC via either Lago Systems or System Industries interface cards.

We're currently using 64 MB but are working on another 64. To utilize the 64 MB fully, we only had to open the working sets a bit. Most of our hard faults went away. The next 64 MB will allow us to do some serious caching and handle the 15 or so new users expected in the next few months. This second 64 MB also will interleave neatly with the first.

These million-dollar machines are truly rock-solid. My field service engineers tell me that their installed base of large 8000s is almost flawless in performance. Just looking at the machines builds confidence.

In addition, we've upgraded our tape drives to HSC-compatible units — 8mm with a Micro Technology MA-24 and nine-track with an SI2100. HSC tape drives deliver a huge improvement in performance. We also installed a Seagate Sabre-6 (2 GB), as modified by Emulex, along with an Emulex DA card in the HSC.

Moving to VMS V5.3-1 also has allowed us to upgrade our DEBNAs to DEBNIs with a corresponding boost in Ethernet bandwidth use. Now if I can just get my hands on a solid-state disk. ...

In summary, the crash of the 8000 line has produced an opportunity to buy VUPs at unheard-of prices. Go thou and do likewise.

*PS: Look for The Cuckoo's Egg by Clifford Stoll. If you're concerned about computer security, this book is a must-read.*

# CD-WARE FROM LOGICRAFT Now, YOU CAN PLAY DOS CD-ROMS ON YOUR VAX.

CD-Ware allows anyone using a DEC® VT terminal or workstation—anywhere on a VAX® network—to access the hundreds of CD-ROM applications currently available on PCs. Up to 16 users can access multiple CD-ROM drives and applications across a distributed Ethernet thick or thin-wire network. Now, you can distribute critical CD-ROM based information across multiple sites using your existing VAX connections.

Call us today for  
more information at  
(603)880-0300.



## LOGICRAFT

22 Cotton Road, Nashua, NH 03063  
(603)880-0300 FAX: (603)880-7229



Logicraft is a registered trademark of Logicraft Inc. DEC, VT and VAX are trademarks of Digital Equipment Corporation.

CIRCLE 141 ON READER CARD

# LETTERS

*Editor's note: In his March editorial, "Time For Change," Publisher Carl B. Marbach asked for your opinions on two possible system upgrades for Professional Press: a VAX 6000 Model 400 or a VAX 6000 Model 200/300 plus MicroVAX IIIs. Here are the replies we received.*

## VAX GAMBLE

My heart says a VAX 6000 Model 400, but my mind says invest in client/server topologies. It's a difficult question, and it makes us all gamblers or romantics.

**Steve Sloan**  
Findlay, Ohio

## BIG-VAX SOLUTION

My company, GEC Avionics, first entered the DEC world with a PDP-11. In 1984, we purchased our first VAX, an 11/750. Within a year we had outgrown the 11/750. With word processing, spreadsheets and database programs, we managed to suck up every CPU second the 11/750 could give us. We then acquired two MicroVAX IIs to distribute our users across multiple processors.

Then DEC introduced the MicroVAX 2000 and LAVc, which seemed like a good idea. You could just add another VAX every time you added users. Within a year, we had purchased six MicroVAX 2000s, another MicroVAX II, a VAXstation 2000 and a MicroVAX 3600. There was much debate over many small VAXs versus one hefty VAX capable of supporting all our users. The LAVc appeared to offer a better financial solution, but many of us thought it was only a short-term one. We recently added a couple of VAXstation 3100s for a total of 14 nodes in our cluster.

We're a pure VAX/VMS shop and have no plans to consider RISC or UNIX

systems. For our new fiscal year we've budgeted a VAX 6000 Model 410 with 96 MB of memory and a couple of disk controllers. We're trading in as many of our small VAXs as we can to reduce our cluster to a more manageable size. We've concluded that one large VAX is better than several smaller VAXs. We have several reasons for not wanting many smaller VAXes:

1. System management overhead.
2. Higher I/O bandwidth by avoiding LAVc file accesses (needed for database applications).
3. Redundant copies of VMS resident in memory.
4. Increased hardware maintenance costs.
5. Computer resources (CPU, memory and I/O) from one system aren't available to another. If one system is idle and another saturated, you lose performance.
6. The distributed lock manager has problems when a system crashes. To get locks back where they belong, you have to reboot the entire cluster to make sure the system serving the disk owns the locks for that disk.
7. Cluster reboot time is terrible.
8. Large LAVcs usually require multiple system disks.

On the bright side, DEC has made many enhancements to VMS since V5.0 that have significantly improved our ability to keep our cluster operational.

We're looking forward to the arrival of our VAX 6000 Model 410 and hope it provides the performance gains we anticipate. My vote strongly favors that alternative.

**Mark Stephenson**  
Atlanta, Georgia

## UPGRADE BY ENVIRONMENT

I'm a system engineer/manager for a network of DEC and non-DEC computer systems at the Air Force Institute of Technology in Dayton, Ohio. I have the same concerns and questions as far as the best method of upgrading.

Both positions have merit. The VAX 6000 Model 400 approach will provide a faster machine but only to a fixed number of users. You may not be able to add users as your conditions change. Even if you can, the users are still using the same fixed resources. Response (and everything else) will decrease.

The file server approach has the advantage of relatively unlimited users. If your workload changes, just add another

## DEC PROFESSIONAL WINS AWARDS

*DEC PROFESSIONAL* has been named a runner-up in the fifth annual Computer Press Awards. Cosponsored by Citizen America Corporation and the Computer Press Association, the prestigious Computer Press Awards contest recognizes excellence in computer journalism.

*DEC PROFESSIONAL* won two awards from among more than 800 entries competing in 19 categories. "Computer Slump Or Temporary Confusion" by Publisher Carl B. Marbach (June 1989) won runner-up in the category Best Opinion or Editorial in A Computer Publication. "Dispelling Disaster" by Field Service Editor Ron Levine (December 1989) won runner-up in the category Best Feature in A Computer Publication.

*DEC PROFESSIONAL* is pleased to receive this honor.

# THE ONLY 8MM TAPE BACKUP THAT ASKS TO SEE YOUR ID.



Most 8mm tape drives can't tell the company president from a midnight visitor. Meaning anyone who pushes the right buttons can easily pocket 2.5 GB of your sensitive data.

That's why the CY-8200 with our security option demands proof of identity up front.

The CY-8200's security subsystem employs a digital card-key reader.

Without an authorized card-key, an interloper can't read or write the first byte. And since each particular card-key uniquely encrypts data, a stolen tape cannot be read without it.

You can even establish security levels by limiting

the operations allowed for individual card-keys.

Security doesn't mean loss of flexibility. You can still read tapes generated on other standard 8mm tape drives. And high level card holders can still write standard 8mm tapes.

So all you really lose is a security risk.

Of course, the CY-8200 offers the widest range of standard SCSI and Pertec interfaces. Add a 2-line, 40-column display option, advanced helical scan technology and 15 MB per minute speed, and you can see why the CY-8200 is already the best 8mm tape backup system on the market.

Now with a security subsystem, it's simply a steal. So call today for more information, (804) 873-0900.

CONTEMPORARY  
**CYBERNETICS**  
*Group*

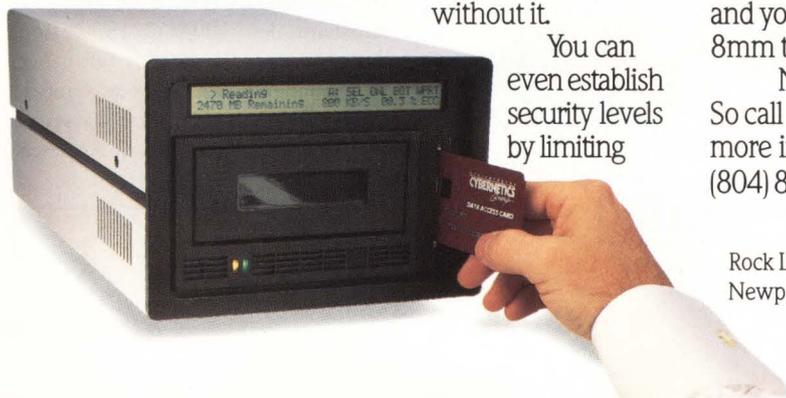
Rock Landing Corporate Center • 11846 Rock Landing  
Newport News, VA 23606 • (804) 873-0900 • FAX (804) 873-8836

CIRCLE 112 ON READER CARD

#### True "Plug-And-Play" Compatibility With:

Alliant	DEC 3100	IBM S/36	Pertec
Alpha Micro	DEC HSC	IBM AS/400	Plexus
Altos	DEC Q-Bus	Macintosh	Prime
Apollo	DEC TU/TA81	NCR	Pyramid
Arix	DEC Unibus	Novell	Sequent
AT&T	Gould	PC 386/ix	Sun
Convergent	HP	PC MS-DOS	Unisys
Data General	IBM RT	PC Xenix/Unix	Wang

and more...



## Correction

In "New Light On Windows" (April 1990, page 28), a portion of Interactive Technology Inc.'s mailing address was inadvertently omitted. The complete address is:

Interactive Technology Inc.  
460 Park Plaza W.  
10700 S.W. Beaverton-Hillsdale  
Hwy.  
Beaverton, OR 97005  
(503) 644-0111

node and you can have 25 more users.

Throw in the fact that there are virtually unlimited choices of what you can buy for your environment. It seems that every two weeks, announcements come from DEC or its competitors of faster, bigger and better machines. It's difficult to make the best decision.

We believe that the upgrade method you follow depends greatly on your environment. We decided recently that,

instead of replacing our aging VAX 11/780, we would update our existing MicroVAX network and disperse the load. It seems to work fine. As we need more power and capabilities, we add another node. We don't see any decrease in response, and our users are happy.

It would be very advantageous if the Digital performance laboratory mentioned in "Time For Change" could give us data about the response of certain configurations. I'll mention this to my sales representative and get his thoughts.

**Dan Zambon**  
Wright Patterson AFB, Ohio

## DISTRIBUTED ADVICE

I recommend the distributed system approach to upgrading your system. This will prove to be the most common and prudent choice through the end of this century, not because of performance advantage, but because of lower risk. The ability to increase computer power

gradually without the major transition of replacing one big box with another undoubtedly will be the preferred choice.

If feasible, consider a switch to a version of UNIX that supports distributed processing. This makes the choice of CPU a minor concern. If you can stick with an open systems standard for the operating system and with applications that conform with the operating system, you'll gain great freedom in implementing future hardware additions or changes.

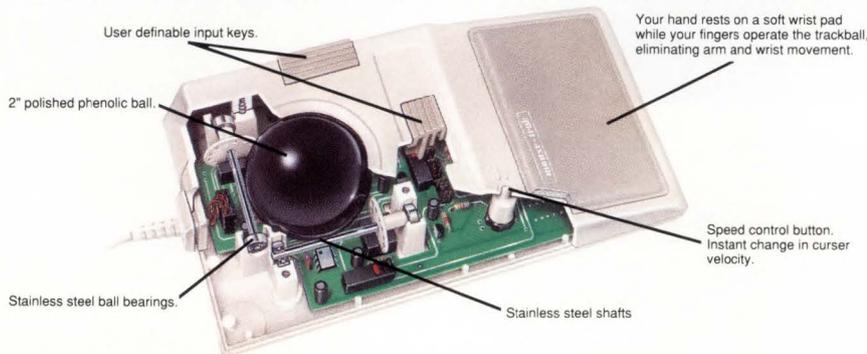
The choice between a RISC or VAX CPU architecture depends on the operating system. VMS gets more performance from a VAX than ULTRIX. Assuming you're using a UNIX-based operating system, the RISC CPUs probably will get the best performance at each server node. The reason for this is the efficiency of optimizing C compilers for RISC CPUs.

As commercial computer systems consumers, we claim to want open systems and portable software. Yet we continue to purchase closed proprietary systems. Major vendors have relatively open products targeted at the government and research communities. Commercial consumers are preoccupied with the immediate price/performance of their purchases. Vendors use our preoccupation to lure us into their proprietary product lines.

When commercial consumers demand open systems with their purchasing dollars instead of empty words, vendors will respond. When it's clear that open systems are an expanding market, vendors will race to produce open systems products at competitive prices. Until then, we must pay more to get the open systems we claim we want.

**Richard W. Schroeder**  
Aurora, Illinois

## MOUSE-TRAK. THE BEST CURSOR CONTROL IN THE WORLD



- **Built For Accuracy And Precision Control.**
- **Stationary.** Mouse-trak eliminates arm and wrist movement.
- **Engineered For Total Compatibility** with DEC and other computers.
- **User Definable Keys.**
- **Speed Control.** Instant change in cursor velocity.
- **Toggle Mode.** Any or all input keys can be selected for Toggle or Alternate Action.
- **Complete** with cable, instruction manual, and a One Year Warranty.

**Order a Mouse-trak risk free for 30 days.  
If not completely satisfied, return it for  
a complete refund!**

To Order or For More Information, Call Toll Free

**1-800-533-4822**

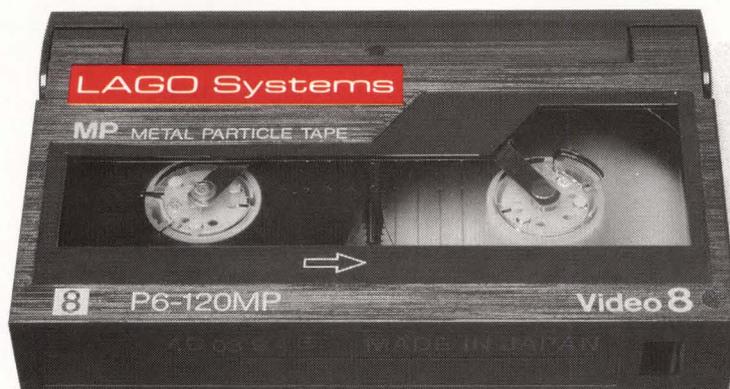
**mouse-trak**®

Mouse-trak is manufactured in the U.S.A. by ITAC Systems, Inc., Garland, Texas • FAX (214) 494-4159

Mouse-trak is a registered trademark of Itac Systems, Incorporated. DEC is a trademark of Digital Equipment Corporation

Please address letters to the editor to *DEC PROFESSIONAL*, P.O. Box 218, Horsham, PA 19044-0218. Letters should include the writer's full name, address and daytime telephone number. Letters may be edited for purposes of clarity or space. You also can fax letters to us at (215) 957-1050.

# MAX VAX BACKUP



**Maximize your VAXcluster® backup** without maximum expense. Introducing LAGO Systems' new LS/200T 8 mm Cartridge Subsystem. It looks just like DEC's TA® series tape drives to your VAXcluster, but that's where the similarity ends.

**Max Capacity.** Every LAGO tape cartridge stores up to 2 gigabytes of data. That means you can backup an entire SA600® on just five of our compact cartridges. Instead of juggling 70 reels of tape.

**Max Performance.** Need lots of backup? You can attach up to four of our drives on each port of an HSC® tape data channel and backup a whopping 32 gigabytes in just over five hours.

**Max Savings.** We designed our system to save you both time and money. For the

price of one DEC® TA90, you can buy five LS/200T subsystems. What's more, you'll have nearly ten times the on-line capacity — over 20 Gigabytes! Enough capacity to make backups unattended and free your people for more productive work.

**Max Your Backup Now.** Call or write us today for more information about the LS/200T and how quickly it can go to work for you. LAGO Systems, Inc., 160E Albright Way, Los Gatos, CA 95030.  
**408/374-1818**



## LAGO Systems

Registered trademarks and trademarks of Digital Equipment Corp. and LAGO Systems, Inc. ©1989 LAGO Systems, Inc.

CIRCLE 274 ON READER CARD

## DEC FREIGHT CHARGES

### QUERY:

**Ray Stone** (SIG 91/MESS 92): Do you ever check your DEC freight bills? We received an invoice for our VAX 3100 a few days before the hardware arrived. The invoice listed freight charges for six pieces totaling 3,429 pounds. We awaited the shipment with trepidation, because we're on the second floor of a building with no elevator.

When it arrived, the six boxes were easily handled, making us wonder what the total weight really was. We weighed them and they totalled about 400 pounds. We called DEC and received a credit.

A few years ago I had a similar experience with shipping charges and DECdirect over the method used and the cost for shipping us one manual. I wonder if I've stumbled on a DEC revenue-enhancement policy.

What bothers me is that the original invoice looks like the output from a billing program that has the weight built in for this standard package. What must be the weights for much larger standard packages? Are we an isolated case?

### REPLY:

**Robert G. Schaffrath** (SIG 91/MESS 93): I received an LN03R, which according to the invoice weighed 120 pounds. When I got the printer, the shipping label stated that it weighed about 60 pounds. I'd say it's definitely a revenue enhancer, because DEC seems to create the bill before it determines the actual shipping charges.

## SET DEFAULT FOR PRIV ONLY?

### QUERY:

**Kim Lee** (SIG 37/MESS 1311): We use a special connect command for our users

to connect to client directories so that computer use can be recorded. Some people are using SET DEFAULT to bypass this. Is there a better way?

### REPLIES:

**Michael A. Baydoun** (SIG 37/MESS 1312): You could play with the protection of the SET.EXE file in SYSS\$SYSTEM to prevent certain users from setting anything. Or, you could remove the SET command from the violating users' command table. In either case, they wouldn't be able to set anything. Could you make them captive users? If not, write a command file that accepts a variable number of parameters. Set up a symbol for the users such as:

```
$ se*t :== @set.com
```

In the command file, check to see if the first parameter (p1) is equal to some form of the word *default*. If it is, take appropriate action. If not, issue the SET command from the command file and send along the parameters received in the SET.COM command file. If you issue the SET command from the command file with the word *set*, you'll end up calling your own command file, resulting in an infinite loop. A quick workaround is to have another symbol in SET.COM:

```
$ command = set
```

and issue the COMMAND command from SET.COM.

**Robert G. Schaffrath** (SIG 37/MESS 1315): SET DEFAULT is an internal DCL command, i.e., SET.EXE and SETP0.EXE aren't called. The only way to eliminate it is to get a copy of SET.CLD (either from your VMS05x.A saveset or via

## How To Use ARIS/BB

Subscribers to *DEC PROFESSIONAL* can call up our online bulletin board and log into ARIS/BB, our Automated Reader Information Service. In ARIS/BB, you can download programs from this publication, communicate with our editors, request a change of address, find additional information about advertisers, order books and back issues, check the guidelines for submitting articles, take a peek at our editorial calendar for the year and communicate with other VAX users.

To log in, you'll need your subscription number from your mailing label. Set your terminal to seven data bits, one stop bit and space parity, or eight data bits, one stop bit and no parity. Set your terminal emulation to VT100 and dial:

- (215) 957-1000 - Pennsylvania
- (818) 577-9100 - Southern California
- (415) 873-2135 - Northern California
- (617) 863-5010 - Massachusetts

Baud rates: 300, 1,200 or 2,400.

When the modems CONNECT, hit Return two or three times.

The ARIS/BB symbol appears at the beginning of each article when the program is downloadable. *VAX PROFESSIONAL* programs are available to subscribers of *VAX PROFESSIONAL* only. For subscription information, contact Phyllis Chandler at (215) 957-1500 9 a.m. - 5 p.m. Eastern Time. Use these recommendations at your own risk. Professional Press is not liable for any damages to your system that might be caused by the hardware, software, programs or procedures discussed here.

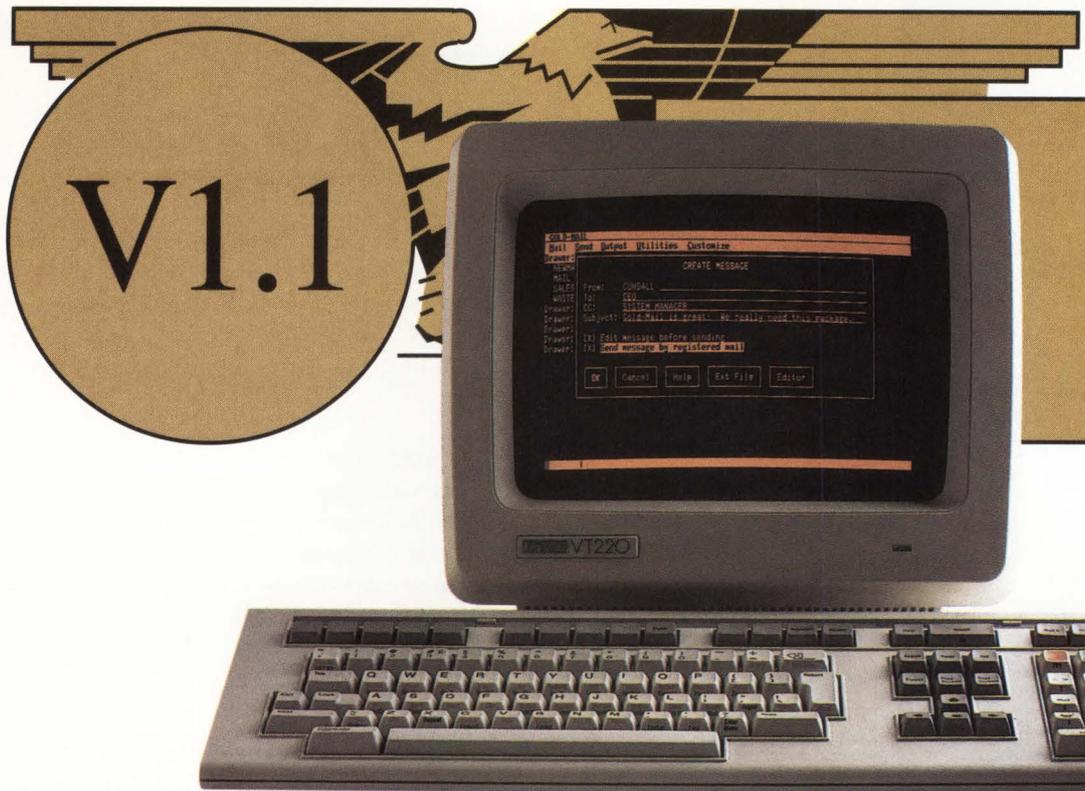
*XMODEM and Kermit are available.*

## SIG Identification

The SIG categories referenced in this month's ARISTALK are:

- 11 ..... Clustering/Networking
- 37 ..... VMS
- 91 ..... Open forum re DEC

VERB.EXE) and delete the default command directly. This means that you have to keep two sets of DCL tables, one for privileged users and one for nonpriv-



# Gold-Mail™

*Now, Gold-Mail Shines Brighter  
Than Ever With Version 1.1*

The introduction of Gold-Mail offered a welcome new alternative for VMS Mail users. Registered mail, a powerful text editor, accelerator keys, and pull down menus were available with 100% VMS Mail compatibility.

Now Gold-Mail delivers important new features not found in VMS Mail. Version 1.1 allows you to send non-text messages such as word processing documents and graphic files. Gold-Mail's directory services let you search for and select from available mail users. *WordPerfect* has been added to the list of editor options to create and send messages. And,

new functionality has been added for easy creation and maintenance of mail distribution lists.

Features	VMS Mail	Gold-Mail
100% VMS Mail compatible	•	•
Pull down menus		•
Registered mail		•
Non-text files		•
Mail directory services		•
Distribution list management		•
Re-edit message text or header		•
Gold accelerator keys		•
Message undelete		•
Visual drawer/folder system		•
Batch mode send		•
WORD-11 support		•
WordPerfect support		•

Gold-Mail is a premium electronic mail product without a premium price. For more information call us today at:

800-843-1317

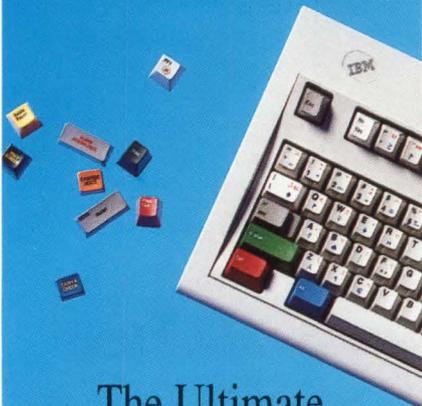


**Data Processing Design, Inc.**

1400 N. Brasher St., Anaheim, CA 92807  
Phone: 714-970-1515 • Fax: 714-779-7468

Gold-Mail is a trademark of Data Processing Design, Inc.  
WordPerfect is a trademark of WordPerfect Corp.

# AMERICA'S BIGGEST CORPORATIONS PRESS US INTO DUTY EVERY DAY



## The Ultimate Custom Keys

Maximize your software investment with custom key sets displaying any symbol, language, code or legend. Or if you prefer, Syntronics can provide keyboards with custom keys made to your exact specifications. Everyday, our custom keys and keyboards enable some of America's biggest corporations to:

- Reduce training time
- Instantly increase user productivity
- Promote on-the-job user satisfaction
- Increase hardware utilization

Custom keys available for DEC, IBM, WYSE, and other computer systems. Keys for WordPerfect, Mass-11, 3270 terminal emulation, and more are available from stock.

For complete product information  
and quantity discounts call

**800-444-KEYS**

**Syntronics**

980 Buenos Ave., Suite C2  
San Diego, CA 92110, 619-275-3525  
FAX 619-275-3520

CIRCLE 162 ON READER CARD

[ Report From Dr. R. ]

## Rigel-Powered VAX 4000

*Editor's note: Dr. R. contributes timely information about upcoming DEC products and strategies. Look for his insights on ARIS/BB and in ARISTALK.*

■ The MicroVAX 3800 and 3900 teeter on the verge of obsolescence, said sorry state to be precipitated by the arrival of the Rigel-powered VAX 4000 series. Expect the VAX 4000 and a host of other goodies to debut at DECworld Phase I in Boston. The other goodies could include:

1. A VAXstation 3100 successor (PVAX II).
2. A DECsystem 5400 successor.
3. A DECsystem 3100 successor.
4. The much-vaunted R6000-powered MAXserver (uniprocessor Merlin).
5. The VAX 6000 Model 500, now with eight heads, XMI II backplane and XMI I/O.

What about a VME VAX? Sorry, not until next year.

■ Details on PILLAR are few and far between. According to one loquacious ex-DECWest compadre, PILLAR was to have been System Implementation Language (SIL) for VMS and for both PRISM operating systems. Alas, information about PILLAR is hidden within the QUARTZ that once graced Bellevue's glaciers and moraines.

ileged users. Be sure to eliminate the SET COMMAND command from the tables, as well. However, this won't guarantee that the users can't change their defaults. You can change your default drive easily by redefining SYS\$DISK to point to the new drive. But a clever user can write a simple program to call SYS\$SETDDIR and change the default. Your best bet is to set protections on various directories to prevent access.

### PRINTING THROUGH DECNET

#### QUERY:

**John Flynn** (SIG 11/MESS 542): As I understand it, printing through DECnet can be done only if the file and queue exist on the same node. Are there any other options? For example, if the printer hangs off a DECserver and everything is on a single Ethernet, is there a way for multiple VAXs to share the printer transparently? How are other sites sharing printing resources among multiple nodes in a network?

#### REPLIES:

**Richard B. Gilbert** (SIG 11/MESS 543): Issue a PRINT/REMOTE command, but as you noted, both the file and the print queue must be on the remote node. For

occasional use, you can COPY the file to the remote node and then print it.

A printer attached to a DECserver can be used by any node in the network with LAT capability. You need to specify the special LAT print symbiont, which will deallocate the port when it isn't busy. The DECserver does some sort of queuing on its own and will serve various nodes in turn.

If you don't have a DECserver, there's a remote-print facility available on at least one recent DECUS VAX SIG symposium tape. See your LUG librarian.

**Comet** (SIG 11/MESS 544): Something like the following will help you automate printing across DECnet. Make sure the printer is a spooled device. Then, you can just copy files:

```
$ RPRINT := @REMOTE_PRINT
REMOTE_PRINT.COM
$ IF P2 .EQS. "" THEN P2 :=
  NETVAX::LTA100: ! Remote printer on
                  ! remote node
$ COPY/LOG 'P1' 'P2'
$ EXIT
```

ARTICLE INTEREST QUOTIENT  
Circle On Reader Card  
High 449 Medium 450 Low 451

# ***TCP/IP for VAX/VMS. Add Fusion<sup>®</sup> and stand back.***

Presenting Fusion from Network Research. It's a field-proven success in thousands of nodes around the world. Join the growing number of network managers who have discovered powerful Fusion features including:

- **NFS Server**, which allows all workstations on your network, (Sun, Silicon Graphics, IBM PC, etc.) to use VAX file and disk services, *transparently*.
- **Network Security**, an air-tight defense against virus injectors, hackers and software vandals.

• **Mail**, allowing you to enjoy network-wide mail service and increased productivity using Network Research Mail. Or, you can interface with your existing VMS mail service.

Fusion is easy to install using VMSINSTAL. It's also easy to operate with on-line VMS HELP.

We've provided networking solutions for thousands of DEC VAX, IBM PC and UNIX systems. And the support and service our customers receive is unsurpassed.

Give your VAX a blast. Call Network Research today.

**1-800-541-9508**

 **Network Research**  
*When high energy solutions for DEC connect, it's Fusion.<sup>®</sup>*

# Money Matters Made Easy

*Dun & Bradstreet Software Services Tailors Online, Real-Time Financial System To VAX Market*

The ability of network managers to run identical software packages on mixed platforms was pioneered in part by McCormack & Dodge, now Dun & Bradstreet Software Services. The company's Millenium software operating environment, released in 1983, was the first to provide identical software capabilities on four hardware platforms: Fujitsu, ICL, IBM and the VAX.

Current advancements in Millenium cater to VAX users. As nearly half of its financial applications are in VAX installations, Dun & Bradstreet's latest releases possess a distinct VAX flavor.

A recent modular addition to the Millenium series is FA:Millenium, a VAX-based real-time fixed-asset information system. Preceding the FA announcement, Dun & Bradstreet debuted AP:Millenium, a VAX-based accounts payable information system, and Millenium:SDT, a fourth-generation system development tool.

GL:Millenium, a general ledger information system for the VAX that functions identically to and includes the same capabilities, features and user interface as the IBM mainframe version, was introduced to the DEC market

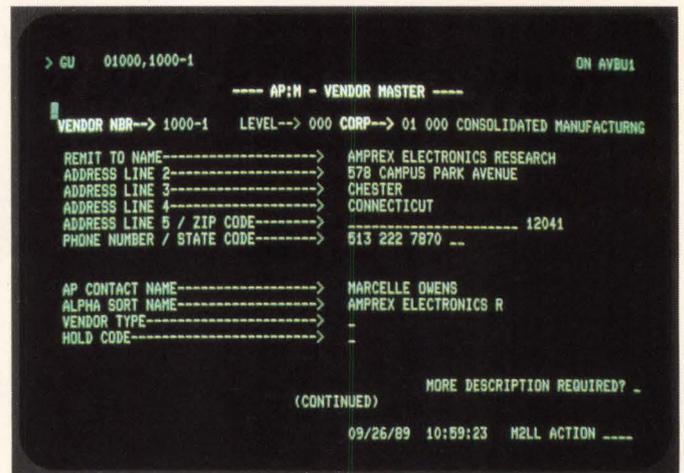
in August 1988.

According to Dun & Bradstreet Vice President John V. Coles, Millenium is "integrated in terms of functionality. The IBM/VAX consolidated functionality is the result of our vision of a multiplatform environment years before it happened."

FA:Millenium automates asset tracking, depreciation and reporting. It also provides automatic tax updates, aiding users in monitoring tax legislation changes and system upgrades.

FA:Millenium on the VAX comes equipped with standard Millenium features such as HELP and QUERY, which provide field-level assistance and up-to-the-minute information from any application.

AP:Millenium features high-volume invoice entry and online edit capabilities. Invoice entry speeds invoice processing, while online editing reduces the need to detect and correct errors. The product calculates favorable payment dates by reviewing options for early-payment discounts and terms of payment on the invoice. It then automatically cuts a check for the predetermined pay date in accordance with the user's banking requirements. It also reconciles cancelled checks against outstanding checks automati-



**AP:Millenium provides comprehensive cash management and reconciliation with multicorporate, multibank capabilities.**

cally and updates appropriate general ledger accounts once checks are issued.

Millenium:SDT allows VAX users to speed application customization, build applications and related subsystems, and create interfaces between applications. Users may customize applications by changing screens or application logic to accommodate their business needs.

GL:Millenium provides the means for processing financial, accounting and statistical data. Journal entries can be entered and edited online in real-time or can be brought in directly from other subsystems. GL:Millenium can access information quickly, going

from summary information to the transaction level in real-time.

The Millenium software family is available immediately. FA:Millenium, which runs on a range of VAXs, is priced from \$30,000 for the VAX 3600. AP:Millenium and Millenium:SDT are priced from \$39,000 and \$38,000, respectively, for the VAX 3600. GL:Millenium is priced at \$100,000 and is available for systems from the MicroVAX to the VAX 8900 series.

## FOR MORE INFORMATION

**Dun & Bradstreet  
Software Services  
1225 Worcester Rd.  
Natick, MA 01760  
(508) 655-8200  
Circle 431 on reader card**

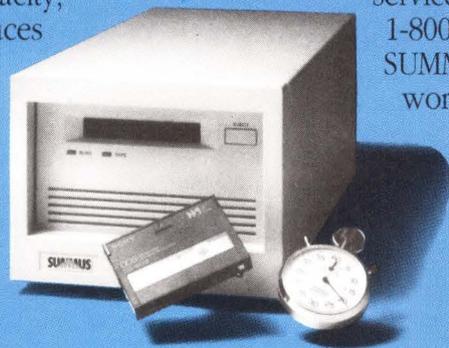
RELIABLE, COMPATIBLE, HIGH-CAPACITY STORAGE

# BINGO!

## SONY & SUMMUS: 1.3 GB ON 4MM IN 20 SECONDS AND IT'S YOURS NOW!

*You've seen 8mm perfection from SUMMUS...now we've teamed up with SONY to bring you the DATUS 4: our new lightning fast 4mm!*

Our DATUS 4 subsystem is the newest, fastest, most accurate and most durable high-capacity back-up ever created. At 1.3 gigabytes capacity, a single 4mm cartridge easily replaces eight 150-meg cartridges. You get Sony's proven quality in standard DDS data formatting and over ten years of high-capacity experience from SUMMUS, all built into one neat little high-capacity box.



Plus, we back up our back-up with one year warranties, optional 24-hours swaps, and on-site service in most metro areas. We provide 1-800 troubleshooting at the drop of a hat. SUMMUS and SONY: the first and last words in 4mm back-up. Call today and ask about high-capacity 4mm and 8mm products from SUMMUS.

Call 1-800-255-9638

# SUMMUS

THE HIGH-CAPACITY PEOPLE

©1990 SUMMUS CORPORATION 17171 Park Row, Houston, Texas 77084 713-492-6611/FAX 713-492-0092. MAGNUS is a trademark of SUMMUS.

CIRCLE 161 ON READER CARD

# Grading Your Software

*Performance Software Inc.'s V-Test Provides VAX/VMS Software-Testing Solutions*

VAX system managers often are hard pressed to gauge new software accurately while meeting strict deadlines. Although few care to admit it, new or revamped software applications too often are installed with minimal testing and regard for capacity planning. Performance Software's V-Test, however, offers VAX managers software-testing solutions that might prevent sleepless nights.

V-Test is a software package that provides VAX/VMS managers with a practical method of testing load conditions and measuring computer performance. Complete testing results are achieved by supplying terminal application inputs automatically and by providing facilities to record terminal response times. V-Test also aids in establishing capacity planning capabilities and system or application tuning. It runs in any VMS environment, including SMP and clusters, and embraces any target software.

"In today's computing environment, project overruns cause testing to be squeezed, which makes the application testing suffer, potentially undermining the product," notes Performance Software's President Tom Hankinson.

The three integral components of V-Test are test-building, a run-time

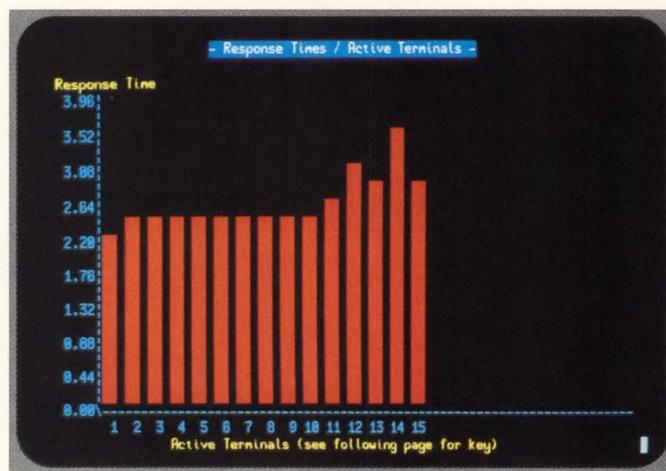
system and results analysis capabilities.

Test-building combines the recording of terminal activity on existing applications with V-Test's script language. Using the terminal session recorder, the script converter and the script compiler, V-Test creates "script preparation." The script provides random data input, multiple test repetition and interrogation of application responses.

The terminal session recorder allows terminal sessions to be recorded into data files. According to

scripts can be replicated at specified rates or at the original recording session speed. The script compiler converts script source files (files that contain script language statements) to script object files. The language statements are receptacles that control the flow of script execution, incorporate random data into the terminal input stream, and examine the terminal application to determine supplied input stream effects.

Before a script is implemented, it's organized by the



*This V-Test statistics analysis result screen shows how response times grew, depending on the number of terminals.*

Hankinson, terminal input is directed to one file for use in V-Test script development. After the output is sent to another file, the data is used as a baseline for regression testing.

The script converter changes a terminal input session recording file into a V-Test script file. Speed

script compiler and ultimately loaded into a script library, V-Test's housekeeping function.

A run-time system manages the run-time component as a detached process. The run-time process specifies the V-Test terminal

## FOR MORE INFORMATION

Performance Software Inc.  
28 Green St.  
Newbury, MA 01951  
(508) 462-0737  
Circle 404 on reader card

profiles, passes operational requests to itself, retrieves and displays operational information and allows for audit file inspection. The run-time control system has two operational modes: interactive and standard VMS command line interface. The run-time component is created by the run-time system to create and delete pseudo-terminals and execute scripts. It can also log messages to the audit file and log statistical data to a common statistics file.

V-Test relies on its load statistics analyzer utility to analyze load session testing results. Graphics, tables and listings can be displayed showing minimum or maximum terminal response times over all or part of the load period. The load statistics analyzer utility can run interactively or be driven from the command line and sent to a print file. The format of the statistical file is documented, providing customized recording and analysis of the accumulated data. Data also can be accessed via DATATRIEVE or ported to a PC for additional analysis.

V-Test costs from \$10,000, depending on system processor.



MA92, 3480 on the HSC

# Unattended Backup

## Nobody Backs Up Your Cluster Like Micro Technology

When it comes to selecting the most efficient, cost-effective form of HSC tape backup, there are just a few serious alternatives. Fortunately, Micro Technology has considered them all for you: the MA-40, 4mm DAT for fast searches and connectivity from workstations to mainframes. The MA-24, 8mm helical scan for high-capacity unattended backup on a daily basis. And the MA-92, 18-track 3480 IBM compatible subsystem, for those times when IBM and DEC exist in the same environment.

They're all 100% HSC 40/50/70 compatible with pure DEC TA emulation. Each includes all the interface capabilities to connect to the HSC5X CA/DA card via the MTI proprietary SCSI-to-STI adaptor, the MA90.

And coming from Micro Technology, you know you can rely on them. Each subsystem is designed with the fewest possible components. That means you get the high-

est reliability and the lowest cost of ownership, every time around. With ratings of 22,000 hours MTBF for the MA-92 and 20,000 hours for the MA-24/40; you can backup a lot of data in the mean time.

And because Micro Technology wants to assure top performance and continued solutions—applications assistance, installation and service come with every tape cartridge subsystem. They're warranted for one full year. It's all part of Micro Technology's commitment to your future.

Everything considered, there's no one that backs up your business like Micro Technology. The new leader in cluster backup technology, designs and manufactures enhancement products for the DEC VAX environment.

To find out which tape cartridge backup subsystem meets your application needs, write or call Micro Technology today at 800-999-9MTI.



MA24, 8mm on the HSC



MA40, 4mm DAT on the HSC



### Micro Technology

5065 East Hunter Avenue  
Anaheim, California 92807

800-999-9MTI (714) 970-0300

CIRCLE 144 ON READER CARD

DEC, VAX, HSC are registered trademarks of Digital Equipment Corporation.

# Reach For The Sky

*Sky Computers' Skybolt Offers  
DECstation Users Accelerated Performance*

DECstation 5000 users looking for increased power would do well to examine Sky Computers' Skybolt application accelerator. By combining Intel's 64-bit i860 and i960 processors, Sky has boosted DEC's most potent RISC-based workstation to levels approaching 40 mips and 80 Mflops, according to Sky marketing manager Cimarron Boozer. Skybolt was first released in November 1989 on VMEbus, Sun and IBM PC-based platforms.

"We have increased the DECstation performance capabilities, accelerating five to 20 times, depending on code vectorization," says Boozer. "These figures border on supercomputing performance."

Skybolt is geared toward such applications as simulation, modeling, finite element analysis, seismic analysis, fluid dynamics, chemistry and financial applications.

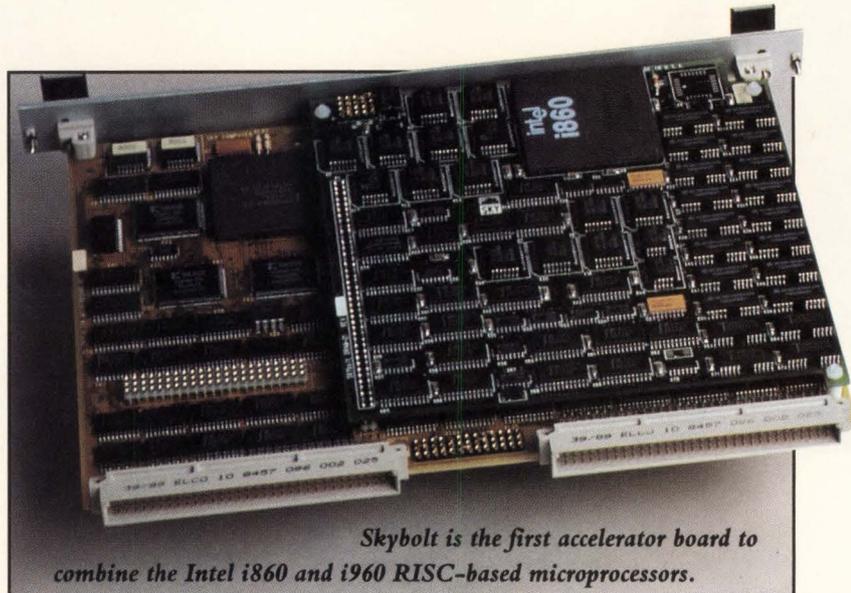
Sky's use of the Intel i860 and i960 processors coupled with enhanced Metaware compilers provides the microprocessing boost. The i860 and i960 processors

combine with the compilers to create Skybolt's embedded processor based on supercomputing design blueprints. The resulting scalar processing, pipelined vector processing, high-bandwidth memory architectures and vectorizing compiler make up Skybolt.

The Skybolt board provides up to 16 MB of memory shared with the main processor. It also boasts a direct memory access engine and a separate onboard channel for external devices. A 32-bit, 54-Mbps interface connects Skybolt to the DECstation 5000 and other devices.

The i860 is a 64-bit processor with a 40-MHz RISC chip that incorporates integer, floating-point and graphic computations. The i960 is a speedy scalar processor that complements the i860 by relieving it of housekeeping duties, handling interrupts, I/O processing and memory management.

Sky relies on its suite of compilers and software tools to help users customize



*Skybolt is the first accelerator board to combine the Intel i860 and i960 RISC-based microprocessors.*

applications for Skybolt's architecture and to provide an application support library.

The Skyvec C and F77 C and FORTRAN compilers are based on Metaware's High C and Lahey Computer Systems' FORTRAN f77 software. Sky has added a second-generation vectorizing module that automatically produces code during compilation, the same method supercomputing compilers use, according to Boozer. Comparably, compilers normally use preprocessors before compilation, dramatically reducing code performance.

An expansion interface allows connection of custom I/O devices independent of the bus interfaces. Skybolt's internal protocol lets you design an interface to mirror

another device's I/O port.

Notes Boozer, "We offered users Intel i860 and i960 on the same board because we knew the i860 wasn't effective as a general-purpose computer. While it's good at throughput or floating-point, it doesn't handle interrupts very well.

"It is simply not designed to act as a general machine, and this is where the i960 comes into the picture. The i960 acts as another I/O processor, handling polling and VME activity in a parallel processing environment."

Pricing for the DECstation 5000-compatible Skybolt starts at \$12,450, with OEM and system integrator discounts available. Skybolt is expected to ship during the third quarter of this year.

## FOR MORE INFORMATION

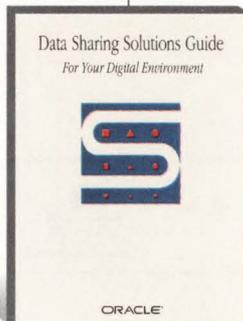
**Sky Computers Inc.**  
27 Industrial Ave.  
Chelmsford, MA 01824  
(508) 250-1920  
Circle 468 on reader card

# Putting DEC On The Fast Track

*ORACLE lets Digital users integrate their VAX and non-VAX computers to create a company-wide data management system.*

Digital is the acknowledged leader in providing hardware that networks entire organizations. But everyone still needs the software that will let those systems actually share data.

Which is why so many DEC customers are buying Oracle's family of integrated software products. According to a 1989 Computer Intelligence study, 40% of those planning to purchase a VMS database are choosing ORACLE. That's over twice as many as any other database.



Even DEC's own Rdb.

ORACLE lets MIS departments increase the performance and capability of their existing VAX systems. While also giving them an unlimited choice of hardware, operating systems, networks, gateways to other data and products from independent software vendors.

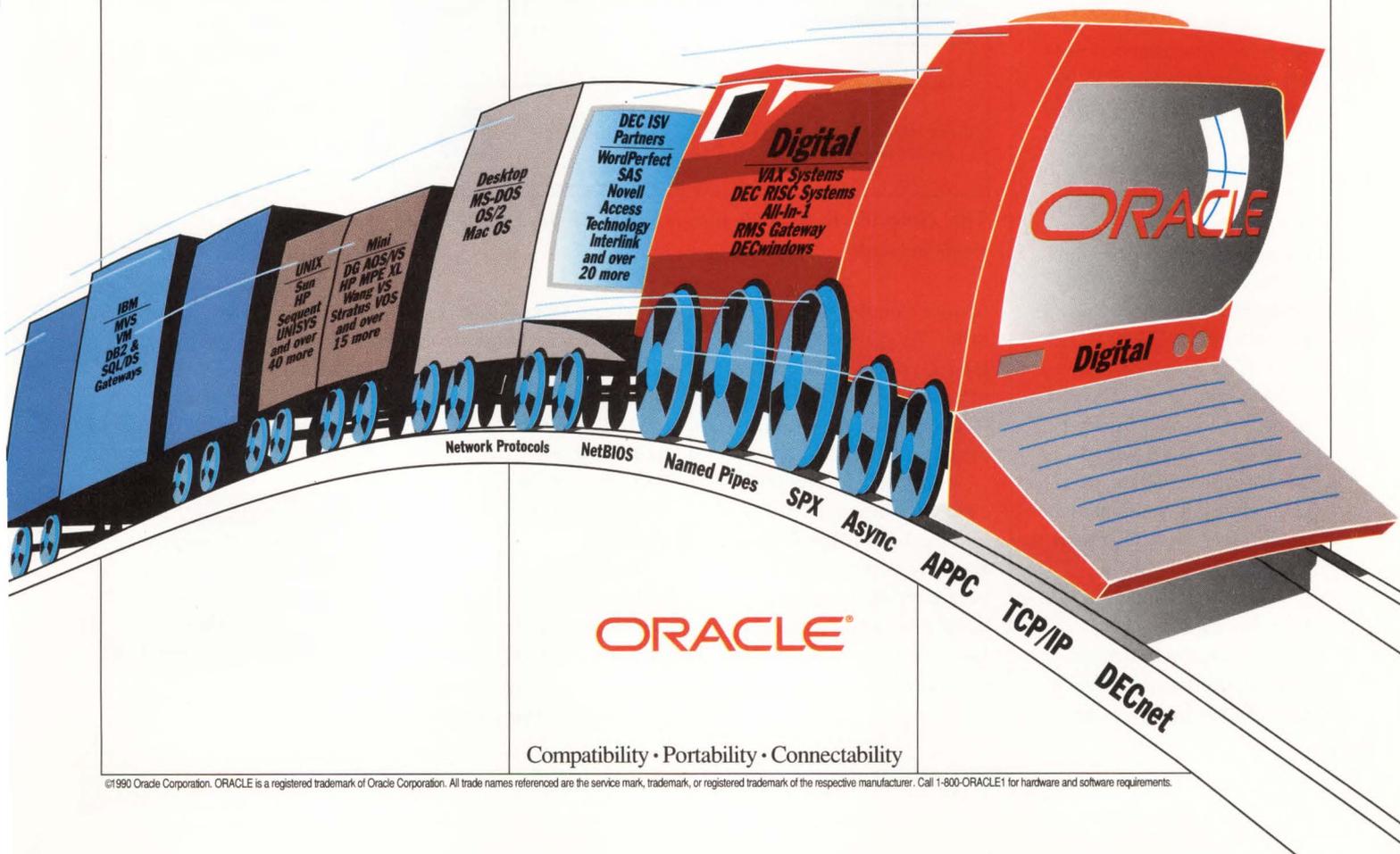
The Oracle family of integrated software includes everything from databases and integrated CASE tools to applications and networking

products. All of it backed by the largest database service, support and consulting group in the world.

To help get you on board, Oracle offers a Data Sharing Solutions Guide. A 150-page step-by-step handbook filled with real-world solutions for connecting VAX systems to DEC's other computers and just about everything else.

Call 1-800-ORACLE1 ext. 1699 to sign up for an Oracle Database conference today. You'll get a free copy of the Data Sharing Solutions Guide. And an open track to the future.

**Call 1-800-ORACLE1 ext. 1699 for the Oracle Database Conference in your area and get a free copy of the Data Sharing Solutions Guide.**



# Bridging The Gaps

*Develcon's internetworking products help solve LAN problems*

Have you dreamed of transforming your organization's data processing and data communications facilities into one cost-effective network? Develcon Electronics Ltd. defines this phenomenon as "internetworking" and can help you achieve it with its LAN internetworking products.

Previously, you'd have to integrate multiple products from different vendors to internetwork LANs. You could end up with incompatible local bridges from one vendor, fiber optic interfaces from another and routers from another.

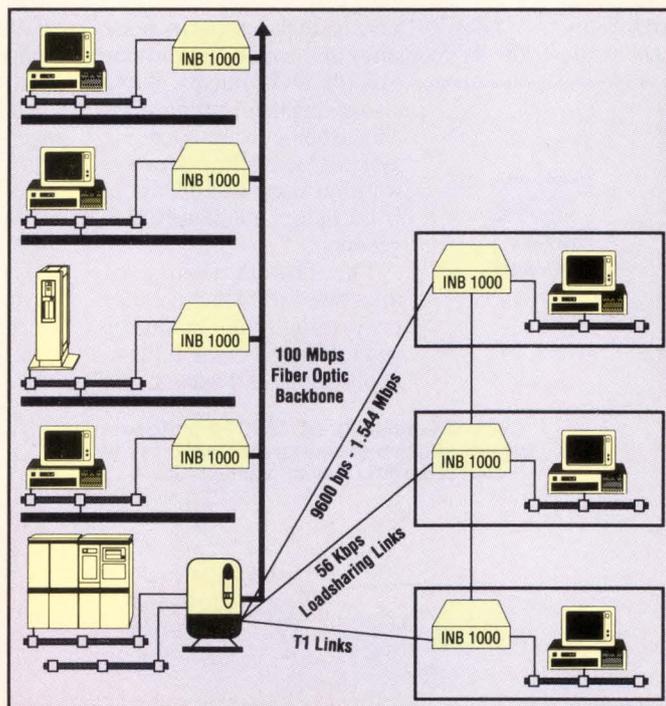
Develcon's products integrate multiple LANs into a single communications network. The combined LANs function as a single seamless LAN, whether the destination is local or remote, without reconfiguration of network resources or changes in user procedures.

Develcon has two fully compatible internetworking product lines: INB 1000 and DevelNet. The INB 1000 is a full-featured, flexible routing bridge. It lets you internetwork up to 32 LANs in local, campus and wide area environments and is independent of all upper-layer protocols including OSI, TCP/IP, DECnet, NetWare and OS/2 LAN Manager.

Each internetworking node permits any combination of LAN interfaces or

network links. Multiple LAN interfaces are available for local applications. Distributed networking applications can use a variety of link

application. Data destined for a remote LAN is routed to the required LAN only, using the best available path. This relieves the backbone



*The Develcon INB 1000 integrates up to 32 LANs into a single network.*

options from 9.6 Kbps to 100 Mbps. As your network grows, you can add bridge interfaces or links to remote INB-1000 bridges without disruption.

You can link each INB 1000 with integral 100 Mbps fiber or 1.544 Mbps facilities, allowing you to build a corporate internetworking backbone. This backbone can be implemented in the topology best suited for your

or other LANs of unnecessary internet traffic, minimizing congestion.

LAN interface options for the INB-1000 are up to three AUI transceiver (DB15F) or BNC connectors for ThinWire (10Base2) Ethernet.

Also bridging the gap of LAN interconnectivity is Develcon's Model 7183 Ethernet Bridging System. Part of the DevelNet series of internetworking products,

Model 7183 is the card used by DevelNet to provide integral bridge functionality.

Distributed or remote applications of the Model 7183 can use a wide variety of facilities from 9.6 Kbps to 100 Mbps including 1.544 Mbps. Each 7183 bridge card supports a single Ethernet LAN interface with AUI transceiver or ThinWire (10Base2).

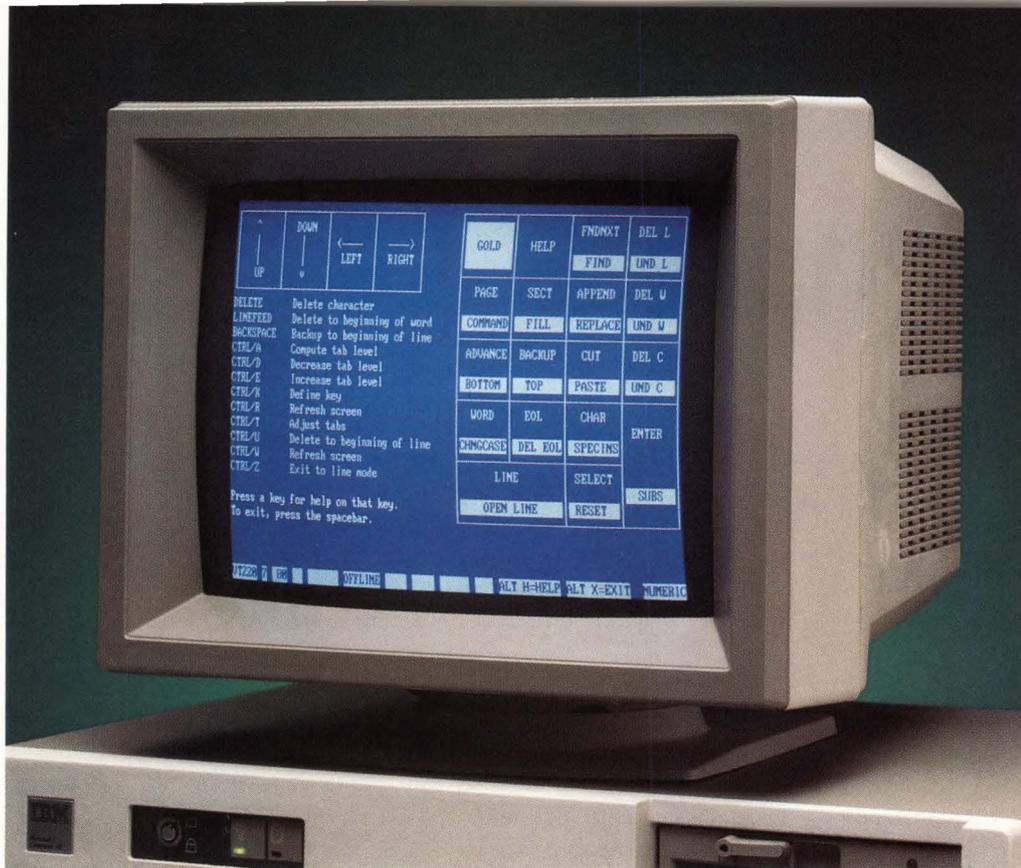
DevelNet's functionality is similar to that of the INB 1000's, but it increases the number of LAN and network interfaces available within a single chassis. The INB is limited to four LAN or link interfaces, while DevelNet can support up to 32.

In addition to internetworking LANs with integral bridges, DevelNet also supports many integral gateways including TCP/IP, X.25, 3270 protocol conversion and asynchronous interfaces.

Develcon's interworking product costs vary depending on the application. Ready-to-run INB bridge products start at \$6,000. A DevelNet Node configured for bridging starts at \$10,000.

## FOR MORE INFORMATION

**Develcon Electronics Ltd.**  
**515 Consumers Road/Ste. 500**  
**Willowdale, Ontario M2J 4Z2**  
**(416) 495-8666**  
**Circle 403 on reader card**



**EM320 is a versatile VT320 emulator and communications program. EM320 eliminates the need for a dedicated VT320 terminal.**



## VT320 EMULATION

### EM320

- VT100, VT220, and VT320 Emulation
- DCL-Like Command (Script) Language
- True 132 Column Display
- Remappable Keyboard
- Extensive Online Help Library
- ASCII, KERMIT, and XMODEM File Transfer
- Loadable Character Sets
- DOS Hotkey
- Modem Dialer

EM320 includes more productivity features than the competition and runs on most popular PC networks. EM320 is easy to install, is backed by a 30-day no-risk purchase policy, and a Toll Free support number.

Diversified Computer Systems has been providing terminal emulation productivity tools to PC users for seven years.

For more information, contact:



### ***Diversified Computer Systems, Inc.***

3775 Iris Ave. Suite 1B, Boulder, Colorado 80301  
**(303) 447-9251 FAX: (303) 447-1406**

*Other DCS emulators: EM4105 — Tektronix 4105  
 EM4010 — Tektronix 4010*

# Fast COBOL

*Acucobol's Enhancements Add Speed And Portability To A Tried-And-True Language*

Reports of the demise of COBOL are premature. Recent enhancements to the widely used programming language by Acucobol Inc., including upgrades in speed and portability, have signaled a new era for COBOL users.

Acucobol-85 was developed as an in-house response to user concerns regarding long delays in running applications, according to company president Dr. Pamela Coker. "Over the last 10 years, COBOL programmers have written more than 10 million lines of code," says

Coker, "so we were fairly certain the language was being used. But problems in file systems, run times and COBOL compiling forced us to develop solutions on our own."

These solutions include a speedier compiler, extensions for boxed, reverse-video and pop-up windows, color, scrolling, machine-independent file and directory name handling, file locking, and index file compression and encryption. Perhaps the most intriguing feature of Acucobol-85 is its portability

to most major platforms, including VAX/ULTRIX and VAX/VMS, without changing code.

Acucobol-85 runs on 150 platforms under AIX, MS-DOS, OS/2, Netbios, ULTRIX, UNIX, VAX/VMS and XENIX. It also transports applications to new models, supporting Mips, SPARCstation and VAX.

A COBOL application needs to be recompiled only once in Acucobol-85, using its own run times to allow the object code to run on any supported platform. It requires the maintenance of only one version of source code while supporting multiple operating environments. Acucobol-85's object code is compact, five to 10 times smaller than comparable code compilers. Written in C, it ports to new RISC architectures, such as the 88000, 68040, SPARC and IBM RISC, as well as the Japanese G-Micro Chip.

Acucobol-85 compiles four to 10 times faster than other compilers, according to Coker. One Acucobol-85 user recently recompiled a 400,000-line system in less than 45 minutes, an eye-opening improvement over the average recompile time of 4 1/2 hours. Clock times

## FOR MORE INFORMATION

Acucobol Inc.  
7950 Silverton Ave., Ste. 201  
San Diego, CA 92126  
(619) 271-7097  
Circle 507 on reader card

range from 7,000 to 12,000 lpm on a PC-AT to more than 50,000 lpm on RISC-based platforms.

Acucobol-85 manages configuration control internally within COBOL, eliminating the need for extensive coding within large database files. Its SET FILE-PREFIX verb lets you identify which directory contains a data file. Only one SET FILE-PREFIX statement is needed to access a different directory set, allowing you to control configuration within the Acucobol-85 environment.

Acucobol-85 is fully compatible with RM/COBOL and has a VAX/COBOL compatibility mode. Applications written in VAX/COBOL can run in Acucobol-85 and vice versa. Acucobol-85 applications can talk to other VAX/VMS applications through the RMS file system.

Acucobol-85 costs from \$3,000 on MicroVAX platforms and from \$6,000 on VAX platforms. It costs \$2,000 on a standalone and \$3,000 on a network DECstation 5000 workstation.

```

display "performance of RM/COBOL-85.".
display "by switching to " "ACUCOBOL-85", bold, "you".
display "gain faster compile times and".
display "the power of a source-level".
display "debugger.", no advancing.

perform return-to-continue thru return-to-continue-end.
portability end.

Windowing.
display window line 2, lines 21, erase.
if has-color = "Y"
    add blue, backgrnd-white giving border-color;
else
    add black, backgrnd-white giving border-color.
display window line 4, column 16, size 47, lines 14,
    boxed, color border-color,
    title "ACUCOBOL-85 Screen Manager".
-----ACUCOBOL-85 Debugger-----
DEMO 0105D: d item-part-no
00153
DEMO 0105D: b dis-terminal-attributes
DEMO 0105D: d machine-operating-system
MS-DOS
DEMO 0105D: gp dis-terminal-attributes_
    
```

**Acucobol Inc.'s Acucobol-85 provides its own interactive source code debugger.**

# UNATTENDED BACKUP WITHOUT TAPESYS® IS LIKE CAKE...

## ...WITHOUT THE FROSTING.

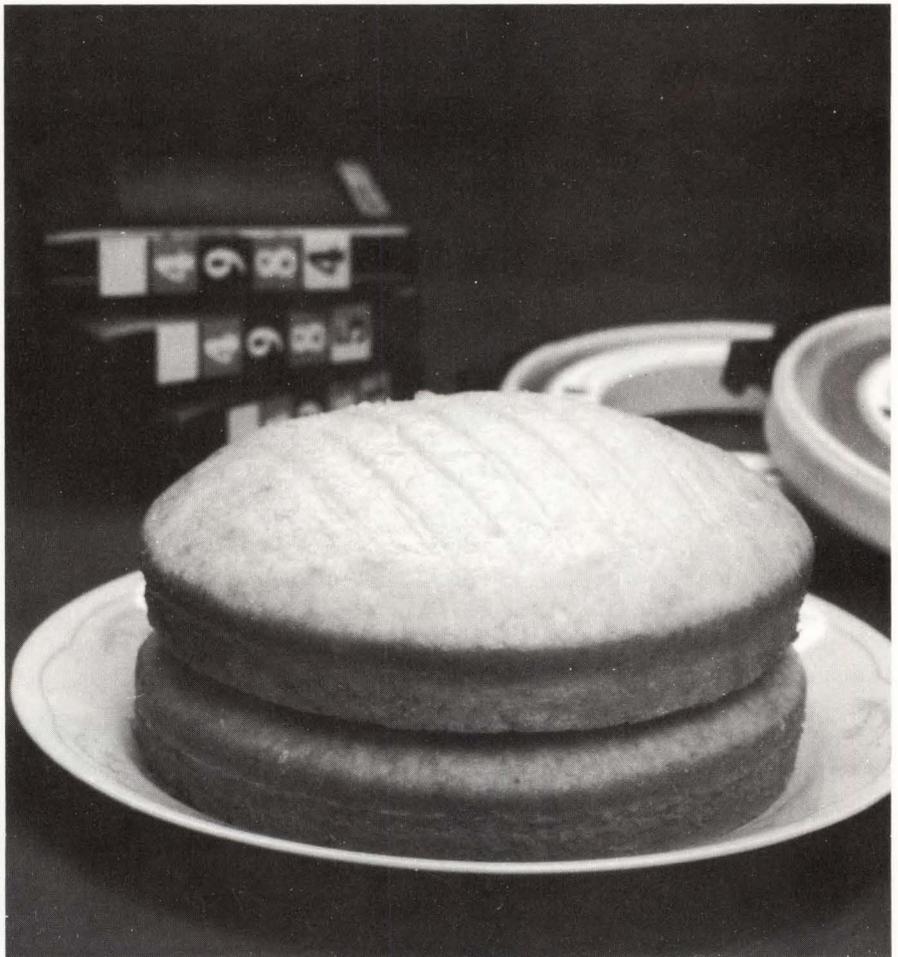
**W**ho wants cake without frosting? It's just not complete! Just like running unattended backup is incomplete without TAPESYS®, The VAX/VMS Tape Management System.

Unattended backup by itself gives you the ability to start your backups and let them run unattended. But, you still need to be able to find those backed up files and you need to be sure that the wrong tapes aren't erased in the process. When it comes time to restore files, TAPESYS® gives you a quick and easy way to find them and bring them back!

TAPESYS® offers you more features like an interface to your IBM media library, scheduling of all backups, a vault storage control system, and tape drive allocation control. TAPESYS® now includes CMP™, The Concurrent Mag-tape Processor, which lets you make up to 8 identical copies of your backup at the same time. TAPESYS® works with all media, including TA-90s, optical disks, and 8mm cartridges.

Put the icing on your cake! Let us show you how to make your unattended backup process complete!

Call us today at 508-887-6409 to get your **FREE DEMO** copy of TAPESYS®.



