



ULTRIX™

VCL/EDT+

NOVEMBER ■ 1989

DEC

\$4.00 ■ VOL. 8, NO. 12

■ Why Online Transaction Processing Is In Your Future

■ An In-Depth Look At The Digital Storage Systems Interconnect (DSSI)™

■ "Vacsimile" — Techniques For Tying Your VAX™ To Your Fax

# Professional

*An Independent Magazine from Professional Press*

**MAINFRAME  
VAX!**



**High-Volume Computing**



For Our Free Offer:  
Agree to evaluate SmartStar® for your  
company by stopping by DEXPO West  
booth 1260 or calling 800-235-5787



## How To Really Get Digital's "Free" Rdb For Free!

### Our Free Offer

Agree to evaluate SmartStar® by calling us toll-free at 800-235-5787. We'll then quickly send you for evaluation: run-time Rdb media, plus the complete SmartStar application development environment, including the full documentation set. And even if you don't buy SmartStar, you can keep run-time Rdb!

Cost: \$0.00 (plus your time for evaluation)

*Note – Since there appears to be some confusion about what's really free, here are the facts: (1) If you have a current VMS 4.7 or above license, you are now licensed to use run-time Rdb at no charge. (2) You first have to obtain the media before you can use it.*

What's our motivation? We are so convinced you'll see the extraordinary functionality of SmartStar teamed with Rdb that we will happily absorb the costs, and really provide Rdb-RT to your doorstep absolutely free! SmartStar is one of today's "big three" in the VAX/VMS 4GL marketplace, with more than a 25% market share;\* but more importantly to you:

*SmartStar Corporation is a Digital CMP partner authorized to distribute run-time Rdb media . . . the only company that is making you this "package" offer.*

### Other Software Vendors Free Offer

Other software vendors don't even tell you how to get "free" Rdb-RT. Just to show you that we are serious about providing customer service, we'll give you that information also. . . even if you decide to evaluate one of the other guys first. Rather than you having to track down the Digital order number for the Rdb-RT media, here it is (for a TK50) with our compliments: QA358AA-H5.

Cost: \$755.00 (plus your time for evaluation)

If you're a serious VMS developer, we know your evaluation of SmartStar and run-time Rdb will revise some long-held (and hard-sold) opinions regarding database engines and what levels of productivity you have a right to expect. Act now, and get a head start on the future of Digital-based application development!

 **SmartStar**®  
Digital-Based Application Development

SmartStar Corporation  
120 Cremona Drive, P.O. Box 1950  
Goleta, CA 93116-1950  
(805) 685-8000 (800) 235-5787

**digital**™ Cooperative  
Marketing  
Program

DPRA 11/89

\*Source: Computer Intelligence market report.

VAX, VAX/VMS and Rdb/VMS are trademarks of Digital Equipment Corp.



# Our New SDA900 DEC Storage Arrays: More Capacity. Less Complexity.

Emulex introduces more room for reliable storage, and less room for worry! Our new SDA900 Series Subsystems feature the first third-party drives to integrate DEC's Standard Disk Interface *right into the drives.*

By eliminating the external protocol converter, the drives are completely self-contained. Result: More gigabytes per square foot than RA-series drives, plus lower costs and faster access times.

With fewer boards and connection components to contend with, the SDA900 is more reliable as well. The pre-formatted drives are easily installed and the new intelligent control panels include diagnostic, operational and security modes.

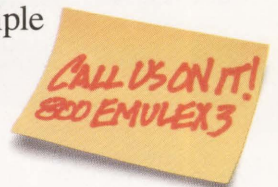
Emulex's advanced SDA900 Subsystems are



available in 4-drive, 12-drive and 18-drive configurations, with formatted storage over 17GBytes. For information,

call Emulex toll free. It's one call to one company to handle multiple product needs.

Visit us at booth #1300  
DEXPO West 89  
Disneyland Hotel  
Anaheim, CA  
Nov. 7-9 1989



Emulex Corporation, 3545 Harbor Blvd., Costa Mesa, CA 92626, (800) EMULEX-3 or (714) 662-5600 in California  
North American Offices: Anaheim, CA (714) 385-1685; Dublin, CA (415) 829-1170; Roswell, GA (404) 587-3610; Burlington, MA (617) 229-8880;  
St. Louis, MO (314) 569-7792; Saddle Brook, NJ (201) 368-9400; Reston, VA (703) 264-0670; Schaumburg, IL (312) 605-0888; Canada (416) 673-1211  
International Offices: Wokingham (44) 734-772929; Munich (49) 89-3608020; North Sydney (61) 2-957-1669; Paris (33) 134-65-9191  
National Distributors: Hamilton/Avnet Computer (800) 426-7999; Pioneer Technologies Group (800) 227-1693;  
Wyle Laboratories Electronics Marketing Group (800) BUY WYLE



# Buying RA 90's? Buy Ours and We'll Give You an HSC 8mm for FREE

1 9 9 0  
digital review  
**TARGET  
AWARDS**  
N O M I N E E

Finally there is a way to have your storage and backup too! Micro Technology introduces the 6200 Storage System, a one-to-one relationship of storage to backup, at no extra cost. So, if you've been concerned with your increasing storage requirements, the backup comes for FREE.

There are only three things you need to do with Micro Technology's HSC-compatible high-capacity storage and backup solutions: **Plug them in. Let them run. Leave them alone.**

At least that's what our customers say... people like Dupont, Western Digital and Ford Aerospace. You see, they know Micro Technology high-capacity storage arrays are designed and tested with such rigor, they can deliver 40,000 hours of high performance without fail. What's better, there's no preventative maintenance required. Starting at 2.0 gigabytes and stacking up to 20 gigabytes per footprint, they just sit there and work—no problem.

Just like there's no problem backing up every single gigabyte when no one is around. Micro Technology's HSC-compatible 8mm tape cartridge subsystem, the MA-24, can do it all, unattended for 20,000 hours without fail. And that's a long, long time. Particularly when you can back up 32 gigabytes in just about 7 hours.

So call Micro Technology when it's time to add gigabytes, not worries about backup. We'll provide the **Total Solution** and the backup for FREE. For more information call us at 800-999-9MTI.

"Visit us at DEXPO West Booth 1434"



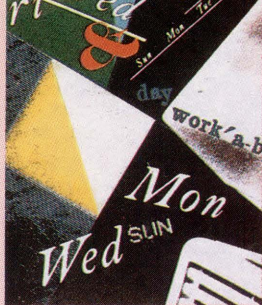
## Micro Technology

5065 East Hunter Avenue  
Anaheim, California 92807  
1-800-999-9MTI

Micro Technology's offer is based on a MDI 476 PLUS System at standard prices. Offer effective October 15 through December 31, 1989. RA90, HSC are registered trademarks of Digital Equipment Corporation.

CIRCLE 331 ON READER CARD





DEC Professional

# C O N T E N T S

NOVEMBER 1989

VOL. 8, NO. 12

## HIGH-VOLUME COMPUTING

### 38 OLTP IS IN YOUR FUTURE

by Philip A. Naecker

Within the next few years, the number and size of OLTP applications are likely to grow sharply for both small and large organizations. Digital seems to view OLTP as one of the most dominant if not *the* dominant form of computing in the 1990s.

### 50 MAINSTREAMING THE SUPERCOMPUTER

by Peter Gregory

Researchers and entrepreneurs now are becoming aware of opportunities to apply supercomputer levels of performance to many areas of information processing. What are the hurdles to overcome, and what are the implications of mainstreaming supercomputer performance?

## FEATURES

### 36 ARIS/BB: ONLINE TEXT-RETRIEVAL GUIDE

by Anne Schrauger

Current subscribers now can access issues of *DEC PROFESSIONAL* online with the ARIS/BB Text-Retrieval System. A text-search capability makes it easy to find topics of interest.

### 62 STORAGE: DSSI IN DEPTH

by Richard Wrenn and Fernando Zayas

Since October 1988, Digital has announced several products that use a bus called the Digital Storage Systems Interconnect (DSSI). This article provides a comprehensive look at DSSI, including detailed information about storage devices, adapters and DSSI performance.

### 76 SETUP: PROFESSIONAL MOVE

by David B. Miller

Do you need to relocate your computers? Careful planning is the key, as the recent move of the Professional Press VAXcluster™ to our new facility proves. Here's a step-by-step look at how mission-critical machines were relocated to their new address.

### 80 COMMUNICATIONS: VACSIMILE!

by Lynn Haber

Tying your VAX to a fax can be a sound decision. Feature-rich devices and network offerings let the system manager decide how fax can best serve the organization.

#### ON THE COVER:

Digital's new VAX 9000 mainframe is a key element in the company's product strategy for the 1990s. For an interview with Robert M. Glorioso, Digital's vice president of high performance systems, see page 118. Photo courtesy Digital Equipment Corporation.

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





# CONTENTS

Continued from page 3.

## DEPARTMENTS & COLUMNS

### Publisher

by Carl B. Marbach

DEC's Technology Leap ..... 10

### Editorial

by Dave Mallery

Packaging For The Next Decade ..... 14

### Digital Watch

by Evan Birkhead

DEC's Mainframe Power Play ..... 116

### Workstations

by David W. Bynon

Workstations For OLTP ..... 122

### Networking

by Bill Hancock

Ethernet Performance Truths ..... 124

### Field Service

by Ron Levine

Service Selections: DEC, TPMs  
And Self-Maintenance ..... 130

### DCL Dialogue

by Kevin G. Barks

Taking The DECwindows™ Plunge ..... 140

### Let's C Now

by Rex Jaeschke

VAX C V3 And The  
ANSI Standard, Part 2 ..... 142

### The Mac Connection

by Al Cini

Beyond File Servers ..... 152

### Back End

by John C. Dvorak

Where's Your Laptop? ..... 192

Letters ..... 16

Product Watch ..... 20

ARISTALK ..... 32

Products ..... 162

Used Equipment ..... 185

Product Showcase ..... 187

Classified ..... 189

Advertisers Index ..... 190



### From The Lab

#### Is It UNIX™ or VMS™?

by David B. Miller ..... 90

If VMS commands are the ones you know best but you have to contend with the ULTRIX universe, Boston Business Computing's EDT+ and VCL may be what you need to get over the learning hurdle.

#### Speeding Your Drive

by David B. Miller ..... 98

Are you disappointed with your tape drive performance? Touch Technology's Dynamic Tape Accelerator provides relief for slow tape drives and helps reduce time spent on tape operations.

#### Printing Across

##### Multivendor Environments

by Barry Sobel ..... 105

If your company is trying to standardize on a single type of laser printer but can't find one compatible with its PCs, VAXs, Hewlett-Packard systems and IBM mainframes, consider Xerox Corporation's 4045 Laser CP Model 150 laser printer. It's ideal for multivendor environments.

#### Welcom Planning

by George T. Frueh ..... 110

All projects have one common need: the properly timed execution of many individual activities. Welcom Software Technology's Open Plan is an efficient and easy-to-use software package that helps meet the needs of projects and project managers of all types.

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, P.O. Box 218, Horsham, PA 19044. COPYRIGHT© 1989 by Professional Press, Inc. All rights reserved. No part of this publication may be reproduced in any form without written permission from the publisher.





# KNOCK, KNOCK. KNOCK, KNOCK, KNOCK, KNOCK, KNOCK, KNOCK, KNOCK, KNOCK, KNOCK, KNOCK, KNOCK.

Presenting a host of opportunities to tap powerful DEC® mainframe and mini computer software from a PC. SmarTerm® 320 for precise text terminal emulation and SmarTerm 240 Version 3.0 for vivid graphics terminal emulation are both available in Multi-User versions.

Now individual PCs, and PCs networked on LANs or WANs, can run SmarTerm software to outperform dedicated terminals. So in both worlds, SmarTerm gives you the best.

SmarTerm 320 and 240 will use shared printers, modems, files, and communications servers on most networks. Multi-User versions can be loaded on a file server and shared.

For text terminal emulation, SmarTerm 320 has raised industry stan-

dards by faithfully duplicating DEC VT320® features and functions for the PC. Exact support for VT320 features including 25th status line, true double-high, double-wide characters, and 132-column displays is provided.

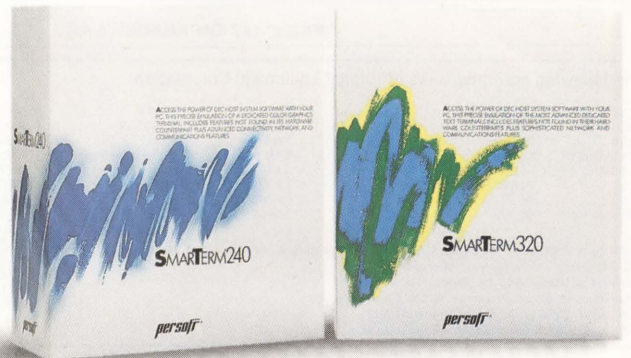
SmarTerm 240 incorporates advanced VT340 color graphics terminal features for 16 color ReGIS® graphics. Rubber band cursor actions, complex filled regions, 3-D graphics, and 132-column displays make it the VT240 emulation that gives you more than a VT240 terminal.

Robust features for PC-to-the-rest-of-the-World communications, an interface designed to speed learning and cut training costs, convenience features for versatility, plus free technical support backing you up, combine to make SmarTerm an obvious path to take.

To access all the power of DEC hosts, we'll open the doors. RSVP today by calling 1-800-EMULATE.

**persoft®**

**ACCESS THE POWER YOU NEED.**

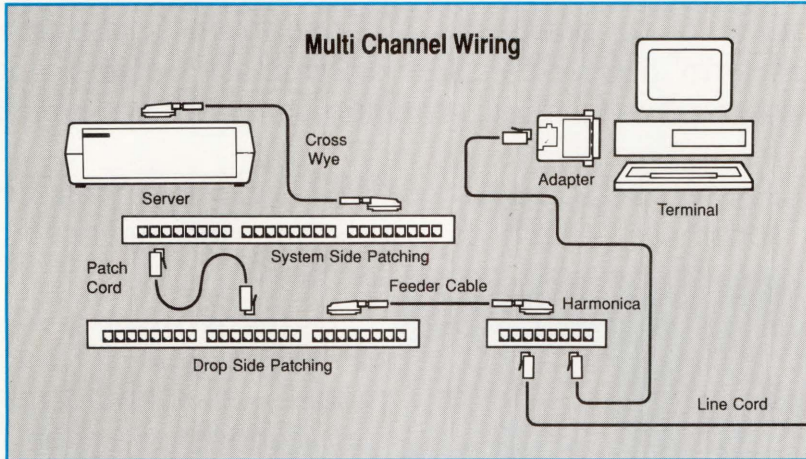




TechTip No.

7

# DECconnect Solutions



25 Pair multi channel cables consolidate individual wiring channels. These channels run from the wiring closet to the feeder split (harmonica) located in the office area. Perfect for use in open/modular office environments. Greatly reduces installation costs, provides versatility, and restores order to your communications wiring system.



**MMJ** is the DEC standard data jack style. The unique off-set style prevents users from plugging data equipment into a voice outlet. All **MOD-TAP**'s products are available with the **MMJ** option and are compatible with DEC's wiring system.

**MOD-TAP** offers innovative solutions for all your communications wiring needs. Call today for your **FREE** copy of our new 1989 Applications Catalog.

## MOD-TAP System

The **MOD-TAP Communications Wiring System** is a modular solution for voice and data building wiring. **MOD-TAP System** is not biased towards any particular manufacturer's equipment or Local Area Network design.

Harvard, MA USA	508-772-5630	FAX 508-772-2011
Southampton Hants, UK	44 703 701919	FAX 44 703 702147
Le Chesnay, France	33 1 30575707	FAX 33-1-30481298

Trademarks are the property of their respective owners.

CIRCLE 147 ON READER CARD

The following are trademarks of Digital Equipment Corporation:

A-to-Z	DECgraph	DECwindows	HSC	LSI-11	Q-bus	VAXcluster
ALL-IN-1	DECmail	DELNI	IAS	MASSBUS	Rainbow	VAX DIBOL
CDD	DECmate	DEQNA	IVIS	MicroPDP-11	RALLY	VAXELN
DATARETRIEVE	DECnet	DIBOL	LAN Bridge	MicroPower/Pascal	Rdb/VMS	VAXFMS
DDCMP	DECaytem-10	DNA	LAT	MicroVAX	ReGIS	VAXlab
DEC	DECSYSTEM-20	Eve	LASO	PDP	RSTS/E	VAX LISP
DECcalc	DEC/Test	FMS	LA100	PDT	RSX	VAXpc for VMS
DECconnect	DECUS	GIGI	LQP02	P/O/S	RT-11	Software
					TEAMDATA	VAX SCAN
					TOPS	VAXserver
					ULTRIX	VAXstation
					UNIBUS	VMS
					VAX	VT
					VAXBI	Work Processor
						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.

# DEC Professional

Publisher: Carl B. Marbach  
 Editorial Director: R.D. Mallery  
 Executive Editor: Linda DiBiasio  
 Executive Design Director: Leslie A. Caruso

## Editorial

**MANAGING EDITOR** Lou Pilla  
**SENIOR TECHNICAL EDITOR** David B. Miller  
**SENIOR EDITOR** Evan Birkhead  
**ASSISTANT EDITORS** Pamela F. Fullerton, Eric Schoeniger  
**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** Bill Hancock  
**TECHNOLOGY EDITOR** Philip A. Naecker  
**ULTRIX EDITOR** Philip E. Bourne, Ph.D.  
**UNIX EDITOR** Elaine L. Appleton  
**WORKSTATIONS EDITOR** David W. Bynon  
**EDITORIAL SYSTEMS COORD.** Anne Schrauger  
**EDITORIAL ASSISTANTS** Nadina R. Chapman, Lea Smith (Buyers Guide)  
**CONTRIBUTORS** Lynn Haber, Peter Gregory, Richard Wrenn, Fernando Zayas

## DP Laboratory and Testing Center'

**MANAGER** David B. Miller  
**TECHNICAL EDITOR** George T. Frueh  
**REVIEW EDITORS** Bill Davis, Tom Davis, Sheldon Green, Miles B. Kehoe, Del Lukens, Joel Martin, 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  
**PRODUCTION ARTIST** Patricia Kraekel  
**TYPE/PRODUCTION COORD.** MaryEllen Coccimiglio  
**ADVERTISING BOOKING COORD.** Lori Goodson  
**ADVERTISING PROD. COORD.** Suzanne Garr  
**TRAFFIC/PRODUCTION ASST.** Kim Macheski  
**PROMOTIONS MANAGER** Timothy M. Kraft  
**GRAPHIC DESIGNERS** Carolyn J. Brown, Richard Kortz, Thomas Owen, Sue Ann Rainey

## Circulation

**CIRCULATION DIRECTOR** Carrie Eisenhandler  
**CIRCULATION MANAGER** Betsy Ellis  
**FULFILLMENT MANAGER** Margie F. Pitrone  
**CIRCULATION DBA** Rebecca Schaeffer

## Marketing

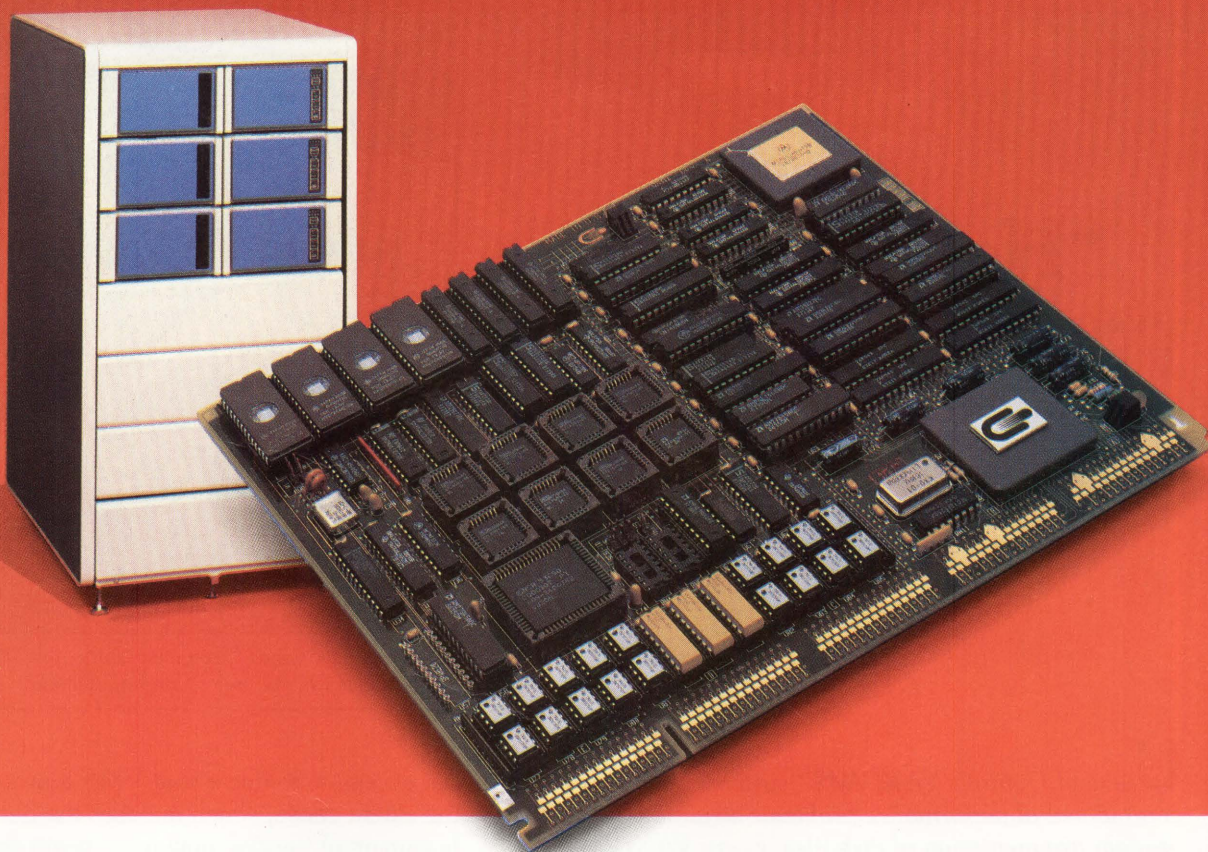
**DIRECTOR OF MARKETING** Mary Wardlaw  
**MARKETPRO NEWSLETTER EDITOR** Colleen Rogers  
**SENIOR PROMOTION WRITER** James Jordan  
**TRADE SHOW MANAGER** Peg Schmidt  
**PROFESSIONAL PRESS, INC.**

**PRESIDENT** Carl B. Marbach  
**VICE PRESIDENT** R.D. Mallery  
**VICE PRESIDENT** Peg Leiby  
**VICE PRESIDENT** Helen B. Marbach  
**CHIEF FINANCIAL OFFICER** Bruce W. Shanzer  
**CONTROLLER** Andrea Bencke  
**PERSONNEL MANAGER** Robin L. Bordelon  
**ASSISTANT TO THE PRESIDENT** Jan Krusen

For information on how to contact your sales representative, see page 190. Editorial, Advertising Sales and Executive Offices at 101 Witmer Rd., Horsham, PA 19044 (215) 957-1500. FAX (215) 957-1050. TWX 910 333 9522. EasyLink 62805174. ARIS/BB (215) 957-1000; Southern California (818) 577-9100; Northern California (415) 873-2135; Massachusetts (617) 863-5010. 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.



# High End VAXes Demand High Performance Disk Storage Solutions



## Clearpoint Delivers the Fastest Disk Sub-Systems For Your VAX 6XXX and 8XXX

Clearpoint introduces the DCMS-DSB series of disk controllers and disk storage subsystems—another engineering innovation guaranteeing the fastest disk performance. The Clearpoint DSB disk controller resides directly on the VAXBI I/O bus, using only one slot but providing ports for up to seven disk devices. Each port supports a 1.0 Gigabyte storage device, the highest capacity now being offered, and comes with several different configuration options.

See us at DEXPO West Booth #1316

### The DSB Disk Controller

Through the combined use of Motorola's 68020 micro-processor, FIFO buffering, and a single, direct connection to the VAXBI I/O bus, the DSB disk controller provides the fastest possible bandwidth. Compare our performance:

Comparison	Clearpoint DSB*	DEC KDB-50
Peak Transfer	4.0 MB/sec	1.2 MB/sec
# Devices Supported	7	4
# Slots Required	1	2
DC Amps drawn at 5V	5.01	10.48

\*Available in configurations from standard 19" rack-mountable units to fully configured cabinets.

### The DSB Disk Subsystem

Clearpoint has implemented SCSI (Small Computer System Interface) as its interface with DEC's MSCP (Mass Storage Control Protocol). This design assures users system compatibility and maximum flexibility in peripheral selection.

### The Clearpoint Difference

- Each sub-system passes the most stringent QA testing in the industry
- Various comprehensive service options are available. In addition, Clearpoint has designed a proprietary serial port for maintenance, diagnostic and monitoring purposes.

Call or Write For the DSB Product Update and our Catalog & Technical Service Guide.



Clearpoint and DCMS-DSB are registered trademarks of Clearpoint Research Corporation. DEC, VAX, BI, MSCP are registered trademarks of Digital Equipment Corporation.

CIRCLE 151 ON READER CARD

Clearpoint Research Corporation  
35 Parkwood Drive, Hopkinton, MA 01748-1659  
1-800-CLEARPT (508) 435-2000  
Japan (03) 221-9726 Canada (416) 620-7242  
UK (0628) 66-7823 Netherlands (023) 273744





See us at  
DEXPO WEST Booth 226

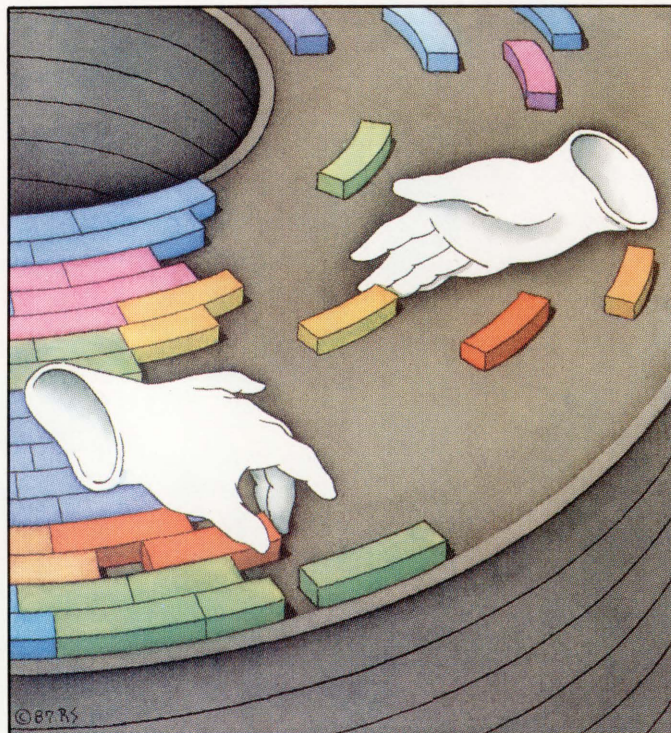
## “How Badly Is File Fragmentation Slowing Down Your VAX™?”

Users of Digital's VAX/VMS™ systems have long complained of performance problems stemming from the gradual fragmentation of disk files. Every VAX/VMS Files-11 ODS-2 disk tends to fragment with use. It might take a month or it might take only a few days, but sooner or later the disk will have to be defragmented.

With **DISKEEPER/Plus** customized online defragmenter, all the disks on a VAX/VMS system can be kept defragmented indefinitely. **DISKEEPER/Plus** cleans them up and keeps them that way. Running as a low-priority background job, **DISKEEPER/Plus** carefully rearranges files on a disk so they consist of as few pieces as possible, and attempts to combine spaces on the disk into a single large contiguous space. Because of its customization features you decide when and how **DISKEEPER/Plus** is to run on your system. It is a true set-it-and-forget-it approach to defragmentation.

### How Does Fragmentation Occur?

VAX/VMS tries to allocate space for a file as close to the beginning (logical block number zero) of the disk as possible. It does so even if there is plenty of free space near the end of the disk and placing the file near the beginning requires that the file be split up into many pieces. In other words, the file is created by VMS™ in a badly fragmented condition even though there is plenty of free space further along on the disk in which the file could have been created contiguously.



Like “magic hands” Executive Software’s **DISKEEPER/Plus**™ eliminates file and free space fragmentation on your disks.

An exception to this is that VMS draws space first from the extent cache, which matches the free space near the beginning of the disk until users begin deleting files. Space freed up by deleted files is added to the extent cache and so could be allocated to new files. When extent cache space is used up, the extent cache is reloaded from the spaces nearest the beginning of the disk.

When you consider the long-term effects of this allocation strategy on a disk in continuous use, you can readily see that fragmentation can become extreme. Before **DISKEEPER/Plus**, the recommended remedy for disk fragmentation was to backup the fragmented disk to tape (or another disk), reinitialize the disk and restore the files from the backup save-set. Unless you are fortunate enough to have a spare disk drive available, this roll-out, roll-in procedure on a large disk takes four to six hours — per disk, per week (or however frequently your installation requires defragmentation). Even with a spare disk drive, the procedure requires taking the disk out of service for the duration.

### Why does VAX/VMS Fragment Files?

VMS fragments files for 2 reasons:

- 1) It always must file all the data at the beginning of the disk and
- 2) It must always fill in any existing free space located at the beginning of the disk first (no matter how small that free space is).



With these two conditions inherent in the make-up of VMS there is no getting around the fragmentation problem.

## How Does Fragmentation Affect Performance?

Every disk has fragmentation unless it has just been defragmented and not used since. A file fragmented into two pieces can take twice as long to access as a contiguous file. A three-piece file can take three times as long, and so on. Some files fragment into hundreds of pieces in a few days' use. Imagine the performance cost of 100 disk accesses where only one would do! Defragmentation can return a very substantial portion of your VAX to productive use.

## What to Do About Fragmentation

There are only three ways to handle the fragmentation problem on your system.

1. Don't let the users on the system — ever.

We have found this solution is very unpopular due to the fact if there are no users on the system, then the need for a computer system is not a high priority. This results in no jobs for VAX Managers and technicians.

Not recommended.

2. Spend late nights or weekends doing the mundane chore of backup and restore (knowing you will only have to do this activity again as soon as your users start turning into an angry mob because the cursor isn't moving).

Now, you may already be choosing backup and restore as your solution. There's just one catch: this "solution" does not free *you* from having to do the work. You still have to stand around (after hours) and do backup and restore.

3. Get **DISKEEPER/Plus** Customized Online Defragmenter and let *it* do all the work.

We have advanced the concept of defragmentation by making available 18 specialized start-up commands; one to suit every site and VAX configuration.

With **DISKEEPER/Plus** available, now more than ever, there is no reason to permit fragmentation of your files, no excuse for a slow VAX, no need for weekends or late nights doing backup and restore.

Buy **DISKEEPER/Plus**, then you won't have to give fragmentation another thought — ever.

This may seem too good to be true or unbelievable to you, so we offer a 100% money-back guarantee of satisfaction.

## Finding Out About Fragmentation

### File Fragmentation Analysis Utility

You can find out how fragmentation slows down your system's performance.

By obtaining a copy of the File Fragmentation Analysis Utility, you will be able to determine the degree of file and free space fragmentation on your disk. It can provide anything from a quick summary to a very detailed analysis.

### Some of the questions the File Fragmentation Analysis Utility will answer for you are:

- How many of my files are fragmented?
- Which are my most badly fragmented files?
- What is the average state of file and free space fragmentation on my disks?
- What is my total free space?
- What are my total split I/Os?

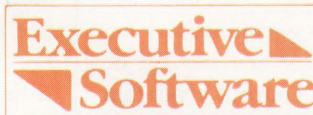
(The answer to this question is the most meaningful indicator of the actual cost of fragmentation on your VAX!)

## Free Offer

If you are running VAX/VMS you may be qualified to receive a **free** copy of our File Fragmentation Analysis Utility to determine the extent of fragmentation on your disks.

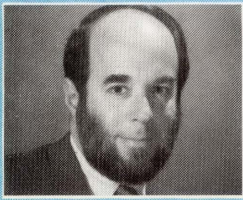
## Call Today!

**(800) VAX-HELP**  
**ext. 2321**



2219 Broadview  
Glendale, CA 91208-1395





**PUBLISHER**

**Carl B. Marbach**

# DEC's Technology Leap

DEC is a technology-driven company. It always has produced computers that were ahead of their time — machines that were state of the art, processors that did things others couldn't. And they did this for less money than the competition's systems.

From the mid-'60s until the '70s, the PDP series of minicomputers was the timesharing system that others were measured against. At first, DEC had the only timesharing minicomputer. Then, when others rolled out their minis, DEC's was still the best. When 16 bits weren't enough, the VAX brought us into the 32-bit world with just enough of the PDP heritage to keep it on top. In the early '80s, the VAX/VMS system simply was better than other midrange competition.

DEC's technology hasn't always been applied just to computers. When the venerable ASR-33 Teletype wasn't good enough, DEC brought out a 30-characters-per-second dot-matrix printer, and when this LA-36 finally came along it became a legend in its own time. As the need for faster terminal interaction arose, DEC introduced CRTs at the leading edge of technology, from the VT05 to today's VT320. Look at the VT320 and see if Ken Olsen's remark that the back should look just as good as the front hasn't come true.

Technology doesn't move in a continuous way. It leaps forward with great staggering steps and then rolls on slowly until the next giant leap. If the time between leaps is too long, competitors and clones can catch up. When asked if he was bothered by the rampant plagiarism of his works, Rudyard Kipling replied, "They can't steal my mind, I'll leave

them in the dust, six months behind." And so it is with DEC. The competition can't steal its talent and its mind, but if it's too long between advances, then it looks vulnerable.

This happens to other companies, including IBM. However, it has a lesser impact on companies that rely on things other than technology. IBM is legendary for its sales, marketing and support abilities. When it isn't the technology leader, it relies on strong sales efforts and unequaled marketing.

In the mainframe area, in which IBM has had the technology sewn up for years, sales and marketing efforts have combined to give IBM a huge share of that market. In microcomputers, IBM isn't the technology leader, and because of the nature of that market (small unit dollars), not even its sales and marketing can save it.

In the midrange arena, IBM has stayed close for many years with a weaker product in the System/36. The AS/400 has brought parity in technology to the midrange for the first time, and IBM's superior sales and marketing are hurting DEC in its home town. A recent research study showed that although DEC had penetrated some IBM accounts in this range, DEC never "controlled" the accounts. Now that the AS/400 has come on the scene, DEC is expected to lose new sales.

Technology has saved DEC before and will save it again. The VAX 9000 series is made from new technologies that once more will catapult DEC into new areas (see Dave Mallery's editorial, "Packaging For The Next Decade," on page 14). A 30-mip (scalable to 60-mip) uniprocessor is possible with this new packaging, and a box holding six of these using standard SMP VMS software is capable of 180 to 360 mips. That's true mainframe per-

formance that IBM can't match.

But what really separates mainframes from midrange systems today is the software. Mainframes are stuck with operating systems designed in the 1960s that require care and feeding from system programmers and are hostile to users and programmers alike. When VAX/VMS, today's most popular multiuser system, achieves or exceeds mainframe power, it's a technology leap. Digital needs that leap badly, and its success is crucial to the corporation. Apple bet the company on the Macintosh and won. Now its DEC's turn to roll the dice.

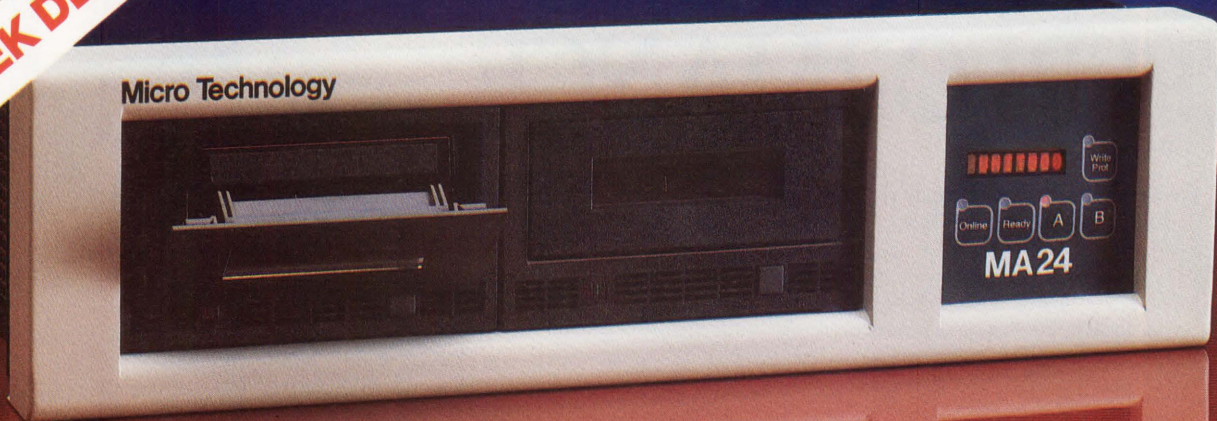
Plenty of unknowns will influence the outcome. What will happen to UNIX and ULTRIX? Will they fade into a POSIX-compliant VMS or stand alone and be recognized? Will RISC processors mean the end of VAX as we know it, the CISC technology to be replaced by a better one? How will OSF and UNIX International influence the standards of tomorrow? And where's all the software for UNIX/ULTRIX?