Or, if you want a brochure, call or write us at:

Software  
Partners/32, Inc.  
447 Old Boston  
Road  
Topsfield, MA  
01983

**508-887-6409**

FAX# - 508-887-3680.

TAPESYS® is also available throughout Canada, the United Kingdom, Europe, and Australia.



SOFTWARE PARTNERS/32, INC.

# Integrated Control

*Integrated Systems' Interactive Animation Module Aids In The Development Of Real-Time Embedded Control Systems*

Integrated Systems Inc., software tools supplier for control systems design and development, announced the Interactive Animation Module, a simulation/animation tool integrated into a comprehensive CAE/CASE tool environment for the development of real-time embedded control systems.

Interactive Animation is useful for demonstrating and modeling system design behavior to management or customers and for understanding the operation of the design. It also permits designers to debug systems in real-time, thus reducing development time. This addition to the company's product line is in response to demand by electronic control system designers working for aerospace, automotive, computer peripheral and industrial automation OEMs.

Interactive Animation lets designers visualize and demonstrate the performance of a complex simulated control system before the design is committed to a hardware prototype. The engineer can interact with the animated simulation by making online changes to the model during the animation.

A graphical interface allows the engineer to create control display panels from a palette of dynamic icons

representing such things as onscreen strip charts, meters, dials, LEDs, switches and knobs. With a system mouse, the designer can click on input icons to change the model's parameters during simulation to evaluate system performance interactively. The user can create his own icons.

"A major problem with system design is the delay between model building and the evaluation of simulated results," explains Don Rich, vice president of marketing. "Engineers can spend weeks repeating this cycle. Interactive Animation accelerates this process by letting users interact with a real-time visual execution of the system model."

Interactive Animation is linked to the company's Matrixx engineering analysis, design, modeling and simulation software environment. It requires Matrixx and SystemBuild V2.0 or later.

Matrixx is an interactive engineering analysis and design package. It's used by the engineering team to conceptualize and organize the design and perform a variety of analyses. It incorporates hundreds of engineering functions and graphic routines. SystemBuild is a graphical programming environment that models the control system and the physical world. It lets the user perform linear and nonlinear system modeling and simulation and

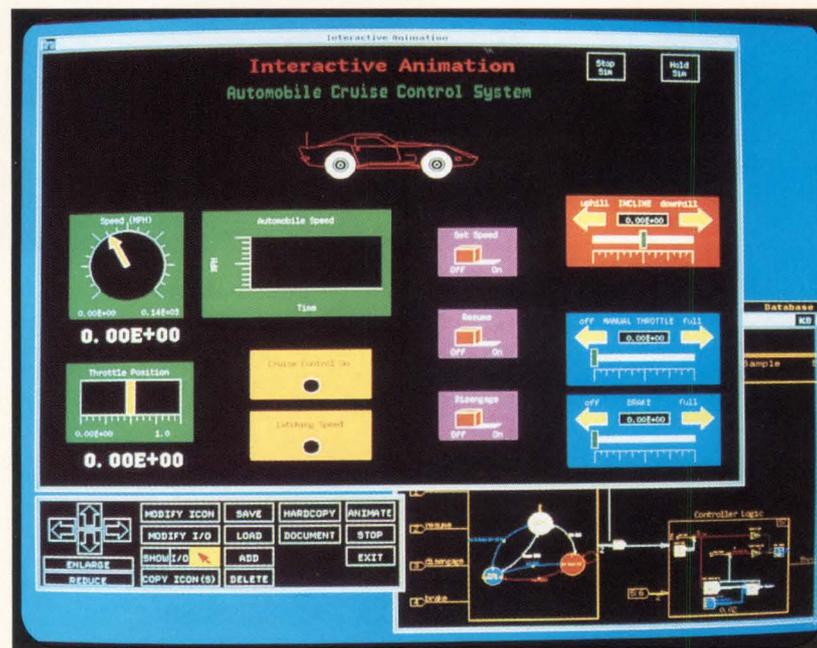
## FOR MORE INFORMATION

**Integrated Systems Inc.**  
 2500 Mission College Blvd.  
 Santa Clara, CA 95054  
 (408) 980-1500  
 Circle 400 on reader card

creates WYSIWYG models with engineering diagrams. Each diagram can be decomposed into smaller functional blocks.

The products run on DEC, HP-Apollo and Sun engineering workstations, VAX minicomputers and mainframes, and IBM PC/XT, PC/AT and PS/2 microcomputers and compatibles.

Interactive Animation is priced at \$5,000 in single-unit quantities. It initially is available on the VAXstation running VMS.



*The Interactive Animation Module provides an interactive, graphical simulation environment.*

# Which terminal emulation keyboard would you rather use?



We thought so too. The *PowerStation* is an exact VT200/VT300 layout keyboard that plugs into your PC. The *PowerStation* brings VAX applications to your PC without having to rely on messy labels.

Here's the opportunity to standardize on one keyboard throughout your department. The *PowerStation* keyboard has been designed to work on PCs, XTs, ATs, PS/2s, and the AT&T PC. And you can switch effortlessly between real VTs and the *PowerStation*.

The *PowerStation* eliminates keyboard remapping when you run PC versions of your favorite VAX applications, including EDT+, WPS-PC, WPS-PLUS/DOS, and nu/TPU. And the keyboard can be used with regular DOS applications.

The *PowerStation* keyboard comes with ZSTEM 240 or

ZSTEM 220 terminal emulation software for connecting to your VAX. ZSTEM 240 includes full VT241 emulation and complete VT340 16 color ReGIS & sixel graphics. If you only need text, ZSTEM 220 will give you fast, accurate and complete VT220/320 emulation.

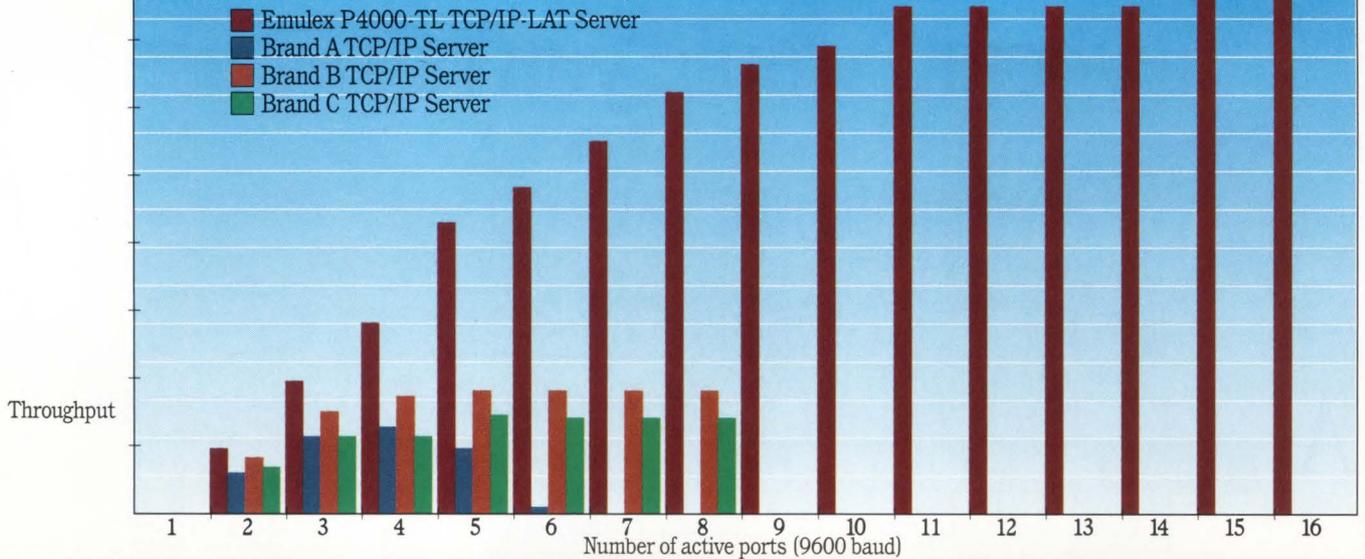
With KEA's top-notch technical support and documentation, plus a solid warranty, you can be assured of quality products backed by quality people. Find out why Digital Review Labs says KEA's *PowerStation* is "a godsend." Call today!

KEA Systems Ltd.  
3738 North Fraser Way, Unit 101  
Burnaby, B.C., Canada V5J 5G1  
Phone: 604-431-0727  
Fax: 604-431-0818

Toll Free Order Desk  
800-876-6089



## TCP/IP Test Results



# Emulex introduces a terminal server that dramatically outperforms the competition!

P4000-TL raises performance standards for TCP/IP and LAT users.

Test results are conclusive: In a heavily-loaded network, Emulex's new Performance 4000-TL combination TCP/IP-LAT Terminal Server delivers

*substantially* more throughput than all other servers tested. In fact, the heavier the load, the greater the difference between Emulex and competitive servers. Which is critical for growing networks...and demanding applications like high-speed graphics.

The Emulex P4000-TL *combined* protocol performance is



so great, it beat every competitor's *single-protocol* product tested — LAT or TCP/IP.

**Emulex TCP/IP and LAT servers also win big.**

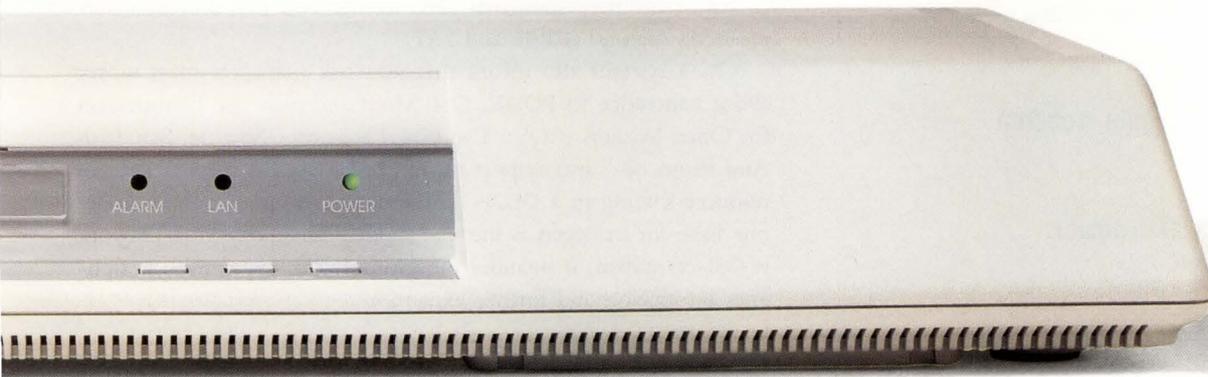
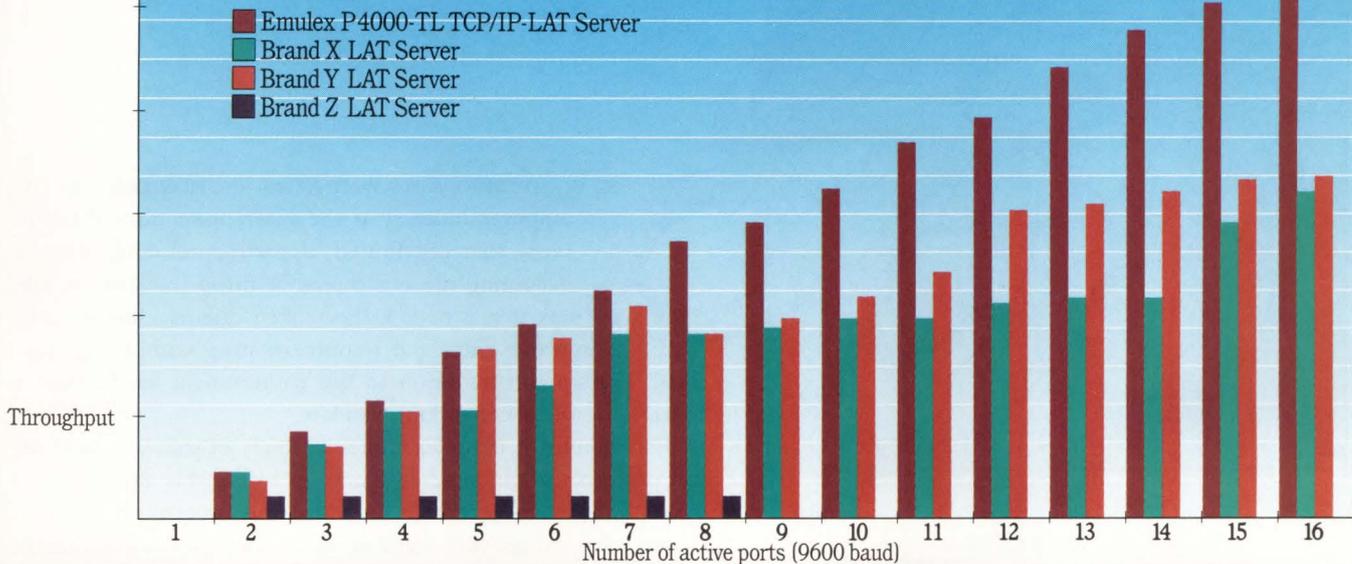
Emulex also tested the P4000-T TCP/IP and P4000-LAT single-protocol terminal



servers against the top competition. All test results show that you'll work a lot more efficiently with an Emulex Terminal Server.

You'll also work more confidently. Emulex Terminal Servers are now covered by a 3-year warranty, which is our commitment to reliability.

# LAT Test Results



## Free test results.

Emulex has published a benchmark report that *documents* the results of all tests. It explains how the tests were conducted, what parameters were employed, and how each competitor "stacked up."



It also explains how the unique dual-processor design architecture provides performance superior to every competing product.

It's yours *free!* Simply call 800-EMULEX-3 and ask for the Emulex Performance Report.

## Free 30-day trial.

Emulex is so confident of the performance of this new product that we'll let you "test drive" one *absolutely free!* We'll also provide you with a videotape that will show you how easily the unit is installed. Once you have it plugged in, the P4000-TL includes a program that *demonstrates* the many features of this server. It's like an on-board seminar!

To arrange for your 30-day demo, call one of the offices listed and ask about the free trial program. Then prepare to be impressed.



Because Emulex built a server that outperforms *our* competition to help you outperform *yours!*

**Emulex.**  
**The Genuine Alternative.**

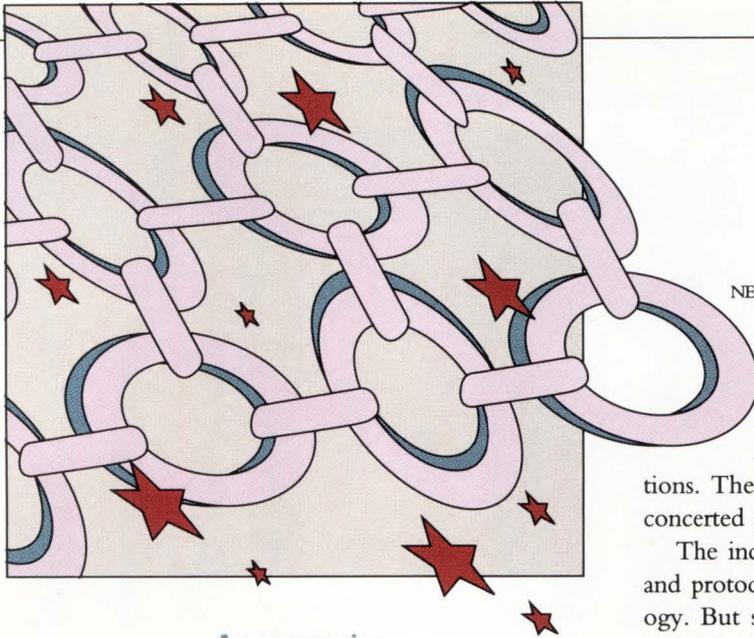


(800) EMULEX-3

Emulex Corporation, 3545 Harbor Blvd.,  
Costa Mesa, CA 92626  
(714) 662-5600

North American Offices: Anaheim, CA (714) 385-1685;  
San Jose, CA (408) 452-4777; Roswell, GA (404) 587-3610;  
Burlington, MA (617) 229-8880; Saddle Brook, NJ (201) 368-9400;  
Reston, VA (703) 264-0670; Schaumburg, IL (312) 605-0888;  
Canada (416) 673-1211.

© 1990 Emulex Corporation.



As companies  
link their LANs,  
users gain freedom  
and power.  
But sharing  
resources such as  
printers presents

network managers  
with complex  
problems.

■  
EVAN BIRKHEAD

ONE OF THE MOST IMPORTANT AREAS FOR PIONEERING IN THE computer industry is the interconnection of LANs. Now that distributed, departmental computing is becoming more accepted at many installations, the next step is to link these often dissimilar networks to improve data- and resource-sharing within organizations. The smooth transition to this environment has become a concerted goal of networking vendors.

The industry is using an impressive body of software standards and protocols as the building blocks to realize this new technology. But so many standards exist that the issue often becomes clouded. For the network manager, sifting through them is a nightmare. Particularly at VAX sites, which are heavily network-oriented, managers must concern themselves with compliance to major industry standards such as OSI and EDI and transport protocols such as TCP/IP and LAT.

Open systems also means that network managers must worry about adherence to POSIX, OSF/Motif and now the Corporation for Open Systems (COS). The box, "Resource-Sharing: Standards And Protocols," lists important standards. But for the purposes of resource-sharing in a DECnet/Ethernet environment, the number one issue for managers is the OSI model. These days, if a network is OSI-compliant, it includes the groundwork for smooth peripherals integration and further expansion.

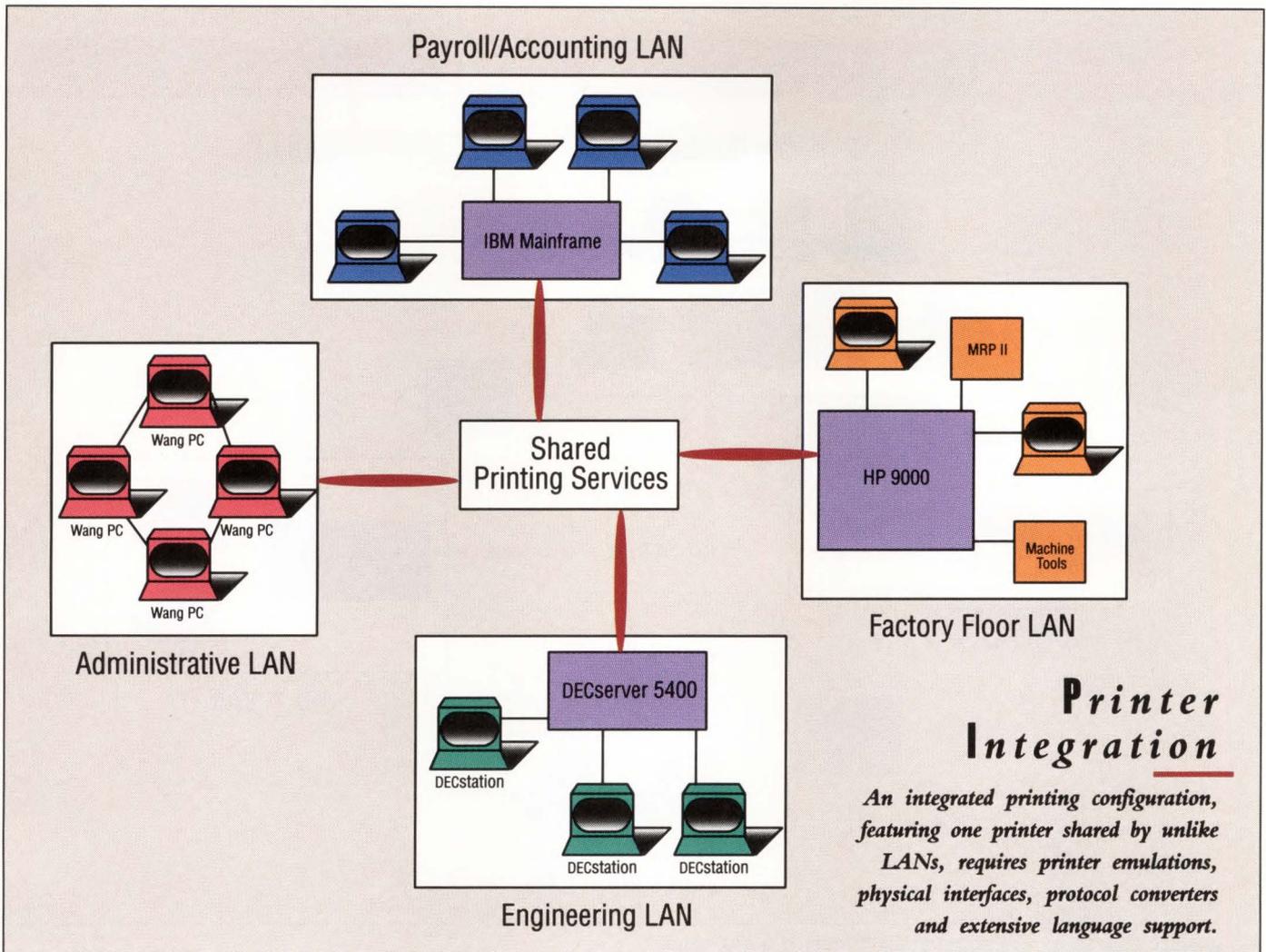
### **DECnet And Ethernet**

The Ethernet networking market, which encompasses virtually every major networking architecture and open systems standard, is at the core of most network product development. Your ability to interact with Ethernet varies depending on whose computer and whose networking software you're using. The race

to create hardware and software solutions that make connections among LANs cheaper, faster and seamless is heated.

Luckily, today's VAX-based client/server networks are efficient managers of resources and peripherals, so linking Digital networks is less of a hassle than with many other networks. Additionally, Digital offers proprietary software and gateways that tie VMS-based networks with ULTRIX, UNIX or IBM/SNA networks.

The ability to make an integrated set of printing resources available to a variety of users in an open heterogeneous network has been called "printegration" by one printer vendor, Kyocera



Unison. Realizing this concept in the multivendor world involves multiple physical interfaces and networking cards, protocol converters, support for graphics languages such as Adobe's PostScript, and printer emulations. Put simply, printegration can't occur in the real world without a solution that involves a jumble of software and hardware components to ensure the support of a variety of platforms.

For example, tying IBM mainframes to desktop printers in an MIS department requires that the printers play in IBM's PROFS and DISOSS environments. To support VAXs, UNIX workstations, PCs or Macintoshes, the same printers require additional components.

When linking purely Digital networks based on the client/server architecture, however, accessing remote printers isn't

a problem. The problems arise when the networks use dissimilar operating systems and protocols.

Easy access to distributed printing and communications devices is at the core of the DECnet/OSI and VAX/VMS philosophies. The resource-sharing capabilities of VAXclustering is the best example of this. Nevertheless, system managers have felt badly burned by the fact that Digital's DECnet Phase V and NAS network blueprints aren't yet fully defined or available as tangible products.

### The Near Future

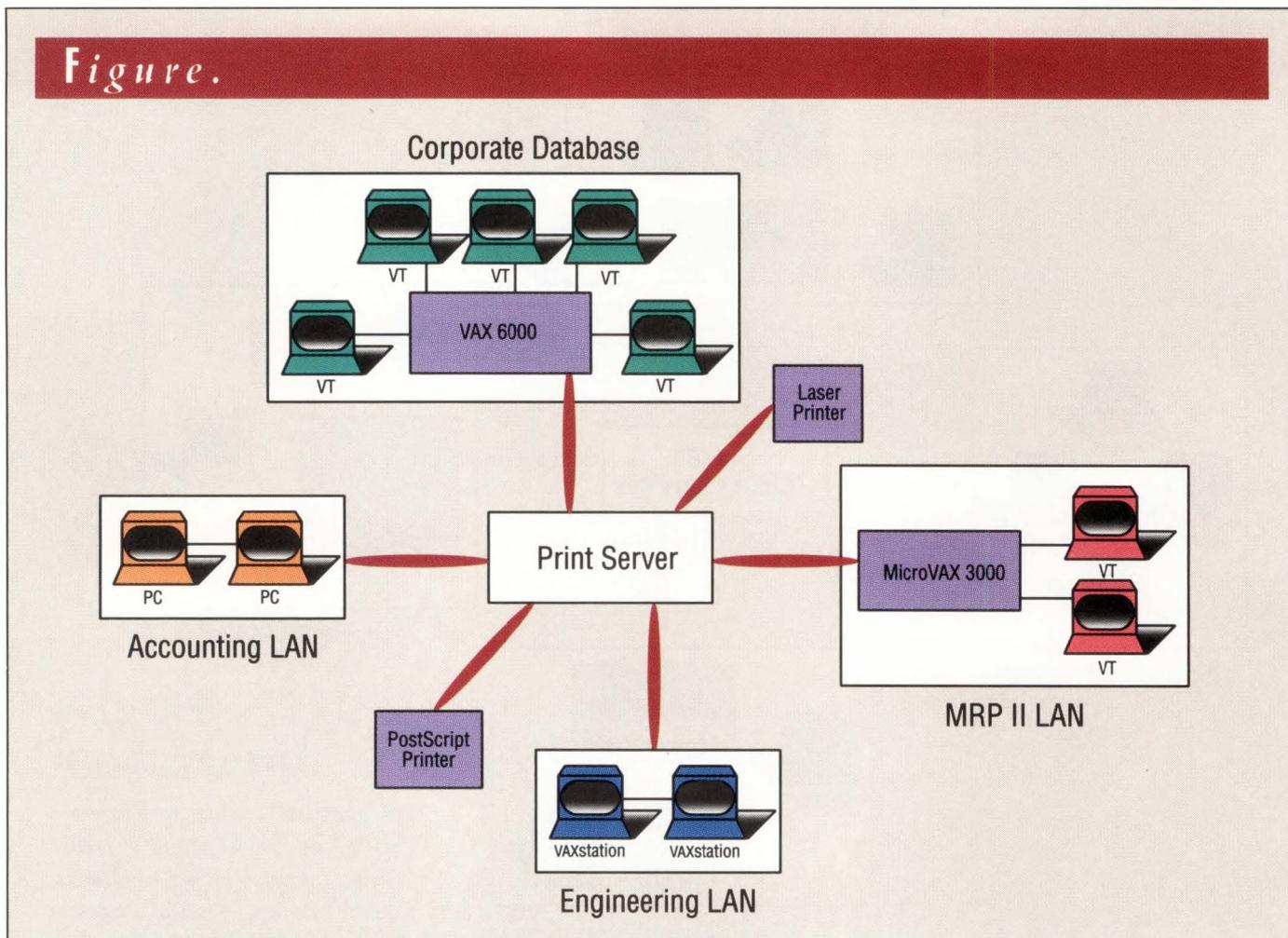
Many of these challenges are ironed out nicely by John McQuillan, a Digital networking consultant and a developer of the Arpanet. McQuillan maintains that the implications of the continued growth in PCs, LANs and distributed processing

(i.e., distributed databases and resources) include a growth in both client/server and peer-to-peer computing, which Digital calls desktop computing.

This networking model will coexist with other models, according to McQuillan, and no model will dominate, at least in the near future. Other models include interactive terminals (in which the storage and user interface are remote) and PCs with terminal emulation or micro-to-mainframe communications (in which there's a measure of local processing).

Significantly, most of the new applications available are for client/server computing. This style of computing, in which Digital has invested heavily, is distinguished from the others in that the entire user interface is located on the workstation.

Figure.



A distributed print server application at the fulcrum of a VAX network.

McQuillan predicts that “more user devices will be on networks,” noting that “different parts of applications already reside on different machines.” The “islands of automation” buzzword heard so much in the early 1980s will fade.

Mainframes and other large computers will act as servers, and the desktop steadily will become the center of creativity in the computing universe. The general trend is an increase in power and flexibility for desktop users through freer access to networked applications and resources. This power grows exponentially as LANs are connected to LANs. McQuillan calls this trend “the democratization of computing.”

McQuillan says that this network will involve a balance of freedom and discipline. The freedom on the desktop can exist only if there’s discipline along

the network. That means solid protocols and standards that act as good traffic cops and network managers who know how to use them.

### Client/Server Printing

In Digital’s enterprise blueprint, printers fit into the networking scheme as a fundamental component of the client/server product set and philosophy. Printer functionality generally can be shared by several desktop users through print servers (see Figure). Like other servers, print servers are computers accessible to other devices on a network that allow users to share resources.

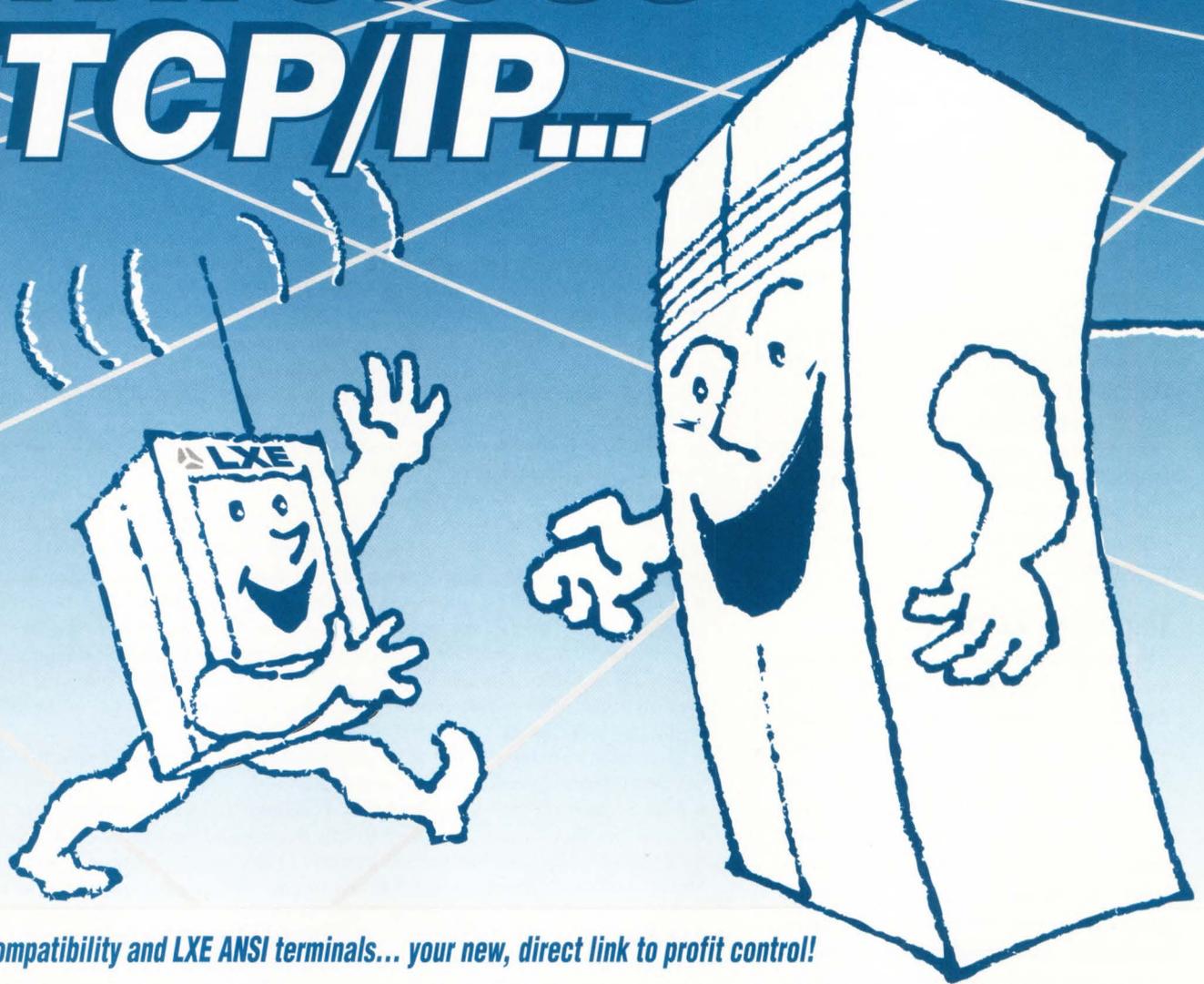
The print server in this configuration also could be designated as a file server, application server or compute server that can be accessed from across the network. In the Digital OSI environment, addi-

tional servers — for example, servers that connect LANs to WANs — are part of the seamless network. Digital’s PrintServer 40, which comes with client and support host software, is often used in such a configuration. Additionally, terminal and communications servers from vendors such as Datability Software Systems and Xyplex can easily support printers (using LAT or TCP/IP) with the same configuration.

Print servers allow several users to share printers, which is a capability that only recently has been perfected. This is a big plus, especially when you consider the cost of laser printers and today’s extravagant color printers.

By using distributed printers, an organization can respond to change quickly, adding resources where the demand is greatest. Many users can share

# Introducing Wireless TCP/IP...



***TCP/IP compatibility and LXE ANSI terminals... your new, direct link to profit control!***

Let's face it, data captured precisely at the point of action eliminates profit-killing paper trails. But connecting a wireless asynchronous terminal has not always been easy... until now. LXE's new ANSI terminals connect to most networks and virtually any host computer through standard TCP/IP Telnet protocol. That means real-time control and improved profits in your warehouse or on your factory floor without custom programming, cabling costs, time delays or software changes.

Under TCP/IP, LXE Systems are transparent to a multitude of host oper-

ating systems. That means you can run your current applications with the added mobility of LXE wireless terminals. LXE terminals can be hand carried, mounted on a forklift truck, or go wherever it is



impractical to run wires. And LXE terminals are fully compatible with automatic ID input devices such as bar code scanners.

Introduce your TCP/IP network to LXE wireless ANSI terminals by contacting one of our Project Coordinators at **(404) 447-4224**.



**WIRELESS DATA FOR INDUSTRY**

303 Research Drive • Norcross, GA 30092 • USA  
CIRCLE 289 ON READER CARD

a printer while using different applications, often printing multiple formats on various sizes and types of media.

### Resource Distribution

In true network computing, in which different computers and workstations communicate as peers, users can tap the applications and other resources of any computer along the network, regardless of the type of terminal or workstation on the desktop. Moreover, users needn't concern themselves with where these resources and applications reside. With its comprehensive set of network peripherals servers and software, Digital is probably closer to achieving this goal than its competitors are.

ULTRIX V4.0, for example, features a media kit with client support for Digital's PrintServer series of printer servers, which means that these peripherals are now interoperable with each of Digital's operating systems. In addition, the new version of ULTRIX includes support for many new systems and peripherals.

### Third-Party Activity

The long-term purveyors of printing machines in the Digital world — CIE America (formerly C.Itoh), Datasouth Computer, Facit, Printronix, Talaris Systems and Taneum, among others — are well-versed in the problems facing today's network manager regarding peripherals sharing. Many of these solutions are geared toward eventually providing enterprisewide printing integration. Industry-standard communications and print controllers and servers are available from most Digital-industry printer vendors, and most offer ways to optimize performance and functionality in network settings.

Companies concentrating on this area of technology have developed a variety of approaches to the same general issues involved in printer integration:

- Bay Technical Associates, which designs and manufactures peripheral-sharing devices, has developed LaserShare, an internal buffer and spooler that lets any Hewlett-Packard LaserJet-com-

## RESOURCE-SHARING: STANDARDS AND PROTOCOLS

Distributed resource-sharing is perhaps the fundamental advantage of Digital's enterprise networking architecture. In the context of sharing printers and other peripheral devices on VAX networks, let's look at the major standards and protocols from the top down:

- Digital's Enterprise Management Architecture (EMA) is an open-ended, all-encompassing networking strategy. It specifies connectivity among network nodes (X.25, ISDN) and data interoperability with the outside (PCSA, DECnet/SNA).
- Open Systems Interconnect (OSI) is the International Standards Organization's (ISO) networking model. DECnet/OSI, which is compliant with the model, is the fundamental component of EMA.
- Network Application Support (NAS) is Digital's unfinished applications integration environment. One of the four components of NAS is Information and Resource Sharing Services, which allows users and applications to share networkwide information and resources. The other components are Applications Access Services, Communications Services and Operating System Services. These services are available to VTs (ULTRIX or VMS) and workstations running DECwindows.
- Portable Operating System Interface (POSIX) is an industry-standard operating system extension that defines the Operating System Services portion of NAS. It provides an operating system interface for applications portability.
- Sun Microsystems' Network File System (NFS) has become a LAN file management standard and is supported by Digital.
- MIT's X Window System is a connectivity standard that specifies a graphical user interface (GUI) look and feel. DECwindows is based on X, and both OSF/Motif and AT&T's Open Look contain X components.
- Digital's Compound Document Architecture (CDA) contains the Digital Document Interchange Format (DDIF), a Digital-standard protocol for networked compound documents. It was designed to let users share text, graphics, tables and other data.
- Computer-Aided Acquisition and Logistics Support (CAL) is the Department of Defense's (DoD) standard for information and document management. It defines a suite of standards that's an architecture for creating and transmitting technical information.
- The ISO's Office Document Architecture (ODA) is another complex document standard that specifies document processing styles and structures through to the generation of the document image.
- Electronic Data Interchange (EDI) is a standard for the computerized exchange of standard business documents or forms transactions.
- Adobe Systems' PostScript is the standard language that graphics printers read.
- Initial Graphics Exchange Standard (IGES) is a standard for graphical data transfers.
- DECprint is Digital's Print Services portion of NAS, part of Information and Resource Sharing Services. It provides a way for users to print from a variety of systems to a variety of output devices without specifying exact formats or print characteristics.
- Digital's Local Area Transport (LAT) is the proprietary VMS transport protocol for terminals and printers, and TCP/IP is the corresponding UNIX-standard protocol. On a typical Digital network, the two often coexist. They'll soon coexist with OSI. —E.B.

patible printer be shared by up to four computers.

- Crystal Point has designed a software gateway product called LineLock that lets modems be shared. Laden with security functions, this program provides control over network modem access by permitting multiple modem servers to share a network database and to monitor the network's modem pool remotely.
- Gold Key Electronics makes an elec-

tronic switch box that allows multiple users to share and select from multiple printers in a LAN environment. It comes with an LN03 emulator for HP LaserJet printers.

- GrayMatter Software & Consulting offers ScriptServer Software for VMS, which lets PostScript printers (including color printers) tie into VAX networks via LAT and PCSA.

An integrated printing strategy is

# ETHERNET ON BROADBAND!

## Looking For Flexibility?

Our M8023 Modem is a fully-compliant IEEE 10BROAD36 modem. Our flexibility fits your network, whether it's Ethernet\*, OSI, TCP/IP, TOP, DECnet, XNS, Novell NetWare, or MS-net.

## Need Interoperability?

Our M8023 is completely interoperable with existing Ethernet on broadband networks. You can then share and access everything broadband has to offer.

## Want Options?

The M8023 is available in single- or dual-cable versions with one, two, or eight ports.



Ask Us About...

# EtherWare

  
**FAIRCHILD**  
DATA CORPORATION

350 N. Hayden Road  
Scottsdale, AZ 85257  
(602) 949-1155  
FAX: (602) 941-0023  
TWX: 910-950-0085

12020 Sunrise Valley Drive  
Reston, VA 22091  
(703) 391-2725  
FAX: (703) 476-2217  
TWX: 249803 (VA)

\*Ethernet, OSI, TCP/IP, TOP, DECnet, XNS, Novell NetWare, and MS-net are registered trademarks of their respective owners.

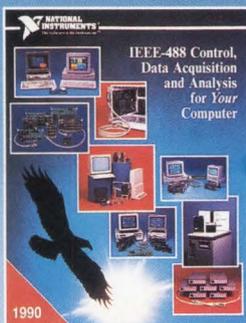
# IEEE-488...



## for Q-BUS and UNIBUS

- DMA or programmed I/O interfaces
- **Drivers for:** VMS, RSX, RT, VAXELN, UNIX, and ULTRIX
- **Software provided in source code**
- Interactive program development utility
- High and low-level function for FORTRAN, BASIC, Assembly, C, and Pascal
- No license fee
- Support of MicroVAX, VAX, and PDP-11 series computers
- **FREE customer support**
- 30-day money back guarantee
- 2-year warranty

Call for **FREE** catalog



**NATIONAL INSTRUMENTS®**  
*The Software is the Instrument™*  
6504 Bridge Point Parkway  
Austin, Texas 78730  
(512) 794-0100  
(800) 433-3488

JAPAN (3) 788-1922 • FRANCE (1) 48 65 33 70  
UNITED KINGDOM (63) 523-545 • WEST GERMANY (89) 80-7081  
ITALY (2) 4830-1892 • THE NETHERLANDS (7) 099-6360

**CIRCLE 302 ON READER CARD**

## OUTPUT DEVICES

necessary in the democratized client/server organization of the future. In one scenario, that could involve the IBM mainframe that handles payroll and accounting and shares printing services to output checks; the VAX in engineering that prints complex graphics; the HP system used for MRP II on the factory floor; and the Wang word processing systems used in an administrative LAN to create correspondence (see diagram on page 39).

Meanwhile, companies such as BGL Technology, Advanced Technology, QMS and Tektronix continue to improve the state of the art and the price/performance ratios of laser printers. The sharing of these advanced products will eventually lead to even greater savings.

SHARING IS THE KEY, AND IT'S AVAILABLE inexpensively on OSI platforms. Inherent in DECnet and the rest of Digital's networking product set is support

for shared databases, shared printers and plotters, shared array processors, shared terminals and shared communications devices.

The best rule of thumb for network managers to follow when making configuration and location decisions is that the most cost-justifying printers are the ones constantly in use. That means printers should be interfaced with as many different systems as possible. The technologies to do this efficiently, which include client/server and third-party solutions, are quickly multiplying.

*Editor's note: For a comprehensive listing of output devices that work on Digital systems, including vendors and equipment specifications, consult the DEC PROFESSIONAL Hardware Buyers Guide. For information about the Guide, contact Lea Smith at (215) 957-1500.*

ARTICLE INTEREST QUOTIENT  
Circle On Reader Card  
High 481 Medium 482 Low 483

## For More Information

Adobe Systems Inc.  
1585 Charleston Rd.  
Mountain View, CA 94039  
(415) 961-4400

**CIRCLE 440 ON READER CARD**

Advanced Technology Int'l  
1501 Broadway, Ste. 1314  
New York, NY 10036  
(212) 354-8280

**CIRCLE 532 ON READER CARD**

Bay Technical Associates Inc.  
200 N. Second St.  
Bay St. Louis, MS 39520  
(601) 467-8231

**CIRCLE 484 ON READER CARD**

BGL Technology Corp.  
438 Constitution Ave.  
Camarillo, CA 93010  
(805) 987-7305

**CIRCLE 539 ON READER CARD**

CIE America Inc.  
2515 McCabe Way  
Irvine, CA 92714  
(714) 660-1421

**CIRCLE 485 ON READER CARD**

Crystal Point Inc.  
22122 20th Ave. S.E., Ste. 148  
Bothell, WA 98021  
(206) 487-3656

**CIRCLE 486 ON READER CARD**

Datability Software Systems Inc.  
322 8th Ave., 11th Fl.  
New York, NY 10001  
(212) 807-7800

**CIRCLE 495 ON READER CARD**

Datasouth Computer Corp.  
P.O. Box 240947  
Charlotte, NC 28224  
(704) 523-8500

**CIRCLE 487 ON READER CARD**

Facit Inc.  
400 Commercial St.  
Manchester, NH 03101  
(603) 647-2700

**CIRCLE 491 ON READER CARD**

Gold Key Electronics Inc.  
P.O. Box 186  
Goffstown, NH 03045  
(603) 625-8518

**CIRCLE 533 ON READER CARD**

Graymatter Software & Consulting Inc.  
1300 Dexter Ave. N., Ste. 550  
Seattle, WA 98109  
(206) 281-8800

**CIRCLE 537 ON READER CARD**

Kyocera Unison Inc.  
1321 Harbor Bay Pkwy.  
Alameda, CA 94501  
(415) 748-6680

**CIRCLE 488 ON READER CARD**

Printronic Inc.  
17500 Cartright Rd.  
Irvine, CA 92714  
(714) 863-1900

**CIRCLE 489 ON READER CARD**

QMS Inc.  
P.O. Box 81250  
Mobile, AL 36689  
(205) 633-4300

**CIRCLE 470 ON READER CARD**

Talaris Systems Inc.  
P.O. Box 261580  
San Diego, CA 92126  
(619) 587-0787

**CIRCLE 493 ON READER CARD**

Taneum Computer Products Inc.  
203 S.W. 41st St.  
Renton, WA 98055  
(206) 251-0711

**CIRCLE 492 ON READER CARD**

Tektronix Inc.  
P.O. Box 500  
Beaverton, OR 97077  
(503) 627-7111

**CIRCLE 518 ON READER CARD**

Xyplex Inc.  
330 Codman Hill Rd.  
Boxborough, MA 01719  
(508) 264-9900

**CIRCLE 514 ON READER CARD**

**RACAL**

**INTERLAN SERIES**

# SNMP, TSM, IPS with LAT/TCP...ASAP.

The NTS200 Terminal Server offers complete LAT, TCP, SNMP, TSM and Integrated Print Server (IPS) support. New low pricing and quantity discounts available.



### The most flexible LAT/TCP Terminal Server now supports SNMP network management.

The Racal InterLan LAT/TCP Terminal Server now supports Simple Network Management Protocol, the accepted LAN network management standard. So you can add universal access, control, and management of your terminals, network-wide.

It also supports DEC's Terminal Server Manager, allowing central configuration management for sites using TSM. Seamless integration and management of the NTS200 has never been easier.

And, it supports an Integrated Print Server, providing dual protocol print queues. Which means you can share network print resources for both VMS/

LAT and UNIX/TCP hosts. Now network resources can be shared and managed from anywhere.

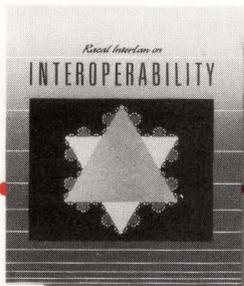
All at once, the NTS200 brings you protocol choice, resource sharing, and network management flexibility. Now. For more information, call 1-800-LAN-TALK, or Fax (508) 263-8655.



**The LAN Networking Company**

CIRCLE 334 ON READER CARD

Call 1-800-LAN-TALK to receive your free copy of "Guide To Network Architectures" excerpted from our best-seller, "Racal InterLan On Interoperability."



Order our best-seller, "Racal InterLan On Interoperability" with this coupon and only \$16.95. Send check or money order to:  
Racal InterLan, Inc.  
155 Swanson Road  
Boxborough, MA 01719

Name \_\_\_\_\_ Title \_\_\_\_\_

Company \_\_\_\_\_ Division \_\_\_\_\_

Address \_\_\_\_\_ Mailstop \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone \_\_\_\_\_

© 1990, Racal InterLan, Inc. All rights reserved. 1091

FOREVER

PostScript

Despite competing technologies, Adobe Systems' page description language will remain a standard. KEVIN G. BARKES

WHAT A DIFFERENCE SIX MONTHS MAKES.

At the fall 1989 Seybold professional publishing conference, it appeared that PostScript and its parent, Adobe Systems, were in serious trouble. Apple Computer announced it was selling its Adobe stock and developing Royal (also known as TrueType), its own "open" font technology. It was replacing PostScript fonts in new versions of its Macintosh system software, stanching Adobe's impressive royalty income and terminating a relationship that had single-handedly created a new industry — desktop publishing.

Even worse, Apple and Microsoft revealed an arrangement in which Microsoft licensed TrueImage, its clone PostScript interpreter, to Apple in exchange for the TrueType fonts. Microsoft also said it would use TrueType in future releases of its graphical user

interface (GUI), Windows. It was a stunning announcement in light of the continuing litigation between the two firms over Microsoft's alleged infringement of Mac copyrights with its Windows interface.

Adobe stock prices dropped. Great gnashing of teeth occurred in the publishing industry, as NATS (not another type standard!) jitters besieged those with huge investments in PostScript and Adobe fonts.

Then came the March Seybold conference and IBM's announcement that it had selected Adobe's Type 1 fonts and Adobe Type Manager font-rendering technology for its System Application Architecture-compliant (SAA) operating systems, including OS/2, OS/400, VM and MVS. IBM had already chosen Display PostScript for its new UNIX desktop

systems, and the SAA scheme would be compatible with the AIX Windows and Next Step implementations.

Big Blue did say it would offer the TrueType font scheme, but only on OS/2 systems. Since fewer than 220,000 copies of OS/2 have been sold since its introduction, that wasn't much of an endorsement.

IBM's decision was more practical than technical. Adobe's type library boasts 600 typefaces. PostScript can drive about 70 output devices and is supported by more than 4,000 application software packages. More than 30 major computer, printer and typesetting manufacturers, including Digital, have PostScript interpreter or Display PostScript agreements with Adobe.

TrueType, despite its promotion by Apple and Microsoft, is still vaporware,

and its alleged compatibility with Adobe Type 1 fonts is untried. Perhaps most important, surveys strongly indicated that IBM would experience a revolt within its user base if it forced customers to dump the \$4 billion they had invested in Adobe fonts and font-rendering technologies.

And as for the argument that TrueType would be an open font standard as opposed to PostScript's proprietary approach, Adobe was selling copies of its Type 1 font specifications at its booth at the Seybold show.

After a winter of discontent, PostScript was back on top of the heap.

### The King Of PDLs

What exactly is PostScript? And why is its acceptance as a standard important?

PostScript is the name of Adobe's computer programming language, which is used primarily to communicate high-level graphic information to laser printers and other output devices in a device-independent manner.

While a PostScript program can be created by a programmer using a text editor, the general method is machine generation. That is, a software driver produces a PostScript program that's transferred to an output device containing a PostScript interpreter, such as a laser printer, that executes the program and produces the required images. Display PostScript is conceptually similar, except that the interpreter is a component of the system software and the output device is a bitmapped screen.

PostScript isn't the only page description language (PDL), nor is it technically superior to the others. Its success is the result of two critical strategic agreements: the inclusion of PostScript in the

original Apple LaserWriter and the licensing by Adobe of Linotype's type library of professional, high-resolution fonts. With the 300-dpi LaserWriter at the low end and Linotype's 2,450-dpi Allied Linotronic L300 at the high end, Adobe established PostScript's device-independence and won the hearts and minds of desktop publishers and professional typographers in one fell swoop.

Since PostScript was the only easily accessible, nonhardware-specific PDL around, it was quickly embraced by software vendors. They flooded the market with PostScript-compatible programs, making the language a de facto standard.

PostScript isn't without its faults. It

can be unbearably slow when processing complex graphic images, although early performance problems could be blamed on driver software that produced inefficient PostScript code. When speed is important, users frequently resort to driving output devices in their native

### What's A Type?

PostScript Type 1 fonts get their name from the FontType language variable in the PostScript PDL. Type 1 fonts are, logically enough, FontType=1 in PostScript programs. There are several advantages to Type 1 fonts. For example, they use a restricted set of PostScript language operators, making them quite compact and able to be quickly interpreted and rasterized.

Type 3 fonts are user-designable fonts generated using the full set of PostScript language operators. PostScript-compatible fonts sold by nonlicensed third-party vendors are Type 3 fonts.

Until the release of its specifications, only Adobe and its licensed type foundries could produce Type 1 fonts. Adobe opened its Type 1 font specifications at the March Seybold conference, selling the 102-page, \$14.95 manual at its show booth.

While the publication of the formerly secret specifications exposes Adobe to increased competition from other vendors, the company claims it isn't worried. As one

Adobe representative said, "If you laid out all the parts of a Ferrari, could you build your own Ferrari?" The published Type 1 specs, while describing the fonts, don't explain how they're generated, pointing out the major difference between PostScript and the TrueType font-



## POSTSCRIPT NOTES

**Display PostScript Debuts** — Digital is reinforcing its support of the Adobe standard with the support of Display PostScript in DECwindows under VMS V5.4 and the release of a product that permits the output of PostScript files to any Digital desktop graphic Sixel printer.

Digital announced its licensing arrangement with Adobe for Display PostScript in 1988 before the release of DECwindows and VMS V5.0. With every subsequent point release of VMS, software houses have anxiously awaited the integration of the screen imaging technology with Digital's GUI. Even more galling to those loyal to VMS was that Digital included Display PostScript support in its ULTRIX workstations before VMS DECwindows.

Still, programmers aren't complaining. "We're converting everything as fast as we can," says one developer. "This will make cross-platform support a heck of a lot easier."

"DECprint Utility for PostScript to Sixel Printing for VMS" may not be a snappy product name, but it says it all. DECprint is a software-implemented PostScript interpreter running on VMS V5.1 or later. It costs \$450 per user, roughly comparable to the full retail price of PC-based PostScript clones such as LaserGo's GoScript or QMS' UltraScript. DECprint isn't a clone, however. It's licensed from Adobe, and a separate PostScript agreement is included with the customary Digital licensing material. The product is installed using the VMSINSTAL procedure. Access to the DECprint software is accomplished with a DCL "PSPRINT" command.

DECprint reads PostScript source files and converts them to a format that can be sent to Digital's LJ250, LA75, LA324, LA210 or LN03 Plus printers. The printers can be attached to either a shared printer queue or a video terminal printer port; DECprint uses the VMS job controller for queued devices and the terminal driver for attached printers. Color PostScript output is supported on the LJ250 Companion Color Printer or, with color ribbons installed, on the LA324 Multiprinter. LN03 users also need Digital's Image Support and ScriptPrinter software packages.

**The Fax Connection** — PostScript compatibility may extend to fax machines if Adobe's preliminary foray into the fax market is successful. The company is testing a low-cost fax modem daughterboard add-on to its PostScript printer controllers. In addition to generating 300-dpi laser printer output, the printer's PostScript interpreters could produce compressed 200-dpi images for industry-standard Group III fax transmission.

Even more enticing is the ability to transmit raw PostScript data files, although such transmissions could only occur among PostScript-capable fax machines or add-on computer fax cards. Adobe is working on a proprietary data transmission scheme to compensate for the limited error correction available in the Group III standard.

Raw PostScript transmission offers several advantages. Since PostScript files are an order of magnitude smaller than compressed bitmapped fax images, the time required to send a document would be significantly reduced. And the receiving machine wouldn't have to be a 300-dpi PostScript laser printer. It could be any PostScript-compatible device, including high-resolution typesetters. This would permit the virtually instantaneous transmission of typeset-quality documents to any site with a dial-up telephone line and fax-capable PostScript device.

**When Type Isn't Type** — While you still can't get a patent for the perpetual motion machine you've been tinkering with in the garage, you now can be awarded a copyright for programs that generate typefaces. The Library of Congress recently awarded a copyright to Adobe for its ITC Garamond typeface program. It's believed to be the first time a type font has been protected.

Copyright laws state that digital typeface designs can't be registered, and it wasn't the Garamond letter forms that received protection. Rather, the copyright was awarded to Adobe for the PostScript program that generates the typeface.

Industry analysts call the Copyright Office's actions a milestone in electronic publishing, since it will encourage fair competition among vendors. The legal protection of a copyright makes it easier to justify the significant investment required to develop digital typefaces. — K.G.B.

rendering schemes.

In PostScript, the "intelligence" is built into the rasterizer, the font-rendering software that generates the images produced by the output device. PostScript Type 1 fonts consist of two components: a file containing the font outline data, and an auxiliary structure containing hints or data describing important typographical aspects of the typeface. The hint data is processed by the rasterizer to improve the quality of the type, especially at lower resolutions.

The isolation of font data from the hints permits Adobe to maintain its font-rendering software without making its existing fonts obsolete. PostScript fonts can improve with age as Adobe enhances its rasterizer and hinting algorithms. PostScript rasterization technology is currently in its sixth generation. This design, coupled with the BuildFont software Adobe licenses to a half-dozen major commercial typeface foundries, permits the generation of Type 1 fonts in a matter of minutes.

The TrueType approach is the opposite of PostScript's. Preliminary reports indicate that the rasterizer is fairly simple and about half the size of the Adobe Type Manager renderer. That's because the intelligence, or font control, is built into the fonts. This makes TrueType potentially faster than PostScript but makes font generation an onerous chore, since the programmer, not the rasterizer, must do most of the work. Further, the quality of the font depends on the skill of the programmer.

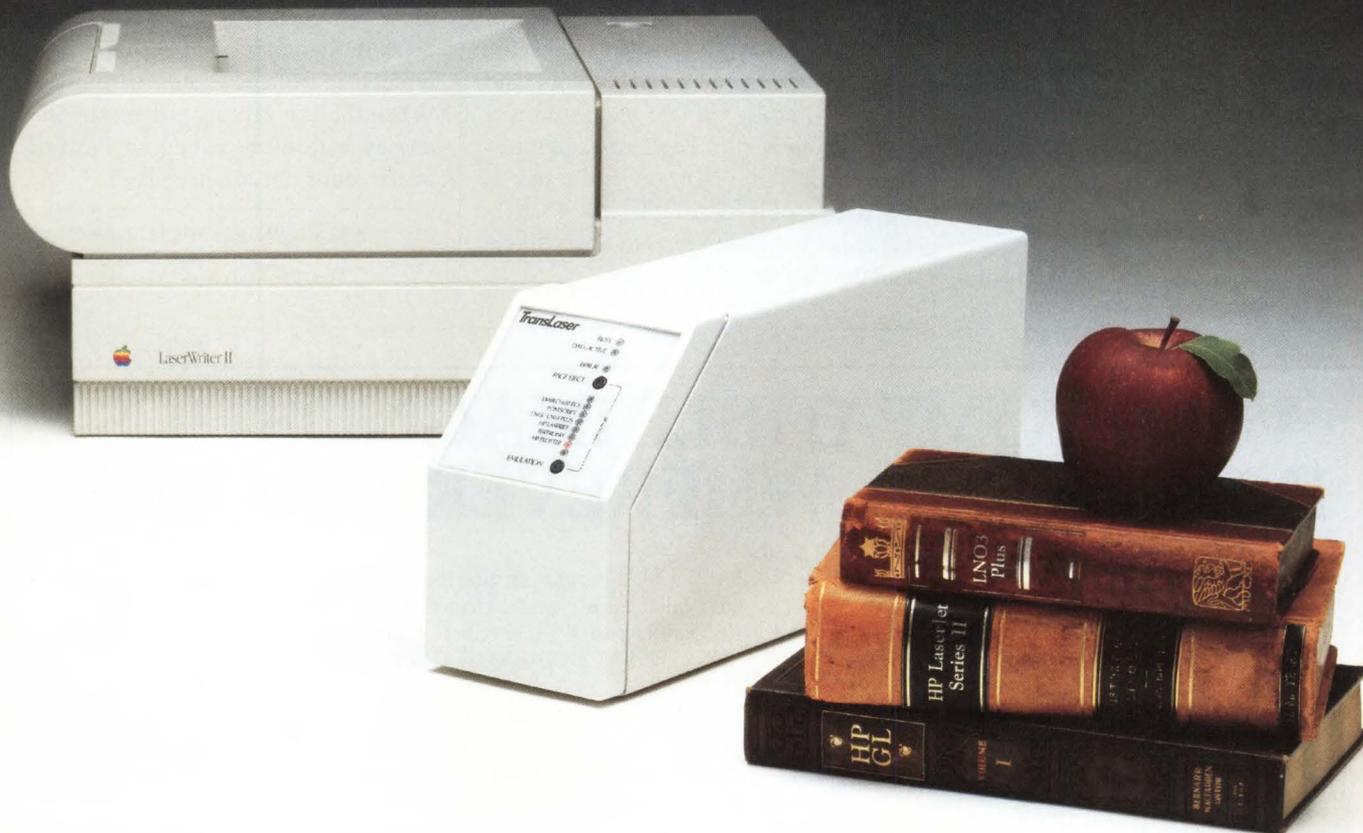
### A Matter Of Perception

PostScript's dominance as the de facto PDL standard has never been in question. The Apple/Microsoft development of TrueImage and TrueType wasn't motivated by a desire to broaden the frontiers of publishing. It was a way for the companies to avoid paying Adobe fees for PostScript technology and generate their own license fee revenue.

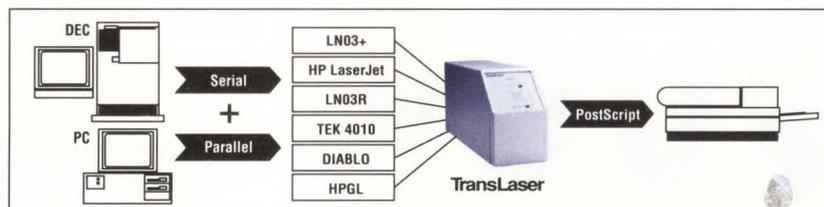
Adobe and PostScript are usually viewed as a single entity, but they are, for all practical purposes (and to the potential dismay of Adobe), two different animals. While the fortunes of Adobe

# How to teach PostScript six languages.

Call today  
for special  
distributor pricing!



PostScript printers, with their terrific graphics and wide array of fonts, make great output devices. If only they spoke your language. Like DEC® LN03™ and LN03+™. Or HP®, Tektronix®, Diablo® and HPGL. Now if these are your languages, your existing system can print PostScript. With Camintonn's new TransLaser™. All you have to do is connect TransLaser to a printer equipped with PostScript page description language by Adobe®. Then send text and graphics files just as you would to your usual output devices. The emulation modes are



software selectable and can be changed per job, or even per page. TransLaser automatically picks an active serial or parallel port, receives incoming data, translates it to PostScript and sends it to the printer. Couldn't be easier. And couldn't be an easier way to leverage your computer output investment.

## TransLaser

CIRCLE 242 ON READER CARD

**CAMINTONN**

CORPORATION

*Leveraging your computing investment.*

(714) 553-0247

2332 McGaw Avenue, Irvine, CA 92714-4992

FAX (714) 660-8063

TransLaser is a trademark of Camintonn Corp.  
All other trademarks acknowledged. © 1990 Camintonn Corporation.

**For More Information**

Adobe Systems Inc.  
1585 Charleston Rd.  
Mountain View, CA 94039  
(415) 961-4400  
CIRCLE 440 ON READER CARD

QMS Inc.  
P.O. Box 81250  
Mobile, AL 36689  
(205) 633-4300  
CIRCLE 470 ON READER CARD

LaserGo Inc.  
9369 Carroll Park Dr., Ste. 8  
San Diego, CA 92121  
(619) 450-4600  
CIRCLE 469 ON READER CARD

Unisys Corp.  
P.O. Box 500  
Blue Bell, PA 19424  
(215) 542-4011  
CIRCLE 444 ON READER CARD

The Linotype Co.  
425 Oser Ave.  
Hauppauge, NY 11788  
(516) 434-2000  
CIRCLE 442 ON READER CARD

Xerox Corp.  
800 Long Ridge Rd.  
Stamford, CT 06904  
(203) 968-3000  
CIRCLE 445 ON READER CARD

are at the mercy of the marketplace, PostScript has transcended such mundane considerations. Clone PostScript interpreters are available from many sources, and the language is on the threshold of becoming an official institution.

The International Standards Organi-

zation (ISO) soon will adopt font and PDL standards. The remaining major complaint against adopting PostScript font technology as a standard — Adobe's proprietary rights controlling third-party access to its font technology — is moot after the publication of its Type 1 font specifications. PostScript, or something virtually indistinguishable from it, seems likely to be adopted by the ISO as the world's Standard Page Description Language (SPDL).

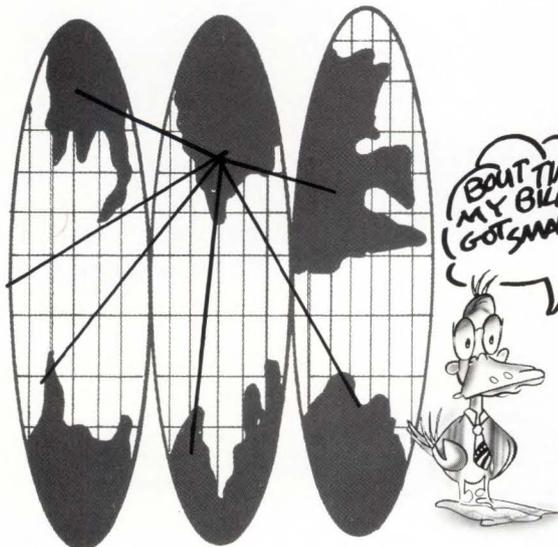
Work on the standard has been under way since 1986 under the cooperative management of Adobe and Xerox. Initially, SPDL was to consist of a combination of PostScript and Interpress, the Xerox PDL originally developed by John Warnock and Charles Geschke (who left Xerox to form Adobe and develop PostScript).

However, Digital, IBM, Unisys and others strongly urged the U.S. committee to adopt the PostScript model, and Xerox eventually dropped its objections. During the ISO sessions, the Adobe Red Book (officially, the *PostScript Language Reference Manual*) was ubiquitous, and it's a safe assumption that SPDL and PostScript will be almost one and the same, with small conversion programs handling the few components that aren't directly translatable.

Whither PostScript? The PDL is firmly entrenched, and nothing short of an inconceivable, revolutionary breakthrough in imaging technology will wrench it from its dominant position. When the 21st century arrives, the smart money will still be riding on PostScript or one of its direct descendants.

ARTICLE INTEREST QUOTIENT  
Circle On Reader Card  
High 446 Medium 447 Low 448

# VAX™ -COMPATIBLE DIAGNOSTICS INSTANTLY...WHEREVER YOU ARE!



PARSE™ Diagnostics, serving the full family of VAX computer systems, are available for General License (CPU and site independent), System Resident License (CPU specific) . . . and now as fully operable REMOTE MAINTENANCE DIAGNOSTIC SOFTWARE.

PARSE II, 3000 Series, 700 Series, 8000 Series and 6000 Series Diagnostics are currently serving over 5000 VAX computer systems worldwide. NOW! PARSE Diagnostics can be licensed on a fully paid, rental or monthly service basis.

**PARSE REMOTE MAINTENANCE DIAGNOSTIC SOFTWARE**

PARSE/RMDS is operable from any location in the world. Immediate diagnosis, via standard voice-grade telephone line, can make self maintenance a reality for any VAX system user.

**SAVE THOUSANDS OF DOLLARS PER MONTH IN MAINTENANCE CHARGES.**



**PARSE Incorporated**

6360 Orcutt Road, San Luis Obispo, CA 93401

Also available: PARSE MV Diagnostics for Data General MV™ 4000 thru 20000 Systems

PARSE is a trademark of PARSE Incorporated, VAX is a trademark of Digital Equipment Corporation, MV is a trademark of Data General.

Wherever you are in the world,  
PARSE has your answer

(805) 544-8588

FAX: 805•541•0792

CIRCLE 339 ON READER CARD

# Networkaholics



Here's a family of 15 to 50 page per minute printers that you can put to work on your network without fear that they won't do their share. Talaris printstations specialize in local area printing on any Ethernet network, including TCP/IP or DECnet®. They have 5 emulations (including LNO3® Plus) and an optional PostScript® interpreter, enough to please every user on the network. And their Multiplexed I/O capability brings new meaning to the word connectivity.

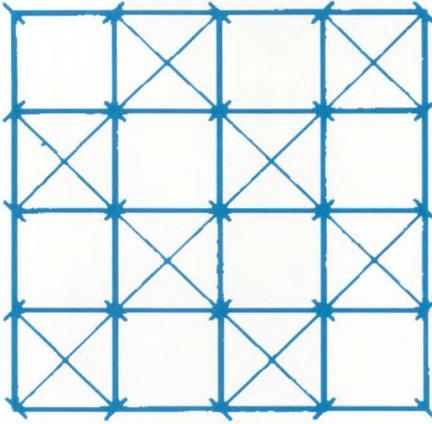
Multiplexed I/O lets the printstation function as a node on the network, while at the same time being connected to a PC through the RS232 port and to a printsharing device through the Centronics parallel port. The printstation handles the switching, even setting a different default emulation depending on the input port. With that kind of flexibility you've finally got a printer that can work as hard as your users.

**TALARIS**  
SYSTEMS INC.®

Registered trademarks are proprietary to their respective manufacturers.

CIRCLE 165 ON READER CARD

(619) 587-0787  
6059 Cornerstone Court West  
P.O. Box 216580 • San Diego, California 92126



# DEC PROFESSIONAL RECOGNIZES...

▼ Clearpoint Research Corporation

▼ Cognos Corporation

▼ Maintech

▼ Miller Freeman Expositions

▼ Programmed Intelligence Corporation

▼ Walker Richer & Quinn, Inc.

▼ Bull Printing Systems

DEC Professional wishes to thank the DEC computing industry leaders listed above who joined us in co-sponsoring the June 27 reception at the Computer Museum. Five hundred guests attended this successful and enjoyable event, touring the museum and learning more about the history of computing.

Proceeds from this event went to benefit the Computer Museum and aid this valuable institution's efforts to document the past, present and future of the computer industry.

## DEC Professional

101 Witmer Road, Horsham, Pennsylvania 19044 ■ (215) 957-1500



# Choose It and Use It.

Remember when you were a little kid? Put a penny in the gumball machine and wait to see what would roll out. Sure, you'd want the red one but it seemed like the green one would always appear. Until now, using a video display terminal was like buying a gumball. Cumbersome setup menus and complex commands would leave you hoping for one result but receiving another.

With the Infinity Series from Falco Data Products, you always know what you're getting. The Infinity Interface makes sure of that. Employing a DOS application-like feel, the Infinity Interface effortlessly guides you through terminal setup and windowing configuration. With a mouse or a cursor, you choose the configuration and windowing capability and use the full power of the world's most technologically advanced video display terminals. Point and choose. No cryptic commands. It's that simple.

It's also what you would expect from Falco—a VDT industry leader for ten years. So, rather than spending your pennies and hoping that what you see is what you'll get, call Falco and choose your favorite flavor. ANSI, ASCII, or Multiple Personality. With or without graphics. The choice is yours.

## FALCO

1-800-FALCO-4-U

Falco Data Products, Inc.  
Sunnyvale, CA 94086  
Tel: 408-745-7123  
FAX: 408-745-7860

Falco-Europe  
Tel: (33) (1) 3043-1446  
FAX: (33) (1) 3064-0557



CIRCLE 127 ON READER CARD

All trademarks are registered to their respective owners.



&  
TION

STANDARDS

# EDI: Ready For Takeoff

Brian O'Connell

## Electronic Data Interchange Starts Its Countdown Toward Industry Acceptance.

The days of corporations exchanging invoices, payments and other business records by mail are numbered. The wheels of commerce in the U.S. and abroad are turning toward electronic correspondence as the primary means of conducting business.

Electronic Data Interchange (EDI) is a set of automated business communications standards that enables companies to send and receive documents electronically. Companies such as Digital, which continues to champion the Open Systems Interconnect (OSI) as the global computing unifier, have developed OSI-influenced application tools geared toward EDI solutions. Proprietary standards that threatened EDI's early growth have crumbled in recent years, leading to the emergence of a handful of dominant EDI standards.

An independent study of *Fortune* 100 and 500 companies reveals that EDI is big business. More than 75 percent of the *Fortune* 100 use EDI, as do 39 percent of the *Fortune* 500. A \$130 million industry in 1987, EDI skyrocketed to more than \$300 million in 1989 and is expected to reach \$2 billion by 1995.

Before EDI, companies generated purchase orders and invoices, then funneled them to their destinations through the postal service. Upon receipt, the cycle renewed itself in the accounting offices and purchasing and sales departments of the corresponding vendors. Aside from the 10- to 14-day delay in finalizing the deal, companies had to contend with

processing errors and accounting discrepancies.

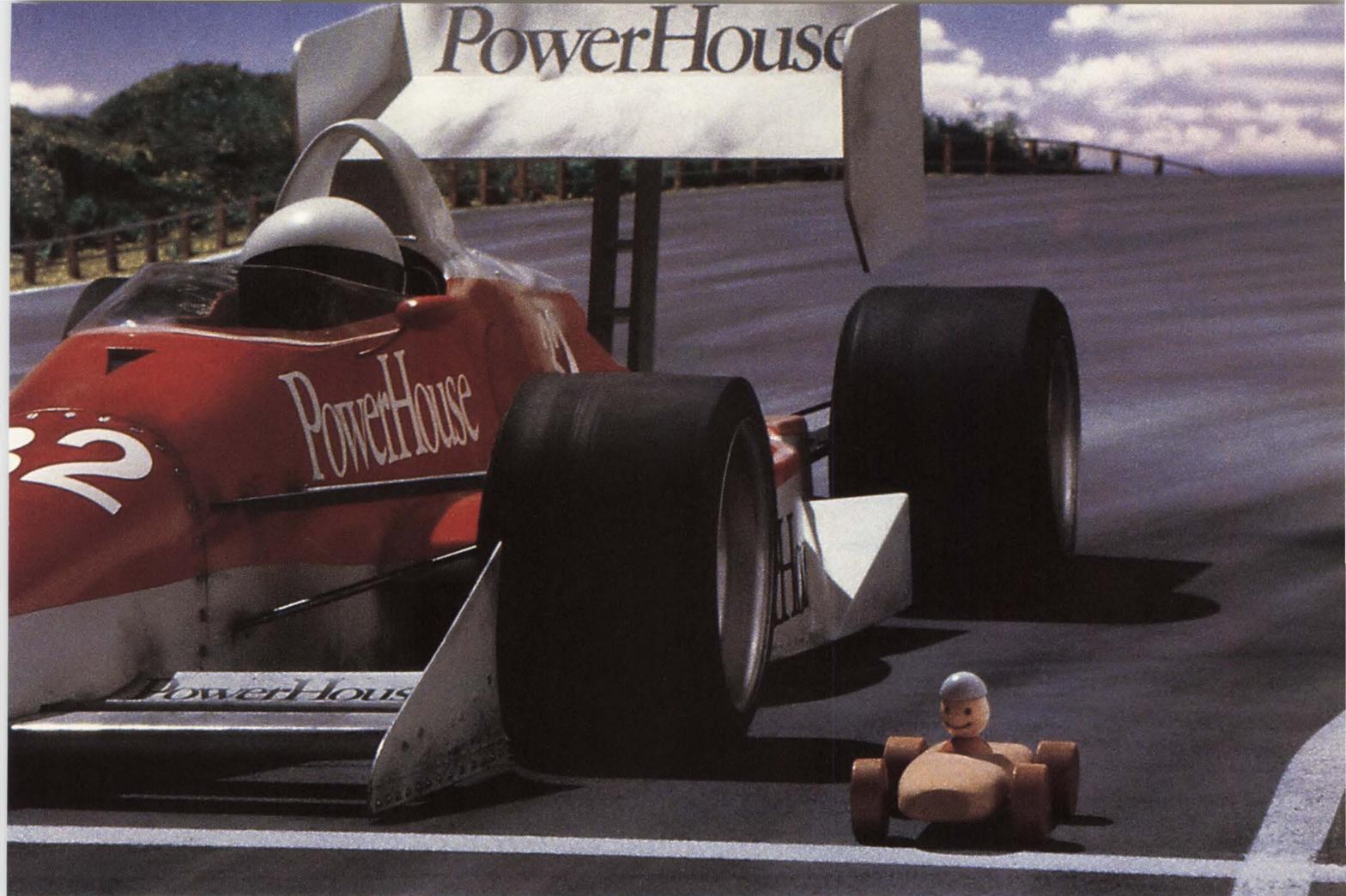
EDI heralds a better way of doing business. EDI orders can be structured into a computer-readable format and either transferred to a Value-Added Network (VAN) or transmitted over direct lines established by the trading partners. The purchase or sales order can then be routed to the vendor's EDI application, converting the information into an accurate business document. EDI enthusiasts claim cycle times can be reduced to two or three days.

### Digital's New Role

Digital's involvement with EDI dates to 1984, according to Digital EDI project director Bill Carlisle. Early activity focused on product and services implementation in the transportation sector, an early EDI user. EDI on the VAX was introduced two years ago in Europe, providing software that supported international EDIFACT EDI standards as well as the dominant ANSI X.12 standard in the U.S. Then Digital announced its Compound Document Architecture (CDA), an integrated architecture for creating and managing distributed compound documents through an enterprisewide DECnet/OSI network.

Marty Schultz, president of ASA/Omtool, says that Digital considers EDI "a major revenue stream." Schultz notes the emerging influence Digital's consulting services has on firms that are considering EDI but are unsure of implementation costs and procedures.

Digital's current strategy is to forge an alliance between EDI and its Network Application Support (NAS) unified software environment



# NO CONTEST.

In the race for performance, no other application development environment can keep up with the unparalleled speed of Cognos' PowerHouse.<sup>®</sup>

Because the PowerHouse application development environment is tightly integrated with Digital's CASE/IS strategy and VAX/VMS architecture — including Rdb, RMS, CDD/Plus and ALL-IN-1. So the applications you create run with maximum speed and performance. And beat anything else hands down.

And for multi-vendor and UNIX environments, Cognos StarBase™ beats any other portable RDBMS. Also hands down.

No wonder PowerHouse is the most widely installed application development environment for VAX/VMS systems (*Computer Intelligence*, 1989).

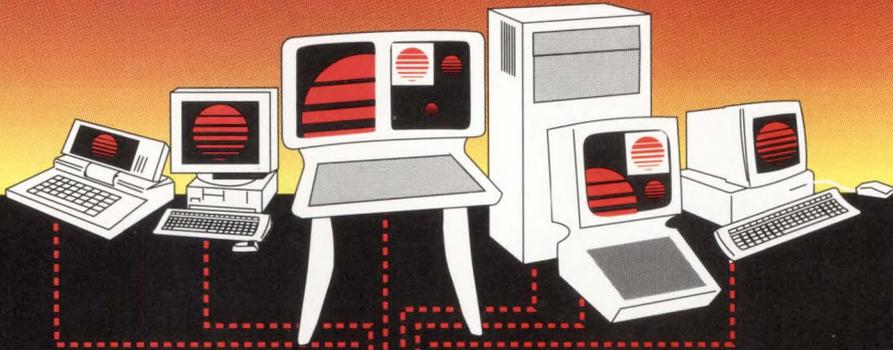
So try using some real tools, not toys, for application development. For more information, call 1-800-4-COGNOS. In Canada, call 1-800-267-2777.

**COGNOS<sup>®</sup>**  
**Real Tools. Not Toys.**

CIRCLE 108 ON READER CARD

© 1990, Cognos. PowerHouse is a registered trademark and StarBase is a trademark of Cognos. The other trade names referenced are registered, trademarked or service marked by their respective manufacturers.

# Truly Compatible...



## ... and 26 Pages per Minute

### The fastest systems on the market.

BGL's family of LaserLeaders deliver the best price/speed/performance available. To prove it we will benchmark any files you choose to send us. Compare our print quality, graphics processing and application flexibility to any other plotter or printer on the market.

#### Easy Compatibility

Because of the architecture of the controller, no matter how complicated the graphics used, or if dissimilar hosts are driving simultaneously, the printer will never show a "PRINTER BUSY". BGL's system has two 8 1/2"x11" full page buffers (11"x17" double page buffers available) for maximum throughput.

#### Expandability

LaserLeaders are designed to change as your needs change. Easy to update and create emulations, LaserLeaders have flexibility of interfacing, and the ability to add special features for customers (on site if desired.)

#### Internal Emulation and Network Versatility

LaserLeaders can mix and match with LN03, LN03 Plus, HP/GL, LaserJet Series II, Versatec,

Tektronix 4010/4014, and BGL/PDL (PostScript), Sixel Graphics, and "Z" emulations. **Network interfaces include:** Ethernet (DECnet, TCP/IP), Versatec, Centronics, Dataproducts, AppleTalk, IEEE-488, and RS-232C. **Up to 35 typefaces standard.** Mix as many fonts as you need per page. Supports Adobe type fonts. Duty cycles range from 25,000 to 100,000 pages per month.

#### Ten Years of Reliability

BGL has systems installed in Fortune 500 companies and the government. LaserLeaders can run almost all communication software, enabling our systems to communicate for remote diagnostics and software updates.

LaserLeaders have a 16 MHz/286 (16 MHz/386 or 20 MHz/386 optional), 5.64 MB of memory and a 1.2 megabyte floppy, 20 megabyte hard disk standard, coupled with graphics processor or the newest 32 bit Intel 80960 RISC processor.

BGL's systems have nation-wide maintenance support through TRW.

For further information, call  
**(805) 987-7305**

**BGL Technology Corporation**  
438 Constitution Avenue  
Camarillo, CA 93010

FAX: (805) 987-7346  
Telex: 467154



(see Figure). NAS includes standards-based application services that provide integration among software applications across a distributed environment of multivendor systems. Digital has incorporated its original VAX/EDI release with NAS to install EDI at Digital and to build customized EDI systems for customers.

Digital announced a significant EDI release in Boston on May 30. According to EDI Marketing Manager Curt Anderson, DEC EDI is a client/server distributed computing product that's NAS-oriented in scope and implementation. DEC EDI is a combination communications server, translation server and application server that integrates EDI with CDA.

The communications server handles all inbound and outbound electronic messaging while supporting most export/import protocols, including the X.400 standard messaging protocol. The translation server supports industrywide EDI standards such as EDIFACT, ANSI X.12 and the Transportation Data Coordinating Committee (TDCC) while supporting smaller, more customized industry protocols. The application server interfaces "hook customer applications into an EDI environment," says Anderson.

"Our distributed server environment offers customers three capabilities," he adds. "Flexibility in implementation, upgradability without changing software, and a wide choice of trading partner connections." These connections include four of the largest VANs in the U.S.: GE Information Services, British Telecom Tymnet, (formerly McDonnell Douglas), AT&T EDI and MCI Mail.

Digital also will provide a series of enterprise integration strategies for EDI users, involving programs to educate companies in the planning, design, implementation and management of EDI. "We feel that 80 percent of the problems companies are having with EDI today are management-related," notes Anderson. "The other 20 percent are technological in nature."

Digital also announced the formulation of consulting relationships with two

# Desktop Imaging Supercomputer Performance

Performance, standards, plus ease of integration, add up to **MILLENNIUM**, Ramtek's most powerful image processor yet!

## HIGH RESOLUTION

1280 x 1024 displayable from independent 2048 x 1024 graphics and imaging frame buffers.

## X WINDOW SYSTEM

Millennium supports X11.3 with the 10 MIPS TI34020 processor.

## GRAPHICAL USER INTERFACE

Millennium is compatible with industry standard interfaces such as Motif, Openlook, etc.

## IKS

Industry standard Imaging Kernel System includes:

- FFT's, Histograms
- Convolutions, Warping
- Morphology, Geometry, etc.
- Compliance with ANSI PIK

## IMAGE PROCESSING

Powerful imaging functions accelerated by 80 MFLOPS of floating point processing.

## OPTIONS

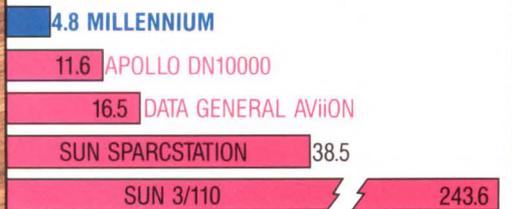
- Include choice of host connections using SCSI or VME
- Real-time input for on screen live NTSC or PAL Video
- Turn Millennium into an imaging workstation by adding the Sun SPARCengine 1E single-board 12 MIPS processor



## PLATFORM INDEPENDENT

Connects to any host which supports the X Window System and has either VME or SCSI ports available.

## FAST FOURIER TRANSFORM 512x512 — IN SECONDS



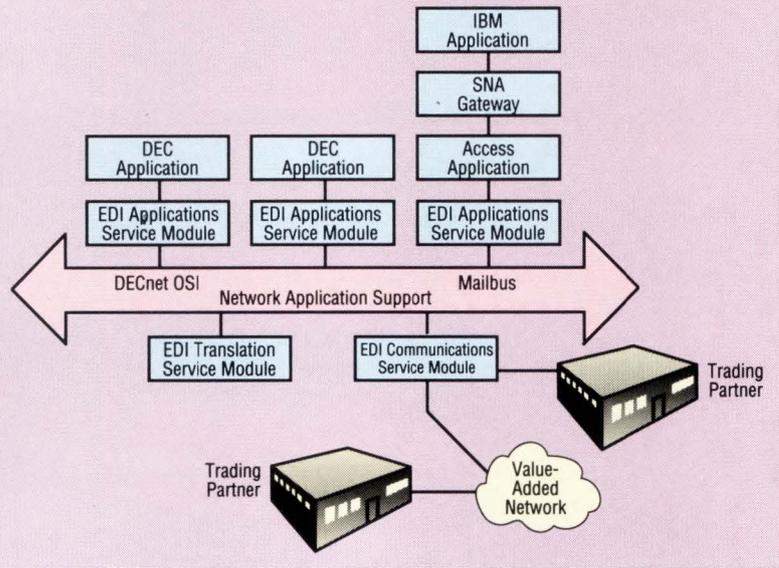
Details Available Upon Request

# Ramtek

Ramtek Corporation  
1525 Atteberry Lane  
San Jose, CA 95131  
1-800-RMK-MILI

F

FIGURE



The EDI architecture plays a critical role in Network Application Support (NAS), Digital's unified software environment solution.

leading EDI advisors — Coopers & Lybrand and Price-Waterhouse — and a software partnership program to help integrate users with EDI, Anderson says.

**Early EDI**

Retired Air Force Colonel Edward A. Guilbert is widely credited with developing EDI in 1969 as a way to alleviate congested paperwork in the transportation industry. Guilbert organized the industry by convincing airline, train and bus bigwigs to commit to the development of a unified standards architecture. After a bitter struggle, that architecture, an early version of today's ANSI X.12 standard, was finalized in 1975. It proved to be the cornerstone of today's EDI message subset standards.

Now president of Guilbert Associates, a Washington-based corporate think tank, Guilbert recalls the early days of EDI. "Although today EDI is recognized as the hottest thing on campus, there were a great many skeptics in the '60s and '70s who thought EDI would never fly. It took a great deal of prodding to

convince corporations that EDI was something they needed and wanted. No consideration was given to electronic message standardization among companies back then. In fact, larger companies were prepared to exclude competitors by installing proprietary software in client computers."

This attitude came back to haunt EDI, as the lack of unified standards inhibited its early development. EDI standards primarily are a structure for the message envelope that surrounds the transmitted data, a structure for the message field and contents segment, and a means of communications among external computers.

EDI requires that all correspondence transmitted among trading partners be sent in an envelope. Regardless of standards, message envelopes must begin with a header segment that indicates the location of the sender and must end with a trailer segment that indicates the location of the receiver. Message envelopes also contain codes to identify the nature of the data contained in the message.

The content data normally includes purchase order numbers, terms of the

transaction, and billing and shipping information. The contents contained in the message envelope are normally structured to adhere to the EDI standard agreed on by the corresponding firms. It's left to the trading partners to agree on EDI standards that define the contents and structure of the message envelope.

Trading partners can customize their EDI applications to verify trading partner ID during transmission and in the group headers, specify transaction status or categorize data separators. Data can be transmitted among computers through such standard methods as NJRE, RJE, 3780/2780 protocol, SNA or X.25 packet-switched networks.

**EDI Standards**

Guilbert eventually helped engineer the acceptance of two early EDI standards that dominate the culture today: ANSI X.12 and the (TDCC) standard. These standards provide guidelines on how EDI data should be configured and how electronic communications among trading partners should be implemented.

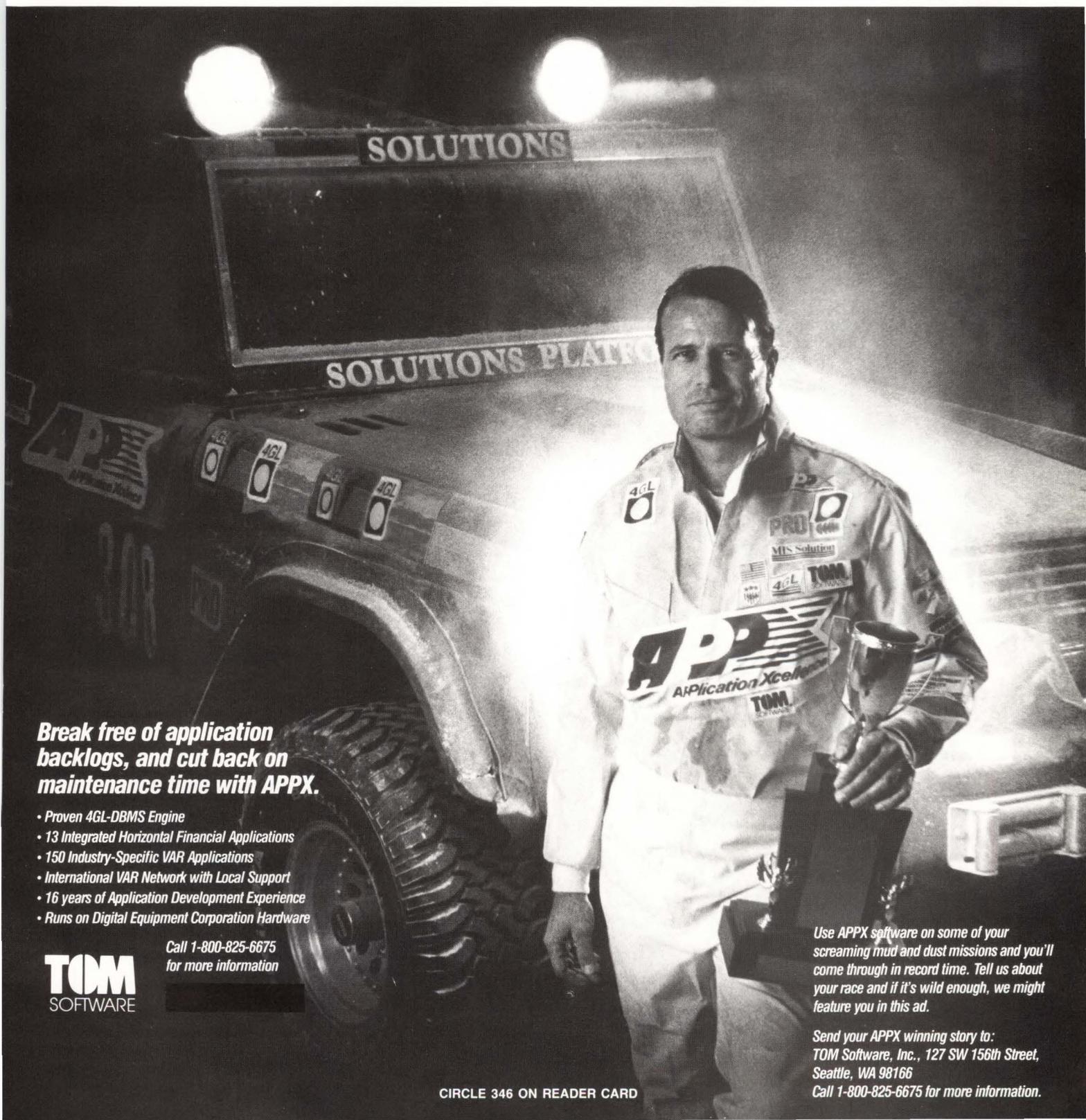
Ruth Anderson, vice president of *The EDI Forum*, an Oak Brook, Illinois-based publication, explains that while the ANSI X.12 and TDCC standards are dominant domestically, two international standards, EDIFACT and X.400, are emerging as companies seek to conduct business globally. In addition, industries have established and enforced their own standards to meet the needs of their markets. These standards include CIDX for the chemical industry and VICS for the grocery industry.

Companies such as American Business Computer and LDJ have designed their software packages to comply with standards used by the auto industry. On the other hand, firms such as Electronic Data Systems and GE Information Services have designed EDI packages for wider, more commercial use.

According to Ruth Anderson, domestic, international and industry EDI standards are converging on ANSI X.12

# APPX™

## APPlication Xcellence



**Break free of application backlogs, and cut back on maintenance time with APPX.**

- Proven 4GL-DBMS Engine
- 13 Integrated Horizontal Financial Applications
- 150 Industry-Specific VAR Applications
- International VAR Network with Local Support
- 16 years of Application Development Experience
- Runs on Digital Equipment Corporation Hardware

Call 1-800-825-6675  
for more information

**TOM**  
SOFTWARE

Use APPX software on some of your screaming mud and dust missions and you'll come through in record time. Tell us about your race and if it's wild enough, we might feature you in this ad.

Send your APPX winning story to:  
TOM Software, Inc., 127 SW 156th Street,  
Seattle, WA 98166  
Call 1-800-825-6675 for more information.

CIRCLE 346 ON READER CARD

as the de facto EDI standard. ANSI X.12 is a flexible, generic standard that can be used by many industries. Once implemented, industries can determine their own guidelines in tune with their own business but subject to the rules and in-

dealing with currency exchanges on EDI, but few, if any, have solved language problems," he says.

Any integration of EDI standards involving EDIFACT is subject to the concerns of the leading members of the

the accepted language of EDIFACT in Europe."

While the DEC EDI release has merged EDI effectively with X.400, some industry analysts contend the EDI-X.400 link can be taken to an even higher plateau. X.400 is the ISO's response to application-to-application data transferral. According to EDI Solutions' Kessler, the X.400 standards take EDI capabilities one step further by enabling firms to exchange e-mail, graphics and facsimile documents.

The ISO's upper layer harbors X.400, where it's used by manufacturers and retailers to send business correspondence among different computers. Currently, companies must establish gateways to transmit e-mail properly.

X.400 developers at Digital have created a single gateway for companies to communicate with one another, regardless of computer models. As EDI relies solely on the Binary Synchronous protocol to send messages, some users

## While the DEC EDI release has merged EDI effectively with X.400, some industry analysts contend the EDI-X.400 link can be taken to an even higher plateau.

terpretation of ANSI X.12.

Jeffrey Kessler, national accounts manager at EDI Solutions, believes that EDIFACT and ANSI X.12 are destined to merge into a uniform international trading standard. "Some technology already exists that combines the two standards. Domestically, companies are already

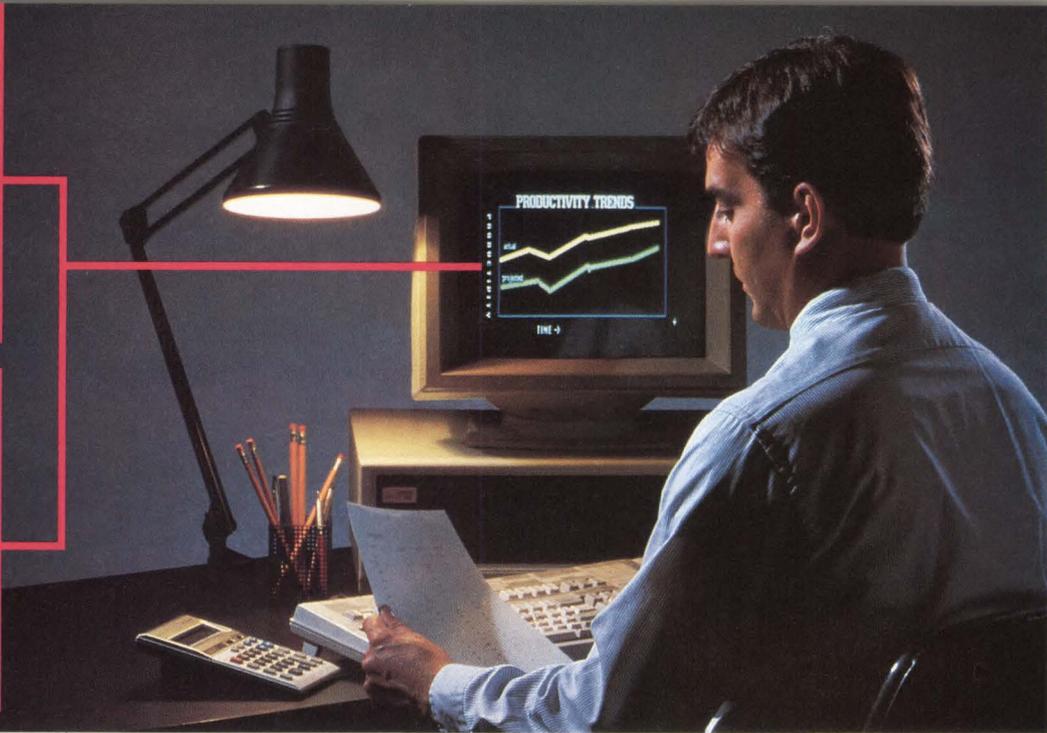
European Economic Community. Warns John Witten, director of marketing for DNS Associates, "With EDIFACT in Europe, nobody can agree on standardization, everyone is going his own way. The French want to do it one way, and the Germans want to do it another way. And nobody is happy about English as

To realize the complete potential of EDI, you need software that's completely functional. EDI/EDGE for VMS™ is just that software. It has a user interface, for example, that makes it fast and easy to type a document, transmit the

coded data 0100110101011010101010101010101010101010101010101001011010010101100101 and deposit the information in your trading partner's electronic mail box. EDI/Edge also features windowing, user-definable outputs, and it comes from ASA, an Authorized Digital Solution Provider. EDI/Edge. For the complete story, call 1-603-898-7000 Ext. 140.

**ASA digital**™ Authorized Solution Provider  
ASA/Omtool Division  
13 Industrial Way, Salem, NH 03079

As an Authorized Digital Solution Provider, ASA International Ltd. has satisfied Digital's requirements for business performance and financial stability. VMS is a registered trademark of Digital Equipment Corporation.



## VAX Data Collection Systems Because You Can't Manage Without the Facts

Get real-time information on the status of your entire operation with Burr-Brown Collection Data Systems.

Inventory, production flow, labor status. . . all the facts you need to run your operation, identify problems, and make up-to-the-minute decisions are available to you instantly.

All this from a cost-effective, simple-to-install, easy-to-use data collection system designed to interface with your existing computer system or network, and designed to grow as your business grows.

### FROM THE LEADER IN DATA COLLECTION

Burr-Brown Data Collection Systems are increasing productivity in hundreds of plants worldwide in industries like electronics, automotive, pharmaceutical, paper, textile, and medical. We have 27 international and domestic offices with sales and service-specialists to support you.

### THE COMPLETE SOLUTION

Burr-Brown Data Collection Systems offer a complete solution to your application. Our software is designed

to meet your application needs and requires no knowledge of programming. Each Transaction Processor we offer can support a variety of terminals. These terminals can be easily configured for specific functions and located throughout your plant. Printers, Laser Scanners, Magnetic Stripe Readers, Bar Code Wands, Voice Input/Output Systems, and Machine Interface Modules are some of the many peripheral devices available to you.



Use them for:

- Material Tracking
- Monitoring Use of Plant Resources
- Quality Control
- Labor Reporting
- Inventory Control
- Statistical Process Control

### EASILY ADAPTABLE MICROTERMINALS

Microterminals are as easy to use as bank ATMs. Prompts guide the user through data entry and are displayed on a highly-visible back-lit liquid crystal display. Employees use the terminals to input data, make inquiries, or receive transactions.

Burr-Brown offers the **Total Solution** to all of your data collection problems. Let us provide you with a complete information package on how to get back to the basics in plant management with Burr-Brown Data Collection Systems.

Burr-Brown Corporation  
Post Office Box 11400  
Tucson, Arizona 85734  
1-800-548-6132

**BURR-BROWN®**  
**BB**

may prefer to integrate X.400, which offers more capabilities and operates on a greater number of protocols.

WHILE EDI ADVANCES toward a unified standard that incorporates parts of ANSI X.12, TDCC, EDIFACT and X.400, its

future lies in corporate implementation. EDI was bankrolled primarily by industrial giants such as Ford Motor and General Electric, which are now positioned to pass the costs of EDI to smaller firms that may not be able to afford it.

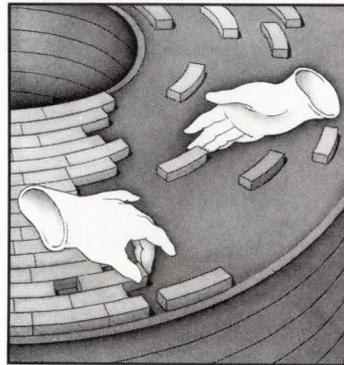
After all, notes Schultz, larger com-

panies that have already implemented EDI can afford to be selective about whom they conduct business with. "How well can businesses absorb EDI's costliness?" he asks. "EDI's implementation is inevitable. The longer companies wait, the more it's going to cost them in the long run."

EDI is already a fixture in the global marketplace. While some maintain that EDI hasn't taken off yet, it certainly is taxiing down the runway. Non-EDI users should ask whether this is a ride they can afford to miss.

ARTICLE INTEREST QUOTIENT  
Circle On Reader Card  
High 475 Medium 476 Low 477

**"System performance... Do you believe in magic?"**



Can the slow performance on your VAX™ vanish as if by a simple sleight of hand?

Can you escape the bonds of Backup/Restore?

What is it that works in the background, as if behind a curtain, to make your fragmented files contiguous?

Do what the majority of VAX System Managers do to be the magicians of their VAX/VMS™ Systems.

See how by a simple installation of software...

- Your system's speed can magically increase!
- Your time will free up! • Your users will applaud!

**BE A MAGICIAN WITH YOUR VAX!**

Call **1-800-VAX-HELP** ext. 2334

and let DISKEEPER/Plus™ Customized Online Defragmenter make your fragmentation problems disappear for the next 30 days — free!

Get your Free 30-Day Trial Demo of DISKEEPER/Plus with Fragmentation Analysis Utility today!

Let our "wizards" of cost justification help you astound your finance people! Get your cost justification materials today!

DISKEEPER/Plus

**Executive Software**

**I/O EXPRESS™**

Copyright © 1989, 1990 Executive Software International. All Rights Reserved. DISKEEPER/Plus and I/O EXPRESS are trademarks owned by Executive Software Int. VAX and VAX/VMS are trademarks owned by Digital Equipment Corporation.

CIRCLE 126 ON READER CARD

### For More Information

American Business Computer  
1968 Green Rd.  
Ann Arbor, MI 48106  
(313) 930-7840  
CIRCLE 496 ON READER CARD

ASA Int'l Ltd.  
13 Industrial Way  
Salem, NH 03079  
(603) 898-7000  
CIRCLE 478 ON READER CARD

British Telecom Tymnet  
P.O. Box 49019  
San Jose, CA 95161  
(800) 538-5465  
CIRCLE 538 ON READER CARD

DNS Associates Inc.  
1 Militia Dr., Ste. B1  
Lexington, MA 02173  
(617) 862-8569  
CIRCLE 497 ON READER CARD

EDI Solutions Inc.  
7760 France Ave. S., Ste. 1140  
Minneapolis, MN 55435  
(612) 831-9000  
CIRCLE 479 ON READER CARD

Electronic Data Systems Corp.  
1615 Dundas St. E.  
Whitby, ON L1N 7S6  
(800) 263-7946  
CIRCLE 498 ON READER CARD

GE Information Services  
401 N. Washington St.  
Rockville, MD 20850  
(301) 340-4000  
CIRCLE 499 ON READER CARD

LDJ Inc.  
P.O. Box 219  
Troy, MI 48099  
(313) 528-2202  
CIRCLE 500 ON READER CARD

At this very moment your DEC VAX is capable of doing many things. But imagine being able to communicate directly with your field offices, your suppliers, your customers, your potential customers, anybody, no matter what system they are using without ever having to buy a single new piece of hardware.

Imagine your secretary being able to send a fax, EasyLink® e-mail, telegram, telex,

cablegram, or Mailgram® message without ever having to leave the desk.

Imagine being able to access stock quotes and airline schedules without ever having to call your broker or travel agent.

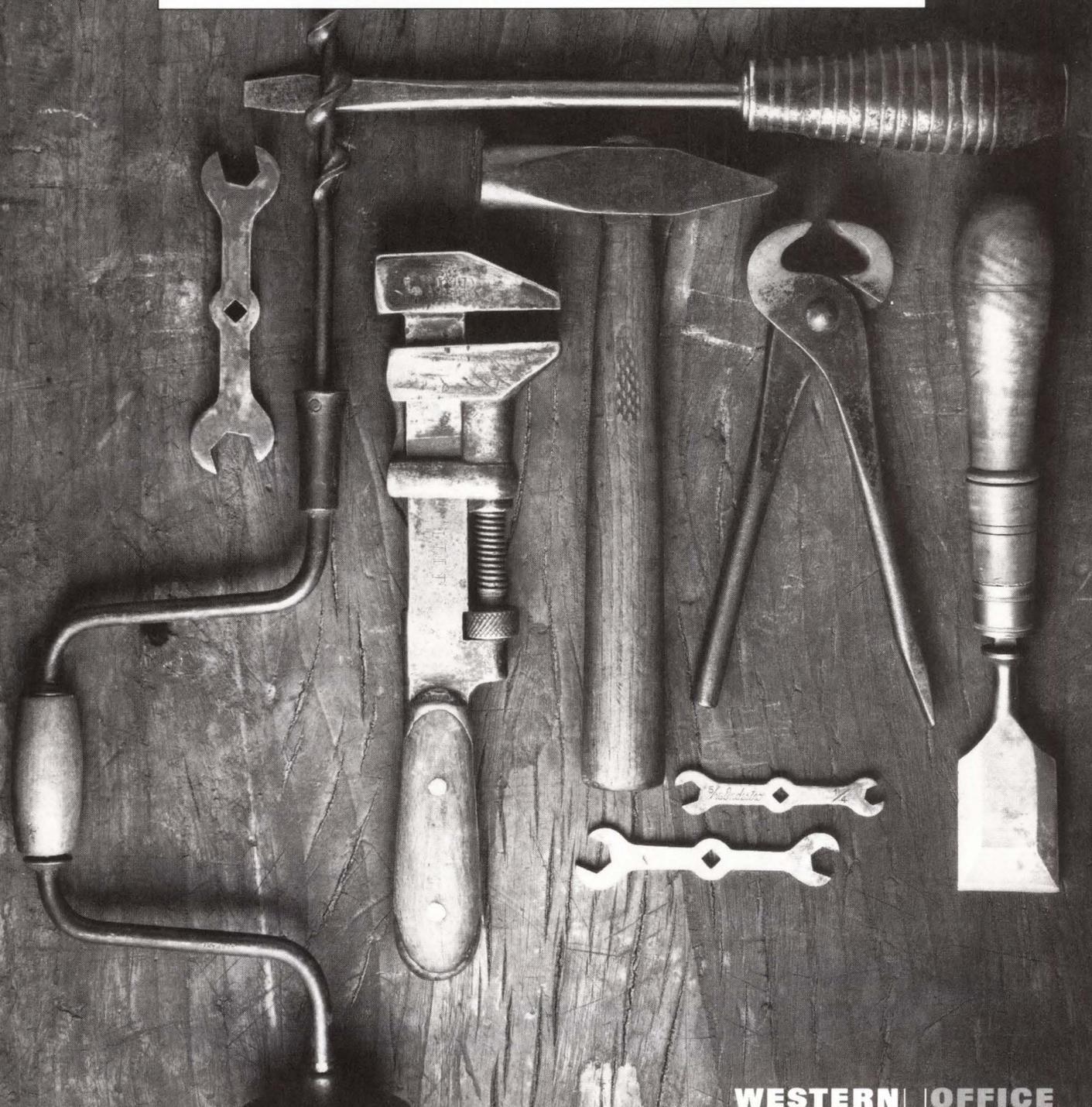
With Western Union's OfficeAccess<sup>SM</sup> you don't have to imagine. Because it allows your

DEC VAX to do all these things without having to retrain your staff or disrupt your present system. In short, it's the link that literally puts the world at your desktop.

For more information on Western Union's OfficeAccess, call 1-800-779-1111 Dept. 910. Once you see how much more efficient it can

make your business, it'll be hard to imagine how you ever managed without it.

## The Only Kind Of Hardware Western Union Can't Hook Up With Your DEC VAX.



*Datability Software Systems' Vista Network Protocol Translator Card And LAT-TCP/IP Network Interface Card Expand Terminal Server Range.*



# A Server To Suit

In the computer industry, good ideas spread like wildfire. DEC's Local Area Transport (LAT) protocol terminal server is one of those ideas. In the seven years since the LAT terminal server's inception, many functions have been added, and the number of OEMs building terminal servers has expanded. Some of the terminal server OEMs mirror the original, while others add value.

As with most mature products, the terminal server's evolution has been driven by customer demand. Customers demanded more ports per server and got it. They demanded smaller servers with a lower cost per port and got that, too. The most recent demand was for greater compatibility with systems that don't support LAT, primarily TCP/IP. Databil-

ity Software Systems is one OEM that has granted this wish.

The Datability Vista is a high-end terminal server designed around a modular chassis. You can pick and choose from the available options to build a server configuration that suits your requirements. Datability's approach to building communication servers lends itself to long-term solutions that can expand and change. We reviewed Datability's Vista Network Protocol Translator (NPT) card and the LAT-TCP/IP Network Interface Card (NIC) options.

An NPT card translates between any two supported communication protocols on a Vista NIC. The NIC provided for this review was the dual-protocol LAT-TCP/IP unit. The board is plug-ready

DAVID W. BYNON



# MAX YOUR VAX.

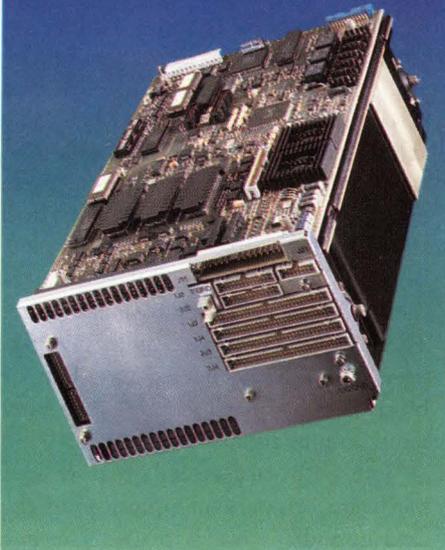
*Specify Sabre™ disk drives—  
the performance leader  
by many other names.*

digital VAX

## **Sabre™ Disk Drives**

Many of today's advanced computer systems utilize Sabre disk drives to maximize system performance. Now VAX users can too. CAE, CAD, real-time imaging, high-resolution graphics and network file servers need a special kind of disk drive.

Sabre disk drives feature a 15 ms average seek, 15% faster than a DEC RA90. And two Sabre model 1123 drives offer 1730 MB of formatted storage yet fit into the same space as one RA90, providing you with 40% more capacity in the same amount of space.



## **Reliability you can count on.**

DEC VAX systems have the power to place enormous demands on a disk drive subsystem. But, with Sabre's advanced design, 24 hour-a-day duty cycle and 50,000 hours-plus MTBF, Sabre is built to accept the challenge.

Thousands of DEC users have experienced the benefits of Sabre drives—you should too. To max the performance of your VAX insist on Sabre when adding disk storage. You'll get improved performance, superior reliability and greater capacity...at a very affordable price. For the name of the Sabre subsystem supplier nearest you, call (612) 931-8625.

 **Seagate**

for ThickWire or ThinWire Ethernet connections. In this configuration, the NPT's job is to convert between LAT and TCP/IP TELNET.

### TELNET Tie

TELNET is an industry-standard terminal-to-host protocol. It's part of TCP/IP (the Internet Protocol Suite) and is available for most UNIX systems. TELNET is completely separate from LAT network services, but it provides many of the same features. The idea behind TELNET is that a user with access to the network can start a terminal session with a network host. Unlike LAT, which supports LANs only, TELNET works with WANs. Because TELNET was designed primarily for the WAN environment, it isn't aware of hosts or services until the user requests a connection. It wouldn't be practical for TELNET hosts to broadcast their services as LAT hosts do with multicasts.

TELNET is an application-layer network protocol commonly called the Network Terminal Protocol. When you use TELNET to connect to a host system, TELNET is completely ignorant of your

terminal type and the host. TELNET begins the connection assuming both ends of the connection are dumb terminals. The two ends then negotiate options and features for the session.

TELNET is supported by the Transmission Control Protocol (TCP), a connection-oriented protocol that supports multinet applications. TCP is

a 32-port line card, and the LC-8-RS232, an eight-port line card — are additional plug-and-play options. At least one line card is required.

### Server Operation

The Vista is very much a standalone system. It doesn't require a host download, although it can accept a load file if

**“  
The Vista is essentially a computer chassis and bus  
with option cards installed to meet a  
communication requirement.  
”**

responsible for end-to-end reliable data transmission. It interfaces to a lower level protocol, such as the Internet Protocol (IP). IP provides the necessary mechanism for TCP to send and receive variable-length information packets. IP defines the fundamental unit of data transfer in the Internet.

### Installing The Boards

The Vista is essentially a computer chassis and bus (called the Vista Bus) with option cards installed to meet a communication requirement. The NIC is the main component. It provides the network connection and the system's processing intelligence. NICs come in several flavors, including LAT-only, TCP/IP-only and the dual-protocol LAT-TCP/IP unit.

The NIC directly supports any of three network interface connections: a standard DIX/AUI transceiver connection, BNC ThinWire connection and RJ45 connection for unshielded twisted-pair wire. The network connection style is configured through the use of two jumper blocks at the front of the NIC. No other setup options are necessary.

The NPT card doesn't require user hardware setup. You simply plug the card in and it's ready to use. The line card options — such as the LC-32-RS423,

necessary. The Vista is ready to connect to LAT services from the moment it's switched on. Connecting to TELNET services requires a minor amount of configuration work.

Because TELNET services aren't broadcast to the network, network name servers are required. A TCP/IP network name server is any node set up to relate TCP/IP names and addresses to other nodes. Although functionally part of the TCP/IP network, name servers communicate with a special protocol of their own. An IP user (client) who knows a name server's IP address can send it a name and receive an IP address, if the name server knows it.

Much like an IP name server, the Vista can store IP names and addresses. In the Lab, two VAX systems were used to test the Vista, the first a VAX running VMS V5.3 and the second a VAX running ULTRIX-32 V3.1. When the Vista is switched on, it immediately knows the LAT service names, which include the VAX/VMS system. The ULTRIX-32 system is unknown because it isn't running LAT and its IP address hasn't been defined to the server. Prior to using the Vista in the TCP/IP network environment, the network manager must assign an IP address and define name server names

## Vista

**PLATFORMS:** VAX or UNIX-based systems

**PRICE:** The Vista NPT card costs \$2,399. The LAT-only NIC costs \$1,200. The TCP/IP-only NIC costs \$1,200. The dual-protocol LAT-TCP/IP NIC costs \$1,600. The Vista chassis costs \$1,000

## DATABILITY

### HEADQUARTERS:

Datability Software Systems Inc.  
322 8th Ave., 11th Fl.  
New York, NY 10001  
(212) 807-7800

**PRODUCT LINE:** Multivendor connectivity products

**FOUNDED:** 1977

**OWNERSHIP:** Private

**BRANCHES:** Atlanta, Boston, Chicago, San Francisco and London

CIRCLE 495 ON READER CARD

and addresses to the Vista. The features are easily established from the server's console port:

```
Vista> SET PRIVILEGED
Password> system
Vista> CHANGE ADDRESS 192.41.217.20
Vista> CHANGE NAMESERVER CHAZ IP
192.41.217.4
```

The Vista's command interface is modeled after the DECserver. Anyone with DECserver experience will feel at home with Datability's software.

### Network Protocol Translator

Each NPT card supports one to 16 translation sessions. A translation session is an incoming connection that's translated to another protocol and sent back out as an outgoing session. The feature is used to connect LAT services to TELNET services and vice versa.

The NPT is essentially a line card, similar to the LC-32-RS423, without physical line connections. The NPT's connections are logical, provided within the unit. You can picture the card

as having two sets of ports, source and destination, which are logically connected. Port 1 maps to port 17, port 2 maps to port 18, and so on.

To create a LAT service on the Vista that can be used to connect to a TELNET TCP/IP host, a command such as the following would be entered:

```
Vista> CHANGE SERVICE CHAZ PORT 1-8 ID
"Chaz"
VIRTUAL ENABLE VIRTUAL "192.41.217.4"
Vista> CHANGE PORT 1-8 ACCESS REMOTE
Vista> CHANGE PORT 17-24 VIRTUAL ENABLE
```

This allows up to eight users to connect to TELNET TCP/IP address 192.41.217.4. The VIRTUAL ENABLE command on the remote ports (17-24) makes it possible to disconnect the connection with the source port when the destination port disconnects. To allow multiple sessions through one port, the local switch option must be set. It's also possible to configure a TELNET TCP/IP host address to translate to a LAT service. This would permit users on a TELNET TCP/IP host to connect to a

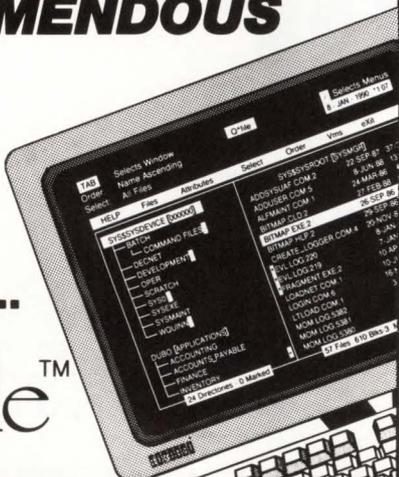
LAT service, such as a VAX/VMS host, anywhere on the LAN.

THE WEEKS I SPENT with the Vista were productive. I not only learned a few things about TELNET and LAT, I also learned how easy it would be to integrate UNIX systems and users into the DECnet/LAT environment.

One characteristic I didn't like about the Vista was its noise level: Its fans are loud. My second gripe is directed at the documentation. Even though I have many years of network and terminal server experience, I could have used more examples. This was especially true when trying to configure a TELNET TCP/IP host address to a LAT service, such as a printer.

I give Datability's Vista praise on two counts: flexibility and ingenuity. I like being able to configure a system with, say, 32 ports now and 64 or more later. The protocol converter is another great idea. These features expand the possibilities of Datability's terminal server. ■

## A 'TREE'MENDOUS NEW WAY TO MANAGE YOUR VAX...



**Q\*file™**

Tree menuing architecture — the state-of-the-art for advanced microcomputer environments, is finally available for your VAX/VMS system. Q\*file™ brings you the ultimate in command shell software designed for both system professionals and end users.

Q\*file™ increases user productivity while giving System Managers powerful File/Disk Management capabilities. Q\*file™ offers very fast execution, graphical directory tree, point and shoot menus, terse mode for experienced users, integrated VMS Command Line and full On-line Help.

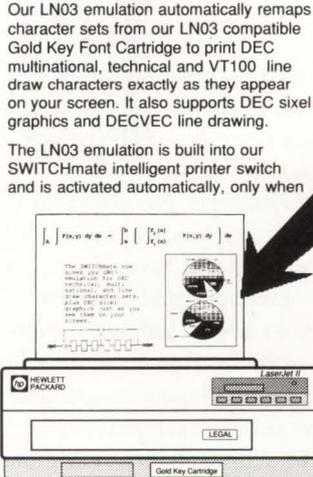
Contact us to obtain a 30 day FREE trial and see how 'Tree'mendous your system can be!

W. Quinn Associates, Inc.  
 Phone: (800) VAX-FILE  
 Fax: (703) 476-0414

CIRCLE 340 ON READER CARD

# WYSIWYG

Now What You See on your Digital screen Is What You Get from your HP LaserJet printer.



Our LN03 emulation automatically remaps character sets from our LN03 compatible Gold Key Font Cartridge to print DEC multinational, technical and VT100 line draw characters exactly as they appear on your screen. It also supports DEC sixel graphics and DECVEC line drawing.

The LN03 emulation is built into our SWITCHmate intelligent printer switch and is activated automatically, only when needed, so your LaserJet also becomes a shared resource for up to six systems, DEC and non-DEC alike.

Want the most popular laser printer on the market, but with DEC compatibility as well?

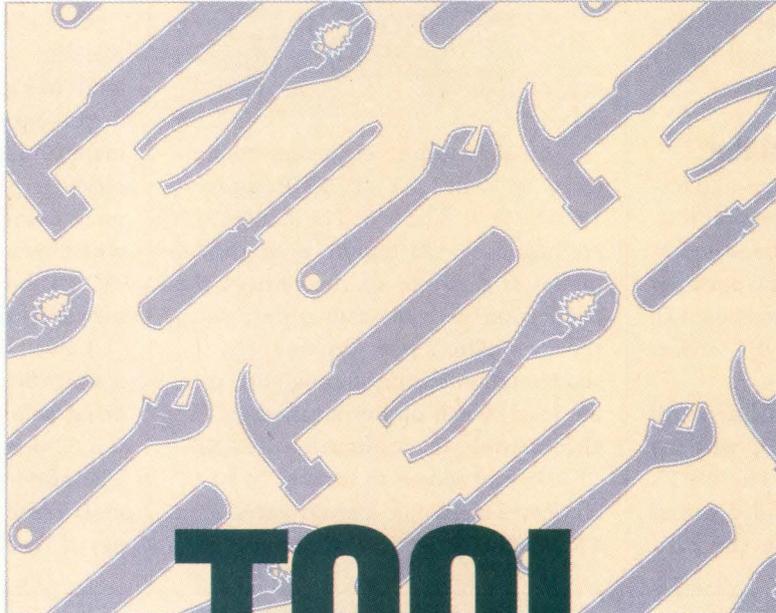
**"WYSIWYG."**  
 With Your SWITCHmate It's What You Get!

**Gold Key ELECTRONICS, Inc.**

18 Lamy Drive, P.O. Box 186, Goffstown, NH 03045 (603) 625-8518  
 SWITCHmate, Digital, DEC, DECVEC, LN03, VT and LaserJet are trademarks of their respective owners.

CIRCLE 131 ON READER CARD

*Touch Technologies' I/O Plus Can Add  
Subsystem Monitoring To Your System Management Toolbox.*



# TOOL FOR THE I/O TRADE

Your computer system is only as fast as its slowest resource. Take your I/O subsystem, for example. No matter how well your CPU can crunch numbers or how much memory you have, if your data is slow to enter and leave these resources, your whole system suffers. Remote file access, severe file fragmentation and poor distribution of frequently accessed files can cause performance problems.

I/O Plus from Touch Technologies

helps you identify trouble spots in your I/O subsystem. We tested V1.1 on our production MicroVAX II and VAX 8350 running VMS V5.1-1.

Installation is a simple matter of backing up the distribution to a directory of your choice and running a startup command procedure. You can optionally define a logical name to point to a directory to hold I/O Plus' data for your node.

I/O Plus requires `BYPASS`, `CMKRNL`

DAVID B. MILLER



# FlashDAT™, the fastest, most reliable 4mm backup system



## Best VMS backup

FlashDAT gives you the most speed *and* reliability of any 4mm backup system by integrating tape acceleration software and the only computer-grade DAT drive.

## Twice the speed

FlashDAT can halve backup time because it incorporates Touch Technologies' world-famous Dynamic Tape Accelerator (DTA). DTA keeps tapes streaming continuously

at optimal speed by smoothing the uneven data transfer from VMS BACKUP.

Second by second, the DTA monitor reveals backup progress. Transfer rates, tape remaining, throughput history and many other details put you totally in charge.

## Software-aided reliability<sup>SM</sup>

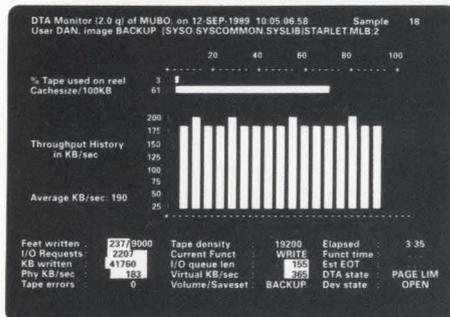
Two software breakthroughs greatly enhance the inherent reliability of FlashDAT's computer-grade drive. First, continuous tape streaming ends the punishing wear and tear of start/stop operation. Second, electronically controlled tape positioning replaces error-prone belts, pulleys, and springs.

## A triumph of teamwork

It took the combined skills of three technology leaders to create FlashDAT. Winchester Systems teamed with tape pioneer Archive Corporation and backup experts Touch Technologies to bring you the ultimate DAT storage system.

## Unbeatable value

FlashDAT comes complete with controller, DTA software, and computer-certified 4mm tape, yet costs only \$4,995\*. Available now.



*FlashDAT maintains continuous tape streaming to backup 1.3GB in 2 hours - unattended.*

FlashDAT conforms 100% to the Digital Data Storage (DDS) format, and to DEC's TMSCP protocol and Q-bus, UNIBUS, 3100, and HSC interfaces. Capacity ranges from 1.3 to 9 gigabytes in a variety of enclosures.

**Try FlashDAT for 28 Days  
at no risk!**

**Call Today!**  
**800-325-3700**

**WINCHESTER SYSTEMS**

400 Cummings Park  
Woburn, MA 01801 FAX : 617-933-6174

Winchester Systems is a registered trademark, FlashDAT is a trademark, and Software-aided reliability is a service mark of Winchester Systems Inc. VMS, TMSCP, Q-bus, UNIBUS, and HSC are trademarks of Digital Equipment Corporation. Dynamic Tape Accelerator is a trademark of Touch Technologies Inc.

See us at Booth #4607 at DEXPO East 90.  
CIRCLE 345 ON READER CARD

\*1.3GB Q-bus version.

and WORLD privileges. It also requires a BYTLM quota of at least 24,000 and a PGFLQUO of at least 20,480.

**I/O Knowledge**

I/O Plus' main menu is shown in Figure 1. As you can see, I/O Plus can be run

interactively or in batch mode. Under Miscellaneous Procedures, you can get to DCL to perform VMS functions, then return to I/O Plus.

You start your first I/O Plus session by taking a snapshot of the images currently running on your system with the Sample

menu option. The time required to sample your system will vary widely as your system load varies. For example, it took five minutes to sample our 8350 at 11:30 a.m. on a weekday. You'll want to take samples during times of peak use to get the most accurate picture of your I/O performance.

Samples can be appended to one another and analyzed as one large sample. And samples on various nodes in a VAXcluster can be consolidated and analyzed as a single sample, providing cross-cluster analysis. However, you must log into each node to create a data sample. You can't initiate a sample across cluster nodes.

I/O Plus provides enlightening reports and graphs. A sample is shown in Figure 2. Reports and graphs can be displayed on your terminal, sent to a system printer or to a slave printer attached to your terminal.

Figure 2 is a lock master analysis. Remotely mastered locks can slow cluster performance if there's a need for a lot of cross-node I/O. This report shows the locks that are mastered on various nodes in your cluster and the I/O activity taking place between the node on which the sample was taken and other cluster members.



**Need An Easy-To-Use Alternative?**

The Easy-To-Use & Powerful Solution Is



*The User Data Management System*

UDMS efficiently integrates all common VAX/VMS™ data management products.

- Rdb™ • Run-Time Rdb™ • RMS™
- VAX-DBMS™ • RS/1® • INGRES®
- ORACLE® • SYBASE® • SYSTEM 1032®

You'll appreciate UDMS's window-driven productivity tools, performance, affordability and our unequaled software support.

Use Our Intuitive User-Interface To:

- Create Reports • Update All Supported Databases
- Download to PC's • Integrate Applications
- NEW!** • Create Graphical Reports

Call Us Today For Your **FREE Demo Copy** Of UDMS.  
1-800-962-UDMS or 303-987-1001



7175 West Jefferson Ave., Denver, Colorado 80227-9905

INGRES is a trademark of Relational Technology, Inc. ORACLE is a registered trademark of Oracle Corporation. Rdb, Run-Time Rdb, RMS, DATATRIEVE, VAX/VMS and VAX-DBMS are trademarks of Digital Equipment Corporation. RS/1 is a registered trademark of BBN Software Products Corporation. SYBASE is a registered trademark of Sybase, Inc. SYSTEM 1032 is a registered trademark of CompuServe Data Technologies. UDMS is a trademark of Interactive Software Systems Inc.

CIRCLE 133 ON READER CARD

**I/O Plus**

**PLATFORMS:** VAX/VMS V4.2 and later

**PRICE:** From \$995 for the MicroVAX to \$1,595 for the VAX 6000. A VAXcluster version costs \$3,995

**TOUCH TECHNOLOGIES INC.**

**HEADQUARTERS:**  
9990 Mesa Rim Rd., Ste. 220  
San Diego, CA 92121  
(800) 525-2527

**PRODUCT LINE:** VMS system tools and 4GL software

**FOUNDED:** 1982

**OWNERSHIP:** Private

CIRCLE 458 ON READER CARD



# Nothing Is Faster Than A Great Team.

In sailing, great teamwork wins races. The combination of a powerful sailboat and a skilled crew can't be beat. For high performance computing, there's another team that can't be beat; your workstations and our memory.

You see, Dataram memory is the perfect teammate for your workstation. No other memory gives you more speed and high performance than our technically superior boards.

But we give you more than speed. We assure our memory's quality and reliability with a Lifetime Guarantee and The Express Spares Program. We price our memory quite competitively. And we support it with an expert technical staff. In fact, since 1967, we've offered a full line of high performance memory products – with speeds up to 250 MHz.

For the ultimate in high performance computing, team your workstation with our memory. It's an unbeatable combination.

DEC	SUN	HP/Apollo	DG
VAXstation 3100	3/260 3/280	DN2500	AViON
VAXstation 3200-3900	3/470 3/480	9000/340 DN3000	MV series
VAXstation 2000	4/260 4/280	9000/360 DN3500	
DECstation 2100/3100	SPARC 330 SPARC 370	9000/350 DN4000	<b>IBM</b>
MicroVAX II/III/IV	SPARC 490	9000/370 DN4500	RISCSys 6000
VAX 6000 Systems	1MB/4MB SIMMs		

## DATARAM

**Your workstations, our memory. A powerful team.**

The Dataram Corporation, P.O. Box 7528, Princeton, NJ, 08543  
**1(800)822-0071** In NJ, 1(609)799-0071

DEC • SUN • HP/Apollo • IBM • Mac • MIPS • SGI

All brands and/or product names mentioned are trademarks or registered trademarks of their respective manufacturers.

**CIRCLE 245 ON READER CARD**

Another report that focuses on files and locks suggests candidates for data caching or buffering. A file fragmentation report can point out potential problems by displaying the activity on fragmented files. A hot file report identifies files with high I/O activity. You can also generate reports on a file-by-file basis. You'll be able to see which files are open, which users are accessing these files and which images are being run that use the files in question.

User-, device- and process-based reports can be generated. A user report displays the images users are running and the files they're accessing. A device report can help you balance the load placed on your disk drives by showing you the activity on a drive-by-drive basis. A process report breaks down I/O subsystem activity by PID rather than by user. Two related reports can tell you how processes are behaving in relation to each other. These reports can show you processes blocking access to a resource and processes waiting for a resource locked by other processes.

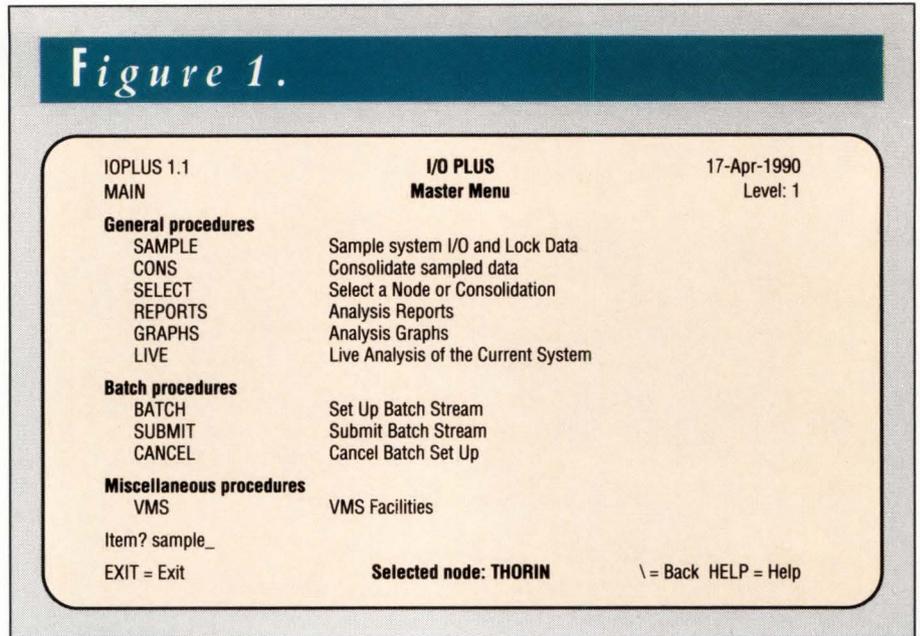
### I's And O's

In V1.1, graphs are available for the lock master, user and image analysis. Any terminal will be able to display graphs. Also, graphs can be printed out on any hardcopy device.