A product line anchored by the ever-popular MicroVAX, linchpinned in the center with the solid VAX 6000 line and topped by the mainframe-power VAX 9000 offers an enterprisewide computing capability second to none. Such a product line doesn't have to be sold. It will, in the usual DEC fashion, sell itself. It won't require brilliant marketing, just enough to let people know that it's there.

It's still true that if you build a better mousetrap, people will beat a path to your door. In this case, it looks as if DEC is readying a better computer and may catch a lot of business in the '90s.



**OVER 800 INSTALLED**  
**guaranteed**  
**ONE WEEK DELIVERY**



# Upgrade Your 8mm To Your HSC Today!

Are you tired of waiting to connect your Unibus or Q-Bus tape to your HSC? Micro Technology, the Leader in HSC compatible products, now makes its popular MA-24 Technology available to the 8mm Unibus and Q-Bus installed base.

Moving to an HSC means that with a HSC5X-CA/DA card you can backup a full 16 Gigabytes in just 3 hours—with no operator intervention. And that means time and money to you. So, the MA-24 is fast, flexible, reliable and offers proven performance. Just ask some of our satisfied customers. People like Hughes Aircraft, Ford Aerospace, Jet Propulsion Laboratory, Dupont and Dow Chemical, to name a few.

Regardless of who sold you the first system, Micro Technology with its Nationwide service can upgrade your Exabyte to your HSC with a guarantee of "ONE WEEK DELIVERY".

So, if your original vendor can't deliver and you're tired of broken promises, just give us a call at 800-677-4HSC and Micro Technology will ship your HSC upgrade next week.

Micro Technology, the new leader in cluster backup technology, designs and manufactures enhancement products for the DEC VAX environment. We offer worldwide sales and service to meet the needs of today's rapidly expanding market.

## As quoted in Digital Review:

"In the battle for 8mm tape market share in the VAXcluster arena, Micro Technology of Placentia, Calif., enjoys a significant lead as the only third-party supplier shipping an HSC tape subsystem."

See us at DEXPO West Booth #1434

**YES! I want to Upgrade my 8mm to my HSC.**

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

Company \_\_\_\_\_ Phone \_\_\_\_\_

Co. Address \_\_\_\_\_

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

or  
**call 1-800-677-4HSC**

Please send me more information on upgrading

On a new MA-24 HSC 8mm \_\_\_\_\_

On storage systems \_\_\_\_\_

On network management products \_\_\_\_\_

DP1189

CIRCLE 124 ON READER CARD



**Micro Technology**

5065 East Hunter Avenue  
Anaheim, California 92807  
1-800-999-9MTI

HSC5X-CA/DA, HSC, DEC, are trademarks of Digital Equipment Corporation



# SAY GOODBYE TO POOR PERFORMANCE

One minute you're dealing with I/O bottlenecks, the next it's crippling CPU contention. But today's quick fix means more work and aggravation for you tomorrow—because only a part of the performance problem is addressed. Despite your best efforts, your system slows to a virtual standstill. Your applications and your users suffer. In the end, your company pays the price for lost productivity.

Until today, a quick fix was all you could do. No comprehensive solution—from one expert source—was available to support you.

It's time to meet RAXMASTER.

## THE RAXMASTER ROUTE TO SUPERIOR VAX/VMS PERFORMANCE

Now, instead of buying one product that fixes one problem today, and leaves you facing performance problems again tomorrow, take advantage of RAXMASTER. After eleven years, RAXCO Software has developed the one solution that addresses all areas critical to great VAX/VMS performance: memory, I/O, and CPU. With RAXMASTER, your system is optimized by software you control.

## PROVEN SPEED, RELIABILITY, AND FLEXIBILITY

Now dynamic system tuning, disk analysis, disk defragmentation and optimization, data caching, memory-resident disks, file I/O analysis, and memory management can all be yours with one complete solution. From one powerful menu, you can delegate performance management tasks to RAXMASTER with ease.

## THE RAXCO SOLUTION: EXPERIENCED. RELIABLE. COMPLETE.

If you want to ensure peak system performance, maintain user productivity, extend the life of your existing system, and act with solutions instead of reacting to problems—call today for a free RAXMASTER demonstration. Get the expertise you expect, the support you need, and the performance you demand!

RAXCO also offers VAX/VMS Educational Courses. Contact RAXCO for details.

Write RAXCO Software Inc.,  
2440 Research Boulevard, Suite 200,  
Rockville, MD 20850, or call:  
(301) 258-2620  
FAX: (301) 330-5756

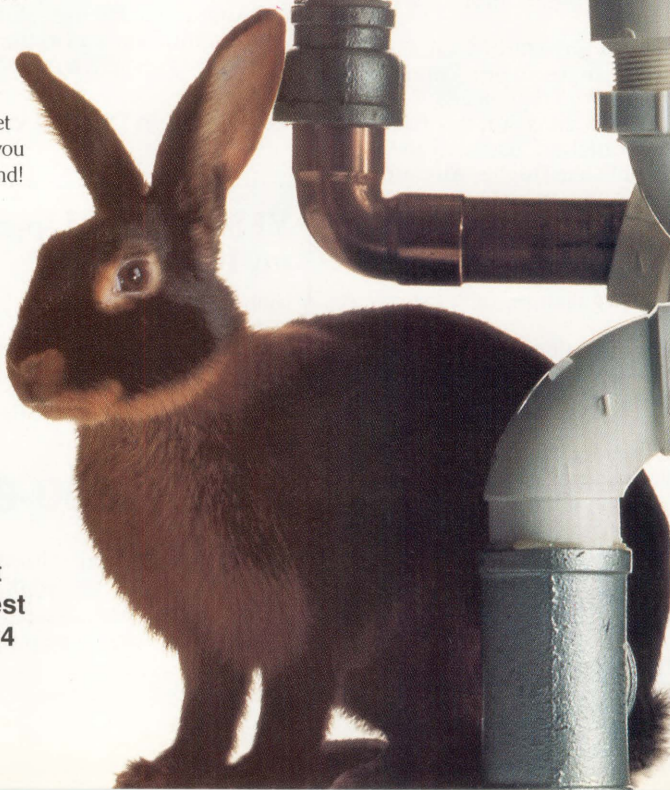
West U.S.A.: (714) 863-0100 FAX: (714) 863-1417  
Canada: (519) 371-5020 FAX: (519) 371-5533

CIRCLE 190 ON READER CARD



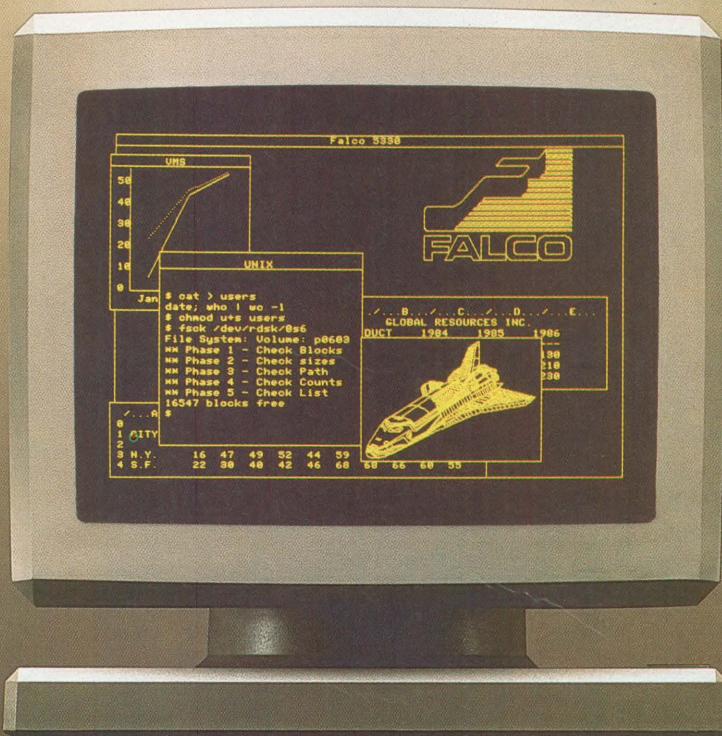
See us at  
DEXPO West  
Booth #424

RAXMASTER is a trademark of RAXCO Software Incorporated. VAX/VMS are trademarks of Digital Equipment Corporation.





# Don't Blame DEC.<sup>TM</sup> They Did The Best They Could.



**FALCO 5330**



**VT330**

**The Basics.** The DEC VT<sup>TM</sup> 330 is a basic ReGIS<sup>TM</sup> graphics terminal. But basic isn't good enough today. The Falco 5330 supports ReGIS, VT300 and SSU<sup>TM</sup>. That's easy. But you've come to expect more from Falco—the first, and leading supplier of concurrent multi-host terminals. So we give you something infinitely better...

**Infinity Windows<sup>TM</sup>** Users can vary the size, shape and position of all 6 windows on the screen with the cursor keys or a mouse. And they're terminal resident, so you can display up to 6 different sessions of graphics or text concurrently—without special software or hardware.

**Four Concurrent Ports.** The Falco 5330's 4 ports allow simultaneous access to 4 different hosts. And since speed is so critical in graphics applications, we put in a 60 MHz processor, which operates 2-3 times faster than their basics.

**And More.** Add to this a 50 line display, Dynamic Pan, 54 pages of text memory, and desktop accessories that include a clock and alarm with battery backup. Additionally, the Falco private escape sequences allow host control of all terminal and window functions. Quite simply, it's the most flexible display in the industry.

**Price.** We give you the best there, too.

**CALL NOW!** Let Falco give you the full range of superior DEC alternatives. For more information and the name of your authorized distributor,

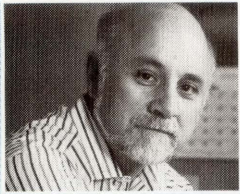
**CALL: 1-800-FALCO4U Ext. 500  
or 1-800-325-2648 Ext. 500  
or FAX: 408-745-7860**



See us at  
**DEXPO West '89**  
Platinum Hall -  
Booth #2616

Falco Data Products, Inc.  
1294 Hammerwood Ave.  
Sunnyvale, CA 94089  
408-745-7123





## EDITORIAL

**Dave Mallery**

# Packaging For The Next Decade

---

Even though you more than likely won't run out and buy a VAX 9000 this afternoon, it's important to understand the implications of the packaging technology. That technology will have a profound effect on the next computer you buy.

In September, Digital announced an interconnection technique for semiconductor chips called High-Density Signal Carrier (HDSC). It also introduced the Multi-Chip Unit (MCU), which provides heat dissipation as well as physical and electrical connections from the system to the HDSC.

Basically, DEC has eliminated the chip carrier and its socket (or the holes into which the chip carrier is soldered). If you ever saw a chip "laid bare," you'll remember that the tiny chip in the center is dwarfed by the surrounding carrier. Nearly invisible wires connect the edge of the tiny chip to the larger conductors in the carrier, which lead to the pins on the edge. There's about a 10x difference in size between the chip and its carrier. In 1970, there was no other way to bridge the tiny integrated circuit chip to the larger outside world.

Now there is. DEC has reduced the outside world to the same scale as the tiny chip. The wiring that used to be on several circuit boards has been reduced to a five-inch multilayer substrate. This is done in the same tiny scale as the chip. Now, chip carriers and sockets are unnecessary, because the chips are connected directly to the wiring via tape automated bonding (TAB).

The obvious benefit is that compressing three to five circuit boards from your current 8000/6000 machine onto a five-inch-square carrier saves space. The hidden benefit is that the end product is *much* faster than its predecessor.

It's faster because the distances have been greatly reduced. Because we're dealing with signals traveling at the speed of light, the problem facing the engineer — getting signals from here to there — has been simplified. He can run the chips faster.

How important is this? All in all, DEC has achieved a 30x reduction in the size of its computers, except for the power supplies and outside-world connections. It has done this with conservative (that is, manufacturable and repairable) use of a few new technologies. It has leapfrogged the competition (IBM) and produced an interconnect technology that will change everything built from now on.

Also bear in mind that the 9000 is built with ECL chips (read: fast, but hot and not too dense). The same packaging technology can be applied to the CMOS (read: not so fast, not hot, very dense) chips that are in your current VAXs. When DEC does this, the density achieved should be at least another 4x multiple.

I leave you with the implications. The '90s will be a wonderful DECade.



# MAX PORT

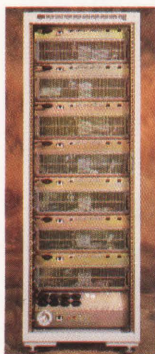


## TAKE YOUR STORAGE TO THE MAX WITH HIGH-PERFORMANCE DISK ARRAYS FROM EMC

### MAXIMUM PERFORMANCE AND CAPACITY:

MAXPORT utilizes the fastest disk drives available today. MAXPORT is up to 50% faster than DEC's RA82 and 10% faster than the RA90. With our MAXPORT you can configure up to 11.5GB in the same footprint as DEC's SA482 or SA600.

### Intelligent Cabling:



Only EMC  
Has It.

**MAXIMUM COMPATIBILITY:** MAXPORT attaches directly to your HSC, BI, Unibus or Qbus disk controller to ensure 100% compatibility. MAXPORT utilizes all DEC system and HSC level diagnostics as well as DEC formatting procedures.

**MAXIMUM SUPPORT: THE INDUSTRY'S ONLY THREE YEAR, ON-SITE PARTS WARRANTY.** Our MAXPORTs come with a full, three year, on-site and parts warranty; they are custom built and tested to ensure problem-free installation and use. MAXPORT's unique, off-line RS232 service port allows you the flexibility to field re-format your drives off-line.

**MAXIMUM SERVICE:** EMC supports over 10,000 customers worldwide through our network of service centers staffed with our own customer service engineers and technicians. We stock spare parts in every office.

**MAXIMUM INVESTMENT PROTECTION:** MAXPORT costs up to 30% less than Digital's drive and requires significantly less operating dollars than DEC's RA81, 82 and RA90. What's more, you can field upgrade your MAXPORT MRA600 (622MB) to a 1200 (1244MB) simply by adding an additional disk actuator — that's *100% investment protection!*

Let EMC's memory and disk arrays make your systems more reliable and your bottom line more solid; call us at **800-222-EMC2** (in MA: 508-435-1000 and in Canada: 800-543-4782). Ask for extension **D924**.

**EMC<sup>2</sup>** The System  
Enhancement Company.

MAXPORT is a registered trademark of EMC Corporation.  
DEC is a registered trademark of Digital Equipment Corporation.

See us at DEXPO West Booth #2826

CIRCLE 157 ON READER CARD



## LETTERS

### BENCHING BENCHMARKS

As a software engineer in the emulation group at Phoenix Technologies Ltd., I'm surprised by some items in Kevin G. Barkes' review of M Software's M\*PC ("Emulation Edge," August 1989), particularly the speed comparison with VAXpc V1.0, a product developed in my group and sold by DEC. VAXpc V1.0 consistently gets an SI rating of between 4.2 and 4.9 on a VAXstation 3100. For reference, a 6-MHz AT gets about 5.7, a PC/XT gets 1.0 and Barkes' article notes that M\*PC gets 0.4. VAXpc performance generally is acknowledged to be much more than twice the speed of PC/XT over a range of applications.

It can be misleading to rely on a single benchmark to determine performance. One reason is that emulation technology often involves optimizing the foreign

Please address letters to the editor to *DEC PROFESSIONAL*, 101 Witmer Rd., P.O. Box 218, Horsham, Pennsylvania 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.

code. The more sophisticated an optimizer, the more likely it is to discover that the loop in SI or a Dhrystone test performs no useful work. Therefore, the code can be eliminated, which yields a

very high performance number. This "speed increase" never would occur in a real application.

In addition to providing good performance, VAXpc operates under DEC-windows and a number of serial terminals. VAXpc supports the use of floppy disks as both disk images (i.e., VMS or ULTRIX files) or the host VAX floppy diskette drive. PC/AT hard disks are supported as both disk images and redirected VMS or ULTRIX directories.

This information pertains to VAXpc V1.0, which DEC is shipping. Phoenix has a new version of VAXpc that runs much faster. It will be supplied to DEC in the near future.

Software co-processor approaches to PC emulation provide an ideal way for users to run a wider variety of software applications on their machines than ordinarily would be possible relying only on native applications.

**Marty Galligan**  
**Phoenix Technologies Ltd.**  
**Norwood, Massachusetts**

*Kevin G. Barkes:* The M\*PC review noted that the tests were run on an 11/750, not a VAXstation 3100. The claims for M\*PC versus VAXpc performance were M Software's and were identified as such. It also was noted that the comparison was speculation on M Software's part; VAXpc had been announced but wasn't yet available. The reference that Norton SI thought the emulator was an 80286 was intended to cast doubt on the use of the utility as a reliable benchmark indicator.

### MAC MARKS THE SPOT

David W. Bynon's "The Problems With X Programming" (August 1989) notes the

## DEC Professionals At DECUS U.S Chapter '89 Fall Symposium

DEC PROFESSIONAL editors will share their expertise and experience at the DECUS U.S. Chapter '89 Fall Symposium, held Monday, November 6, through Friday, November 10, at the Anaheim Convention Center in Anaheim, California. Look for the following presentations.

#### **Kevin G. Barkes, DCL Editor**

- "Advanced DCL Command Procedure Design"

#### **Philip E. Bourne, Ph.D., ULTRIX Editor**

- "UNIX for VMS Users: Converting DCL Command Procedures to Shell Scripts"
- "UNIX for VMS Users: Converting VMS Applications to UNIX"
- "UNIX for VMS Users: Fundamental Concepts and Getting Started"

#### **Al Cini, Macintosh Editor**

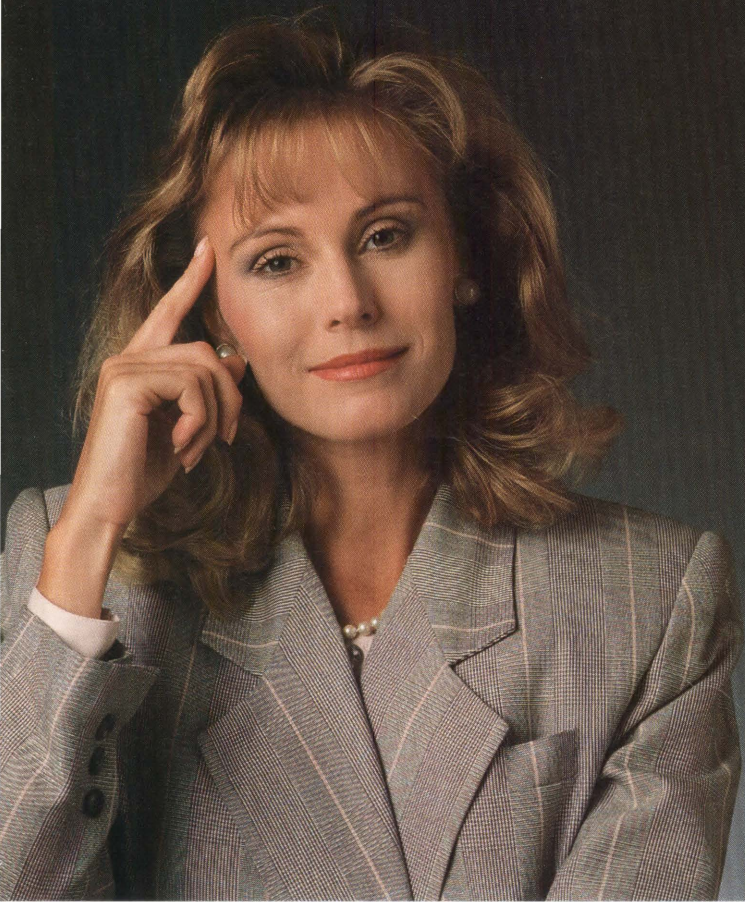
- "Evaluating A Database Management System For Business Applications"
- "Using Macintosh/VAX Networking To Solve Business Problems"

#### **Bill Hancock, Networking Editor**

- "Elements Of Good Network Design"
- "Expert System Development For Network Analysis"
- "Understanding Ethernet"



What It Takes To Be A Good  
VAX System Manager.



What It Takes  
To Be A Great One.



CIS introduces RoboMon.  
The only VAX/VMS software with *unlimited* system monitoring  
and problem-solving capabilities.

Chances are, you've got everything it takes to be great. Everything, that is, but time. Because, if you're like most VAX system managers, you're forced to spend too much of your time fire-fighting and baby-sitting the system.

What every great VAX system manager needs is a great assistant.

Meet RoboMon. Your new assistant. The first full-system software designed to work with you to increase VAX reliability, improve user productivity and eliminate expensive downtime. In addition, RoboMon gives you the extra time and on-target information

you need to make sound management decisions.

RoboMon is sophisticated enough to handle any activity you delegate to it. From performance measurement, real-time tuning, capacity planning, and queue management to security, reliability, operations, and admin-

istration. The possibilities are as unlimited as *your* imagination.

RoboMon anticipates potential problems and prevents them from happening.

With RoboMon you're in total control. You create the rules, define the

conditions you're looking for and the actions you want taken. RoboMon does the rest.

Don't waste any more of your valuable time. Give RoboMon a free, 30-day trial.

For more information on what RoboMon can do for you or to arrange for a free, 30-day, hands-on evaluation, call CIS today and speak directly to the experts. This could be your great opportunity.

**RoboMon**

**CIS** COMPUTER  
INFORMATION  
SYSTEMS, INC.

120 Wells Avenue, Newton, MA 02159 USA  
(617) 527-1550 FAX: (617) 527-6132



“ We’ve  
cut our  
training  
time by  
33% with  
custom  
keys. ”

## THE ULTIMATE KEYBOARD ENHANCEMENT.

Maximize your software investment with custom key sets displaying any symbol, language, code or legend. Custom keys from Synctronics enable you to:

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

Stock and custom keys available for DEC, IBM, WYSE, COMPAQ, and other systems.

For complete product information and quantity discounts call

(800) 444-KEYS



  
**Synctronics**

4901 Morena Blvd., Suite 302  
San Diego, CA 92117, (619) 581-6303

CIRCLE 141 ON READER CARD

[Report From Dr. R.]

## Aquarius Arrives

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

■ As the Age of Aquarius draws near, DEC will be announcing the VAX 9000 series around October 31, 1989. Why Halloween? It's the fifth anniversary of DEC's last high-end system, the VAX 8600. This date may slip by a week or two, however; sources report that Ken Olsen is tied up in board meetings on All Hallows' Eve.

■ Aquarius initially will be available in January 1990, as the bounded, entry-level VAX 9000 Model 210. The VAX 9000 Models 410 through 440, which feature in-cabinet expandibility and price tags to match, won't begin shipping until midsummer 1990. The Model 400s will be accompanied by an on-site Field Service engineer, and DEC doesn't want to fill these non-revenue positions until absolutely necessary.

■ Disk defragmentation is a hot topic among system managers, and reliable sources tell me that defragmentation capabilities will be incorporated into VMS version 5.4 (due out in midsummer 1990). Will VMS Engineering be able to fold this goody into the O/S during this brief time window? I think not. DEC may be forced to purchase a third-party defragmentation product from certain Left Coast software executives.

■ ULTRIX version 4.0, the SMP UNIX with all the fiber and none of the cholesterol, will ship in January-February 1990.

■ What's the brouhaha about 8mm backup devices? DEC will spurn 8mm technology — relegating it to VCR-land — and will offer a 4mm solution. “DAT” is the way to go, DEC.

■ Datatrieve isn't dead. On the contrary, the soon-to-be-announced Datatrieve version 5 is DECwindows compatible.

■ Don't look for Digital to incorporate a vector co-processor on the DECsystem family of fine CPUs. It's almost certain that a VME-bus will find its way onto the once and future DECsystem. The secret word for future RISC performance is superscalar, and the secret prediction for a VME-based VAX is *no way*. But the ULTRIX V4.0 VME drivers already have passed their road test.

■ The future of DEC's fault-tolerant hardware is crystal clear but not as close as I once expected. The much-vaunted Cirrus processor isn't due to hit the streets until early 1990; originally the fault-tolerant box was supposed to debut with the VAX 9000 and Superclusters.

lack of tools to prototype and develop applications quickly under the X Window System. The hypothetical program, Xworkbench, that he'd like to see developed will be a valuable tool.

Such a tool, called Macworkstation, already exists for the Macintosh. It has a simple yet powerful toolkit to develop host-based applications with the look and feel of the Mac interface. The toolkit comes with a dialog builder utility to create dialog boxes with Macdraw-type operation. These local resources are accessed from the host application by referencing from the code. Another utility, event handler, provides a way to process mouse selections from menus, dialogs,

list windows, and so on locally.

In general, Macworkstation is years ahead of the toolkits available for other windowing products. Program-development time is a fraction of that for other windowing systems. The best part is that it's available for \$100 through Apple Programmers and Developers Association.

**Kris Lakshmanan**  
Piscataway, New Jersey

*Editor's note: The Macworkstation price quoted is for a single-user license. To contact Apple Programmers and Developers Association (APDA), call (800) 282-APDA.*





WORD-11 4.2 sets a new gold standard for VAX word processing.

# The Power Of Gold

PF1

**T**he gold key has been accepted as the most efficient user interface for the VAX, bar none. And WORD-11 version 4.2 sets the standard for gold key word processing on the VAX. That's because WORD-11 couples gold key functionality with over 100 sophisticated features.

WORD-11's list of gold standards includes the following:

- Multiple font support
- Automatic spelling correction
- Thesaurus
- Multiple wrapped columns
- Choice of a wide variety of printers
- VAX mail interface
- VAX/FAX option
- Calendar Manager option

WORD-11 was designed specifically for the VAX user, which means high performance with low CPU overhead. Plus, WORD-11 is available on the IBM PC with the identical format and gold key interface as the VAX version.

If you're in the market for a word processor you owe it to yourself to see WORD-11. For more information or a demonstration kit, call or write us today.

## WORD-11

Data Processing Design, Inc.  
1400 N. Brasher St., Anaheim, CA 92807

800-843-1317

In California call 714-970-1515

Fax 714-779-7468

See us at DEXPO West Booth #1269



# To Catch A Butterfly

*The TC2000 From BBN Advanced Computers Delivers Supercomputer Power With Motorola's 88000 And The Butterfly Switch*

Moving forward in the growing field of parallel processing is BBN Advanced Computers Inc. of Cambridge, Massachusetts, which offers the TC2000 high-performance multi-processor computer system.

Unlike traditional Von Neumann, crossbar and hypercube architectures, the TC2000 architecture consists of multiple processor nodes interconnected through the Butterfly switch. By way of the Butterfly switch, each TC2000 processor can communicate rapidly with other processors and access all memory in the system. An advantage of the Butterfly-switch design is the ability to increase total aggregate bandwidth almost linearly when more switching components and processor nodes are added to the system.

The system base module forms the core of all TC2000 systems and consists of an expansion module, a utility module and a peripheral cabinet.

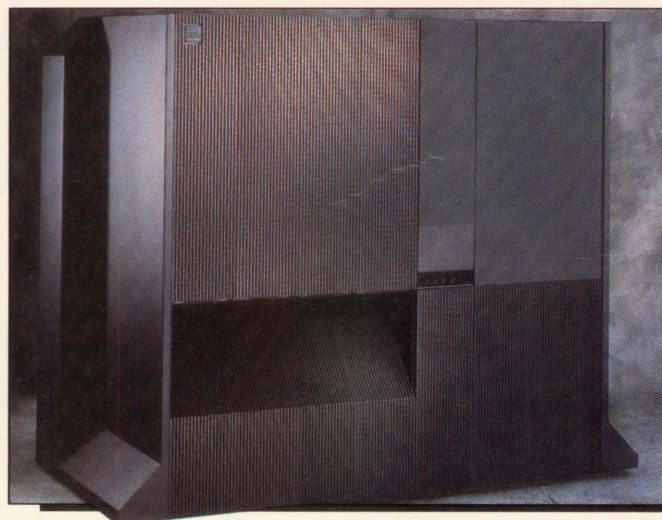
The expansion module holds eight TC2000 function cards and includes two Butterfly switch modules, a power supply and an optional eight-slot VME midplane and VME power supply. Expansion modules can be added quickly to existing systems in the field

to provide additional Butterfly-switch capacity and function-card slots. Seven expansion modules can be added to the system base to meet your computational, memory and I/O requirements.

The utility module contains the Test and Control System master processor,

the TC2000. Each function card is implemented on a single-circuit board and is equivalent to a high-end superminicomputer.

The TC2000 system supports two types of function cards within the expansion module, allowing systems to be tailored to your application requirements. The



*The TC2000 architecture consists of processor nodes interconnected by the Butterfly switch.*

(including TCS disk drives and modem), the system clock card, one 1/4-inch cartridge tape drive, one eight-inch Winchester disk drive and the front-panel controls for the system.

The peripheral cabinet mounts standard 19-inch rack equipment and houses additional peripherals including disk and tape drives.

Function cards provide the processing, I/O and shared-memory resources for

TC/FP function card contains the Motorola 88100 32-bit RISC-based microprocessor and 16 or 32 MB of memory. The TC/FPV function card contains the 88100 microprocessor, 4 or 16 MB of memory and a VME I/O interface.

Each TC2000 function card supports an interface to the Butterfly switch. Paths through the Butterfly switch

are eight bits wide and are clocked at 38 MHz, providing 38 MB per second per path of bandwidth. By adding more processors and switch paths, the aggregate bandwidth can be increased to a maximum of 2,394 MB per second for a 63-processor TC2000 system.

The TC2000 offers two operating systems that can function concurrently on the same machine. The nX operating system is a general-purpose multiuser system based on Berkeley UNIX 4.3BSD. It provides the TC2000's booting and configuration capabilities, application development environment and enhanced execution environment. pSOS+m is a real-time operating system from Software Components Group Inc. that offers the speed, responsiveness and predictability needed for applications such as real-time data collection or simulation.

The TC2000 provides a complete set of programming and software-development tools for debugging, analysis and performance tuning of multiprocessing programs, as well as a full set of programming languages and compilers including FORTRAN, Ada, C and assembly language.

Pricing for the TC2000 system starts at \$350,000 for a base model with 152 Dhrystone mips and 160 Mflops.

## FOR MORE INFORMATION

**BBN Advanced Computers Inc.**  
10 Fawcett St.  
Cambridge, MA 02138  
(617) 873-6000  
Circle 525 on reader card





# Gold-Mail™

## The VMS Mail Enhancement Package

Finally! Now there's an affordable VMS electronic mail package that gives you all the features you've been waiting for—Gold-Mail. It's easy to use and 100% VMS Mail compatible.

Gold-Mail includes pull down menus with accelerator keys for frequently used functions. There's a powerful text editor for easy creating and editing of messages. Plus, Gold-Mail has registered mail, so now you don't have to wonder if your message has been read. Best of all, Gold-Mail lets you interact freely with VMS Mail users; it allows you to access messages from networks

See us at DEXPO West Booth #1269

and systems which interface with VMS Mail without conversion headaches.

Features	VMS Mail	Gold-Mail
100% VMS Mail compatible	•	•
Pull down menus		•
Registered mail		•
Re-edit message		•
Re-edit header		•
Gold accelerator keys		•
Message undelete		•
Visual drawer/folder system		•
Automatic line wrapping		•
Bold, underline, line draw		•
Multiple columns and rulers		•
Spell correction		•
Batch mode send		•

Once you've seen Gold-Mail, you'll never want to use anything else on your VAX. Give us a call today for our introductory prices at:

800-843-1317

**Gold-Mail**

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.



# Your Database Vista

*Raima Corp.'s db\_Vista III Database Development System Offers Portability To C*

Built on a combined relational and network technology, the db-Vista III Database Development System from Raima Corporation of Bellevue, Washington, offers the professional applications developer a complete set of development tools that feature high performance and portability to any C-language environment.

The network model refers to a "network" of interconnected files. In the past, network-model databases have been used to build large business applications on mainframes.

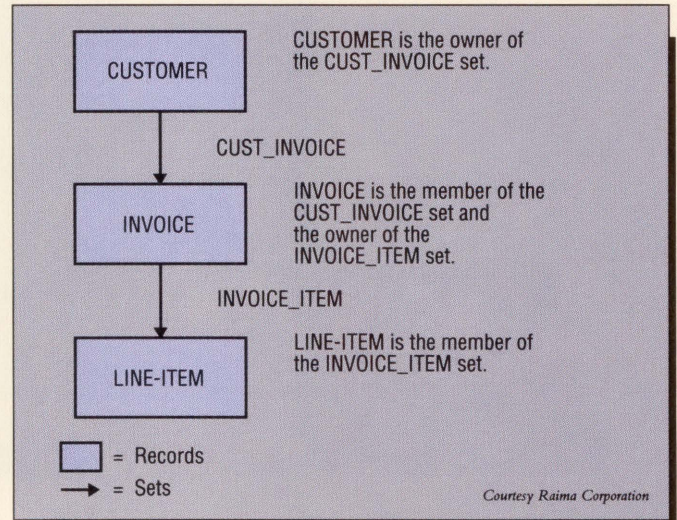
Relational databases are so named because they use the mathematical construct called a relation. A relation is simply a table or "flat file" with the rows representing data records and the columns representing fields. Relations can be linked on the basis of a common field. The advantage of this type of construct is that the system can be changed easily. Fields can be added and deleted and new relationships established simply by associating common key fields in different tables. The disadvantage is that the more relationships you need to establish, the larger your system grows.

The network-model database also uses records and fields. However, in place of related key fields, a construct

called a *set* is used to establish a relationship between records. A set defines a one-to-many relationship between two record types. Sets are implemented through the use of linked lists or pointers to record locations resulting in a *network* of interconnected records. Duplicate fields and their associated indexing aren't required, thus reducing the size of the database and allowing related records usually to be accessed directly with one read operation.

For example, say you have three records, *customer\_rec*, *invoice\_rec* and *line-item\_rec*. Field *cust\_#* is common to *customer\_rec* and *invoice\_rec*; *invoice\_#* is common to *invoice\_rec* and *line-item\_rec*. The database-schema diagram illustrates the inter-record relationship (see Figure). The *cust\_invoice* set forms a one-to-many relationship between the customer record type (the *owner* of the set *cust\_invoice*) and the invoice record type (called the *member* of the set). Another one-to-many relationship exists between the invoice and line-item record types.

With the combined relational and network technology in *db\_Vista*, a developer can implement his applications in a network model database, a relational



**Database-schema diagram illustrating inter-record relationship.**

model database or a combination of the two.

*db\_Vista III* is written in C. It's offered royalty-free, and the C source code is available. A C compiler is required.

*db\_Vista III* is composed of three modules:

1. *db\_Vista 3.1*, the database engine, is based on a combined relational and network model technology. It supports record and file locking, has a database dictionary, a Database Definition Language patterned after C, and a range of database utilities.
2. *db\_Query 2.1* is an SQL-based Query and Report Writer module. It's C-Linkable for applications development.
3. *db\_Revise V1.0* is a database-restructuring tool that enables you to revise your

database without writing conversion programs or exporting and importing database contents.

*db\_Vista III* supports VMS, ULTRIX, UNIX System V and Berkeley 4.2, SunOS, XENIX, OS/2, QNX, MS-DOS, Microsoft Windows and the Mac. The product is hardware-independent.

Prices range from \$5,985 for object code only to \$13,470 including source code on a MicroVAX 2000, MicroVAX II or DECstation 3100 and from \$23,985 for object code only to \$53,970 including source code on a VAX 6000 Model 310 and higher.

**FOR MORE INFORMATION**

**Raima Corp.**  
**3245 146th Pl. S.E.**  
**Bellevue, WA, 98007**  
**(206) 747-5570**  
**Circle 549 on reader card**



# Put a little tramp in your DEC system.

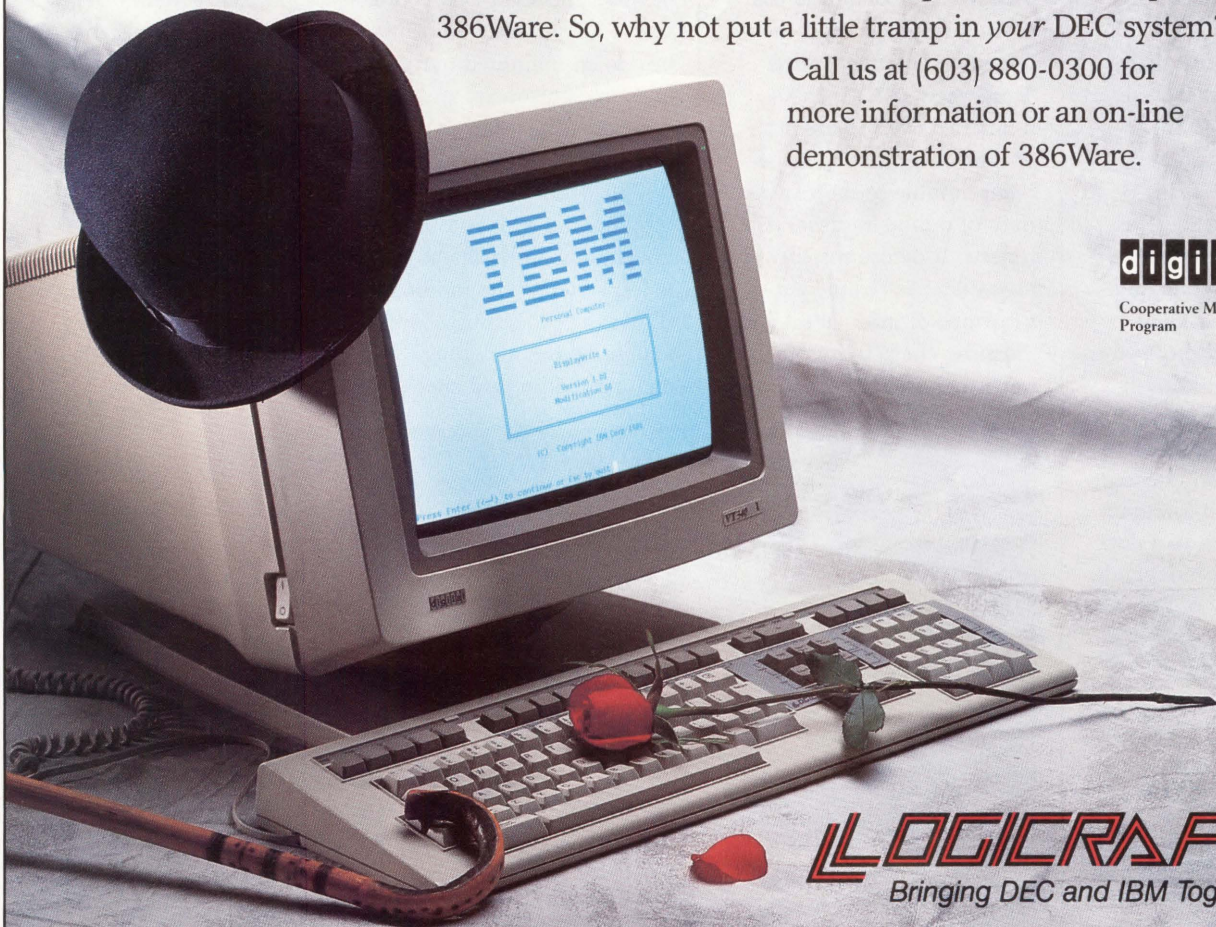
Modern times are here. 386Ware enables any DEC® VT terminal or workstation to emulate a high-performance PC. With 386Ware, your VAX® can run IBM® PC-compatible software.

386Ware has features you can really hang your hat on. Like a high-speed 80386 microprocessor, full compatibility with DECwindows® and PCSA, and support for up to 16 simultaneous MS-DOS® sessions. Plus, users can access all DEC peripherals, such as printers and hard disks.

Many of the world's largest government, education, and financial organizations, as well as over 200 Fortune 1000 companies, are already using 386Ware. So, why not put a little tramp in *your* DEC system?

Call us at (603) 880-0300 for more information or an on-line demonstration of 386Ware.

**digital**™  
Cooperative Marketing  
Program



**LOGICRAFT**  
Bringing DEC and IBM Together

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

See us at DEXPO West Booth #401

Trademarks: Logcraft and 386Ware - Logcraft, Inc.; DEC, DECwindows, VT, and VAX - Digital Equipment Corporation; IBM and IBM PC - International Business Machines Corporation; MS-DOS - Microsoft Corporation.

CIRCLE 156 ON READER CARD



# The Common Denominator

*GSI Transcomm's Tolas V6.4 Provides Multicurrency Capabilities*

GSI Transcomm's Tolas V6.4 is a software-development system aimed at product distribution, warehouse management, inventory and financial control. Tolas V6.4 consists of 15 new or improved highly interactive applications modules for the VAX.

A unique feature of Tolas is its systemwide multicurrency-processing capability. This feature may be attractive to multinational organizations that require a single software solution for their product-distribution network.

"A company that really wants to do international business simply has to go with a multicurrency system," says GSI Transcomm's project leader Jean-Marie Peeters in Brussels. "Otherwise, the company manually would have to convert all operations into its legal currency for consolidated financial reports."

The value of multicurrency to a company depends on the number of foreign transactions made on a day-to-day basis. It also depends on the frequency of business a company has with countries that wish to be invoiced in their own currencies. There are no limitations to the number of currencies that Tolas can handle.

The Tolas family of modules includes Sales Order

Processing, Inventory Management, Purchase Order Processing, General Ledger, Accounts Payable and Accounts Receivable.

The Tolas Sales Order Processing module provides the capability for single-location and multilocation sales-order entry. Upon completion of an order, a document-printing schedule can be accessed to produce order acknowledgements, bills of shipping and invoices. This module supports international order processing through the use of multilanguage invoice documents, Value Added Tax System (VATS) and multicurrency processing.

The Inventory Management module provides a variety of online inquiries and reports. It determines inventory value, tracks the performance of stock items and measures the activity of non-stock items.

The Purchase Order Processing module supports a wide variety of purchase orders that can be defined to handle situations such as normal stock replenishment POs, general supply purchases and direct-ship purchases.

The foundation of the Tolas financial-management system is the General Ledger module. The Multi-Currency Financial Reporting System is a special extended version of the General Ledger software. It includes the ability to record and report financial information in an unlimited number of source currencies and consolidate them in one specific base currency.

The Tolas Accounts Payable module is an automated vouchering and disbursements system. The module allows the processing of six voucher types including memos and prepaid checks.

## FOR MORE INFORMATION

**GSI Transcomm**  
 1380 Old Freeport Rd.  
 Pittsburgh, PA 15238  
 (412) 963-6770  
 Circle 533 on reader card

When combined with the Purchase Order Management module, Accounts Payable permits vouchers to be created using transactions resulting from purchasing and receiving activity.

Finally, the Tolas Accounts Receivable module is designed to work either as a standalone system or as part of an integrated system. This module lets you handle special transactions such as memos, adjustments and multiple payment types.

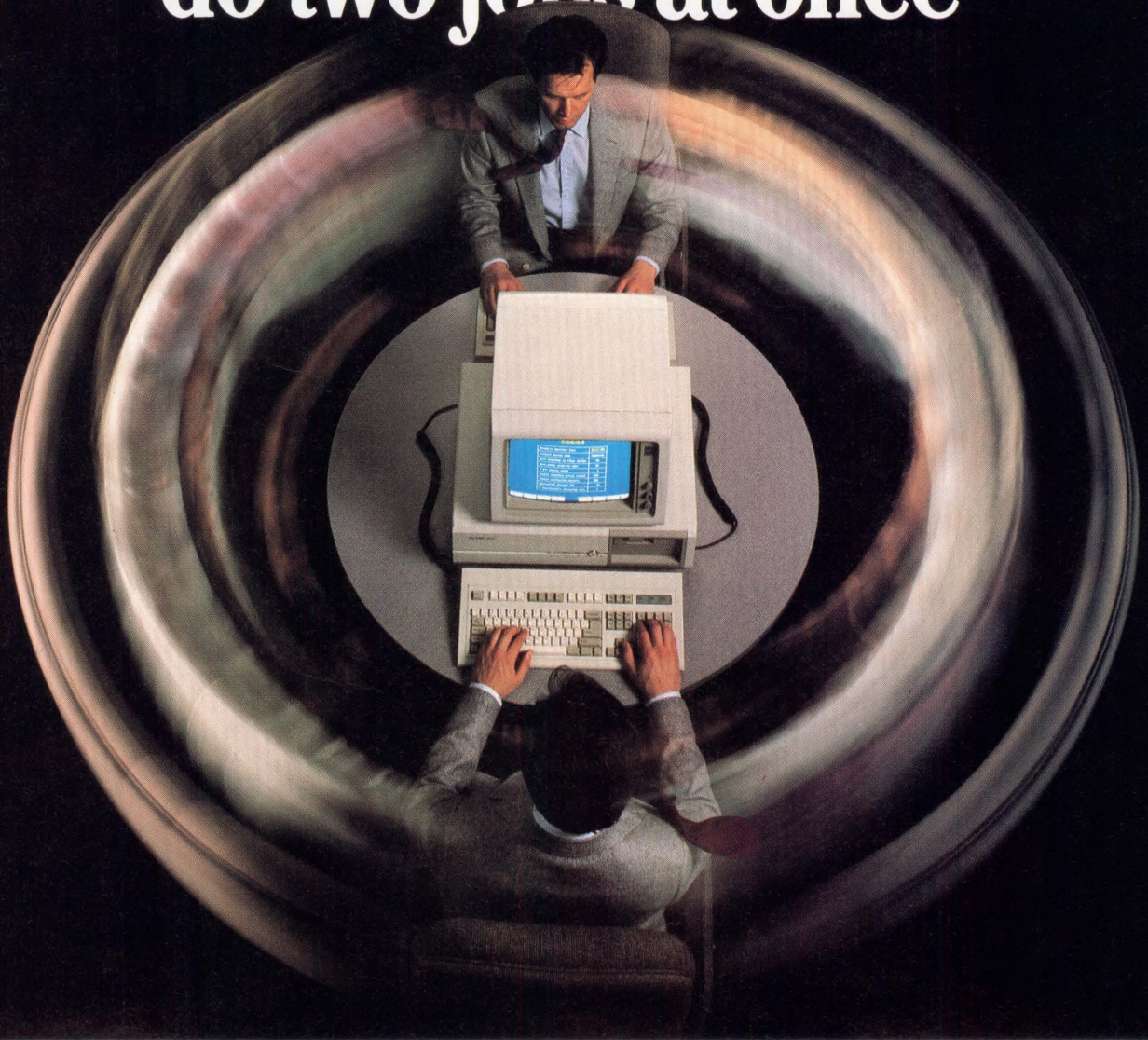
Tolas V6.4 is available for use exclusively on VAXs. A complete version of Tolas V6.4 with all 15 modules is priced from \$60,000 for a MicroVAX II to \$400,000 for a VAX 8800.



*GSI Transcomm's Tolas features systemwide multicurrency capability.*



# Reflection<sup>®</sup>-When you need to do two jobs at once



You can do the work of two when you use Reflection terminal emulation software.

Only Reflection gives you the power to perform simultaneous PC and host operations. For instance, let Reflection monitor your VAX Mail in background while you run other applications on your PC. Reflection will inform you of new mail and leave you with enough memory to run another DOS application in the meantime.

Pulling double duty is only one of the virtues that made Reflection the winner of the 1989 *Digital Review Target Award*. A programmable script language gives you the flexibility to automate tedious tasks.

Reflection's high-speed file transfer works with a wide range of computers and includes easily-uploaded VAX and UNIX file transfer software at no extra charge. The PLUS option offers support for all popular networks and a sophisticated PC file backup and restore capability.

All these features come with a 60-day satisfaction-or-your-money-back guarantee.

**Reflection 4 PLUS** offers accurate VT241 emulation, plus 16-color ReGIS graphics, for \$349.\* For VT320 emulation only, choose **Reflection 2 PLUS** at \$249.\* Quantity discounts are available.

Call toll-free to order Reflection from Walker Richer & Quinn, the connectivity specialists.

**REFLECTION<sup>®</sup>**  
SERIES  
**SOFTWARE**

**1-800-8PC-2VAX**  
(1-800-872-2829)

CIRCLE 143 ON READER CARD

**Walker Richer & Quinn, Inc.**

2825 Eastlake Avenue E., Seattle, WA 98102  
206-324-0350 FAX 206-322-8151



\* Shipping and applicable taxes will be added. Reflection is a registered trademark of Walker Richer & Quinn.



# Windows And 386Ware Make A Match

*DECwindows Capability And Network Server For UNIX Workstations Enhance Logcraft Line*

Logcraft Inc. of Nashua, New Hampshire, has announced that its 386Ware V3.6 is fully compatible with DECwindows. 386Ware consists of a network server and software to interface the MS-DOS and DEC environments.

Logcraft also has announced the LC-16 MS-DOS network server for UNIX workstations. The LC-16 enables RISC workstations to create a PC window and run MS-DOS applications such as Lotus 1-2-3, dBase III and WordPerfect.

DECwindows, an extension of the X Window System, lets you create windows on your workstation to view, edit or execute files stored anywhere in a DEC network. DECwindows implementation in 386Ware V3.6 transforms 386Ware's setup menus into pull-down menu windows.

VAX/VMS V5.0 or later, 386Ware V3.6 and a VAXstation or DECstation with a mouse are the system requirements needed to run Logcraft's 386Ware with DECwindows.

Using a mouse, you can pull down a menu window and run spreadsheets, databases, word processing or other programs from

386Ware inside a window created on a DEC workstation. Several windows can appear on the screen simultaneously. Every descending menu window appears as a new window, overlaying the previous one.

Certain keystrokes are different when running PC applications in 386Ware with DECwindows, because the IBM PC and the DEC-compatible VT keyboard layouts are different. A keyboard-remapping feature has been added so that 386Ware users can remap their keyboards.

The X User Interface (XUI) toolkit incorporated within VMS V5.0 is the

software component of DECwindows that lets you custom design your own windows. It features widgets — prepackaged software devices such as clocks, calendars, sliders and dials that simplify the design of DECwindows applications. Menus for 386Ware with DECwindows incorporate some widgets that save time during data entry.

You can begin a 386Ware DECwindows session from the VMS \$ prompt in several ways, depending on the type of implementation desired. After a session is started, an MS-DOS icon appears beside other application icons in the icon box line. The

## FOR MORE INFORMATION

**Logcraft Inc.**  
22 Cotton Rd.  
Nashua, NH 03063  
(603) 880-0300  
Circle 420 on reader card

DECterm icon is one of these.

The 386Ware window can be opened by clicking on the MS-DOS icon with the mouse. The five pull-down menu window options — Configuration, Devices, Edit, File and Help — appear from left to right on the top of the screen.

Companies that have a software-maintenance agreement with Logcraft will receive the 386Ware V3.6 software update free of charge. The price of 386Ware V3.6 for out-of-warranty updates is \$1,000.

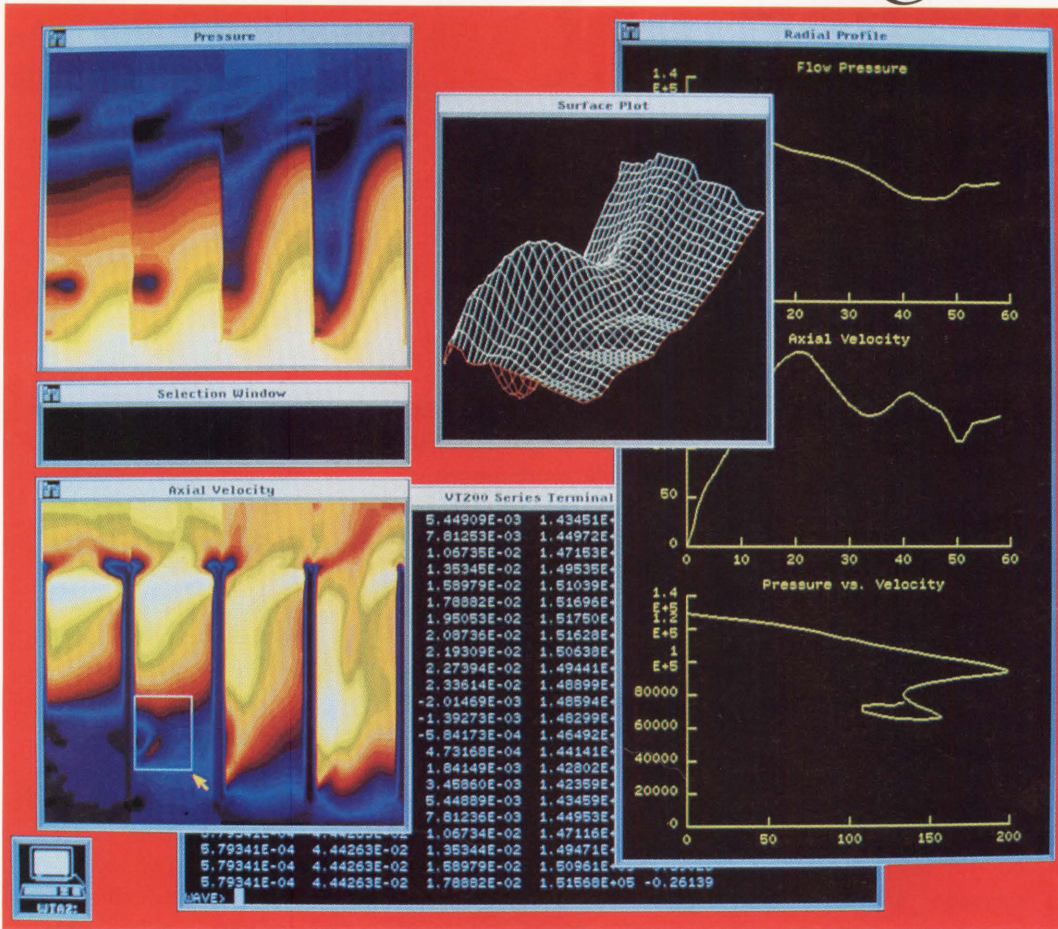
Logcraft's LC-16 network server can handle 16 simultaneous MS-DOS sessions. It's 80386-based and comes configured with 8 MB of RAM and a 1.2-MB floppy drive. Additional memory, math co-processors and status displays are available as options.

The LC-16 is available for DECstations 2100 and 3100 and DECsystems 3100, 5400 and 5800 and is priced from \$11,995.

*DECwindows provides faster access to Logcraft's 386Ware.*



# Better Science Through Pictures



Results of computational fluid dynamics (CFD) analysis using data from Holset Engineering as visualized on a VAXstation 2000. At the left, powerful image processing features quickly show an overview of the full data set. From there, features and trends are identified interactively and displayed as surfaces and line graphs. PV~WAVE is ideal for quickly viewing large data sets to gain important insights. Using this new information, it is then possible to select features and subsets for further review and analysis.

## PV~WAVE

### Interactive Data Display and Analysis Software

#### Immediate Visual Gratification

Explore, analyze, reduce and visualize your data interactively with PV~WAVE on your VAX, DEC or SUN workstations. Our Scientific Visualization software lets you interact directly with your data to navigate through data sets, select key features, and visually identify trends. Your data will be translated into publication-quality graphics fast — 262,000 data points from disk to display in less than 10 seconds!

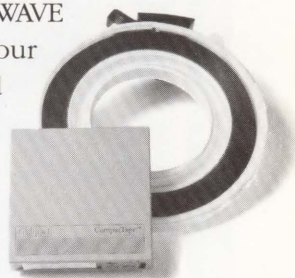
PV~WAVE; DEC, VAX, VAXstation 2000; and SUN are registered trademarks of Precision Visuals, Inc.; Digital Equipment Corporation; and SUN Microsystems, Inc., respectively.

#### See Inside Your Data Fast

PV~WAVE lets you select from a full range of analysis, image processing, and graphics visualization methods to let you see inside your data fast. With PV~WAVE you can access any data in nearly any format. Tie into your own software or commercially available products; there's no need to build or buy special data converters. And you can easily develop specialized applications to create custom interfaces using commands, macros or pop-up menus for all users — from novices to experts.

#### How Immediate? Let Us Show You!

Discover how PV~WAVE helps you see your data fast. And spend more time formulating important results. Call Chris Logan at **800/447-7147** to qualify for a free evaluation copy.



**Precision Visuals®**

Precision Visuals, Inc.  
6260 Lookout Road  
Boulder, Colorado 80301 USA  
303/530-9000 Fax 303/530-9329

See us at DEXPO West Booth #1712

CIRCLE 172 ON READER CARD



# Text Management On The Large Scale

*3CI Inc.'s Textbase Text-Management System Searches And Retrieves Textual Data On Large Relational Databases*

If you've been wishing for an RDBMS that can handle variable-length text fields and fixed-length data fields easily, 3CI Inc. of Fort Collins, Colorado, may have what you need. Its Textbase text-management system handles search and retrieval of textual data on large relational databases.

Textbase is designed as an extension to 3CI's InFoCen RDBMS/4GL. InFoCen V8.2 is a full-featured RDBMS that includes an SQL called ISQL, a data dictionary/directory, a FORMS module, a MACRO language, a Report Writer, programmable security levels, a FORTRAN subroutine

library and a WordPerfect SHELL that lets you move easily between WordPerfect word processing and InFoCen. Using InFoCen's IMPORT facility, you can extract and reformat data from another RDBMS for subsequent manipulation by Textbase.

Textbase was designed to meet the needs of high-speed data retrieval in text-intensive applications such as legal support, quality control, research documentation, insurance, law enforcement, personnel, publishing, product management, pharmaceuticals and government.

3CI has made Textbase

fully compatible with WordPerfect. WordPerfect users can access Textbase from the word processing menu. Textbase users can search a WordPerfect-formatted document transparently.

Textbase uses one of three techniques to search a textual database, depending on the query. Queries are issued using the Command Language or the Menu System. The method used for the search is transparent to the user and is determined by the system.

One method is a non-indexed approach. Text is stored in a series of data clusters in a text block within the database. A blocked sequential fast text scan is used within the data cluster. Results matching the information requested are returned in a subset. This low-speed, no-overhead approach can be used on any variable-length text item.

Another technique uses the Association for Computing Machinery (ACM) signature method. Signatures are bit vectors representing patterns of text. Query criteria are vectorized and scanned against the signature vectors. Matches are verified and returned to you in a subset. The speed of the

## FOR MORE INFORMATION

**3CI Inc.**  
2057 Vermont Dr.  
Fort Collins, CO 80525  
(303) 223-2722  
Circle 421 on reader card

search depends on the uniqueness of the pattern used in the query in relation to stored text. This is a medium-speed, low-overhead approach.

If the index is narrowed to the word level, you get Textbase's WINDEX method. This method is a very-high-speed, variable-overhead approach. Each word has an index that uses a representative bit vector to indicate inclusion in the requested document. 3CI claims that this method can locate any word in a database usually in less than one second.

System requirements for Textbase are from 10,000 to 20,000 blocks of disk space for the executable and support files, depending on the configuration of InFoCen/Textbase you choose.

Prices range from \$9,120 for Textbase only on a MicroVAX 2000 to \$179,040 for a complete InFoCen/Textbase package on a VAX 8978.

DATABASE NAME: TEXTBASE      TODAY'S DATE: (date)  
CURRENT DATASET: DOCUMENTS      CURRENT SUBSET:

---

TEXT SEARCH

---

DOMAIN: \*      Subset name or '\*' to search the current dataset

ITEM NAME: text

search criteria (or enter 'H' for Help):  
'narcotics' and 'gun' 1 P

---

Subset Name: gun

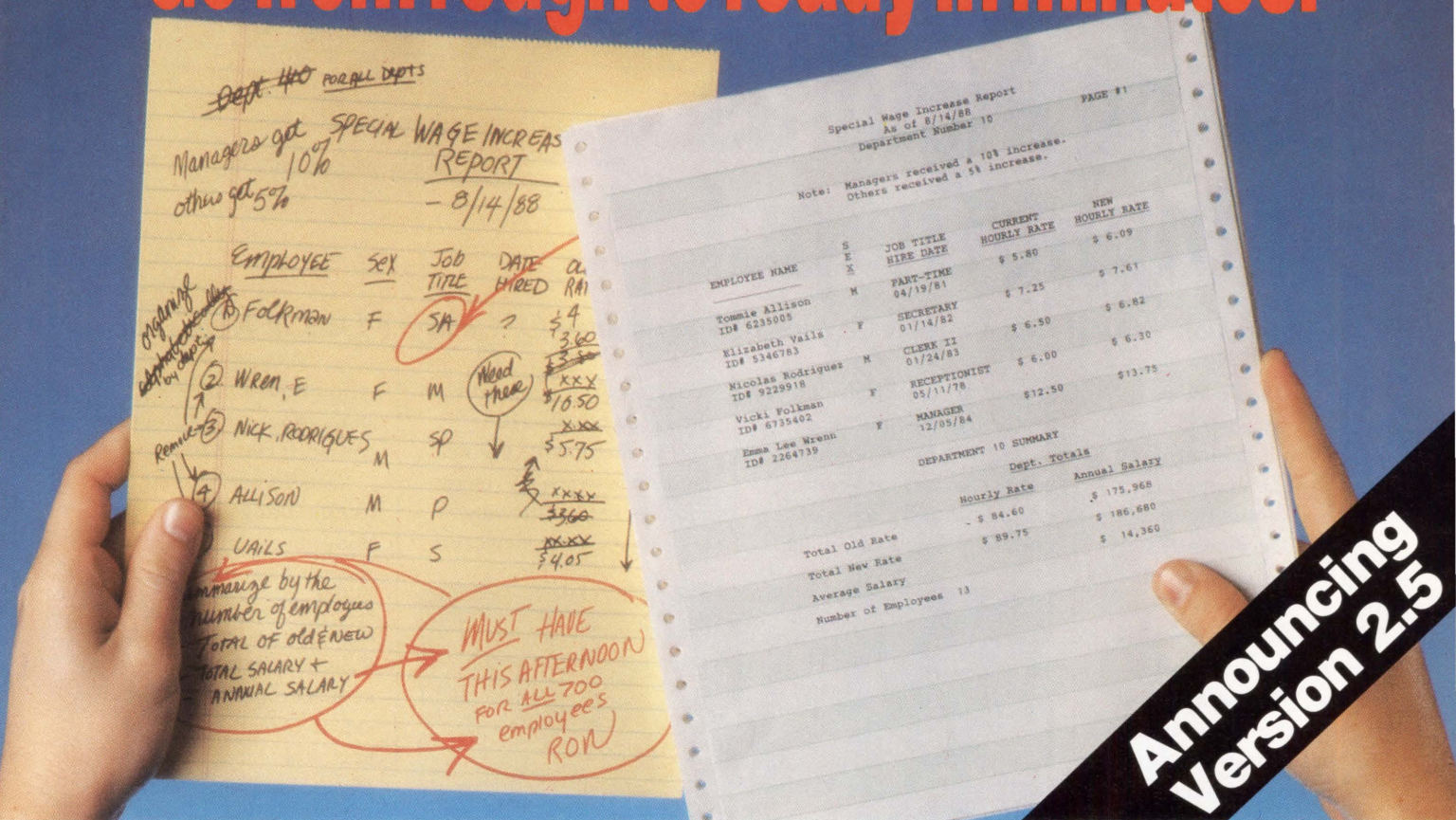
Do you want to perform another Text Search (Y/N) N

The number of records meeting the Text search was: 11

*Shown is a search for narcotics and gun using the Menu System. 1 P indicates that the words should be in the same paragraph.*



# Go from rough to ready in minutes.



## With Intelligent Query™, the VAX report writer for everyone. Booth 1550

### 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 Printer
- English 4GL
- Predefined dictionary to shield users from technical aspects of database management

### Don't rewrite a line of code!

IQ integrates with your existing applications providing a consistent user interface for a wide variety of programs for many VAX databases and of course RMS files.

### 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

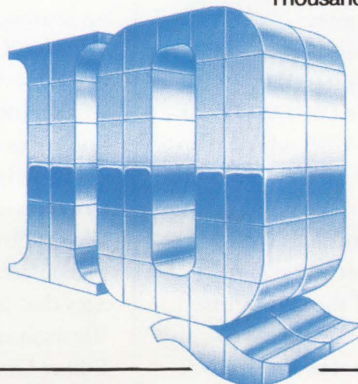
Additionally, IQ incorporates incremental selection, native key linkage, index retrieval and numerous other techniques to maximize efficiency.

### IQ Puts You In Smart Company

Thousands of VAX users put IQ to work everyday, to turn data into information. At companies like Champlin Oil, ABC Radio Networks, Lockheed, Fluor Daniel, and Echo Bay Mines...even DEC has licensed 30 copies (and they could have gotten DATATRIEVE free).

### See For Yourself

Stop by our booth, 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 35,000 copies.



“IQ was the most exciting software at the show” ...DEXPO West attendees.

## Programmed Intelligence Corporation

3295 River Exchange Dr. Suite 550 Norcross, Georgia 30092 1-800-458-0386 (404) 446-8880

CIRCLE 238 ON READER CARD

The products mentioned above are trademarks of their respective companies.



# Moving Pictures For Input/Output

*V.I. Corporation's DataViews Provides Graphical Representation Of Changing Data In Real-Time*

If you need to develop custom color graphics displays for real-time monitoring and control on both the input and output sides, consider DataViews V7.0 from V.I. Corporation of Amherst, Massachusetts.

DataViews is a graphics-based application-development software package that lets you create a graphical user interface for monitoring, controlling, interpreting and analyzing data that's changing in real-time. The graphical user interface provides input and output development capabilities.

Input tools let developers build the graphical interface. Output tools add graphical meaning to the interface so that you can perform data analysis and make decisions based on visual information presented. The developer can apply graphical content to the interface in the form of color, objects and a variety of graph types.

DataViews consists of two components: DV-Draw and DV-Tools. DV-Draw is a 2-D menu-driven drawing editor that lets you create drawings with static and dynamic components. A dynamic drawing can change in color or shape as its input data changes. Static drawings provide a back-

ground or additional context for the dynamic portions.

The DV-Draw drawing editor provides text-editing capabilities and a series of primitive objects including

active operator control of the process displayed.

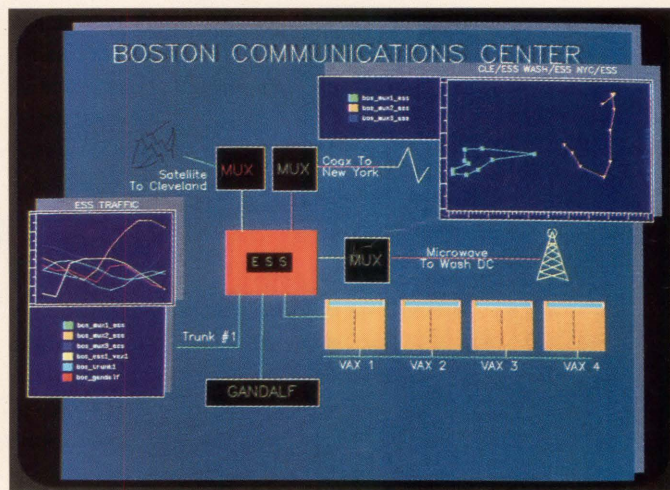
The method of communication between DV-Draw and DV-Tools is the view. DV-Draw creates views that

subroutines for building application-specific drawing editors. It costs \$2,700.

DataViews/Nexpert Subroutine Bridge is a software bridge between DataViews and the Nexpert Object expert system shell from Neuron Data Inc. of Palo Alto, California. It lets you connect objects from the expert system directly to graphical objects in DataViews. DataViews/Nexpert Subroutine Bridge costs \$1,700.

DataViews is available on a variety of hardware platforms including MicroVAXs, VAX 11/750s and VAXstations running ULTRIX or VMS. It's also available for the VAX 11/780, 11/785 and VAX 8000 series. DataViews runs on the X Window System under ULTRIX on the VAX.

DV-Draw is priced at \$7,700. DV-Tools, which includes DV-Draw, is priced at \$17,700.



**DataViews works in a variety of industries including network monitoring and control.**

lines, circles, rectangles and arcs. These objects can be combined to create complex drawings. DV-Draw includes CAD functions.

DV-Tools is a general graphics routine library that includes the DV-Draw drawing editor, with which it works closely. The DV-Tools library provides more than 750 C subroutines for creating user interfaces. Features of the subroutine library include memory-resident screens for immediate recall, the ability to animate drawings, and inter-

active operator control of the process displayed. These views then can be played back using DV-Tools routines. Or, a portion of the view can be extracted and altered by the application program.

The Graphical Editor Construction Kit and DataViews/Nexpert Subroutine Bridge are application packages that enhance the DataViews family. The Graphical Editor Construction Kit is a set of generic editing

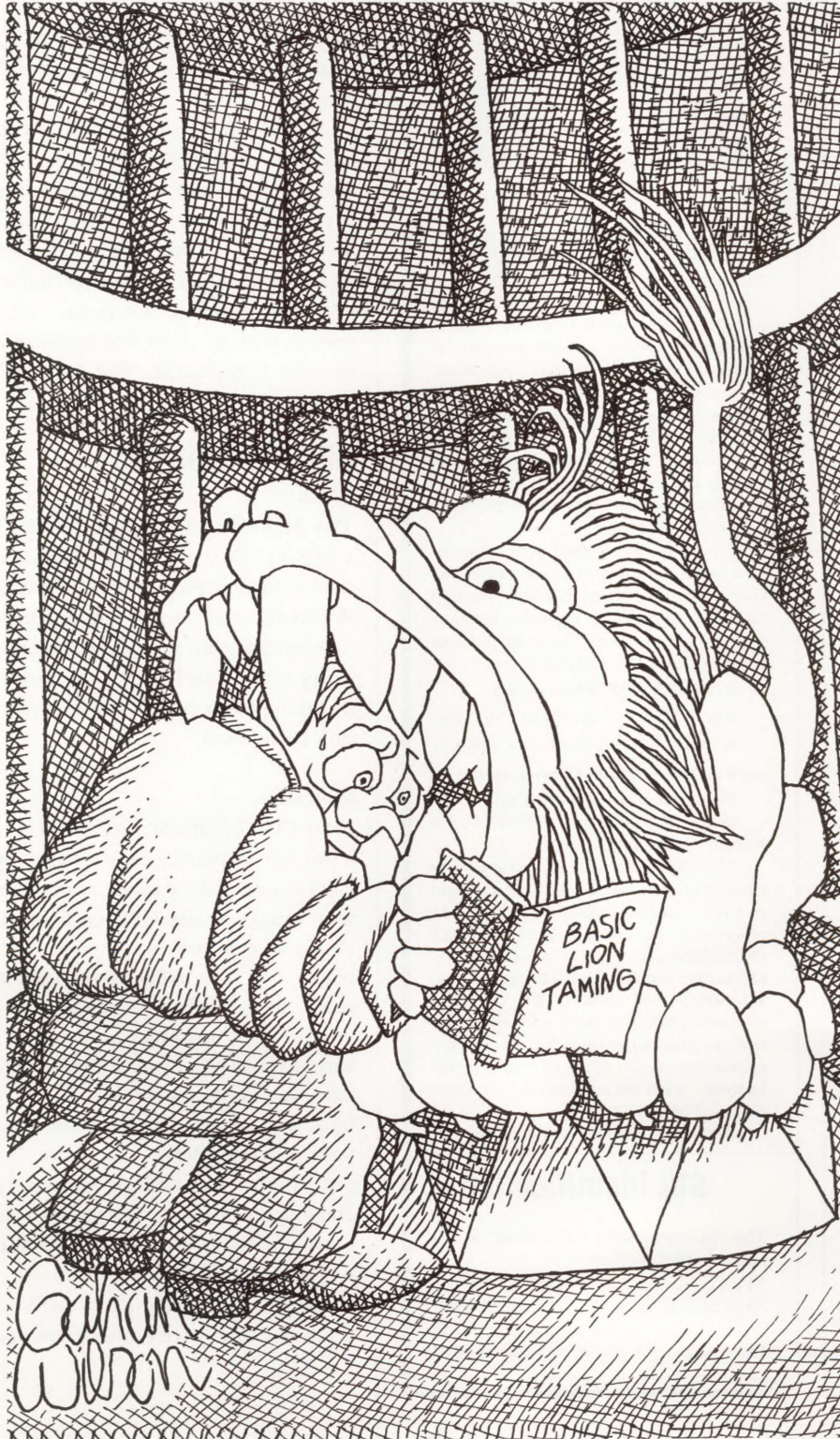
## FOR MORE INFORMATION

V.I. Corp.  
Amherst Research Park  
Amherst, MA 01002  
(413) 253-3482  
Circle 526 on reader card

Neuron Data Inc.  
444 High St.  
Palo Alto, CA 94301  
(415) 321-4488  
Circle 527 on reader card



# WHEN FACED WITH LEARNING A NEW TEXT EDITOR, YOU CAN PROBABLY THINK OF SOMETHING ELSE YOU'D RATHER DO.

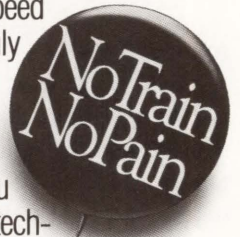


Most people would do just about anything to avoid learning a new text editor.