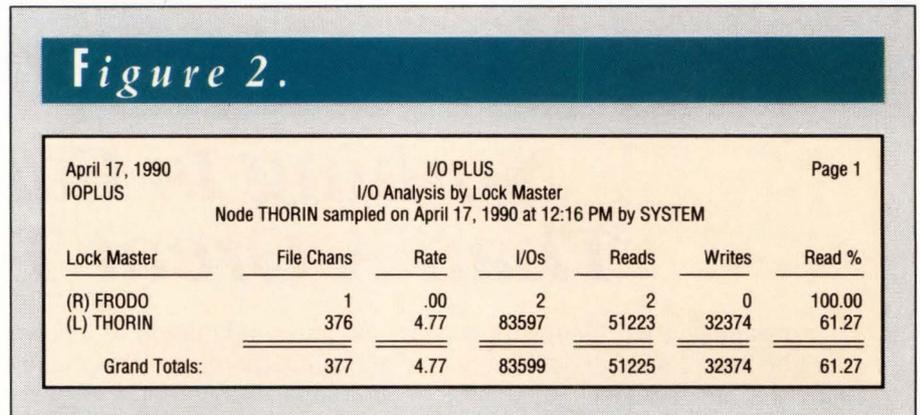
It's easy to run I/O Plus in batch. The Batch Procedures choices on the main menu automate the process of setting up and submitting I/O Plus commands as a batch stream. The batch job can be set up for submission at any time of the day. It would be useful to be able to set up a batch procedure that resubmits itself, but this isn't part of the current implementation.

Help is readily available by typing HELP at any prompt. A list of related topics is displayed, when necessary, so you can get additional information.

The I/O Plus documentation follows the Touch Technologies "thin brown book" standard. Instructions are easy to follow and the manual is brief. There are sections in the back of the documenta-



I/O Plus main menu.



The lock master analysis shows outstanding locks on resources your node is trying to access.

tion that discuss I/O bottlenecks and how to avoid them, as well as the concept of lock mastering.

Identifying performance bottlenecks is part and parcel of the system manager's job. The amount of information and advice regarding VMS performance can be overwhelming. That's why tools like I/O Plus can be so useful in pinpointing performance problems. Try adding I/O Plus to your manager's toolbox.

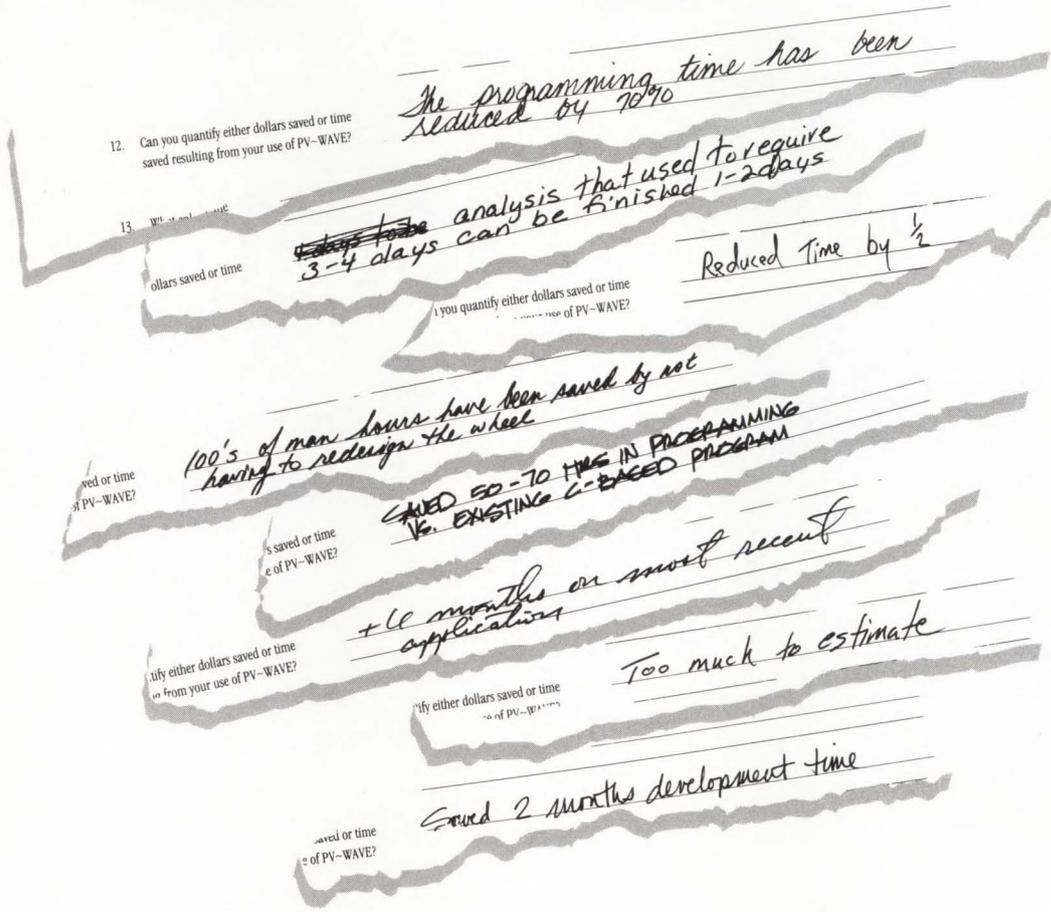
*Editor's note:* Since our review of I/O Plus, new features have been added. LHOLDER is a report showing holders of locks for which other processes are

waiting. RSREMOTE displays remotely mastered files with high I/O activity. These are candidates for remastering. A procedure is provided to force files to be kept open and mastered on the appropriate node.

Touch Technologies now provides I/O performance help. The Technical Performance Group will accept I/O Plus reports that you generate and will help you pinpoint your I/O bottlenecks. A command procedure is provided to take samples once each hour until 6 p.m. Then, you can simply send or fax the output to Touch Technologies. ■

# Productivity ?

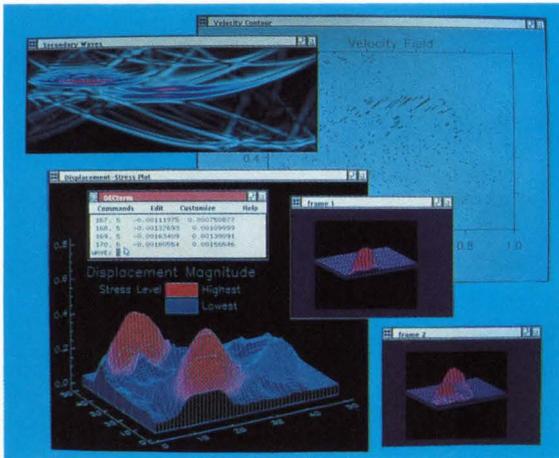
# The Engineer's Definition:



## PV~WAVE Visual Data Analysis Software

▲ Results taken from Precision Visuals 1990 Customer Survey.

▼ Non-destructive test analysis courtesy of National Institute of Standards and Technology.



PV~WAVE combines dynamic graphics, image processing, and powerful array-manipulation capabilities. Ideal for engineering analysis of data from tests, experiments, simulation, or processes on your Sun, DEC, HP, and Silicon Graphics computer.

Discover for yourself the productivity power of PV~WAVE. Call us at **1/800-447-7147** to qualify for a free evaluation copy.



PV~WAVE; Sun; DEC; VAX; HP; and Silicon Graphics; are registered trademarks of Precision Visuals, Inc.; Sun Microsystems, Inc.; Digital Equipment Corporation; Hewlett-Packard; and Silicon Graphics Inc., respectively

CIRCLE 295 ON READER CARD

# There's been a breakthrough

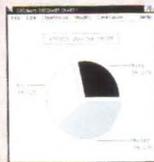


VT1000

The VT1000 terminal gives your users the power of windows. At a price that won't leave you broke.

For years, Digital has set the standards for terminals. And the VT1000 is our most advanced yet. The key is windows.

The VT1000's windows let your users work with several VT applications at once. In fact, thousands of VT applications are available, many of which you may already have.

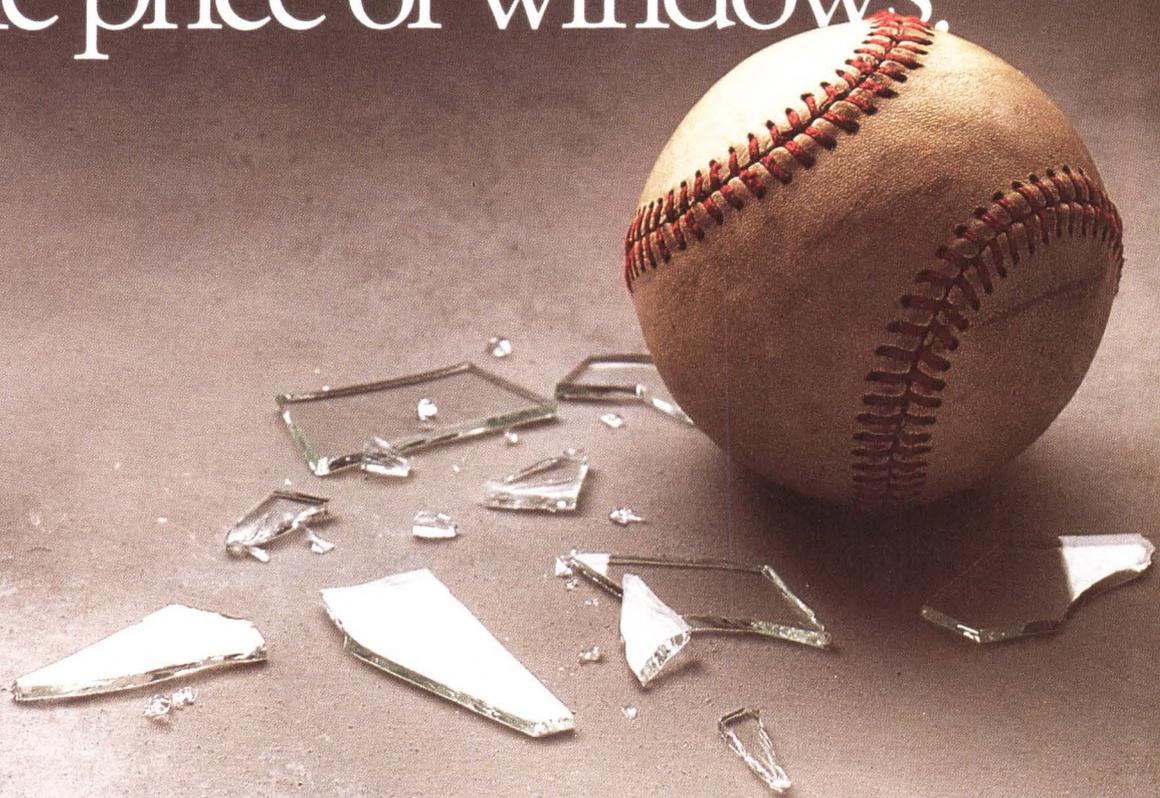


That helps make the VT1000 a terrific investment. Your users become more productive. And you won't have to spend a cent on software or retraining.

In addition, the VT1000 is compatible with the X Window System™ standards. So your investment will

digital™

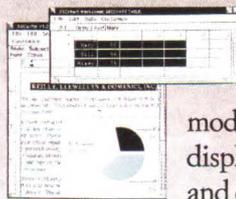
in the price of windows.



be good if you need compatibility with the X Windows environment.

And the VT1000 connects directly to your network with no need for a terminal server. So any VT application on the network is just a point and click away.

The VT1000 comes with a choice of high-resolution monitors. So whether you choose the 15-inch or 19-inch model, anything you display will be clear and crisp.



Digital's VT1000. The only VT with windows. And at a price you've got to see. To find out more, call 1-800-343-4040, ext. 387.

Digital  
has  
it  
now.

*Intra Computer's SAM2010 Disaster Prevention System Helps Avert Computer Catastrophies.*

# AN OUNCE OF PREVENTION



Photo: John Kaladar

**I**n today's computer-dependent business environment, protecting the company's data processing assets is a major concern. Many hours of effort go into creating and testing a viable disaster recovery plan. However, it's better to avert a disaster than to attempt a recovery from one.

As more companies go to 24-hour-a-day computer operations, environmental monitors that watch over computer systems after hours, on weekends or whenever the computer room isn't staffed are becoming common. Many firms can't shut down their computer networks, even though they aren't staffed around-the-clock, because of employees dialing

in from outside locations at all hours.

The SAM2010 Disaster Prevention System from Intra Computer is an automated monitoring device that protects your site from a disaster. It can prevent loss of data and damage to your computer hardware caused by heat, humidity, smoke, fire, water, power problems or unauthorized intruders. It works with any VAX running VMS or ULTRIX and requires no special tools for installation. In fact, you don't even have to open your system.

## Standing Watch

We tested the VAXcluster version of the SAM2010 on our MicroVAX II in our

RON LEVINE



# Meet the #1 Software for a Growing Family

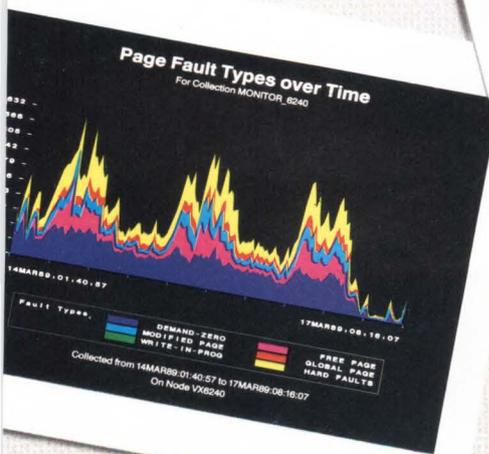
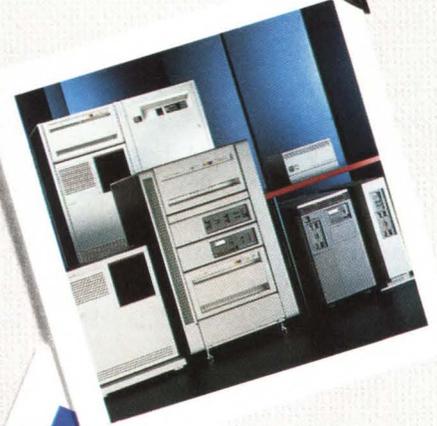
The more you rely on the expanding family of VAX™ computers, the more you need the SAS® System—the leading data analysis and graphics software in the VAX market. No other software has the power and flexibility to handle *all* your data management, analysis, and presentation needs. Across the entire range of VAX systems.

The SAS System brings you more choices for data entry, retrieval, and management . . . report writing and graphics . . . statistical and mathematical analysis (including quality control) . . . business planning, forecasting, and decision support . . . operations research and project management . . . and applications development. All fully integrated. All backed by VMS-specific technical support, training, and documentation.

And now we've extended the family with specialized tools for evaluating VAX computer performance, as well as interfaces to popular data bases such as ORACLE® and Rdb™. No wonder experts call the SAS System “. . . perhaps the most sophisticated and versatile family of products on the market.”\*

## Yours for 30 days. . . FREE

Find out why the SAS System is the software you won't outgrow. Ask for our free 12-page executive summary and details about a free 30-day software evaluation. Call us today at (919) 677-8200. In Canada, call (416) 443-9811.



**The SAS® System.  
More Choices  
for More Applications  
than Any Other Software.**

\*Digital Review. Reprint available.

The SAS System runs on the entire family of VAX minicomputers and workstations under VMS. Mainframes, personal computers, and UNIX-based workstations from other vendors are also supported.

SAS is a registered trademark of SAS Institute Inc. VAX, VMS, and VAX Rdb/VMS are trademarks of Digital Equipment Corp., and ORACLE is a registered trademark of Oracle Corp.

Copyright © 1989 by SAS Institute Inc.  
Printed in the USA.



SAS Institute Inc.  
SAS Circle □ Box 8000  
Cary, NC 27512-8000  
Phone (919) 677-8200  
Fax (919) 677-8123

Pasadena office and found it extremely easy to install, test and operate. It took two people only one day to install and test SAM and its associated devices and software. Everything required for the installation was provided by Intra, including a screwdriver for terminal connections.

The equipment came individually boxed within one large box. Only the supplied screwdriver is needed for standard installation. I removed SAM, plugged it into the RS-232 terminal port on the MicroVAX, and plugged the power cord into an outlet. The red Power On light on the front panel illuminated, and a green LED, also on the front panel, began flashing.

As I continued to hook up the associated units, Technology Editor Philip A. Naecker, who assisted with the review, attempted to establish communication with SAM via the MicroVAX. SAM was connected to a video terminal using the supplied cable, and the baud rate was set for our system via a switch panel on the

front of SAM. Using the SET HOST/DTE command, Phil was able to "talk" to the unit.

Following the SAM installation procedures, we first entered a command to clear the temperature indicators on the front panel, then connected the relay output cable to the computer's power controller. We then installed each of SAM's auxiliary components, including the Humidity Probe, Power Quality Monitor, Temperature Probes, Auto Dialer, Air-Flow Sensor, Water Sensor, Smoke Sensor, and Intrusion Detector.

As each hardware device was installed, we made certain that the terminal could communicate with it by issuing the

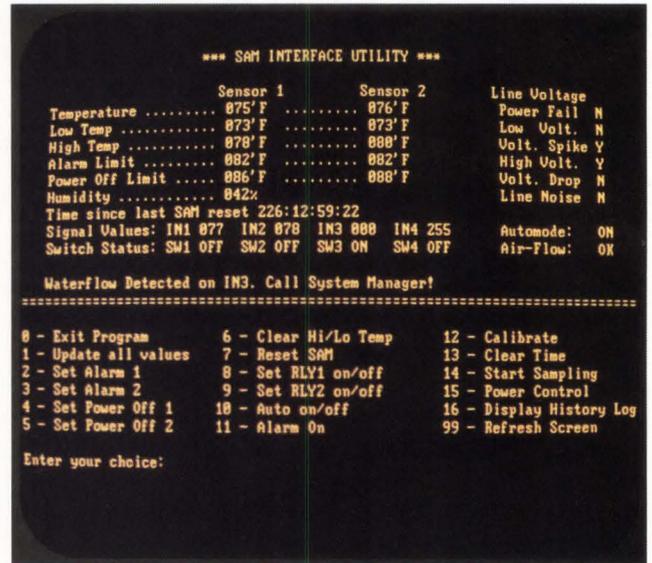


Figure: Sample Menu screen for SAM utility software.

commands depicted in the manual. They all worked on the first try. After the hardware was in place, we installed the SAM software. Phil loaded the TK50 cartridge (cluster version). Standard file-loading procedures are employed.

The software consists of two routines:



## AS/400<sup>®</sup>, SYSTEM 3X AND DEC<sup>™</sup> CONNECTIVITY

Computer system connectivity doesn't have to be a nightmare. You want to maximize your organization's computing power and reap the

monitor and utility. The monitor is responsible for data sampling, logging, issuing user warnings and initiating the host system software and hardware shutdown when alarm conditions and power-off limits are exceeded. It runs in batch mode and samples such conditions as temperature, humidity, smoke, water, and air flow every 10 minutes. When a threshold, set either by default or by the user, is exceeded, a warning is sent to system users. When the condition becomes critical, sampling frequency is increased from every 10 to every two minutes. If the problem isn't resolved after five samplings, the host sends a timed-out power-down command to SAM. A system software shutdown then is initiated. At completion, the system is powered down. Sampling frequency, thresholds and alarm warnings can be modified for your requirements.

The utility is a menu-driven, interactive program that allows viewing of SAM's capabilities and gives the system manager access to SAM's internal param-

eters for interrogation or modification (see Figure).

**Check Out**

With the hardware and software installed, we were ready to check out SAM in a normal operating environment. To do this, Phil and I used a combination of things to "force" error conditions.

Software parameters were changed to lower threshold settings, while smoke, water, heat and humidity were brought into our computer room to test each sensor/detector. The air-flow sensor was moved to various locations within the room, some with air-flow obstructions, some without, to observe its operation.

The devices detected their respective conditions, sounded the SAM audible alarm, which is extremely loud, and caused a system warning message to go out to all users.

The Auto Dialer also was activated. It automatically dialed the first number (of the four previously programmed) to report the alert condition in the computer

room. It does this with a synthesized voice message. The unit also requests a reply from the receiving party. It asks to be called back at the computer room to acknowledge receipt of the alert message. It then repeats the message and hangs up.

If an acknowledgement isn't received within a specified time, the Auto Dialer repeats the procedure with the next number in its memory. This continues in a round-robin style until the call is acknowledged.

The Intrusion Detector was installed but not fully tested; it requires programming and setup that aren't covered in the SAM manual. It has its own installation documentation. We connected it, however, and it recognized movement that occurred across its path.

When we corrected the environmental condition that caused the alarm, SAM cancelled the alarm mode. All was quiet again. When the over-threshold condition was allowed to continue, after five repeated intervals of sampling and sending system warning messages with

possible return from your IBM® and DEC computer investment -- but how?

**The Mitek OpenConnect Systems<sup>SM</sup> Solution**

For years, Mitek OpenConnect Systems has pioneered connectivity solutions for a wide range of diverse operating environments and platforms. And now, Mitek OpenConnect Systems has a new cost-effective way to help make your AS/400, System 3X and DEC/VAX™ systems part of a full connectivity and network management solution.

The Mitek OpenConnect Systems solution allows IBM® systems to communicate with other IBM and non-IBM systems by providing such powerful benefits as:

- Advanced Program-to-Program Communication (APPC) support,
- Full screen terminal emulation for 5250, 3270 and asynchronous terminals,
- Electronic mail exchange for TCP/IP Simple Mail Transport Protocol (SMTP) and IBM's Systems Network Architecture Distribution Systems (SNADS),
- File transfers between and among systems which are networked, and
- Low-cost entry level configurations for growing network flexibility.

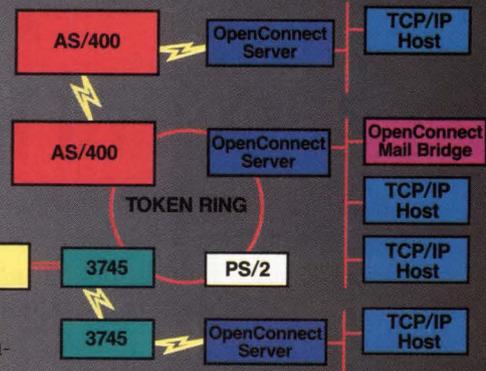
To learn more about OpenConnect midrange solutions please call:  
(214) 490-4090



**OPENCONNECT SYSTEMS<sup>SM</sup>**

2033 Chennault Drive  
Carrollton, Texas 75006

OpenConnect is a registered trademark of Mitek Systems. OpenConnect Systems is a service mark of Mitek Systems. IBM and AS/400 are registered trademarks of International Business Machines Corporation. DEC and VAX are trademarks of Digital Equipment Corporation.



nonstop sounding of the audible alarm, SAM automatically initiated the power-down procedure.

### Glitches

In our tests, the smoke, water, temperature, humidity, air flow probes and power quality monitor all worked. The Auto Dialer also performed as it should have. The Intrusion Detector worked to the limited extent that it was tested. The SAM module successfully recognized each environmental hazard we created and took appropriate action according to the parameters we set. However, we ran into two minor problems.

First, although the supplied SAM manual was easy to follow and clearly depicted which cables/wires to hook where, the labeling on the boxes didn't always match the names used in the manual. This caused minor confusion as to which box to open next, and I wasn't always sure I was handling the right device. I also found the manual amateur-

ish and the instructions for using the software incomplete.

Second, the water, smoke and intrusion detector cables had spade-lug connectors at both ends. The SAM back panel, however, requires BNC-type connectors. To get around this, Intra supplies spade-to-BNC adapters. I found this to be a strange approach. The cables should have the right connectors at each end without this kludge.

Even with these few minor annoyances, the installation went smoothly. I'm sure that any experienced VAX/VMS user could install and activate SAM. If you have a question, Intra provides telephone support.

The SAM2010 Disaster Prevention System is an asset where computer operations and installations must be protected in unattended environments. It senses environmental changes within the computer room, checks the environmental conditions against preset thresholds, and alerts users when a safe parame-

## SAM2010

**PLATFORMS:** Any VAX running VMS or ULTRIX

**PRICE:** About \$6,430 (including the Intrusion Detector, a \$450 item) for complete system for a VMS cluster. It isn't necessary to buy all sensor/detector options

### INTRA COMPUTER INC.

**HEADQUARTERS:**

87-46 Van Wycke Expwy.  
Queens, NY 11418  
(718) 297-5500

**PRODUCT LINE:** Disaster prevention and computer protection systems

**FOUNDED:** 1979

**OWNERSHIP:** Private

CIRCLE 504 ON READER CARD

ter has been exceeded. In critical situations, SAM shuts down the computer in an orderly fashion, ensuring that all data and files are saved. ■

# XENTIS™

## The Standard for VAX Report Writers

Find out what over 1000 companies already know...that for features, versatility, and ease of use, XENTIS is the report writer by which others are measured. XENTIS lets you use data from RMS files, Rdb, DBMS-32, Ingres and Sybase databases all in the same report!  
XENTIS is the only report writer for all your VAX/VMS reporting needs.

### Features

- On-screen three window "Display Mode"
- Easy interactive dialogue allows end users to create reports without the aid of DP staff
- On-line help at any prompt
- Extensive calculations and comparisons
- Powerful selection logic
- Optimized for fast execution
- Consolidate data from several files in a new data file
- Works with popular spreadsheet and word processing programs
- Multiple levels of security



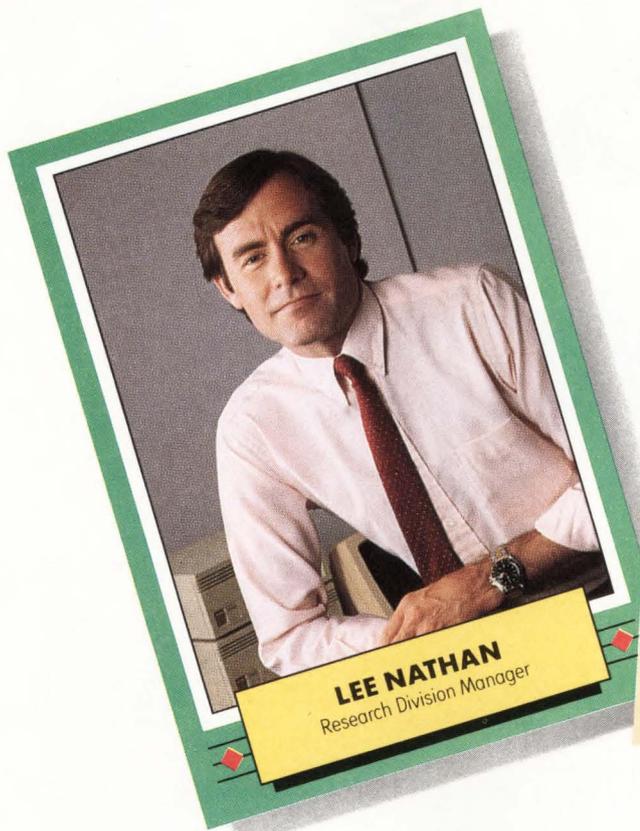
**PARK SOFTWARE INC.**

P.O. Box 31529  
Seattle, Washington 98103-1529  
(206) 343-0447 - FAX (206) 682-6866

**Dealer Inquiries Invited**

XENTIS is a registered trademark of Park Software, Inc. VAX, VMS, DBMS-32, and Rdb are all registered trademarks to the Digital Equipment Corporation. Sybase is a registered trademark of Sybase, Inc. Ingres is a registered trademark of Ingres, Inc.

# Put us on DEC and we'll make you Manager of the Year.



**LEE NATHAN**  
Research Division Manager

**CAREER HIGHLIGHTS**

- 1982** Used SPSS data entry/analysis system for customer satisfaction surveys. Led to 17% increase in customer-retention rate within first year.
- 1984** Designed sales-lead tracking system, using SPSS data management facilities and SPSS Graphics™ charts. Slashed overhead costs—and gave more accurate results in half the time.
- 1986** Chose new office sites, based on SPSS forecasts from economic and demographic data. Result: New revenues more than doubled old goals.
- 1988** Named Manager of corporate-wide research and strategic planning staff.

Another Story in the SPSS SUCCESS SERIES

## Data analysis software from SPSS® helps you get the most out of your stats.

The potential for success that your VAX™ gives you is only part of the game. Knowing how to reach that potential is what really counts.

That's where SPSS-X™ comes in. Its data analysis talents can take your VAX to new levels of productivity. And take your company along with it.

The complete SPSS-X base package and options let you go from data entry to

high impact graphics, with statistical procedures designed for the end user. It's highly interactive, with commands in plain English. So your people get hard-hitting answers for sound business decisions. Which makes you a better manager.

SPSS-X interfaces with other popular VMS™ software tools, from All-In-1™ and 20/20™ to DATATRIEVE™, Rdb™, ORACLE™ and Ingres™. It lets you access files anywhere on your DECNET. And it works smoothly with your PC environment as well.

You get the speed, accuracy and versatility that's won repeated awards from

industry publications. Plus the training, documentation and support that's made SPSS a leader in statistical software for over 20 years.

Get the full details on what SPSS-X software can do with your VAX system by calling

**1-312-329-3304.**

Because, after all, it's the right decisions that help you reach the top.

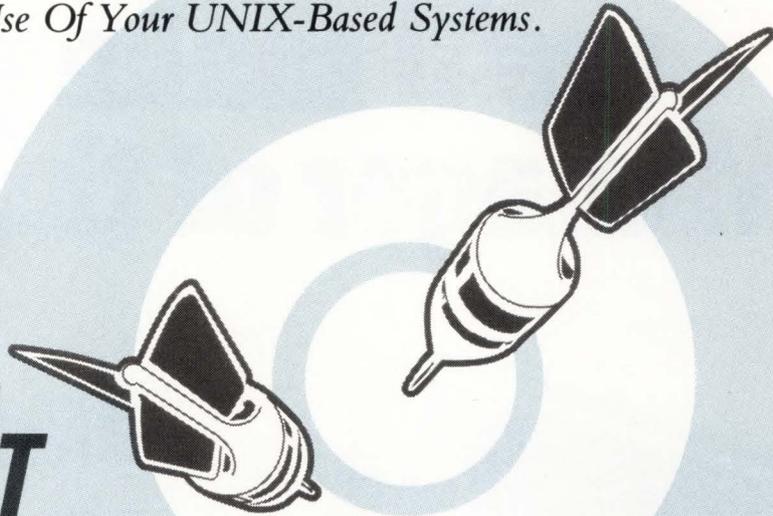
**SPSS inc.**

*Best in the final analysis.*

444 North Michigan Avenue · Chicago, Illinois 60611

*Braintree Technology Inc.'s AIM Resource Accounting Package Helps You Get A Handle On The Use Of Your UNIX-Based Systems.*

# TAKING AIM AT UNIX RESOURCES



As UNIX-based systems make their way into more commercial sites, accounting for system resources becomes an increasingly important issue. One solution to this problem is offered by Braintree Technology, which has introduced a resource and accounting package for UNIX-based systems. AIM Resource Accounting (RA) runs on a wide variety of machines and flavors of UNIX, including BSD 4.2 and 4.3, HP-UX, SunOS, System V and ULTRIX. It's compatible with VAX and DECstation RISC machines as well as with AT&T and HP machines. The product was developed by AIM Technology.

We installed RA V2.0 on our Lab's DECsystem 3100, which is a multiuser DECstation. This machine uses the Mips Computer Systems RISC chip. The product was provided on a TK50 tape in tar

group: 2	group: 4
disk 0.005	disk 0.005
cpu:	cpu:
mon-fri 09:00 17:00 45.0	mon-fri 09:00 17:00 30.0
mon-fri 17:00 22:00 30.0	mon-fri 17:00 22:00 20.0
mon-fri 22:00 9:00 20.0	mon-fri 22:00 9:00 20.0
sat-sun 00:00 24:00 15:00	sat-sun 00:00 24:00 10.00
holiday 15.0	holiday 10.0
login:	login:
mon-fri 09:00 17:00 10.0	mon-fri 09:00 17:00 7.0
mon-fri 17:00 22:00 7.0	mon-fri 17:00 22:00 5.0
mon-fri 22:00 9:00 7.0	mon-fri 22:00 9:00 5.0
sat-sun 00:00 24:00 7.0	sat-sun 00:00 24:00 3.0
holiday 5.0	holiday 3.0

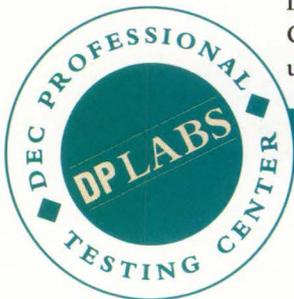
**A portion of the AIM Resource Accounting rate file showing rates for administrators (group 2) and programmers (group 4). Rates are shown in dollars for time slot on days indicated.**

format. We created a directory on our system:

```
/usr/local/aim_ra
```

and loaded the RA files into that directory. The software was delivered in

**BARRY SOBEL**





# FOR EXPERIENCED VAX/VMS PROS ONLY

## *Your Complete Guide to VMS Computing*

Enhance your skills and your system performance with Mastering VMS!

By David W. Bynon,  
co-author of Introduction to VAX/VMS  
Softcover, 465 pages.

### Only \$39.95!

- DECwindows — How DECwindows enhances the X Window System, base applications, session manager, FileView, the Customize menu, terminal emulation
- Command Procedures
- VMS Operational Management
- System Security — Internal and external security, controlled user environments, auditing and surveillance
- System Performance Management

MASTERING VMS is an important learning aid and reference tool for any system manager, programmer or operator who works in VMS. Order a copy for yourself, or your entire MIS department. Call, mail or FAX your order today!

Clip and return the coupon below to order by mail. For fastest service, call Trish Dunkerley at (215) 957-4265, 9am - 4pm eastern time, or FAX to (215) 957-1050.

MASTERING VMS is a valuable "how to" guide for the experienced VMS pro who's looking to improve hands-on computing skills. Every section starts with an overview of that chapter's topic, and then leads you into greater detail to intermediate-level and advanced applications and techniques. You can go through MASTERING VMS chapter-by-chapter or go straight to the section you need most. Either way, you get the full benefit of expert information and step-by-step instructions.

Here's just a sample of what's inside . . .

- A Look into the VMS Operating System
- DECnet — Networking capabilities, protocols, routing, task-to-task communication, file and terminal services
- VAXclusters
- Utilities and Commands

CLIP HERE ✂ CLIP HERE ✂

## MASTERING VMS Order Form



\*Shipping and handling: in the US, \$3 for the first copy, \$1 for each additional copy. Outside the US, please call for prices.

Please send me \_\_\_\_\_ copies of MASTERING VMS @ \$39.95 each, plus shipping and handling.\* My payment is enclosed.

Book Total \$ \_\_\_\_\_

Name \_\_\_\_\_

Shipping Total \$ \_\_\_\_\_

Company \_\_\_\_\_

ORDER TOTAL \$ \_\_\_\_\_

Address \_\_\_\_\_

Check enclosed.

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Charge my:  VISA  MasterCard  
 American Express

Telephone \_\_\_\_\_

Acct. No. \_\_\_\_\_ Exp. Date \_\_\_\_\_ Signature \_\_\_\_\_ Date \_\_\_\_\_

DPHF0790

101 Witmer Road ■ P.O. Box 446 ■ Horsham, PA 19044 ■ (215) 957-1500 ■ FAX (215) 957-1050

## Figure.

```
sobel personal login time
00:00, February 1 1990 to 14:44, February 26 1990
Period Hours Per-Hour Charge
mon-fri: 09:00 - 17:00 2:20 $ 7.00 $ 15.40
mon-fri: 17:00 - 22:00 0:00 $ 5.00 $ 0.00
mon-fri: 22:00 - 09:00 0:00 $ 3.00 $ 0.00
sun sat: 00:00 - 24:00 0:00 $ 3.00 $ 0.00
holiday: 00:00 - 24:00 0:00 $ 3.00 $ 0.00
Total: 2.20 $ 15.40

sobel personal CPU use
00:00, February 1 1990 to 14:44, February 26 1990
Period Seconds Per-Hour Charge
mon-fri: 09:00 - 17:00 7 $ 30.00 $ 0.05
mon-fri: 17:00 - 22:00 0 $ 20.00 $ 0.00
mon-fri: 22:00 - 09:00 2 $ 20.00 $ 0.01
sun sat: 00:00 - 24:00 0 $ 20.00 $ 0.00
holiday: 00:00 - 24:00 10 $ 20.00 $ 0.02
Total: 19 $ 0.08

sobel disk use
February 1 1990 to February 26 1990
1682 bytes per day
4 1/2k blocks per day
Charge for disk use: $0.01 - at $0.005 per 1/2k block per month

Statement for sobel
Login time: 2 hours, 20 minutes
Charge for login time: $15.40

CPU use: 0 minutes and 19 seconds
Charge for CPU use: $0.08

Average disk use: 1682 bytes per day
Charge for disk use: $0.01

Total Charge: $15.49
```

A portion of the statement for user sobel.

source code. A shell script, `ra_make`, is provided to compile the software and create libraries. The script asks you on which system you'll install RA and also about other parameters, such as maximum number of users.

We had a problem with the compile on our system. The compiler flagged a syntax error in one of the source modules. A check with the technical support staff at AIM Technology revealed that this occurs only on DEC's RISC platform. A VAX chip with the same version of ULTRIX won't flag the error. The temporary fix was applied. AIM Technology is addressing the problem in its next scheduled release. According to the company, no other problems should result; we didn't experience any.

The second part of the installation procedure requires that another shell script be run. This one configures RA for your system environment. You should be familiar with the setup of your system so that you can respond to the prompts. For example, this script will ask you to verify all possible user log in shells, because

RA needs to run each user's shell within one of its files to keep track of and charge system resources to the users.

Whoever installs RA at your site should understand UNIX directory structure and syntax. While the step-by-step installation instructions are complete, you must edit a system file (`/etc/passwd`) and be familiar with who's on your system and where things are located on your system.

**Right On Track**

RA can track UNIX system use and can

charge resource use to individual users as well as user-defined groups and projects. UNIX monitors CPU time used for each program run, when the program was run and the total elapsed time. It also identifies the user who ran the program by identification number and tracks user log ins and log outs. RA tracks total log in time for each user, CPU time and disk use in bytes.

The person designated as the RA system administrator can define rate groups, i.e., a set of rates to charge users for different types or levels of activity. A typical rate group will have the rates for CPU and time in dollars per hour. Disk use is logged in dollars per 1/2K block of storage per month. Rates for CPU and log in time can vary with time of day, day of week and holidays.

The rate groups are stored in the file called `rates`, which on our system was in the directory `/usr/local/aim_ra/adm`. This illustrates the default directory organization when you install RA. An `aim_ra` directory is created under `/usr/local`. Subdirectories, such as `adm` for

"RA administrator" files, bin for executables, and `admbin` for "administrator" executables, are created under the `aim_ra` directory, with applicable files placed in the directories.

For simplicity's sake, I'll indicate the filename with the path omitted. The RA documentation has a complete file and directory listing. Our rate groups setup for "administrators" and "programmers" is shown on page 82.

The next step is to add users to the rate groups you've defined. There are two ways to do this. You can run the script `ra_adduser`, which prompts you through the process, or add the users manually in the RA command mode. To get into command mode, type RA. This brings up the RA prompt, `->`. RA command language is 4GL-like, using statements with keywords such as "add," "get" and "put." For example, to add sobel to rate group 4, type:

```
->add sobel to rate 4
```

RA responds with:

```
assigned user sobel to rate 4
```

After you add your users to RA, you must edit the `/etc/passwd` file to change their log in shells. To track system use

**AIM Resource Accounting V2.0**

PLATFORMS: UNIX or ULTRIX

PRICE: From \$1,350 to \$9,900, depending on CPU

**BRAINTREE TECHNOLOGY INC.****HEADQUARTERS:**

600 Cordwainer Dr., Ste. 102  
Norwell, MA 02061  
(617) 982-0200

**PRODUCT LINE:** System management software for VMS, UNIX and ULTRIX

**FOUNDED:** 1989

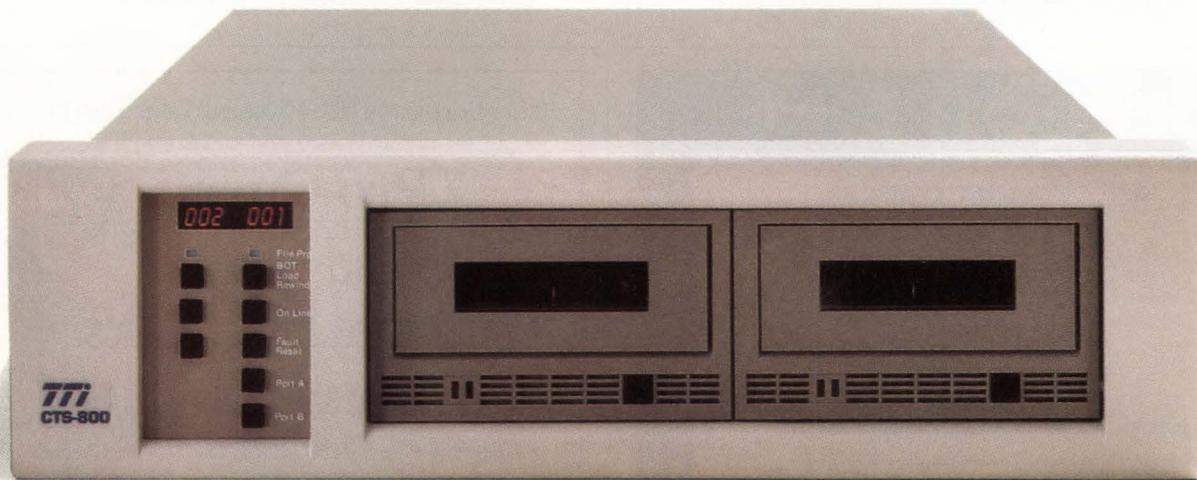
**OWNERSHIP:** Private

CIRCLE 432 ON READER CARD

# Backing up a VAXcluster can be reel slow.



## Or real fast.



You decide.

You can stick with your TA-79 and back up at a snail's pace.

Or you can switch to TTI's CTS-800 Series and accelerate the entire backup process.

You can stand around all day (or night) loading reels — 15 reels in all — to back up 2.2GB on your VAXcluster.

Or you can insert just one 8mm cartridge in a CTS-800 Series drive and let it back up those 2.2GB of data completely unattended.

Need really high capacity? Up to four tape drives can be connected to a single port on your HSC40/50/70 controller. So with a fully loaded HSC5X-CA card, you can back up 32GB overnight... completely unattended. That's real efficiency.

And upgrading to a high performance TTI backup subsystem is really easy. The CTS-800 is a plug and play swap with TA drives and 100% HSC compatible too.

TTI's CTS-800 Series Tape

Subsystems. It's the VAXcluster backup subsystem with un-reel performance.

For more information, call the leader in unattended backup systems, TTI, at 714-744-1030.

Or write to: Transitional Technology, Inc., 1411 N. Batavia, Suite 203, Orange, CA 92667.

**TTI**  
TRANSITIONAL  
TECHNOLOGY, INC.

European Sales Office. Transitional Technology, Suite A, Regal Court, 112 London Road, Headington, Oxford OX3 9AU. Phone: 0865 742266.

VAXcluster, HSC and TA79 are trademarks of Digital Equipment Corporation.

CIRCLE 169 ON READER CARD

## For More Information

AIM Technology  
4699 Old Ironsides Dr., Ste. 150  
Santa Clara, CA 95054  
(408) 748-8649  
CIRCLE 433 ON READER CARD

Mips Computer Systems Inc.  
950 deGuigne Dr.  
Sunnyvale, CA 94086  
(408) 720-1700  
CIRCLE 434 ON READER CARD

for each user, RA runs each user's log in shell within its /acct\_shells directory.

The last step is to run duacct to initialize disk charges. You must run duacct as root while in your system's RA directory.

### Class Structure

Groups of various classes of users can be defined, as can group leaders. The members of the groups can still be assigned individually to rate groups. This feature lets you organize the users for reporting

purposes.

Optionally, projects can be defined and subdivided into tasks. Members (not necessarily from the same user group) and leaders can be assigned to each project. Projects can be assigned to a particular rate group. All work done for that project is recorded at that rate. RA also has scripts available to help with this job.

Various statements can be requested at the RA command level. Issuing the command:

```
->get sobel statement
```

produces a statement like the one that appears in the Figure.

RA has the flexibility to add and delete groups, users and projects, reassign users to different projects, and so on. These tasks can be performed by issuing simple Englishlike commands at RA's command prompt.

RA V2.0 offers a new feature. Reports of various formats can be created using built-in routines provided by RA. How-

ever, you must first produce an ASCII file by issuing a dump command at the RA command prompt:

```
->dump everyone's summary statement  
in asciifile
```

The file produced can be examined directly for the accounting information. Therefore, if someone at your site is proficient in C, you can write your own reporting routines using this raw data.

THE DOCUMENTATION CONTAINS a complete installation section, a command language reference and a listing and description of the system files. Separate sections are geared to administrators, group and project leaders, and users.

If you're a UNIX system manager confronted with an onslaught of new users or a VMS manager charged with managing an ULTRIX box, AIM Resource Accounting is worth a look. It'll help you get a handle on who's doing what on your system. ■

# Oregon C++

TRUE OPTIMIZING COMPILER  
not a translator

SOURCE-LEVEL DEBUGGER  
window interface available

LIBRARY SUPPORT  
C/C++ Libraries

2.0 COMPATIBLE  
Multiple Inheritance & Pure Virtual Functions

- VAX/VMS
- VAX/ULTRIX
- NCR Tower 32
- Hewlett-Packard 9000/300
- Sun 386i
- MOTOROLA Delta Series 680X0
- Sun-3
- Interactive UNIX/386
- SCO Xenix/386, SCO UNIX/386, & AT&T UNIX/386
- Soon to be joined by DECstation and Sun SPARCstation

Also available from Oregon Software: Pascal-2 and Oregon Modula-2 development systems, Source-Tools management system, & C++ training seminars

Software leasing program available!

Call 1-800-874-8501

OREGON SOFTWARE

6915 S.W. Macadam Ave. Portland, Oregon 97219  
TEL: 503-245-2202 FAX: 503-245-8449

CIRCLE 149 ON READER CARD

Error Detection on DEC\* Systems Is Easier Than Ever With

## Pro-Cure™ Stand-Alone Hardware Diagnostics



From Electronic Service Specialists Ltd.

- Comprehensive Testing of CPU and Peripherals
- Accurate Failure Detection
- Starts Testing Even When System Is Down
- Auto Configuring
- Easy To Use
- Flexible Licensing Plans

We invite you to give Pro-Cure diagnostics a try today! We're sure you will agree that it is one of the most effective, yet economically priced diagnostic software tools on the market. Until September 1, 1990, ESS is offering this low introductory special —

TRADE your present diagnostic package\*\* and get Pro-Cure for the price of its yearly update fee.

Call ESS today for further details and get Pro-Cure software working for you!



Electronic Service Specialists Ltd.  
N92 W14612 Anthony Ave.  
Menomonee Falls, WI 53051  
(414) 255-4634 FAX: (414) 253-3262  
International FAX: (414) 253-3300

DEPOT REPAIR • SALES • TRAINING  
DATA RECOVERY • TECHNICAL SUPPORT SERVICES  
Sales representatives available 7:00 a.m. to 7:00 p.m. (CST)

Pro-Cure is a trademark of Bell Atlantic Corporation.

\*DEC and VAX are registered trademarks of Digital Equipment Corporation.

\*\*DEC diagnostics do not apply to this offer.

CIRCLE 344 ON READER CARD



4th Annual

# EWC

## ENGINEERING WORKSTATIONS CONFERENCE LOS ANGELES - OCTOBER 9-11, 1990



### SOFTWARE

- CAD/CAE
- CASE
- Database Management
- Graphics/Imaging
- Networking Software
- Office Automation/E-Mail
- Project Management
- Spreadsheets
- Statistics/Math
- Technical Publishing
- Utilities/Optimizers

### HARDWARE

- Communication Devices
- Controllers, Disk/Tape
- Drives, Disk/Tape
- Furniture/Supplies/Accessories
- Memory/Processors
- Monitors
- PCs/Compatibles/Macintosh
- Printers/Plotters
- Workstations

### SERVICES & SUPPORT

- Consultants
- Conversion Services
- Maintenance/Repair
- Training/Education

### JOIN EXECUTIVES FROM:

• Aerojet • American Composite Tech • Anchor Engineering • Andover Controls • AT&T • Bendix • Bechtel • Businessland • Dept. of Defense • Dept. of Transportation • Digital • Douglas Aircraft • Dupont • Federal Reserve Bank • Ford Aerospace • Fujitsu • General Dynamics • Grumman • Harvard Medical School • Honeywell • Hughes • Image Data • ITT Aerospace • John Hancock • Kodak • Kwikset • Litton • Lockheed • MIT • Mass. General Hospital • McDonnell Douglas • McGraw-Hill • NASA • Northrop • Nova Biomedical • Panasonic • Polaroid • Pratt & Whitney • RAND • Raytheon • Rockwell • Seiko • Teledyne • Teradyne • Texas Instruments • TRW • Unisys • U.S. Air Force • Wang Labs • Westinghouse • Xerox

### SEE PRODUCT DEMOS FROM COMPANIES LIKE THESE:

• Apple • Autodesk • Bruning • CADAM • CADnet • CAD West • Clearpoint • Cognition • Compaq • Computervision • CSA • Dazix • DEC • Definicon • EGS • Electrohome • Electro Rent • EMRC • Enter Computer • Ergotech • Escher-Grad • Evans & Sutherland • G.A. Computer Products • Harris • Helios • Hewlett-Packard/Apollo • Hitachi • Houston Instruments • IBM • Iconex • IDE • Intergraph • Interleaf • Kurta • Matrix • MegaGraphics • Megatek • Metier • Mfg. & Consulting Svcs. • Microsource CAD/CAM • Mino-Micrographics • MIPS Computer Systems • Mupac • NCR • NEC • Novell • Nth Graphics • Océ Graphics • Pacific Numerix • Peripheral Systems • Personal Computer Graphics • Raster Technology • SAS Institute • Schlumberger CAD/CAM • SDRC/CAE International • Seiko Instruments USA • Sigma Instruments • Skok Systems • Sony Microsystems • Source Engineering • Summus • Sun Microsystems • Tektronix • Televideo • Texas Instruments • Tops Computer • Transitional Technology • Unbound • Unison • U.S. Sertek • Video Graphics • Wisdom Systems/DOS • Wolfram Research • Workstation Technologies • Wyse Technology • ZAIZ

**Call Leni at 213/450-0500, FAX 213/450-0132, or Mail Coupon**

Return to: EWC, P.O. Box 3275, Santa Monica, CA 90403 Attn: Leni

Send information on:  Attending EWC  Exhibiting at EWC

Name \_\_\_\_\_ Title \_\_\_\_\_

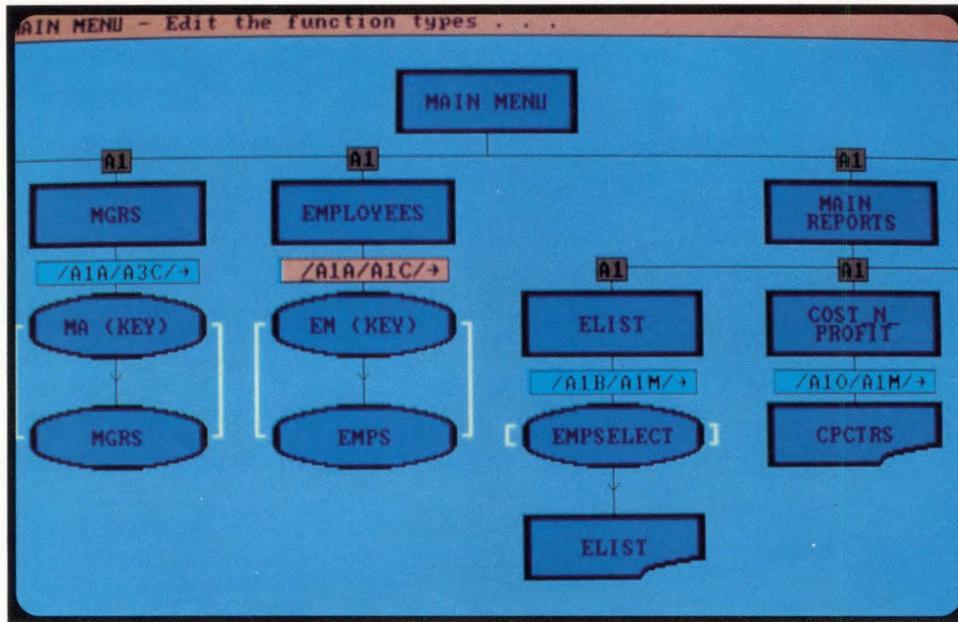
Company \_\_\_\_\_

Address \_\_\_\_\_

City/State \_\_\_\_\_ Zip \_\_\_\_\_ Phone \_\_\_\_\_

CIRCLE 300 ON READER CARD

*Watch Your CorVision-Generated Application Grow Using Icons, Symbols, Pop-Up Menus And Gateways.*



*Personnel system menu created with the Menu Diagrammer.*

# BUILDING FROM THE CORE

Cortex's CorVision V4.32 is an integrated computer-aided software engineering (I-CASE) tool for the VAX and IBM PCs and compatibles. It automates the design, programming, testing, implementation, maintenance and documentation of application software. Applications use DEC's Record Management System (RMS) and can use Rdb. Applications that benefit from CorVision include manufacturing-related systems such as inventory and quality control and order processing, as well as general business systems such as accounts payable and receivable.

CorVision consists of three major components: a set of picture-program-

ming software design tools, a central repository that resides on the VAX, and an application generator.

Through Picture Programming, you can diagram a complete application using CorVision's software design tools and the color graphics capabilities of your PC. These design tools include pop-up menus, icons and windows.

The central repository stores all application information and is managed by an intelligent guidance system that lets developers share application specifications with other CorVision developers across a network. This lets multiple developers work on an application simultaneously.



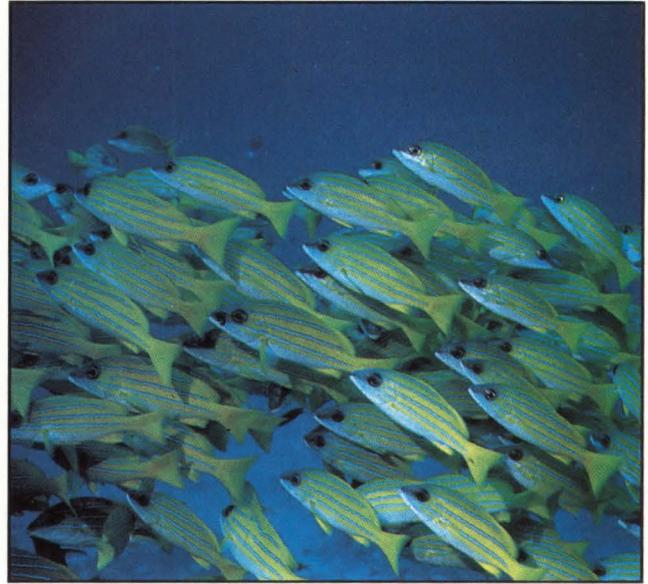
GEORGE T. FRUEH

# There are Two Schools of Thought When It Comes to Tape Management



## **SAVE TIME**

- ✓ Automatic On-Line Tape Journal
- ✓ Journal Search by File Name or Saveset
- ✓ Full Reporting Capabilities (by tape creation date, expiration date, dataset name and/or scratch tape listing)
- ✓ Automated Tape Handling with Multiple Tape Pool Support
- ✓ Menu-Driven Interface



## **INSURE DATA INTEGRITY**

- ✓ Cross References Every Tape Access to Protect ALL Tapes in the Library, Regardless of Origin
- ✓ Operates with Standard VMS BACKUP and DCL Tape Commands
- ✓ Automates Inventorying of All VMS BACKUP and FILES-11 Tapes
- ✓ Monitors Multiple Tape Devices

Regardless of the size of your tape library, the integrity of your organization's information depends on how well you manage it. TAPECONTROL, *new* from RAXCO, combines both schools of thought, insuring your data integrity and saving you time. TAPECONTROL, an automated tape management system, monitors and manages the activity of magnetic tape storage in the VAX/VMS® environment.

Why wait? Discover TAPECONTROL, RAXCO's new tape management system. *For a free trail call RAXCO (301) 258-2620.*  
RAXCO HEADQUARTERS: 2440 Research Blvd, Rockville, Maryland 20850.



**RAXCO**  
SOFTWARE INC.

The central repository also provides interactive help throughout the development process.

The application generator, running on the VAX, automatically generates 95 to 98 percent of the application in the form of compiled machine code. The remaining code may be added with Cortex's 4GL Builder or any VAX 3GL.

### From The Inside Out

CorVision Version 4.32 arrived on two 1,600-bpi nine-track tapes. We installed it on our Lab's MicroVAX II running VMS Version 5.2.

Once you create your [CORTEX] account on the VAX, you should make sure your quotas, privileges, default protection and SYSGEN parameters are set to those specified in the CorVision release notes. After creating your CORTEX directory, BACKUP the files to disk and issue the VMSINSTAL command.

Following installation, you may install the Component Specification Reports (CSR). These arrived on two 1,600-bpi tapes. CSRs are CorVision reports that describe each of your application's data and program components. You can run these reports while you specify your application's components and use them to keep track of development progress. You can also use CSRs as technical documentation for your application. CSR installation instructions appear in the CorVision release notes.

CorVision software for the PC is supplied on two 5 1/4-inch floppy disks. Before installing CorVision on your PC's hard disk, make sure that the BUFFERS and FILES values in your CONFIG.SYS file are set to 22.

You also need a Microsoft mouse and driver software to use CorVision, and you need to include the command DEVICE = <directory path> MOUSE.SYS in the CONFIG.SYS file. <directory path> specifies the PC directory in

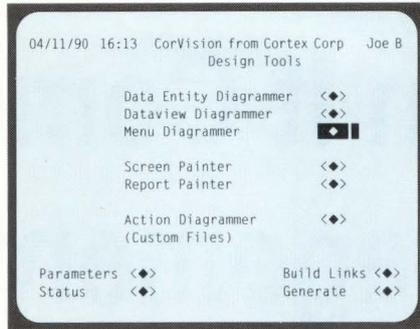


Figure 1: CorVision's Design Tools

which MOUSE.SYS resides.

### CorVision Components

CorVision's software design tools include a Data Entity Diagrammer, Dataview Diagrammer, Menu Diagrammer, Screen Painter, Report Painter and Action Diagrammer. You can access these design tools through the Design Tools menu (see Figure 1).

The Data Entity Diagrammer lets you design a data model and create your application's data structure using icons. Data entity diagrams consist of datasets and data links. A dataset is a logical grouping of related fields represented by icons, while a data link is a connection that provides access from one dataset to another.

The Dataview Diagrammer helps you define access paths to data within files. With this diagrammer, you can create unique paths that let you access data that's relevant to your application.

The Menu Diagrammer lets you design hierarchical menu structures that represent the logical flow of an applica-

tion from the user's perspective. Screen and report icons in the Menu Diagrammer can be selected to access the Screen Painter and Report Painter.

The Screen Painter lets you lay out the appearance of an application's data screens, while the Report Painter lets you specify the content and layout of application reports.

Finally, the Action Diagrammer is an interactive screen editor designed to enter and modify Cortex's Builder code. With Builder, you can customize your application by providing additional procedural logic that CorVision's generated code can't provide.

CorVision's central repository on the VAX recommends logical steps toward the design of your application. It also performs consistency and completeness checks throughout the entire process.

### Running CorVision

You can start CorVision automatically or manually by setting the AUTOLOGIN parameter to Yes or No, respectively, in the file C:\CORTEX\CVPARAMS.DAT on the PC. To start CorVision manually, enter CVMAIN at the DOS prompt. This takes you to the initial user screen. After you enter your username, CorVision's Design Tools screen is displayed.

The diamond character positioned to

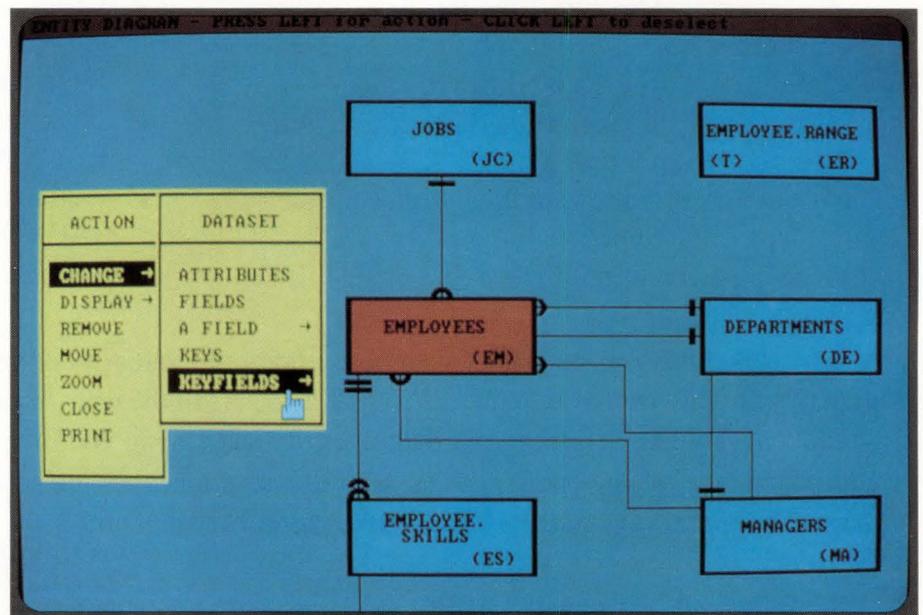
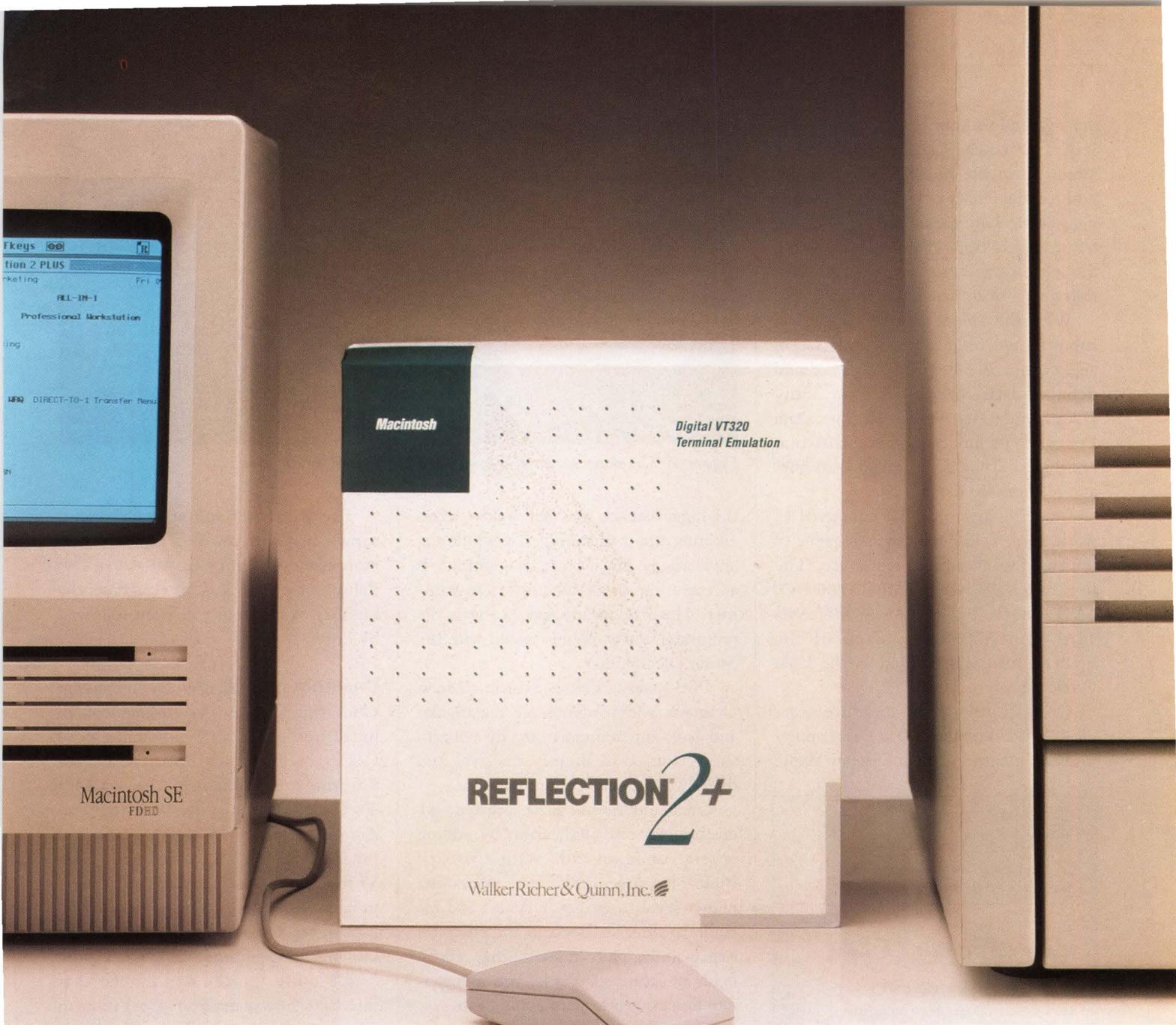


Figure 2: An Entity Diagram with links and relationship icons.