Fortunately, there's EDT+. EDT+ from Boston Business Computing is a full-featured text editor based on VAX EDT. EDT+ let's you move from VMS to UNIX or MS-DOS without the expense or hassle of retraining.

EDT+ supports all the familiar EDT features like line and keypad mode commands, disaster recovery, command macros, user-defined keys and initialization files. It also offers important improvements over the old standby, including TPU/EVE features like SHELL and LEARN and 132-column support — all with the speed expected of a truly contemporary product. You will benefit immediately, as you optimize newer technology and eliminate a drain on your VAX resources.

And as the leader in DEC compatible software, we'll fully support your move from VMS to the not so familiar world of UNIX or MS-DOS. Call (508) 470-0444. Before you do anything drastic.



## EDT+

**Take the bite out of going from VMS to UNIX or MS-DOS.**

BOSTON BUSINESS COMPUTING, LTD.

The DEC Compatible Software Company

CIRCLE 297 ON READER CARD

© 1989 Boston Business Computing, Ltd. Three Dundee Park, Andover, MA 01810 (508) 470-0444. All rights reserved. UNIX is a registered trademark of AT&T Corp. IBM is a registered trademark of International Business Machines Corporation. MS-DOS is a registered trademark of Microsoft Corp. VAX and VMS are registered trademarks of Digital Equipment Corporation. VCL and EDT+ are trademarks of Boston Business Computing, Ltd.



## MODEM BLUES

### QUERY:

**Christopher Atkins** (SIG 37/MESS 940): I manage a MicroVAX II. We have an annoying problem with our modems. They won't hang up after someone has called in and hung up on his end but not logged out on ours. Often other users are waiting to log on under the same line. I know of hardware devices that would solve this problem, but what could alleviate this via software?

They aren't DEC or DEC-compatible modems. Maybe this is the problem. The modems are serial-connect (RS-232).

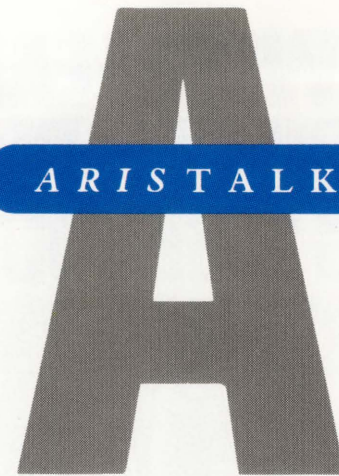
Is there software available, such as the KERMIT program from a DECUS tape, that will function with modems? It's annoying to have only one protocol to use, especially one that doesn't allow sending files without a remote KERMIT server waiting to receive at the other end.

### REPLY:

**Andrew Duggan** (SIG 37/MESS 941): I run a VMS time sharing system with more than 32 modems, none of which are DEC modems. Here are the basics for the successful use of modems under VMS:

Use a terminal multiplexer or server that supports modem control. Set the terminal port to /MODEM /HANGUP. Your modem must watch the Data Terminal Ready (DTR) and supply Carrier Detect (CD), Data Set Ready (DSR) and Ring Indicate (RI). There usually are DIP switches to set the modem for this type of setting. Here's what should happen when the modem answers a call:

The line rings and the modem raises RI. It doesn't answer. VMS raises DTR. When the modem sees DTR high, it answers the phone. If a connection is made,



## How To Use ARIS/BB

Subscribers to *DEC PROFESSIONAL* can call up our on-line 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

**New!** ■ (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 Karol Hughes at (215) 957-1500, 9 a.m. - 5 p.m. EST. 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:

- 13 ..... System Performance
- 23 ..... MicroVAX
- 37 ..... VMS
- 45 ..... Programming Languages/AI

the modem raises DSR and CD. If CD and DSR don't come on in 30 seconds, VMS drops DTR.

When you log out from the dial-in call, VMS drops DTR. When the modem sees DTR go down, it hangs up the phone. It's a good idea to have the terminal port set to /DIAL so you can enable security audits for dialup login/logout/logfail.

For a complete description of what goes on with modems, see Section 8.2.3 of the *I/O User Manual, Part 1*, pages 8-12 through 8-17.

## CPU EXHAUSTED

### QUERY:

**Tim Manville** (SIG 13/MESS 233): I have a VAX 11/750 with 14-MB memory that's dedicated to a PowerHouse application. When the application is running, the CPU is exhausted even though little memory is being used. Can I increase performance by taking advantage of the memory that isn't being used?

### REPLIES:

**Robert G. Schaffrath** (SIG 13/MESS 234): Your 750 is suffering from a classic case of CPU bound. All the memory in the world won't make a slow CPU go faster unless your processes are swapping all over the place. Try a MONITOR MODES command to see what percentage of time you're spending in user mode. If it's high and you have a lot of processes in the COM state, you need a faster CPU. You may not be able to increase memory use, because your processes don't want more. If your processes are page faulting excessively, increasing the working set sizes will result in better memory use. Excessive faulting will slow your CPU.

**Richard B. Gilbert** (SIG 13/MESS 239): Taking advantage of unused memory will





**EM4105 is a sophisticated Tek 4105/DEC VT220 terminal emulator that converts your IBM PC into a color graphics workstation. EM4105 costs thousands less than a dedicated graphics terminal.**



## 4105 EMULATION

### EM4105

- 16/64 colors
- Pan/Zoom
- High resolution Hardcopy
- Mouse cursor control
- 4010 and VT640 Emulation
- 640 x 350 EGA support
- 640 x 480 VGA and EGA support

And, EM4105 includes all the features of DCS's popular VT220 emulator, EM220.

- ASCII, Xmodem, and Kermit File Transfer
- Command (Script) files
- Phone Directory
- Scroll memory
- Hot Key
- Loadable Character Sets
- Network support



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

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

*Other DCS emulators: EM220 — DEC VT220 Emulation  
 EM4010 — Tek 4010/VT220 Emulation*



## FIGURE.

```

02 80-COLS.
03 FILLER      PIC S9(04) COMP VALUE 27.
03 FILLER      PIC S9(04) COMP VALUE 91.
03 FILLER      PIC S9(04) COMP VALUE 63.
03 FILLER      PIC S9(04) COMP VALUE 51.
03 FILLER      PIC S9(04) COMP VALUE 108.
02 132-COLS.
03 FILLER      PIC S9(04) COMP VALUE 27.
03 FILLER      PIC S9(04) COMP VALUE 91.
03 FILLER      PIC S9(04) COMP VALUE 63.
03 FILLER      PIC S9(04) COMP VALUE 51.
03 FILLER      PIC S9(04) COMP VALUE 104.
    
```

help only if your application is suffering from lack of memory. If you're doing a lot of paging, you might get a little CPU power back by increasing your working sets. Paging can't be entirely eliminated, however, no matter how big you make them. When an image is activated, it's paged into memory as required.

Don't expect a lot of improvement even if you can eliminate some paging. The 11/750 isn't built for speed. If you need more throughput or better response

time, look to a faster CPU. One of the machines in the MicroVAX 3000 series would give you five to six times the horsepower you have now.

Another possibility is to use spare memory for I/O buffers. If you're reading from or writing to sequential files, doing it in bigger blocks might eliminate some overhead.

Unless your system or your application is horribly mistuned, a faster CPU is probably the only answer.

## BINARY DUMP

### QUERY:

**Ken Papworth** (SIG 23/MESS 212): How do you perform a binary dump on a non-ASCII file?

### REPLY:

**John Briggs** (SIG 23/MESS 213): Use the DCL DUMP command:

```
$ DUMP /RECORD filename
```

The hexadecimal portion of VAX

dumps is read from right to left, i.e., the first byte in a line is the right-most byte. It's strange, but given the VAX convention of least-significant byte first, it makes sense.

## SET TERM FROM COBOL

### QUERY:

**Lance Buchmiller** (SIG 45/MESS 418): I'm trying to design an inquiry program that needs a lot of screen space, and I can't set the screen width to 132 from the COBOL program. I've found examples of calling QIO\$\_SETMODE in VAX PROFESSIONAL, but they're in BASIC and FORTRAN. Perhaps my third-party terminal isn't emulating VT220 correctly. I've had success calling other system routines from COBOL.

### REPLIES:

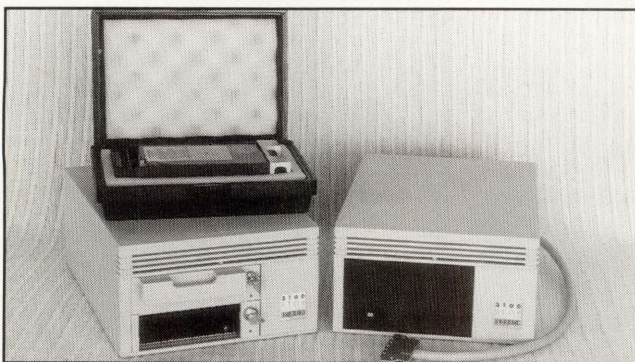
**John Briggs** (SIG 45/MESS 420): A QIO\$\_SETMODE call to change terminal width won't change your terminal into 132-column mode as the DCL SET TERMINAL /WIDTH=132 does. To change the physical terminal's screen size, send the appropriate escape sequence (<ESC>[?3h).

Determine whether your SETMODE QIO has worked with the SHOW TERMINAL command.

**Jim Shelly** (SIG 45/MESS 421): I've written a number of programs in COBOL that do screen manipulation and scrolling in different areas. The Figure shows the easiest way I've found to change the terminal width under WORKING STORAGE.

When you want to go to 132 characters, just "DISPLAY 132-COLS." And of course you can "DISPLAY 80-COLS." to go back again.

## SHOP AT UNBOUND's 3100-STOR Add In - Add On - Removable for the VAXStation 3100 and DECStation 3100



- \* 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,  
California 92647

Tel. 1-714/843-1895  
FAX 1-714/843-0627

Model	Disk Drive		
STOR100-I	Internal RZ23	100MB	\$1,460.00
STOR200-I	Internal UZ24	200MB	\$2,240.00
STOR100-E	External RZ23	100MB	\$1,835.00
STOR200-E	External UZ24	200MB	\$2,675.00
STOR380-E	External RZ55	380MB	\$2,950.00
STOR600-E	External UZ56	600MB	\$3,950.00
STOR760-E	External UZ57	760MB	\$4,650.00
<b>External Removable Storage</b>			
STOR200-R	(2) RZ23-R	200MB	\$3,520.00
STOR400-R	(2) UZ24-R	400MB	\$5,080.00
STOR300-R	RZ23-R UZ24-R	300MB	\$4,300.00

\* All products are registered trademarks of their manufacturer

CIRCLE 305 ON READER CARD

ARTICLE INTEREST QUOTIENT  
Circle On Reader Card  
High 564 Medium 565 Low 566

The ARIS/BB Online Text-Retrieval System lets ARIS users access issues of DEC PROFESSIONAL. For information on how to use this service, turn to page 36.





# Terminal emulation doesn't have to be this way.

We've all been there. Trying to remember whether the "Do" key is really <Ctrl-F1>. Or was it <Alt-F1>? And the editing keypad. Can you be absolutely sure you're about to press the "Select" key and not the "Remove" key? The results can be disastrous.

That's why KEA developed the PowerStation. The PowerStation, an exact VT200 layout keyboard bundled with VT240 or VT220 terminal emulation software, turns your IBM PC or compatible into a key-by-key replica of a DEC terminal - without messy labels!

But what does that get you?

**Peace of mind.** The PowerStation keyboard takes the frustration out of switching between a DEC terminal and a PC *because each key is right where you'd expect it to be*. And our "Gold Key" version makes ALL-IN-1 and WPS a breeze.

**Savings.** If you think you can't afford both emulation software *and* a keyboard, think again! The PowerStation can actually save you money by eliminating the time you waste every day translating between VT and PC keystrokes. And with the PowerStation, *startup training costs are virtually eliminated*.

**Consistency.** The PowerStation keyboard provides a consistent interface for both VT emulation and regular PC applications. In emulation mode you get the 105-key functionality of a real DEC keyboard and in PC mode you get a super enhanced keyboard. *And* you can use the PowerStation on virtually any PC! Move between an XT, AT, PS/2, AT&T PC and a DEC terminal *without missing a keystroke*.

**The best in terminal emulation software.** With the PowerStation keyboard you get the fastest, most precise, DEC terminal emulation software available: ZSTEM. You have the choice between two popular software packages: ZSTEM 240, our VT241/VT340 graphics emulator and ZSTEM 220, our VT220 text emulator. Both packages will impress you with their speed and feature-by-feature accuracy.

To top it off, the PowerStation gives you all this at a surprisingly low price. But find out for yourself why Digital Review Labs says "the PowerStation 240 is a godsend." Call us at 800-663-8702.



1 9 9 0  
digital review  
**TARGET  
AWARDS**  
N O M I N E E

PowerStation and ZSTEM are trademarks of KEA Systems Ltd. All other brand and product names are trademarks or registered trademarks of their respective holders.



KEA Systems Ltd., 2150 West Broadway, Suite 412  
Vancouver, B.C., Canada V6K 4L9  
Telephone: 604-732-7411 Fax: 604-732-0715

See us at DEXPO and COMDEX

CIRCLE 119 ON READER CARD



# Online Text-Retrieval Guide

If you're a current subscriber, the ARIS/BB network gives you instant access to articles published in DEC PROFESSIONAL.

Current subscribers now can access issues of DEC PROFESSIONAL online with the ARIS/BB Text-Retrieval System. Information unavailable from any other source is just a keystroke away.

Simply log into ARIS/BB with the subscription number from your mailing label. Option 46 from the ARIS Master Menu places you in DEC PROFESSIONAL's Text-Retrieval Index. Review the brief introduction. Then enter a word or phrase

of interest when you see the Keyword prompt at the bottom of the screen. Figure 1 uses the example keyword *Window*.

When searching a phrase, be brief. If the phrase you enter appears on two separate lines, it won't be found. You can't search for "noise" words such as *if*, *and* or *but*. If you try to search a noise word, you'll get a message telling you so.

The File screen lists the articles in which *Window* ap-

pears and the number of times it appears (see Figure 2). Use the Up/Down Arrow and Next/Prev Screen keys to move the highlighted area to an article that interests you.

Depending on your terminal, these keys may not work. Figure 3 is a diagram for using your numeric keypad. Here, press the Right Arrow key or enter VIEW or READ. Commands aren't case-sensitive.

Using the Right Arrow or keying in VIEW puts you in

the Text screen at the first occurrence of *Window*, which is highlighted (see Figure 4). The title and issue are located at the top of the screen. Entering READ takes you to the Text screen at the top of the document. Use the READ command when you want to read the entire article. In this case, the word you searched for won't appear highlighted.

From the Text screen, the Left Arrow key returns you to the File screen. At the File screen, entering FILTER plus

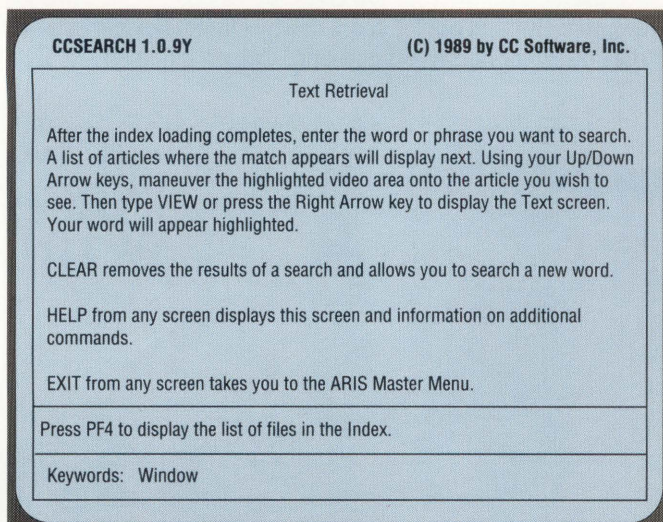


Figure 1: Keyword prompt appears at the bottom of the screen.

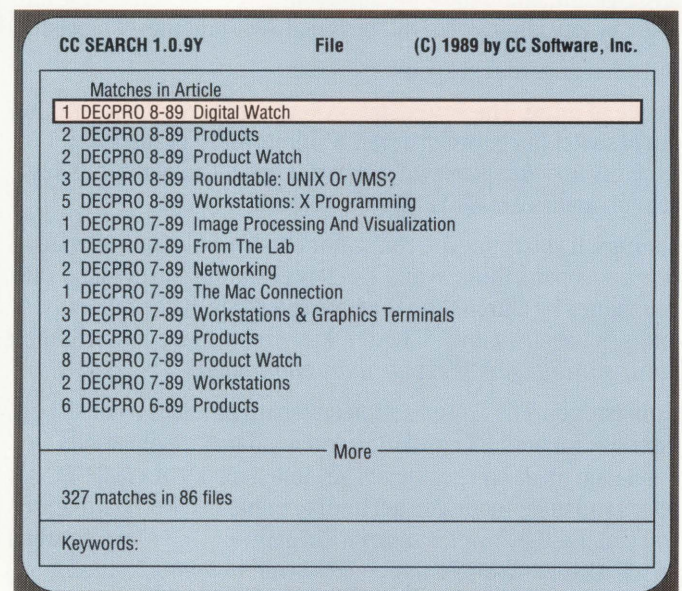


Figure 2: File screen lists articles in which *Window* appears.



# DEC PROFESSIONAL'S BULLETIN BOARD ARIS/BB



another word (e.g., FILTER UNIX) will reduce your File list by searching for UNIX from the list produced by searching for Window.

To begin a new search, type CLEAR. This will erase the results from your previous searches.

Figure 5 shows the definitions of additional commands that can be used in the text-retrieval system. — Anne Schrauger is editorial systems coordinator. For more information call her at (215) 957-1500.

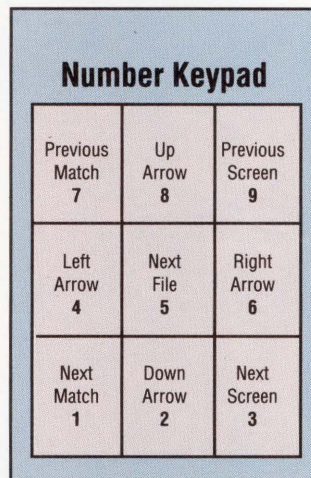


Figure 3: Diagram for keypad.

**CC SEARCH 1.0.9Y** Text (C) 1989 by CC Software, Inc.

More

Text from DECPRO 8-89 Digital Watch  
 Temporary Shelter — Wellfleet Communications Inc. is delivering a set of client/server-based communications products that adhere to the Simple Network Management Protocol (SNMP), the current standard on the Department of Defense's Internet. SNMP is an interim standard that will be used until the move to the International Standards Organization (ISO) model. SNMP is ISO-like, but not part of the model. Wellfleet's versions run TCP/IP and use the X~~Window~~ System environment.

Networking — Agreements with Chipcom Corporation and StrataCom Inc. signal DEC's willingness to cooperate with third-party vendors in building its enterprise networking strategy. Chipcom's ORnet fiber optic Ethernet system will help DEC comply with FDDI standards, while StrataCom will provide data, voice, video and image services over T1 networks.

Companies Mentioned In This Article More

Displaying from Lines 219-233

Keywords:

Figure 4: Text screen; first occurrence of Window highlighted.

Command Definitions		
<i>Unless noted, these commands can be given from any screen.</i>		
Command	Abbrev.	Definition
CLEAR	CL	Clears results of previous search.
CTRL-B		Recalls previous commands in reverse order.
CTRL-U		Erases keywords just keyed in by mistake, instead of deleting them one character at a time.
CTRL-W		Repaints or Refreshes the screen. REFRESH does the same.
EXIT	EX	Returns to ARIS Master Menu. CTRL-Z or QUIT do the same.
FILTER	FIL	Narrows a search by using the initial matches in a File screen to search for a new word.
FIND	FIN	Followed by one or more words, determines frequency of a word and whether or not it's a noise word. Noise words can't be searched. Use from Intro screen.
HELP	HE	Access from any screen. CTRL-Z to get out.
LOCATE	LO	Locate a word or string within Text screen; it won't be highlighted but will be positioned on the line. Note: If string is located on two lines, it won't be found.
NEAR:		Use to search two words that are located within 10 words of each other. Noise words aren't counted. The syntax is <b>word near: word</b> . You can specify a proximity, i.e., NEAR:5 or NEAR:20, which will search for words within 5 and 20 words of each other, respectively. In this case, noise words will be counted. NEAR: can only be used from the Intro screen.
NEXT FILE		Moves from the Text screen of one article to the Text screen of the next article.
READ	REA	Takes you from the File screen to the beginning of the text of the highlighted article. However, the word that was searched won't be highlighted.
VIEW		Initiated in the File screen, it displays text of the highlighted article where first match appears.
*		Wildcard searching. Example: Search Window*, and the result would list the variations found, i.e., WINDOW WINDOW-WINDOW-BASED WINDOW-DRIVEN WINDOW-MANAGEMENT WINDOWED WINDOWING WINDOWS WINDOWS...

Figure 5: Definitions of additional commands.



HIGH VOLUME



MESSINA



# OLTP is in your FUTURE

**Most users will  
be interested in  
OLTP in coming years.  
Why? The reasons  
are many.**

BY PHILIP A. NAECKER

You may not know it yet, but you're likely to have at least one Online Transaction Processing (OLTP) application in your environment within the next few years. And the number and size of OLTP applications are likely to grow sharply for both small and large organizations.

Digital seems to view OLTP as a dominant form — possibly *the* dominant form — of computing in the 1990s. This may shock Digital users who have no current plans for implementing OLTP applications, but there are many reasons why most users probably will be interested in OLTP in the future.

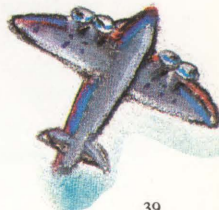
## Pouring Concrete

Why will there be so much OLTP in the future when there's relatively little today? The answer lies in the foundation of a complete TP environment. Like the foundation of a skyscraper, building the

foundation for a new style of computing requires digging a big hole and pouring a lot of concrete. In Digital's TP strategy, that foundation is just beginning to reach ground level, and subsequent floors will follow quickly (see Figure).

Let's first look at the structure of a typical TP application, then examine the recent announcements of TP foundation products and enhancements.

A typical OLTP application isn't much different from any other application, because it generally involves users and a database. A request initiator, such as a customer at an automated teller machine or a user at a terminal, requests a transaction. The transaction usually involves checking a database for account balances or the number of open seats on an airplane flight. If the initial check passes (you have money in your account or there are seats free on the plane), then the





0000000  
00P0000  
00DBMS0

## Objects And Objectives

After years of development in academia and major software houses, object-oriented technology is entering the mainstream of software engineering. Object-oriented approaches to programming and application development (OOP) and object-oriented database management systems (OODBMS) represent a radical new software paradigm that's changing the way many people think about how data is stored.

The technology is being evaluated, developed and pursued by many major producers of RDBMS systems, including Digital, IBM, Apple Computer and Sun Microsystems. Advanced OOP technology for VAX/VMS and UNIX environments already exists from vendors such as Ithaca Software, Ontologic, ParcPlace Systems, Servio Logic Development, Symbolics, Stepstone and Dome Software, which incorporates a Mac front end.

The premise of object-oriented systems is that data is stored with its corresponding procedures (called methods in OOP) inside executable screen icons called objects. These data structures, which are created with languages such as Object PASCAL and variations on AT&T's C++, are intended to make the management of data easier and spur the productivity of database users.

An OO programmer can specify several classes of objects. Each class definition specifies the structure of the data in all objects in that class as well as the methods implemented by that class. Objects within a class share the same methods, but with different data. Classes, in turn, have subclasses, which inherit the methods and data of their superclasses. A list is the structure that manages and implements methods, such as adding, removing, listing and iterating items.

New classes can be created from these subclasses by altering either data or the described methods. This simplifies both the design and maintenance of databases. The hierarchical tree that's formed by classes has the object at its root. Some OOP languages will support multiple inheritance, which implies that a complex lattice is designed with just a few changes in data.

OOP languages are fundamentally polymorphic, i.e., a large set of operations that can be invoked on a large set of data can be executed with one procedure.

### OO Databases

"There's a debate as to whether OO databases are separate from relational databases," explains Mark Hanner, product marketing manager for application development at Relational Technology (RTI). "Object-oriented can be made part of the relational model, overlaying the RDBMS a layer above."

The types of applications currently using OO databases are predominantly in CAD/CAM and CASE environments. Objects are an ideal way to store graphical diagrams and software-engineering command sets. Mainstream uses, such as data processing applications, are being introduced gradually as performance problems (particularly database speed) are solved. OLTP is expected to be a large area for OO databases as the technology continues to be perfected.

RTI concurrently is developing an OO toolset for UNIX and VMS. "There isn't much difference in the two," says Hanner, "although UNIX has had a problem in that it doesn't do high-performance I/O very well."

Other UNIX and VMS programs are beginning to flood the market. Database owners will be faced with new buying decisions that include:

1. Choosing from among emerging object-oriented methodologies and commercial programming languages. Metrics that measure the quality and effectiveness of these languages are just emerging.
2. Determining whether or not these systems will fit on top of existing structured database systems. As noted by Hanner, object-oriented systems can include evolutionary pathways from relational databases.
3. Deciding whether or not OODBMSs are necessary for their environment. Until prices drop significantly, many sites won't consider OOP. But in the not-too-distant future the technology is expected to be more cost-effective than relational systems for many applications. —*Evan Birkhead*

next part of the transaction is to make a withdrawal or issue a reservation.

Several aspects of the TP model of computing make it more demanding than a typical application such as a spreadsheet or an engineering simulation.

1. TP applications are naturally distributed — you want to make your reservation from a nearby office or make a withdrawal from a local bank branch. But you can't have this application on just your local node (as you might with an engineering simulation), because you want to make the reservation from any travel agent and make withdrawals from any automated teller machine or branch office.
2. TP applications have difficult response-time requirements, as anyone who has stood in a long line at a teller machine knows.
3. TP applications must be reliable. No one wants the airline to lose his reservation, and a bank that loses automated teller transactions soon will be out of business.
4. TP applications must be highly available. If people can't make a reservation immediately on one airline, they'll probably call another.

In the Digital layered-software environment, the various components of a TP application are provided by many different layered products. The database engine is typically Rdb. DECnet provides the connectivity among nodes, TDMS or DECforms provides the terminal interface and ACMS or DECintact provides the application-development environment and run-time control. Many other products also can be involved.

### Databases A Cornerstone

During the last two years, Digital has made a series of announcements and product introductions that show how the company intends to increase its presence in traditional TP markets as well as increase the number of TP applications running in existing VAX shops. Digital's share of the TP market is currently about 5 percent (\$1.5 billion), and the company claims that its TP business is growing 50 percent each year.

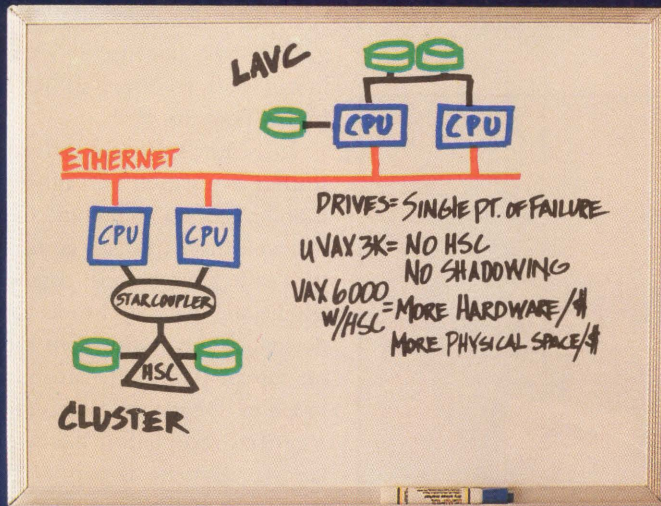
One cornerstone of Digital's TP archi-



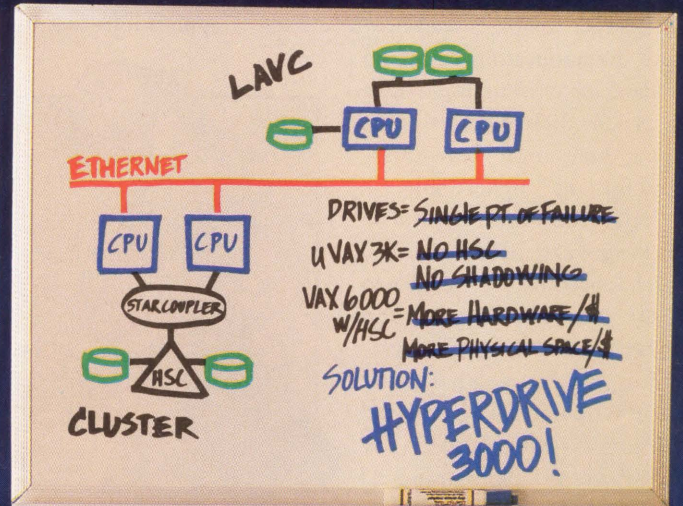
# INTRODUCING HYPERDRIVE 3000.

THE BEST SOFTWARE SOLUTION  
FOR HSC OR NON-HSC DISK SHADOWING.

## PROBLEM:



## SOLUTION:



New HYPERDRIVE 3000, a software-only disk shadowing solution that saves money while it protects data. HYPERDRIVE 3000 is the *most versatile* shadowing product available to VAX/VMS® users.

### Cost-saving flexibility.

HYPERDRIVE 3000 supports the full range of DEC/VAX® processors including mixed VAX® Clusters. HYPERDRIVE 3000 functions with all DEC-compatible disk drives (including RAM disks) and controllers (HSC and non-HSC) regardless of manufacturer, model or size (you can shadow your RD54 to an RA81). With HYPERDRIVE 3000, your shadowing requirements no longer dictate your hardware selections.

### Data-protection reliability.

In critical, high-availability systems, real-time or transaction-processing operations continue uninterrupted with no loss of data. If a processor or a disk drive should fail, HYPERDRIVE 3000 (which is resident on all nodes and shadows to multiple disks) continues shadowing uninterrupted and without operator intervention. When the failed disk is again available to the shadow set, the catch-up facility restores all prior disk activity.

### Performance-boosting versatility.

HYPERDRIVE 3000 can shadow all or part of multiple disks. It can create a virtual disk in CPU memory and can speed up access to frequently used data by 500% or more. By shadowing Bear's Memory Disk to a physical disk, data stored in memory is automatically backed-up to disk. Physical disks that are shadowed can attain a 50%-80% performance boost in disk access time due to HYPERDRIVE 3000's load balance capability of simultaneous read operations from the member disks of the shadow set.

### DEC Tested and Accepted

With the introduction of HYPERDRIVE 3000, Bear Computer Systems continues to provide software solutions with maximum flexibility and economy. In 1988, for their MIRA® System, Digital Equipment Corporation tested and accepted Bear's HYPERDRIVE 2000 Shadow and Virtual Disk products. Now, these products just got better.

Call 800 255-0662, Ext. 200

(in California 818 508-1894, Ext. 200) for more information on HYPERDRIVE 3000.

BEAR COMPUTER  
SYSTEMS INC.

5651 Case Avenue  
North Hollywood, CA 91601-9985

See us at DEXPO West, booth #440

CIRCLE 350 ON READER CARD





ture is Rdb, Digital's relational database engine. In Rdb/VMS V3.0, Digital made major performance improvements. For large applications and applications willing to make changes to the database structure, performance improvement factors of three to five or larger were seen. This level of performance has placed Rdb in the running as a major "industrial-strength" relational engine.

Rdb also has been enhanced to allow much larger databases than before and to allow the application to spread the database over multiple disks to avoid disk bottlenecks, among other improvements targeted for large applications.

"It's clear that Digital is working very hard on Rdb. Rdb has become very suitable as an OLTP engine," says John Bruzas, product marketing manager at Informix. That's one reason why Informix has ported its Informix-4GL to run on top of Rdb/VMS. By making its tools available on Rdb/VMS as well as its own relational database on other platforms, Informix will make it easier for its users to port Informix-4GL applications among platforms.

For smaller sites and sites with many small machines running database applications, Digital is providing two "freebies."

First, VAX SQL, the DEC implementation of the standard database-access language, is available as part of Rdb. SQL has been made more standards-compliant. DEC believes that by making SQL available to all users of Rdb it will enhance its position as a supporter of standards and allow more applications to be ported to the VAX.

Second, a license for a run-time version of Rdb is now part of the VMS license. Although the run-time license doesn't allow you to define new databases or develop database applications, it allows you to use an Rdb-based application on any VMS machine after you install the Rdb software. This can be a

boon to organizations that would like to develop small database applications and install them on many workstations and other small nodes in the network.

Many potential benefits to Digital will accrue as a result of the easy availability of Rdb. Digital products are now freer to use Rdb as a storage platform for their own data. Digital's dictionary product, CDD/Plus, already has done this. CDD/Plus data is stored in Rdb databases. User applications that use Rdb will be much

also cites a more aggressive application focus in Digital's marketing, work in the area of IBM data access and price/performance enhancements as signs that DEC is more interested in the OLTP market than it recently had been.

Digital and RTI have a marketing agreement for Ingres Tools for Rdb, and Digital has an agreement with RTI to use Ingres as its database offering on ULTRIX. According to Pilkington, RTI sees the free run-time licensing of Rdb as good news, because it means lower cost to users of RTI's Ingres Tools for Rdb.

Informix's Bruzas offers a similar assessment. "Eighteen months ago, no one would have believed that Rdb was going to be a strategic relational database engine and that major tools vendors would be putting their tools on top of Rdb." He attributes much of Digital's turnaround to a general recognition that a relational database is part of the core of applications support that must be offered on any major operating system.

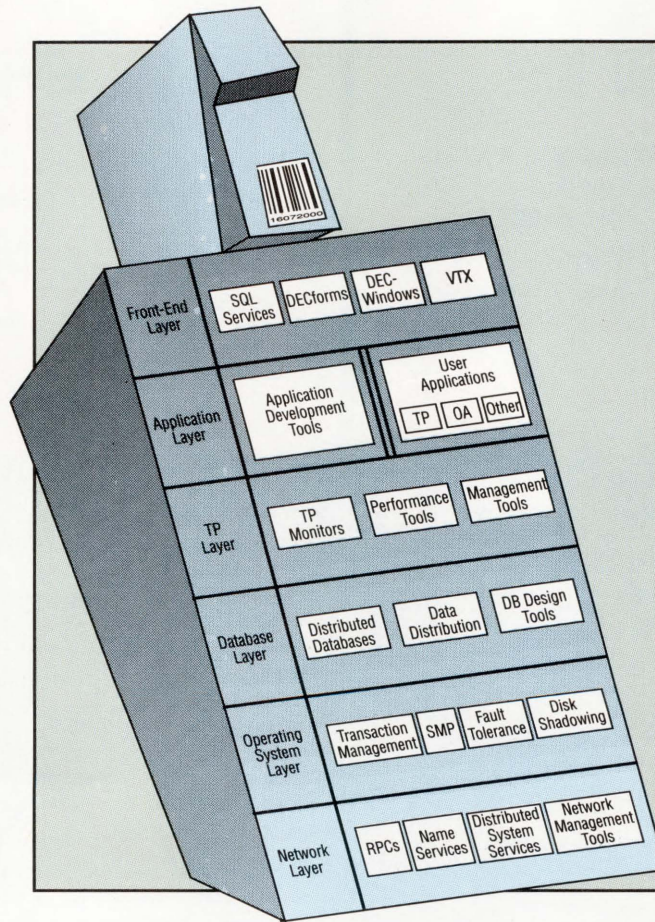
Also in the database arena, Digital has announced SQL Services, a product that allows applications on remote nodes to access a database using a highly standardized Application Programming Interface (API). The API, especially the C implementation, is directly portable across operating systems and platforms, so an application using SQL Services easily can be moved among all kinds of machines,

including VMS VAXs, ULTRIX and ULTRIX/RISC machines, IBM PC compatibles and soon the Mac. SQL Services is a very powerful tool that will make it easier to develop fully distributed applications.