## The one thing that should come between your Mac and your VAX.

The one thing you want between your Macintosh and VAX computers is a fast, accurate terminal emulator.

So try the new Reflection 2 PLUS for the Macintosh. It takes full advantage of both the VAX and the Mac, letting you get the most out of each computer.

Access your VAX with Reflection's thorough VT320 emulation. Of course, the familiar VT320 keystrokes still work,

but the addition of Macintosh user friendliness makes tasks easier to accomplish. Issue commands quickly with pulldown menus. Cut and paste complicated VAX filenames to save time and reduce errors. Use MultiFinder to monitor VAX Mail in the background.

Transfer Macintosh and VAX files quickly with Reflection's proprietary file transfer software. It's included free of charge.

Don't put just any terminal emulator between your Mac and your VAX. Get Reflection 2 PLUS for your Macintosh. Call us toll-free and ask about our money-saving introductory offer.

**1-800-872-2829**

**Walker Richer & Quinn, Inc.** 

2815 Eastlake Avenue E., Seattle, WA 98102  
206.324.0407 FAX 206.322.8151  
Zeestraat 55, 2518 Den Haag, The Netherlands  
+31(0)70.356.09.63 +31(0)70.356.12.44 FAX

Reflection is a registered trademark of Walker, Richer & Quinn. All other trademarks are property of their respective holders.

**CIRCLE 172 ON READER CARD**

the right of an item is that item's gateway. To access a Diagrammer or Painter screen from the Design Tools screen, position the cursor over the corresponding gateway with the mouse and click the left mouse button. Pressing and holding the left mouse button brings up the action menu, from which you select Open.

With the aid of Cortex's technical support, we built a personnel system application. We began by creating and defining datasets with the Data Entity Diagrammer (see Figure 2). The Data Entity Diagrammer represents datasets as rectangles. Datasets are linked with lines and relationship icons.

Our Employees dataset contained 14 fields. Each field held a specific piece of information about the employee. The first five fields were EMPLOYEE.NO, LAST.NAME, FIRST.NAME, MID.INITIAL and ADDRESS. Each of the fields in turn was defined in the Data Dictionary.

Once all datasets and data links were created, we used the Menu Diagrammer to create menus. A Menu Diagram shows

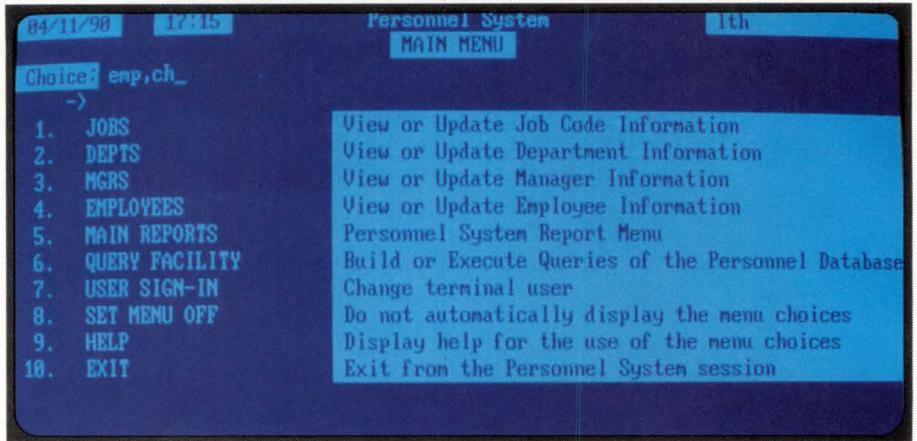


Figure 3: The main menu of a completed CorVision application.

the logic that the user will follow when entering and maintaining data within the application. The Menu Diagrammer is accessed like the Data Entity Diagrammer. The diagram on page 88 shows the personnel system menu created with the Menu Diagrammer.

Two types of menu exist in a Menu Diagram. Menu menus are rectangular and have other menus directly beneath them. Function menus are oval and directly access application functions.

Once our menus were created, we customized our application by adding several lines of code with Cortex's Builder language. Builder resembles other higher-level languages in syntax and includes arithmetic, Boolean and character expressions, pattern matching, verbs, fields and routines that let you incorporate functions into your application.

The following code is an example of Builder:

```
TOTAL.SKILL.VALUE:#EM=0
IF N..LINES GTO
SAVE..N=GROUP.NUMBER
GROUP ES WRITE SAVE..N
FOR LOOP.INDEX=1 TO N..LINES
GROUP ES READ LOOP.INDEX
TOTAL.SKILL.VALUE:#EM=
TOTAL.SKILL.VALUE:#EM+
SKILL.RATINGS:#ES
ENDFOR
GROUP ES READ SAVE..N
ENDIF
SCREEN_ITEM "TOTAL.SKILL.VALUE.EM"-
REDISPLAY
```

The final stages of development included generating the Builder source code for our application and then compiling it. Compilation took only a few minutes.

The main menu for our application is shown in Figure 3. You can select an item using the Up or Down arrow keys followed by Enter. Or, you can enter the number of the item you want followed by Enter.

THE DOCUMENTATION accompanying CorVision is extensive. It includes an installation guide, a three-volume set of CorVision reference manuals, a two-volume set describing the Builder Toolkit, an architecture handbook, an Action Diagrammer user's guide and other items. To get started with CorVision, Cortex recommends you attend its basic two-week training course, which introduces a step-by-step approach to building an application using CorVision.

Recently Cortex announced that interfaces now exist from CorVision to DEC's CDD/Plus and Index Technology's Excelerator. The CDD/Plus interface allows developers to distribute, maintain and control information via a central repository, while the Excelerator interface automates the transfer of design specifications from Excelerator to the development, code generation and maintenance phases of CorVision. The interfaces to CDD/Plus and Excelerator cost from \$2,000 to \$4,000, depending on CPU size.

Cortex plans to release CorVision V4.4 this summer. The new version will include pop-up windows, full support for VAX dates and times, metadata export, and transaction management. ■

Index Technology Corp.  
1 Main St., 9th Fl.  
Cambridge, MA 02142  
(617) 494-8200  
CIRCLE 474 ON READER CARD

## CorVision V4.32

**PLATFORMS:** VAX/VMS V4.4 or later and IBM PC or 100 percent compatible running MS-DOS V3.X

**PRICE:** From \$40,000 for a CorVision Development license on a MicroVAX 2000

## CORTEX CORP.

### HEADQUARTERS:

200 Fifth Ave.  
Waltham, MA 02154  
(617) 894-7000

**PRODUCT LINE:** I-CASE application development software

**FOUNDED:** 1977

**OWNERSHIP:** Private

CIRCLE 494 ON READER CARD

# A LAN analyzer would never see it coming.



But Spider Systems would. Introducing powerful monitoring and analyzing for remote LANs.

Most LAN analyzers wouldn't see a problem coming unless it landed on them.

Which is, we think, just a little too late.

That's why people are turning to Spider Systems.

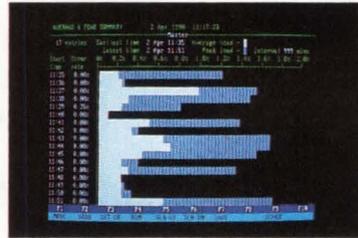
We offer the industry's leading family of combined analyzers and monitors. So you can see problems *before* they strike.

And now we've hit another high note with multi-segment monitoring. Just place a SpiderProbe™ on every remote segment and you'll have our advanced, high-level monitoring and analyzing across your whole network. All integrated in one system. It's less expensive than buying extra PC monitors. And far easier than sending out costly technicians.

Spider gives you much more than packet analysis. You get meaningful reports on all phases of LAN performance, like usage statistics, summary data and management reports. And Spider keeps accumulating data even when you switch to other applications.

Our continuous, multi-tasking feature keeps right on working in the background, monitoring alarms, statistics and all other data for all segments. So you never miss a beat.

Nobody offers a broader, more proven family of Ethernet and Token Ring LAN monitors and analyzers than Spider Systems. We're an international leader in network management. Call 1-800-447-7807 for your free demo disk. And please do it soon, before any more unexpected problems befall you.



Free demo disk! Call 1-800-447-7807 or send this coupon.

Yes, I want a free demo disk of SpiderAnalyzer,™

SpiderMonitor™ and SpiderProbe.

..... Token Ring ..... 5 1/4" ..... 3 1/2"

..... Ethernet ..... 5 1/4" ..... 3 1/2"

My need is immediate. Please have a representative call.

Name .....

Title .....

Company .....

Address .....

City ..... State ..... ZIP .....

Telephone .....

SPIDER SYSTEMS

Mail coupon to: Spider Systems, Inc., 12 New England Executive Park, Burlington, MA 01803

Spider, SpiderProbe, SpiderMonitor and SpiderAnalyzer are trademarks of Spider Systems Limited.

CIRCLE 193 ON READER CARD

# Genuine 486™ System... Amazing 386™ PRICE!

Yes, full powered 80486 computer systems with all the traditional Northgate features and performance.

And a price that says "BUY NOW!"

**\$5,895<sup>00</sup>**

Delivered to Your Home or Office

**YOU CAN'T IMAGINE WHAT SPEED REALLY IS** until you have Northgate's new Elegance 486 under your fingertips. Feel the power! It delivers everything a 486 should do ... **AND MORE!** Applications—even CAD—appear on the screen almost before you release the keys. Gone is the aggravation of waiting!

**Sizzling performance requires the hottest components ... and that's what Northgate delivers.**

**486 processor** combines the capabilities of an enhanced 386, fast 387 math coprocessor, an advanced cache controller and 8K of supporting static cache memory. Result? Incredible processing speed!

Now add in Northgate's new proprietary motherboard. Unique design maximizes the power and features of the 486 processor.

And look at this! A Maxtor 200Mb hard drive. Breaks performance barriers with 15MS speed ... yet doesn't make a peep.

**Impressed? There's more.** 4Mb of RAM (expandable to 16Mb). And 64K of 25NS read/write-back cache (expandable to 256K). Of course, it comes with a Northgate *OmniKey*™ keyboard—your choice of PLUS or ULTRA models.

**PLUS,** Northgate has a full range of expansion options! Monitors, hard drives, tape backups, memory cards, printers, modems, and more. Custom configure the system that's right for you.

**Use a Northgate 486/25 for 30 days.** If it fails to do everything we say, just return it.

### Special 486/33 Upgrade Offer

Buy your Elegance 486/25 now. And when you need more processing power, we'll upgrade it to a 486/33MHz for just **\$1500.00!**

**ORDER TODAY!** Be sure to ask about custom configurations, leasing and financing programs.

**CALL TOLL-FREE 24 HOURS A DAY**

**800-548-1993**

Notice to the Hearing Impaired: Northgate now has TDD capability. Dial 800-535-0602.



*"We hear you!"*

1 Northgate Park, Northgate Parkway, Eden Prairie, MN 55344

Financing: Use your Northgate Big 'N' revolving credit card. We have millions in financing available. We accept Visa and MasterCard, too. Lease it with Northgate, up to five-year terms available.

## Elegance™ 486/25 system configuration

- 25 MHz Intel 80486™ processor with 80387-compatible floating point coprocessor
- Industry Standard Architecture (ISA) bus
- 4Mb of 32-bit DRAM (expandable to 8Mb on the motherboard; total system RAM expandable to 16Mb with an optional memory card)
- Proprietary, U.S.-made motherboard
- 200Mb Maxtor hard drive with 15 MS access time
- 64K SRAM read/write-back cache (optional 256K cache available)
- High density 1.2Mb-5.25" and 1.44Mb-3.5" floppy drives; also reads, writes and formats low density disks
- Eight expansion card slots; one 32-bit, six 16-bit and one 8-bit
- Weitek numeric co-processor support
- Two serial and one parallel ports
- 14" monochrome monitor
- Hercules compatible video controller
- MS-DOS 4.01 and GW-BASIC software; Smart Drive disk caching software
- On-line users guide to system and MS-DOS 4.01
- 220 watt power supply
- Elegance 7 drive-bay custom tower cabinet pictured (desktop style available)
- Clock/calendar with 5 year battery backup
- Your choice of exclusive award-winning *OmniKey*/PLUS or ULTRA keyboard
- Park utility
- Front mounted controls for high/low speed operation, system reset, and keyboard lockout
- Total compatibility with all of your existing AT peripherals and I/O boards
- FCC Class B Certified

## Superior Northgate Support

**Famous 30-Day Performance Guarantee.** Northgate backs every system with our famous no-risk policy. If you aren't 100% satisfied, return it—no questions asked.

**Warranties.** Your system is covered by a 1-year limited warranty (5 years on keyboard). If a part fails, we'll ship a new one overnight at our expense—before we receive your troubled part.

**Industry's Best Unlimited Toll-Free Technical Support.** February 7, 1990, *BYTE* Magazine, Dr. Jerry Pournelle,\* on Northgate technical support ... "has become the standard that other mail order computer companies must match."

Our system consultants are on duty 24 hours a day, 7 days a week to answer your questions. **On-site service** is available to most locations if we can't solve your problems over the phone.

Prices and specifications subject to change without notice. Northgate reserves the right to substitute components of equal or greater quality or performance. All items subject to availability.

©Copyright Northgate Computer Systems, Inc., 1990. All rights reserved. Northgate, *OmniKey* and the Northgate 'N' logo are registered trademarks of Northgate Computer Systems. 80386 and 80486 are trademarks of Intel. All other products and brand names are trademarks and registered trademarks of their respective companies.

**CIRCLE 278 ON READER CARD**

# BOOKSHELF

## PERSONAL TRAINER

Aside from restoring a trashed disk from backup tapes, the most unpleasant task a VAX system manager or administrator must endure is teaching new personnel the wonders of VMS. And perhaps the most pathetic site in VAXdom is that of a neophyte user ripping through the two-inch-thick *VMS User's Manual (VUM)* trying to figure out where the file he'd been working on for the past two hours disappeared to.

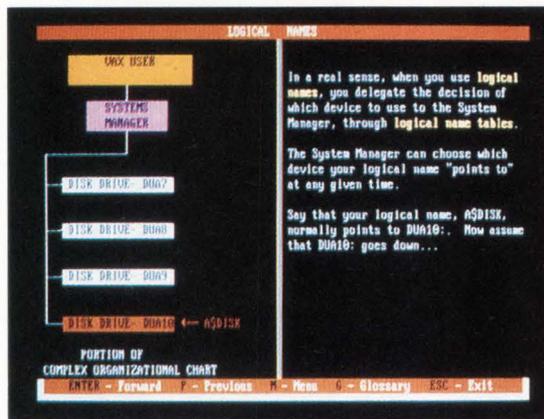
In DEC's defense, the *VUM* is a well-organized, completely indexed guide to VMS and contains almost everything the average user needs to know. But it's an intimidating work, and its abrupt, concise style is sometimes confusing.

A kinder, gentler approach to VMS is provided by Bernstein & Associates' Personal Trainer (PT). A PC-based training program that mixes colorful graphics and good, solid information, PT can help even the most dyed-in-the-wool computerphobe get up to speed quickly.

PT requires an IBM PC, XT, AT or compatible with at least 256 KB of memory. It also requires a color monitor (CGA or EGA) and a hard disk drive. It comes on four diskettes and requires a little more than 1 MB of disk space. An automated procedure reduces installation to a five-minute disk-swapping exercise. Once on the PC's hard drive, a simple batch file calls up the program.

There's no written documentation for PT, because none is necessary. You're presented a menu of topics. You just choose one and dive in. Seven subjects are covered: the VAX environment, the user environment, DCL, files, symbols, logical names and batch processing.

Each module provides a thorough discussion of its topic, including rudimentary animation to highlight the points being discussed. PT takes advantage of the limited graphics capability of the PC, using color to emphasize key



*Bernstein & Associates' Personal Trainer provides a menu of seven subjects, including logical names, illustrated above.*

points of interest. You can move forward and backward through a lesson, reviewing previously discussed points, or you can jump back to the main menu and move on to a different topic.

The screens are well-designed and uncluttered, and important points are emphasized with multiple-choice review questions. You must enter text to simulate typical VMS operations. The differences between the PC and VT keyboards aren't at issue here, since VT function and control keys aren't used.

PT comes with a hefty, three-ring reference manual that provides more in-depth information. The book alone is almost worth the cost of the entire package. Not only does it discuss the topics in the computer-based tutorial in more detail, it contains summaries that are extremely useful in daily operations. I have a sneaking suspicion the system manager will snatch the superb peripherals and VAX CPU performance comparison tables before releasing the manual to students.

I have only a few minor complaints about PT:

1. It would be convenient if PT allowed "book marks," enabling a user to return to a specific screen following an interruption. And since PT will probably be used

by more than one person at a site, some method for maintaining enrollment records would be a plus. Multiple users could use the same package on the same machine, with the software restarting the user at the point of interruption.

2. Some of the screens list questions in an "ABC" format, while the answers have to be input in a "123" format. This is a quibble, but it's distracting to someone trying to master the concepts being presented.

3. The PC running PT must have a color monitor. The

company should remember that some sites run monochrome only. My office PC doesn't have color, because I'm not pleased with the way reasonably priced color displays render text. I had to appropriate my son's PC to review the package. While color enhances the training process, it isn't really essential.

When I completed the review, my son took my place at the keyboard and restarted the package. In less than an hour he was fluent enough to be able to log on to my VAX and leave me an abusive mail message about hogging his hard drive.

Penny-pinching front office types may blanch at the price of \$1,050 per copy or \$5,000 for a site license. GSA, university and nonprofit firms get a price break. But considering the hidden expenses of employee training — distracted users and system managers, mistakes, lost data and the ever-present learning curve — hiring Personal Trainer for your operation is a training bargain. —*Reviewed by Kevin G. Barkes, DCL Editor*

Bernstein & Associates Inc.  
3 Dunwoody Park, Ste. 103  
Atlanta, GA 30338  
(404) 392-1488  
CIRCLE 460 ON READER CARD

IT'S NOT  
JUST dBASE  
ON UNIX.  
IT'S BETTER.

Yes, it runs your dBASE, FoxBASE and Clipper applications on UNIX, XENIX and AIX (also VAX/VMS and ULTRIX.) But that's only the beginning of Recital. It's a complete relational database and 4GL for developer and end users alike. It's also got a powerful data dictionary. SQL interface and over 350 additional commands.

And oh yes, there's one more advantage...you can have it today.

Call now 508/750-1066.

**Recital**<sup>TM</sup>

The world's most compatible database.

In the Americas:  
Recital Corporation Inc.  
85 Constitution Avenue  
Danvers, MA 01923  
Tel. 508/750-1066  
Fax 508/750-8097

International:  
Recital Corporation Ltd.  
Southbank Technopark  
90 London Road  
London, SE1 6LN U.K.  
Tel. 01/401-2727

All trademarks are the properties of their respective companies.

CIRCLE 231 ON READER CARD

# System Management On The Desktop, Part 2

Last month I described the use of FileView as a platform for system management. Although FileView provides a solid foundation from which to build, it has limitations. FileView's inability to support a complex dialog box from a command procedure is the biggest drawback for system management purposes. In this article I'll show you how to get around the FileView limitations by developing a simple DECwindows program. The source code is longer than can be presented here, but it's available on ARIS/BB. I'll explain the bulk of the program through code segments.

## Point And Shoot

In Part 1, I discussed some of the benefits a workstation can bring to multisystem management. The ability to access many systems simultaneously from the same screen and keyboard is a powerful feature, but the potential benefit of using a workstation for system management goes far beyond the multisystem aspect. With the proper software, the novice or expert system manager can easily be more productive.

DECwindows is a user-to-operating system agent. In the nongraphical context, there's nothing you can do under DECwindows that can't be done at the DCL level. DECwindows simply makes using the features of DCL commands easier, but only for the limited set of commands supported by FileView. To extend this benefit to other DCL commands, you must develop programs.

Unfortunately, FileView's developers didn't provide a means to expand FileView's built-in verbs, such as COPY, RENAME and DELETE. I call these verbs built-in verbs because they're linked to

widgets defined in VUE\$MASTER.UID and to callback routines in VUE\$MASTER.EXE (the FileView image). To invoke one of the built-in verbs, a FileView subprocess executes the special symbol VUE\$GET\_COMMAND with the name of a verb widget, such as VUE\$C\_COPY\_VERB, as its parameter.

To emulate FileView's interface with DCL commands, it's necessary to build a dialog box with the appropriate widgets and gadgets to collect parameters and qualifiers from the user. From the dialog box, a DCL command can be assembled and spawned to a subprocess. If this is done within the context of a FileView subprocess, FileView will provide support for the subprocess's terminal output.

## Using UIL

UIL is a programming tool that programmers can use to create user interfaces that conform to the X User Interface (XUI) Style Guide. UIL is a specification language for defining the initial state of a user interface for an application. Using UIL, you can describe widgets such as windows, menus, dialog boxes, labels, push buttons and others that will be used by your X application.

UIL is a pseudo programming language. Its source, a UIL file, is a series of object definitions. The output of the UIL compiler is a User Interface Description (UID) file, which is interpreted at run time by the Digital Resource Manager (DRM). DRM is a routine you must initialize in your main program.

There are several advantages to using UIL to create a user interface. The biggest advantage is that it's very easy to specify a user interface. Using UIL, there's no need to be familiar with the numerous widget creation routines. To create a UIL object, simply include the object

arguments to be changed. Another advantage is UIL's ability to separate form from function. Because you define your user interface in a separate module, its form (what the objects look like) has little

**“  
UIL programming is  
nothing more than a series  
of object definitions.  
”**

to do with the application code that uses it. Finally, it's easy to prototype a new application. Using UIL, a programmer can whip up a working user interface in a matter of hours.

UIL programming is nothing more than a series of object definitions. You specify an object in a UIL module by declaring its name, type, arguments, controls and callback reasons. The object's name is any text string you choose. Arguments are one or more attribute modifications. Each object type has a different set of supported arguments and default values. Controls are widgets or gadgets associated with the object. For instance, when you define a pull-down menu, you must list each entry in the menu as a control. In turn, each control you list must be defined as an object. Finally, within an object you can specify callback routines for one or more reasons (object-specific). Common callback reasons are activate, create, destroy and help. The callback reason provides a simple way of connecting the user's input (manipulation of the user interface) to an action routine.

The typical object would be coded in

**Take your files with you — safely.**

Data Commuter gives you true portability, and safety for your data. It lets you move between systems easily. All you do is slide the Data Commuter carrier into the chassis, turn the key, and your data is available. Carry it in your hand or briefcase.

**All the versatility you need.**

You select the capacity and speed you want — slower, less expensive 3.5" drives for back-up and faster drives for

on-line use. Data Commuter connects to SCSI, ST506 or ESDI interfaces, and machines such as IBM, Compaq, DEC, Sun, Silicon Graphics and other popular micros and workstations.

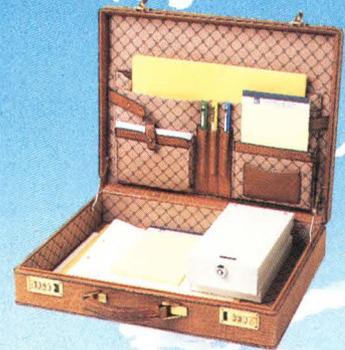
**Full-time security.**

Your data is safe. Even if Data Commuter is dropped, it will survive a 200-G shock. Remove the disk and lock it in your desk or safe. Even if you leave the carrier unattended, it takes your key and lock combination

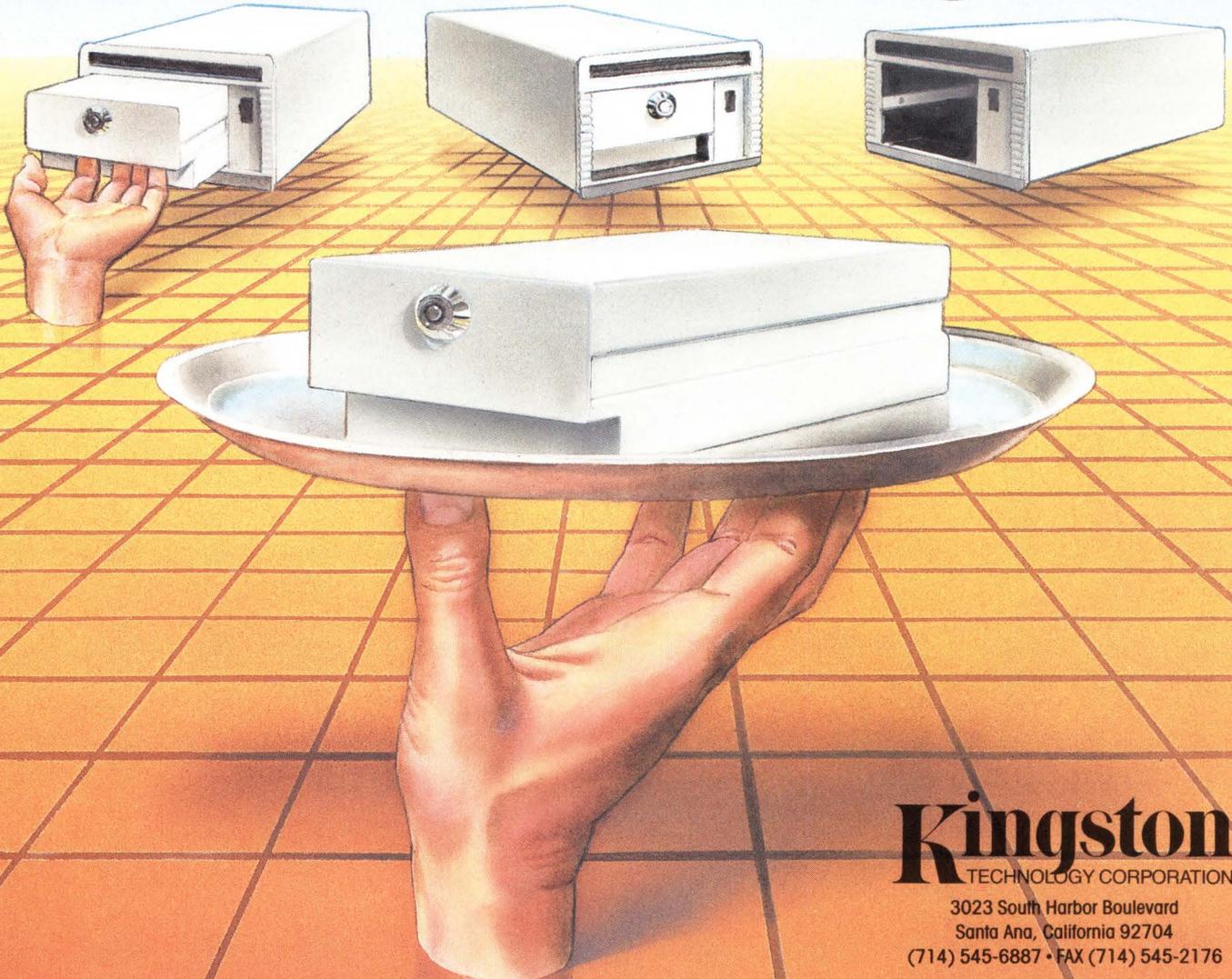
to operate the drive.

**Take it with you.**

When you can't leave the data behind, take it along — safely. Call for your evaluation unit now. (714) 545-6887.



# Hot disk drives to go.



**Kingston**  
TECHNOLOGY CORPORATION

3023 South Harbor Boulevard  
Santa Ana, California 92704  
(714) 545-6887 • FAX (714) 545-2176

Makers of memory products for: DEC, IBM PS/2, Apple, AST, Compaq, Silicon Graphics, Sun Micro, Toshiba and H-P LaserJet.

Brand names mentioned are trademarked by their respective holders.

CIRCLE 270 ON READER CARD

the following manner:

```
object
  object_name : object_type {
    arguments {
      ...
    };
    controls {
      ...
    };
    callbacks {
      ...
    };
  };
};
```

To make the linkage between your UIL objects and your callback code, the callback routines must be defined. This is done through a procedure section. All callback procedures listed within the callback section of a UIL object definition must be defined in the procedure section. A typical procedure section might look like:

```
procedure
  create_proc (integer);
  activate_proc (integer);
```

Notice that the procedures defined in the example identify a parameter type. This is an option. The parameter is known as a callback tag and must be a

valid UIL value type. I use the tag to tell my callback routines which object has called it. To do this, I use a value section in the UIL module to identify each object with a callback procedure:

```
value
  w_main_menu_bar : 1;
  w_exit_button   : 2;
  w_nc            : 3;
  w_image_dialog  : 4;
  w_image_ok      : 5;
  w_image_cancel  : 6;
  w_saveaset_name : 7;
  ...
```

I use corresponding definitions in the C source of the main routine:

```
#define w_main_menu_bar 1
#define w_exit_button   2
#define w_nc            3
#define w_image_dialog  4
#define w_image_ok      5
#define w_image_cancel  6
#define w_saveaset_name 7
...
```

Through the use of an array and a simple routine (`create_proc`), I can log the widget identifications of widgets as they're used. The benefit of doing this is that it avoids having to manage widgets before it's necessary. My `create_proc` routine looks like this:

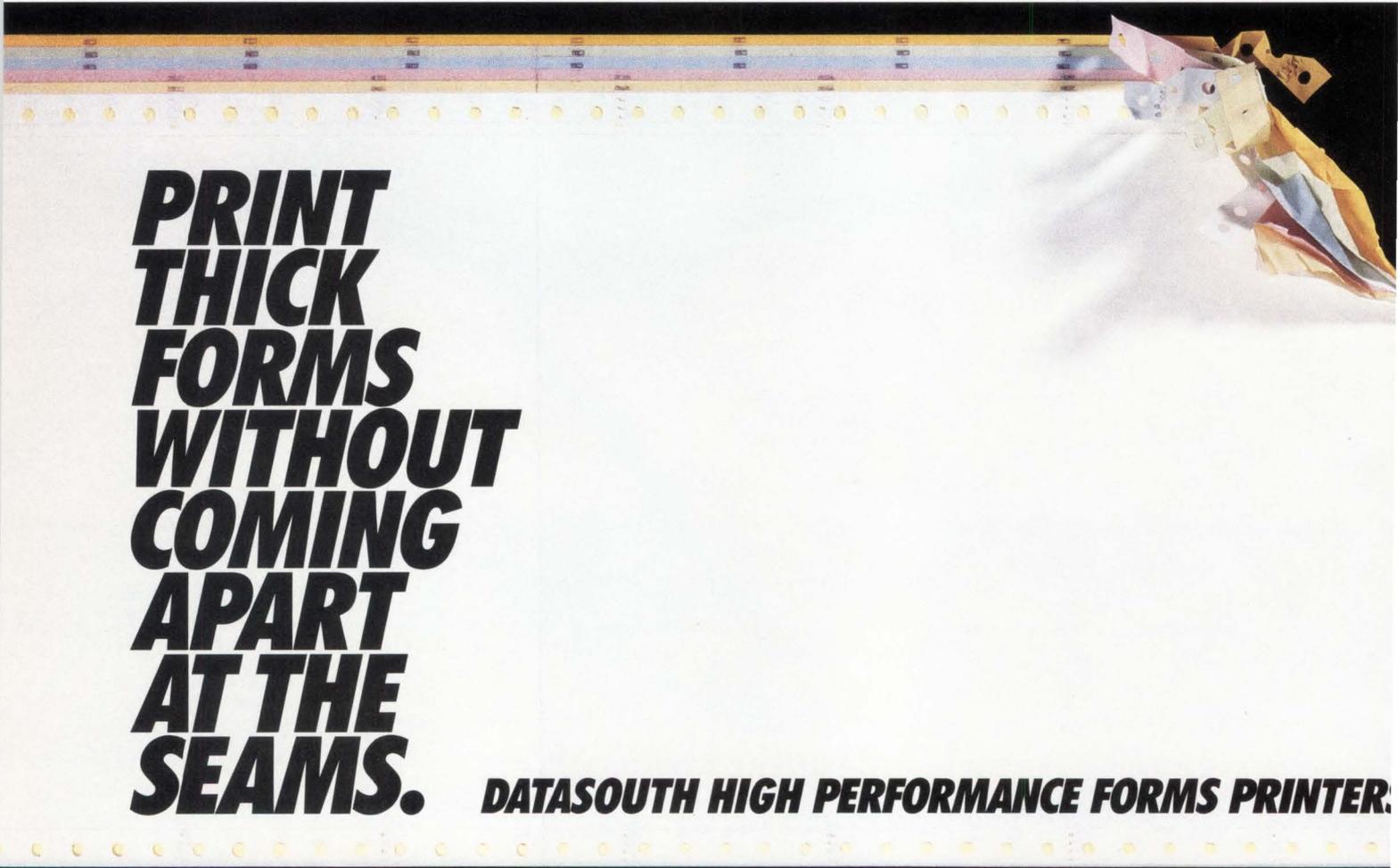
```
static void create_proc(w, tag, reason)
Widget w;
int *tag;
unsigned long *reason;
{
  int id = *tag;
  widget_farm[id] = w;
}
```

## Power Of The Callback

To use the objects specified in your UIL module, you must create an application program with the callback routines referenced by your UIL objects.

A callback routine is a procedure linked to a widget action, such as a button press or pointer location. In the standard X.11 programming environment, the callback facility is managed through a callback structure. In this environment, each callback routine must be declared before the main routine. The widget-to-callback linkage is static.

Using UIL, the widget-to-callback procedure must be dynamic, because the UIL module can change without the need to rebuild the executable image. This dynamic linkage is managed by the



**PRINT  
THICK  
FORMS  
WITHOUT  
COMING  
APART  
AT THE  
SEAMS.**

**DATASOUTH HIGH PERFORMANCE FORMS PRINTER.**

DRM, which you must use to open your UID file and register your callback routines. The following is an example of the necessary definitions and the initialization of DRM:

```
static DRMHierarchy s_DRMHierarchy;
static char *vec[]={"my_program.uid"};
static DRMCode class ;
...
static void create_proc();
static DRMCount regnum = 1;
static DRMRegisterArg regvec[] = {
    {"create_proc", (caddr_t) create_proc}
};
...
DwtInitializeDRM();
DwtOpenHierarchy(1, vec, NULL,
    &s_DRMHierarchy);
DwtRegisterDRMNames(regvec, regnum);
```

Once these calls to DRM have been made, you can fetch widgets (using `DwtFetchWidget`) from the UID file. The first widget to be fetched is always your main window. Once fetched, the widget must be managed (using `XtManageChild`) so the X server can display it. Widgets can then access their associated callback routines. For example, the callback procedure for the "Exit" function on a pull-down menu might be coded

as follows:

```
static void activate_proc(w, tag, reason)
Widget w;
int *tag;
unsigned long *reason;
{
    int i;
    int widget_num = *tag;
    switch (widget_num) {
        case w_exit_button:
            exit(1);
        ...
        default:
            break;
    }
}
```

### X Backup

To demonstrate the use of UIL and callback routines, I've written a user interface to the BACKUP utility. Several widgets, including a main window, pull-down menus, dialog boxes and toggle buttons, are demonstrated. The program has limited functionality to make it as easy to understand as possible. From the same basic program core, I've written several front ends to my favorite system management utilities. You can do the same.

The XBACKUP program consists of a

main window with two pull-down menus, Control and Backup, in its menu bar. The Control menu provides an exit path, and the Backup menu lists backup types: Image, Incremental and Physical. When you select a backup type, a dialog box with the appropriate qualifier and parameter widgets pops up. Using the mouse and keyboard, you can complete the dialog box information, and the backup will begin.

The BACKUP command is an extraction of information from the dialog box widgets. A command string is built parameter by parameter and qualifier by qualifier. If enough information is available, the BACKUP command is spawned to a subprocess. If XBACKUP is installed as a verb on a FileView menu, terminal output from a BACKUP subprocess will display in a terminal window created by FileView.

Although my XBACKUP program is limited in its present form, it demonstrates what can be achieved with a little programming effort. ■

If your printer leaves your nerves as ragged as your multipart forms, then it's time to retire — the printer, that is. And pick up a Datasouth printer instead.

Only Datasouth printers are designed to go easy on you and your multipart forms. They're built to withstand grueling 100% duty cycles for years of trouble-free printing, even on your most troublesome forms.

Datasouth printers are packed with a multitude of solid features. Like a straight paper path to eliminate bunching and jamming. A high powered ballistic print-head to print legibly through forms up to six copies thick. A range of speeds from 180 to 400 cps. Even a zero tear-off feature for demand document applications.

And Datasouth printers are plug compatible with your standard hardware: ASCII minis and micros, DEC VAX systems, or IBM System/3X, AS/400, or 3270-type systems.

So before you and your forms go to pieces again, get rid of your old printer. And get your act together with a Datasouth. Call **1-800-476-2120** for the name of your nearest dealer.



© 1990 Datasouth Computer Corporation. DEC is a registered trademark of Digital Equipment Corporation. IBM System/3X, and AS/400 are trademarks or registered trademarks of International Business Machines Corporation.



**Datasouth**

AMERICA'S HIGH PERFORMANCE  
PRINTER COMPANY

**CIRCLE 180 ON READER CARD**

Please send me more information on the printers that keep my forms in one piece.

NAME \_\_\_\_\_

TITLE \_\_\_\_\_

COMPANY \_\_\_\_\_

STREET ADDRESS \_\_\_\_\_

CITY/STATE/ZIP \_\_\_\_\_

( ) \_\_\_\_\_

PHONE \_\_\_\_\_

Mail to: Datasouth Computer Corporation  
P.O. Box 240947, Charlotte, NC 28224

DP0790

## NETWORKING

Bradford T. Harrison

# Harvesting Processor Power With NCS

*"Those guys at IBM and DEC haven't figured out how to use the*

*new technology and keep their higher priced products. The only way you do that is by providing enormous amounts of computing power for the same money, for the same revenue that you were getting in the past. Well, they haven't done that. I think they are going to fly both of those companies into the ground."* — Gordon Bell, former DEC employee and chief architect of the VAX, speaking in Fortune, March 26, 1990.

Responding to competitive pressures from companies that have caused customers to begin thinking in terms of mips rather than software compatibility or big-company support, DEC and IBM are lashing back with processing power as great and inexpensive as the industry has ever seen.

On April 3, DEC introduced the DECstation 5000 Model 200, which clocks in at 24 mips for \$14,995, about \$625 per mip. That's 20 times the power of the VAX-11/780. Similarly, IBM's new RS/6000 RISC workstations and servers are providing the strongest floating-point performance in the industry, and the HP-Apollo merger will now result in a processor board favoring neither mips nor Mflops, instead providing a clean 100 of both — in parallel. This product, a blending of the HP/PA and Apollo PRISM architectures, is expected by 1992. Users will have the option of plugging multiple processor boards into a system bus in parallel for virtually unlimited computing power.

But what about when the architect, engineer or scientist running one of these machine takes a coffee break? Billions of

machine cycles are wasted. This is the problem the Network Computing System (NCS) was originally designed to solve. Software engineers at Apollo decided to build a software system that would "steal" that power right off the engineer's desk, even if he were only on the phone or his application wasn't processor-intensive.

NCS has since become much more than an attempt to harvest idle processor cycles, though that remains one of its primary applications. Equally important is the ability to add processor power to the network and transparently migrate applications to the new resource, regardless of the hardware architecture. This is the same functionality provided by the VAXcluster, whereby processor power may be added incrementally. But now unlike processors may be added, as well.

### A Happy Union

DEC is expanding the VAXcluster and uniting the VAX architecture with its new RISC machines via NCS. The April 3 announcement included native support for NCS in ULTRIX V4.0 and the addition of NCS to the VMS/ULTRIX Connection (UCX) in V1.3. UCX runs on VMS and provides services designed to integrate the VMS and UNIX environments.

Although technically considered a service in DEC's Network Application Support (NAS) group, NCS is developing a life of its own. It was originally engineered at Apollo, but DEC has worked with HP-Apollo to improve NCS by adding support for WANs and other features.

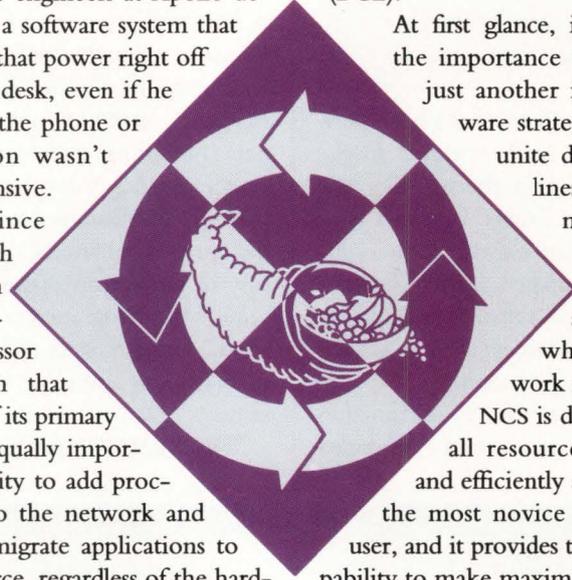
Furthermore, on May 15, OSF announced full support for NCS as part of the OSF Distributed Computing Environment (DCE).

At first glance, it's easy to miss the importance of NCS. It isn't just another innovative software strategy or attempt to unite disparate product lines. It's the beginning of a new way of treating the network as a unified system, whether that network is local or global. NCS is designed to make all resources transparently and efficiently available to even the most novice programmer or user, and it provides the important capability to make maximum use of all resources — especially processor power — thus staving off the need to add expensive new resources.

### RPCs

The Remote Procedure Call (RPC) is at the heart of NCS. An RPC may occur with a node five feet down the Ethernet or on the other side of the globe. An RPC consists of a procedure name, a node address and parameters. The addressed node executes the named procedure using the supplied parameters and returns the results to the calling routine on the calling node. Hundreds or even thousands of RPCs may occur every second on a busy network computer.

The RPC is at the heart of client/server computing. Without the RPC, the programmer would have no easy way to partition his program to take advantage of the various compute servers and other



# No big box. No big price. Real big deal.

30 day  
Unconditional  
Return Guarantee.

**ETS-8**  
8-line Terminal Server  
LAT-TCP

**ETS-16**  
16-line Terminal Server  
LAT-TCP

**EPS-4**  
4-line Terminal Server  
w/printer port  
LAT-TCP



**\$1695**

**\$2495**

**\$1495**

Terminal servers that come in a big-big box at a big-big price can be a very big waste.

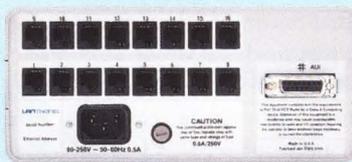
With Lantronix, you save a bundle by thinking small.

First, you save big bucks by not having to buy more lines than you really need. After all, why get a large, expensive box when a 4-, 8- or 16-line Lantronix terminal server is all you really need?

You save again with our low, low unit price. Lantronix offers quality-built concurrent LAT-TCP/IP



ETS-8



ETS-16



EPS-4 with parallel port supporting Centronics-Dataproducts interfaces.

terminal servers at the lowest cost to you.

You even can save on installation costs. Lantronix servers are so small they can be located close to your workgroups—minimizing the time, trouble and expense of cabling terminals to the server.

Think small, save big. Call to place your order today.

1-800-422-7022

**LANTRONIX**

**Call for educational, reseller and volume pricing!**

Lantronix, 26072 Merit Circle, Suite 113, Laguna Hills, CA 92653, (714) 367-0050. Lantronix EPS-4, ETS-8 and ETS-16 are trademarks of Lantronix. All other brand or product names are trademarks or registered trademarks of their respective owners.

CIRCLE 140 ON READER CARD

## For More Information

Netwise Inc.  
2477 55th St.  
Boulder, CO 80301  
(303) 442-8280  
CIRCLE 471 ON READER CARD

VXM Technologies Inc.  
P.O. Box 9121 Kenmore Station  
Boston, MA 02215  
(617) 730-8490  
CIRCLE 429 ON READER CARD

resources on the network. As RPCs mature, the server and client components are becoming more clearly defined. Server machines of the future will support libraries of RPCs, and client programs running on less-powerful machines will tap into these large libraries across the net.

The NCS RPC isn't, however, the only one. Sun Microsystems' Open Network Computing (ONC) services also provide one, and numerous products are appearing that facilitate the implementation of RPCs, most notably the RPC Tool from Netwise.

A fierce and perhaps unfortunate battle is developing between AT&T/Sun and OSF/IBM/DEC/HP-Apollo in regard to the RPC, and DEC's incorporation of the NCS RPC into ULTRIX is the third solid and seemingly irreversible commitment made by a large company. The other two occurred when AT&T incorporated ONC into UNIX System V.4 and when HP-Apollo built NCS in HP's HP-UX UNIX operating system. According to a Sun spokesperson, however, the problem began when Apollo failed to implement the Sun RPC when it first installed NFS on its systems. Apollo instead developed its own, giving us the two incompatible RPCs we have today.

The two RPCs will coexist at least for the near term. At this point they're too different to interoperate. Where this will eventually lead is anyone's guess, but to make informed choices, system managers must be aware of the issues regard-

ing the different RPC mechanisms. There are four primary issues:

1. Data representation.
2. Transport protocols.
3. Development tools.
4. Naming.

Let's look at each and see how DEC is supporting them in ULTRIX V4.0 and the next release of UCX. Improvements with regard to all four categories are happening fast. Ram Sudama, project leader of the RPC project at DEC, provided the details on DEC's current work in each category.

### Data Representation

The data representation problem is one of the most difficult issues in RPC implementation. Machines vary widely in their native data types. Integer size, floating-point precision and byte ordering all differ even among machines from the same manufacturer.

In an effort to deal with the problem, Sun developed the External Data Representation (XDR) model, which uses what's called a canonical format to represent data on the network. The data is converted to a common format known to all machines so that they may individually convert from the canonical format to their native data types. The OSI Abstract Syntax Notation One (ASN.1) is another canonical solution to the problem and includes a variety of other features that allow canonical representation of complex data types and data structures.

There are two primary problems with the canonical approach. One is the truncation or loss of precision of numbers that are larger or more precise than can be represented by the canonical format in use. More common are the inefficiencies that occur when a network is for the most part made up of the same machines — conversion occurs even though it isn't required. In general, canonical formats work best on networks in which there are many different machine architectures in place.

NCS uses a different representation model called the Network Data Representation (NDR) model, whereby data transferred on the network is tagged with

the make of machine from which it's being sent. It's then up to the target node to convert the data to its own data types. If the communicating machines use the same architecture, then no conversion is required. If they're different, it's up to the target to take care of the conversion. Of course, a problem emerges when there are many different types of machines on the network. The overhead of run-time libraries that must include support for every type of machine on the network grows rapidly as machines are added.

In its first release of NCS, DEC is supporting NDR. So if the network consists of only DECstations/DECsystems, no overhead will be incurred. Add a VAX and the conversions begin. Add an MC68000 machine and a couple of SPARCstations, and the performance problems with NDR rapidly appear. Sun criticized Apollo when it developed NDR, because the method is biased against multivendor environments. But DEC is fully behind the OSI Presentation Syntax Notation (PSN) and ASN.1 and promises support for whatever data representation models become popular as the RPC marketplace matures.

### Transport Protocols

With many RPCs occurring every second on a busy network computer, network performance becomes a serious issue. FDDI will receive a significant boost as RPCs catch on, and the debates continue as to how to improve RPC performance. Network protocol issues become extremely important, as a slow RPC can radically impact application performance. NCS has dealt with the problem by building the network protocol into the RPC mechanism.

For example, in NCS the distinction is made between *idempotent* and *nonidempotent* RPCs. An idempotent RPC may be unintentionally executed more than once, whereas a nonidempotent must occur no more than once. An example of an idempotent RPC is a mathematical calculation on a vector processor. An

# YOU CAN Lan ANYTHING FROM HERE.



## A MODULAR, MULTIMEDIA CONCENTRATOR/BRIDGE THAT LETS YOU DEAL THE BEST CARDS FOR YOUR NETWORK.

The CentreCOM 5000 SERIES lets you meet changing network requirements quickly, efficiently, and with high quality cards and building blocks. Move users around, add stations, change cabling schemes, bring more offices on-line, share new applications . . . Allied Telesis has a cost-effective solution for each of your networking needs:

- Star Coupler or Active Concentrator operation through optical modules - connect to Data Terminal Equipment (DTE) with ATI transceivers to create FO networks
- Fiber Optic Inter-Repeater networking capability (FOIRL)
- Dual-bus architecture allows simultaneous transceiver and repeater operation
- Partition and test to independently operating ports, isolate malfunctions from the network
- Modules for Thick-Net, Thin-Net, Fiber-Optics and Twisted Pair
- Meets Ethernet, DECnet, IEEE standards
- Optional built-in bridging capability allows broad network expansion
- Smallest concentrator today, also available as 19 inch rackmount unit

Transceivers

Optical Repeater

Thin-Net Repeater

Termination Switch

Auto/Manual Partitioning Switch

Thick-Net Repeater

**ALLIED TELESIS INC. — Excellence in Connectivity**  
*High Quality, Low Cost, Superb Service*

Contact ATI for the nearest distributor offering volume pricing.

## Allied Telesis, Inc.

627 National Avenue  
Mountain View, CA 94043, U.S.A.  
(415) 964-2771  
FAX: (415) 964-0944  
CIRCLE 103 ON READER CARD





# TCPware™ How suite it is!

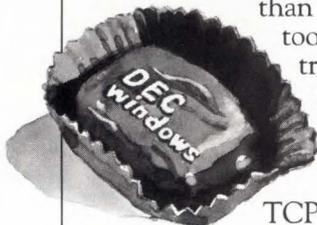
*The only modular family of DEC  
networking protocols.*

If you're networking DEC VAX or PDP-11 systems to UNIX, make sure you choose a method that doesn't force-feed you with more software than you really need. No matter what your application, TCPware – our efficient, modular suite of TCP/IP products – lets you pick and choose for optimum performance.

Only TCPware grows with you. All the major networking services – FTP, NFS, SMTP, TELNET, and much more – are standalone TCPware modules. You can start with just one and add services as your needs grow.

And with TCPware, your investment pays off in better performance and more CPU availability. Designed exclusively for DEC, TCPware runs with 40% less CPU loading than ported TCP/IP products. It's more reliable, too. And TCPware benchmarks at 50% higher transfer rates. So you'll get faster file transfers and quicker keyboard response – on more systems at less cost.

Best of all, modularity means you don't pay for what you don't need. That makes TCPware the sweetest deal on the market.



Call Process Software Corporation today for complete details.  
800-722-7770, 508-879-6994, FAX 508-879-0042

TCPware is a trademark of Process Software Corporation.  
DEC, VAX and PDP are trademarks of Digital Equipment Corporation. UNIX is a trademark of AT&T.

CIRCLE 157 ON READER CARD

example of a nonidempotent RPC is an update to a record in a data file by reading an amount and adding to it, then writing the new value back to disk.

In NCS, nonidempotent RPCs are carefully tracked. The protocol specifies several packet exchanges to guarantee proper execution. On the other hand, idempotent RPCs use the minimum number of packet exchanges to execute the call without error-checking. NCS may thus be implemented at the datagram level or over a fully connection-oriented protocol. In its first release of NCS, DEC is supporting NCS on the TCP/IP, UDP/IP and DECnet protocol stacks.

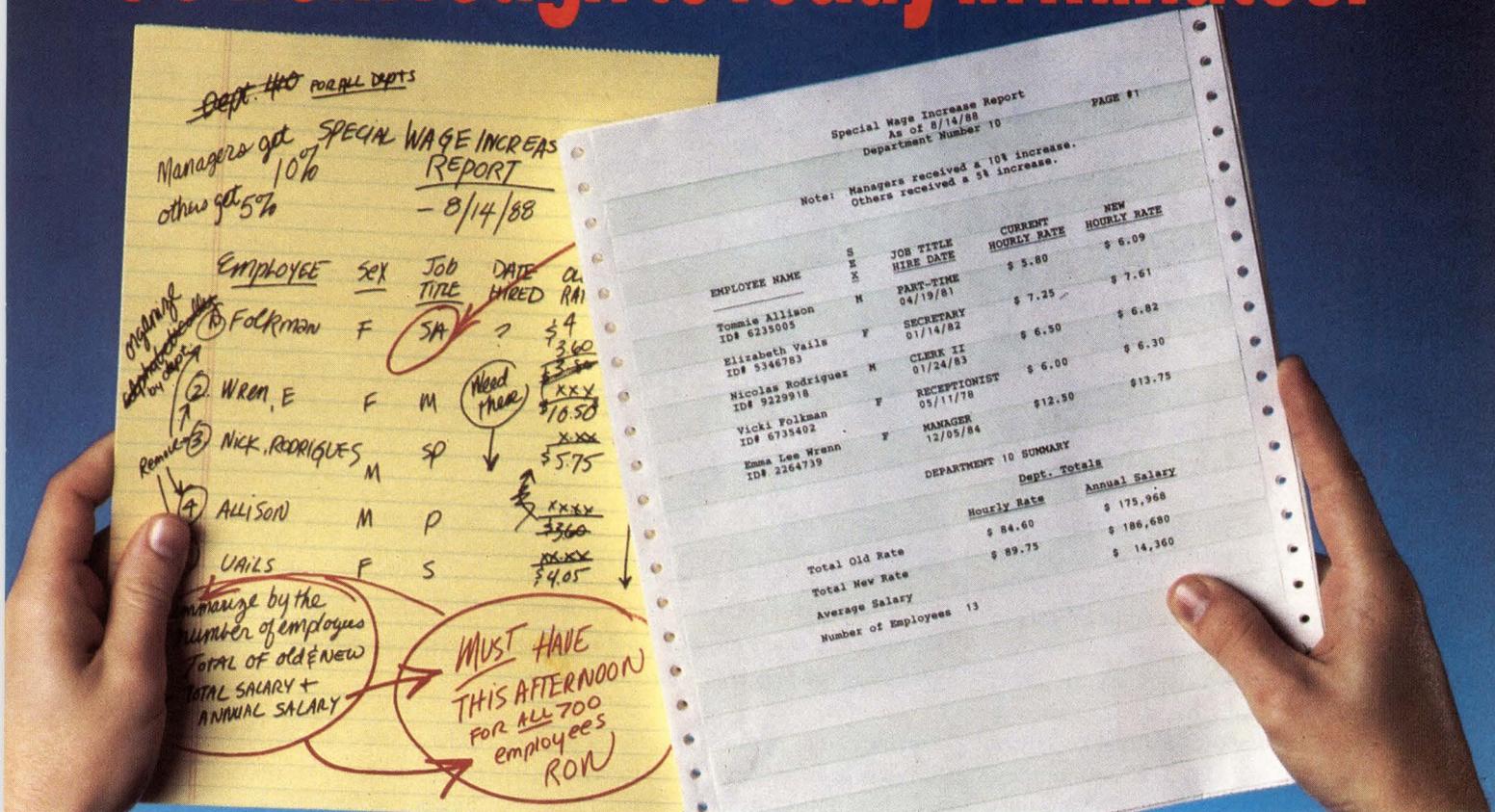
To accommodate the different types of RPCs and available system resources, it's desirable for the appropriate transport for the RPC to be selected at run time rather than compile time. AT&T built this functionality into UNIX System V.4 with the Transport Layer Interface (TLI), and now DEC is doing the same with the Dynamic Transport Selection (DTS) mechanism.

## Development Tools

To implement RPCs efficiently, programmers need sophisticated tools to simplify their work. Early RPC development tools such as Sun's RPCgen required programmers to have an intimate knowledge of the network and addressing mechanisms. This is changing quickly. The goal is total transparency in which the underlying structure of the network needn't be known and the programmer or user deals with network resources via simple mnemonic designations. However, it will be several years before this goal is achieved. DEC's Sudama estimates that we're perhaps 30 to 40 percent of the way there, though the underlying mechanisms are pretty much in place. In fact, according to Sudama, much of the work DEC has been doing with VAXclusters during the past several years has laid the groundwork for much of this technology.

With RPCs, the programmer is confronted with a range of new considerations. Whereas previously he partitioned his program into procedures based on

# Go from rough to ready in minutes.



## With Intelligent Query®, the VAX report writer for everyone.

### IQ—Not Just “Another Report Writer”

IQ is a sophisticated decision support tool—built from the ground up to be easy enough for End Users and powerful enough for DP professionals.

### Everyone Can Become More Productive

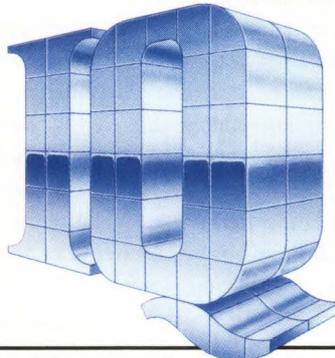
When you put IQ to work on your VAX applications—everyone becomes more productive.

End users can create their own custom reports and graphs by easily retrieving, sorting, calculating and formatting information. Technical managers and developers can create production reports in a fraction of the time normally required. They spend less time supporting users or creating ad hoc reports, and more time on urgent development issues.

### Ease of Use—A lot of Software Companies Talk About It...

#### IQ Defines It With:

- A windows-like menu style
- Visual Screen Painter
- English 4GL
- Predefined dictionary to shield users from technical aspects of database management



### Optimized For VMS

IQ was designed to take advantage of a number of Digital VMS facilities and guidelines for optimized performance including:

- SMG (screen management guidelines)
- VMS sorting facility
- DSRI for efficient Rdb access

Additionally, IQ incorporates incremental selection, native key linkage, index retrieval and numerous other techniques to maximize efficiency.

### IQ Puts You In Smart Company

IQ is the number one choice of over 500 software companies that remarket it under their own trade names. Every day thousands of VAX users put IQ to work—turning data into information.

### See For Yourself

Just phone or write and let us show you what IQ can do. We're confident, that after you see IQ you'll understand why we've sold more than 100,000 copies.

## Programmed Intelligence Corporation

3295 River Exchange Drive • Suite 550 • Norcross, Georgia 30092

Act now! Call today: 1-800-458-0386 • In Georgia (404) 446-8880 • FAX (404) 448-4088

The products mentioned above are trademarks of their respective companies.

logical functions within the program and was concerned with performance primarily through analysis of the order of his algorithms, he must now also consider the amount of data that may be transferred across the network for execution on a remote machine. Transfer time versus execution time becomes a consideration, as well as the data types and data structures that may have to be transferred. Procedures no longer share a common main memory.

RPC compilers accept as input specific information about the interface between the calling procedure and the called procedure. The procedures may be written in any number of languages, including C, Pascal and FORTRAN. Routines don't have to be written in the same language, but they must be able to act on the same parameters.

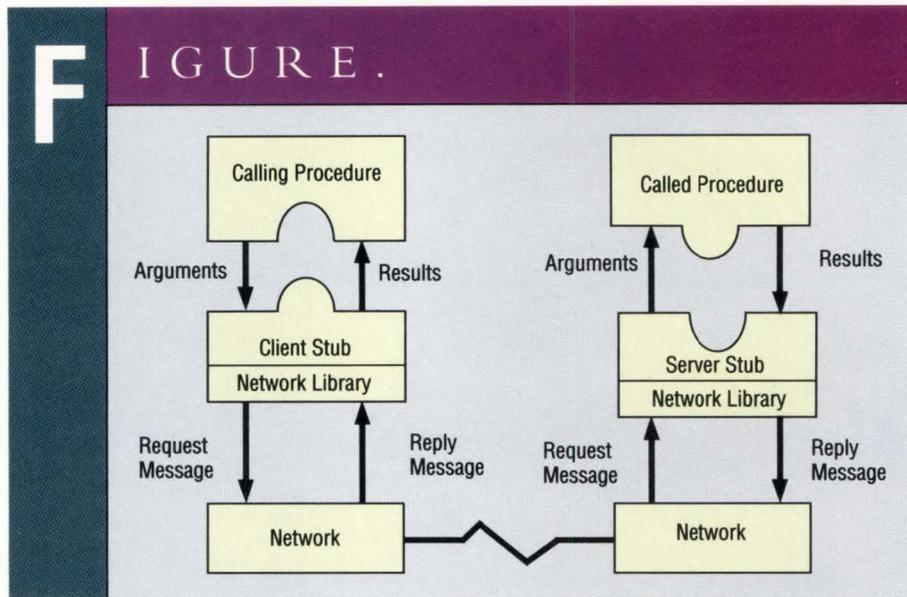
The language used with the RPC compiler is usually based on C, though Apollo also supports Pascal-like syntax and the Netwise RPC Tool also supports Ada. Client and server "stubs" are output from the RPC compiler, usually in C. The C stubs are then compiled on the machines where the client and server routines they support are located, and the procedures are ready to communicate (see Figure). The stubs cause procedure calls to appear local to the procedures.

Multiple stubs and their corresponding procedures may be compiled on a variety of machines and selected automatically at run time according to which machine is the least loaded and thus has the freest amount of processor time to execute the procedure.

DEC's enhancements to the Network Interface Definition Language (NIDL), the NCS compiler, currently support only C-based calling conventions. However, the company will be expanding language support for the compiler as the NCS product line develops.

## Naming

Since RPCs are being implemented on a variety of existing networks, it's important that a mechanism be included that allows for flexibility in binding RPCs to the various nodes on which they may



*Client and server stubs are output from the RPC compiler. The stubs are compiled on the machines where the client and server routines they support are located. The procedures are then ready to communicate.*

*Courtesy Netwise Inc.*

execute. DEC is supporting the Name Service Independent (NSI) interface, which supports its Distributed Name Service (DNS) and the NCS Location Broker (LB).

Clients and servers are "bound" according to three different mechanisms. In implicit binding, the client-serving binding is set up once at compile time. The remote procedure is always executed on a specific node. In explicit binding, the node may be specified by the programmer each time the remote procedure is called. The network is given all the information it needs to make the call by the application. In automatic binding, a mechanism is invoked to determine the node on which the procedure will execute according to what the mechanism knows about the current load (or some other characteristic) of the network nodes that can execute the procedure. In NCS, this functionality is achieved with the LB. In ONC, it's achieved with Yellow Pages.

The naming service is responsible for translating from the logical names used by the various components of the network computing system to the physical locations. Directories may reside in multiple locations on the network, and it's the responsibility of the naming service to return to the calling node the network

address of the system with which it's to communicate. On a WAN, physical addresses may be diverse.

WILL RPC TECHNOLOGY sweep the industry? To be sure, there's competing technology, including VAXclusters. And products such as The VXM System from VXM Technologies provide an alternative to RPCs by making "extended virtual machines" of each machine on the network. The application programmer thus views the network as consisting of machines with the same fundamental architecture. This is accomplished with "shells" that provide a consistent view of each machine. The programmer then writes "scripts" instead of procedure calls to access a wide variety of remote resources. All resources are dealt with according to common conventions. The VXM System also supports NCS, letting programmers use conventional RPC technology if required.

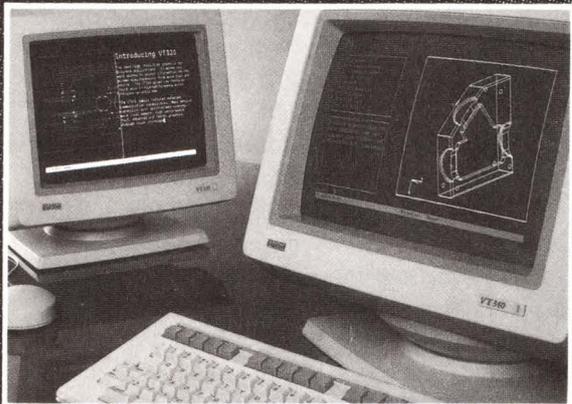
Perhaps all these technologies are leading in the same direction and will eventually coalesce in network-level user and programmer interfaces as simple to use and learn as the Macintosh. The road may not be smooth, but it's quite clear in which direction it's leading. ■

The Competition is Good.

Our VS-230E is Excellent.

Feature Richness sheds new Light on DEC Compatibility.

Simply, THE BEST VALUE!



Good News for the DEC users;  
VT330 Features at VT320 price



### Features:

- VT320/VT330 Compatibility.
- 14" Flat, Non-glare Screen.
- Choice of Soft-white, Amber or Green Screen.
- Dual Session Support.
- 2 Status/User Lines.
- 45 Nonvolatile Function Keys.
- 96 Lines Screen Memory.
- Block Mode (VT131 and VT330 Compatible).
- Serial/Parallel Printer Support.
- Bi-directional Aux Port.
- 38.4K BPS Data Comm. Speed.
- ISO Latin-1 Character Sets.
- Dedicated ESC, LF & BS Key.
- Optional Word Processing Keyboard.
- Optional Graphics Board.  
Board 1: Tektronix 4010/4014 Compatible.  
Board 2: Tektronix 4010/4014 and ReGIS Compatible.
- Optional Data Comm. Board  
Board 1: RS422/RS423 Interface.  
Board 2: DEC423 Interface.  
20mA Current Loop

For more information :

 **Visentech Systems Inc.**

11500 North Stemmons Frwy  
Dallas, Texas 75229  
TEL 214-247-5931  
1-800-248-5931  
TLX 251750-VIS DAL  
FAX 214-247-5964

CIRCLE 171 ON READER CARD

\* Digital, DEC, VT320, VT330, VT340, DEC 423 and ReGIS are registered trademarks of Digital Equipment Corp.  
\* Tektronix 4010/4014 are registered trademarks of Tektronix Inc.  
\* Visentech, VS 230-E are registered trademarks of Visentech Systems Inc.

**Al Cini**

# VAXshare In DEC LanWORKS For Macintosh

*Editor's note: Last month Macintosh Editor Al Cini introduced*

*the basic capabilities of DEC LanWORKS For Macintosh. This month he focuses on the product's file and print services.*

Conceptually, VAX/VMS-based network file and print services for Macintosh users aren't new. These basic capabilities have been available for two years, in products such as AlisaTalk from Alisa Systems and PacerPrint/PacerShare from Pacer Software.