Most current TP applications have their data not on workstations or IBM PCs but on IBM mainframes. So a recent series of Digital announcements for products that make data on IBM mainframes available to applications running on VAXs

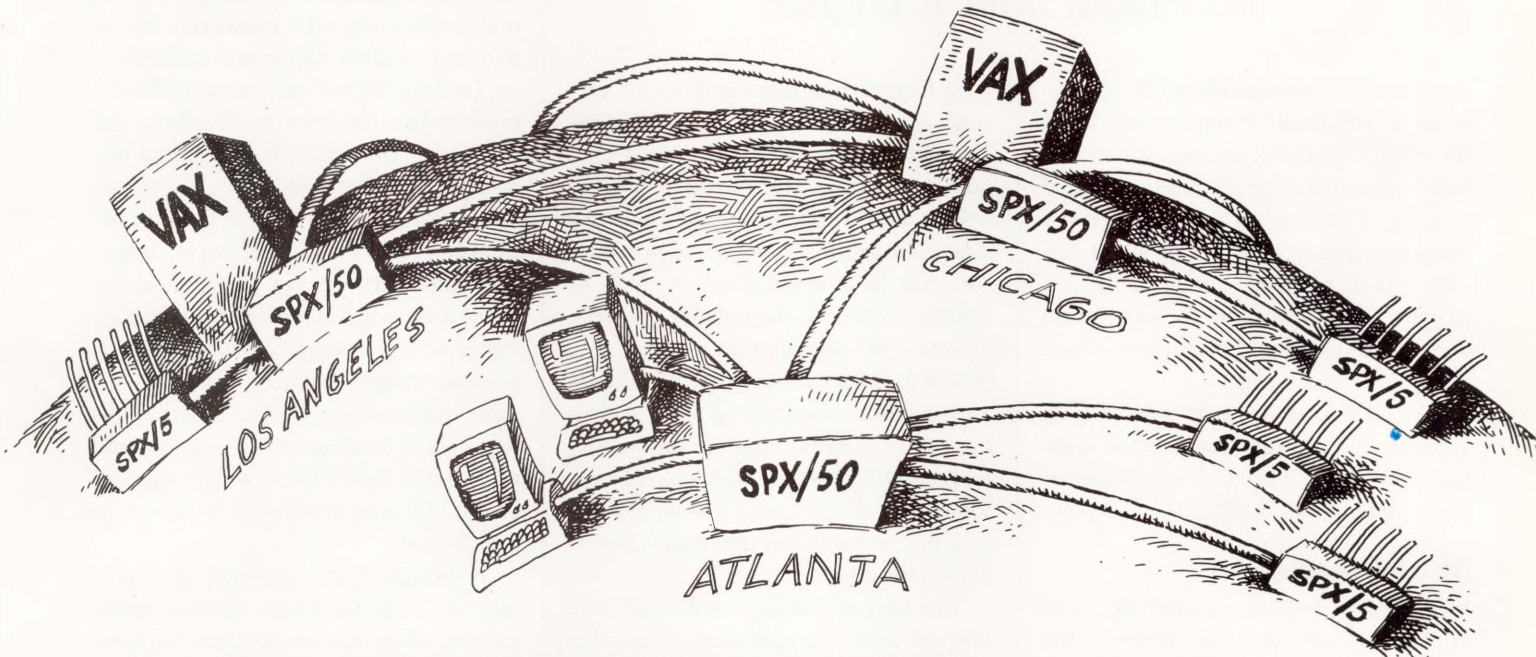
more cost-effective to port or distribute to other VAXs, a benefit that helps keep users from leaving the VMS platform.

According to Cynthia Pilkington, business manager, Ingres for VMS at Relational Technology (RTI), the decision to make run-time Rdb available is one of many steps that Digital has taken to become more competitive in the relational database market. "DEC appears to want to maintain more control over enterprise data," says Pilkington. But she





# Why limit yourself to a terminal server that only serves the terminal down the hall?



*The SPX terminal server from N.E.T. lets you design both wide area and local terminal networks exactly the way you want. And grow the network as you must.*

*Because the SPX offers unbeatable flexibility. And a cost savings over other solutions.*

The SPX from N.E.T.<sup>™</sup> serves both wide-area and local connectivity needs. You're spared the significant costs of additional multiplexer and terminal server purchases.

Even better, you get an integrated system that gives you a consistent command and control interface in both wide-area and local environments.

#### **What makes the SPX network so unique and cost efficient is this:**

The SPX/SI Software Interface installs on any DEC<sup>®</sup> VAX<sup>™</sup> host running VMS<sup>™</sup>, and shares the host's standard Ethernet<sup>®</sup> controller. This enables your VAX to communicate

directly with SPX<sup>™</sup> terminal servers, providing both wide area and local terminal connections.

#### **Unlike DEC's LAT solution, our protocol extends LAT functionality to the wide area.**

You get optimum wide-area performance and flexibility. With automatic rerouting to assure reliable connectivity over any wide-area topology. And redundant links for critical applications.

The SPX protocol is optimized for fast interactive response over both local and wide area links. It also supports permanent circuits.

**See us at DEXPO West Booth #1554**

And you get local terminal server capabilities that offer many advantages over LAT-based solutions. Unlike LAT, an SPX terminal server excels in a mixed host environment. And it supports asynchronous DECnet<sup>™</sup> for superior host-to-host connectivity.

Like to know more?

#### **Take the next step.**

SPX  
Product  
Guide

Call for our SPX terminal server information package.

**Information  
Hotline:  
1-800-235-6935.**

**NETWORK**  
EQUIPMENT TECHNOLOGIES<sup>™</sup>

Access Products Division  
(formerly ComDesign)

A  
step  
ahead.



## THE IDEA OF PUSHING DISTRIBUTED OLTP support into the operating system has caught hold at Digital.

constitutes a direct assault on the strongholds of traditional TP applications. VIDA for DB2 (VAX-IBM Data Access for DB2, IBM's relational database) has been added to a list of IBM access products that has been growing steadily for several years. The idea is to let the data reside on the mainframe but distribute the application and the human interface front end into the VAX environment.

Digital also has made it easier to port applications from IBM machines by making available a CICSlike TP development environment: DECintact.

### Distribution Key

Digital has been busy on other aspects of application distribution, as well. Although there have been no product announcements, Digital has licensed Network Computing Services (NCS) from Hewlett-Packard's Apollo Division. Among other things, NCS includes a robust mechanism for Remote Procedure Calls (RPC). The HP, Apollo Division implementation of RPCs also has been licensed by other vendors and is the front-running candidate for an industry standard.

RPCs are a powerful tool for distributing applications, especially in the Digital environment. RPCs allow programs to execute subroutines on other nodes in the network with scarcely more development effort than is involved in building a traditional single-node application. Consider the potential for having an extremely fast ULTRIX compute server in your network. Using an RPC, you can access that compute server from any node, which will save you from porting your entire application to that node just to gain compute performance on one or two routines.

If Digital does support RPCs, it isn't clear whether it will be part of the operating system or a layered product. One possibility is that the run-time support will be in the operating system but that a layered product will be required to construct RPC applications. As with licensing Rdb with the operating system, putting RPC support into the operating system (or into DECnet, which is already a separately licensed part of VMS) will allow many Digital applications to use RPCs. CDD/Plus and ACMS already use some form of RPCs, so it's likely that the new product will find other users among Digital products.

The idea of pushing distributed OLTP support into the operating system has caught hold at Digital. One example is the new transaction-management facility that's apparently in the works for a future version of VMS. At a 9:00 p.m. meeting at the May 1989 DECUS Symposium, a member of the VMS Development Team gave a technical presentation about how such a facility might work. The session was lightly attended, but the 25 people there got a preview of a powerful and robust set of facilities that may make VMS one of the premier platforms for TP and distributed-database applications. You might expect that similar capability could be built into ULTRIX.

The new transaction-management facility will provide a call interface and transaction semantics to implement rollback and commit, transaction logging and a common journaling facility. The new facility also will implement the now-infamous two-phase commit protocol (2PC). 2PC is a technique for ensuring that two databases (usually on different network nodes) are updated consistently. 2PC is essential for fully distributed

applications and has been a significant gap in the capability of Rdb/VMS. Many other database vendors have had implementations of 2PC for some time.

Digital has had distributed read capability in Rdb since the product was introduced, allowing an application on one node to access databases on many other nodes simultaneously. However, 2PC is required to allow distributed update.

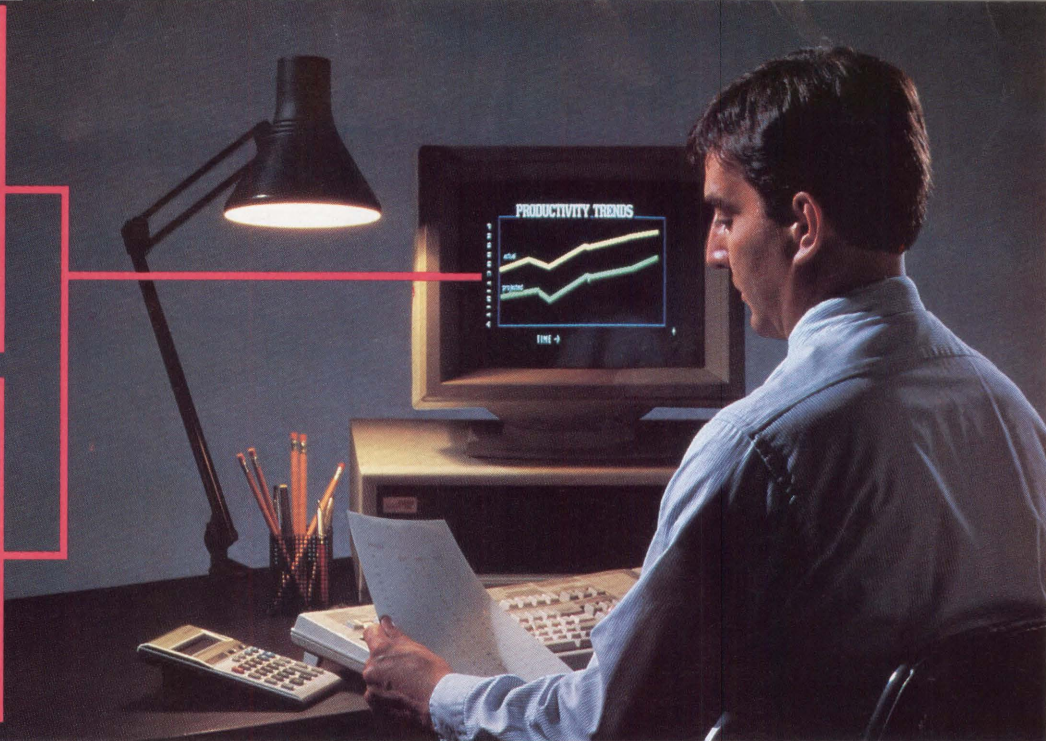
To date, Digital's approach to distributed update has been to distribute the data rather than provide distributed update access. This is accomplished by the VAX Data Distributor (VDD), which allows updates in one database to propagate automatically (in batch mode) to other databases. Such distribution can go either way — from a central database to multiple remote databases, or from remote databases that "roll up" their results to a central database. VDD is a powerful tool, but it hasn't been widely applied, perhaps because it isn't widely known or understood.

Although 2PC is essential to implementing fully distributed database applications, other barriers to their implementation (such as administrative and maintenance issues) and the availability of VDD have meant that the absence of 2PC in Rdb hasn't been a major factor in Rdb's acceptance to date. And, in traditional Digital engineering fashion, the company has been busy pouring a foundation — putting transaction-management functions into VMS.

Why is it better to have such functions in the operating system rather than in the database system? The most frequently quoted reason is performance. In theory, by putting transaction management into the operating-system kernel, the function can be more efficient.

It isn't clear that performance is the biggest win, however. That distinction may belong to the fact that an application program using the new facility will be able to create a single transaction that spans multiple nodes, multiple file systems (such as Rdb, DBMS, RMS and even third-party databases) and possibly even multiple application programs running on different nodes.





## 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 backlit 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**

Data Collection Systems

CIRCLE 244 ON READER CARD



DECforms also will provide a means for application distribution in the future, although the current version doesn't support it. In a distributed forms environment, front-end machines will be able to collect data from terminals on behalf of back-end machines. DECforms is a key OLTP announcement, however, because it replaces the limited TDMS product as Digital's lead terminal I/O package. DECforms quickly will become the standard forms interface tool for TP applications, now that ACMS supports it. DECforms is also an implementation of an international forms interface standard (FIMS), so Digital has been pointing to DECforms as another feather in its open systems cap.

Software tools such as DECforms, RPCs, SQL Services and the various IBM database-access products provide more than just distribution of an application on similar machines. They also provide, or have the potential to provide, true inter-

operability among different kinds of machines. This interoperability is very important to the developers of OLTP applications, because many of those applications need to play in the world of mixed-vendor environments, PC front-ends, and so on.

Although Informix's Bruzas feels that the current interoperability features from Digital are "still embryonic," he notes that "Informix's clients are in a position to take advantage of DEC's [interoperability] tools when they become available." And Digital seems to be trying hard to open all kinds of opportunities for third-party TP applications in all of its new software offerings.

### Who Cares?

If you have current or planned TP applications, some of these developments may make your life simpler. But what if you don't have any plans for TP? In that case, you should be interested in TP develop-

ments for two reasons:

1. TP tools — especially the distribution and interoperability tools — will be key in the development of all kinds of applications, not just TP. Because TP tools are designed for large, high-performance and high-reliability applications, they generally will have more than enough horsepower to be applied to most other applications.
2. You're likely to encounter TP applications as your organization streamlines the way it does business in the next few years. Further, TP applications become more likely as your organization moves from a timesharing environment to a more modern computing model. Here's why.

When organizations were hierarchical and compartmentalized, there wasn't much need for OLTP. In this type of organization, each department was responsible for a particular function (e.g., purchasing or accounting) and there wasn't much need for coordination outside the department: You put in your purchase order, they ordered the material and it arrived.

Such hierarchical and compartmentalized organizations aren't popular today. They're inefficient and frustrating. Today, the popular approach is one of distributed functionality. Each department handles its own ordering, for example, and the role of the purchasing department has changed drastically.

One key to such changes is that the information systems must make corresponding changes. If there are people in 50 departments ordering from the same vendor, how do you get all 50 orders billed to the right departments? How do you get the volume discount that your organization deserves? How do you make sure that proper authorization is provided for each order?

The answer is to build an OLTP system that implements these business rules. But the system can't be a simple program in the timesharing sense. It no longer will suffice to have each of the 50 departments log into a central machine and type \$RUN ORDER\_ENTRY.EXE. That was a solution in the past, but for many rea-

## DIRTY TAPES?



MAGNETIC TAPE CLEANER/REWINDER

## PERIPHERALS

A High Technology Company

1363 Logan Ave.

Costa Mesa, CA 92626

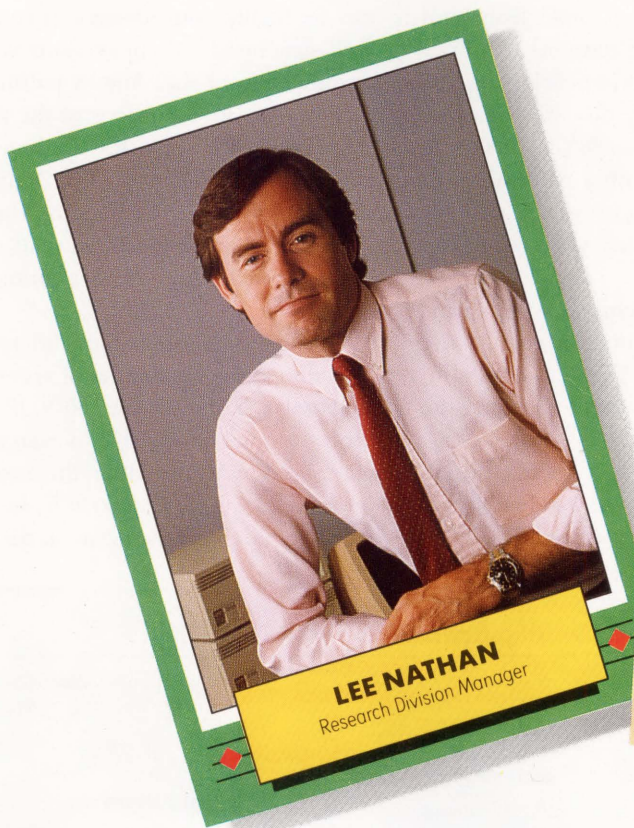
Headquarters 714-540-4925

Outside CA. 1-800-468-6888

FAX 714-540-2026



# 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



## CONNECTIVITY FOR TERMINAL emulation is great, but users want application connectivity.

sons, it won't work anymore.

For example, each of those 50 departments has its own PCs or departmental computers. It's supremely inefficient to have them do terminal emulation from their own system to a central system just to run this program. Also, they don't do this for just one system. For example, they have to enter some of their own accounting data, do their budgets and schedule for shared conference rooms — all on separate systems.

Connectivity for terminal emulation is great, but users want application connectivity. They want to run part of the application locally and have part of it reside somewhere else. In some cases, they may need just a local human interface, and that need can be fulfilled by DECwindows, which does a good job of distributing the human interface. In other cases, they'd like to run most of the application locally — perhaps build their own application but have it work on remote data. And there are combinations and permutations of these two approaches. Again, these requirements point toward the kinds of distributed OLTP applications for which Digital is laying the foundation.

### Technical Trends

In addition to the organizational trends that steer application development toward distributed transaction-based applications, there are technological reasons why such computing systems will be attractive and cost-effective.

1. Separating the functions of an application (typically, the front-end human interface, the middle application layer and the back-end database layer) has major implications for both performance and maintainability of the systems.

For example, with Digital's ACMS TP monitor you can improve performance significantly by using small front-end processors to offload terminal I/O from a big machine. In one benchmark, the number of simultaneous users was increased from 150 on an 8800 to 300 on an 8800 front-ended with a MicroVAX II. Doubling the capacity of an 8800 by adding a 1-MVUP machine is a very good deal.

Such layered systems are more maintainable, because you can change the front end (e.g., from TDMS to DECforms or DECwindows) without changing the back end.

2. Big-scale hardware is far from dead, with compute, disk, bus bandwidth and other performance measures to grow

considerably in the next few months. We'll soon see SMP VAXs with six processors of 30 VUPS each in clusters that easily might provide 1,000 VUPS of compute power that's highly available and symmetric. They'll share disk resources in the tens or hundreds of gigabytes, host many other specialized peripheral resources and be managed as easily as a single VAX.

Such systems aren't tremendously efficient at general timesharing, but they can be highly cost-effective at running well-structured TP applications with a distributed front end. And by putting the integrity-sensitive portions of the application in a data center, the data integrity and availability features of VAXclusters can be applied (not to mention the advantages of a professionally run MIS shop, such as backup and disaster-protection services).

3. There's still tremendous differentiation among the capabilities of systems in a network. For example, 60-VUP uni-processors will be available to even moderate-sized networks within the next few months, and there are likely to be network graphics servers, network database

### Companies Mentioned In This Article

Apple Computer Inc.  
20525 Mariani Ave.  
Cupertino, CA 95014  
(408) 996-1010  
CIRCLE 560 ON READER CARD

AT&T  
550 Madison Ave.  
New York, NY 10022  
(212) 605-5500  
CIRCLE 461 ON READER CARD

Dome Software Corp.  
655 W. Carmel Dr., Ste. 151  
Carmel, IN 46032  
(317) 573-8100  
CIRCLE 462 ON READER CARD

Hewlett-Packard, Apollo Div.  
330 Billerica Rd.  
Chelmsford, MA 01824  
(508) 256-6600  
CIRCLE 540 ON READER CARD

Informix Software Inc.  
4100 Bohannon Dr.  
Menlo Park, CA 94025  
(415) 926-6300  
CIRCLE 541 ON READER CARD

Ithaca Software Inc.  
902 W. Seneca St.  
Ithaca, NY 14850  
(607) 273-3690  
CIRCLE 430 ON READER CARD

Ontologic Inc.  
3 Burlington Woods  
Burlington, MA 01803  
(617) 272-7110  
CIRCLE 431 ON READER CARD

ParcPlace Systems  
1550 Plymouth St.  
Mountain View, CA 94043  
(415) 691-6700  
CIRCLE 432 ON READER CARD

Relational Technology Inc. (RTI)  
1080 Marina Village Pkwy.  
Alameda, CA 94501  
(415) 769-1400  
CIRCLE 433 ON READER CARD

Servio Logic Development Corp.  
15220 N.W. Greenbrier Pkwy.  
Ste. 100  
Beaverton, OR 97006  
(503) 629-8383  
CIRCLE 434 ON READER CARD

Stepstone Corp.  
75 Glen Rd.  
Sandy Hook, CT 06482  
(203) 426-1875  
CIRCLE 435 ON READER CARD

Sun Microsystems Inc.  
2550 Garcia Ave.  
Mountain View, CA 94043  
(415) 960-1300  
CIRCLE 436 ON READER CARD

Symbolics Inc.  
8 New England Executive Park  
Burlington, MA 01803  
(617) 221-1000  
CIRCLE 437 ON READER CARD



machines and different specialized high-performance systems. There's a rumor that the next generation of VAXs will have some form of fault tolerance.

To be most cost-effective, these systems will be tapped by applications that can distribute different parts of the application to different machines.

4. The final factor is the foundation that DEC has been pouring for the last two years, the foundation of DECnet, Network Application Support (NAS), RPCs, DECwindows and TP tools.

This foundation will allow applications of a new type to be built, applications that can tap the vast resources available in a fully distributed environment of mega machines. Although these machines won't all run VMS, the power of distributed processing through DECnet, distributed database technology, RPCs, DECwindows and other techniques will make those machines directly useful to the installed base of VAXs.

When you look at these factors together, an interesting trend appears. Every application is becoming part of a great client/server model of computing. Client/server computing isn't new, especially to workstation pioneers such as HP, Apollo Division and Sun Microsystems. But Digital's software foundations, especially where they hook up with standards such as NCS and X, will make the client/server model much easier to implement and manage over a wide range of computing scales, not just in LANs.

Digital's computing model seems to be this: Great clusters of SMP VAXs will provide a highly available compute resource with a consistent file system to act as servers to a network of desktop workstations and PCs. But instead of just serving files or providing a place for DECwindows' clients to run, these clusters will provide centralized processing for a new range of client/server applications, applications built on the TP model.

The 1990s will be an interesting time for VAXs.

ARTICLE INTEREST QUOTIENT  
Circle On Reader Card  
High 422 Medium 423 Low 424

# BGL'S Laser Printer. RISC: State of the art in GRAPHISC'S.

*"In addition to our DEC applications, the LaserLeader also interfaces with every other system we have."*

*"Perfect for networks because of its high speed and spooling capabilities."*



## The fastest systems on the market

Tired of plotters that run out of memory and take forever to plot/print PostScript or CAD files?

LaserLeader systems are the fastest, with a 12 MHz/286 (16MHz/386 or 20MHz/386 optional), 4MB of memory and a 20 MB hard disk standard, coupled with a graphics processor.

### Never a busy Signal

Because of the architecture of the controller, no matter how many dissimilar hosts are driving our units, the printer will never show a "PRINTER BUSY". BGL's systems have two 8 1/2" X 11" full page buffers (11" X 17" double page buffers available) for maximum throughput.

### Expandability

The LaserLeaders were designed for ease of creating and updating emulations, flexibility of interfacing, and the ability to add special features for customers (on site if necessary).

### Versatility

Emulations you can mix and match. LaserLeaders are compatible with LNO3, HP/GL, LaserJet Series II, Versatec, Tektronix 4010/4014, Diablo 630, BGL/PDL (PostScript), and "Z".

Interfaces include: Ethernet (DECnet, TCP/IP), Versatec, Centronics, Dataproducts, Appletalk, IEEE-488, and RS-232C. Mix as many fonts as you need per page and print on paper sizes from 8 1/2" X 11" to 11" X 17". Duty cycles range from 25,000 to 100,000 pages per month.

### Reliability

BGL has systems installed in Fortune 500 companies. The Mark I and III can run most communication software, enabling our systems to communicate for remote diagnostics and software updates. BGL's systems have nation-wide maintenance support through TRW.

Now with RISC processor.

**(805)987-7305**



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

FAX: (805) 987-7346  
Telex: 467154

© 1989. BGL Technology Corporation. All rights reserved.

Appletalk is a trademark of Apple Computers, Inc. PostScript is a trademark of Adobe Systems, Inc. Centronics is a trademark of Centronics Data Computer Corporation. Dataproducts is a trademark of Dataproducts Corporation. Diablo 630 and Ethernet are trademarks of Xerox Corporation. Epson FX80 is a trademark of Epson America. "Z" is a trademark of BGL Technology Corp. HP/GL, HP LaserJet Series II and LaserJet PLUS are trademarks of Hewlett-Packard Company. Tektronix is a trademark of Tektronix Inc. Versatec is a trademark of Versatec, Inc. DECnet and LNO3 are trademarks of Digital Equipment Corp.



# Mainstreaming The SUPERCOMPUTER

Applying supercomputer performance and power to  
new areas of information processing. BY PETER GREGORY

TRADITIONALLY, THE LABEL "supercomputer" has been assigned to a computer that performs at the highest level on a narrow range of numerically intensive computing problems. The word supercomputer also has been associated with high costs, obscure programming methods, exotic and expensive environmental requirements and lack of compliance with industry standards.

Despite these hurdles, supercomputers have produced many advances. Computationally based science and engineering is faster, more cost-effective and safer than previous experimental methods.

Researchers and entrepreneurs now are becoming aware of opportunities to apply supercomputer levels of performance to other areas of information proc-

essing. Numerical and non-numerical applications that could benefit from supercomputer performance are being identified in information-intensive industries such as banking and finance, insurance, transportation and publishing. The supercomputer is being brought into the mainstream of information processing.

What are the hurdles to overcome, and what are the implications of mainstreaming super performance? Necessary changes involve applicability; scalability; interconnectability and interoperability; and stability.

### **Applicability**

Super performance has been concentrated in numerically intensive computing. As long as the computations were

amenable to vectorization and didn't perform much data-dependent branching, the pipelined, vector processing supercomputer had no competition.

But users ask why they can't get supercomputerlike performance across a range of computing and information-management applications. Major benefits will come from combining the flexibility and broad performance of the traditional mainframe computer with the capacity and performance of the supercomputer.

Many vendors are attempting to develop that solution. But broadening applicability of super-performance computers requires departures from traditional architectures. Early supercomputers combined high-performance scalar com-



puting with the capability to perform vector arithmetic at fast rates. This required specialized architectures that traded broad applicability for blinding speed. Similar tradeoffs occurred in the operating systems and other software provided with supercomputers.

As pipelined vector-processor supercomputers have matured, they've moved slowly toward mainstream programming methods and operating systems. However, the race for highest peak performance rather than wide applicability or ease of use has monopolized the attentions of these companies. Further, architectural limitations of traditional supercomputers

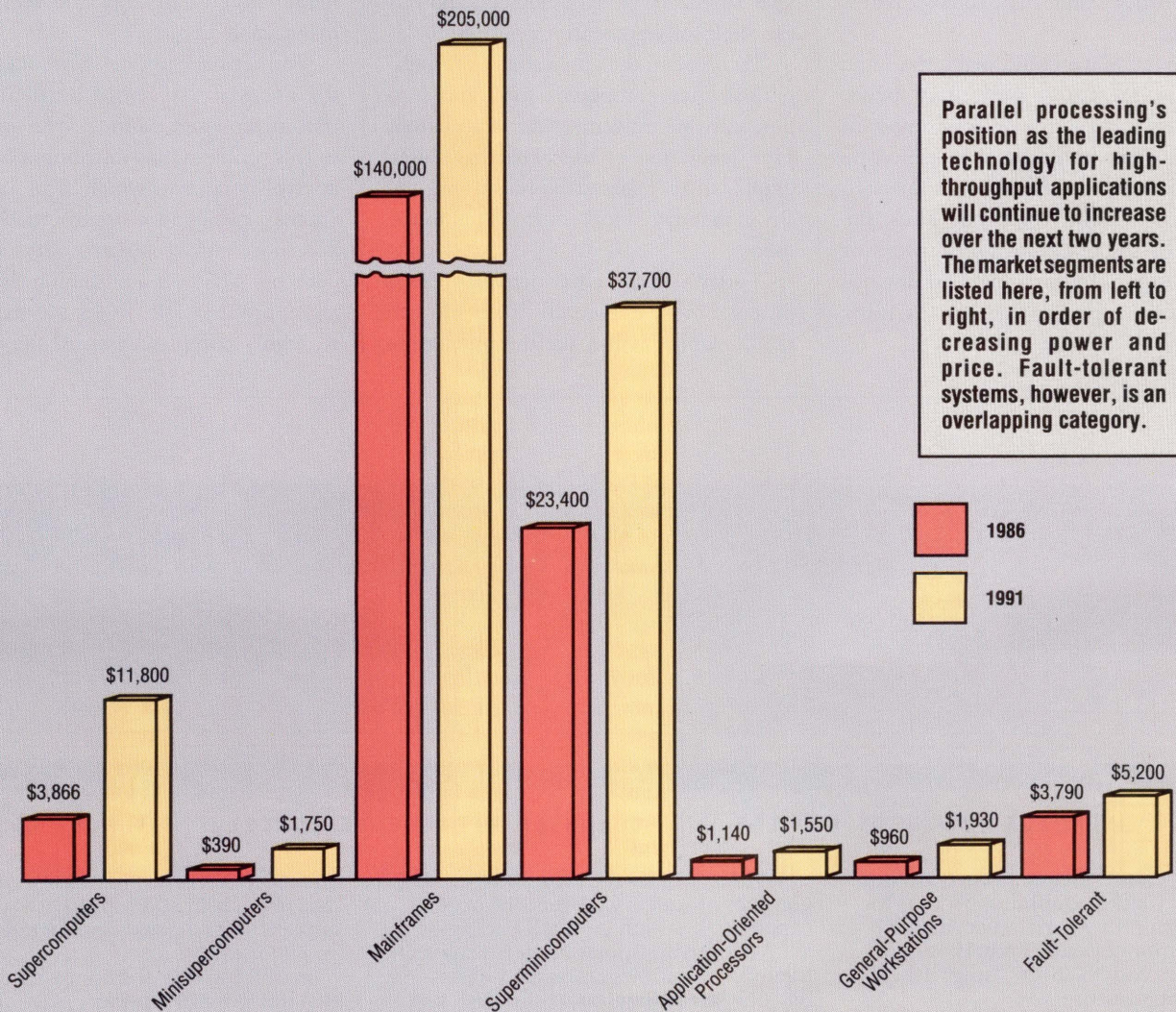
hamper their progress.

Mainframe vendors, seeing the potential, have boosted their floating-point performance with attached array processors that provide a more balanced performance profile across general-purpose and numerically intensive processing. The performance of these machines still isn't comparable to the largest supercomputers. The ubiquity of mainframes, however, assures some success for this incremental approach. Adding multiple processors extends the performance of a mainframe/array-processor system, but there are clear limits of this approach without major architectural changes.

Another technological development, true parallel processing, allows a new generation of computers to enjoy the cost benefits of the CMOS component revolution by assembling hundreds or thousands of off-the-shelf microprocessors that operate concurrently to solve large problems. One goal of parallel processing is to attain supercomputer performance while retaining broad applicability and following the workstationlike cost/performance curve.

Using standard microprocessors or de facto standard RISC technology processors provides a more balanced performance spectrum (i.e., not just scientific

The Emerging Worldwide Parallel Processing Market (\$ Millions)



Parallel processing's position as the leading technology for high-throughput applications will continue to increase over the next two years. The market segments are listed here, from left to right, in order of decreasing power and price. Fault-tolerant systems, however, is an overlapping category.

Courtesy Computer Technology Research Corp.



applications) and potentially makes more software available from third-party vendors. Many feel that massively parallel processing represents an inevitable direction because of the potential unlimited scalability of machines built in that manner.

One reason for this conclusion is the limits of physics. The semiconductor devices used and the wires and printed circuit conductors in computers or networks are limited to some fraction of the speed of light in their rate of producing and conducting signals. This restricts the performance of individual processors. Advanced semiconductors approach that limit. In fact, the theoretical limits of semiconductor logic speed in a single powerful processor might be only a few tens of times faster than today's fastest processor.

But even if we could make the logic elements operate at unlimited speed, processors have miles of conductors of internal signals, and those signals must be carried in conductors that are subject to the speed-of-light limitation. Thus, the design of today's fastest uniprocessor computers is dominated more by distance across the machine than by its logic speed.

To support thousands or millions of times faster computation, developers must break each problem into as many parts as possible and have individual processors work concurrently on each part. If language constructs and control mechanisms can be developed to manage unlimited numbers of processors in this way, then it makes sense to choose the smallest and least expensive processors to assemble into large systems.

To gain access to the full capability of early supercomputers, scientists had to learn more about computers and their internal workings than perhaps they wanted. Programming often was done at the assembler level, requiring direct manipulation of registers and clever handling of memory and I/O. Higher-level languages weren't efficient, and off-the-shelf software wasn't available.

To broaden the applicability of high-performance computers, tools and support software must meet the expectations of a generation of users that have used graphical, icon-based workstations, and VAXs that gave local control back to the users.

Today's highest-performance computers almost universally have adopted UNIX. UNIX will make the integration

with Digital machines and high-end workstations of all types much easier. What's required are language compilers that comply with industry standards and that can still tap the power of the new generation of high-performance computers. The compilers should be close enough to existing ones to allow migration of existing programs and efficient enough to avoid the need for heroic programming efforts.

## Scalability

Scalable systems provide the appropriate computing or storage resources to solve a current problem but allow expansion in the future. When the granularity of scaling is correct, then adjustments in system capacity or performance can be made in economically and technically manageable chunks.

For networks to scale without bound, it's necessary to avoid bottlenecks in transmission and control. One approach to this problem uses distributed network control systems in which local resources are managed by local control mechanisms and more global control codes can execute on whatever computing resources are appropriate. In its logical extension to highly complex systems, the control



What most graphics products for the VAX™ computer produce is anxiety. But now, you can do

### Introducing Vivid™ Presentation Graphics.

Most presentation graphics products for the VAX are painfully hard to use, hugely expensive or functionally limited. But now, Access Technology of 20/20™ spreadsheet fame has created a cure.

Vivid combines the look and feel of PC graphics products with the advanced capabilities of high-end VAX packages. With it, even computer novices can create totally customized graphs and charts—pie, bar, line, area, high-low, composite, text

and more. Vivid lets you easily incorporate data residing in 20/20 and a host of other applications packages. *And it doesn't cost you a fortune.*

In other words, the company that proved that the VAX is the perfect platform for a



## THE SEMICONDUCTOR DEVICES USED AND the wires and printed circuit conductors in computers or networks are limited . . .

mechanism is hierarchical wherever the resources are organized hierarchically.

This distributed, layered approach to control is partially reflected in the model offered by the International Standards Organization (ISO) in its Open Systems Interconnect (OSI) model for networking and communications. Distributed, hierarchical control systems are required for massively parallel computers and for complex networks of systems.

Optimal control mechanisms will exploit various aspects of the phenomenon of locality. This basically observes that program instructions or data about to be accessed will be in the same "neighborhood" as data or programs recently referenced. Programs proceed linearly more than they branch, and database searches exhibit temporal locality rather than being wholly random. Advances such as clustered systems as avail-

able from Digital, cache memories and pipelined processors take advantage of locality of execution and reference to improve performance while avoiding bottlenecks. Locality of reference is the single most powerful feature of computer and communications behavior that allows development of strategies for unlimited scalable performance and control.

For distributed DBMSs, scalability also requires separating the physical and logical views of the system. The physical reality of the system then can change without needing new programming. Programs can be written for use in various locations for execution anywhere, and the names that the control mechanism assigns to resources can be independent of the names convenient to the user. Separation of the logical and physical views of the system is required to integrate large numbers of heterogeneous

or homogeneous resources in a single system or network.

Broad scalability and flexibility of systems also benefit from being constructed in a way that separates the necessary control mechanisms from the programs, data and other resources they manage. Designers separated operating systems from programs so that each programmer didn't have to manage the system in addition to understanding his programming problem. Some early networks and parallel computers have reverted to the old ways by requiring the user to manage control of the system.

Parallel high-performance computers or computer networks that scale without limit must exhibit the characteristics of hierarchical distributed control, separation of the logical and physical views, and separation of the control mechanism from the data and programs. Individual systems that exhibit these characteristics will integrate more easily into the networked, integrated systems of tomorrow.

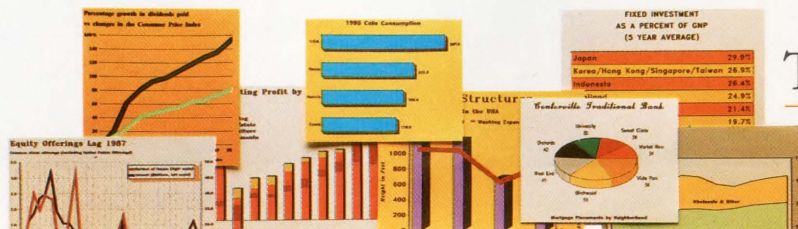
Individual systems that will inhabit the network also must conform to software standards that support scalability rules. Examples include relational databases using ANSI-standard SQL, object-oriented software following emerging language,

Trademarks are the property of their respective holders

line charts, bar charts, even text charts--without creating irregularities in this chart.

spreadsheet has proven that it's the perfect platform for a graphics product.

For our free "Slide Show" that demonstrates just how vivid Vivid really is, or to receive a Vivid Evaluation Kit, phone 1-508-655-9191.



Access  
Technology  
A CompuServe Company  
Vivid™



graphics and database standards, and the OSI model communications protocols. Most major vendors' products, including Digital's, are moving in directions compatible with scalability.

### **Interconnectability And Interoperability**

To the extent that the industry is successful in interconnecting heterogeneous distributed computing and storage resources, the operation of the network will become transparent to the user. The largest example of a complex general system is the worldwide telephone system. The user doesn't have to understand how the network is connected or what path his transmission takes. These details are

below the user's view.

In the same way, the details of registers, busses and memory locations in computer systems have been pushed below the user's view through the use of higher-level languages. On-line access to global dictionaries of resources will make all the information available and usable in a large parallel system or network. Cooperating distributed dictionaries based on standards emerging from the National Institute of Standards and Technology (NIST) can keep a consistent and current view of resources available on the computer network.

However, before conquering the technical challenge in its simple form, true object-oriented approaches will

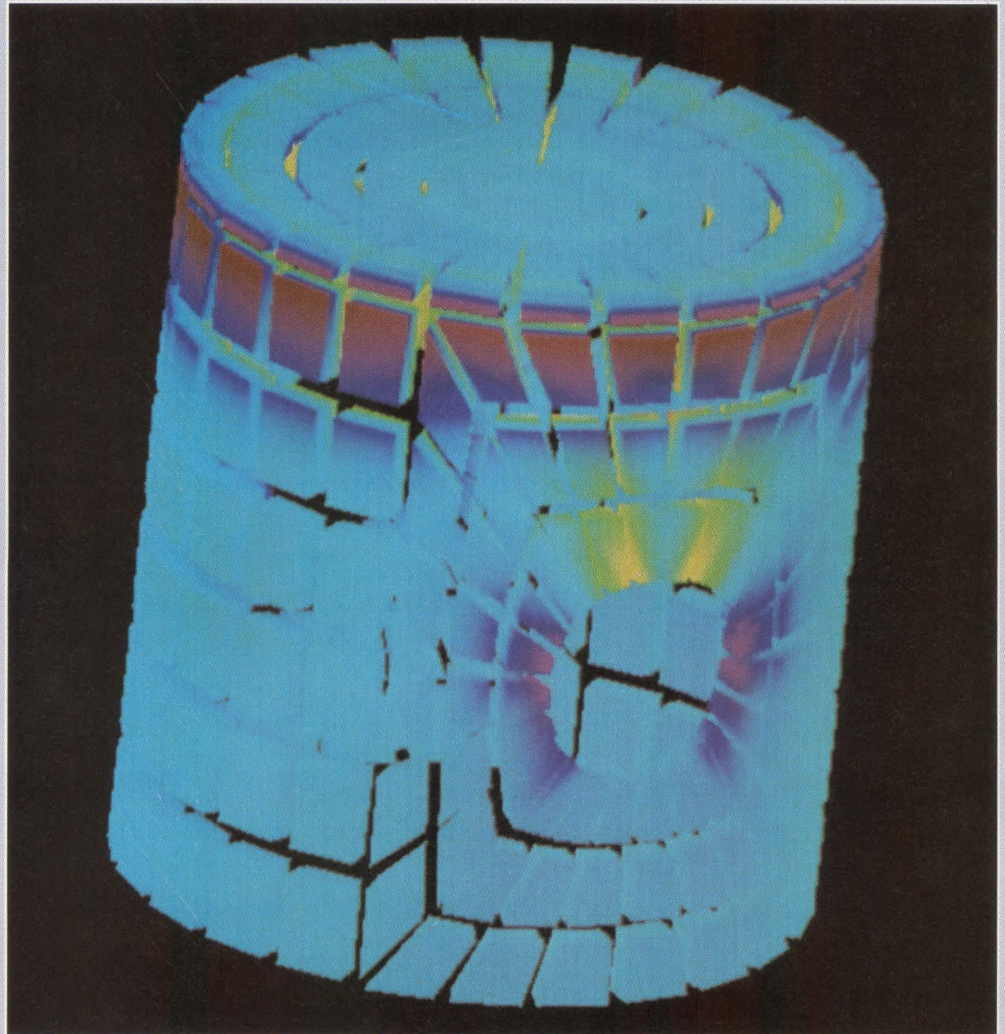
complicate the problem. When systems achieve the characteristics intended by object-oriented standards, we'll consistently be able to refer to programs, files, pictures, voice and even whole computing resources in heterogeneous networks without regard to their differences.

Emerging parallel computers shouldn't pose a greater challenge to near-term integration on a network than other computer systems. Local connections among highly powerful computers will continue to require special protocols and connections for some time. These include HSC, Ultra Network Technology's Ultranet and Network Systems' Hyperchannel, which are high-performance computer-to-computer connections used

*An element-shrink  
model of a piston  
created parametrically.*

*Design, analysis and  
optimization were done  
using Swanson Analysis  
Systems' Ansys on a  
Stardent supercomputer.*

*The design-  
optimization goal was  
to minimize material  
weight by varying  
the cylinder-wall  
thickness and/or the  
radius of the piston.*



*Courtesy Stardent*



# Western Union introduces Desktop Faxing.<sup>SM</sup>

**1. Now you can fax  
from the desktop terminals  
on all VAX systems.**

The most efficient fax machine is sitting right on your desk. With Western Union's OfficeAccess<sup>SM</sup> messaging services and software, anyone in your office can now fax from their terminal. OfficeAccess is fully integrated with VMS Mail<sup>®</sup> and ALL-IN-1<sup>®</sup> for sending fax or any other of Western Union's messaging services.

The fax machine has become the water cooler of the 80's office. But with OfficeAccess, your people can avoid those long trips to the fax machine. Because they won't be using it.

**2. Eliminate waiting in line  
at the fax machine.**

**3. Send up to 999  
copies all at once.**

Another way we've made faxing faster is "broadcast faxing" or the ability to fax a document to as many as 999 different locations at one time. Just compose the message once, and one keystroke automatically sends it to everyone on your mailing list.

Because Western Union's transmission is all digital, you'll send consistently higher quality faxes, instead of sending muddy, streaky, spotty pages full of broken up, hard-to-read type.

**4. Fax the cleanest  
most readable copies ever.**

**5. Get automatic  
confirmation  
of delivery.**

Now, you'll never have to waste time calling to find out if your fax got through because Western Union automatically confirms delivery right on your terminal screen as soon as the message reaches its destination.

Call Western Union at 1-800-779-1111, Dept. 112. And find out how fast and easy Desktop Faxing can be.

**WESTERN UNION | OFFICE ACCESS**



COOPERATING TASKS ON HETEROGENEOUS  
network resources including  
supercomputers will require considerably  
more work in the standards area.

mainly among high-bandwidth supercomputers and mainframes. However, these types of connection don't preclude concurrent connection to other networks and protocols such as DECnet, NFS, NCS, SNA, TCP/IP and Ethernet.

Assuming that general-purpose super-performance computers will hide their architectural details through the use of standard languages and operating systems connections, you can plan for the next step: interoperability. Cooperating tasks on heterogeneous network resources

including supercomputers will require considerably more work in the standards area. This is a diverse effort involving operating systems, languages, databases and network standards. A high degree of interoperability means transparent access to files, databases and even executing programs, regardless of their type or location.

Perhaps an early example of interoperating programs will emerge from the need for high-performance workstations to decide which parts of such programs

as large database queries to process locally and which to ship to larger computing resources. When parts of programs can execute on the most cost-effective resource, we'll have achieved some of the major benefits of this trend.

Optimally, workstations should decide whether or not to process locally or ship computations to their host or the network. Similarly, any resource attached to a network should be able to perform those parts appropriate to its capacity and current load and to export the rest to network resources. This implies distribution of system load balancing responsibility to each intelligent device on the network.

### Stability

System managers want to purchase or write software that survives for as long as the organization needs it. With computer-automated design (CAD) tools emerging rapidly, hardware generations

## UDMS... a Fresh Twist in Data Management.

### The Situation:

End-users throughout one of the nation's largest beverage distributors, Western-Davis, needed to quickly and easily combine information on one report or inquiry from a variety of application databases. Many end-users had little computer experience but all had sophisticated reporting and data management needs.

### The Solution:

Western-Davis purchased a corporate license to UDMS—the User Data Management System from Interactive Software. UDMS provides easy-to-use yet powerful window-based read and write integration to:

- Rdb™ • RMS™ • VAX-DBMS™ • INGRES® • ORACLE®
- System 1032® and • RS/1® for the VAX/VMS™ environment.

Up to 32 files, tables and/or records may be joined for reporting, querying, exporting, merging and updating.

### The Results:

According to Dave Santistevan, Manager of Systems and Programming, "UDMS was installed easily and has become an invaluable tool for both our end-users and data processing personnel. In our evaluation, we were surprised to find a truly easy-to-use product like UDMS that also satisfied even our most sophisticated data management and reporting needs."

**Call Today** to find out why many of the nation's largest software development companies and M.I.S. organizations use UDMS to enhance their software and services. Toll Free 1 800 962-UDMS or (303) 987-1001.

**INTERACTIVE**  **SOFTWARE**

7175 West Jefferson Avenue, Denver, Colorado 80235

INGRES is a registered trademark of Relational Technology, Inc. ORACLE is a registered trademark of Oracle Corporation. Rdb, RMS, VAX-DBMS and VAX/VMS are trademarks of Digital Equipment Corporation. System 1032 is a registered trademark of CompuServe Data Technologies. RS/1 is a registered trademark of BBN Software Products Corporation. UDMS is a trademark of Interactive Software Systems Inc.





## Super Strategies, Smart Shortcuts

Although Digital has developed a popular gateway that lets VAXs front end Crays (this capability recently was announced for the VAX 6000 series), most of Digital's solutions to high-throughput computing are still in the future (see Figure 1). A set of vector processing boards for the VAX 6000 series won't debut until early next year, and the VAX 9000 mainframe with Superclusters isn't scheduled to be ready until this month. Superclusters will be a potent sequel to CI-based clusters, with support for the new mainframe, twice the current number of DECnetted VAX nodes and several factors' greater I/O bandwidth.

The VAX 9000 will run VMS as well as ULTRIX. It will be designed to increase the VAX presence in Online Transaction Processing (OLTP) settings and help Digital better compete with the ubiquitous IBM 3090 series.

Neither Digital's nor IBM's mainframes, however, are optimized for the equally heavy throughput and real-time processing styles involved in supercomputing and minisuper-computing applications. There's a huge market for high-throughput computer applications beyond OLTP, and in almost every instance these applications reside alongside VAXs and IBMs running more traditional applications. The push is on for developing interoperability among these machines in the guise of gateways, device sharing and operating-system shells.

These high-throughput applications are best supported by specialized technical systems — as opposed to general-purpose computers — and include such number-crunching tasks as scientific and engineering experimentation and simulation; departmental and corporate research (i.e., 3-D financial modeling); and a burgeoning new area called graphic visualization, in which data instantly is processed into easy-to-grasp images rather than charts or tables. The predominant operating system for these processors is UNIX, with a split down the middle on compatibility with Berkeley and System V, although many proprietary operating systems have achieved popularity, particularly in settings in which real-time is a requirement.

### Four Segments

The research firm Dataquest of Boxborough, Massachusetts, estimates that the overall supercomputing market will more than double to about \$4 billion by 1993 as supercomputing enters more commercial

areas. Dataquest divides the industry into four distinct segments:

1. Graphics/project supercomputers, sometimes called graphics superworkstations, which are visualization processors produced by Hewlett-Packard, Apollo Division, as well as Silicon Graphics and Stardent. Prices for these systems have dropped below \$500,000, and many of the low-end systems are in the \$100,000 range.
2. Departmental supercomputers, or minisupers, which are parallel multiprocessor systems manufactured by such companies as Alliant Computer Systems, Convex Computer, ELXSI, Encore Computer, FPS Computing, Multiflow Computer and Stratus Computer. The price range here is from \$250,000 to \$3 million.
3. Corporate supercomputers, the classic high-end systems that are the traditional reign of such companies as Cray Research but have become the territory of Japanese competitors Fujitsu, Hitachi and NEC. These cost anywhere from \$5 million to \$30 million and beyond.
4. Supercomputers optimized for scientific and engineering research, which include high-throughput systems from BBN Advanced Computers, Concurrent Computer, Modcomp Computer Systems, NCube, Myrias Computer and Thinking Machines, among others. They're priced similar to departmental supercomputers.

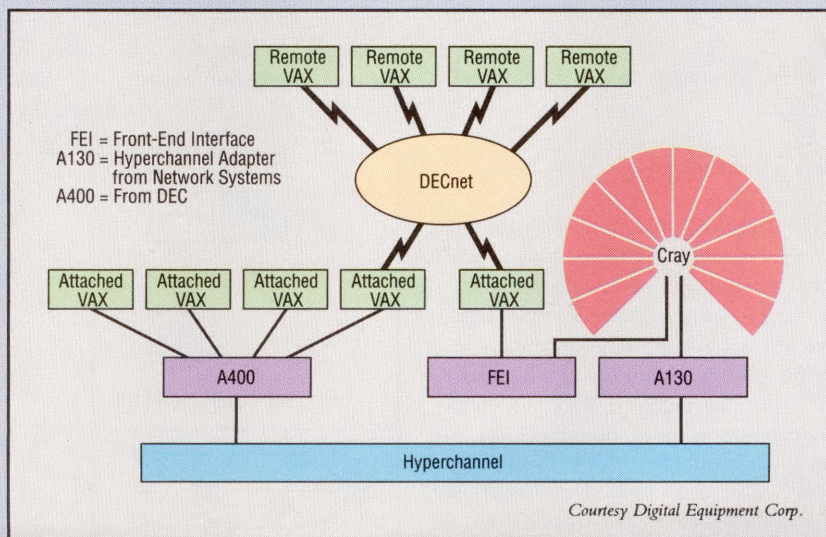
There are variations on these themes. Aptec Computer Systems produces a machine optimized for high I/O throughput that often is used as an adjunct machine in VAX sites. VXM Technologies offers

a Network Super-computer client/server software package that converts a network of PCs, Macs, RISC/UNIX workstations, VAXs and mainframes (DECnet, SNA, and so on) into a high-throughput system via parallel processing. Evans & Sutherland counteracts the massively parallel market with a computer it calls moderately parallel, configurable with two to eight processors, each with 16 independent computational units.

VAXs also can be boosted inexpensively

to high-throughput performance ratings with the addition of vector processing boards, which are giant intelligent memory arrays produced by such companies as Avalon Computer Systems, CSPI, Oryx, Numerix and Star Technologies. (Even IBM 3090s have an optional vector-extension facility.) These short-cuts to high performance are specially configured and OEMed for specific applications but particularly have taken off in scientific/engineering visualization

*Continued on page 58.*



**Figure 1: System management for VAXs front ending a Cray. Special VAXstations now are optimized for this, and the Cray front end also supports the VAX 6000 series.**



can appear at ever-faster rates. Electronic CAD vendors have been evolving highly integrated tools for almost 10 years. The result may look like an expert system in which the behavior of the required system is defined in a set of rules. After that, the hardware design and related manufacturing requirements are produced automatically by the CAD system.

These possibilities put even more emphasis on the ability of software to survive across hardware generations. Standards for languages and operating systems have helped in this area but so have our design systems. Compilers to-

day almost universally generate architecture-independent intermediate code. The parts that have to change to accommodate hardware differences are minimized by this approach. Multiple compilers from major vendors can generate the same intermediate code. This enables optimizations to be applied that result in the source compilers running faster. Computer and network designers must prevent hardware dependencies from creeping into their software.

VERY HIGH-PERFORMANCE computers are being absorbed into the mainstream

of computing. This has been stimulated by:

1. The emergence of standards that have been widely adopted by vendors and that will support scalability of systems.
2. A revolution in component technology that's changing the cost/performance ratios available (inexpensive, high-performance CMOS microprocessors).
3. The arrival of practical parallel processing architectures that will use the new component technologies and remove the barriers to unlimited scalability.
4. The availability of higher-bandwidth communications methods that better

## Super Strategies, Smart Shortcuts

*Continued from page 57.*

sites. Imaging Technology and Omnicomp Graphics, for example, provide cross-industry graphics solutions. Add-on vectors generally are implemented on the larger VAXs, but systems for the MicroVAX are also available from such vendors as Mercury Computer Systems and Sky Computers.

### Parallel Processing

There are several available supercomputing processor architectures, most notably, as shown in Figure 2:

1. Simple parallel bus systems.
2. Crossbar switches, which permit all processors to access all available memory modules.
3. The Hypercube layout, in which each processor exchanges data with each of its adjacent processors, using store-and-forward, and communicates to thousands of distant nodes by data passing.
4. Multistage switches, in which processors access memory directly, and messages pass from node to node as in packet switching.

In its report on supercomputing technology, Computer Technology Research (CTR) of Patchogue, New York, attributes the impending growth in supercomputing to the emergence of workable parallel processing schemes and foresees a pivotal role for parallel processors in minisupers, general-purpose workstations and fault-tolerant systems. CTR anticipates that these advancements will be accompanied by software better optimized for supercomputing (i.e., neural network databases) and standardized supercomputing software techniques.

Hardware capabilities also are expected to improve. Gallium arsenide is a high-speed, low-density semiconductor technology that's already replacing silicon circuits in multiprocessor test configurations at IBM and Cray Research. Additionally, silicon chips eventually are expected to replace disks as storage devices, with the help of emerging memory technologies called flash memory and ferroelectric memory. Flash memory uses floating gates to store 0s and 1s on chips. The storage properties of these gates allow data to be read at unusually high speeds. Ferroelectricity, which uses ceramic

conductors to align 0s and 1s in electrical fields, is being used to develop chips that store 1 Mbit each.

Digital has staked its future in the high-throughput arena carefully. Besides its development plans, the company is co-sponsoring a Data Parallel Supercomputing Research Initiative along with Thinking Machines. The goal is to get up to 25 universities (whichever submit the best proposals) to develop distributed supercomputing languages, applications and techniques. Theoretically, this eventually will increase the number of VAX-using scientists and engineers able to incorporate parallel computing into their research. —Evan Birkhead

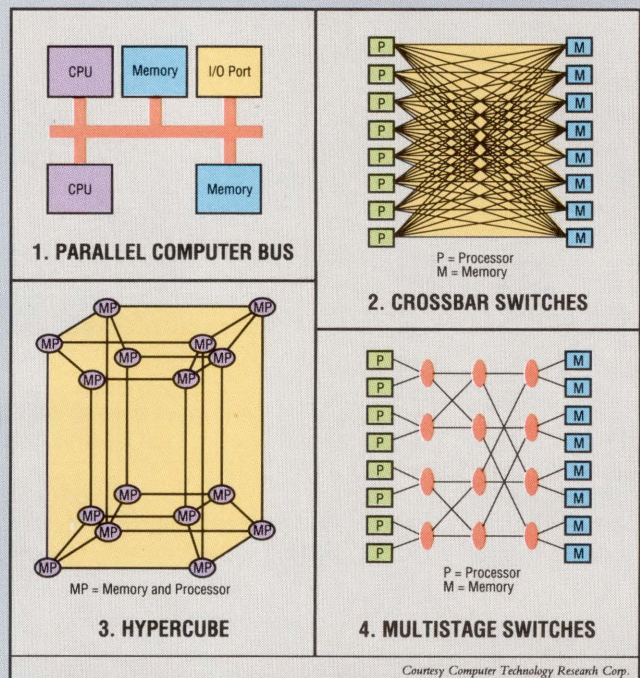
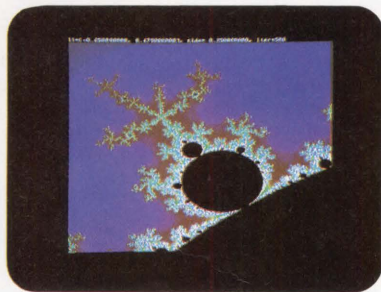
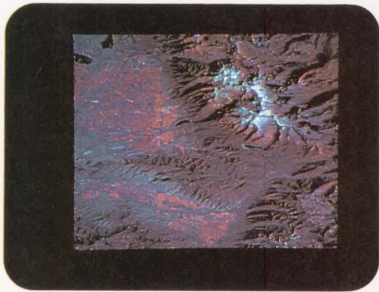
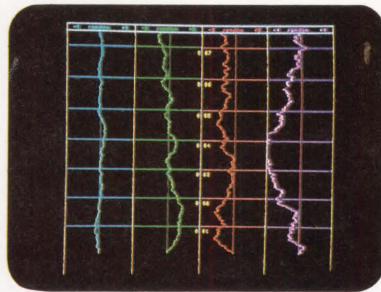
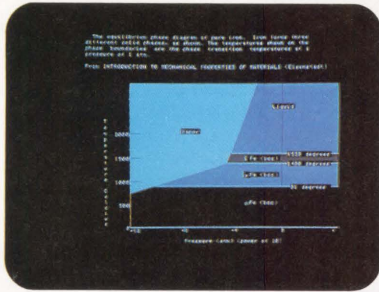


Figure 2: Supercomputing processor architectures.



# Peritek does it with color!

NOW WITH X-WINDOWS



## Graphics and alphanumeric for LSI, PDP, VAX and MicroVAX.

Peritek has been offering the widest range of Q-bus and Unibus display controllers available anywhere for over 10 years. Hardware and software for most applications. Color and monochrome. Low to high resolution. Software support for RT/TSX, RSX, VMS, and ULTRIX, and bit-level subroutines which interface directly to Fortran and C. Image processing software is also available.

Peritek's most powerful board, the VCL-Q combines an advanced CRT controller and a very fast 68030-based computer on one quad-height card.

You get:

- 1024 x 1024 x 8 color graphics
- 1024 x 1024 x 4 graphics overlays
- CPU with 1MB to 10MB 32-bit private memory, optional 68882 FPU
- hardware graphics cursor
- hardware pan and zoom
- 4 serial RS-232 I/O ports
- 2 Channel DMA controller
- High speed, 8-bit SCSI port

The VCL-Q prices range from \$4,870 to \$6,795. A complete package with software and monitor starts at \$7,790.

For your special requirements, Peritek can supply custom configurations of our standard products. We're ready to quote on custom software and hardware design projects, too.

### Call or write for free catalog.

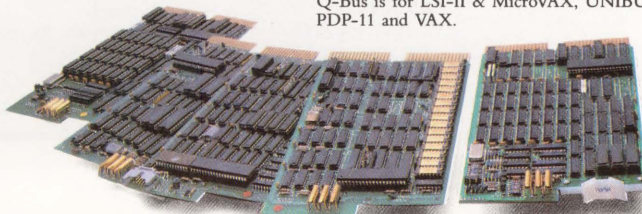
Peritek Corporation  
5550 Redwood Rd.,  
Oakland, California 94619.  
Phone (415) 531-6500.  
In the east, (516) 798-1919.

See us at DEXPO West,  
November 7-9, Booth #223



	MODEL	BUS & SIZE	FEATURES AND OPTIONS	PIXEL GRAPHICS		ALPHA-NUMERICS
				PRIMARY	OVERLAY (S)	
COLOR/GRAY SCALE	VCL	Q QUAD	68030,68882 32-BIT RAM, ACRTC, DMA 2 DUART, PAN ZOOM, SCSI	1024 x 1024 x 8	1024 x 1024 x 4 HARDWARE CURSOR	
	VCM	Q DUAL	ACRTC, PAN ZOOM, DUART	1024 x 1024 x 8	1024 x 1024 x 4 HARDWARE CURSOR	
	VCW	Q DUAL	ACRTC, PAN, 2 CHANNELS	640 x 480 x 8	HARDWARE CURSORS	50 x 80 x 6
	VCT (avail. 1/90)	Q QUAD	34020, PAN ZOOM, SCSI, 2 DUART	1024 x 1024 x 24	1024 x 1024 x 8 HARDWARE CURSOR	
	VCX	Q & U QUAD	EXTERNAL SYNC INPUT	512 x 512 x 24		50 x 80 x 6
MONOCHROME	VRH	Q DUAL		1024 x 1024		64 x 128
	VRS	Q DUAL		512 x 512		50 x 80
	VRA	Q DUAL				24 x 80

NOTES: VCK, VRC, VCH, etc. also available, contact factory.  
Q-Bus is for LSI-II & MicroVAX, UNIBUS is for PDP-11 and VAX.



RT, RSX, VMS, ULTRIX, LSI, PDP, VAX and MicroVAX are trademarks of Digital Equipment Corporation. TSX is a trademark of S & H Associates.

CIRCLE 131 ON READER CARD



match the abilities of the computing devices.

Thus, you can expect a future in which a user at a workstation or PC connected to any host or network can access computational power of any sort and of any performance or capacity profile. Distributed hierarchical systems of high flexibility and interoperability can be dynamically reconfigured to meet the needs of their users.

The cost of future ultra-high-performance computers will be better

aligned with the cost/performance profile of other computers. However, advances in software will make interactive mixed uses more practical, and scalability will let you choose systems that fit your needs while retaining compatibility and the ability to migrate to new machines.

The emergence of highly parallel computers will improve the ability of companies to sustain a competitive advantage by creating new products and services or by responding more quickly

to market conditions. Companies that successfully implement strategies to make their programs and data independent of underlying hardware features through the 1990s will extend their information systems toward their suppliers, customers and collaborators. —*Peter Gregory is president of Myrias Computer Corporation, Boston. R. David Lowry, vice president of marketing at Myrias, contributed to this article.*

ARTICLE INTEREST QUOTIENT  
Circle On Reader Card  
High 413 Medium 414 Low 415

### Companies Mentioned In This Article

Alliant Computer Systems Corp.  
1 Monarch Dr.  
Littleton, MA 01460  
(508) 486-4950  
**CIRCLE 425 ON READER CARD**

Hewlett-Packard  
Apollo Div.  
330 Billerica Rd.  
Chelmsford, MA 01824  
(508) 256-6600  
**CIRCLE 540 ON READER CARD**

Aptec Computer Systems Inc.  
P.O. Box 6750  
Portland, OR 97228  
(503) 626-9000  
**CIRCLE 426 ON READER CARD**

Avalon Computer Systems Inc.  
425 E. Colorado St., Ste. 710  
Glendale, CA 91025-1675  
(818) 247-2216  
**CIRCLE 427 ON READER CARD**

BBN Advanced Computers Inc.  
10 Fawcett St.  
Cambridge, MA 02138  
(617) 873-6000  
**CIRCLE 525 ON READER CARD**

Concurrent Computer Corp.  
106 Apple St.  
Tinton Falls, NJ 07724  
(201) 758-7000  
**CIRCLE 428 ON READER CARD**

Convex Computer Corp.  
3000 Waterview Rd.  
Richardson, TX 75083  
(214) 497-4000  
**CIRCLE 555 ON READER CARD**

Cray Research Inc.  
608 2nd Ave. S.  
Minneapolis, MN 55402  
(612) 333-5889  
**CIRCLE 429 ON READER CARD**

CSPI  
40 Linnell Cir.  
Billerica, MA 01821  
(617) 272-6020  
**CIRCLE 438 ON READER CARD**

ELXSI  
2334 Lundy Pl.  
San Jose, CA 95131  
(408) 942-0900  
**CIRCLE 439 ON READER CARD**

Encore Computer Corp.  
6901 W. Sunrise Blvd.  
Ft. Lauderdale, FL 33313  
(305) 587-2900  
**CIRCLE 442 ON READER CARD**

Evans & Sutherland  
600 Komas Dr.  
Salt Lake City, UT 84158  
(801) 582-5847  
**CIRCLE 440 ON READER CARD**

FPS Computing  
3601 S.W. Murray Blvd.  
Beaverton, OR 97005  
(503) 641-3151  
**CIRCLE 416 ON READER CARD**

Fujitsu Microsystems of  
America Inc.  
3055 Orchard Dr.  
San Jose, CA 95134  
(408) 434-1160  
**CIRCLE 441 ON READER CARD**

Hitachi America Ltd.  
2000 Sierra Pt. Pkwy.  
Brisbane, CA 94005  
(415) 589-8300  
**CIRCLE 443 ON READER CARD**

Imaging Technology Inc.  
600 W. Cummings Park  
Woburn, MA 01801  
(617) 938-8444  
**CIRCLE 444 ON READER CARD**

Mercury Computer Systems  
600 Suffolk St.  
Lowell, MA 01854  
(508) 458-3100  
**CIRCLE 445 ON READER CARD**

Modcomp Computer  
Systems Inc.  
1650 W. McNab Rd.  
Ft. Lauderdale, FL 33340  
(305) 974-1380  
**CIRCLE 446 ON READER CARD**

Multiflow Computer Inc.  
31 Business Park Dr.  
Branford, CT 06405  
(203) 488-6090  
**CIRCLE 447 ON READER CARD**

Myrias Computer Corp.  
20 Park Plaza  
Statler Bldg., Ste. 1212  
Boston, MA 02116  
(617) 695-0370  
**CIRCLE 448 ON READER CARD**

Ncube  
1825 N.W. 167th Place  
Beaverton, OR 97006  
(503) 629-5088  
**CIRCLE 571 ON READER CARD**

NEC America Inc.  
8 Old Sod Farm Rd.  
Melville, NY 11747  
(516) 753-7000  
**CIRCLE 449 ON READER CARD**

Network Systems Corp.  
7600 Boone Ave. N.  
Minneapolis, MN 55428  
(612) 424-4888  
**CIRCLE 464 ON READER CARD**

Numerix Corp.  
20 Ossipee Rd.  
Newton, MA 02164  
(617) 964-2500  
**CIRCLE 450 ON READER CARD**

Omicomp Graphics Corp.  
1734 W. Belt N.  
Houston, TX 77043  
(713) 464-2990  
**CIRCLE 451 ON READER CARD**

Oryx Corp.  
30 W. Century Rd.  
Paramus, NJ 07652  
(201) 261-0770  
**CIRCLE 452 ON READER CARD**

Silicon Graphics Inc.  
2011 N. Shoreline Blvd.  
Mountain View, CA 94039  
(415) 960-1980  
**CIRCLE 453 ON READER CARD**

Sky Computers Inc.  
27 Industrial Ave.  
Chelmsford, MA 01824  
(508) 250-1920  
**CIRCLE 454 ON READER CARD**

Star Technologies Inc.  
515 Shaw Rd.  
Sterling, VA 22170  
(703) 689-4400  
**CIRCLE 455 ON READER CARD**

Stardent Inc.  
85 Wells Ave.  
Newton, MA 02159  
(617) 964-1000  
or  
880 W. Maude Ave.  
Sunnyvale, CA 94086  
(408) 732-0400  
**CIRCLE 456 ON READER CARD**

Stratus Computer Inc.  
55 Fairbank Blvd.  
Marlboro, MA 01752  
(508) 460-2000  
**CIRCLE 457 ON READER CARD**

Swanson Analysis Systems Inc.  
Johnson Rd.  
Houston, PA 15342  
(412) 746-3304  
**CIRCLE 465 ON READER CARD**

Thinking Machines Corp.  
245 1st St.  
Cambridge, MA 02142  
(617) 876-1111  
**CIRCLE 458 ON READER CARD**

Ultra Network Technology  
101 Daggett Dr.  
San Jose, CA 95134  
(408) 922-0100, ext. 579  
**CIRCLE 579 ON READER CARD**

VXM Technologies Inc.  
P.O. Box 9121 Kenmore Station  
Boston, MA 02215  
(617) 730-8490  
**CIRCLE 459 ON READER CARD**

Wavefront Technologies Inc.  
530 E. Montecito St., Ste. 106  
Santa Barbara, CA 93103  
(805) 962-8117  
**CIRCLE 463 ON READER CARD**



HOST PROGRAMMABLE GRAPHICS

# Any way you want to look at it, the graphics solution is CA-DISSPLA.

**The leading business, scientific and engineering graphics solution:**

**CA-DISSPLA™**, the de facto industry standard of FORTRAN graphics subroutine libraries, is now serving programmers at more than 3,000 sites worldwide.

**Visualizes data for quick, clear analysis and decision making:**

With the most extensive graphics capabilities available, **CA-DISSPLA** can graphically represent any type of data, and even integrate all types of graphics from charts to graphs to drawings.

**Graphic forms of any type:**

From simple bars, pies, and lines, to complex 3D object rendering, **CA-DISSPLA** produces an unlimited variety of graphics forms.

**Extensive CPU and output support:**

**CA-DISSPLA** operates on supercomputers, mainframes, mid-range systems and personal workstations. Supports over 300 graphics devices, CRTs, plotters, printers, and slide makers, as well as CGM and Postscript. Computer and device independence, plus programmability, assures you maximum flexibility and protects your investment in existing systems.

**Easy to learn. Easy to use:**

Especially in sophisticated applications, you'll spend less time programming and more time analyzing the results.

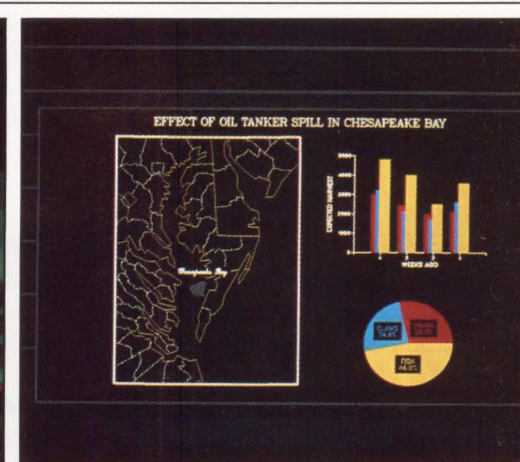
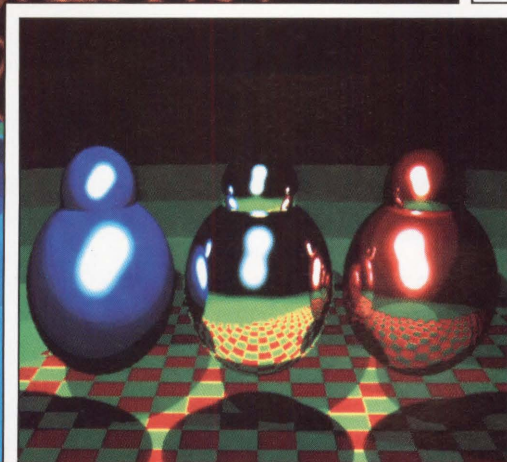
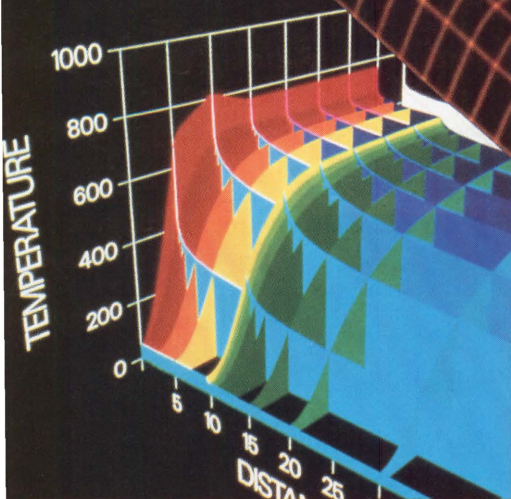
For more information, write or call Chris Andrews today.