Like its predecessors, the VAXshare component of DEC LanWORKS for Macintosh provides file and printer services using Apple's AppleTalk Filing Protocol (AFP) and Printer Access Protocol (PAP). As we'll see, VAXshare adds important new technical features to an old and proven product idea.

## File Services

Using Apple's AppleTalk for VMS V3.0, which is included with LanWORKS, the VAXshare file server is VAX/VMS-based software that emulates a Mac running Apple's AppleShare file server software. To Mac users, a VAXshare file server appears through their Chooser desk accessory and allows them to access VAX-based files as though the files were on a Mac hard disk (see Figure). The VAXshare file server publishes one or more Mac volumes, which behave like mounted hard disks on a connected Mac. On the VAX, each volume is linked to a specific VMS disk directory, and any Mac folders created in a volume have corresponding VMS subdirectories.

Under the Macintosh Operating System, each disk file consists of three distinct elements:

1. A Mac file's catalog information includes its dates of creation and other

statistics as well as its Mac creator and type fields. The creator and type fields of a Mac document tie it to the Mac application that created it and allow a Mac user to "double-click" (select and open) a document icon from the Mac desktop and automatically execute the appropriate Mac program to work with it.

2. A Mac file's resource fork contains Mac-specific technical information, such as icons, Finder reference information and the source code for application programs. Among other things, the resource fork determines how a file looks on the Mac desktop.

3. A Mac file's data fork contains user-specific information. For a word processing or graphics program, this would be the user-created document or drawing.

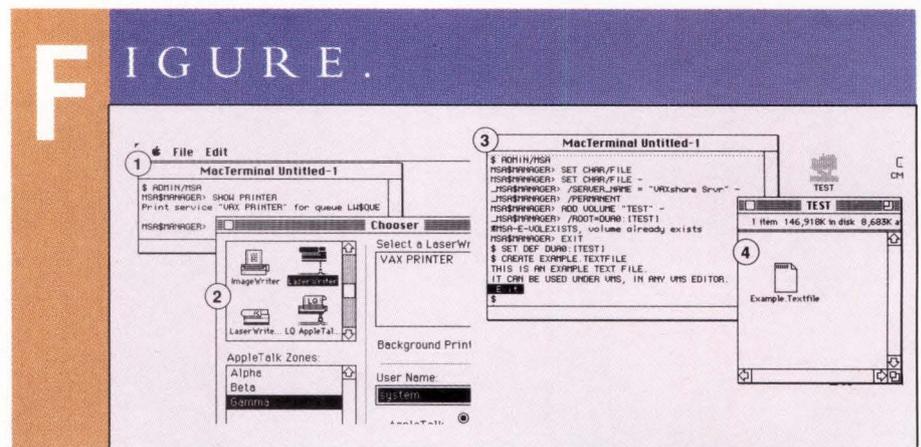
When a Mac user creates a file on a VAXshare server, VAXshare separates its various elements into three areas on the VAX. The Mac file's data fork appears as a file in the VAX/VMS directory that corresponds to the Mac folder into which the Mac file was placed. Its resource fork

appears as a file by the same name, in the [.MSAF\$RESOURCES] subdirectory of the data fork's directory, which is invisible to the Mac user through VAXshare.

VAXshare keeps a Mac file's catalog information as a record in a special RMS indexed file. VAXshare maintains a different catalog file for each VAXshare volume in the "root" directory MSA\$ROOT. Catalog filenames correspond to their Mac volume names, with a .CAT file extension.

## Sharing Data

VAXshare's "Apple Double" approach to representing Mac files as two separate files on the VAX/VMS host allows the exchange of information between certain Mac and VAX/VMS applications. VAX/VMS systems equipped with DEC LanWORKS for MS-DOS (PCSA) can also equate their VAX/VMS-based MS-DOS file server directories with those of the LanWORKS for Macintosh volumes, allowing Mac and MS-DOS users to exchange information through the



**The \$ADMIN/MSA command on the VAX creates a VAX process that emulates a LaserWriter printer (1) and appears through the Mac's Chooser (2). Print jobs sent from the Mac are automatically queued to LW\$QUE on the VAX. Similar commands create VAXshare file server volumes (3), which can be accessed from a client Mac as if they were Mac hard disks (4).**



## It's a jumble out there.

When you're searching for that vital micro-to-VAX connection, you can face a bewildering thicket of products and companies. Or you can cut straight through the confusion with Reflection Series Software.

Walker Richer & Quinn's award-winning Reflection software supplies more connectivity features than any other terminal emulation software.

We're the one vendor that can link PCs and Macs with your VAX, deliver 16-color graphics, and run over important PC and host networks. Our technical support staff is available to customers every working day at no charge. For nearly a decade, people in large and small businesses have relied on us for timely, quality integration software.



Call us today at 1-800-872-2829. We're your most dependable guide through the jumble.

**REFLECTION**  
SERIES  
**SOFTWARE**

Walker Richer & Quinn, Inc. 

2815 Eastlake Avenue E., Seattle, WA 98102  
206.324.0407 FAX 206.322.8151

\*Shipping and applicable taxes will be added. Reflection is a registered trademark of Walker Richer & Quinn. All trademarks above are property of their respective holders.

**CIRCLE 173 ON READER CARD**

common host VAX.

For example, the data fork of a word processing document that's saved to the VAX as a text-only file can be edited on the VAX using TPU or EDT. A Microsoft Word document saved to a LanWORKS volume in MS-DOS format can be directly opened by an MS-DOS user of Microsoft Word. Where the on-disk data representation formats of the user software under all client operating systems agree, for example, WordPerfect word processing documents, a Mac data fork on the VAX can be used interchangeably with a VMS or MS-DOS file.

Where the formats don't agree, a conversion utility can be used. LanWORKS will probably include a \$CONVERT/DOCUMENT feature that can convert MacWrite-format compound documents to DEC's DDIF document interchange format. Users of other word processors might want to consider third-part conversion solutions such as Keyword Office Technologies' Keypack.

Since the VMS and MS-DOS computer environments don't naturally support Mac catalog information, VAXshare allows the files they create on the VAX/VMS host to inherit specific Mac creator and type codes. By editing a control file in the VAXshare root (MSAF\$FILE\_TYPES.DAT), the VMS system manager can specify the Mac creator/type fields that non-Mac files should inherit based on their RMS characteristics or file extensions. A VMS-created text file with the extension .WKS, for example, can be given a text type field and Microsoft Excel's creator field. Mac users see an Excel text icon for this file in their LanWORKS volume window, and double-clicking the document's icon automatically launches the Microsoft Excel application.

### Print Services

Like the VAXshare file server, VAXshare printer receiver processes running on the VAX use AppleTalk for VMS to emulate

an Apple LaserWriter, allowing a Mac user to see VAX/VMS printer queues through the Mac's Chooser. The VMS print queue, in turn, can be directed to an Apple LaserWriter that's connected to an Apple LocalTalk LAN or via an async line to a DEC terminal server or VAX terminal multiplexer.

Print jobs in the VMS print queue can also be directed to a DEC PostScript-equipped printer, such as the LN03-R or LPS-40. This feature lets Mac users print to DEC printers using standard Mac system software as though the printers were AppleTalk-networked LaserWriters.

### What's New?

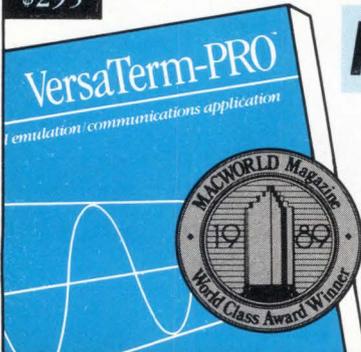
More than a year ago DEC announced that it would license the basic technology found in AlisaTalk, so it should come as no surprise that the basic capabilities found in VAXshare closely parallel their AlisaTalk counterparts. There are several important VAX-visible differences between the two, however, with respect to system management and VMS file security.

Unlike AlisaTalk, which is managed by editing various parameter and command procedure text files, VAXshare is administered using a new \$ADMIN/MSA (Macintosh Systems Architecture) DCL command. Similar to the \$ADMIN/PCSA command interface for MS-DOS, the command line syntax for \$ADMIN/MSA controls file and printer services and is much easier to work with than its AlisaTalk config file ancestors.

Like AlisaTalk, VAXshare uses a single VAX/VMS-based process to handle file server access for all connected Mac clients. Unlike AlisaTalk, the VAXshare file server uses VMS file security system services to determine whether access to specific VAX files should be allowed or denied, and it fully supports Access Control Lists and UIC group-based protection.

As with AlisaTalk, special AppleShare folder protection modes, such as Drop Folders, are supported by VAXshare. In addition, the VAXshare server adds a management option that automatically changes the protection codes of VAX

\$295



**VersaTerm-PRO**  
emulation/communications application

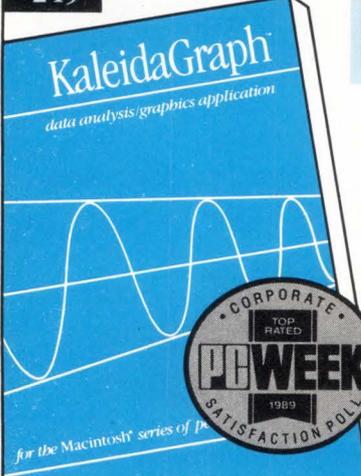
MACWORLD Magazine  
World Class Award Winner

**Access text and graphics mainframe applications from one easy-to-use program**

- **EMULATE** industry standard text and graphics terminals, including the DEC VT100, DEC VT200, DG D200, Tektronix 4014, and Tektronix 4105
- **COMMUNICATE** with a wide variety of mainframe computers or information services
- **TRANSFER** files using popular protocols, including XModem, YModem and Kermit
- **BACKGROUND** operation is supported under MultiFinder
- **SUPPORTS** Apple CommToolbox.

developed by  **Abelbeck Software**

\$249



**KaleidaGraph**  
data analysis/graphics application

CORPORATE TOP RATED  
**PB WEEK**  
1989 SATISFACTION POLL

**Import data, analyse the data, and generate high resolution scientific and business graphics from one easy-to-use program**

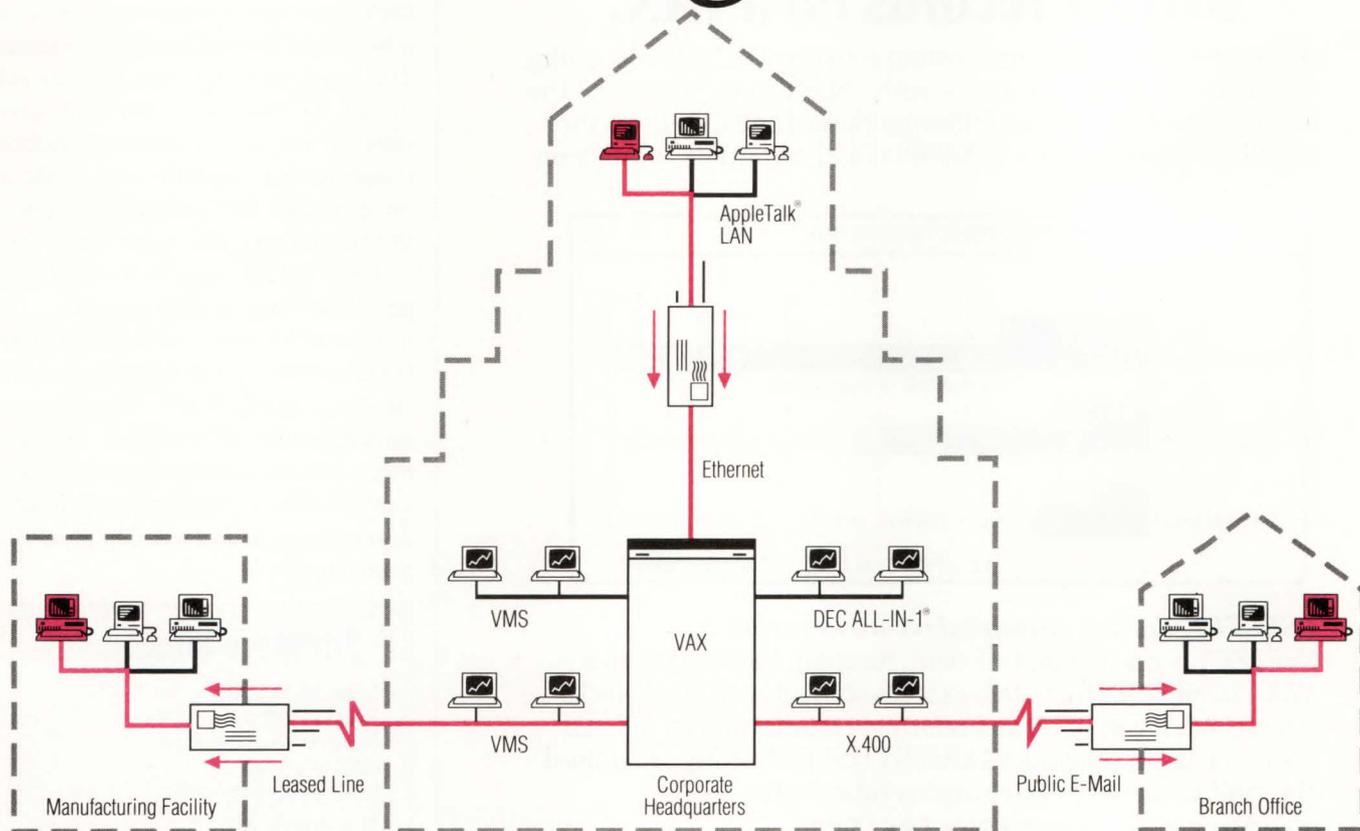
- **FLEXIBLE** data import facilities
- **FAST** operation (5 to 20 times faster than CricketGraph™ version 1.3)
- **LARGE** data sets supported (32,000 data points per variable)
- **PROGRAMMABLE** RPN Calculator and Algebraic Formula entry
- **FEATURES** including: curve fitting; 15 plot types; log & linear scaling, zoom, and pan; automatic plot generation; hot links to data.

 **SYNERGY SOFTWARE**

2457 Perkiomen Ave., Reading, PA 19606, 215-779-0522

NOW SHIPPING

# Use PacerPost. Word will get around!



Use PacerPost® to unite isolated Micro-soft® Mail Macintosh™ and PC LANs with your corporate VAX®, and not only will words get around much quicker, so will vital spreadsheet data.

Microsoft Mail 2.0 does its part by carrying popular Word, Excel and other Mac/PC application files. PacerPost does the rest, by extending this LAN-resident capability to your entire enterprise.

The promise of 2nd-generation E-mail — being able to transmit comprehensive fact-and-figure documents to thousands of users — is finally here.

Seamless Mac/PC-to-VAX E-Mail isn't the only benefit of a VAX server. You also

get the CPU and database size needed to handle larger user populations and heavier traffic volumes — along with the simplified administration, back-up and security of the VAX.

PacerPost provides VAX-based gateways that give you access not only to VMS™ Mail, but to other DEC®, IBM® and X.400 systems via Message Router. So you can send messages to co-workers next door as well as to distributed users

on DEC ALL-IN-1®, IBM PROFS®, and a variety of public systems.

Since PacerPost servers and gateways are 100% compatible with Microsoft Mail 2.0,

you can mix-and-match VAX and Mac servers and gateways to achieve your optimal configuration. The fact is, PacerPost provides the most advanced VAX-based E-Mail interconnection available, and at a much lower cost than you might think. To further aid connectivity, Pacer provides a developer's kit to support writing other VAX-based gateways.

With PacerPost, your VAX is the Post Office. Which means first-class deliveries, enterprise-wide, every time.

For more information on how PacerPost can help you get the word out, call (619) 454-0565 on the West Coast or (508) 898-3300 in the East.



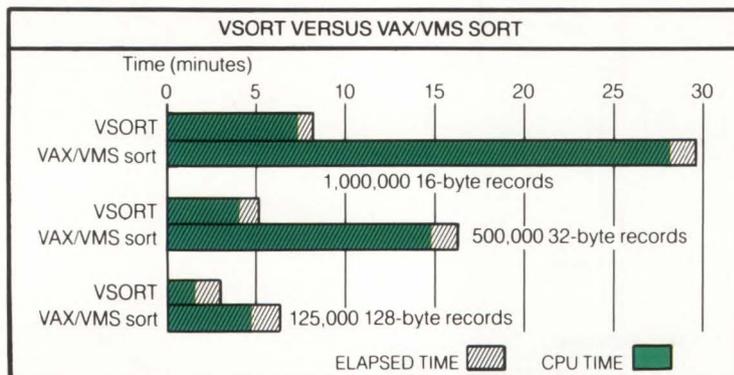
With PacerPost, Mac/PC users can communicate enterprise-wide while retaining their usual E-Mail interface.



# VSORT AND VSELECT

## The fastest way to sort and extract records on a VAX.

If you spend too much time sorting with the VAX/VMS sort utility, spend less — up to 75% less — with VSORT from Evans Griffiths & Hart, Inc. Compare the following elapsed and CPU times for VSORT (V03.07) and the VAX/VMS (V4.2) sort utility running on a VAX 11/780.



### **VSELECT, the fast sequential record extractor.**

VSELECT is also fast and efficient. Running stand-alone on a VAX 11/780, VSELECT often exceeds scan rates of 1,000 blocks per second. It can select and reformat records from an indexed file much faster than the VAX/VMS CONVERT utility can unload the same file — often three or four times faster.

### **For RSTS/E, use FSORT3 and SELECT.**

If you run RSTS/E on the PDP-11, we invite you to join the hundreds of users and OEMs who, for the past ten years, have relied on FSORT3 and SELECT for the fastest possible record processing.

### **Other software products for VAX/VMS and RSTS/E**

- *ROSS/V* a RSTS/E operating system simulator under VAX/VMS.
- *KDSS* a multi-terminal key-to-disk data entry system.
- *TAM* an efficient screen formatter for transaction processing applications.
- *DIALUP* a data communications package that links VAX/VMS and RSTS/E systems to remote computers.
- *BSC/DV* a device driver for DEC's DV11.

For more information, call (617)861-0670 or write:  
Evans Griffiths & Hart, Inc.  
55 Waltham Street  
Lexington, MA 02173  
TWX: 710-326-0103

Evans  
Griffiths  
&  
Hart, Inc.

**EG&H**

DEC, VAX, VMS, RSTS and PDP are trademarks of Digital Equipment Corporation.

CIRCLE 194 ON READER CARD

files contained in folders to match their folders' protection characteristics. This option compromises VMS file security in some cases but eliminates the annoying operational problem of Mac users losing access privileges to their files when their folder ownership is changed.

INCLUDED WITH LANWORKS, VAXshare is implicitly licensed on all VAX systems. The LanWORKS kit costs \$440, including all the necessary client and server software and one set of documentation. Customers can install the server software on all of their VMS servers, regardless of VUPS, with no additional licensing costs.

LanWORKS usage is licensed on a per-client basis at \$295 per Mac. This license includes not only the ability to use VAXshare but also to download and use all other LanWORKS client features, including terminal emulation, DECwindows, DECnet for Macintosh and e-mail. LanWORKS is shipping to application developers now and will ship to users in September 1990.

### For More Information

Adobe Systems Inc.  
1585 Charleston Rd.  
Mountain View, CA 94039  
(415) 961-4400  
CIRCLE 440 ON READER CARD

Alisa Systems Inc.  
221 E. Walnut St., Ste. 175  
Pasadena, CA 91101  
(818) 792-9474  
CIRCLE 501 ON READER CARD

Keyword Office Technologies Ltd.  
2816 11th St. N.E.  
Calgary, AB T2E 7S7  
(403) 250-1770  
CIRCLE 531 ON READER CARD

Microsoft Corp.  
1 Microsoft Way  
Redmond, WA 98052  
(206) 882-8080  
CIRCLE 443 ON READER CARD

Pacer Software Inc.  
7911 Herschel Ave., Ste. 402  
La Jolla, CA 92037  
(619) 454-0565  
CIRCLE 502 ON READER CARD

WordPerfect Corp.  
1555 N. Technology Way  
Orem, UT 84057  
(800) 321-4566  
CIRCLE 503 ON READER CARD

# How to hold a conference with a mouse.

It's really all you need, provided it's attached to a Macintosh. And provided you have Alisa's MaxNotes—the Mac-based electronic conferencing program that speaks the DECnet VAX Notes protocol, and supports everything VAX Notes does.

MaxNotes is a Macintosh front end application for Digital's VAX Notes electronic conferencing system, using our DECnet package to connect to remote VAX Notes conferencing servers. It's simply the easiest way for Mac users

to participate in VAX Notes electronic conferences.

And MaxNotes makes full use of the Mac's graphic interface. So there's no need to learn or use commands. Just point and click with your mouse.

MaxNotes is a powerful messaging tool you can use to promote communication, problem solving, and interpersonal education. And we designed it to be easy for the beginner, yet powerful enough for the experienced user.

MaxNotes. At last, it's possible to communicate with a mouse.



Alisa Systems Inc.  
We keep everybody talking.

221 East Walnut Street, Suite 175 Pasadena, CA 91101 (818) 792-9474  
Alisa Systems (Europe) Ltd. 5 Surbiton Hill Road, Surbiton, Surrey KT6 4TW United Kingdom 44-1-390-3376

© 1989 Alisa Systems Inc.

MaxNotes is a trademark of Alisa Systems, Inc. Macintosh is a trademark of McIntosh Laboratory, Inc., licensed to Apple Computer, Inc., and is used with the expressed permission of its owner. TSSnet is a trademark of Thursby Software Systems. DEC, DECnet, and VAX Notes are trademarks of Digital Equipment Corporation.

CIRCLE 234 ON READER CARD

# Expert Systems: From Promise To Reality

Over the years there have been numerous claims about the benefits of using artificial intelligence (AI) systems in service delivery. Most of these promise a Utopian service environment in which all problems will be solved with minimum delay. At the same time, the service provider could cut costs drastically by reducing its field force.

Today, those of us responsible for service better understand the role of AI (or expert systems, as it's now often referred to) in the service environment. Expert systems are just a tool. Like any other tool, they aid but don't replace the field engineer (FE). By realizing the true role and limitations of expert systems, we can better use their many benefits in the service arena. They aren't a cure-all for every service and maintenance problem. Rather, they support the field organization by turning knowledge and expertise into companywide assets available to all personnel.

With expectations of their value brought down to earth, expert systems are beginning to have a positive impact on service quality. Expert systems packages allow a service or maintenance vendor to computerize the troubleshooting knowledge and experience of its best engineers and technicians. This knowledge base can be made available to all personnel at any time. Less-experienced FEs can draw on this database of expert knowledge, enabling them to troubleshoot like the experts.

In a typical expert systems application, the FE receives hand-holding guidance via a laptop or desktop computer without outside assistance or a product manual. He is led step-by-step through the problem. After the FE enters a description of the symptoms, the expert

system suggests procedures, diagnostics, corrective action, and how to verify that the fault has been resolved. When put online, expert systems can evaluate troubleshooting results and suggest corrective action from a remote location.

## Expert Technology

The definition of an expert system program is murky. Some service companies call their remote diagnostics and analyzing tools expert systems, while others don't. Any program that can see that a fault exists and recommends corrective action is a service tool that aids in the maintenance process. But it isn't necessarily an expert system. Most of these software packages are conventional database programs.

What makes expert systems programs different isn't the end result but the manner in which the troubleshooting process and analysis occurs. In a true AI package, the computer mimics human behavior, i.e., the computer troubleshooting follows the same reasoning process that an experienced technician would in approaching and solving a problem. Further, the computer "learns" from each troubleshooting experience.

Expert systems used in field service combine this approach with a more conventional database "lookup" feature created with input from experienced FEs. The database is constantly expanded as additional information is gathered during the use of the program. This is why today's systems aren't considered true AI programs but rather expert systems.

A number of expert system methodologies are in use, and each has benefits and drawbacks. The following is a summary of the most common expert systems technologies:

**Rule-Based** — Rule-based systems work by compiling in-depth knowledge of how a product can fail. They also re-

quire programming knowledge. Usually, you must hire a knowledge engineer — that is, a specialist familiar with AI programming techniques. This engineer must work with product specialists, engineers and FEs to translate their troubleshooting expertise into rules.

Chances are the knowledge engineer has little or no experience in field service. Therefore, communication and an understanding of the troubleshooting process is all-important during the knowledge-acquisition phase of the project. Editing data and adding information is easy for small knowledge bases but becomes harder as complexity grows.



**Model-Based** — Model-based systems function by describing how a product works as opposed to how it fails. They describe the product in much the same way a technician would learn about it in a training class. Programming knowledge



THE  
FIRST  
MONTH  
IS FREE!

## Just to get our foot in the door with DEC users.

McDonnell Douglas Field Service Company really wants to service your DEC system. And to show you just how serious we are, we'll foot the bill for your first month of service.

When you sign a year's contract with McDonnell Douglas Field Service Company, you'll receive the first month completely free.\* We make this offer because we're positive you'll appreciate the extras that make our service stand out.

Like a sophisticated tracking sys-

tem to ensure that no service call ever gets lost or goes unanswered. Online control of a distributed, multimillion-dollar parts inventory. Predictive maintenance from our remote monitoring center that automatically analyzes errors on your DEC VAX system. And of course, 24-hour availability of field engineers every day of the year.

What's more, our service is customized to meet your exact needs. With local representatives who really understand the special tech-

nology of your DEC system. And the experience you'd expect from one of the nation's largest independent field service organizations.

So let McDonnell Douglas Field Service Company handle all your DEC needs. And get the first month of service absolutely free.

To learn more about the McDonnell Douglas Field Service program, call us today at **(800) 826-4944**. Because we're opening the door on a great deal for DEC users.

**MCDONNELL DOUGLAS**

\*Offer available in more than 100 U.S. cities to first-time customers, for a limited time only. DEC and VAX are registered trademarks of Digital Equipment Corporation.

CIRCLE 176 ON READER CARD

isn't required. Input can be entered directly by the technicians, engineers and other specialists who work on the product.

A complete knowledge base doesn't have to be built at the beginning. It can be augmented and refined progressively. Model-based systems are easier to edit and change than rule-based systems, although they may require more start-up time. Thus, model-based systems are ideal for implementing service on new products, since they can be formulated while the product is in the design stage.

**Custom-Made Programs** — Most expert systems used in field service are custom made. These programs either were written from scratch or customized to fit the user's needs.

Until recently, most expert systems were rule-based programs. In a commercial situation, the cost of building and updating this type of troubleshooting tool was often prohibitive. Usually only an OEM could afford the investment in such a program.

The emergence of expert system shells, which permit the building of expert systems without programming, put these troubleshooting tools within reach of third-party vendors and self-maintainers. With shells, users can cost-effectively create and implement customized databases for the systems and equipment being serviced.

Expert system shells simplify the way data is collected and input, making it possible to build the knowledge database in-house. AI developers have long been aware that the service industry is a prime market for expert systems and continue to modify existing shells to orient them toward the service environment.

**Off-The-Shelf Programs** — Rosh Intelligent Systems created one of the first off-the-shelf expert systems for the service industry. Jaron Lotan, general manager at Rosh, reports that his com-

## SMART SERVICE

Rosh Intelligent Systems calls its off-the-shelf expert system the Computer Aided Intelligent Service (CAIS). The product was introduced in October 1988 and today is used by over 16 companies. It includes modules for troubleshooting, call logging and closing, and automatic generation of product-service manuals. CAIS consists of three main parts:

1. Central CAIS (the main program).
2. Knowledge CAIS (the informational database).
3. Brief CAIS (the field laptop unit, which is the FE's troubleshooting aid and link to the main program and database).

One unique feature of CAIS is its Advisor Option. The Advisor Option tells the FE what tests to run and how to run them, displays graphics detailing test connection points and interprets test results. It leads the FE step-by-step from fault isolation to solution. The replacement advice starts with the most logical, least costly part and continues down a chain of possible components until the problem is resolved and correction is verified.

At any point in the troubleshooting process, the FE can accept the system's advice, reject it or return to it later. This permits CAIS to be used by all levels of field personnel. Inexperienced technicians can follow its step-by-step recommendations, while experienced troubleshooters can selectively ask for help.

At the end of the troubleshooting and problem-correction phase of the service call, the CAIS log replaces the paperwork that was once done by the FE. A complete service call report is generated, detailing the symptoms, action taken, parts used and additional information. Previously unlisted symptoms or actions taken are added to the database. A management report is output that includes the final status of the service call. — R.L.

pany uses a model-based approach that requires no user programming. Product specialists enter their knowledge directly into the computer's database. The knowledge base is built by inputting complete descriptions of products.

Data entered includes physical and functional structures, product illustrations, detailed symptoms of malfunctions, tests available for diagnosing faults, and repair/replacement actions. According to Lotan, this method of building an expert system reduces the time and cost of knowledge acquisition to about one-tenth of what it would be under a rule-based approach (see box, "Smart Service," for more information on how the Rosh product works).

### Expert Systems Benefits

Used correctly, expert systems can provide many benefits in equipment servicing. By making the knowledge of the best and most experienced product specialists available to everyone, it's possible for a less experienced technician to complete complex repairs with one service call.

Most service vendors that employ expert systems should find that not only will repair time be reduced but also the number of "no problem found" service

calls. Bell Technical Services (Canada's largest TPM, with more than 8,600 contracts and offices in 47 locations) found that, before employing an expert system, 45 percent of its service calls required repeat trips to the site. With expert systems, that number has dropped to 23 percent. And the company's number of good board swaps also has been reduced, thus freeing inventory.

Further, for TPMs and self-maintainers, expert systems make it possible to take on new products without the eight to 12 months of waiting time usually required to learn about new offerings. With an expert system, a product can be supported from the start.

As expert systems technology evolves, it will become a built-in component in more devices. Diagnostics, test equipment and computer and peripheral chips will incorporate expert systems abilities for predictive, preventive and corrective maintenance activities. And, possibly most important, the knowledge of product specialists becomes a corporate asset, not a perishable commodity.

Rosh Intelligent Systems  
50 Cabot St.  
Needham, MA 02194  
(617) 449-0049  
CIRCLE 430 ON READER CARD

ARTICLE INTEREST QUOTIENT  
Circle On Reader Card  
High 452 Medium 453 Low 454

# WHERE DO YOU GO WHEN YOUR PRODUCTS ARE NO LONGER ON DECK?



## THE SERVICE PROFESSIONALS...MAINTECH.

With so many products coming onboard, and many not-so-old products going overboard, you could be a castaway before you know it.

Don't be caught adrift in a costly and turbulent sea. Let Maintech offer you the security of 18 years of quality, resource and commitment.

With a Maintech service agreement you enjoy:

- Guaranteed 4-hour response
- A 12-hr. service window, 8 a.m. - 8 p.m.
- Complete FCO management
- MEMO Error Log Monitoring
- MC-220 Console Management
- Complete Diagnostic Software Support

If you have less critical maintenance requirements, or wish to migrate to self-maintenance, ask us about our Guardian Maintenance and Transition Maintenance programs.

**1 800-426-TECH**

212 827-2603 FAX 212 869-2876

**MAINTECH**

A DIVISION OF VOLT DELTA RESOURCES INC.  
1133 Avenue of the Americas  
New York, NY 10036

CIRCLE 142 ON READER CARD

Philip E. Bourne, Ph.D.

# Debugging And Profiling

*Editor's note: We continue our introduction to UNIX for VMS users by*

*debugging and profiling a high-level language application in a UNIX environment.*

Sir Winston Churchill once was approached by a temperance group member who accused him of always being inebriated. Allegedly he replied, "So much done and so much to do." So it is with programming. Writing the code is only the beginning. Debugging and profiling — determining where computer resources are being used — may take longer than writing the first draft of the code. Streamlining the resource-intensive portions of code is particularly important when using hardware architectures that support, for example, symmetric multiprocessing or vectorization, in which significant improvements can be made if code is organized efficiently.

All versions of UNIX have a number of tools for handling high-level language programs. Some ULTRIX tools are shown in Figure 1.

We'll confine our discussion to three of the most commonly used tools: **error**, for finding syntax errors in a source code file (compare the VMS /LIST qualifier); **dbx**, for debugging (compare VMS DEBUG); and **prof**, for profiling (compare VMS Performance and Coverage Analyzer [PCA]). The novice UNIX user most likely will be disappointed with the first two tools, because they're cumbersome compared to their VMS counterparts. But **prof** is included with every ULTRIX distribution and doesn't require a separate license as VMS PCA does.

## Finding Syntax Errors

The UNIX command **error** inserts syntax error messages directly into the source-code file for any of the supported compil-

ers. Compare the VMS /LIST qualifier, which provides a separate file (.LIS) locating syntax errors and displaying other useful information. Fortunately the **error** lines are inserted as comments and thus don't affect subsequent compilations. Still, the presence of numerous obsolete error messages for code that has been repaired is annoying when reading the code — who needs to be reminded of previous mistakes? You have the option to:

1. Remove each comment as the error is fixed.
2. Periodically filter the file, removing all error messages.
3. Make a copy of the file into which the error messages are inserted.

The command **sed /<sup>^</sup>C###/d myprog.f** takes care of the second case for the FORTRAN source file **myprog.f**. That is, any record beginning with **C###**,

the flag used by **error** for FORTRAN code, is deleted. Figure 2 illustrates the use of **error** on the simplest of FORTRAN programs.

The command sequence **f77 myprog.f | & error** compiles **myprog.f** and pipes the error messages to the **error** command, which inserts them at the appropriate places in the source code. Each error begins with string **C###** followed by the line number, interpreted as a comment in later compilations. Note that in a C program the string would be **/\*###...\*/**.

## Debugging

The BSD UNIX program **dbx** is a source-level interactive debugger included with ULTRIX. Like its VMS counterpart, **DEBUG**, it can be used with a variety of high-level languages. Figure 3 compares some of the **dbx** commands with the VMS **DE-**

**F** I G U R E 1 .

UNIX	VMS Equivalent	Function
adb	DEBUG	General-purpose debugging program
ar	LIBRARIAN	Archive and library maintainer
cb	-	C program beautifier
ctags	-	Locate functions within a C or FORTRAN program
dbx	DEBUG	Source-level debugger
error	/LIST	Analyze and disperse compiler error messages into source
fpr	PRINT	Print files with FORTRAN carriage control
fsplit	-	Split a multiroutine FORTRAN program into individual files
gcore	ANALYZE/PROCESS	Get core image
gprof	PCA	Profile program execution
indent	-	Indent and format C programs
lint	-	C program verifier
lorder	-	Find ordering relationship for an object library
make	VAX DEC/MMS	Maintain a group of programs
mkstr	-	Create a C error message file
nm	LINK/SYMBOL_TABLE	Print the name list (symbol table) of an object file
pdx	DEBUG	Pascal debugger
pmerge	-	Pascal file merger
prof	PCA	Profile program execution
px	-	Pascal interpreter
pxp	-	Pascal execution profiler
pxref	-	Pascal cross-reference program
ranlib	LIBRARIAN	Randomize libraries
sccs	VAX DEC/CMS	Source code control system
size	-	Display size of an object file
strings	-	Display ASCII strings in a binary file
strip	-	Remove symbol table and relocation bits
symorder	-	Rearrange name list
time	SHOW PROCESS - /ACCOUNTING	Determine system, user and elapsed times
xstr	-	Extract strings from C programs
yacc	-	Compiler writing assistant

*Program development and management tools.*

In a world where timing is everything, your plan for survival had better depend on more than a hunch. Which is why Alan Yoshioka of Shearson Lehman Hutton decided to

**“I NOW USE  
1ST-CLASS  
EXPERT SYSTEMS  
FOR HELP WITH STOCK  
MARKET TIMING.  
I ONLY WISH I'D STARTED  
USING IT SOONER.”**

*—Alan Yoshioka, Vice President, Shearson Lehman Hutton*

quantify and codify his expertise.

Using only raw data, a 1st-CLASS expert system defined performance indicators and built an expert system that allows Yoshioka to determine the most opportune times to enter or withdraw from the market. The result: substantial time savings and increased profits.

Clearly, 1st-CLASS is no ordinary expert system. Among other things, this powerful, easy-to-use, PC and VAX-based system features a unique visual rule tree. The ability to work both inductively and deductively. Easy linkage to other DOS programs, including 1-2-3® and dBase®. And a spreadsheet-like interface.

1st-CLASS HT™ with hypertext is only \$2495. 1st-CLASS FUSION™ for DOS or OS/2 is \$1495 and begins at \$5500 for the DEC VAX.® Each comes with free deployment of your applications.

In short, an expert system you can really put stock in.

See why INFOWORLD rated 1st-CLASS Expert Systems the best expert system shell tested. Call 1-800-872-8812 today for your \$20 tutorial package.

NAME \_\_\_\_\_ TITLE \_\_\_\_\_

COMPANY \_\_\_\_\_

ADDRESS \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

TELEPHONE \_\_\_\_\_



**1st-CLASS**  
Expert Systems, Inc.

DP S 70

526 Boston Post Road 150 E, Wayland, MA 01778 (508) 358-7722

BUG counterparts.

Users of VMS DEBUG may be disappointed with **dbx**. Figure 3 indicates that both debuggers offer similar functionality, albeit using a different syntax. How-

ever, **dbx** doesn't offer the degree of interaction possible with DEBUG. For example, it isn't possible to use a split screen with **dbx** to concurrently display the values of variables and the section of

code that generated them. The availability of a DECwindows interface for VMS DEBUG compounds this discrepancy.

Figure 4 illustrates a simple example of using the **dbx** debugger—the debugger is

## FIGURE 2.

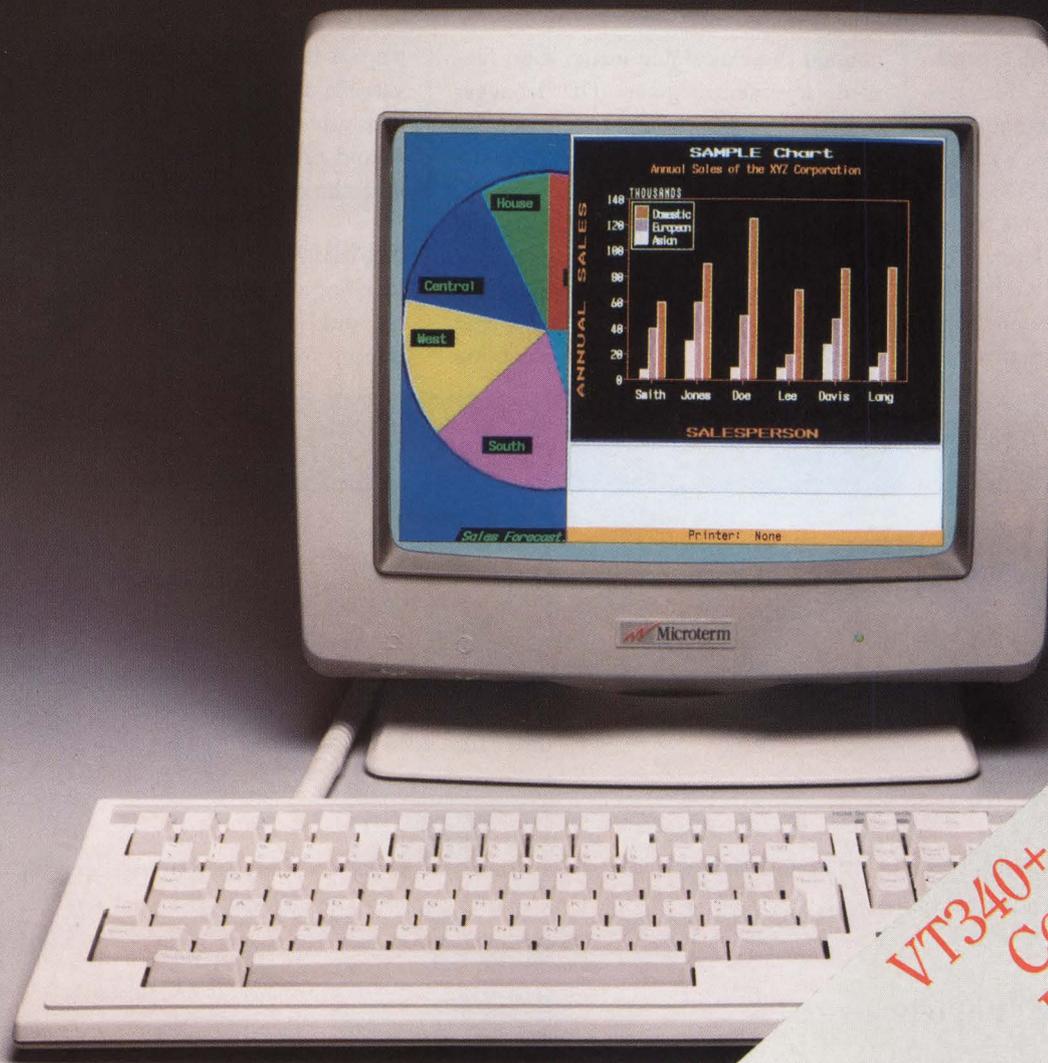
VMS	UNIX
form: \$ FORTRAN/LIST source-file	% f77 source-file  & error
form: \$ CC/LIST source-file	% cc source-file  & error
example: \$ TYPE MYPROG.FOR	% cat myprog.f
READ(5,*)A	read(5,*)a
WRITE(6,*)A	write(6,*)a
END	end
\$ FORTRAN/LIST MYPROG.FOR	% f77 myprog.f  & error
%FORT-F-MISSDEL Missing operator or delimiter	1 file contains errors "myprog.f" (1)
[write(6,*)] in module MYPROG\$MAIN at line 3	File "myprog.f" has 1 error.
...	1 of these errors can be inserted into the file.
	You touched file(s): "myprog.f"
\$ TYPE MYPROG.LIS	% cat myprog.f
...	read(5,*)a
0001 READ(5,*)A	C###2 [f77] Error on line 2 of myprog.f Syntax Error at "]"%%%
0002 WRITE(6,*)A	write(6,*)a
%FORT-F-MISSDEL, Missing operator or delimiter	...
...	

*Using error on a simple FORTRAN program.*

## FIGURE 3.

UNIX dbx	VMS DEBUG	Function
<b>Execution and Tracing:</b>		
run [args]	GO [address-expression]	Begin executing
rerun [args]	GO [address-expression]	Restart execution
trace [trace] [if]	SET TRACE/QUALIFIER(S) - [WHEN.. DO]	Trace execution of a line or procedure, change to a variable, or print expression when line is reached
stop [if, at, in]	SET BREAK/QUALIFIER(S) - [WHEN.. DO]	Stop execution at some point
status	SHOW BREAK/QUALIFIER(S) SHOW TRACE/QUALIFIER(S)	Display active trace and stop points
delete	CANCEL BREAK/QUALIFIER(S) CANCEL TRACE/QUALIFIER(S)	Remove active trace and stop points
cont	GO	Continue execution
step	STEP	Execute one source line
next	-	Step to next line, executing calls
call [proc]	-	Execute object code associated with procedure
<b>Printing Variables and Expressions:</b>		
dump [proc]	SHOW SYMBOL	Display names and values of variables in procedure
print	EXAMINE/QUALIFIER(S)	Display variables
whatis	SHOW TYPE	Display declaration of variable, e.g., real
where	SHOW MODULE	Print active procedure and function
<b>Source File Access:</b>		
/pattern/	SEARCH/QUALIFIER(S)	Search forward or backward for pattern
edit [file]	EDIT [MODULE_NAME\LINE]	Invoke editor
file [file]	SET SOURCE	Change current source file (or return name if no argument is given)
func [function]	SET MODULE	Change current function (or return current function if no arguments are given)
list [line1,line2]	TYPE line1:line2	Display lines of text (default 10)
use [dirs]	-	Search directory for source files
<b>Aliases and Variables:</b>		
alias [chars string]	DEFINE/QUALIFIER(S)	Define chars to be an alias for string
set var [=expr]	DEPOSIT/QUALIFIER(S)	Define value for a variable
unalias [chars]	UNDEFINE/QUALIFIER	Remove an alias
unset var	-	Remove a variable
<b>Miscellaneous:</b>		
help	HELP	Online help,
quit	EXIT	Quit the debugger
sh [command]	SPAWN	Pass command to shell for execution
source [file]	@file-spec	Read commands from a file

*A subset of dbx commands.*



**VT340+ AND VT330+  
COMPATIBLES  
IN STOCK FOR  
IMMEDIATE  
SHIPMENT!**

## PACESETTER.

Our new 5540 terminal sets the pace for exceptional color graphics and speed. Choose up to 16 colors from a palette of 262,144. It displays them with a clear, sharp 800 x 500 graphics resolution on an overscan screen. Plus, with a graphic drawing speed of 2.5 million pixels per second, it runs two to three times faster than comparable terminals.

It's versatile, too. You can display dual sessions from one host (with SSU) or single sessions from two hosts simultaneously. Choose a vertical or horizontal split and adjust it to any proportions. Or switch back and forth between full sessions.

The 5540 runs ReGIS, Tektronix 4010/4014 and Sixel graphics. It stores six text pages in off-screen memory (three per session). It also features user-friendly set-up and optional mouse.

Move ahead of the pack with the pacesetter. Get the fastest color graphics available with the versatile, new 5540 terminal from Microterm. For more information, call 1-800-325-9056.

Solutions You Can See.

VT330+, VT340+, ReGIS, Sixel and SSU (Session Support Utility) are registered trademarks of Digital Equipment Corporation. Tektronix 4010/4014 is a registered trademark of Tektronix, Inc.

Microterm, 3630 South Geyer Road, Suite 300, St. Louis, MO 63127  
(314) 822-4111 1-800-325-9056 FAX (314) 822-0821 Telex: 62890547

CIRCLE 222 ON READER CARD

invoked, the source code listed, a break point set, a variable examined, the variable's value changed and the program run.

Code is compiled and loaded with the **g** option (compare VMS /DEBUG), providing the additional symbol table information needed by the debugger. The command **dbx** (compare VMSRUN/DEBUG) invokes the interactive debugger. The debugger assumes the file **a.out** to

contain the executable image if no filename argument is given. The debugger displays the (dbx) prompt (compare VMS DBG>).

The **dbx** command **list 1,7** lists the first seven lines of the source file, **stop at 4** sets a break point at line 4, and **run < hkl.in** begins execution. Rather than take input from the keyboard, input is read from the file **hkl.in**. When execution

stops at the break point, the value of the variable **nref** is displayed with **print nref**. This value is changed with **assign nref = 4**, and program execution is continued with the **cont** command.

## Profiling

Profiling determines where a program is spending its execution time. This is useful for improving the efficiency of code. The

## FIGURE 4.

```

VMS
form: $ FORTRAN/DEBUG/NOOPT [source-file]
      $ LINK/DEBUG [object-file]
      $ RUN [executable-file]

      VAX DEBUG Version V4.7-1
      %DEBUG-I-INITIAL, language is FORTRAN,
      module set to FCONVERT$MAIN

DBG>

example: $ ASSIGN HKL.IN FOR005
         $ R FCONVERT.EXE
         DBG> TYPE 1:7

1 integer h
2 dimension fii(10)
3 nref = 0
4 read (5,2) nsf
5 write (6,2) nsf
6 10 read (5,2,end=100)h,k,l,fo,sigf, stol,(fii(i),i=1,nsf)

7 write (6,2) h,k,l,fo,sigf, stol,(fii(i),i=1,nsf)

DBG> SET BREAK %LINE 4

DBG> SHOW BREAK
breakpoint at FCONVERT$MAIN\%LINE 4

DBG> GO
break at FCONVERT$MAIN\%LINE 4
4: read (5,2) nsf

DBG> EXAMINE NREF
FCONVERT$MAIN\NREF 0

DBG> DEPOSIT NREF = 4

DBG> EXAMINE NREF
FCONVERT$MAIN\NREF 4

DBG> GO
...

UNIX
% f77 -g [source-file]

% dbx

dbx version 2.0 of 4/2/87 22:10.
Type 'help' for help.
enter object file name (default is 'a.out'):
reading symbolic information ...
(dbx)

% dbx fconvert.exe
(dbx) list 1,7

1 integer h
2 dimension fii(10)
3 nref = 0
4 read (5,2) nsf
5 write (6,2) nsf
6 10 read (5,2,end=100)h,k,l,fo,sigf, stol,(fii(i),i=1,nsf)

7 write (6,2) h,k,l,fo,sigf, stol,(fii(i),i=1,nsf)

(dbx) stop at 4
[1] stop at 4

(dbx) status
[1] stop at 4

(dbx) run < hkl.in
[1] stopped in MAIN at line 4
4 read (5,2) nsf

(dbx) print nref
0

(dbx) assign nref = 4

(dbx) print nref
4

(dbx) cont
...

```

*A simple example of using the dbx debugger.*

## FIGURE 5.

```

UNIX
form: % cc -p myprog.c
      % f77 -p myprog.f
      % a.out
      % prof

example: % f77 -p fconvert.f
         % a.out < hkl.in > /dev/null
         prof

%time cumsecs seconds calls name
42.7 2.71 2.71 mcount
9.6 3.32 0.61 9172 _s_wsfe
7.3 3.78 0.46 1091 _rd_ned
6.9 4.22 0.44 8969 _flsbuf
.....

```

*An example of prof.*

## FIGURE 6.

```

%time The percentage of the total running time of the
program used by this function.
cumsecs A running sum of the number of seconds accounted
for by this function and those listed above it.
seconds The number of seconds accounted for by this
function alone. This is the major sort for this
listing.
calls The number of times this function was invoked, if
this function is profiled, else blank.
name The name of the function. This is the minor sort
for this listing.

```

*prof nomenclature.*



tools available, how they're used and the output produced differ for different versions of UNIX. Only **prof** is discussed here. **prof** is the simplest of the profiling tools and is distributed with most versions

of UNIX based on BSD, including ULTRIX. If desired, the output from **prof** can be passed to another UNIX command, **graph**, which, when used with the appropriate filters, displays the results in a

graphical form.

To produce a profile with **prof**:

1. Compile the program with the **p** option.
2. Run the program to create the file used in profiling (by default, **mon.out**).
3. Invoke **prof**.

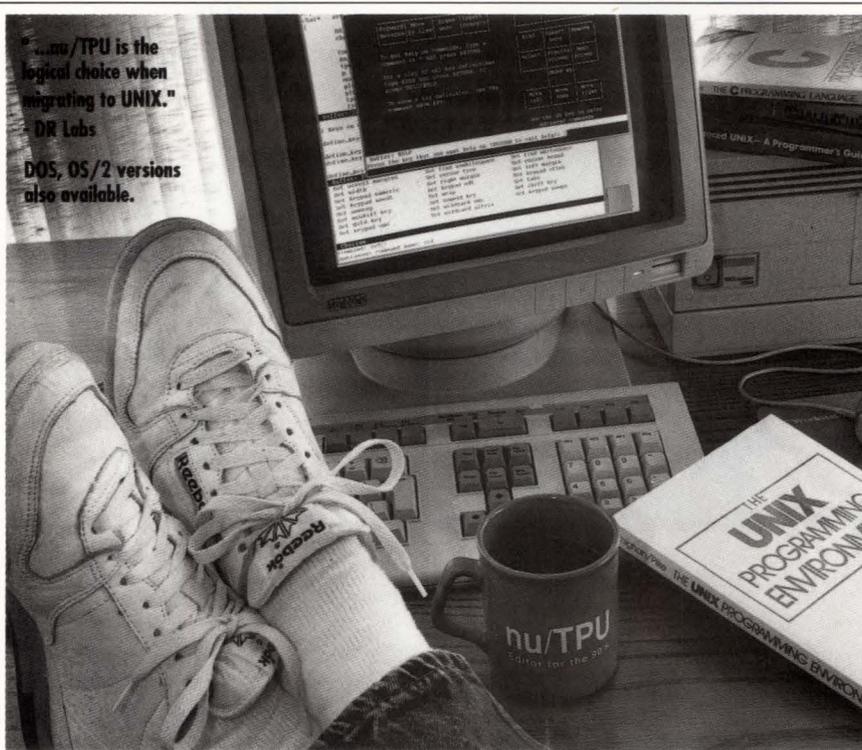
Figure 5 illustrates the use of **prof** by profiling the same FORTRAN program used to illustrate **dbx**. Each time **prof** is invoked, the output includes a description of each field displayed.

**f77 -p fconvert.f** produces a FORTRAN executable image file, **a.out**. The command **a.out < hkl.in > /dev/null** runs the program, reading input from the file **hkl.in** and sending output to **/dev/null**. The device-special file **/dev/null** (compare VMS NL:) is the "bit bucket" used to discard unwanted output. The command **prof** then displays profile information by reading data from the file **mon.out**, created when the program was run. The output is referred to as a flat profile, displaying, in descending order, the amount of time spent in each routine and system call. The fields are shown in Figure 6.

The tool **gprof** (not described) takes this a step further, displaying the interrelationships between function calls — for example, how often one routine calls another. Some versions of UNIX provide an even greater level of detail by providing tools that display how many times each line of code is executed.

Purists might say that the tools described here aren't needed, because good programmers get it right the first time. I wouldn't know. What I do know is that **error**, **dbx** and **prof** have been invaluable in getting my applications to run in a UNIX environment.

INFORMATION REGARDING hints and kinks useful to VMS users grappling with UNIX will be gratefully received. Send it via e-mail to [SYSTEM@CUMBG.BITNET](mailto:SYSTEM@CUMBG.BITNET) or [system@cuhhca.hhmi.columbia.edu](mailto:system@cuhhca.hhmi.columbia.edu). — Philip E. Bourne, Ph.D., a senior associate of the Howard Hughes Medical Institute, is the author of UNIX for VMS Users, published by Digital Press.



## How To Be Comfortable Editing In UNIX: Keep Editing In EVE, EDT or WPS.

Now you can continue to edit in comfort on UNIX platforms without learning a new editor. nu/TPU is the multi-platform editor that comes with your favorite EVE, EDT, WPS, or VI interface. nu/TPU has over one hundred powerful TPU subroutines, multiple windows, unlimited extensions, and TPU compatible programming language. And you can import your customized VAX TPU programs without change.

nu/TPU includes one year of free hotline support, 30 day money-back guarantee, free TPU library exchange, technical bulletin board for news, interface code samples, and TPU open forum. Over 40 UNIX platforms are supported. UNIX prices start at \$395.

**Call (508) 683-4369**

a/Soft Development, Inc.  
1353 Salem Street  
North Andover, MA 01845

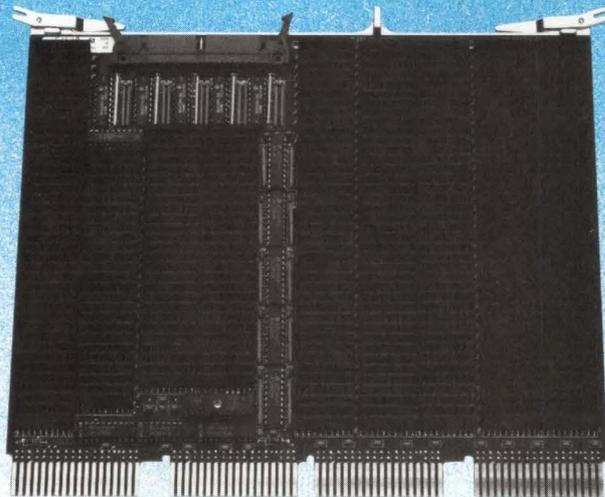
**nu/TPU. The Multi-Platform Editor.**



VAX is a trademark of Digital Equipment Corporation. Unix is a trademark of AT&T. MS-DOS is a trademark of Microsoft.

CIRCLE 102 ON READER CARD

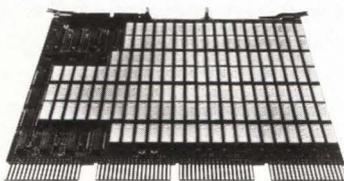
# 32MB MICROVAX III MEMORY



## THE CI-MIV32 FEATURES

- Allows 64MB, the maximum memory capacity of the Microvax III, using only 2 expansion slots in all system configurations, including the BA23 box.
- 8MB, 16MB or 32MB on one board.
- Hardware and software compatible with any Microvax III series.
- On board 32 bit ECC for single bit error correction, double bit error detection.

## MICROVAX II



## THE CI-MIV16 FEATURES

- 16 megabytes on one board.
- On board parity.
- Hardware and software compatible with the Microvax II.
- Backplane space savings.
- Power requirement savings.

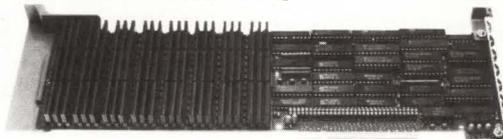
## QBUS PDP 11/23, 11/73



## THE CI-QBUS-EDC FEATURES

- 2 or 4 megabytes on one board.
- Dual width.
- Single bit error correction, double bit error detection.
- Runs DEC diagnostics.
- Block Mode DMA.

## IBM PS/2



## THE CI-SYS2-56 FEATURES

- Available in 2MB, 4MB, and 6MB upgradeable options, and full 8MB.
- Up to 8 megabytes of parity memory in one Micro Channel slot.
- Addressable in combinations of standard and EMS memory.
- EMS support for DOS applications includes device drivers and utilities.
- Full Micro Channel compatibility.
- Compatible with the Programmable Option Select (POS) of Micro Channel.
- 3 serial I/O, 1 parallel, and 1 game port.

"Also available are memories for VME bus, Multibus, PMI and a **Game Port** for IBM's Personal System/2."  
Call for details . . .



**Chrislin Industries, Inc.**

Call Toll Free: **800-468-0736** (pst.)

31332 VIA COLINAS #106

WESTLAKE VILLAGE, CA 91362

TEL: (818) 991-2254 FAX: (818) 991-3490

\*PS/2 AND IBM ARE REGISTERED TRADEMARKS OF INTERNATIONAL BUSINESS MACHINES. BA23, QBUS, MICROVAX II, MICROVAX ARE TRADEMARKS OF DIGITAL EQUIPMENT CORPORATION. MULTIBUS IS A TRADEMARK OF INTEL MACHINES.

*A Wonderful World of Memories!*

CIRCLE 179 ON READER CARD

## UNIX

Elaine L. Appleton

# The ULTRIX Dream

It was 3:00 a.m., and my hair was standing on end. I had just

awakened from a dream that was so remarkable I have to share it with you. In my dream, Ken Olsen announced that ULTRIX is now DEC's core technology. VMS, he said, is fading away. He beckoned me to him, his eyes glowing.

"Can't you see?" he asked in a whisper. "Look around you! We have fancy new graphics processors that compete not only with HP-Apollo and Sun Microsystems but also with Intergraph and Silicon Graphics. We can hold our heads up in the best graphic studios in the auto industry. Engineers can solve machine design problems with the touch of a few buttons."

"OK, OK," I said wearily. "You have nice boxes. It's about time, by the way. But graphics is still a niche market. That isn't proof that DEC has forsaken VMS to move into the UNIX camp."

"Ah," he said, pulling a playing card from his rolled-up sleeve. "But you aren't paying attention. We added symmetric multiprocessing [SMP] to ULTRIX and came out with some hot new multiprocessors that will sling your numbers through before breakfast. In fact, they'll eat your breakfast for you."

"That's great, Ken," I said. "But you guys have been promising this for ages. What's the news?"

"Don't you see? Easy to upgrade, high throughput at decent prices — oh yeah, and with SMP we're giving ULTRIX users something VMS hacks have had for a long time."

I was beginning to get excited, but I was still skeptical. "But Ken, everybody knows VMS is comfortable and easy to

use. How will you persuade the masses to move to user-unfriendly UNIX?"

"Nah," I said, turning to leave. "It can't happen."

"Wait!" he cried, grabbing my hand. "Of course it will happen. After all, we've got Motif on our workstations now. You don't have to wade through UNIX commands. Applications that work on our systems will work on others, as well — after all, what are open systems all about?"

"You mean to say that off-the-shelf software can run on your systems? That with a little work, I can write programs to Motif and save a lot of money porting the software from one vendor's system to another?"

"Sure, sure, no problem," he said.

"Well," I agreed reluctantly, "anything can be had for a price."

"No, no, no! You have the wrong idea!" He was shouting now. "We've reduced prices on all our current RISC systems by 25 to 40 percent. Naturally you'll want to buy the more powerful new systems. But the way this industry is, those prices will drop any day."

"You can bet on it," Olsen contin-

ued, taking another card from his sleeve.

"Besides," he said, lowering his voice, "we know how to compete. We have 700 applications on our RISC boxes, and we're adding 100 each month. Our price/performance is the best in the industry, if you include discounting. And we've consolidated model numbers, so our salespeople and customers aren't confused anymore."

I looked around. It looked like a DEC office building: masses of beige cubicles, blank white walls, computers everywhere, empty desks.

"But Ken, what about Sun? I've heard they have the lowest priced RISC workstation in the market? IBM's new RISC lineup screams. And how do you catch up to Sun's sales volume, not to mention HP-Apollo? How do you convince all those graphic gurus to switch from Intergraph and Silicon Graphics to DEC? I don't get it."

He cut me off at the knees, flicking a playing card at me. It was the Joker. "Can't say — proprietary, you know. But we have plans, big plans."

Now I felt more comfortable. This was the DEC I knew talking.



# EXCITING NEWS FOR ISVS!

THIS YEAR, THE UNIX® MARKETPLACE IS WORTH ALMOST \$17 BILLION. AND, IN THE NEXT TWO YEARS, THE CUSTOMER BASE WILL DOUBLE TO TWENTY MILLION BUYERS. IS IT ANY SURPRISE THAT DEMAND FOR UNIX SYSTEM V RELEASE 4 APPLICATIONS IS AT AN ALL-TIME HIGH? THE 160 MEMBERS OF UNIX INTERNATIONAL ARE SPONSORING AN INDUSTRY-WIDE ISV PROGRAM THAT CAN HELP YOU MOVE YOUR APPLICATIONS FROM YOUR PRESENT BASE TO UNIX SYSTEM V. THEN YOU CAN TARGET THIS LUCRATIVE MARKET FOR YOUR APPLICATIONS. OUR WORLDWIDE PROGRAM INCLUDES SEMINARS, MIGRATION GUIDES, TRAINING, TECHNICAL SUPPORT, EQUIPMENT, SALES SUPPORT, AND MUCH, MUCH MORE. TO PARTICIPATE IN THE UNIX SOFTWARE BOOM, CALL 1 800 848-6495, EXT. 555.



CIRCLE 279 ON READER CARD

"Come to our press conference tomorrow morning," he said, pulling a last card from his sleeve. He turned to leave, but I had to know one more thing. "Ken, will you go on record and admit that ULTRIX is your core technology and that Motif is its de facto user interface?"

"Could be ... you figure it out. Take a look at these numbers." He pulled a scroll of paper from his sleeve and shook it out. It unrolled toward me. As it sailed across the floor it gathered speed. Olsen shouted, "SPECmarks, SPECthruput, Dhrystones, Whetstones, Integer mips, Linpacks — we have them all!" The rolling paper hit my feet and started climbing over my legs. "Four at 9.3!" Olsen whooped. "Three at 9.4!" The paper hit my neck. "Bisons, gawk and doduc!" Numbers rolled over my face, suffocating me. I was terrified. "Sixteen point seven million displayable colors! Twenty-four-bit Z-buffer!" Olsen bellowed.

It was too much for me. I screamed — and awoke, the covers over my head.

## ULTRIX Reality

I knew it had to be a dream. I thought about DEC's April announcements. When DEC announced the DECstation 5000 family of graphic workstations, the DECsystem 5830 and 5840 multiprocessors, and a multitude of enhancements to ULTRIX, the company line was that, although it looked good for ULTRIX, ULTRIX was still "incremental business" for DEC. But at a private briefing, a DEC official told analyst Chuck Barney of market research firm Workgroup Technologies, Hampton, New Hampshire, that ULTRIX will become the core technology for DEC. ULTRIX Marketing Manager Joe Menard straddled the middle, saying, "We still see a strong demand for VMS, but we're also seeing a strong demand for UNIX. We're going after that market with a new aggressiveness."

A DEC official also told Barney that Motif will be ULTRIX's de facto user interface, although as of this writing Motif was available solely as a layered product. By December, Motif will ship with

## THE RISC LINEUP

**DECstation 5000 Model 200** — This RISC-based workstation is designed for 2- and 3-D graphics applications such as electronic and mechanical design, molecular modeling, 3-D modeling and animation. The four configurations include the 200CX entry-level and 200 PX, both for 2-D work, and the 200PXG and 200PXG Turbo. Prices range from \$14,995 to \$51,100.

All configurations support DEC's TURBOchannel open I/O interconnect, a new bus structure hailed by analysts. The DECstation 5000 supports a variety of graphics standards, including Graphics Kernel System (GKS), Programmer's Hierarchical Interactive Graphics System (PHIGS), and PEX, which links the PHIGS/PHIGS+ Extension to X. The higher end systems, the PXG and PXG Turbo, include the Intel i860 64-bit RISC microprocessor, which runs at 33 MHz and functions as a graphics accelerator for fast 2- and 3-D geometric transformations. All DEC RISC-based systems are binary-compatible.

**DECsystem 5830 and 5840** — Three- and four-processor systems respectively, these new members of the DECsystem family are based on the Mips Computer Systems R3000 microprocessor. They use ULTRIX V4.0, which includes SMP. They feature up to 256 MB of standard ECC memory, up to 115 GB of disk storage, up to five VAXBI channels and up to four Ethernet connections. They run at up to 62 Integer mips. Throughput scaling is good: SPECthruput ratings run from one processor at 10.0 to four at 9.3. This modular system allows for simple upgrades. The 5830 is priced from \$140,000, and the 5840 is priced from \$160,000.

**ULTRIX V4.0** — Version 4.0 includes SMP, Remote Procedure Calls (RPC) and new distributed computing services.

RPCs, the first step in a joint-development effort with HP-Apollo, enable portions of applications to run concurrently on several computers in a multivendor network. RPCs are designed to let applications access the most appropriate computer for their tasks — one that not only has enough power and the correct features but also has free time.

Other distributing computing services include Network Time Protocol, which provides networkwide clock synchronization; Hesiod name services, which provide centralized password database administration; and Kerberos authentication service, which improves ULTRIX security. MIT's Project Athena, which developed X, developed Hesiod and Kerberos.

ULTRIX now supports up to 144 GB of storage in 96 disks — a 300 percent increase. DEC increased support for physical memory by 400 percent, going from 128 to 512 MB. Version 4.0 also includes an optional security environment being evaluated by the National Computer Security Center.

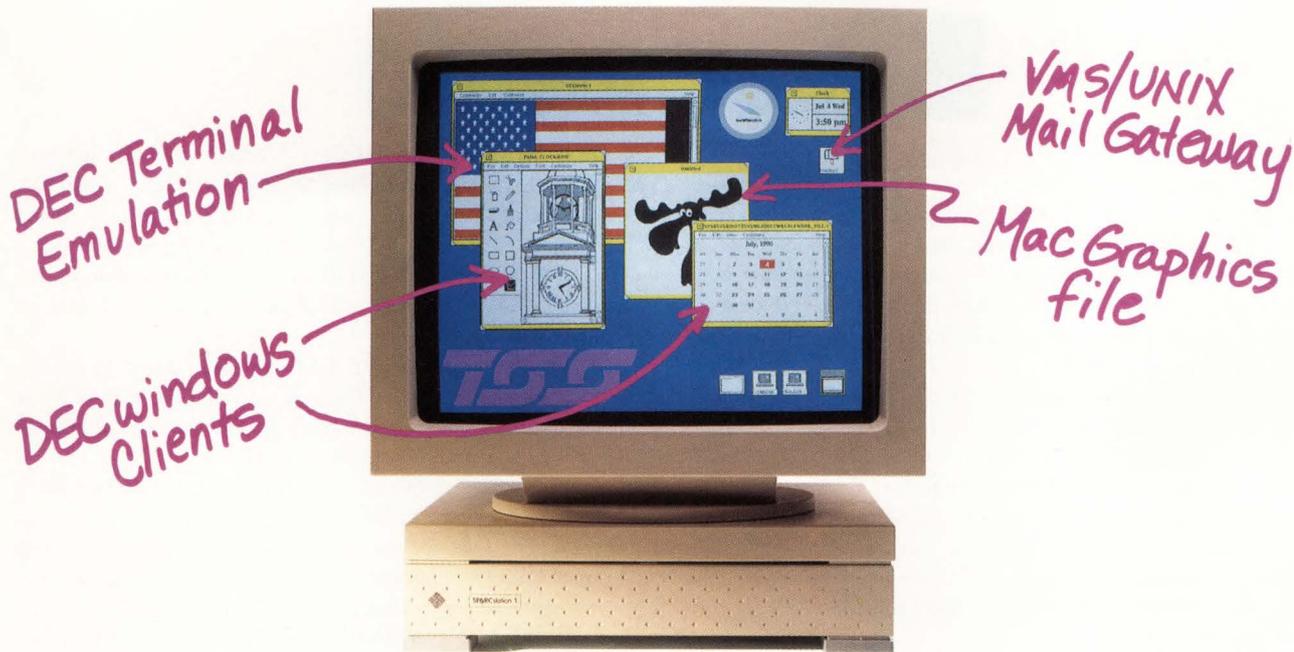
**New Languages** — DEC announced Pascal for RISC, an entirely new product, and FORTRAN for RISC V2.0, which includes extended compatibility with VAX FORTRAN. The company has joint-distribution agreements with Micro Focus for its COBOL/2 mainframe-level compiler and with Verdex for its Verdex Ada Development System (VADS). —E.L.A.

ULTRIX and will then be the default interface. As Barney said, "DEC is supporting DECwindows because customers are slow to move over to Motif." Menard admitted that the company will support DECwindows as long as customers ask for it and that with new versions of ULTRIX it will be possible to toggle to DECwindows rather than use the default Motif interface.

As I pondered these conundrums, I

remembered what DEC spokesperson Sarah Miller said about the DECsystem 5830 and 5840 three- and four-processor systems. They're efficient, she said, and suited to any general-purpose, compute-intensive task. "We don't like to narrow the niche for them," she stated.

A year ago, DEC official Dave Zwicker admitted that DEC would try to



# Now, networking between UNIX and DEC includes more than just file transfers.

The question is no longer whether to network, but how. Decisions to integrate UNIX workstations into your DEC environment must include a cost efficient and up-to-date networking strategy.

Which solution will bring these distinctly diverse worlds of UNIX and VMS together, provide you with a transparent user environment for both systems, yet still offer the broadest range of networking services available?

**TSSnet™ offers a complete DECnet solution for UNIX while retaining TCP/IP coexistence.** And with TSSnet running on just your UNIX system, you can talk with any or all DEC machines on the network.

**TSSnet LAT services provide both host and terminal support** offering the highest performance network terminal interaction possible. Character intensive remote file editing can now be done easily and efficiently.

TSSnet brings **DECwindows to your UNIX desktop**, letting you work easily with both UNIX and VMS applications. You can even take advantage of DECterm to use full color ReGIS graphics.

**A UNIX SMTP and VMS mail gateway** is provided, offering a complete mail utility between UNIX and VMS. TSSnet employs a high performance record blocking method to ensure that your mail will not only get through quickly, but will be handled properly, and transparently as well.

**A VT320 emulator** is built right into TSSnet's Sun version. A VT320 keyboard is drawn on your screen so mapping keys becomes as simple as point and click.

TSSnet also includes **a full set of network management utilities, shared printing resources, as well as a complete programming interface.**

And yes, we do offer the fastest and most comprehensive **file transfer utility available**, supporting a complete range of file commands. Users on either UNIX or VMS can even enter their own file name conventions with TSSnet.

One last word! TSSnet for UNIX is fully compatible with our TSSnet for the Macintosh.

To find out more about  
TSSnet for Sun, RS/6000  
and other UNIX platforms,  
just call  
1-800-283-5070

**Thursby Software Systems, Inc.**  
5840 W. Interstate 20 • Suite 115  
Arlington, Texas 76017 U.S.A.  
Phone: (817) 478-5070  
Fax: (817) 561-2313  
In Europe: 44-81-390-3376

## OPEN STANDARDS STANDOFF

**OSF Merger Shut Tight** — A proposed alliance among rival computer groups that would have established an open software environment was rejected in April. Negotiations among the Open Software Foundation (OSF), UNIX International and AT&T's UNIX division were cut short after repeated attempts to guarantee equal voice for each organization fell by the wayside. OSF expects the first shipment of its initial open standards product, OSF/1 V1.0, to occur in November 1990.

In related news, on May 15 the OSF announced its Distributed Computing Environment. OSF plans to divide its distributed computing responsibilities between Fundamental Distributed Services and Data-Sharing Services. The former allow for software developers to create remote procedure call software, naming and directory services, time services, PC integration and parallel programming support. The latter provide users with distributed file services such as diskless operation capability and MS-DOS file and printer support.

**Have Your Cake And Leave It, Too** — DEC's longstanding policy of no layoffs is beginning to inch inevitably toward the scrap heap after a voluntary retirement program took effect in late March. DEC targeted manufacturing plants in Phoenix, Arizona, and Burlington, Vermont, as the first outposts participating in the companywide program. Digital hopes to oust some 300 employees from these locations by offering redeployment at another location, retraining at another site, or a cash and benefits package to leave the firm. Employees who opt to take the money and run can look forward to a generous severance package based on length of service (a maximum of 104 weeks' pay for workers with 20 or more years of service) and complete medical, dental and life insurance for one year after termination.

As of May, only 800 DEC employees had accepted the retirement package after 4,500 had received the offer. Analysts fear that DEC will be unable to pare its work force by the estimated 8,000 employees needed to avoid further steps to cut payroll. DEC recently told analysts it expects that 2,000 employees will have left the firm through voluntary layoffs by October 1. While no one at DEC is using the "L-word," analysts predict that unless more employees opt for voluntary retirement, more cost-cutting measures will be undertaken, perhaps as early as autumn.

**Thumbs Up To LAT Accord** — DEC has approved a licensing agreement that allows communications software developer Walker Richer & Quinn to resell DEC's LAT protocol. Walker Richer & Quinn is best known as a major supplier of PC-to-VAX connectivity software and will incorporate LAT into its existing R-LAT line.

**Ross Opens DECwindows** — VAX financial software firm Ross Systems has announced the availability of DECwindows facilities for its series of financial applications software.

Another DEC financial software firm, Coda, has signed a Complementary Software House (CSH) agreement with DEC. Established in late 1989, DEC's CSH program enables software customers to purchase products directly from the source and integrate them in-house.

**VW Bugs Nixdorf With DEC** — German auto manufacturer Volkswagen has replaced neighbor Nixdorf Computer with DEC as its contractor for a major computer-integrated manufacturing (CIM) project. DEC will invest \$12 million and 25 employees into the Tool Construction 2000, or Ibis, project. Sources indicate that beleaguered Nixdorf lost \$30 million on the Ibis project since its 1987 inception.

In a related announcement, DEC has been awarded a \$100 million contract by Deutsche Telepost Consulting GmbH of West Germany to supply operational support systems for a pan-European digital cellular telecommunications network.

**DEC Gets Small** — DEC unveiled three multiuser systems using the SCO UNIX System V/386 and the Intel 386 processing line as a blueprint. The DECsystem 316+, 325 and 333 have more than 3,000 small business applications available on SCO UNIX V/386. The new systems are geared toward organizations with annual revenues of \$5 to \$50 million and from two to 64 users. The DECsystem packages support entry-level four- to eight-user configurations with 4 or 8 MB of memory, an 80- or 170-MB disk drive, backup tape, a terminal multiplexer and unlimited user license and distribution of SCO UNIX System V/386. Pricing starts at \$9,690 for the DECsystem 316+, \$14,455 for the DECsystem 325 and \$15,360 for the DECsystem 333.

**Sorbus By Any Other Name** — Sorbus, the computer services subsidiary of Bell Atlantic, has changed its name to Bell Atlantic Business Systems Services. For 30 years Sorbus has been a maintenance provider for IBM and DEC computers, joining Bell Atlantic in 1985. The name change comes on the heels of Bell Atlantic's purchase of Control Data's TPM operations in January.

**Sharing Knowledge** — Citing the need for next-generation software technology that will capture and manage knowledge assets, DEC, the Carnegie Group, Texas Instruments, US West and Ford Motor have joined to form the Initiative for Managing Knowledge Assets (IMKA). Knowledge assets are the assets that exist primarily in the minds of a company's employees. They include design experience, engineering skills, financial analysis skills, competitive knowledge, market knowledge and knowledge of the company's policies, practices, goals, objectives and strategies.

IMKA's objective is to develop an industrial-strength knowledge asset management technology that's nonproprietary, easily integrated within conventional systems and applications, and distributed and portable within heterogeneous computing environments. The effort represents a combined contribution of more than \$10 million from the member companies.

**Array In Tandem** — Tandem Computers announced it has merged with disk array specialist Array Technology. Under the terms of the agreement, Array will become a wholly owned subsidiary of Tandem. Array designs, develops and markets software and hardware disk subsystems based on redundant arrays of inexpensive disks (RAID).—Brian O'Connell, East Coast Editor. Pamela F. Fullerton, Assistant Editor/Articles, contributed to this report.



## For More Information

Array Technology Corp.  
4775 Walnut St.  
Boulder, CO 80301  
(303) 444-9300  
CIRCLE 534 ON READER CARD

Bell Atlantic Business  
Systems Services  
50 E. Swedesford Rd.  
Frazer, PA 19355  
(215) 296-6000  
CIRCLE 441 ON READER CARD

Carnegie Group Inc.  
5 PPG Place  
Pittsburgh, PA 15222  
(412) 642-6900  
CIRCLE 472 ON READER CARD

Coda Inc.  
Numerica Bldg., 6th Fl.  
1155 Elm St., Box 13  
Manchester, NH 03101  
(603) 647-9600  
CIRCLE 402 ON READER CARD

Intel Corp.  
3065 Bowers Ave.  
Santa Clara, CA 95051  
(408) 987-8080  
CIRCLE 456 ON READER CARD

Intergraph Corp.  
289 Dunlop Blvd.  
Huntsville, AL 35824  
(205) 730-2000  
CIRCLE 435 ON READER CARD

Micro Focus Inc.  
2465 E. Bayshore Rd.,  
Ste. 400  
Palo Alto, CA 94303  
(415) 856-4161  
CIRCLE 436 ON READER CARD

Mips Computer  
Systems Inc.  
950 deGuigne Dr.  
Sunnyvale, CA 94086  
(408) 720-1700  
CIRCLE 434 ON READER CARD

Nixdorf Computer Corp.  
300 3rd Ave.  
Waltham, MA 02154  
(617) 890-3600  
CIRCLE 457 ON READER CARD

Ross Systems Inc.  
1860 Embarcadero Rd.  
Palo Alto, CA 94303  
(415) 856-1100  
CIRCLE 505 ON READER CARD

Silicon Graphics Inc.  
2011 N. Shoreline Blvd.  
Mountain View, CA 94039  
(415) 960-1980  
CIRCLE 437 ON READER CARD

Tandem Computers Inc.  
19333 Vallico Pkwy.  
Cupertino, CA 95014  
(408) 285-6000  
CIRCLE 535 ON READER CARD

Texas Instruments Inc.  
6550 Chase Oaks Blvd.  
Plano, TX 75023  
(214) 575-4404  
CIRCLE 473 ON READER CARD

Verdix Corp.  
14130-A Sullyfield Cir.  
Chantilly, VA 22021  
(703) 378-7600  
CIRCLE 455 ON READER CARD

Walker Richer & Quinn Inc.  
2815 Eastlake Ave. E.  
Seattle, WA 98102  
(206) 324-0350  
CIRCLE 506 ON READER CARD

position ULTRIX-based systems as useful for OLTP. He also said, "Online transaction processing will be the dominant computing style of the 90s." With the 90s upon us, multiple processors and SMP are critical features for OLTP. OLTP is a profitable arena. It all adds up — except for crucial missing components such as trans-

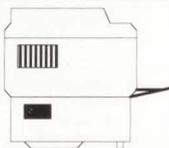
action journaling, queuing and security. Using ULTRIX for OLTP applications is still a risk. But since DEC has added SMP and SQL to ULTRIX, as well as support for 144 GB of disk storage and 512 MB of memory, OLTP on ULTRIX may not be too far in the future.

I reached for the pen and paper by my

bed. As I fumbled in the dim light, I saw something strange: a tangled roll of paper. It was a massive list of facts and figures detailing the April RISC/ULTRIX announcements, including performance specs (see "The RISC Lineup").

You can read them. I'm going back to bed. ■

### Connect any PostScript Printer to your VAX Network with . . . ScriptServer Software for VMS



**Supports PostScript printers from third party vendors**

**Converts HPGL & ASCII to PostScript**

**Supports LAT, PCSA, & SNA**

**PostScript Formatting Utility**

ScriptServer supplies extensive error reporting and manages printer synchronization, avoiding the common problems of data loss and partially completed PostScript documents when files are printed using traditional VMS spoolers. ScriptServer now allows software switching of printer-based emulations, plus support for Color PostScript output.

ScriptServer controls print spooling functions and acts as a filter to convert straight ASCII text or HPGL plot files to PostScript output on Adobe PostScript compatible laser printers. PostScript files created by user applications can be intermixed in the print queue and are printed directly.

ScriptServer supports local or network attachment of PostScript printers, with full LAT support and compatibility with terminal emulation products. The PCSA and Gateway products from DEC are also supported.

The menu-driven SCRIPT facility provides a user interface for printing options such as typefaces, job priority, paper size, orientation and margins. It allows the user to store form setup modules, for custom forms or company letterhead, and also output 2-up, 4-up or 8-up formats.

Call today for information  
on our free 30 day Trial  
800-477-0348



**GrayMatter**  
Software & Consulting

1300 Dexter Avenue North Suite 550  
Seattle, Washington 98109

CIRCLE 132 ON READER CARD



*"Best network training course I've ever attended!"*  
*"Complete, concise, and entertaining -Thanks !"*  
*"Really prepared me to build my network!"*

Register today for

### THE MACINTOSH-VAX/VMS NETWORKING LAB™

And Learn :

- ★ *To install, use and manage AlisaTalk™, PacerLink™, TSSnet™, and other Mac-VAX products!*
- ★ *To connect your Mac and IBM PC workstations through a VAX host!*
- ★ *How AppleTalk works, and How a VAX/VMS system works within an AppleTalk network!*
- ★ *To develop VAX-based Macintosh database applications!*

NOW COVERS DEC LAN WORKS FOR MACINTOSH

*Offered monthly in our fully equipped lab facility - \$995 tuition per student includes lecture, materials, lab access - even continental breakfast and lunch! Call for 1990 class dates! Ask about our custom, on-site training program!*

Register RIGHT NOW, with your Visa or MasterCard!

**800-969-4360**

**COMPUTER METHODS CORPORATION**  
525 Rt 73 South • Suite 300 • Marlton, NJ 08053

CIRCLE 277 ON READER CARD

**Kevin G. Barkes**

# DCL Trivia

In some respects, writing this column is akin to being a gunslinger in the Old West. Every time I go to a DECUS symposium or similar event, there's some DCL guru lurking there ready to ambush me in front of an appreciative crowd. I guess I ask for

trouble. Fellow speakers tell me they structure their talks so there's no time for questions and answers, thereby eliminating the possibility of wholesale humiliation.

I try to leave a few minutes to clear up any ambiguities caused by my rambling delivery and general mental fuzziness. And it never fails that a nondescript

fellow shuffles up to the mike and asks something like, "What's the maximum number of characters permitted in a DCL command line after symbol and lexical expansion?"

This guy won't accept "more than you could possibly imagine" as an answer. He smirks and says "one thousand twenty-four" and disappears into the

## FIGURE

<p><b>Command Interpreter</b></p> <p>Size of verbs and qualifiers examined by CLI is 4. (Keywords read in entirety.)</p> <p>Minimum abbreviation for verbs and qualifiers is 1 (assuming truncation is unique). Exceptions: CONTINUE, DEPOSIT, EXAMINE and RUN can be truncated to one character even though the truncation isn't unique.</p>	<p><b>Label Names</b></p> <p>Maximum size is 255.</p> <p><b>Logical Names</b></p> <p>Maximum size is 255 (31 for table names entered in LNM\$PROCESS_DIRECTORY or LNM \$\$SYSTEM_DIRECTORY).</p> <p>Maximum size for logical nodename is 15.</p>	<p><b>Recall</b></p> <p>Range of RECALL command specifiers is 1 to 20. Size of RECALL buffer is 1,025.</p> <p>Maximum number of characters that can be read from a RECALL command is 255.</p>
<p><b>Command Procedures</b></p> <p>Maximum number of parameters that can be passed to a command procedure is 8 (P1 ... P8).</p> <p>Maximum depth of nested command procedures is 32 (including the top-level procedure).</p>	<p><b>Password</b></p> <p>Maximum size is 31.</p> <p><b>Print (see also Queues)</b></p> <p>Range of values to /COPIES qualifier is 1 to 255.</p> <p>Range of values to /JOB_COUNT qualifier is 1 to 255.</p> <p>Maximum size of /NAME qualifier is 39.</p> <p>Maximum size of /NOTE qualifier is 255.</p> <p>Maximum size of /OPERATOR qualifier is 255.</p>	<p><b>Reply/Request</b></p> <p>Maximum size of message text is 128.</p> <p><b>Symbols</b></p> <p>Minimum size for symbol name is 1. Maximum size for symbol name is 255.</p> <p>Range of integers in substring replacement (symbol[x,y] := string) is 0 to 768 (x+y must =&lt; 769).</p> <p>Maximum size of arithmetic overlay is 32.</p> <p>Maximum size of evaluated string expression without /SYMBOL qualifier on WRITE command is 1,024.</p> <p>Maximum size of evaluated string expression with /SYMBOL qualifier on WRITE command is 2,048.</p>
<p><b>Command String</b></p> <p>Maximum size after symbol and lexical expansion is 1,024.</p> <p>Maximum size without using hyphen (command string extension) is 256.</p> <p>Maximum size per element is 255.</p> <p>Maximum number of elements is 128.</p>	<p><b>Process Names</b></p> <p>Maximum size is 15.</p> <p><b>Prompt</b></p> <p>Maximum size is 32.</p>	<p><b>UICs</b></p> <p>Range of numeric group number is 0 to 37,776 octal.</p> <p>Range of numeric member number is 0 to 177,776 octal.</p> <p>(Named format) maximum size of group name is 31.</p> <p>(Named format) maximum size of member name is 31.</p>
<p><b>File Specifications</b></p> <p>Maximum size for full file spec, including delimiters, is 255.</p> <p>Maximum size for node name is 6.</p> <p>Maximum size for optional access control string used with node name is 42.</p> <p>Maximum size for device name, including controller and unit number, is 15.</p> <p>Maximum size for filename is 39.</p> <p>Minimum size for filename is 0 (null).</p> <p>Maximum size for file type is 39.</p> <p>Minimum size for file type is 0 (null).</p> <p>Maximum version number is 32,767.</p> <p>Maximum size for directory name is 39.</p>	<p><b>Queues</b></p> <p>Range of process priorities with /BASE_PRIORITY= qualifier is 0 to 15.</p> <p>Maximum size of queue name is 31.</p> <p>Maximum number of concurrent jobs per queue (/JOB_LIMIT qualifier) is 255.</p> <p>Maximum number of parameters for /PARAMETER qualifier is 8. (Maximum size of each parameter is 255. Total length of all 8 parameters is 480.)</p> <p>Range of values to /PRIORITY qualifier is 0 to 255.</p> <p>Range of pages that can be printed with START/QUEUE/ALIGN is 1 to 20.</p> <p>Maximum size of START/QUEUE/SEARCH string is 63.</p> <p>Range of buffers with START/QUEUE/MANAGER/BUFFERS command is 0 through 127.</p> <p>Range of blocks with START/QUEUE/MANAGER/EXTEND_QUANTITY command is 10 to 65,535.</p>	<p><b>Volume Names</b></p> <p>Maximum size of disk volume name is 12.</p> <p>Maximum size of tape volume name is 6.</p> <p>Alternate maximum size for ANSI-labelled mag tape is 15 (14 for owner identifier field, 1 for volume accessibility field).</p>
<p><b>Forms</b></p> <p>Maximum size of form name is 31.</p> <p>Range of form numbers is 0 to 999.</p> <p>Maximum size of form description is 255.</p> <p>Range of form length values is 1 to 255.</p> <p>Maximum size of stock name is 31.</p> <p>Range of form width values is 1 to 65,535.</p>		

snickering crowd as my self-esteem, reputation and breakfast depart ignominiously. Suppressing an urge to shout, "Get a life!" to my faceless tormentor, I return

“

*Every time I go to a DECUS symposium, there's some DCL guru ready to ambush me in front of an appreciative crowd.*

”

to my dark hotel room and watch the day's events calendar scroll silently by on the TV screen.

In self-defense, I've developed a cheat sheet that contains many DCL trivia answers (see Figure). Aside from protecting myself at DECUS symposia, it's also been helpful in routine operations.

Since some of these values changed between VMS V4.0 and V5.0, it may be possible for you to catch your resident guru in a DCL gaffe. But be gentle with him. Someone plunked a DECstation on his desk, and he can't understand why DIR doesn't work anymore.

FOR YOUR VERY OWN "I Love DCL" sticker and/or a listing of all FidoNet public bulletin board systems in the U.S. featuring message areas with DEC-related topics (VAX, PDP-11 and Rainbow), send a self-addressed, stamped envelope to BBS List (and/or) DCL Sticker, Kevin G. Barkes Consulting Services, 4107 Overlook Street, Library, PA 15129. The list also is available online from my SYS\$OUTPUT bulletin board system: (412) 854-0511, 1,200/2,400 baud, 8 bits, 1 stop bit, no parity. If you're active on FidoNet, ask your local sysop to file request DECBBBS.LST from 1:129/38. — *Kevin G. Barkes is an independent consultant in VAX systems software, management, tuning and training.*

# PRINTUS MAXIMUS.

When your printing volume reaches gladiator proportions, you need the high duty cycles and low cost of ownership that are uniquely found in non-impact ion printers from Image Systems, Inc.

Print up to 250,000 pages per month with 300x300 dot-per-inch resolution, at less than 2 cents per page. Three models provide 30 and 45 page-per-minute output tailored to your applications and needs • graphics • forms • bar codes • multiple users and LANS • multiple fonts per page • DEC, HP, Diablo and Tektronix emulations • and much, much more.

MegaServe, MegaPro and MegaLine printers—winners in any arena. Call Image Systems, Inc. today for more details.



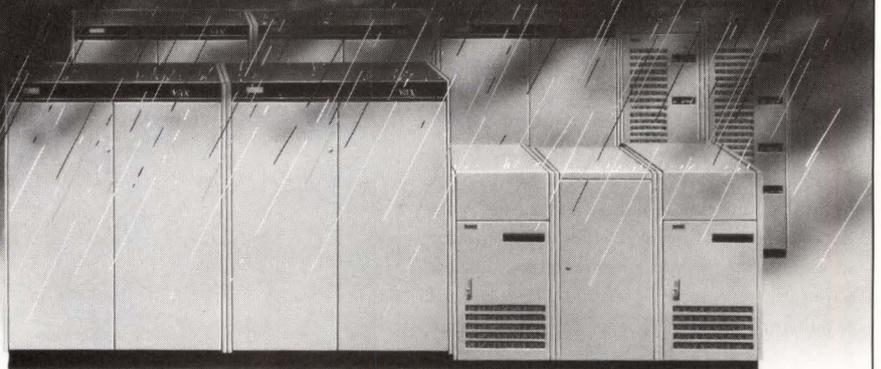
Image Systems, Inc.  
2515 McCabe Way, P.O. Box 25139  
Irvine, CA 92714

(800) 347-2484 Ext. 4480 • (714) 660-1421 • FAX (714) 757-4418

©Copyright 1990 Image Systems, Inc. All product names are trademarks of the respective manufacturers.

CIRCLE 305 ON READER CARD

## WEATHER UPDATE: OUTSIDE, WARM AND DRY. INSIDE, RAINING HEAVILY.



One quiet Saturday, \$20 worth of faulty water pipe leaked all over a VAX computer. On Monday, the damage included \$50,000 of equipment, critical data destruction, and interrupted customer service.

Keep your computer operations from being rained out, with SAM.

SAM is the intelligent, 24-hour protection system that monitors computer room conditions, detects problems in temperature, power, water, and more, and

alerts users. Only SAM can automatically perform a graceful and orderly computer shutdown to maintain data integrity and prevent hardware damage.

Don't let it rain on your operations.

Call Intra Computer at (718) 297-5518 and find out about SAM today.

VAX is a registered trademark of Digital Equipment Corporation

**INTRA**  
COMPUTER INC

87-46 Van Wyck Expressway Queens, NY 11418 (718) 297-5518 Fax: (718) 297-5500

CIRCLE 136 ON READER CARD

# PRODUCTS

## Shadow V2.2 Allows Unlimited Shadow Sets

Advanced Systems Concepts Inc. announced Shadow V2.2, a VMS disk mirroring system. This host-based, disk-independent mirroring system provides transparent support of volume shadowing for local and VAXcluster systems.

Shadow V2.2 lets you create an unlimited number of shadow sets. Each shadow set supports up to 10 members. The product supports the creation of shadow sets for VMS system, quorum and data disks. Using a DCL interface, you create a shadow set usually consisting of two or more disk devices. When a shadow set is created, Shadow uses a high-speed volume catch-up facility to ensure that all members in the shadow set contain the same data. User applications continue to reference the original disk device. In the event of a media failure, Shadow continues read and write operations within the set of surviving eligible members.

Shadow for VMS costs from \$2,000 to \$10,000. A right-to-copy license costs \$1,000. For more information, contact Marie C. Murphy, Advanced Systems Concepts Inc., 33-41 Newark St., Hoboken, NJ 07030; (201) 798-6400.

Circle 405 on reader card

## EDT+ V5.0 Features 50 Percent Speed Increase

Boston Business Computing Ltd. announced version 5.0 of EDT+, a complete emulation of the VAX EDT text editor for MS-DOS and UNIX systems.

EDT+ V5.0 is 50 percent faster than the previous version. It features multiple windows, a status line and ruler, 132-column mode, insert/overwrite modes, color support, adjustable tab stops, command editing and recall from within EDT+, an UNDO command, and improved buffer manipulation. Enhancements have been made to the EDIT and SAVE commands, HELP, JOURNAL and LEARN facilities, and the keyboard interface. The product can edit multiple files using wildcards on the command line. It supports more than 50 UNIX systems and such keyboards as the LK250, and it includes interfaces for EVE, EMACS, vi and WPS.

Licenses cost from \$295.

For more information, contact Edward J. Gaudet, Boston Business Computing Ltd., 3 Dundee Park, Andover, MA 01810; (508) 470-0444.

Circle 407 on reader card

## Univision Graphics Controller Reaches 33 Mflops Performance

Univision Technologies Inc. announced the UDC-7000-TI, a single-board graphics controller for AT-based systems. It features the Texas Instruments TMS34020 graphics controller and optional TMS34082 floating point unit.

The board reaches 33 Mflops performance and a vector drawing speed of 200,000 vectors per second. It can display images of 1,280 x 1,024 x 32 bits from a display memory of 2,048 x 2,048. The onboard 33-Mflops coprocessor, 20-MHz peripheral VSB bus and local pan and zoom hardware let a single add-in board handle imaging and graphics applications at up to 32 bits per pixel. The VSB bus, used in conjunction with the company's UPX-1000 frame grabber, lets images of 1,024 x 1,024 x 8 bits be digitized and viewed at 20 frames per second. Single-screen IBM monochrome, CGA, EGA and 8514/A display standards are emulated in firmware and hardware using a proprietary ASIC gate array. Software support includes TIGA, X and

SDSL. Applications such as Microsoft Windows, CADKEY, AutoCAD and HALO run without modification.

The product costs from \$3,895.

For more information, contact Bonnie Shields, Univision Technologies Inc., 3 Burlington Woods, Burlington, MA 01803; (617) 221-6700.

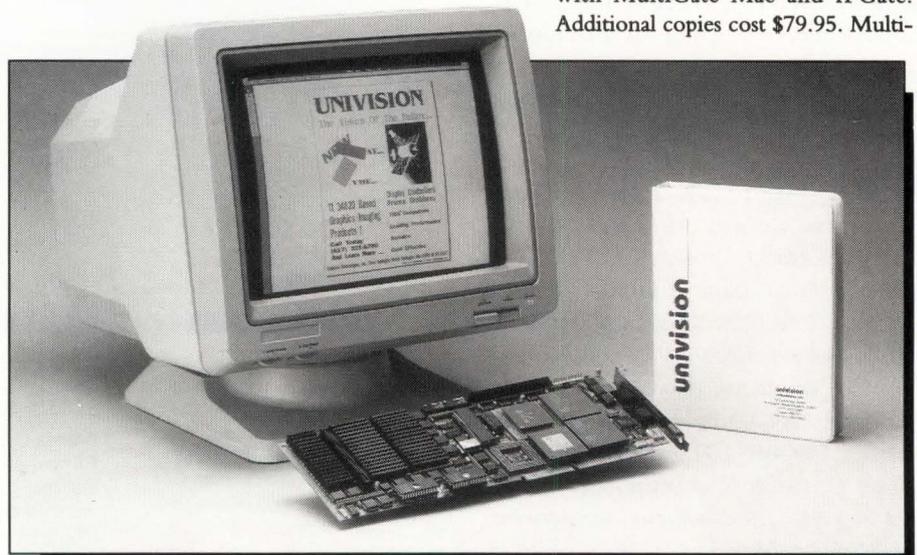
Circle 427 on reader card

## MultiGate Family Connects Mac Users To TCP/IP Networks

Network Resources Corporation announced the MultiGate family. It gives Mac users on AppleTalk enhanced connectivity to TCP/IP-based networks.

MultiGate Access lets you perform file transfer, terminal emulation and editing of host-based files in a Maclike manner. The MultiGate Mac software router runs on the Mac II family and provides IP-to-IP, AppleTalk-to-IP and AppleTalk-to-EtherTalk routing. MultiGate Manager runs on the Mac II family and provides network management capabilities in configuration, performance and security management. The MultiGate 2000 standalone router connects AppleTalk networks or devices to Ethernet, fiber optic or broadband networks. IPGate software downloads to the MultiGate 2000.

A copy of MultiGate Access is included with MultiGate Mac and IPGate. Additional copies cost \$79.95. Multi-



The UDC-7000-TI Display Controller with TMS34020 and optional TMS34082.

Gate Mac costs \$795. IPGate costs \$395. MultiGate Manager costs \$795. Three MultiGate 2000 options are available: AT1 connects an AppleTalk device to the backbone and costs \$1,195; AT2 connects two AppleTalk devices to the backbone and costs \$1,395; LT connects a LocalTalk network to the backbone and costs \$2,395.

For more information, contact Bradley Brown, Network Resources Corp., 2450 Autumnvale Dr., San Jose, CA 95131; (408) 263-8100.

**Circle 464 on reader card**

### **C Solution's Pro-C Builds Applications In K&R C**

C Solutions Inc. announced Pro-C, a source code generator that builds applications in K&R C. It generates C code for screen programs, reports, menus and multiframe updates.

With Pro-C, generated C code is fully commented, allowing freedom for later modification. Pro-C enables complete control over application development. It supports RMS sequential and indexed files, Rdb, Oracle and Ingres database managers and can interface to increase flexibility while maintaining 4GL systems. It offers prototyping capabilities. Nonprogrammers can create screens, menus and reports without C experience. DEC's Screen Management Guidelines have been incorporated to ensure compatibility with the range of DEC terminal products. Applications migration from VAX to ULTRIX systems is a straight transport of generated C code, a recompile and link process.

For more information, contact C Solutions Inc., 210A Regina St. N., Waterloo, ON N2J 3B6; (519) 725-2634.

**Circle 408 on reader card**

### **GatorBox V1.5 Supports AppleTalk Phase 2 And SNMP**

Cayman Systems Inc. announced GatorBox V1.5, an AppleTalk-Ethernet gateway. It connects remote AppleTalk networks over a TCP/IP backbone without using EtherTalk and selectively filters the AppleTalk zones so that remote zones don't automatically appear in the Choosers of Mac users behind the GatorBox.

This new version supports AppleTalk Phase 2 and acts as a bridge between Phase 1 and Phase 2 networks. It also supports SNMP so that network administrators can use SNMP-based network management tools from DEC, Sun and others. It connects AppleTalk networks over TCP/IP networks that don't support EtherTalk, so Mac users can see zones that reside behind IP serves that

don't pass AppleTalk. It selectively filters AppleTalk devices, networks and zones, allowing greater security and controlled access to AppleTalk networks. It can be used to prevent zones from appearing across a tunnel.

The product costs \$2,795. V1.5 will be distributed to registered GatorBox owners at no charge.

For more information, contact Carol McGarry, Cayman Systems Inc., 26 Landsdowne St., Cambridge, MA 02139; (617) 494-1999.

**Circle 409 on reader card**

### **Racal InterLAN Announces Software Drivers For DECnet-DOS**

Racal InterLAN announced software drivers for the NI5210 data-link controller for PC/XT and the NI9210 data-link controller for MCA. The drivers support DECnet-DOS and DECnet V2.1 and V3.0.

DECnet-DOS lets IBM PC, XT, AT, compatible or PS/2 Micro Channel PCs running PC- or MS-DOS V3.2 or later participate as end nodes in DECnet networks. DECnet-DOS software also lets PCs be connected to VAXs in a DECnet network and access information and services contained on other types of DEC systems in the network.

### **CLARIFICATION**

In "Controlex CM331 Delivers 10 ms Access Time" (May 1990, page 182), the access time of the CM331 RAM-disk was quoted at 10 milliseconds (ms). The correct access time is 10 microseconds. For more information, contact Controlex Corp., 16005 Sherman Way, Van Nuys, CA 91406; (818) 780-8877.

**Circle 536 on reader card**

Support for DECnet-DOS lets you access data-link cards that offer performance levels twice that of the DEPCA card. The drivers provide online user information and printer support.

For more information, contact Mark Williams, Racal InterLAN, 155 Swanson Rd., Boxborough, MA 01719; (508) 263-9929.

**Circle 421 on reader card**

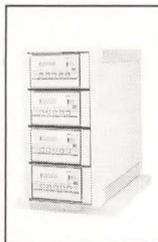
### **MAXview Tools Support Proactive Network Management**

Xyplex Inc. announced a family of Ethernet-based LAN management and analysis tools called MAXview. MAXview includes Scriptor/UNIX, Scriptor/VMS and Scope. Each features a user interface that supports proactive network management and preventive

## **SAVE UP TO 50% WITH EMULEX DIGITAL COMPATIBLE PRODUCTS.**

### **DISK DRIVES**

The Emulex SD89X series of disk drives are plug-compatible with RA-Series drives. No software or hardware modifications are necessary. Disk drives are shipped pre-formatted for easy installation. SD89X disk drives are available in three (formatted) capacities: 663MB (SD890), 873MB (SD891), and 960MB (SD892).



### **DATA CHANNEL CARD**

Emulex's DA01 data channel card has all the features and performs all the functions of Digital's HSC5X-BA, but at a considerable cost advantage. The card supports up to 4 Digital SDI disk drives.

**800-346-2933  
In PA 412-745-0200**

**TriLogic**

RD # 2 • Box 203A  
CANONSBURG, PA 15317

# ARSAP 7:

## The Most Significant Advancement In Data Center Management Since ARSAP 6.



### Introducing ARSAP Version 7—A Strategic Management Tool That Can Actually Affect The Bottom Line Of Your Entire Company

With the introduction of Version 7, ARSAP completes the transition from system accounting to systematic, corporate-wide data center management. ARSAP 7 provides the information necessary to raise the efficiency of a company's entire computer network.

### A Single Package Handles Any Occasion

ARSAP 7 is complete and ready to grow with you. Run times that are significantly faster than the competition let it handle DEC 9000s, 6000s and 3000s with ease, yet ARSAP is inexpensive enough for small workstations. For what

you'd pay for a partial solution, ARSAP gives you all you'll need to manage your data center needs of today and tomorrow. That's real value.

### True Platform Independence

ARSAP's unique, open architecture allows it to produce consistent management reports across VMS, Unix, Ultrix, and

ARSAP 7 to handle system accounting efficiently in virtually any environment.

A consistent VMS-based user interface uses similar commands when accessing different systems. New system usage monitoring and disk management features add extra flexibility, efficiency, and security. No need to change your operating procedures... ARSAP works your way.

A few reasons why 60% of our new business currently comes from our two primary competitors.

	Simultaneously Supports VMS, Unix, and Ultrix on Intergraph Platforms	Supports Unix Systems V, 4.3, and Data BSD on DEC 9000	Operating New Leases VMS Accounting and Error Messages Intake	Offers V Printer Forms Management	Offers Management Information Project Usage in Real Time	Monitors Cash Recovery in Real Time	User Interface and Documentation Conforms to VMS Standards
ARSAP	✓	✓	✓	✓	✓	✓	✓
PACS*			✓	✓			
QUANTUM*							

\*as of May 1, 1990

Intergraph platforms, even accepting data from non-VMS systems such as Convex and IBM. This remarkable flexibility allows

do for you—and your company's bottom line.

### Only ARSAP 7 Beats ARSAP 6

In the entire VAX world, there is no other data center management software that delivers so much—delivers so reliably, so easily, so economically. Call today to see how much ARSAP 7 can

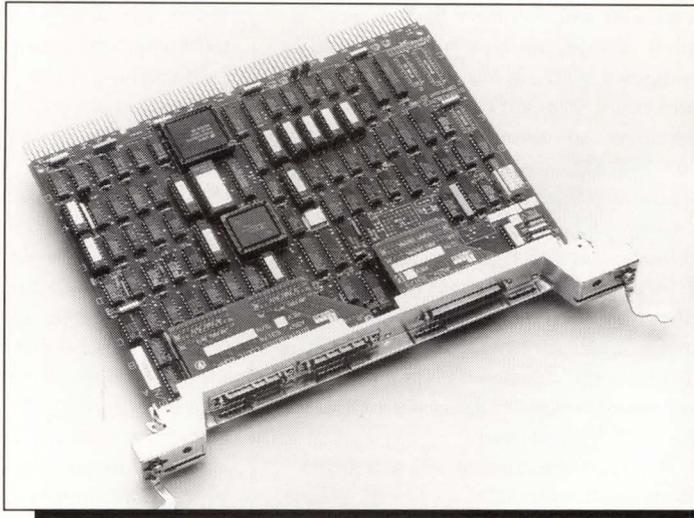
The Professional Choice For Data Center Management.

G E J A C I N C O R P O R A T E D

For further information  
1-800-432-7727  
or (301) 725-2500



**The SM3686  
ESDI disk  
controller from  
Dilog shortens  
total data access  
times by as  
much as 20  
percent in  
shadowed  
subsystems.**



maintenance and can configure, monitor and manage any Xyplex TCP/IP- or LAT-based server installed on an Ethernet network.

MAXview Scriptor is supported on UNIX hosts and VAXs running VMS and ULTRIX. It uses Xyplex's Remote Telnet Console Facility or DEC's Remote Console Protocol to communicate transparently over the Ethernet network. Scope is a network

analyzer that collects packets from the Ethernet and stores them for later display and analysis. The MAXview Scope software program is supported on the MAXview 7610 Network Manager Card. Xyplex also announced MX-TSERV-J16, a 16-port terminal server card for its MAXserver communications server. It provides concurrent support for LAT and TCP/IP Internet protocols.

The Scriptor/UNIX and Scriptor/VMS cost \$1,995. MAXview Scope is included in the standard Xyplex TCP/IP-LAT software kit. The MAXview 7610 Network Manager Card costs \$2,995. The MX-TSERV-J16 costs \$2,495.

For more information, contact Kathleen Coleman-Goodwin, Xyplex Inc., 330 Codman Hill Rd., Boxborough, MA 01719; (508) 264-9900.

**Circle 514 on reader card**

### **Dilog ESDI Controllers Feature Smart Shadow**

Dilog announced three ESDI controllers featuring a Smart Shadow that can enhance data access times by as much as 20 percent over standard ESDI subsystems in DEC systems.

The SM696 and SM686 interface up to two and four 24-MHz ESDI Winchester disk drives, respectively, to MicroVAX IIs and MicroPDP-11s. The SM3686 interfaces up to four 24-MHz ESDI Winchester drives to MicroVAX IIIs and includes a card-edge bulkhead cover compatible with the MA213/215 system enclosure for the MicroVAX III. The controllers handle data transfer rates up

# **STOP GUESSING!**

You've sent VAX mail messages.  
Have they been read? Or not?

Find out . . .

**CONFIRM it !**

**"CONFIRM" by Adminisoft**  
P.O. Box 415  
Dellslow, WV 26531  
Tel: (304) 291-2146  
Fax: (304) 472-9546

VAX/VMS, Network

\$495(single cpu)

**CIRCLE 343 ON READER CARD**

# **EasyEntry™**

Full featured heads down data entry  
for Digital Equipment Corporation  
computers and IBM PC's

- Immediate on-screen development of fill in the blank forms. No coding, compiling, testing—non-DP users can design forms.
- Full of features—error checking, math functions, forms chaining, program calling, HELP, error messages, rekey verification, keypunch simulation, file maintenance, operator statistics...
- Creates standard files for use with other software.
- Low overhead. Supports high volume data entry.
- Low cost.
- Easy to learn. Good documentation. Technical support is just a call away.
- Installed at 1,000 sites worldwide. ICP million dollar award winner.

Call **1-800-334-5510**

**applied information systems**

500 Eastowne, #207, Chapel Hill, NC 27514  
(919) 942-7801

**CIRCLE 105 ON READER CARD**

to 3 MBps on Winchester drives and provide interfacing for one or two SA450 5 1/4- or 3 1/2-inch floppy disk drives. The Smart Shadow feature is implemented using a dual Winchester disk shadow set. It uses the spindle synchronization option available on some ESDI drives. The secondary drive is formatted 180 degrees out of sync with the primary, reducing disk rotational latency by one-half. The controllers are compatible with the DU driver contained in DSM, RSTS/E, RSX-11M+, ULTRIX and VMS.

The SM696 costs \$2,050, the SM686 costs \$2,250 and the SM3686 costs \$2,450.

For more information, contact Judie Dutton, Dilog, 1555 Sinclair St., Anaheim, CA 92806; (714) 937-5700.

Circle 411 on reader card

### StorEdge Offers 2 GB Of Online Storage Capacity

Fujitsu America Inc. announced an enhanced version of StorEdge, a data storage subsystem with more than 2 GB of online storage capacity.

StorEdge is designed for compatibility with NetWare 386 and is certified for Net-

Ware 286 and NetWare SFT. It provides online storage and tape backup. It can be configured with any combination of up to three Fujitsu 778-MB or 380-MB 5 1/4-inch disk drives and half-inch cartridge tape drives. The 778-MB drive features an expected MTBF of 200,000 hours. The half-inch tape cartridge backs up 220 MB of data in about 20 minutes. It features an average access time of 16 ms and a transfer rate of up to 1.875 MBps. Up to three StorEdge units can be daisy-chained to provide up to 4.5 GB of online storage capacity. The product can be configured for compatibility with DEC and MS-DOS V2.1 or later.

StorEdge costs from \$4,995 to \$10,985.

For more information, contact Holly Bourne, Fujitsu America Inc., 3055 Orchard Dr., San Jose, CA 95134; (408) 432-1300.

Circle 414 on reader card

### Tachion-I Provides Throughput Of 4.8 Samples Per Second

KineticSystems Corporation announced the Tachion-I, a multichannel data acquisition system with net throughput to disk of 4.8 samples per second. This CAMAC-based

system uses Parallel Transfer Disk (PTD) technology and interfaces to VAX/VMS.

Tachion-I includes from one to eight CAMAC crates interfaced to the company's differential bus, providing a direct data path from the CAMAC Dataway to a PTD controller. In data acquisition mode, the system streams data from the CAMAC module via the Dataway and the bus to the disk controller and disk. The system supports analog and discrete inputs through a variety of configurations. Data is sampled at precise intervals controlled by the 3656 Timer-Sequencer module. The time base is generated by an internal crystal or an external clock. With suitable CAMAC I/O modules, all input channels can be sampled simultaneously.

A single-crate system, including a CAMAC front end with 32 analog channels, a 600-MB PTD, a MicroVAX II, VMS, FORTRAN and drivers, costs from \$115,000.

For more information, contact KineticSystems Corp., 11 Maryknoll Dr., Lockport, IL 60441; (815) 838-0005.

Circle 416 on reader card

Here it is . . .



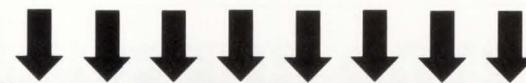
**your complete, step-by-step guide to mastering modern C skills!**

Only \$39.95\*

Here's the quick, easy, inexpensive way to learn the C language with MASTERING STANDARD C, A Self-Paced Training Course in Modern C. Noted C expert Rex Jaeschke has assembled his highly acclaimed seminar course into this convenient, comprehensive book. For only \$39.95, you get the full benefit of . . .

- Detailed chapters on everything from *Getting Started to Structures, Bit-Fields and Unions*
- Exercises and worked solutions
- An easy-to-use glossary of C terms
- Helpful appendices on C language syntax
- 100% ANSI-STANDARD COMPLIANCE

. . . and more! Order your copy **NOW!**



Use this coupon to order your copy now!

### Mastering Standard C Order Form

Name \_\_\_\_\_  
 Title \_\_\_\_\_  
 Company \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_  
 State/Zip \_\_\_\_\_  
 No. of books \_\_\_\_\_  
 Payment enclosed \$ \_\_\_\_\_.\*  
 Charge to:  
 VISA  MasterCard  American Express  
 Acct. No. \_\_\_\_\_ Exp. Date \_\_\_\_\_  
 Signature \_\_\_\_\_ Date \_\_\_\_\_

\*Plus shipping and handling charges: \$3 for the first copy, \$1 for each additional copy. Outside the US call for information. Quantity discounts available.



Mail to: Professional Press Books  
 101 Witmer Road  
 P.O. Box 446  
 Horsham, PA 19044  
 (215) 957-1500 FAX (215) 957-1050

DPHH0790

## MDS32/C Provides Automatic Translation Of C Datatypes

Ergodic Systems Inc. announced MDS32/C, a C language interface for MDS32, the company's menu design tool for VAX/VMS. The interface provides automatic translation of C datatypes to the VMS calling standard observed by MDS32.

MDS32 provides a nonprogramming interface that supports the development of menu environments through text-based menu definition files. This feature lets you incorporate high-quality menus with DCL and third-party applications. Rapid prototyping can be achieved by combining user-coded extensions in MDS32/C with the text-based definitions.

The MDS32 basic license costs from \$213 for VAXstations to \$5,925 for VAX 88xx-series machines.

For more information, contact Steve Duff, Ergodic Systems Inc., 23666-A Birtcher Rd., El Toro, CA 92630; (714) 380-9719.

Circle 413 on reader card

## Epoch-1 File Storage Server Available For VMS Users

Epoch Systems Inc. announced that the Epoch-1 InfiniteStorage Server is available to VMS users through TGV Inc.'s MultiNet NFS Client software.

The Epoch-1 is an NFS- and TCP/IP-compatible file storage server that transparently integrates the high capacity and low cost of optical disks with the high access speed of magnetic disks. The product line includes systems that can be configured from 1 to 1,000 GB. These products provide central data storage and management for networks requiring fast online access to high-capacity disk storage over an Ethernet network. They're based on an online hierarchical storage architecture that seamlessly integrates rewritable or WORM optical disk technology into a high-speed Winchester storage system.

The Epoch-1 costs from \$61,000. TGV's MultiNet NFS Client costs from \$1,680.

For more information, contact Andrew Hettinger, Epoch Systems Inc., 8 Technology Dr., Westboro, MA 01581; (508) 836-4300.

Circle 412 on reader card

## NDC Brings Conversion Services To DEC Minis And Workstations

National Data Conversion Institute (NDC) announced expanded data conversion services that include all DEC minis and workstations.

NDC can translate information between

more than 2,500 computer formats and DEC minis. It supports all standard DEC operating systems and application programs and translates between databases and spreadsheets. It lets dedicated word processing documents and mainframe data be downloaded into DEC computers. The company offers media conversion services to allow disk-to-disk (3 1/2-, 5 1/4-, 8-inch) and tape-to-disk (TK-50, half-inch, magnetic) translations.

OCR scanning is offered for automatic input of typeset and typewritten materials. Supported software includes such word processing programs as Microsoft Word, WordPerfect and WPS-Plus.

For more information, contact Michael J. Daniec, National Data Conversion Institute, 5 E. 16th St., New York, NY 10003; (212) 463-7511.

Circle 418 on reader card



## A CASE FOR HAVING YOUR CAKE AND EATING IT

MOST PEOPLE WANT TO HAVE THEIR CAKE, AND EAT IT. NOW YOU CAN.

WITH DEFT'S MAC/VAX CASE SOLUTION YOU CAN HAVE YOUR CHOICE OF ORACLE®, INGRES®, SYBASE® OR Rdb®, AS THE RDBMS.

AND WHETHER YOU'RE DESIGNING AND BUILDING NEW SYSTEMS, OR MAINTAINING EXISTING SYSTEMS, (THANKS TO OUR REVERSE ENGINEERING) YOU'LL HAVE THE POWER TO GO FROM REQUIREMENTS SPECIFICATION THROUGH TO SYSTEMS GENERATION, AND BACK AGAIN.

ALL WITH THE EASE ONLY A MACINTOSH CAN OFFER. TO HAVE YOUR CAKE AND EAT IT, CALL FOR YOUR OWN FREE COPY\* OF OUR MACINTOSH BASED TRIAL PACKAGE, (416) 249-2246.

IT'S A PIECE OF CAKE.



CASE WITH A DEFT TOUCH

\*MACINTOSH USERS WILL RECEIVE A NO-OBLIGATION, FREE TRIAL FOR 30 DAYS.

## Calendar Manager V3.4 Offers Scheduling Flexibility

Russell Information Sciences Inc. announced Calendar Manager V3.4. It offers scheduling flexibility and ease of use.

Calendar Manager lets you schedule meetings and standby meetings for the same time. It sends up to three "tickler" messages prior to each confirmed appointment. DECnet scheduling has been improved with automatic confirmation of resources and facilities designated "first come, first served." A link to VAXmail is included in all print windows. Schedules of attendees, resources and facilities are searched, with conflicts automatically resolved. It's available in VMS standalone, ALL-IN-1 and X-O integrated versions.

Calendar Manager costs from \$795 to \$34,995.

Also recently announced is Xecutive Office System (X-O), a menu-driven, easy-to-install, "system managerless" operating environment with operating benefits for VAX system managers and users. With the menu interface, the system manager can let others add and delete users, manage printer queues

and selectively back up user directories.

The X-O system is available for any VAX or VAXstation running VMS. It costs from \$795 to \$34,995.

For more information, contact Russell Information Sciences Inc., 25201 Paseo de Alicia, Ste. 111, Laguna Hills, CA 92653; (714) 768-5000.

Circle 422 on reader card

## TapeNet Equips LS200T Subsystem With RS-232 Port

Lago Systems Inc. announced a tape monitor feature for its LS/200T 8mm cartridge tape subsystem used for backup on VAXclusters. Called TapeNet, this optional feature equips the subsystem with an RS-232 port that can be attached to any communications port on a VAX system, DEC terminal or terminal server. It includes a firmware upgrade to the LS/200T that allows it to accumulate and transmit status information on all drives in a subsystem. TapeNet provides data on the amount of tape remaining on a cartridge and the ECC count for an operation. It also provides data on all types of tape errors that occur, the tape

commands being executed, tape labels and cartridge size.

The LS/200T consists of two or four 8mm cartridge tape transports and an STI adapter board that translates signals between the SCSI tape drives and DEC's tape controller. It's designed for attachment directly to the tape data channel on an HSC storage controller. Each 8mm cartridge stores up to 2 GB of data.

A standard LS/200T costs \$24,000. TapeNet costs an additional \$1,000 on new units and \$1,200 on currently installed units. For more information, contact Gordon Orsborn, Lago Systems Inc., 160E Albright Way, Los Gatos, CA 95030; (408) 374-1818.

Circle 417 on reader card

## Kappa Uses Object-Oriented Programming

IntelliCorp Inc. announced Kappa, a software development environment for PCs that aids in the development of low-cost, high-impact business applications.

Based on C, Kappa features object-oriented programming, rule-based reasoning, active graphics, and intelligent links to appli-

Introducing . . . Your Key to Device Drivers

## VMS Advanced Device Driver Techniques

By Jamie E. Hanrahan and Lee Leahy

To order your copy, send \$59.95 plus shipping and handling (\$3.00 for the first book, \$1 for each additional book) to: Professional Press Inc., P.O. Box 446, Horsham, PA 19044-0446

Written for computing pros who want to learn more about...

- Simple VMS Device Drivers
- Full Duplex & State Machine-Based Drivers
- VAX BI Drivers
- User-Written ACPs

DPHQ0790



## VMS Advanced Device Driver Techniques ORDER FORM

Send \_\_\_\_\_ copy(ies)

Check/Money order enclosed for \$ \_\_\_\_\_

Charge \$ \_\_\_\_\_ to  VISA  MasterCard  AmExpress

Account # \_\_\_\_\_ Exp. Date \_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Country \_\_\_\_\_ Phone( ) \_\_\_\_\_

PROFESSIONAL PRESS INC.

P.O. Box 446, 101 Witmer Road, Horsham, PA 19044-0446  
(215) 957-1500 FAX (215) 957-1050

## SHOP AT UNBOUND'S 3100 STOR



"DON'T WASTE THE DYNAMITE! NOT IN MY GONNA CRACK THAT BABY!!"

## External Removable Storage

Model	Disk Drive	Capacity	Price
STOR200-R*	(2)RZ23	200MB	\$1,950.00
STOR250-R*	(1)UZ25	250MB	\$2,300.00
STOR300-R*	(1)RZ23,(1)UZ24	300MB	\$2,510.00
STOR400-R*	(2)UZ24	400MB	\$3,080.00
STOR500-R*	(2)UZ25	500MB	\$4,100.00
STOR380-R	(1)UZ55	380MB	\$2,580.00
STOR760-R	(1)UZ57	760MB	\$3,540.00
STOR1.2G-R	(1)UZ58	1.2GB	\$5,710.00

- + Two Year Warranty
- + Depot Maintenance
- + Phone Line Technical Support
- + Shipping From Stock
- + Call to Order 1-800/UNBOUND

**UNBOUND Inc.**  
17951 Lyons Circle  
Huntington Beach, CA 92647  
Tel. 1-714/843-1895  
FAX 1-714/843-0627

\*3 1/2" Technology

All products are registered trademarks of their manufacturer

CIRCLE 258 ON READER CARD

cations, spreadsheets and databases. These features let software developers build solutions on standard platforms. Application builders use objects to represent company information directly in software and use rules and other language constructs to capture decisions and policies associated with their business activities. The product integrates with such PC software as dBase III, Lotus 1-2-3, graphics and CAD packages, and ASCII files. It provides access to applications in FORTRAN, Pascal and C. It runs on an IBM AT or compatible with 640 KB of RAM, MS-DOS and Microsoft Windows V2.1.

Kappa costs \$3,500. Run-time versions, which can be embedded in the final applications, cost \$450.

For more information, contact Erin Barrite, IntelliCorp Inc., 1975 El Camino Real W., Mountain View, CA 94040; (415) 965-5500.

Circle 415 on reader card

### nthPower Software Includes X User Interface

Signal Technology Inc. announced nthPower, an object-oriented application environment for digital signal processing, data analysis and presentation.

nthPower is an integrated software solution for X-based workstations and client/server networks. It features an X user interface, a client/server distributed architecture, and extensive signal and data analysis functionality provided through a symbolic high-level application language. It also features easy menu selection of commonly used analysis functions with customizable menu setup using point-and-click mouse operations. A bidirectional 3GL interface allows preservation of software investment. Network licensing techniques allow concurrent users to access software. The product initially is available on VAX/VMS, ULTRIX and Sun systems.

nthPower costs from \$6,000 to \$24,000.

For more information, contact Hollie Straub, Signal Technology Inc., 120 Cremona Dr., Goleta, CA 93116; (805) 968-3000.

Circle 423 on reader card

### Le tX Improves X11 Graphic Operations

Peripherals Design Inc. announced Le tX, a high-resolution X station. It combines the graphics quality of UNIX stations with the ease of use of a terminal.

Le tX improves and optimizes X11 graphic operations using GROPE, a custom

Xccelerator ASIC. GROPE ensures high-speed X graphics regardless of the number of planes. The X server can be downloaded for ease of upgrade and uses the TCP/IP-TFTP network protocol. The system hosts a real-time kernel and is based on an open 32-bit bus architecture driven by a 16-MHz Motorola 68030 microprocessor and a 68881 floating point

coprocessor. A memory management unit highly coupled to the X11 protocol ensures the integrity and use of the station even if too many windows are opened. Expansion slots allow the addition of a data compression board and SCSI scanners. The product offers built-in support for PostScript printers. Two models are available: the Le tX M+ 19-inch



Now you can AUTOMATICALLY identify and correct existing and potential VAX security loopholes — with AUDITOR.

## This Is The Only Security Management System Easier To Use Than the VAX\* AUDITOR.

AUDITOR secures all VAX systems on your network or cluster with ONE single utility. AUDITOR determines and (optionally) corrects deviation from your Security Baseline. AUDITOR easily produces security reports with concise explanatory text. AUDITOR is the ideal tool for Systems Managers or EDP Auditors. Call 1-800-232-5215 for more information or a free trial.

**BRAINTREE**  
*Technology Inc.*

SIMPLIFYING SYSTEM MANAGEMENT.

600 Cordwainer Drive  
Norwell, MA 02061

Within Massachusetts or outside the USA,  
call 1-617-982-0200.

\*VAX is a trademark of Digital Equipment Corporation.

CIRCLE 316 ON READER CARD

monochrome with 1,280 x 960 resolution and 2 MB or more of memory and the Le tX-C8 19-inch 8-bit color with 1,280 x 1,024 resolution and 4 MB or more of memory.

For more information, contact Peripherals Design Inc., 3060 Business Park Dr., Ste. E, Norcross, GA 30071; (404) 263-0067.

**Circle 420 on reader card**

### UniSolutions Announces UNIX System Administration Software

UniSolutions Associates announced version 4.1 of the SysAdmin UNIX system administration software package. It provides such administration utilities as account maintenance, multilevel file backup and restore, tape library management, tape manipulation, system security and monitoring, network administration and monitoring, resource accounting and reporting, and performance monitoring.

The UniSol user interface provides multi-level menus, layers, forms, selection lists, command and browsing windows, and context-sensitive help. A user interface toolkit

for C lets you develop windows-based applications for ASCII terminals and workstations. SysAdmin includes the UniMenu and SysAudit software utilities, also available standalone. UniMenu provides a user-modifiable menu interface to UNIX commands and local applications. SysAudit provides system monitoring and auditing tools. SysAdmin is available in binary or source/site license format for systems running ULTRIX, 4.2 BSD, 4.3 BSD, SunOS 3.x and 4.0, and other UNIX variants.

For more information, contact Laurie Craig, UniSolutions Associates, 2103 Mathews Ave., Ste. 1, Redondo Beach, CA 90278; (213) 542-0068.

**Circle 426 on reader card**

### Deft Enhances Its CASE Solution With Deft V4.1

Deft announced Deft V4.1, a CASE solution for RDBMS engineers. Deft V4.1 enhances Deft V4.0 with Rdb and Sybase gateways, editor and gateway support for Ingres V6.0 and Oracle V6.0, Deft dictionary improvements and enhanced diagram editors

and reporting.

Deft's CASE solution consists of four main products. Deft Analyst is an RDBMS CASE system for the Mac that lets the analyst build requirement specifications and perform a detailed analysis of user needs. Deft Designer has all of Analyst's features, adding general and detailed design facilities. Deft Professional has Analyst's and Design's features, adding a multiserver-based repository. Deft Gateways link a Mac running Deft to a VMS host running Oracle, Ingres, Rdb or Sybase. Deft also announced its Gateway to Rdb for VAX/VMS. Database programmers now can compile their Deft designs on the Mac into Rdb/VMS SQL schema on the host.

The Deft Analyst costs \$4,500. Deft Designer costs \$5,900. Deft Professional costs \$7,900 and Deft Gateways costs from \$10,000. Deft's Gateway to Rdb costs from \$10,000 to \$20,000, depending on configuration.

For more information, contact Deft, 557 Dixon Rd., Ste. 111, Rexdale, ON M9W 1H7; (416) 249-2246.

**Circle 508 on reader card**

capture

prioritize

lookup

route

track

respond

mail

report

analyze

solve

## THE BEST SYSTEM MANAGERS ORGANIZE THEIR PROBLEMS

At busy VAX sites, responding to user problems requires an organized solution. That's why these system managers use Target->Hotline, a central problem database.

Here's how it works. The help desk or user logs in a problem. Target->Hotline notifies the support staff of a new problem, then prioritizes and routes the problem to a support representative. Historical data can be reviewed, the solution entered, and the user notified. Reports capture problems, bottlenecks, and performance for all DECnet nodes. And no problem is ever overlooked.

To qualify for a free evaluation copy, call us toll free.  
**1-800-233-3493.**

The best solution for your problems is Target->Hotline.



TARGET SYSTEMS  
CORPORATION

33 BOSTON POST ROAD MARLBORO, MA 01752 USA (508) 460-9206 FAX (508) 481-9187

**CIRCLE 166 ON READER CARD**

\*\*\* ATTENTION \*\*\*

**AlisaTalk™, PacerLink™, Helix VMX, and SequeLink™ Customers!**

*NOW, You Can Dial Into Your VAX and Use These Products, with*

## ASYNCSERVER™

- ★ *Software-only dial-up solution! Works with the modems, asynch lines, and terminal servers you already own!*
- ★ *Totally AppleTalk™ compatible - use your Chooser to select file, print, and database servers!*
- ★ *Works through your VAX to connect you with LaserWriters™, AppleShare™ servers, and other AppleTalk devices!*
- ★ *Fully LAT-transparent Can be used through a DECserver port!*

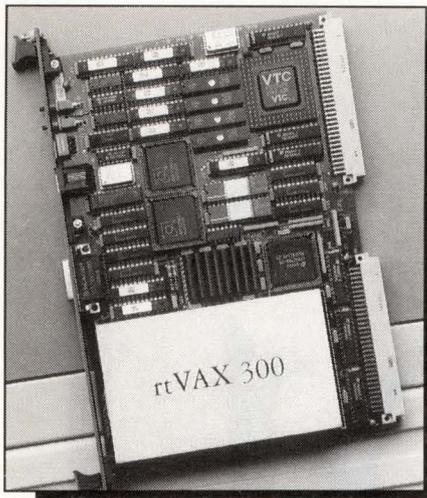
*HyperCard Tour and 30-day evaluation available! Priced between \$750 and \$2500 per VAX CPU - unrestricted user count!*

*Order RIGHT NOW, with your Visa or MasterCard!*

## 800-969-4360

**COMPUTER METHODS CORPORATION**  
525 Rt 73 South • Suite 300 • Marlton, NJ 08053

**CIRCLE 188 ON READER CARD**



*The Aeon VME 300 incorporates the rtVAX 300 in a 6U board with a local memory of 1, 2, 4 or 8 MB.*

### **Aeon VME 300 Incorporates rtVAX 300 Subassembly**

Aeon Systems Inc. announced the Aeon VME 300 processor board. It incorporates the rtVAX 300 subassembly.