**800-841-3734 (Ext. 1911)**

(In Calif. 800-468-0725)

Computer Associates  
10505 Sorrento Valley Road  
San Diego, CA 92121-1698

© 1988 Computer Associates International, Inc.



**COMPUTER ASSOCIATES™**  
Software superior by design.

- World's leading independent software company.
- Broad range of integrated business and data processing software for mainframe, mid-range and micro computers.
- Worldwide service and support network of more than 100 offices.

Resource & Operations Management • Financial • Banking • Graphics • Spreadsheets • Project Management

CIRCLE 188 ON READER CARD





## STORAGE

# DSSI IN DEPTH

By Richard Wrenn and  
Fernando Zayas

### DSSI Is A Vehicle For Connecting High-Performance Storage Products With High-End Features To MicroVAX Systems At A Reasonable Cost.

Since October 1988, Digital has announced several products that use a bus called the Digital Storage Systems Interconnect (DSSI). These products include the RF30 and RF71 disk integrated storage elements (ISE); the RF30 and RF71 removable storage elements (RSE); the KFQSA Q-bus-to-DSSI adapter; the MicroVAX 3300/3400's KA640 CPU module, which includes an embedded DSSI adapter (EDA640); and various enclosures and cables.

Digital developed DSSI as a vehicle for connecting high-performance storage products with high-end features to MicroVAX systems at a reasonable cost. DSSI-based ISEs provide new levels of multiple-disk performance, mainframe data integrity and multihost support. It's even possible to build small VAXclusters based on DSSI instead of the CI.

#### Why DSSI?

When Digital began the CVAX program (MicroVAX 3200/3300/3400/3500/3600/3800/3900), it was clear that the RQDX3 controller and the RD disk drives used in the MicroVAX II wouldn't provide the performance and functionality necessary for these faster systems. The CVAX was to be three to five times faster than the MicroVAX II. This meant that storage-system performance would have to increase. It also was recognized that as MicroVAX performance increased, customers would want to migrate applications from high-end VAXs to MicroVAXs. Many of those applications would require not only higher-performance storage but also greater storage capacity, improved data integrity, increased reliability and greater availability than was provided by RQDX3-based storage.

These high-end features could have been provided by an interface between MicroVAXs and CI-based VAXclusters, but Digital felt that the cost and physical environment of CI-based storage weren't consistent with the majority of MicroVAX applications. CIs, HSCs and RA disks are generally too large, expensive, noisy and hot for the typical MicroVAX customer. DSSI provides functionality similar to the CI but at a reasonable cost and in packages suitable for the open-office environment.

The following goals led Digital to develop DSSI:

1. To provide low-cost solutions (inexpensive connectors, cables, terminators, drivers and data-link hardware).
2. To provide a high-performance storage and cluster bus for low-end systems.
3. To provide a long architectural life to protect customer storage-device investment.
4. To support disks, tapes, optical disks and solid-state disks on one adapter.
5. To decouple system data-transfer rate from media data-transfer rate.
6. To support storage peripherals suitable for the office environment.
7. To develop a storage bus suitable for use inside and between cabinets.

Digital wanted to provide performance great enough to match the increased requirements of evolving MicroVAX products. Many studies have characterized the I/O appetite of VAXs, and it's known that VMS systems request between 15 and 37 QIOs per second per VAX unit of processing (VUP) used. This means that a 2.4-VUP MicroVAX 3300 needs at least 36 QIOs per second of throughput and a 3.8-VUP MicroVAX 3800 could use up to 140 QIOs per second of throughput. A dual-host system needs twice that. Single mechanical disks can't operate at these rates, so multiple-disk performance





CREATING DEC™ COMPATIBLE  
MEMORY FOR  
VAXSTATION 3100™,  
MICROVAX 3100™,  
DECSTATION 2100/3100™,  
MICROVAX 3XXX™

DECSYSTEM 5400™,  
MICROVAX II™ AND LSI/11™  
SYSTEMS, AND COMMUNICATION  
PRODUCTS FOR ALL Q-BUS BASED  
SYSTEMS.  
CALL 1-800-843-8336

## EXPANDING YOUR DEC UNIVERSE

See us at DEXPO West Booth #1370

CAMINTONN CORPORATION 2332-A MCGAW AVE., IRVINE, CA 92714 (714) 553-0247

DEC, VAXSTATION, DECSTATION, DECSYSTEM, MICROVAX AND LSI/11 ARE REGISTERED TRADEMARKS OF DIGITAL EQUIPMENT CORPORATION. COPYRIGHT 1989 CAMINTONN CORPORATION. ALL RIGHTS RESERVED.

CIRCLE 102 ON READER CARD



became a primary goal. Further, to satisfy increasing MicroVAX power, an approach that could support a tenfold increase in throughput was desired (see Figure 1).

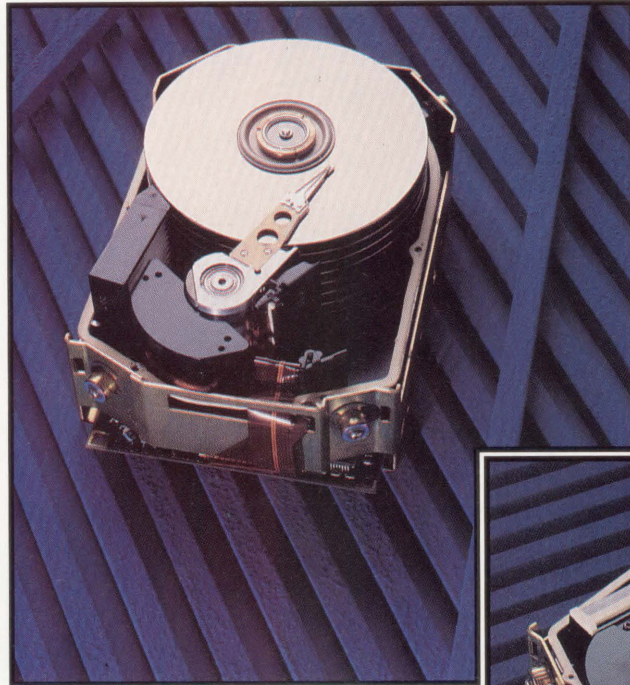
Clearly, more powerful MicroVAXs would need greater storage capacity. Although not generally understood, RD disk-drive capacity is limited by the industry-standard ST506 interconnect used between RD disk drives and the RQDX3 controller. The maximum data rate of the interconnect limits the linear recording density to about 17 sectors per track and thus limits drive capacity. Although other drive-controller interconnects, such as ESDI, SMD and SDI, have higher data rates, they're all ultimately subject to this same limitation. Thus, a primary goal was to integrate the controller with the head-disk assembly (HDA) so that the interconnect wouldn't limit the maximum capacity of the storage element.

Performance studies of Q-bus disk controllers frequently concluded that the controller was a bottleneck, particularly when it controlled multiple disk drives. This is true of the RQDX3, as well as most third-party products. Problems identified include inadequate processor power devoted to the Mass Storage Control Protocol (MSCP) server and controller functions, rotational position sensing (RPS) miss delays associated with a shared data channel, and poor RPS optimization (see Figure 2).

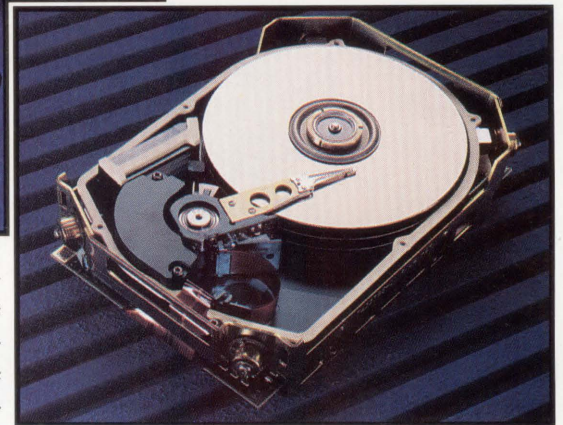
These problems can be solved by integrating a controller with every HDA. By doing so, there's never contention for the data channel, and RPS miss delays never occur. By having an independent MSCP server for each HDA, a request is never delayed by MSCP command interpretation done for another disk.

### What Is DSSI?

Put simply, DSSI is a "Micro CI." Physically, DSSI is very different from the CI,



*The RF71 (400 MB), which is shown at left, is the big brother of the RF30 (150 MB), shown below.*



but logically they're quite similar. In both cases, the multiple hosts of a VAXcluster can communicate directly with storage devices, and the System Communication Architecture (SCA) protocols are used to communicate between host nodes and storage nodes.

Physically, the DSSI is a 50-conductor cable that appears in several forms. Inside a cabinet it's either a flat ribbon cable or a round bundle of twisted pairs. Between cabinets it's a shielded round cable about one-half inch in diameter. The salient features of the bus are:

1. Single eight-bit parallel multidrop data path with byte parity and packet EDC.
2. Bandwidth of 4 MB per second (94 percent efficient).
3. Maximum length of six meters; specific, tested configurations can be as long as 12 meters.
4. Up to eight nodes (storage elements plus adapters).
5. Distributed round-robin arbitration or fixed-priority arbitration.
6. DC coupled with a characteristic impedance of 84 ohms.

In contrast, the CI has two serial data paths, each with a bandwidth of 8.75 MB per second (70 Mbits per second). It can reach 45 meters from the star coupler and

connect up to 24 nodes. Each node is transformer-coupled. DSSI may be shorter, slower and less fault-tolerant than the CI, but DSSI is less expensive and better-suited for the cost-focused MicroVAX products.

The easiest way to understand DSSI is to consider an analogy between a high-end VAXcluster based on the CI and the dual-host MicroVAX based on the DSSI (see Figure 3).

Like the HSC, each ISE contains an MSCP server and communicates with host adapters through the DSSI in the same way that HSCs communicate through the CI to their host adapters. Both use the protocols defined by SCA.

An ISE is analogous to an HSC with one RA disk connected. The DSSI is analogous to the CI. The DSSI adapter is analogous to the BCA that might be found on a VAX 8700.

Theoretically, you can build VAXclusters of MicroVAX CPUs and ISEs in much the same way you can build





# LOOKING FOR SOFTWARE TO DISCIPLINE YOUR VAX?

## Look at us before making any sudden moves.

**ISA provides a family of automated utilities for warning, watching, supervising, and controlling your VAX operations.**

ISA/SysMaster™ warns you, in real time, of impending application failures by monitoring critical resources;

ISA/ResponseMaster™ watches and records response time—at each terminal; ISA/TaskMaster™ automates and supervises complex job scheduling;

and ISA/NetMaster™ automates dial-out DECnet connections.

ISA's automated management tools have evolved from years of serving Fortune 500 DEC VAX sites where their use is critical to successful information systems.

For your poster, our "Answers" brochure, or details about a FREE TRIAL, call Judy at 312-677-3530. To fax your request dial (312-677-3577), or write: ISA Solutions, Suite 204, 5550 W. Touhy Ave., Skokie, Illinois 60077.

**312-677-3530**

**isa**  
SOLUTIONS

Automating  
VAX/VMS  
Operations

**ANSWERS TO  
THE VAX/VMS  
SYSTEM  
MANAGEMENT  
CHALLENGE**

**FREE, COLORFUL  
DOBERMAN POSTER**

DEC and VAX are registered trademarks of Digital Equipment Corporation

CIRCLE 324 ON READER CARD



high-end VAXclusters on the CI. If you can do it with a high-end VAXcluster, then there's a good chance you can do it with a dual-host MicroVAX configuration. However, there are some limitations. For example, you can't currently

**The RF71 stores 400 MB (formatted) on eight platters...**

shadow DSSI disk ISEs.

Another significant distinction between high-end VAXclusters and dual-host MicroVAX configurations is the total amount of storage that can be connected. Each HSC70 potentially can connect 32 RA90 disk drives for a total of 38.4 GB of storage on one VAXcluster node. The RF71 ISE provides 0.4 GB on one node, and thus the dual-host MicroVAX with six RF71 ISEs delivers 2.4 GB of storage. Although there are ways to expand the maximum storage capacity of a configuration, the maximum size of a DSSI configuration always will be significantly smaller than the limits of a CI VAXcluster.

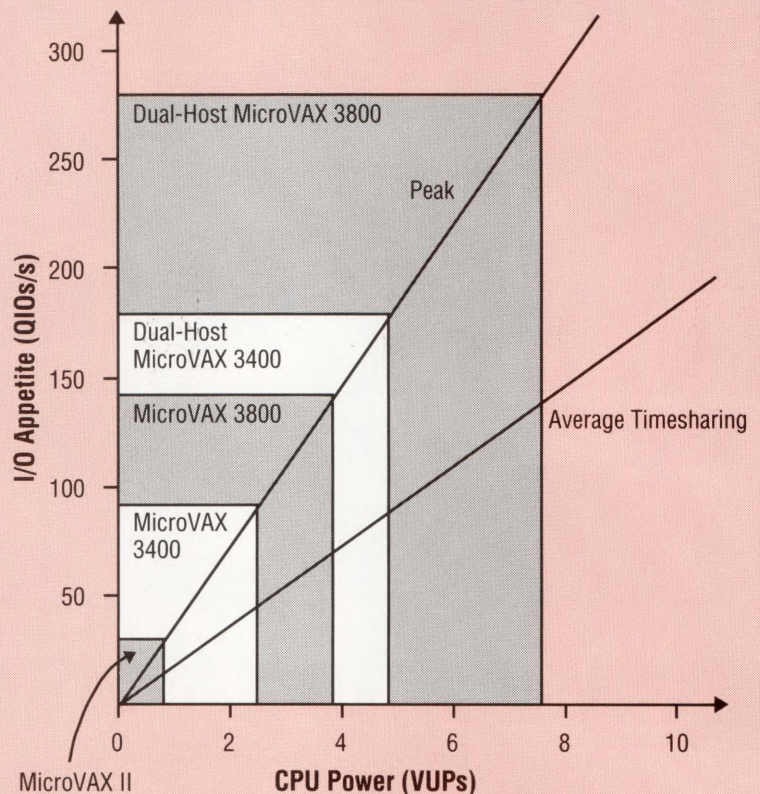
### Integrated Storage Elements

The RF30 and RF71 are disk ISEs. Each consists of a controller and an HDA integrated into a single package that fits into a standard 5 1/4-inch storage cavity (hence the name integrated storage element).

The RF71 stores 400 MB (formatted) on eight platters, while the RF30 stores 150 MB on three platters. The smaller RF30 ISE fits into either a half- or full-height 5 1/4-inch storage cavity, while the RF71 ISE only fits into a full-height cavity.

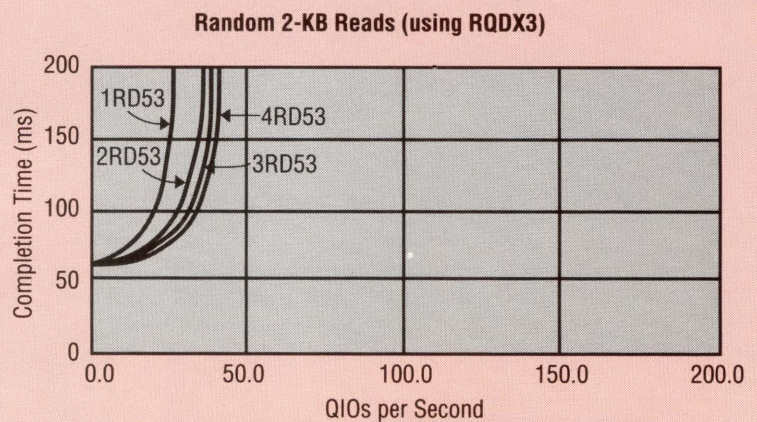
The RF30 and RF71 ISEs are part of the continuing evolution of the Digital Storage Architecture (DSA). The following features of the high-end DSA prod-

**F** I G U R E 1 .



*Rapidly increasing MicroVAX power is raising disk subsystem performance requirements.*

**F** I G U R E 2 .



*A single controller shared among multiple drives may be a performance bottleneck. Adding RD disk drives to an RQDX3 controller yields very small I/O throughput improvements.*



# A VAX IS A TERRIBLE THING TO WASTE.



It happens every day. But it shouldn't. VAXes are *not* being used for in-house publishing, compound document creation and word processing. And, at MEC, we think that's a big waste!

That's because a VAX encourages group productivity. Whether it's putting together complex proposals, end-user documentation, technical specifications or new drug applications, VAX users are able to have rapid access to centrally stored data in creating compound documents.

## MASS-11 — The Ideal Publishing Partner For The VAX

You can easily incorporate text, graphics and data into one final typeset-quality document with MASS-11. Compound documents can be mailed to others through Digital's ALL-IN-1® or MEC's Internodal Mail facility. Or, they can be faxed right from your terminal with MEC's FAXmail.

What's more, MASS-11 supports PostScript. Whether you're using MASS-11 on a VAX or PC, you can put any PostScript font, in any point size, any place on the page. So, with MASS-11, you can use your VAX for desktop publishing.

## The Performance Booster

If you are using DEC's ALL-IN-1, you'll enhance your performance greatly by choosing MASS-11 as the word processor. According to DEC User Magazine, June 1989, "MASS-11/ALL-IN-1 is . . . 600% faster than WPS-PLUS/ALL-IN-1, with the gaps increasing as the tasks became more difficult." That means you can get up to six times more users, better response time, and reduce your hardware budget.

There's more. But you'll have to call us for details. We'll send you a free demonstration tape that will show it all. Do it today. Because the only thing more tragic than wasting a VAX is wasting your time.

**Microsystems Engineering Corporation**  
2400 W. Hassell Road  
Hoffman Estates, IL 60195  
312-882-0111

Europe-MEC Information Systems, Ltd. 01-491-3313  
Far East-Choice Computing 02-411-6311

MASS-11 is a registered trademark of Microsystems Engineering Corporation. WPS-PLUS, ALL-IN-1 and VAX are registered trademarks of Digital Equipment Corporation. All other products listed are registered trademarks of their respective companies.

See us at DEXPO West Booth #1570

**MEC**

THE WORLD IS MOVING TO MASS-11

CIRCLE 170 ON READER CARD



ucts are incorporated in these ISEs:

**1. Multihost support** —

This allows a single ISE to be used by multiple hosts concurrently, a feature that until now was available only with HSCs. For example, two MicroVAX 3400s can be booted from a single ISE.

**2. Seek ordering** —

When multiple I/O commands are outstanding, the ISE performs those commands in an order that minimizes seeking. The commands considered for seek ordering include all commands from all hosts.

**3. Request fragmentation** —

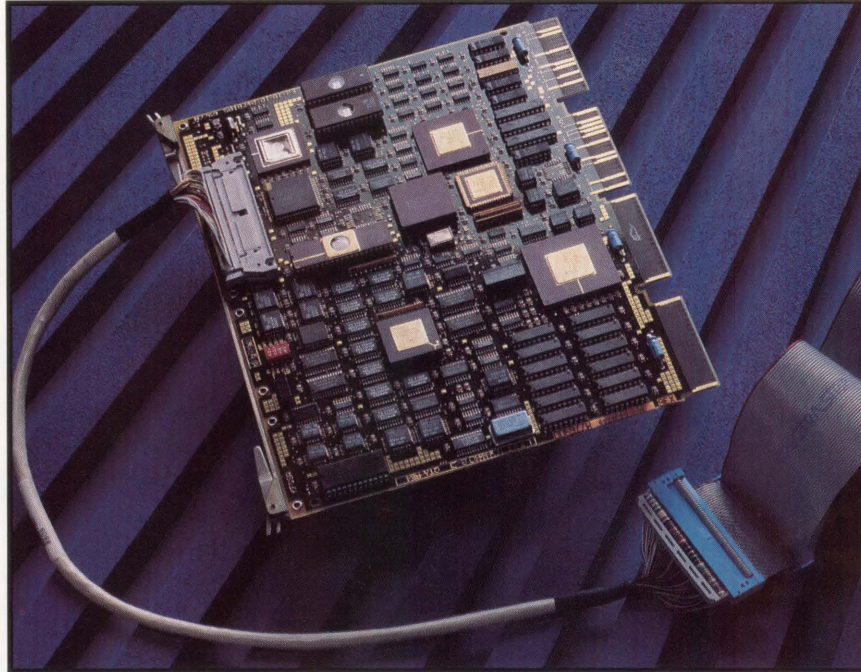
This technique breaks single I/O requests into smaller pieces that can be optimized independently. The result is lower rotational latency and consequently faster access time for large requests.

**4. Quadruplicate headers** — Like Digital's RA disks, the headers preceding each data block are replicated four times to ensure that data isn't lost because of header errors.

**5. Powerful Error Correcting Codes (ECC)** — RA-series disk drives store a 170-bit ECC in each block and can use this additional data to correct up to 80 erroneous bits. The new ISEs store a 264-bit ECC that can correct up to 120 erroneous bits.

**6. Controller-initiated bad-block replacement** — HSCs and the RF30 and RF71 ISEs implement controller-initiated bad-block replacement. The host always is presented with a perfect set of logically contiguous blocks (LBN), and the disk capacity never shrinks as bad blocks are detected and automatically moved to spare blocks.

**7. RCT cache** — The RF30 and RF71 ISEs are the first to cache the replacement control table (RCT). This allows replaced blocks to be located without the expense of seeking to and from the RCT



*The  
KFQSA  
brings DSSI  
to Q-bus systems  
such as the  
MicroVAX II,  
3500 and 3800.*

stored on the media.

**8. Resident diagnostics and utilities**

— Like the HSC, the RF30 and RF71 implement a Diagnostics and Utilities Protocol (DUP) server and several diagnostic and utility programs. These programs can be executed via the DUP server by "setting host" to the ISE.

The RF30 and RF71 RSEs are RF30 and RF71 ISEs packaged in removable canisters. Two RSEs can be mounted in a pedestal or can be rack-mounted and connected to either a KFQSA or an EDA640 adapter. RSEs are intended for secure applications in which it's necessary to remove the data physically from the systems.

**DSSI Adapters**

A DSSI adapter interfaces the DSSI bus to the host's I/O bus. Digital offers two adapters: the KFQSA and the EDA640. The KFQSA is a quad-height Q-bus module that allows the DSSI bus to be interfaced to Q-bus-based systems such as the MicroVAX II, 3500 and 3800. The KA640 CPU module used in the MicroVAX 3300 and 3400 includes a DSSI adapter embedded on the CPU module called the EDA640.

The KA640 CPU is a single quad-height Q-bus module that contains a

CVAX CPU, the first 4 MB of ECC memory, an NI interface, a DSSI interface and a Q-bus interface. By combining these components on a single module, the MicroVAX 3300 and 3400 enjoy a low entry cost and expandability.

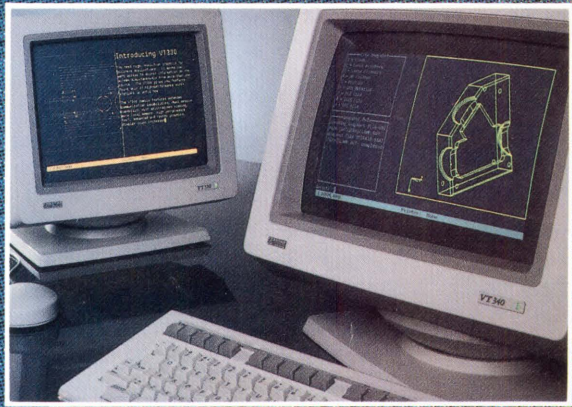
The KA640 NI and DSSI interfaces aren't on the Q-bus. This frees Q-bus slots for the user, and the DSSI interface can take advantage of the higher data rates available on the internal CVAX bus.

Logically, the EDA640 is a CI adapter. The functionality found in the port processor of a CI adapter is implemented in a new port driver (PIDRIVER), while the functionality normally found in the data-link module of a CI adapter is included in the EDA640 hardware. The PIDRIVER also implements functionality found in the PADRIVER and is responsible for interfacing with the EDA640 hardware. Each ISE appears to the host operating system as an HSC with one drive attached.

The KFQSA is a Q-bus-to-DSSI adapter. It emulates up to seven storage system port (SSP) controllers, one for each ISE on the DSSI. These are operated by standard SSP port drivers such as the PUDRIVER in VMS. In other words,



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.  
 20 mA Current Loop

\* 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.

For more information :

 **Visentech Systems Inc.**

11500 North Stemmons Frwy  
 Dallas, Texas 75229  
 TEL 214-247-5931  
 1-800-248-5931  
 TELEX 251750-VIS DAL  
 FAX 214-247-5964

CIRCLE 368 ON READER CARD



each ISE appears to the host operating system as a separate RQDX3 or KDA50 controller with one drive attached.

This presentation scheme provides an important benefit. Existing host software remains unchanged. This is important for operating systems that don't understand the SCA protocols spoken by ISEs.

Because the KFQSA presents ISEs on the DSSI to the host as SSP interfaces, it hides some DSSI functionality from the host operating system. In particular, the SSP interface doesn't allow host-to-host communication and thus can't communicate distributed lock manager messages and other host-to-host cluster communications. However, VAXcluster configurations can be built in which lock manager and other host-to-host traffic use the NI but in which ISE data is accessed directly through the KFQSAs.

The KFQSA is designed so that multiple KFQSAs can be installed in a single Q-bus. The primary benefit provided by the resulting multiple DSSIs is the potential for greater storage capacity. The number of KFQSAs supported on any given system is specified in the operating system Software Product Description (SPD) and in the Systems and Options Catalogue.

### DSSI Enclosures

The BA213 pedestal that houses the MicroVAX 3400, 3500 and 3800 includes four full-height 5 1/4-inch storage cavities, three of which are wired for DSSI ISEs. The smaller BA215 pedestal used for the MicroVAX 3300 has two half-height 5 1/4-inch storage cavities wired for the half-height RF30 ISEs. The BA213 and BA215 each include an operator control panel and a connector that can be used to extend the DSSI bus to other enclosures.

The R215F is a modified BA215 enclosure that holds up to three full- or half-height RF ISEs. The R215F can be used to expand the storage available on a MicroVAX 3400, 3500 or 3800 from three to six ISEs, giving a total formatted disk capacity of 2.4 GB (if RF71 ISEs are used). An R215F also can be used to provide

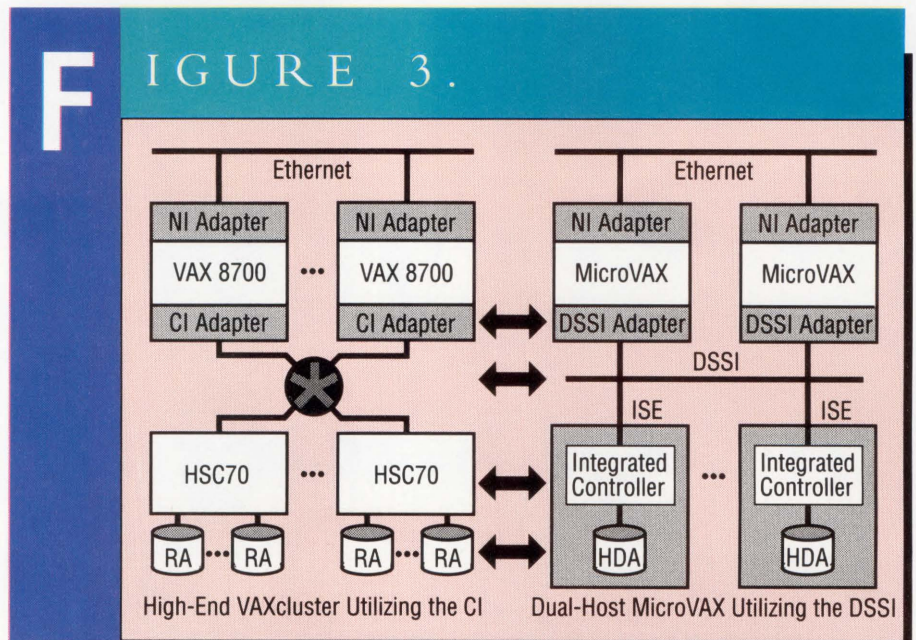
extra storage for Q-bus-based systems that weren't built with DSSI cabling via a KFQSA installed in the system's Q-bus. In this way, RF ISEs can be connected to any MicroVAX, from the MicroVAX II to the MicroVAX 3900.

### DSSI Performance

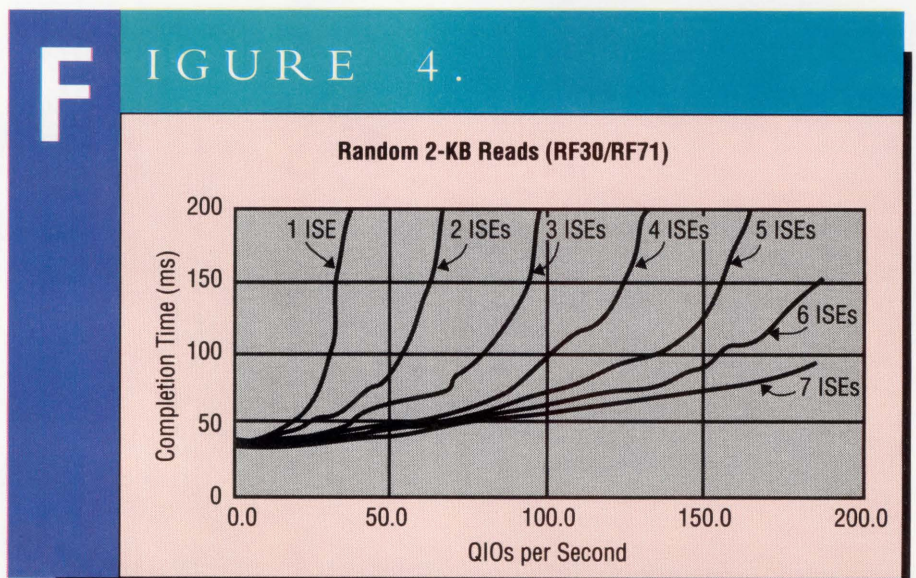
The RF30 and RF71 ISEs provide excellent multiple-disk performance. Because

each ISE has its own controller and buffer, operations can be overlapped completely between ISEs.

MSCP command reception and execution can occur in parallel, because each ISE has its own MSCP server. Seeks are performed in parallel and are overlapped completely. Unlike other designs, seek-command delivery isn't delayed because of another disk's data transfer. Each ISE



The CI/DSSI analogy.



Multiple-disk response-time data demonstrates that DSSI subsystem throughput increases linearly with additional ISEs and that a DSSI adapter isn't a bottleneck.



performs independent rotational optimizations, beginning transfers at the earliest possible time. Because each ISE has its own data buffer, data can be transferred from the media in parallel, completely eliminating RPS miss delays caused by sharing a data channel between disk drives. Because data is transmitted over the DSSI in small packets, command and data transfers to and from multiple ISEs are efficiently multiplexed.

The result is that the throughput limit of a DSSI subsystem increases linearly with additional ISEs up to the adapter limit. In other words, assuming that the load can be spread evenly across the available disks, two disk ISEs provide twice the throughput of one disk ISE, three disk ISEs provide three times the throughput of one disk ISE, and so forth (see Figure 4). No storage subsystem currently available for MicroVAXs can make this claim, including SDI, ESDI, SCSI and SMD.

Single RF30 and RF71 ISEs perform far

better than the RD disk drives. In most cases, the new ISEs perform better than RA81s, but not as well as the RA70s or RA82s. The throughput (I/Os per second) and bandwidth (KB per second) of a single RF30 or RF71 ISE are 70 percent greater than the RD54 and approach that of the RA70. The response times of the RA70 and RA82 are about 15 to 20 percent better than the new ISEs, so response time-sensitive applications will perform a little better on those products. The transfer rate of the RFs is approximately equal to the RA70, but the RA82

The DSSI was designed so that Digital could use it for several generations of systems and storage products before the bus would become a limitation.

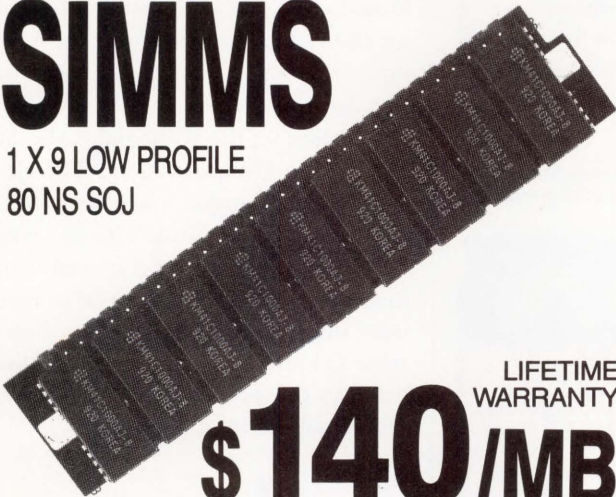
has a significantly higher transfer rate (see Figure 5).

The DSSI was designed so that Digital could use it for several generations of systems and storage products before the bus would become a limitation. Although current DSSI products perform well, expect DSSI performance to improve substantially in transfer rate, request rate, response time and CPU efficiency.

For example, the DSSI has a theoretical throughput limit of 5,000 QIOs per second and a theoretical bandwidth of 3.75 MB per second (94 percent of 4 MB

# SIMMS

1 X 9 LOW PROFILE  
80 NS SOJ



LIFETIME  
WARRANTY

## \$140/MB

24HR Replacement Policy

# 800-334-9191

Volume Discounts Available



**ANDATA CO**  
Computer Peripherals

CIRCLE 155 ON READER CARD

# SHARING PRINTERS SAVES MONEY!

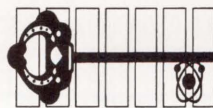
You knew that, of course. But did you know that only one electronic printer switch is specifically designed to provide automatic, transparent sharing of DEC printers? No?

It's called the **SWITCHmate**.

See us at DEXPO West Booth #2007

Share printers and save!

Call us at: 1-800-325-0150



**Gold Key**  
ELECTRONICS, INC.

18 Lamy Drive, P.O. Box 186, Goffstown, NH 03045

SWITCHmate is a trademark of Gold Key Electronics, Inc.; DEC is a trademark of Digital Equipment Corp.

CIRCLE 260 ON READER CARD



per second). However, current adapters limit throughput and bandwidth to fewer than 360 QIOs per second and 1.5 MB per second into any one CPU. This potential is important in multihost configurations and will become even more important with the advent of future CPUs, faster adapters and faster storage products.

### Storage Capacity

The 150-MB RF30 and the 400-MB RF71 comprise the first generation of DSSI disk ISEs. Unlike ST506, ESDI, SMD and SDI,

DSSI doesn't limit disk ISE recording density. Therefore, expect Digital to produce disk ISEs with ever-increasing capacity.

A MicroVAX can be configured with up to six RF71 ISEs on a single DSSI adapter for 2.4 GB of storage. However, additional storage can be added on a second DSSI by installing another adapter (KFQSA) with up to six additional RF71 ISEs for a total of 4.8 GB. The additional ISEs are contained in two R215F storage-expansion cabinets. The maximum stor-

age on a MicroVAX 3800 system configured with two KFQSAs is 4.8 GB (see Figure 6).

For applications that require more than 4.8 GB of storage, the RA90 is available. The MicroVAX 3900 can be configured with eight RA90s for a total capacity of 9.6 GB. For even greater capacity, a CPU, with either BI or CI connectivity, and either multiple KDB50s or a CI and an HSC are required. More than anything, an application's total storage capacity requirements determine whether a CI- or DSSI-based storage system is appropriate.

### Data Integrity And Reliability

The RF30 and RF71 ISEs use a 264-bit ECC on each sector that can correct up to 120 erroneous bits. Like the RA disks, ISEs record four copies of each sector header so that header errors can be tolerated. Like the HSC, bad-block replacement is performed completely within the ISE. The host simply is asked to make an entry in the error log.