The rtVAX 300 includes a VAX processor, an FPU coprocessor and an Ethernet controller coprocessor integrated on a small daughterboard. The Aeon VME 300 incorporates the DEC subassembly in a 6U board with a local memory system of 1, 2, 4 or 8 MB and a VME interface. The VME 300 interface includes the slot zero system controller functions defined by the VME 300 bus specifications. VME master and slave transactions are supported. VME system installations can range from a single VME 300 to multiprocessor systems. The Aeon VME 300 comes with external connections for Ethernet and RS-232. The Ethernet, included with the rtVAX 300, incorporates ThickWire access. ThinWire Ethernet connections can be made using external hardware. One of two RS-232 ports acts as the console device.

A 1-MB version of the product costs \$4,995.

For more information, contact Steve Kadner, Aeon Systems Inc., P.O. Box 10300, Albuquerque, NM 87184; (505) 828-9120.

**Circle 406 on reader card**

### **VersaTerm-Pro V3.1 Supports Apple Comm Toolbox**

Synergy Software announced VersaTerm-Pro V3.1, which supports the Apple Comm Toolbox and VT220 text terminal emulation.

An installation disk lets Mac users with

System 6.0.2 or later add the Comm Toolbox software. VersaTerm and VersaTerm-Pro support the connection and file transfer managers of the Toolbox. By dropping in connection and file transfer tools provided by Apple and others, VersaTerm and VersaTerm-Pro can connect to new networks/protocols. They can also support new file transfer protocols. VT220 emulation includes downloadable character sets, host-definable function keys, and 7- and 8-bit operation. Other features include double-high double-wide characters, protected fields, selective erase, and the DEC multinational character set. The product offers pop-up soft keyboard support for simulating the Apple Extended, VT220 and Data General D200 keyboards as well as support for the Mac Portable keyboard. It includes additional host text printing commands, improved ANSI color support and added ANSI graphics character set support.

For more information, contact Synergy Software, 2457 Perkiomen Ave., Reading, PA 19606; (215) 779-0522.

**Circle 425 on reader card**

### **Soft-Switch X.400 Gateways Operate With SprintMail Service**

Soft-Switch Inc. announced binary file and revisable document exchange certified to operate over X.400 using the X.400 Gateway Model-10 and Model-20. The capability is based on a NIST Implementor's Workshop agreement.

The X.400 Gateways operate with Sprint's SprintMail Service. Customers of the two companies can exchange spreadsheets, revisable documents, software programs, engineering drawings, CAD/CAM documents and other binary information across X.400 networks. The gateways connect through Soft-Switch Central to more than 30 e-mail systems, including ALL-IN-1 and VMS Mail; IBM OfficeVision, PROFS and DISOSS; Wang Office; HP DeskManager; Banyan Vines Mail; and 3Com 3+Mail. The Model-10 is based on a 16-MHz Intel 80386SX processor with 4 MB of memory, two Motorola 68000-based dedicated communications processors, and 40 MB of disk storage. The Model-20 is based on a 25-MHz Intel 80386 processor with 8 MB of memory, two Motorola 68000-based dedicated communications processors, and 322 MB of disk storage.

The Model-10 costs \$30,000. The Model-20 costs \$55,000.

For more information, contact Donald M.

Fisher, Soft-Switch Inc., 640 Lee Rd., Wayne, PA 19087; (215) 640-9600.

**Circle 424 on reader card**

### **NIS Announces Interface To Rdb/VMS**

National Information Systems Inc. (NIS) announced the Accent R SQLgateway to Rdb, an interface to Rdb/VMS.

The product was designed for the VAX SQL interface to Rdb. It's ANSI SQL-compliant and supports VAX CDD/plus. It lets databases be created and updated through DEC's run-time version of Rdb. It lets developers and users read and write Rdb tables by embedding SQL statements with Accent R's Structured Programming Language. Access to Rdb databases is available through the Access R 4th Generation Tools and through the Accent R Express Executive Information System. The SQLgateway to Rdb can be used to manipulate tables for read and write in conjunction with such DEC products as Data Distributor, Rally, TEAMDATA, VAXLink and VIDA.

The product costs from \$825 for the VAXstation 3100 to \$27,100 for the VAX 9000 Model 410.

For more information, contact Dave Wagner, National Information Systems Inc., 1190 Saratoga Ave., San Jose, CA 95129; (408) 985-7200.

**Circle 419 on reader card**

### **Vocal Introduces Portable Modem**

Vocal Technologies Ltd. announced Stowaway 2400, a TLP-based modem product. Vocal's TLP technology eliminates the possibility that a line will be dropped during a communication session due to low battery power.

Stowaway measures 2 x 3 x 3/4 inches and weighs 2.2 ounces. It's compatible with IBM and Apple using any standard RS-232 serial interface. It operates on all telephone lines and supports V.22 bis, CCITT, V.22/Bell 212A/Bell 103 and the extended Hayes AT Command Set. It features autodial, autoanswer, nonvolatile memory, a 40-character command buffer, and 2,400, 1,200 and 0-300 baud with automatic fallback. It doesn't require an internal slot or an AC outlet and can be used on more than one computer.

The product costs \$295.

For more information, contact John Blume, Vocal Technologies Ltd., 3032 Scott Blvd., Santa Clara, CA 95054; (408) 980-5181.

**Circle 428 on reader card**

# Toll

Purchasing Digital's full line of workstations and most popular MicroVAX™ products has never been easier.



Just pick up your telephone and call our name: 1-800-DIGITAL.

Our DECdirect™ team will help you every step of the way, with product, price and purchasing information. You'll reduce the time and paperwork of traditional purchasing, and deal directly with Digital while making your important workstation and MicroVAX purchases.



■ ORDER WORKSTATIONS AT NEW, LOW PRICES.

Call and choose from our convenient packaged workstations. Or customize your own system over the phone.

It's the easiest way to take advantage of our new, low prices on the much-in-demand VAXstation™ 3100 and DECstation™



3100. Plus our VAXstation™ 3520/3540 products, and our DECstation™ 2100 and 5000 family of products. Of course, our popular DECstation™ 200/300 series of PC's is also available.

■ CALL TO ORDER POPULAR MICROVAX PRODUCTS.

DECdirect is also your source for our most popular MicroVAX™ products, including our packaged MicroVAX™ 3100 system and custom packages of MicroVAX™ 3300/3400 and VAXserver™ 3300/3400 systems.

And while you're shopping, you can also order Digital's supplies, software, terminals, servers, drives, communication options and much more, all with the same toll-free call.

© Digital Equipment Corporation 1990. The DIGITAL logo, Digital has it now, DECdirect, VAXstation, VAXserver, DECstation and MicroVAX are trademarks of Digital Equipment Corporation.



# Free.

D I G I T A L

## ■ FAST ORDERING, DIRECT FROM DIGITAL.

DECdirect is the perfect complement to ordering from your Digital representative or authorized distributor. Your discounts will be automatically applied. Your purchase confirmation will be mailed the next day. And every price quoted is guaranteed for 60 days, in writing at your request.

We can even introduce you to our Electronic Store, our free on-line service that lets you browse and purchase from your desktop terminal or PC. It's another easy way to order our full workstation line, our packaged MicroVAX 3100 system, and much more.

## ■ COMPREHENSIVE PRODUCT INFORMATION.

Throughout your purchasing process,

you can get the most up-to-date pricing and availability information, configuration data, and warranty and service details.

All to help you make the most informed purchase possible.

## ■ FREE STARTER KIT.

Call 1-800-DIGITAL and mention code AAM. That's all it takes to place an order, request technical information, or get a free DECdirect starter kit including a subscription to the DECdirect catalog and the Electronic Store Shopper's Guide.

DECdirect. It's the easiest way to get our workstation and MicroVAX products now.

Digital  
has  
it  
now.



## VXM Technologies Focuses PAX-1 On VAX/VMS

VXM Technologies Inc. announced a version of its PAX-1 software for VAX/VMS. It transforms a network of VAXs into a parallel processing, networking supercomputer.

PAX-1 precompiler technology allows asynchronous computation of networked applications across multiple VAXs. The networked applications thus use techniques

available up to now only on multiprocessor machines. PAX-1 applications can be developed for this environment, or existing ones can be modified. The product can replicate a process to create a given number of "workers," or identical processes, that can work on a large or complex problem. It uses a fully distributed approach and runs on VAX/VMS over a DECnet Ethernet LAN.

A primary PAX-1 development node costs from \$7,500 to \$29,900.

For more information, contact VXM Technologies Inc., P.O. Box 9121 Kenmore Station, Boston, MA 02215; (617) 730-8490.

**Circle 429 on reader card**

## DMG Adds Graphics Capability To Its VAX-To-FAX Product

Digital Management Group Ltd. announced the addition of graphics capability to its VAX-to-FAX product, DMG/FAX. DMG/FAX can now add corporate logos, signatures and other graphics to fax messages sent directly from VAX/VMS systems.

DMG/FAX lets any VAX terminal send a fax directly from ALL-IN-1, VMSmail, WordPerfect, WORD-11, Mass-11 or ASCII text directly from the DCL level. It also can be integrated into customer applications such as purchase-order processing.

DMG/FAX uses a standard fax machine as its hardware component, supplied by Pitney Bowes.

For more information, contact John Dightam, Digital Management Group Ltd., 4711 Yonge St., Ste. 600, North York, ON M2N 6K8; (416) 225-7788.

**Circle 515 on reader card**

## Henco's Synchrony Integrates Varied Data

Henco Software Inc. announced Synchrony, a software product for the information integration market. Synchrony applies the relational model of database management to combine data types such as structured data, text and images from different sources, providing information in a thorough, concise manner.

Synchrony is designed to enhance your decision-making capabilities. It can integrate text, data and images from a variety of sources such as online research, corporate databases, optically scanned documents and word processing packages including WordPerfect, Mass-11 and WPS-Plus.

For more information, contact Lauren S. Levenson, Henco Software Inc., 100 Fifth Ave., Waltham, MA 02154; (617) 890-8670.

**Circle 516 on reader card**

## NX850-XL Speeds VAX 8550 CPU From 6 VUPS To 7.5 VUPS

Nemonix Inc. announced the NX850-XL, an in-cabinet CPU accelerator for the VAX 8550. The Nemonix NX850-XL helps MIS directors meet the demands of new users, new

# How much longer can you afford to ignore your lack of control over...

- ▶ IMPACT ANALYSIS
- ▶ CHANGE CONTROL
- ▶ VENDOR CODE MANAGEMENT
- ▶ SOFTWARE AUDITS
- ▶ MIGRATION CONTROL
- ▶ PRODUCTION CONTROL
- ▶ MAINTENANCE BOTTLENECKS
- ▶ ADA DEVELOPMENTS
- ▶ DOD-2167A ADHERENCE



**If you have these PROBLEMS...  
Softool has the SOLUTION!**

It's called **CHANGE AND CONFIGURATION CONTROL (CCC®)**. Softool pioneered this technology, and now the CCC product family sets the standard against which all others are measured.

Available for Digital (VMS, ULTRIX and RISC), UNIX, IBM (MVS and VM), and various other platforms.

**SOFTOOL  
CORPORATION**



"The Change and Configuration  
Management Experts"

**digital** Independent  
Software  
Vendor

340 South Kellogg Ave., Goleta, CA 93117  
Telephone: 805-683-5777  
Telex: 658334 Fax: 805-683-4105

Offices in Chicago, Dallas, Los Angeles, New York,  
San Francisco and Washington, D.C.  
Trained representatives in Australia, France,  
Hong Kong, Israel, Italy, Malaysia, Singapore,  
Spain and the United Kingdom

applications and improving response time. The upgrade improves a VAX 8550's CPU performance from 6 VUPS to 7.5 VUPS. This level of performance exceeds a VAX 6000 Model 410.

Nemonix's upgrade is fully transparent to existing hardware and software and requires a 30-minute installation. Its add-on module can be disabled with a switch, which returns the system to its original configuration.

As part of the Nemonix Technology Advancement Program (TAP), the NX850-XL costs \$9,995, with free installation. For more information, contact Peter Cholakis, Nemonix Inc., 106 South St., Hopkinton, MA 01748; (508) 435-9087.

**Circle 520 on reader card**

### **Q\*file Manages Disks, Directories And Files**

W. Quinn Associates Inc. announced Q\*file V1.0c, a disk, directory and file management command shell software package. Q\*file is the first of the Quinn Software Portfolio family of VMS utilities.

Q\*file is a fast but simple user interface to VAX/VMS. It offers a tree-structured interface for managing disks, directories and files. It uses pull-down windows and point-and-shoot menus for entering commands. Files can be selected based on 46 criteria, many of which let you identify potentially wasted disk space or performance bottlenecks. It features a multiple window display, a Lotus-like command mode, online context-sensitive help and a fully integrated VMS command line.

Prices range from \$795 for a VAXstation to \$7,995 for VAX 9000.

For more information, contact Bill Peake, W. Quinn Associates Inc., 12030 Sunrise Valley Dr., Ste. 300, Reston, VA 22091; (703) 476-2255.

**Circle 430 on reader card**

### **Compass Available For MicroVAX And VAX**

Bonner & Moore Consulting Services announced the Compass maintenance management system for the MicroVAX and VAX. It operates under Rdb or ADABAS.

Compass includes fully integrated equipment, work order, inventory control and purchasing features. A modular design lets you match your needs with system function and operation. Compass can be used with minimum training. Electronic scratch pad, single-key transaction access and automatic

key recall add to ease of use. Online help text and individual field help are available. Table-verified data entry and automatic data default increase operator speed and efficiency. For more information, contact Irasema Emerson, Bonner & Moore Consulting Services, 2727 Allen Pkwy., Houston, TX 77019; (713) 831-9786.

**Circle 460 on reader card**

### **DCMS-TSB Storage System Backs Up More Than 14 GB**

Clearpoint Research Corporation announced the DCMS-TSB 8mm tape storage subsystem for VAX 8000 and VAX 6000 systems. The DCMS-TSB includes a proprietary gate array, providing users with TMSCP emulation and a third-party VAXBI direct-attachment subsystem.

The TSB tape controller functions as a VAXBI-to-SCSI host adapter that plugs directly into the VAXBI peripheral bus. Using one slot, but providing ports for up to seven tape devices, it offers flexible configurations and backup capabilities from 2.3 to more than 14 GB. It also provides simultaneous operation of DEC's TU81 Plus and Clearpoint's 8mm tape drive.

An RS-232 port is standard with the TSB. The Clearpoint Service and Maintenance Utility (CSMU) feature provides maintenance and operating status information including ECC error correction rate to determine the tape quality and amount of unused tape.

The DCMS-TSB storage subsystem costs \$17,850.

For more information, contact Greely Summers, Clearpoint Research Corp., 35 Parkwood Dr., Hopkinton, MA 01748; (508) 435-2000.

**Circle 509 on reader card**

### **Objectivity/DB Meets Engineering Applications Requirements**

Objectivity Inc. announced Objectivity/DB, a DBMS designed to meet the functional and performance requirements of engineering applications. It supports diverse hardware platforms, applications vendors' products, and engineering domains and provides foundation-level functionality.

Objectivity/DB supports mixed networks of DECstations and Sun3s. It also supports distributed control of data. It's designed as a layered toolkit that lets application developers select the functionality they need and specify the granularity of database operations. Data is managed at the object level and can be logically combined into composite objects and physically clustered on disk. Any type of data is supported, including dynamically varying arrays of virtually unlimited size.

Development systems cost \$30,000. Run-time systems are also available.

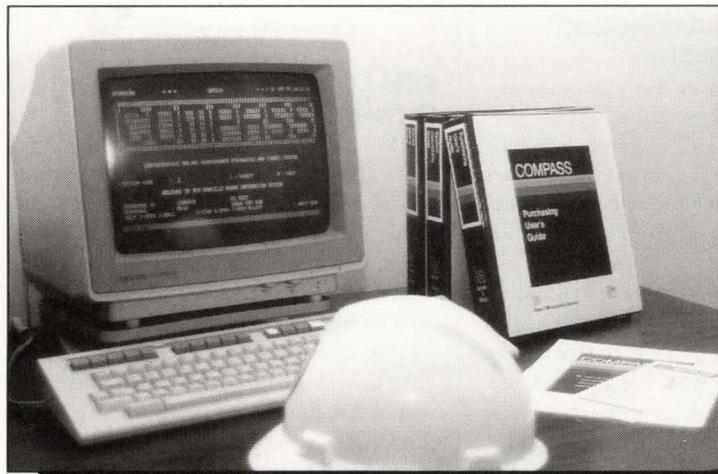
For more information, contact Bob Field, Objectivity Inc., 800 El Camino Real, 4th Fl., Menlo Park, CA 94025; (415) 688-8000.

**Circle 465 on reader card**

### **Phaser PX Networking Printer Switches Ports Automatically**

Tektronix Inc. announced the Phaser PX, a color PostScript-compatible, 300-dpi printer, with multitasking connectivity designed for mixed office environments. It includes serial, parallel and AppleTalk ports standard and can automatically switch among the ports. This lets the printer be shared across platforms and environments, which may be a combination of IBM PCs and compatibles, Macs, workstations, minis or mainframes.

The Phaser PX also supports HP-GL. HP-GL emulation is compatible with HP7475A



*The Compass maintenance management system operates under Rdb or ADABAS.*

plotter drivers, including extensions for 256 colors, user-selectable timeouts and scaling. Phaser PX can switch between PostScript and HP-GL emulation. One input port can be set to accept HP-GL files while the others are set to receive PostScript files.

The Phaser PX costs \$7,995. Any Tektronix color thermal wax transfer printer can be upgraded to the PX's capabilities for \$3,995.

For more information, contact Tektronix Inc., P.O. Box 1000, MS:63-583, Wilsonville, OR 97070; (503) 682-7392.

**Circle 518 on reader card**

### **BAC-Up Backs Up And Restores VAX/VMS Systems**

Professional Software Associates Inc. announced BAC-Up, a VAX/VMS backup librarian. It backs up and restores VAX/VMS systems and includes an archival librarian capability for cataloging tapes and setting up restores.

BAC-Up is compatible and works with the VMS BACKUP utility. Operations can be done interactively by user, or requests can be transferred ready for processing to a computer operator. The command file of any session can be saved to be used later. All tape operations can be double-checked for correct tape labels. Listings and queries of the online database can locate data files quickly. Backup is performed in DEC's backup format using DEC software. Logging and reporting let the manager oversee use of backup operations.

The product costs from \$495 to \$6,995, depending on processor.

For more information, contact Professional Software Associates Inc., 1822 E. Carnegie, Santa Ana, CA 92705; (714) 852-0288.

**Circle 466 on reader card**

### **Innovative Computer Systems' FCX Reduces File Sizes**

Innovative Computer Systems Inc. announced a file compression system that reduces file sizes up to 90 percent in little time with few computer resources. FCX solves problems associated with limited disk space, lengthy file transfers and conversion of files among systems.

Several files can be compressed and packaged together in one FCX file, saving an average of 50 to 70 percent of space. The input files can be any type, size and structure. FCX preserves the different file types and structures as it expands the compressed files. The expanded file will exactly match the original input files both in file structure and

data content. FCX increases available disk space without adding software. It also lets you exchange files between VMS and MS-DOS systems in compressed format. Conversion of files to the proper VMS format is automatic or can be specified manually. FCX requires VMS V4.4 or later and will run on any VAX, MicroVAX or VAXstation under VMS. For more information, contact Innovative Computer Systems Inc., 72 Crooked Ln., Cherry Hill, NJ 08034; (800) 848-4FCX.

**Circle 513 on reader card**

### **SAS System Provides Windowing And Menu-Driven Interface**

SAS Institute Inc. announced the SAS System V6.0. It provides a menu-driven interface, interactive windowing capabilities and other enhancements.

SAS/Assist software, a task-oriented, push-button user interface, provides access to the most-used SAS System capabilities. It lets you point and click through an application to access, manage, analyze and present data in a report or graph. It also provides a facility for constructing executive information systems. The SAS Display Manager System supports window styles familiar to users. Icons, pull-down menus and windows are available, as is a graphics window that lets you view graphics output in a zoomable, scrollable window. It includes a cut-and-paste facility for moving nongraphics output from one window to another. The SAS System V6.0 also includes data access, management, analysis and presentation enhancements. It's available for IBM mainframes under MVS and CMS and for DEC minis and workstations under VMS.

For more information, contact Mike Truell, SAS Institute Inc., SAS Circle, Box 8000, Cary, NC 27512; (919) 677-8000.

**Circle 467 on reader card**

### **KOM Expands Optifile II Software Capabilities**

KOM announced Optifile II for the ATG GD 6000, the Kodak 560 ADL and the UNIX environment. It's available for stand-alone, cluster and networked environments. No changes are required to the operating system or application.

The ATG GD 6000 high-reliability optical disk drive provides 6.4 GB of storage per disk. Optifile II for the ATG GD 6000 lets optical disk drives emulate standard magnetic disk drives. It costs from \$5,000 to \$50,000.

The 560 ADL supports ISO-standard and nonstandard disk cartridges and can be fitted

with WORM and erasable drives. Optifile II for the Kodak 560 ADL lets you plug the 560 ADL into a VAX/VMS host. It costs \$25,000.

Optifile/UNIX lets SPARCstation 1 and SPARCserver 330 users configure a device driver and plug the optical disk drive into the built-in SCSI adaptor. It costs from \$1,500 to \$5,000.

For more information, contact Bill Hopkins, KOM, 145 Spruce St., Ottawa, ON K1R 6P1; (800) 267-0443.

**Circle 462 on reader card**

### **Queman And Outpost Integrate To Form PostPrint**

Data Center Software Inc. and ECAP Systems Inc. jointly announced PostPrint, a utility that integrates VMS PostScript printing with automated queue and forms management.

PostPrint integrates portions of Data Center Software's Queman VAX queue and forms management utility with ECAP's Outpost VMS ASCII PostScript utility. Its user interface lets you select files to be printed and, by determining if they're PostScript files, limit the selection to queues that are attached to PostScript printers.

If the files aren't already PostScript and you choose to send them to a PostScript queue, PostPrint will present a menu of printing parameters for you to choose from for the printing job. Converting plain ASCII data to PostScript lets you print these files to the PostScript queue.

For more information, contact Data Center Software Inc., 70 Herrick St., Beverly, MA 01915; (508) 922-5500.

**Circle 512 on reader card**

### **DDS-1300 DAT Offers 1.3 GB Of Tape Storage**

Symmetrical Technologies Inc. announced the DDS-1300 DAT subsystem. Announced in conjunction with the DDS-1300 was an agreement with WangDAT to supply raw DAT drives for the product.

DDS-1300 offers 1.3 GB of high-performance tape storage. It's based on a half-height 5 1/4-inch 4mm DAT drive. DDS-1300 subsystems are complete, ready-to-use and available for transparent access with Symmetrical Technologies interfaces to VAX, Sun and Macintosh computers.

The DDS-1300 is directly plug-compatible with the SCSI hardware and operating system software of Wang, HP-Apollo, Mips, and Convergent computers. It also is supported on the SPARCstation 1 and



# CAPTURE

## THE EUROPEAN DEC MARKET

### AT THE DEC USER SHOW

#### OCTOBER 2-4, 1990

The word is out among companies in the DEC market — Europe is where the growth is. Approximately 46% of Digital's worldwide revenue comes from Europe. And the proximity of a single European market in 1992 is adding fuel to the fire.

Within this booming market the DEC User Show in Olympia, London is **THE** show for the DEC industry in the UK and throughout Europe. The DEC User Show, October 2-4, 1990, is Europe's largest trade show for the DEC industry and your chance to meet 6,000 DEC users. Among the attendees 78% are involved in buying decisions, 43% have final purchasing authority, and 33% will be prepared to make a buying decision **at the show.**

It has never been simpler for U.S. companies to penetrate the European DEC market. By exhibiting at the DEC User Show, you will be face to face with qualified buyers, able to establish a business rapport with customers and dealers on the spot!

And, to make it even easier, our U.S. representative, M&T International Marketing, can provide you with all the support you need to simplify your entry or expansion into the huge European market. M&T International Marketing, located in Northern California, provides you with a local contact for all inquiries, freight forwarding arrangements, export documentation advice, billing in U.S. dollars, a full range of advertising and direct mail opportunities, and more.

**Take advantage of this enormous opportunity in 1990.  
Call our U.S. office today. (415) 366-3600 X366**

**DECUSER**  
SHOW • 1990

M&T INTERNATIONAL MARKETING  
501 GALVESTON DRIVE  
REDWOOD CITY  
CA 94063

**M&T**  
**INTERNATIONAL**  
**MARKETING**

DEC IS A REGISTERED TRADEMARK OF DIGITAL EQUIPMENT CORPORATION.

CIRCLE 310 ON READER CARD

## DIGITAL PRODUCTS

■ DEC expanded its Sales & Marketing System, a set of applications and communications capabilities that address the needs of sales and marketing organizations. New networkwide packages include communications, proposal development, presentations and pharmaceuticals, as well as a new consulting group specializing in sales and marketing solutions.

More than 500 sales and marketing applications are available, including those for market analysis and planning, headquarters sales and marketing operations, field sales operations, and customer service. Information can be shared across the network using industry-standard devices and NAS. Planning, design, implementation and management services are provided through the Enterprise Integration Services (EIS). The Sales and Marketing Solutions Consulting Group is part of EIS and works directly with customers and DEC's sales support organization.

■ DEC announced two programs that provide enhanced parts replacement services for customers who maintain their own DEC equipment.

DECmailer Plus provides 24-hour turnaround time, selection of more than 2,500 parts, parts shipped at current revision levels, return freight paid by DEC, and a 90-day warranty.

Factory Express is for parts that don't contain DEC proprietary components. It includes a five-day turnaround, selection of over 1,800 parts, parts shipped at current revision levels, return freight paid by DEC, and prices 5 percent below those of DECmailer Plus.

■ DEC's DECrouter 250 assigns the most efficient path for information to travel over the network based on factors such as cost

and network congestion. It operates with DECnet Phase IV and DECnet/OSI Phase V. It provides the functionality of the DECrouter 2000 for up to eight lines and in a variety of speeds and enables sync or async connectivity. It costs \$6,000.

The DEC ISDNcontroller 100 and VAX ISDN Software are the first complete ISDN hardware and software offerings. ISDN, a CCITT standard, enables text, speech, images and data to be carried over the same end-to-end digital telephone network.

The ISDNcontroller 100 interconnects two or more LANs and enables any MS-DOS, ULTRIX or VMS system on a DECnet/OSI network to use ISDN software applications that integrate voice, data and images. The ISDN Software, residing on the MicroVAX, controls the ISDN signal and bearer channels and lets you run DECnet-VAX networking software and other protocols. The ISDNcontroller 100 costs \$4,000. The ISDN Software license costs \$2,000.

■ DEC announced the VAXft 3000 Model 310 fault-tolerant system. In the Model 310, every component, including the backplane, is mirrored. During power failure, the in-cabinet system is kept running for up to 15 minutes by a built-in power supply. The Model 310 runs existing VMS applications without change and can be used standalone, as part of a LAN or WAN, or as part of a mixed-interconnect VAXcluster. It costs \$229,000.

DEC also announced two disk storage options and a tape drive featuring error detection and error-checking, read-back verification, and automatic switch-over. The disk options cost \$8,500 and \$9,600. The tape drive costs \$7,100.

*For more information, contact your local DEC sales office or call (800) DIGITAL.*

DECstation 3100.

For more information, contact Robb Sexton, Symmetrical Technologies Inc., 301 Gallaher View Rd., Ste. 231, Knoxville, TN 37919; (615) 690-3838.

**Circle 510 on reader card**

### **ScriptServer V3.1 Converts HP-GL Files To PostScript**

GrayMatter Software & Consulting Inc. announced V3.1 of its ScriptServer Printing System. The system interfaces and manages the local or network attachment of multiple-vendor PostScript printers to VAX/VMS systems and supports HP-GL plot language. When sent to a PostScript printer, HP-GL plot files are converted to PostScript output by the software. Conversion capability includes full support for HP-GL output to Color PostScript printers.

ScriptServer V3.1 allows software initiation and control of printer-based emulations, including HP LaserJet II, Proprinter, Diablo and DEC LNO3. You can

intermix emulation jobs with ASCII text and PostScript jobs in a job queue invoking the emulations as needed. ScriptServer operates with printers that haven't implemented the CTRL/T Adobe PostScript standard for back channel communication with the host.

Licenses for ScriptServer V3.1 cost from \$495 for VAXstations to \$3,895 for a VAXcluster.

For more information, contact Jerry Beresford, GrayMatter Software & Consulting Inc., 1300 Dexter Ave., Ste. 550, Seattle, WA 98109; (800) 477-0348.

**Circle 511 on reader card**

### **Intermetrics C Compilers Conform To ANSI Standard**

Intermetrics Inc. announced V4.0 of the Whitesmiths C compilers for the PDP-11 (RSX-11M+) and VAX/VMS. They conform to the C standard defined by the ANSI X3J11 Committee under ANS X3.159-1989.

The PDP-11 compiler is highly compat-

ible with the VAX compiler. They share a common front end that allows code written for the PDP-11 to be migrated to the VAX. A VAX-to-PDP-11 cross compiler can be used interchangeably for writing code for PDP-11 applications. The compilers provide support for programmers from the compile stage through debugging. Three kinds of compile-time type checking include a lint-style check, an ANSI/ISO standard check and a check for standard C with Whitesmiths extensions. Extensions to C have been added to V4.0, including in-line assembly to provide faster access to code written in assembly language.

The compilers cost from \$4,000 for a single license on the PDP-11 and \$3,000 for a single license on the VAX. A single license for the VAX-to-PDP-11 cross compiler costs from \$5,000.

For more information, contact Patricia Arcand, Intermetrics Inc., 733 Concord Ave., Cambridge, MA 02138; (617) 661-0072.

**Circle 461 on reader card**

## Accel8 Technology Enhances Transl8

Accel8 Technology Corporation announced Transl8 V1.2, an enhancement to Transl8, its data conversion utility that lets you share data among dissimilar computer systems. Transl8 handles text and binary files and resolves architectural differences, including byte ordering, data alignment, floating point representations, and differences in file and record organizations. In one of Transl8's many applications, a binary data file consisting of integer and floating point data is moved to and from a VAX/VMS computer system to a UNIX computer system for rapid processing.

Transl8 V1.2 adds features for handling data alignment, changing record formats and repeating data structures. It's available on VAXs, RISC systems and IBM RT systems, and runs on DECnet and TCP/IP.

Transl8 V1.2 is priced from \$2,076. Site licenses are available.

For more information, contact Barbara Eddy, Accel8 Technology Corp., 303 E. 17th Ave., Ste. 108, Denver, CO 80203; (303) 863-8088.

Circle 517 on reader card

## Persoft's LAT Implementation Uses 33 KB Of Memory

Persoft Inc. announced its SmarTerm products with built-in LAT support. Persoft's implementation is compatible with Novell Netware and takes 33 KB of memory, has increased speed and the ability to completely unload from memory. It also supports a variety of Ethernet boards including Novell, Western Digital, Racal Interlan and 3Com products.

Persoft's implementation is releasable from memory, allowing you to clear PC memory when finished with LAT. Developed with DEC's specifications, it's completely accurate and compatible with LAT from DEC, including identical command line switches. Multicasting is supported but not required, enabling Persoft's implementation of LAT to access directly a network node independent of its services.

Persoft's implementation of LAT is included free as part of every copy of SmarTerm 240 V3.1 and SmarTerm 320 V1.1. SmarTerm 240 costs \$345 for an individual package. SmarTerm 320 cost \$195.

For more information, contact Mary Bigus, Persoft Inc., 465 Science Dr., Madison, WI 53711; (608) 273-6000.

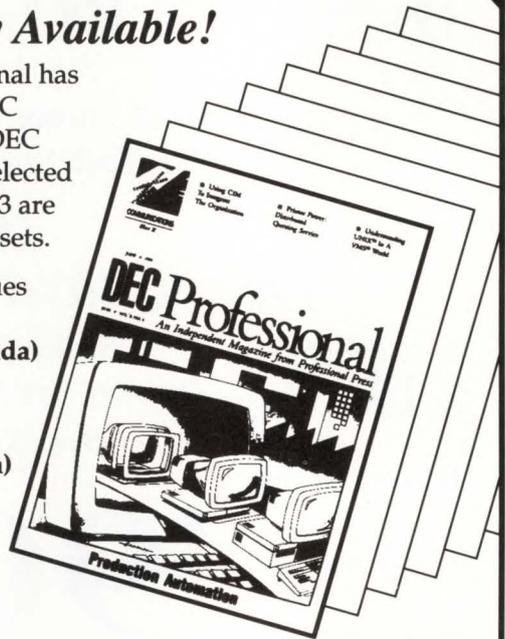
Circle 519 on reader card

# BUILD YOUR COMPUTER LIBRARY DEC Professional

## Back Issues Now Available!

Every issue of DEC Professional has important information on DEC computing and solutions to DEC computing problems. Now selected issues dating back to July 1983 are available individually and in sets.

- Sets of all 60+ available issues  
\$200 (US & Canada)  
\$380 (Outside US & Canada)
- Single Issues  
\$4 (US & Canada)  
\$7 (Outside US & Canada)
- Check below for more information on which issues are available and the topics they cover.



ORDER NOW!  
Supplies Are limited!

ORDER YOUR SET OF AVAILABLE BACK ISSUES NOW!

**FOR FAST SERVICE CALL PHYLLIS AT (215) 957-4266 with credit card information. Or complete and mail the form below.**

▼ Clip and Send ▼

▼ Clip and Send ▼

## DEC Professional BACK ISSUE ORDER FORM

**YES**, I want \_\_\_\_\_ back issue set(s) @ \$200 per set (\$380 outside US and Canada).

Check enclosed for \$ \_\_\_\_\_

Charge to:  VISA  MasterCard  American Express

Account # \_\_\_\_\_ Exp. Date \_\_\_\_\_

Name \_\_\_\_\_ Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Country \_\_\_\_\_ Telephone ( ) \_\_\_\_\_

Please send information about available back issues and topics covered.

**ALL ORDERS MUST BE PREPAID AND IN US DOLLARS.**

Make checks payable to and send to: **DEC Professional**  
101 Witmer Road, P.O. Box 218, Horsham, PA 19044-0218

Or FAX credit card orders to: (215) 957-1050  
(Outside US: 10-1-215-957-1050)

# WHO'S ON DEC.?? WE ARE!!!

## BOSTON BOARDS & SYSTEMS, INC.

55 Rear Main Street, Kingston, MA 02364

5 Years/\$5 Million+ in Annual Sales/ 10,000 Sq Ft/ Test Bays  
Full Tech Support/ Outstanding Sales Engineers!!

**(617) 585-7777**

*Our Guarantee is Our Reputation!!*

Make One More Call: Ask for Sales!!

*Urgent: MVII Buyers: Any Custom Configuration  
Over \$1,000,000 in MVIII Inventory!!*



Boston Boards  
&  
Systems



Boston Boards  
&  
Systems

# '90 PRICE REDUCTION!!! READY TO SHIP!!

### DRIVES!!

RA60	TU78
RA80	TU80/81/+
RA81	TK50/70
RA82	CONTROLLERS
SA/482	RD53
RA/70	RD54

### CLUSTER!!

HSC5XBA	SC008AA/AC
HSC5XCA	C1750
HSC50AA/CA	C1780
HSC70	CIBCA
etc.	KDB50
	KDA50

### ETHERNET!!

Too Many to List

### COMMUNICATIONS!!

DHU11	DMZ32
DHV11	DELQA
DZQ11	DEQUNA
DESTA	DEC SERVER
DESVA	DSRVA
	etc.

### DEC SYSTEMS!!

11/03	11/725
11/23	11/730
11/73	11/780
11/24	11/785
11/44	VAX8200
11/70	VAX8300
11/83	VAX8600
11/84	VAX8700

**\$2 MILLION + \*DEC inventory  
CABLES TO CPU's!! CALL TODAY!!**

**WE ALSO BUY NEW & USED EXCESS \*DEC INVENTORY**

**CALL OR FAX YOUR EXCESS HARDWARE LIST  
FOR PROMPT CASH OFFER!!!**

**SPECIAL:  
8000 SPARES**



FAX: 617-585-6211

TELEX: #920-038BBS \*Digital is a registered trademark of Digital Equipment Corporation

USED EQUIPMENT

# DEC™ Terminal & Printer Problems?



**Call The Board Repair Professionals !**

**3 Day Turnaround on VT\* & LA\* series  
Terminal/Printer Repair.**

Only **\$49** + Flat rate board  
repair charges

\*Excludes VT330, VT340, LA12, LA210

**800-257-4745**

**508-251-7800 in MA**

**508-251-4882 FAX.**



Trademarks of digital equip. corp.

Photo by Geoff Hammet

**11 School St. N. Chelmsford, MA 01863**

***Why this publication and more  
than 1,300 others let us go over  
their books  
once a year.***



Some publications, we're sorry to say, keep their readers undercover. They steadfastly refuse to let BPA (Business Publications Audit of Circulation, Inc.) or any other independent, not-for-profit organization audit their circulation records.

On the other hand, over 1,300 publications (like this one) belong to BPA. Once a year, BPA auditors examine and verify the accuracy of our circulation records.

The audit makes sure you are who we say you are. The information helps advertisers to determine if they are saying the right thing to the right people in the right place.

It also helps somebody else important: you. Because the more a publication and its advertisers know about you, the better they can provide you with articles and advertisements that meet your information needs.

BPA. For readers it stands for meaningful information. For advertisers it stands for meaningful readers. Business Publications Audit of Circulation, Inc. 360 Park Ave. So., New York, NY 10010.

# PRODUCT SHOWCASE

**BUY, SELL, RENT, LEASE,  
AND TRADE FROM YOUR  
BEST  
DEC SOURCE!**

- ★ We sell complete systems, peripherals, and modules at better prices with immediate availability.
- ★ We need to buy your excess DEC equipment now!! Turn your unwanted computer equipment into cash!
- ★ Call us about our leasing program. We can lease systems and peripherals for 1 week to 5 years.
- ★ We are buying all DEC, SUN, and APOLLO equipment.

Call Meadowlark, your full service DEC shop today!!

**MEADOWLARK ENTERPRISES**  
*Market makers in DEC Equipment since 1981*

37 High Street  
Danvers, MA 01923  
**(508) 777-4666**

FAX (508) 777-8433 800-DEC-DLER



CIRCLE 206 ON READER CARD

# Look for the logo

**It's your insurance in the used equipment market.**

When you buy, sell, or need service on used DEC equipment, look for the DDA logo - our members have been working since 1982 to promote ethical standards in the secondary market.

**dda** DIGITAL DEALERS ASSOCIATION

(313) 475-8333 ■ 107 S. MAIN STREET, SUITE 202  
CHELSEA, MICHIGAN 48118

CIRCLE 214 ON READER CARD

# VAX RENTALS

MV3600  
MV3800/3900  
VAX 6000 SERIES  
VAX 8000 SERIES

**Systems & Peripherals**

- Fast Turnaround
- Dependable Products
- Upgrade/Add-On Flexibility

6 Months • 12 Months • 24 Months

**BROOKVALE ASSOCIATES**  
**CDLA** *dda*

EAST COAST WEST COAST  
**(516) 273-7777 (206) 392-9878**

CIRCLE 201 ON READER CARD

# INFORMATION

**Rates:**

1 time: \$700  
3 times: \$650  
6 times: \$600  
12 times: \$550

Size: 1/9 page - 2 3/16" x 2 3/4"

Camera ready mechanical required.

Typesetting and composition available.

For more information call  
Mary Browarek at (215) 957-1500.

# BEST SELLING DEC RA90 DISK DRIVE\*



**NOW \$9,999.**

- DEC MAINTENANCE
- 48 HOUR DELIVERY

Call for more information and demo!  
1-800-783-RACE (7223)  
614-888-0100

**nb** SYSTEMS AUTOMATION

4795 EVANSWOOD DRIVE, SUITE 200, COLOMBUS, OHIO 43229

\*Equivalent DEC.RA90 are trademarks of Digital Equipment Corp.

CIRCLE 205 ON READER CARD

# VAX CAREERS

Winning combinations of these skills can propel **YOU** into some of the best companies on the East Coast!!!!

**DATA PROCESSING / ENGINEERING**

- FORTRAN, COBOL, C, MACRO
- RDB, ORACLE, INGRES
- VMS, ULTRIX, NETWORKING
- FACTORY AUTOMATION, PROCESS CONTROL, PLC'S
- MANUFACTURING, CIM, MRP
- PHARMACEUTICALS



**BRENDA CAREY, C.P.C.**  
Digital Recruiter

**Amos & Associates**

633-B Chapel Hill Road  
Burlington, NC 27215  
(919) 222-0231  
FAX (919) 222-1214

CIRCLE 200 ON READER CARD

# DEC

BUY & SELL  
RENT & REPAIR  
EMERGENCY  
EXCHANGES

**TRADITIONAL  
PRODUCTS  
INCLUDING PDP-8**

SALES:  
408-270-1100 800-726-0726

FAX:  
408-270-1183

2298 QUIMBY ROAD  
SAN JOSE, CALIFORNIA 95122-1356

**CRISIS** CORPORATION



CIRCLE 202 ON READER CARD

# WE RENT VAX

MV 3600/3900  
VAXstation 3100/3200/3500  
DECstation

3 to 12 month term  
Immediate delivery  
Purchase accruals

"Since 1966"

**ACS** Equipment Corporation

26319 I-45 North  
The Woodlands, TX 77380  
Fax: 713-292-1474

**1-800-288-1846**

**We buy surplus DEC/VAX**

CIRCLE 213 ON READER CARD

# Kill idle jobs

With **HITMAN**, you can free terminal lines and plug security leaks by kicking inactive users off your VAX. You set the idle time. You can protect users, images, terminals and groups. **HITMAN** sends idle users warning messages before it terminates them. It only checks interactive processes. Idle parent processes with active sub-processes aren't touched either. And, it works under VMS 5.0!

**FREE 30-day trial**

**SAIGA Systems**  
(403) 263-1151 **\$695**

CIRCLE 212 ON READER CARD

# PRODUCT SHOWCASE

**X.25 SDLC  
QLLC HDLC  
ADCCP PAD**

- C source code
- ROM-able
- Full porting provided
- No OS required



**GCOM, Inc.**  
41 E. University  
Champaign IL 61820  
(217) 352-4266

Specialists in Computer Communications  
FAX 217-352-2215

CIRCLE 221 ON READER CARD



**WESSON, TAYLOR, WELLS Software Consulting Services** was recently named by INC. MAGAZINE as #130 of America's 500 fastest-growing companies. To keep pace with our growth, we are inviting qualified **PROGRAMMER ANALYSTS** to join us in state-of-the-art projects nationwide.

1 (800) 833-2891

CIRCLE 208 ON READER CARD

Wesson, Taylor, Wells needs **Programmer/Analysts** with 2+ years experience in one or more of the following disciplines:

- |             |             |             |             |
|-------------|-------------|-------------|-------------|
| <b>UNIX</b> | <b>UNIX</b> | <b>UNIX</b> | <b>UNIX</b> |
| • Rdb       | • ORACLE    |             |             |
| • INGRES    | • DBMS      |             |             |
| • CORVISION | • SMARTSTAR |             |             |
| • FORTRAN   | • DECNET    |             |             |
| • ALL-IN-1  | • UNIX      |             |             |

Benefit from one of the finest compensation programs in the industry; relocation assistance also available. For more information, call **Tom Hesson** at 1 (800) 833-2895 or **Carol English** at 1 (800) 833-2894.

**WESSON, TAYLOR, WELLS,**  
Dept. DP-07, P.O. Box  
1587, Camden, SC 29020.



Equal Opportunity Employer

CIRCLE 208 ON READER CARD

## CLASSIFIED

### CIM POSITIONS

#### INDUSTRIAL AUTOMATION & INTEGRATION

Permanent positions nationwide utilizing VMS, UNIX, PC's, databases, controls (PLC, DCS, CNC) and networks to automate and integrate manufacturing and process facilities. Software, hardware, systems and project focused positions working with applications such as local and plant-wide integration, data acquisition and report generation; process, material handling and cell control; expert systems, MRP, SPC, CAD/CAM, SCADA, etc. All positions fee paid and require BS or MS degree. Use a headhunter who specializes!

**COVA AUTOMATION SERVICES** Phone: 614/792-6662  
5371 Shannon Park Dr., Dublin, OH 43017 FAX: 614/792-3525

### DEC to non-DEC Data Communications 1-800-SRC-DATA

Serving the Data Comm  
Market for 15 years

**Software Results Corp.**  
Columbus, OH USA

- PRO 350/380 MEMORY BOARDS
- DISK DRIVES - BIG & FAST FOR PRO
- RAM-DISK Software for Micro/RX, \*11M (+) & P/OS\*  
Call 415-420-9579  
Proto Systems  
1238 Josephine St, Berkeley, CA 94703

*buy, sell  
trade*

## LSI\* PDP\* VAX\*

### SYSTEMS & PERIPHERALS

- CPUs • MEMORIES
- DISC & TAPE DRIVES
- CRTs • TERMINALS • PRINTERS
- INTERFACES Etc.

**dce** DIGITAL  
COMPUTER  
EXCHANGE INC.

2487 Industrial Parkway West, Hayward, CA 94545  
CALL-(415) 887-3100  
FAX (415) 887-5590 TLX 709536

dba

\* Registered trademark of Digital Equipment Corporation

**C LANGUAGE CONSULTING AND EDUCATION** by noted **DEC PROFESSIONAL** columnist. Also other languages and packages on RSX, VMS, RSTS and MS-DOS, including DBMS and DECnet. Applications experience includes real-time, process control, engineering, scientific and commercial systems. Rex Jaeschke. (703) 860-0091.

**Disks, Tapes, TK50's converted.** Most DEC cartridges, formats converted to your format, operating system. RT11, RSTS, RSX11M, VMS, MS-DOS, Macintosh supported. Low prices. Accuracy. Call for quotes. Precision Computer Methods Inc. 708/393-6478.

### VAX SERVICES

#### ■ TRAINING, INSTALLATION, SALES AND SUPPORT

- WordPerfect 5.0 for VAX/VMS
- WordPerfect "Office" for VAX/VMS
- WordPerfect PlanPerfect for VAX/VMS
- WordPerfect All-in-One Integration
- WordPerfect upgrade 4.2 to 5.0
- VMS System Management
- VMS Installation

#### ■ EXPERTS IN:

- Office Automation/Feasibility Studies
- Document Management Systems
- VAX/VMS, Novell
- Networking, VAX-PC Connectivity

#### ■ INSTALLATION

#### ■ SOFTWARE DEVELOPMENT

#### ■ DATA CONVERSION

#### ■ HARDWARE MAINTENANCE

#### ■ DATA WIRING (Unshielded Twisted Pair, Thin Wire, ETC.)

#### ■ TIMESHARING

#### ■ SITE SUPPORT/OUTSOURCING

#### ■ EXECUTIVE PLACEMENT

**Omnicomputer, Inc.**  
1440 Broadway  
New York, NY 10018

Tel. (212) 944-9230  
Fax (212) 869-2846

# ADVERTISERS INDEX

Reader Service Number	Page	Reader Service Number	Page
102 a/Soft Development	126	142 Maintech	119
178 Access Technology	1	176 McDonnell Douglas Field Service	117
343 Adminisoft, Inc.	139	260 MESA Technology Corp.	83
101 AI Corporation	121	143 Micro Technology, Inc.	11
234 Alisa Systems	115	144 Micro Technology, Inc.	27
103 Allied Telesis	105	232 Microterm	123
105 Applied Information Systems	139	311 Mitek Systems	78-79
334 ASA/Omtool	60	302 National Instruments	44
296 BGL Technology Corp.	56	147 Network Research Corp.	23
316 BRAINTREE Technology, Inc.	143	278 Northgate Computer Systems	94-95
189 Burr-Brown Corporation	61	Oracle Corporation	29
242 Camintonn Corporation	49	149 Oregon Software	86
179 Chrislin Industries	127	150 Pacer Software Inc.	113
181 Clearpoint, Inc.	7	304 Park Software	80
108 Cognos Corporation	55	339 Parse Incorporated	50
277 Computer Methods Corp.	133	152 Persoft, Inc.	5
188 Computer Methods Corp.	144	241 Polestar Corporation	125
112 Contemporary Cybernetics Group	17	295 Precision Visuals, Inc.	73
114 Data Processing Design	21	157 Process Software Corporation	106
115 Datability Software Systems	8-9	253 Programmed Intelligence Corp.	107
245 Dataram Corporation	71	334 Racal Interlan	45
180 Datasouth Computer Corp.	100-101	337 Ramtek	57
310 DEC User Show & Conference	151	158 Raxco Software, Inc.	89
Deft, Inc.	141	231 Recital Corporation	97
Digital Equipment Corporation	12-13	SAS Institute, Inc.	77
Digital Equipment Corporation	74-75	Seagate Technology	65
Digital Equipment Corporation	146-147	159 SmartStar Corporation	I.F.Cover
120 Diversified Computer Systems	31	233 Softool Corporation	148
290 DMG	6	324 Software Partners/32, Inc.	33
122 Emulex Corporation	36-37	193 Spider Systems	93
125 Equinox Systems, Inc.	2	160 SPSS Inc.	81
344 ESS	86	161 Summus Computer Systems	25
300 EWC	87	162 Synctronics	22
194 Evans, Griffiths & Hart	114	163 Synergy Software	112
126 Executive Software	62	164 System Industries	I.B.Cover
336 Fairchild Data Co.	43	165 Talaris Systems Inc.	51
210 Falco Data Products	53	166 Target Systems	144
128 GEJAC, Inc.	138	TGV	supplement
131 Gold Key Electronics	67	331 Thursby Software Systems, Inc.	131
132 GrayMatter Software	133	346 Tom Software	59
305 Image Systems Inc.	135	169 Transitional Technology, Inc.	85
133 Interactive Software Systems	70	251 TriLogic Corp.	137
314 Interop, Inc.	159	258 Unbound, Inc.	142
136 Intra Computer	135	279 UNIX International	129
138 ITAC Systems, Inc.	18	171 Visentech Systems Inc.	109
139 KEA Systems Ltd.	35	340 W. Quinn Associates, Inc.	67
270 Kingston Technology	99	172 Walker Richer & Quinn	91
274 Lago Systems	19	173 Walker Richer & Quinn	111
140 Lantronix	103	303 Western Union Corp.	63
141 Logicraft, Inc.	15	345 Winchester Systems	69
289 LXE, Inc.	41	175 Xyplex, Inc.	B.Cover

More information about these advertisers is available electronically on our Automated Reader Information Service Bulletin Board (ARIS/BB). Dial (215) 957-1000; Southern California (818) 577-9100; Northern California (415) 873-2135; Massachusetts (617) 863-5010.

## ADVERTISING SALES OFFICES

Jeffrey S. Berman, Associate Publisher  
(215) 957-1500

Mark Durrick, Eastern Regional Manager  
David Beardslee, Western Regional Manager

### MID-ATLANTIC (215) 957-1500

Mark Durrick, Eastern Regional Manager  
101 Witmer Road  
Horsham, PA 19044  
FAX (215) 957-1050

### SOUTH-ATLANTIC (215) 957-1500

Mark Durrick, Regional Sales Manager  
Connie Mahon, Account Executive  
101 Witmer Road  
Horsham, PA 19044  
FAX (215) 957-1050

### NEW ENGLAND (617) 861-1994

Alonna Doucette, Regional Sales Manager  
Michael Barth, Account Executive  
238 Bedford St., Ste. 3  
Lexington, MA 02173  
FAX (617) 861-7707

### MIDWEST & SOUTH (708) 747-0600

Richard E. Julius, Regional Sales Manager  
Kristi Wesslen, Account Executive  
20180 Governors Hwy., Suite 101  
Olympia Fields, IL 60461  
FAX (708) 747-0707

### NORTHERN CALIFORNIA & NORTHWEST (415) 873-3368

Lee D. Salem, Regional Sales Manager  
Judy Courtney, Account Executive  
903 Sneath Ln., Ste. 220  
San Bruno, CA 94066  
FAX (415) 873-6608

### SOUTHERN CALIFORNIA & SOUTHWEST (818) 577-5970

David Beardslee, Western Regional Manager  
Karin Altonaga, Regional Sales Manager  
Mary Marbach, Account Executive  
1010 E. Union St., Ste. 101  
Pasadena, CA 91106  
FAX (818) 577-0073

### CANADA/INTERNATIONAL (215) 957-1500

Helen B. Marbach, Regional Sales Manager  
101 Witmer Road  
Horsham, PA 19044  
FAX (215) 957-1050

(215) 957-1500

Beth Zanine, Advertising Administrator  
Mary Browarek, Classified Ad Manager  
Cathy Dodies, List Rental Manager  
Jane L. Hope, List Rental Sales

# DEC Professional

# I know it works— I saw it at INTEROP!

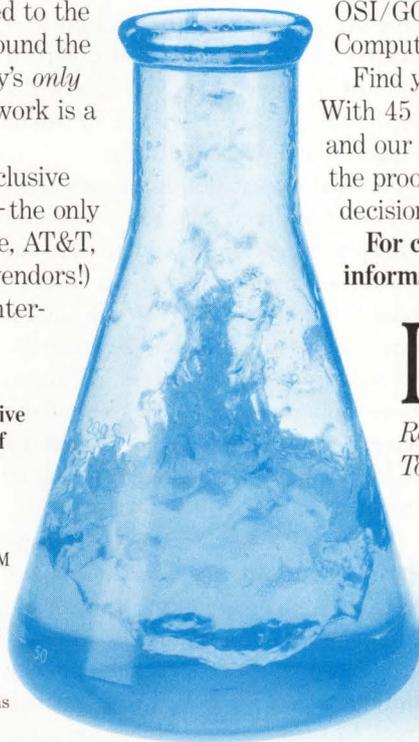
More than an exhibition of practical multivendor network solutions, INTEROP 90 is a live, hands-on laboratory where you can test the products of your 175 most important vendors. They're all connected to the show network and to internetworks around the world. In fact, INTEROP is our industry's *only* exhibition where connection to the network is a requirement for participation!

And you won't want to miss our exclusive Solutions Showcase™ Demonstrations—the only place where you'll find IBM, DEC, Apple, AT&T, and Sun Microsystems (and 170 other vendors!) working together to demonstrate the inter-

operability of their newest products and services. INTEROP 90 special demonstrations will feature network management, new RBOC Services, ISDN, FDDI, OSI/GOSIP, 10 Base T, X.400, Distributed Computing and the X Window System.

Find your formula for success at INTEROP 90. With 45 conference sessions, 21 in-depth tutorials, and our exclusive hands-on exhibition, you'll get the proof you need to make informed buying decisions!

**For complete program details and registration information call 1-800-INTEROP now!**



## INTEROP 90

*Real-World Solutions for  
Today's Networks*

**Test the products of 175 exhibitors at our exclusive Solutions Showcase™ Demonstrations—the proof you need to make informed buying decisions.**

3 COM Able Computer Communications AdvintechAIM

South Cabletron CERFnet Codenoll Computer

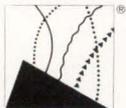
Communications DAVID Systems Digital Analysis

Fibermux FTP Software, Inc. Hewlett-Packard Hummingbird Communications InformationWeek InterConnections, Inc. International Systems Integrators

Kalpana, Inc. LAN Technology Micro Technology Mitek Systems NCR Comten, Inc. Network Applications Technology Network Monitoring, Inc. Network Resources

Corporation Network Systems Novell Inc. NYNEX OSI Network Management Forum Performance Systems International Process Software Corporation

Racal/Interlan Retix SBE SNMP Research Star Tek Synoptics TCL, Inc. Telebit Corporation Themis Computer Ultra Network Unitech Software, Inc.



**INTEROP 90**

**Phone or Fax Us Now! 1-800-INTEROP Ext. 29 Fax 415 949-1779**

5th Interoperability Conference & Exhibition

October 8-12, 1990

San Jose Convention & Cultural Center

San Jose, California

© 1990 Interop, Inc. 480 San Antonio Road, Suite 100 Mountain View, CA 94040 1-800-468-3767 Ext. 29

**CIRCLE 314 ON READER CARD**

## BACK END

John C. Dvorak

# The Name Game

The computer marketplace is confused not only by changes in technology, but also by changes in terminology. Cache, CISC, folder, 486, icon, LAN, mouse, parallel processing, RISC and window are terms that were unknown to the desktop user five years ago. Although it seems that new terms should be confusing to the hapless user who feels he can't keep pace with technology, the opposite is true.

New terms provide a clue that a technology is changing. They aren't developed for old aspects of a technology. They indicate change and make that change easy to follow.

An example of a basic change is the title DP manager. This evolved into MIS manager and then IS manager. These changes in nomenclature reflect a basic change in the environment. If you noticed that MIS is now IS, then a little research will indicate some change in function or environment.

This change in function, no matter how trivial, is always reflected by a change in nomenclature. With technology, a new term means that something new is happening. People who follow the industry are often intimidated by names and acronyms they've never heard before. I spend much of my time reading computer literature, and two or three times each day I find a new term or buzzword. I wonder who dreams up these terms. For example, who coined TSR — terminate and stay resident — or GUI — graphical user interface?

TSRs used to be called memory-resident. The design of the programs changed when people began loading more than one or two into their systems. The nature of the programs changed,

and they had to live not only within the computer, but also with one another. It was then that the nomenclature changed from memory-resident to TSR, indicating some sort of basic transformation.

Some terms have disappeared. Few computer writers now write about microcomputers or even PCs. As the industry oriented itself toward the business user, the machines came to be called desktop computers — the desk being the primary piece of furniture in a business environment. If you observed the terminology change, you observed a basic change in the nature of small computers and who uses them.

Personal workstation is the new term for microcomputer. This term is needed as the basic desktop computer takes on a tower configuration that sits near or under the desk. It's hard to call such a thing a desktop computer. Because the terminology is never reversed, the terms PC and microcomputer are out of the picture. A minor change in technology produces a new term to make it easy to follow.

The word terminal has almost disappeared. Diskless workstation defines today's terminal, indicating some basic change in the terminal and the relationship between the terminal and the computer. We've gone from a small screen to a large screen, color, and some inherent processing power.

If we're to carry these observations to a logical end, we must assume that if a change in technology is to be successful, a change in terminology is required. If this doesn't occur, then subconsciously you assume that the technology hasn't changed. Anyone with experience in the industry senses the connection between changes in terminology and changes in technology. Therefore, you suspect a level of old-fashioned stodginess when

discussing COBOL or multiuser computing, for example. Even mainframe sounds clunky.

Ask yourself which sounds newer — mainframe or minisupercomputer? COBOL or C++? Now what if you heard something such as COBOL/99 or X-COBOL or any other provocative new name? It would be hot, right?

While some think this is ludicrous, it's the only way to communicate change. While marketing people, gurus and writers try to invent new terms to add to the list of new product names, it's the market that accepts or rejects the new term and technological change. HyperCard is a term that caught on, while desktop video is a term that languishes. Multimedia caught on, but hypermedia didn't. Lotus-compatible caught on, but TopView-compatible died.

Many aspects of this observation are worth studying. If a company is advancing the state of the art in some established technology, it should be aware of the necessary terminology change that's required to signal the change. Vendors of a jazzy new COBOL compiler, for example, should rename COBOL. If they don't, we'll figure that nothing has changed. The vendor will complain about lack of respect and recognition.

But we should be the ones complaining. It's the vendor's job to follow the pattern of this industry and let us know that things have changed. If nothing has changed *except* the name, then the vendor will be ridiculed. Conversely, we assume that the reason the vendor didn't change the name was to avoid such a fate. Complainers can't win unless they do some work, follow the rules and give us something better *and* a new name. ■



## Introducing Our New 3½-inch Disk Drive. Because Packing More Capacity Into Less Space Has Always Been Impressive.

Once again, System Industries rises above the rest with new technology solutions. Our new SI350\* Series data storage subsystems come with a 3½-inch disk drive that packs higher storage capacity into less space. The results are indeed impressive.

The trend in data storage is toward smaller and smaller drive assemblies with high capacity. And the SI350 leads the way with 320 MB of formatted capacity. This small form factor is ideal for the new breed of high performance workstations from DEC and Sun, as well as for high-speed small scale systems such as the MicroVAX II and MicroVAX 3000 series.

But the SI350 also gives you flexibility. The kind that lets you pop the system inside the cabinet of a workstation, utilize two-drive shoebox packaging, or rackmount.



There's even a high-speed controller available for Q-bus MicroVAX and VAXstation systems.

The SI350 also gives 12.5 ms average seek time and 19.45 access time. That means less waiting and no bottlenecks. For superior reliability, it has a proven 150,000 hours MTBF rating. And don't

forget our two-year on-site warranty.

Without a doubt, the SI350 Series packs more of everything into a small space. Just call us at **800-333-2220**. We might send you a big apple just to prove it.

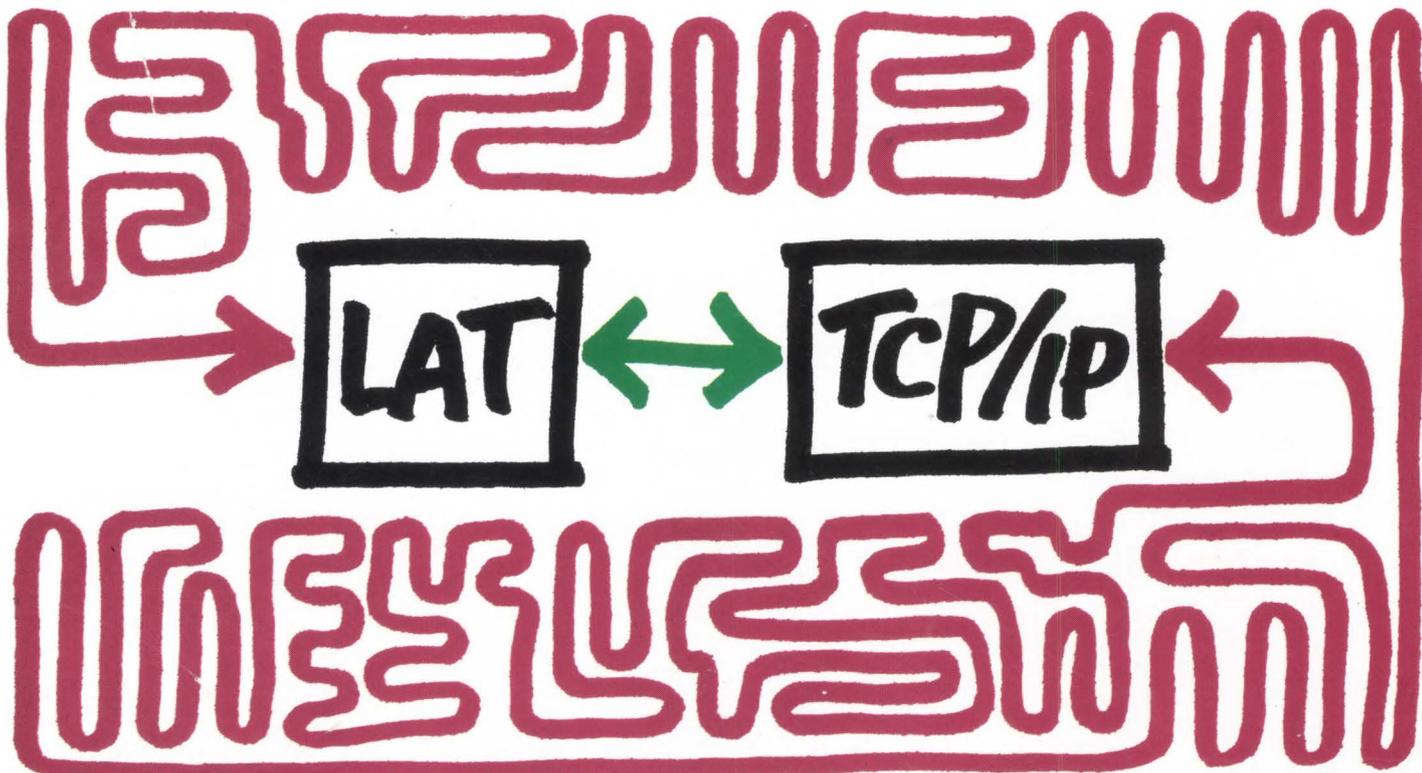
 **SYSTEM INDUSTRIES**

\*SI350 disk drives are manufactured by IBM. DEC, MicroVAX and Q-bus are trademarks of Digital Equipment Corp. IBM is a trademark of International Business Machines Corporation.

**CIRCLE 164 ON READER CARD**

The XYPLEX route.

The other route.



# WHAT'S THE SHORTEST DISTANCE BETWEEN TWO PROTOCOLS?



Connecting LAT to TCP/IP used to be amazingly complex. Then along came Xyplex®. The first company to offer a full line of concurrent, full-featured LAT™ and TCP/IP terminal servers—all backed by an unprecedented 3-year warranty.

How has Xyplex managed to outdistance other companies? By offering concurrent protocol support for DEC™ and UNIX™ hosts, including LAT/TELNET/RLOGIN, for starters. By providing standard UNIX and LAT management tools, too. Not

to mention, multiple loading options—from any VAX/VMS™, ULTRIX™ or UNIX host or from the terminal server itself.

And then there's our user-friendly interface—for UNIX hosts via UNIX style commands, for LAT hosts via a DECserver® compatible user interface. Including Line Editing and Command Recall.

Consider, too, Xyplex innovation. We were the first to offer the seamless integration of LAT and TCP/IP. With features like SLIP, Rotary Connections, Security, Simple Menu Interface and

more. Plus the sharing of printers between UNIX and LAT hosts.

Of course, all this is only part of the reason why Xyplex terminal servers are the best way to get from LAT to TCP/IP.

For more information call  
**1-800-338-5316**  
 Or write, Xyplex, Inc., 330 Codman Hill Road,  
 Boxborough, MA 01719

Name \_\_\_\_\_  
 Title \_\_\_\_\_  
 Company Name \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

**X**  
**XYPLEX**

330 Codman Hill Road, Boxborough, MA 01719

CIRCLE 175 ON READER CARD