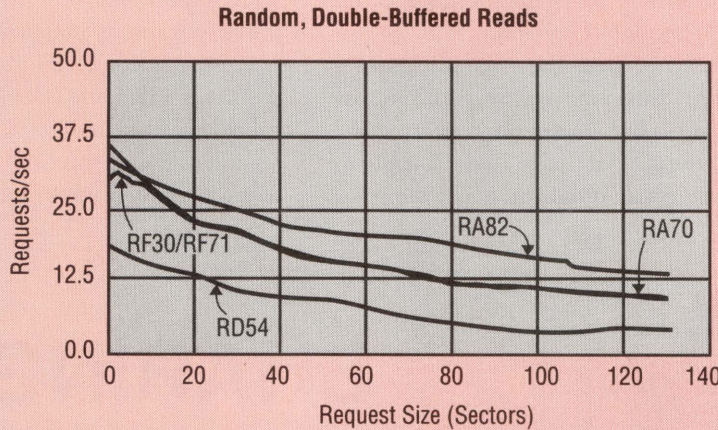
The RF30 and RF71 ISEs support Digital's VAXsimPLUS utility for predicting HDA failures. By predicting HDA failures, corrective action can be taken before data loss occurs.

In addition, the RF30 and RF71 ISEs have a very low parts count. The electronics module makes heavy use of VLSI, gate arrays and high-density memory. These products also have moved many functions previously performed in hardware into firmware, resulting in higher reliability. By limiting the power dissipated by the RF30 and RF71 ISEs, heat-related failures are minimized.

### Availability

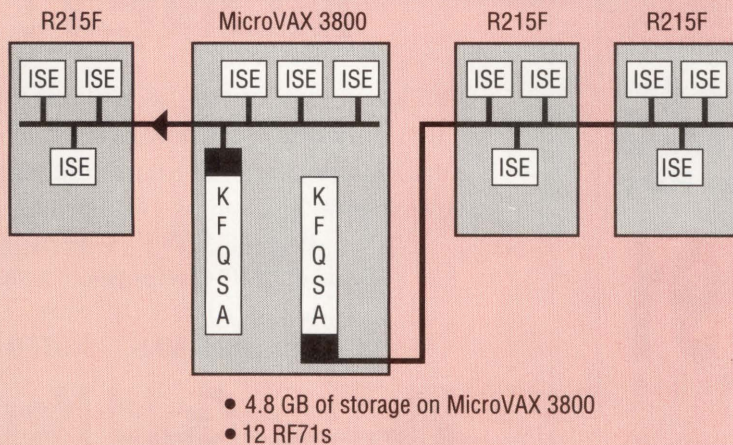
High-end VAXclusters provide a higher-availability solution than single CPUs. If you use a VAXcluster for timesharing, you know that if one CPU in the VAXcluster fails, the jobs running on that CPU fail and must be restarted. However, the other CPUs in the VAXcluster continue to run and can access the same data as the failed CPU, so the jobs can be restarted immediately.

**F** I G U R E 5 .



*Relative performance of several Digital disk products.*

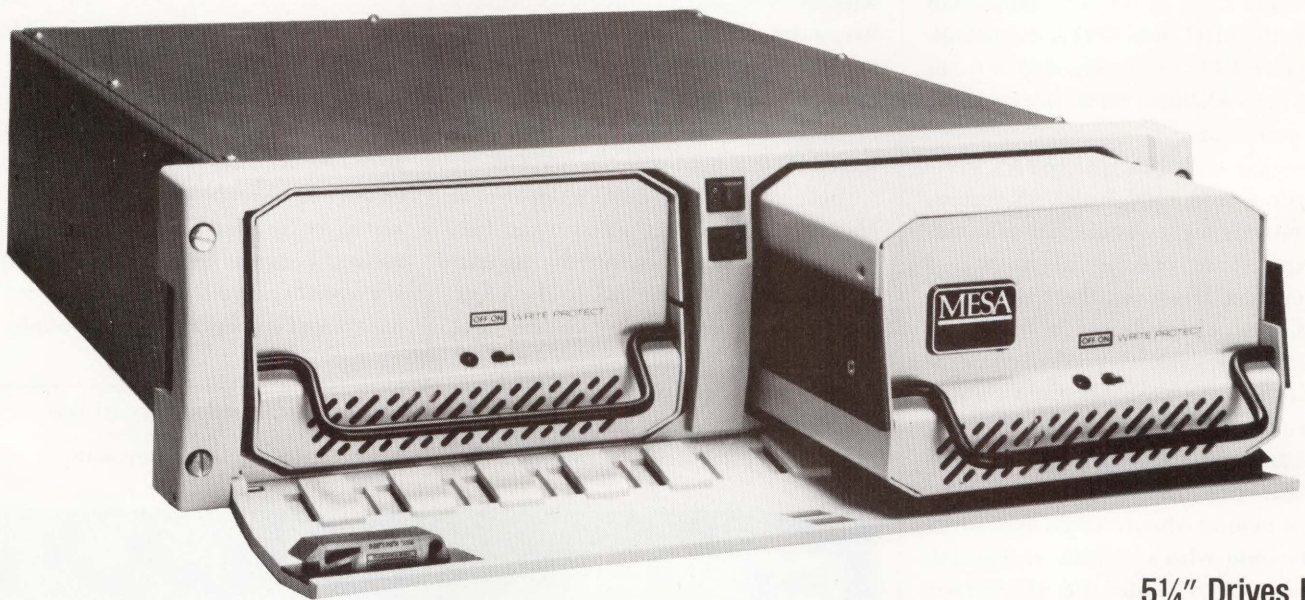
**F** I G U R E 6 .



*Maximum storage on a MicroVAX 3800 system configured with two KFQSAs is 4.8 GB.*



# 150,000 hrs MTBF



## MESA 6300 Series

- MESA turnkey subsystems are plug compatible with DEC® and Sun.®
- Feature reliable 5¼" drives by Hewlett-Packard® and Hitachi.®
- MTBF up to 150,000 hours on HP drives.
- 5 year warranty on HP drives.

- Available with removable or nonremovable drives, in rack mount, desk mount or tower configurations.
- Up to 3 GB per subsystem.
- Installation, on-site service and custom integrated subsystems are also available.



5¼" Drives By  
**HEWLETT  
PACKARD**

DEC is a registered trademark of Digital Equipment Corporation. Sun is a registered trademark of Sun Microsystems, Inc.

**MESA**  
TECHNOLOGY CORPORATION

9720 Patuxent Woods Dr. Columbia, MD 21046

Columbia, MD  
800/950-6372  
301/290-8150

Lowell, MA  
800/999-6780  
508/458-4100

Milford, CT  
800/777-0984  
203/878-6800

Springfield, MA  
800/999-6780

Burlington, VT  
800/999-6780

Raleigh, NC  
800/777-2340

Richmond, VA  
800/777-2340

Morris Plains, NJ  
800/444-9238  
201/538-8004

Philadelphia, PA  
800/333-8641  
215/644-3100

Charlotte, NC  
800/777-2340  
704/529-1792

 An Electrocomponents Company

CIRCLE 371 ON READER CARD



## Because multihost MicroVAX configurations are simply small VAXclusters, they provide higher-availability solutions for the same reasons as high-end VAXclusters.

For example, suppose you're performing word processing on a VAXcluster when the CPU you're using fails. You can recover immediately by connecting to another CPU in the VAXcluster and issuing the EDIT/RECOVER command. The failed CPU can be repaired and can rejoin the VAXcluster while you continue with your work.

Because multihost MicroVAX configurations are simply small VAXclusters, they provide higher-availability solutions for the same reasons as high-end VAXclusters. However, there are limitations. For example, in a high-end VAXcluster, a shadowed system disk prevents a failed system disk from causing the entire VAXcluster to fail. Because ISEs can't be shadowed, DSSI can't provide that same level of availability. However, multihost MicroVAX configurations can be built with a separate system disk for each CPU. While this necessitates replicating many files, it increases system availability.

DSSI dual-host configurations continue to run in spite of single operating-system crashes, CPU hardware failures, memory failures, DSSI adapter failures and NI adapter failures. DSSI-based dual-host configurations are vulnerable to shared power-supply failures, shared system disk failures and DSSI bus failures. CI-based VAXclusters can be configured that aren't so vulnerable.

Like the HSCs, the RF30 and RF71 ISEs implement multihost support, which means that an ISE (or an HSC) can communicate with multiple-host CPUs simultaneously. By implementing multihost support, ISEs can communicate directly to the multiple hosts of a VAXcluster.

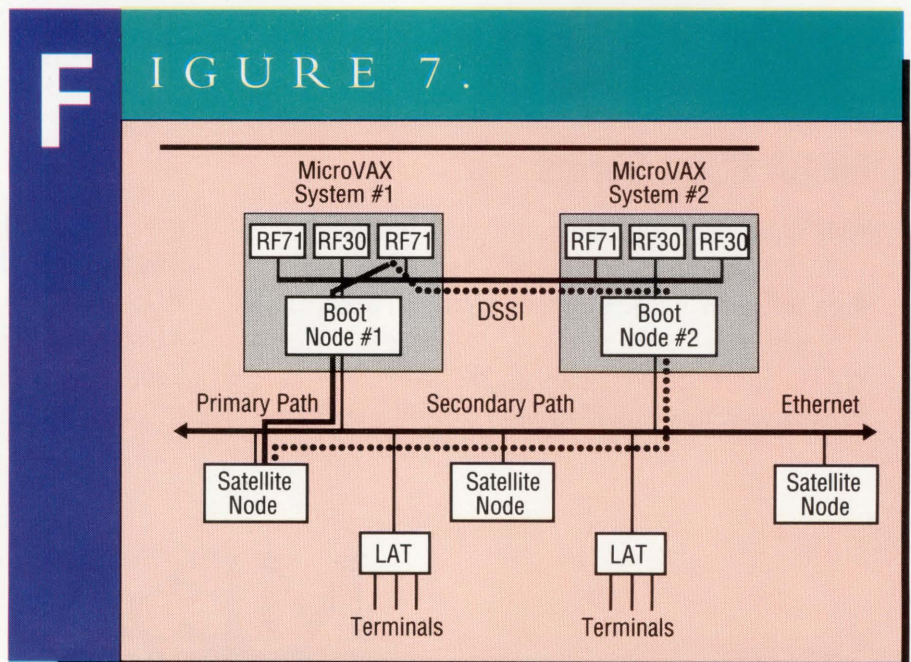
A DSSI-based dual-host MicroVAX makes an ideal LAVc boot server. In an LAVc, a boot member has direct access to a disk containing VMS and thus can be self-sufficient. Satellite members needn't have a disk. They boot the operating system through the NI with the aid of the boot member. However, when the boot member fails, the satellite members served by that boot member also fail.

Because each node of the dual-host MicroVAX has direct access to an ISE, each host can be a boot member and can serve the same system disk to the LAVc satellite members. Further, if one boot member fails, all connections between the satellite members and the failed boot member fail over to the remaining boot member (see Figure 7). This means that

applications running on the satellite members aren't interrupted and completely survive the boot-member failure. This can increase the availability of an LAVc significantly and is an important application for DSSI-based systems.

DSSI IS A LOW-COST VAXcluster bus for MicroVAXs that delivers the performance, capacity, data integrity and reliability required by Digital's new generation of MicroVAXs. Additional disk and tape ISEs are under development. New adapters, storage enclosures and operating-system enhancements are under development that will bring DSSI functionality and performance to more systems. Future disk ISEs will make full use of higher storage density recording techniques to provide more capacity and higher performance. — *Richard Wrenn is a consulting engineer doing performance and system engineering for the Storage and Information Management Group at Digital. Fernando Zayas is a consulting engineer at Digital working in research and development of disk products.*

ARTICLE INTEREST QUOTIENT  
Circle On Reader Card  
High 417 Medium 418 Low 419

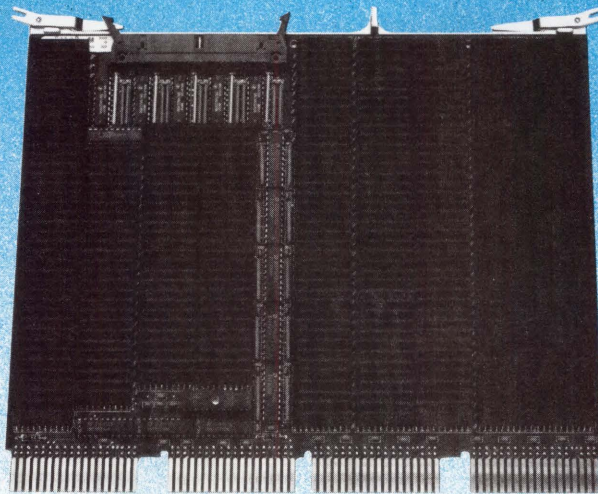


When a dual-host system is used as an LAVc boot server, satellites' access paths to disks served by a boot member will fail over to the surviving boot member.



# 32MB MICROVAX III MEMORY

*"Available  
Now"*

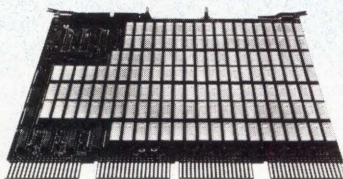


*"Available  
Now"*

## 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

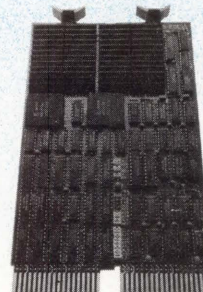


### THE CI-MIV16 FEATURES

- 16 megabytes on one board.
- On board parity.
- Hardware and software compatible with the Microvax II.
- Backplane space savings.
- Power requirement savings.

### QBUS

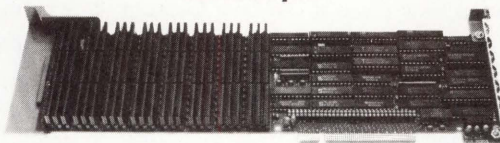
PDP 11/23, 11/73



### 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

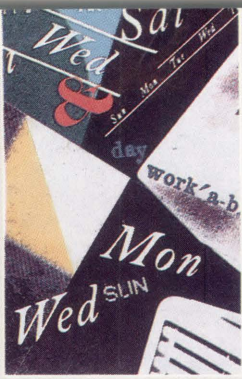
\*PS/2 AND IBM ARE REGISTERED TRADEMARKS OF INTERNATIONAL BUSINESS MACHINES. BA23, QBUS, MICROVAX II, MICROVAX ARE TRADEMARKS OF DIGITAL EQUIPMENT CORPORATION. MULTIBUS IS A TRADEMARK OF INTEL MACHINES.

See us at DEXPO West Booth #1657

CIRCLE 216 ON READER CARD

*A Wonderful World of Memories!*





**SETUP**

# P PROFESSIONAL MOVE

By David B. Miller

**Need To Relocate Your Computers? Careful Planning Is The Key, As The Recent Move Of The Professional Press VAXcluster Proves.**

Professional Press has grown considerably since it introduced its first publication 10 years ago. After seven years at our corporate headquarters in Spring House, Pennsylvania, it was time to find a new location.

We evaluated a number of sites, and found a building six miles away from Spring House that matched our needs. The facility, in Horscham, Pennsylvania, would provide us with three times the space and allow us to house both the Professional Press production VAXcluster and DP Laboratory and Testing Center in one state-of-the-art computer room.

Two months of planning, renovation, wiring and testing took place at our new location before the move. For example, we tested the Ethernet backbone and our new networking hardware. Fortunately, we had the Lab's MicroVAX II and a Datability Vista VCP-1000 communications server to test the network. We wired the building for voice and data —




both twisted-pair and Ethernet — and tested the installation with live machines prior to moving.

Friday, September 1, was the big day. We began moving with the intention to resume business as usual on Tuesday, September 5.

Our production machines include three VAXs: a MicroVAX II, an 8350 and our venerable 750. In addition to the VAXs, we had to move a host of other equipment, including 10 disk drives and a PDP 11/73. Although most of our equipment is fairly new, we were concerned about our older machines. Fortunately, not even our PDP suffered injuries.

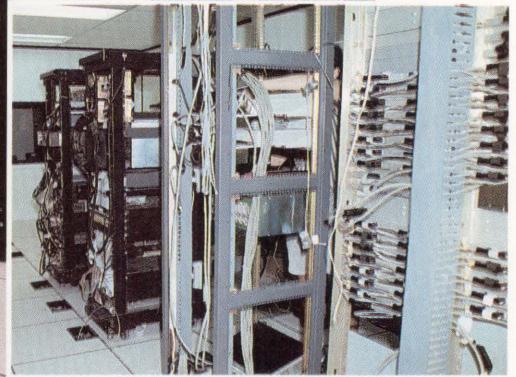
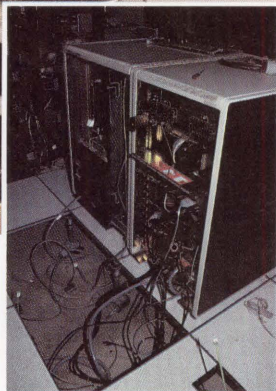
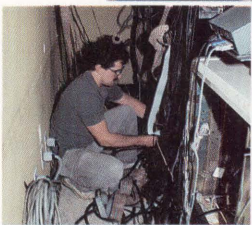
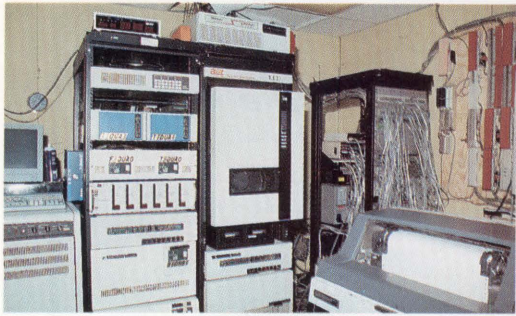
Digital and System Industries examined the existing installation, disconnected some of the equipment and re-examined the installation when it was set up at the new site. Of course, this assistance was not part of our service contract: It had to be contracted separately. Figure 1 illustrates the time and manpower required to inspect and move the production machines.

**F I G U R E 1 .**

EVENT 	TIME REQUIRED 	PEOPLE REQUIRED 
Label Cables	2 hrs.	3
DEC Preinspection	1 hr.	1
SI Preinspection	45 min.	1
Pull Cables	45 min.	2
Move Machines	2.5 hrs.	3
Reinstall	4 hrs.	8 (DEC, SI, MIS, moving personnel)

*Time and personnel required to move the Professional Press production VAXcluster.*





For our Lab computers, Hewlett-Packard also performed a post-move inspection. IBM and the vendors of our Lab and production software felt there was no need for inspection unless problems arose.

Getting the computer equipment out of the building in Spring House was a challenge, because our computer room was located on the second floor and there was no service elevator. The equipment was carried down a flight of stairs with brute force and a lot of padding. The computer room and user equipment was moved by United Van Lines, which used a special air-cushion truck to transport the computers. It's a good idea to have your expensive equipment moved by professional movers for insurance reasons.

Only the production machines were moved

on September 1. The primary Lab machines — a MicroVAX II, DECsystem 3100, HP 3000 and IBM AS/400 — were already in place, having been moved by our Lab staff a few weeks earlier. Our VAXstation 2000s, PCs, terminals and Macs weren't included with the computer room equipment but were moved with the rest of the equipment in the building. A list of our equipment appears in Figure 2.

We set up the new computer room in the same configuration as the original. If you plan to make configuration changes, wait until the original configuration is functioning at the new site. If you move and change your configuration at the same time, the additional variables will make it extremely difficult to locate the source of problems.

The computer systems were verified as up and running within six hours. We used Labor

*Moving the Professional Press production VAXcluster from our old computer room (upper left) was a planning challenge. Deinstallation of the cluster (far left) and moving to the new computer room (top) took place on Friday, September 1. Installation (bottom and far right) was done the same day. A new state-of-the-art computer room houses the production VAXcluster (center).*



# F

## FIGURE 2.

DP LAB EQUIPMENT	PRODUCTION EQUIPMENT	USER EQUIPMENT	
MicroVAX II DECsystem 3100 HP 3000 IBM AS/400 AST Premium/286 MDB DataShuttle 2000 HP LaserJet Printer	VAX 8350 MicroVAX II 11/750 PDP 11/73 7 SI Disk Drives (Fuji) 2 Imprimis Disk Drives MTI (MDI276) Disk Drive Lago SMD-to-SDI Converter 2 MTI 8mm Tape Drives Megatape 8mm Tape Drive SI Tape Drive Cipher GCR Tape Drive 4 Topaz UPSs Emerson 15KVA UPS	Xyplex Maxserver 5000 Vista VCP-1000 Comm. Server Logcraft 386/Ware Server Micom Data Concentrator Xyplex Gateway Xyplex Cluster Controller 2 SI 9900 Controllers Isolan DELNI Cabletron DELNI Cabletron ThinWire Repeater 2 Kinetics FastPaths Emulex 14.4 Modem 2 Multitech Modem Racks (With 16 Modems)	-70 Terminals 4 PCs 13 Macintoshes (II, IIx, IIcx) 4 VAXstation 2000s C.Itoh Megaserve Printer 2 HP LaserJet Printers 2 Talaris T800 Printers Talaris 1590 Printer Varityper 4300P Typesetter 2 Apple LaserWriters AST Turbolaser 14 Personal Printers (LA50s/Facit/3100s)

*The Lab staff transported the Lab equipment, while professional movers transported the production and user equipment.*

Day weekend to install and test user terminals and get critical printers working. The result of this planning and effort was that computer operations resumed at an all but normal pace when personnel returned the day after Labor Day.

During our first week in Horsham, the AppleTalk network was reinstalled, allowing members of the design and production staff to use their Macs. Leased lines to our Lexington, Massachusetts, and Pasadena, California, offices were cut over, dial-in lines were set up, and ad-

ditional printers were put online.

Our careful preparation paid off, and the move took place without notable difficulty. If you're anticipating a similar project, plan ahead and take every aspect of your move into consideration. You'll be glad you did. ■

## NEW OREGON C++ FOR VAX

# The first true C++ compiler for VAX/VMS

Oregon C++ is a true compiler. You never have to read or type any cryptic translator-generated names.

## From the People Who First Brought You Pascal for RSX

Over 10 years of experience in compiler technology and a solid reputation for quality are behind Oregon Software's development of a true C++ compiler for VAX.

Expect the fine performance you found in our Pascal-2 family of products: generation of clear, correct, compact code; conformance to language standards; extensive error checking; clear, complete documentation.

For more information, call 1-800-874-8501.

**OREGON**  **SOFTWARE**

**ANSI-C**  
FOR  
**FREE\***

- Meets the latest specifications for ANSI-C.
- Switch-selectable for programming in ANSI-C, K&R C or C++.

\*WITH PURCHASE OF OREGON C++

6915 S.W. Macadam, Suite 200, Portland OR 97219 USA • (503) 245-2202 • FAX (503) 245-8449

The following are trademarks: Oregon Software, Oregon C++, Pascal-2, Oregon Software, Inc., VAX, VMS, RSX, Digital Equipment Corp.



# How one VAX user saves one month per quarter on financial reporting

In business since 1892, Meridian Mattress Factory Inc. is the leading manufacturer of mattresses and box-springs in the Southeast U.S.

With their old software system, it took Meridian Mattress' bookkeeper a full month to gather data and prepare the required quarterly government wage and tax reports. Now, with MCBA CLASSIC Accounting Software™ on their MicroVAX, Meridian has quick, easy access to the data, and the reports are run *in a matter of minutes.*

MCBA CLASSIC Software also helps Meridian save time generating financial statements, processing payroll checks, and closing out at month-end.

"MCBA CLASSIC Software has dramatically speeded up the paperwork involved in our business," says Meridian Vice President Huff Brown. "Every feature of the software has saved us time."

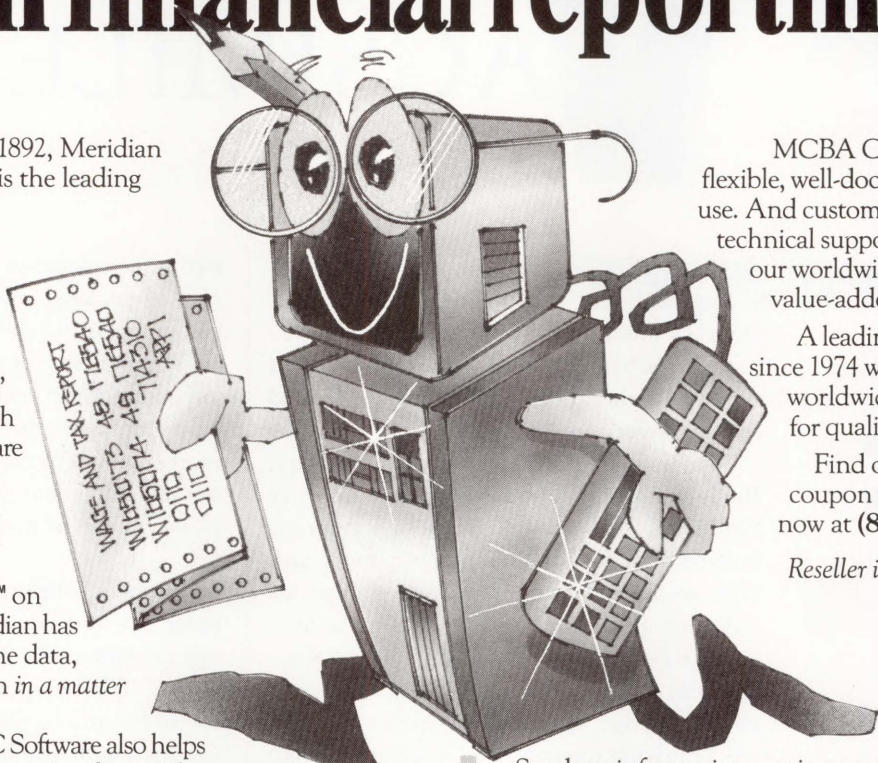
MCBA CLASSIC Software can help save *your* company time, too.

## Quality, Full-Featured Software

You can choose from 19 integrated yet modular MCBA CLASSIC Software packages to create a custom system that best meets your company's needs.

Anything from basic accounting—to wholesale distribution—to complete closed-loop Manufacturing Resource Planning (MRP II).

MCBA CLASSIC Software provides top quality and advanced functionality across the entire VAX line. Like a 24-character, five-level G/L account number. And multi-company capability with consolidation.



MCBA CLASSIC Software is flexible, well-documented and easy to use. And customization, training and technical support are available from our worldwide network of quality value-added resellers.

A leading software developer since 1974 with over 30,000 users worldwide, MCBA is known for quality, reliable software.

Find out more. Return the coupon today or call MCBA now at (818) 242-9600.

*Reseller inquiries are welcome.*

Send me information on time-saving MCBA CLASSIC Software in VAX COBOL:

Accounting;  Distribution;  Manufacturing.

Name \_\_\_\_\_

Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ ZIP \_\_\_\_\_

Phone (\_\_\_\_) \_\_\_\_\_ FAX (\_\_\_\_) \_\_\_\_\_

I am a software:

User;  Reseller;  Consultant.

Company's revenues:

Under \$15 million;  \$15 million and over.

DP1189

# MCBA CLASSIC SOFTWARE™

*The Standard in Business Software Solutions™*

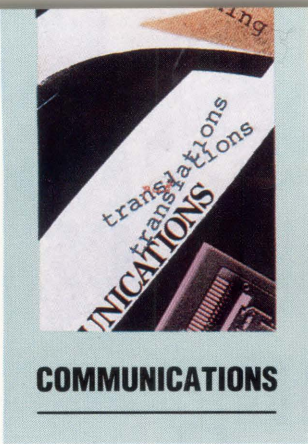
425 W. Broadway, Glendale, CA 91204-1269 • Phone: (818) 242-9600 • FAX: (818) 500-4805

Copyright © 1989 by MCBA, Inc. All rights reserved. MCBA is a registered trademark and MCBA CLASSIC Software and The Standard in Business Software Solutions are trademarks of MCBA, Inc. VAX is a trademark of Digital Equipment Corp.

CIRCLE 121 ON READER CARD

See us at DEXPO West Booth #1566





# VACSIMILE!

By Lynn Haber

**Tying Your VAX To A Fax Can Be A Sound System Decision. Feature-Rich Devices And Network Service Offerings Let The System Manager Decide How Fax Can Best Serve The Organization.**

The astronomical growth of the stand-alone facsimile (fax) product market is well-known. What's less well-known by system managers is that fax innovation also is expected to occur over networks.

The bottom line in fax, according to Joseph Baylock, program director at the Gartner Group Inc., Stamford, Connecticut, is that centralized fax cuts costs and allows you to turn fax into a profit center. "We expect that fax will become a service unto itself," he claims.

John B. Dightam, president of Digital Management Group Ltd., agrees: "Once the novelty of message sending via fax wears off, we'll see a growing movement to integrate fax into the larger worlds of office automation and data processing."

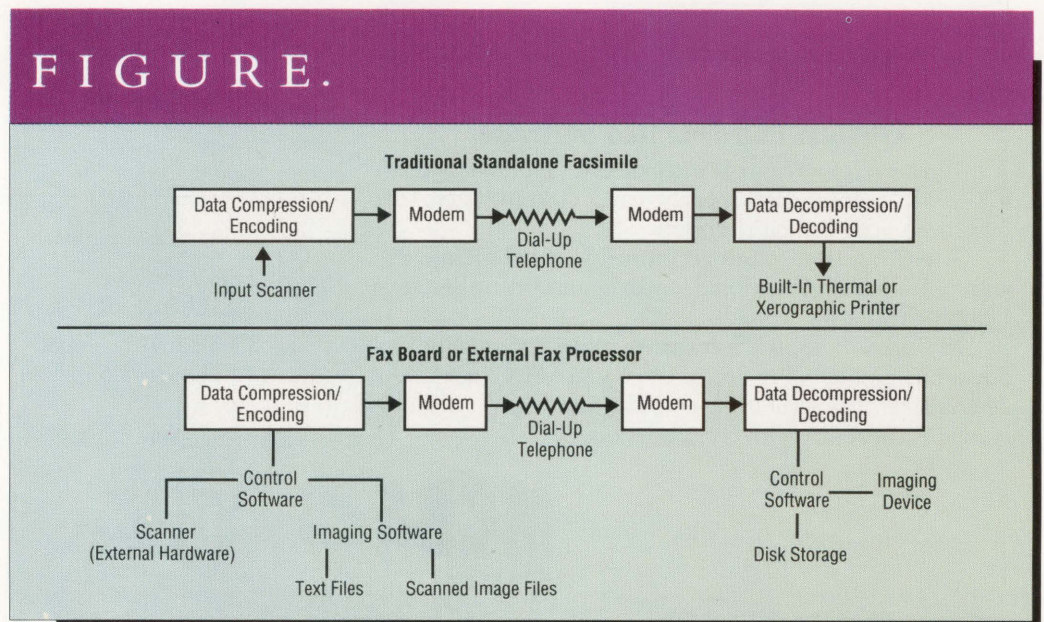
System managers need to keep abreast of

two trends expected to facilitate the optimization of fax use: intelligent customer-premise equipment (CPE) and intelligent networks.

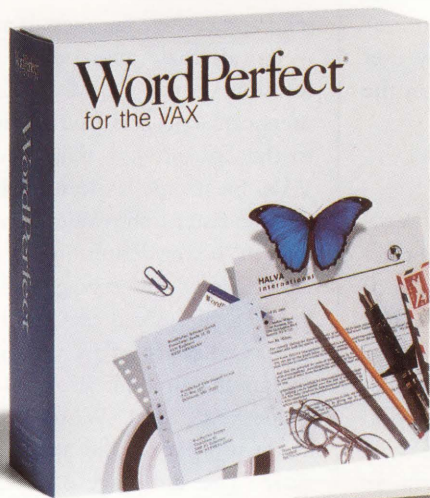
The explosive growth of fax means less and less control over manual fax use in terms of security and cost. As a result, MIS is becoming more involved in the management and administration of fax and more interested in the implementation of computerized, or electronic, fax.

Stephen Gabelnick, group leader of Computer Applications at the Chemical Technology Division of the Argon National Laboratory, Argon, Illinois, reports that, with the increased use of fax as a communication medium, manual fax was becoming a nuisance. "Since the documents existed in a word processing format, it made sense to send them electronically," he says. "For our purposes, computerized fax is a

FIGURE.







# The world's best just got better... Introducing WordPerfect 5.0 for the VAX.

Now all of the impressive word processing features that have made WordPerfect® the world's best are available for the VAX.

The integration of text and graphics lets you create professional-looking documents with ease. WordPerfect automatically downloads soft fonts and lets you import all of the popular graphics formats, including scanned images, in a matter of keystrokes.

And to make sure there are no surprises at the printer, the View Document feature lets you view a document on-screen as it will appear when printed. Even on non-graphic terminals.

WordPerfect 5.0 supports over 400 printers, including laser and PostScript printers.

And because the printer isn't always available when you are, you can assign a future print time for any document.

The WordPerfect 5.0 compound file format is not only compatible between PC and VAX platforms, but can be shared with other WordPerfect users on Macintosh, Ultrix, UNIX, OS/2, IBM 370, and Data General computers.

Other high performance features include global settings for individuals, groups, and multiple groups, giving system managers flexibility.

For more information about getting the best on your system, call us at 801-222-5500 or contact your local VAX reseller.

**WordPerfect**  
CORPORATION

1555 N. Technology Way Orem, UT 84057  
Telephone (801) 225-5000 Telex 820618 FAX (801) 222-5577

**CIRCLE 159 ON READER CARD**



time- and cost-saving device.”

At Argon's more than one dozen divisions, office automation is performed on a divisional basis. Gabelnick notes that a VAX 6000 Model 220 serves as the main node on a VAXcluster for about 280 users in his division. A front-end fax unit on the VAX integrates with the division's office automation software to provide users with a computer-automated fax-delivery system.

The software lets you send faxes from a VAX terminal to another fax machine anywhere in the world. It enhances the functionality of the front-end fax hardware by providing a menu-driven interface within the office automation program, allowing users to queue faxes and specify delayed delivery to take advan-

tage of off-peak phone rates. It also provides accounting information for internal departmental charges.

The PC-based fax unit connects via a 9,600-bps serial link to a communications port on the VAX 6000. Any user in the division with an account on the VAXcluster has access to the fax.

## Fax Solutions

There are a number of ways that VAX managers can implement corporate electronic fax. One method is via a fax hardware/software solution, a separate box that acts as a front end to the VAX and as an independent, shared communications device to users on the network. The front-end fax solution interfaces to the host CPU, or LAN, via an

asynchronous RS-232C serial port. Fax transmissions originate from the front-end unit, which, depending upon the device can be used to send only, or both send and receive fax messages.

An alternate approach is a software solution on the central VAX. Terminal users can send faxes from their terminals to the fax software that resides on the VAX. Electronic fax features are likely to include faster transmission, paperless operation, better definition, controlled access, deferred processing, 24-hour access, group mailings and cost control.

Fax software offers varying levels of integration to applications such as ALL-IN-1, VMS Mail, Word-11 and other word processing and applications software. The advantage of integrating the

## Fax Facts

The recent boom in the fax machine market belies the age of the technology. Facsimile, in various forms, has been around for more than two decades.

Early office machines, using analog transmission, a noisy, rotating drum, and odorous thermal paper, required six minutes to send a barely readable page. Advances in the mid-1970s cut transmission time to roughly three minutes per page through the use of then-new digital technology, but the equipment was extremely expensive and limited to niche markets and major corporations with deep pockets.

The current fax standard, known as Group III, was developed in 1980. Exploiting the capabilities of digital transmission and “on-the-fly” data compression techniques, Group III machines can send a page in 30 to 60 seconds (depending on the content of the page) at resolutions of up to 200 x 200 dots per inch (dpi). Advances in digital circuit design and manufacture, as well as economies of scale, have lowered the cost of basic facsimile machines to well under \$1,000. Add-in facsimile boards for personal computers can be purchased for as little as \$400.

Modern facsimile equipment can be broadly classified into two categories. Standalone units are self-contained devices with a scanner, printer, modem, and facsimile encoding/decoding electronics. Fax processors and fax boards generally contain just the facsimile electronics and modem (see Figure).

Facsimile machines are graphics-based communication devices. A page is read by an optical scanner at 200 dpi horizontal resolution and at either 100 or 200 lines per inch vertically, depending on the capabilities of the unit. The scanning process converts the image into digital form, a series of zeros and ones corresponding to dark and light areas on the image. (More advanced encoding schemes are used to transmit photographic images.) The data is compressed and transmitted by modem over the dial-up telephone network, usually at 9,600 baud. On the receiving end, the digital signal is expanded and, typically, imaged on thermal or xerographic paper.

Advanced facsimile machines can store the compressed images in memory or on magnetic disk. Thus, pages can be scanned and held on the originating end for later transmission (to take advantage of lower phone rates or to retry transmission to machines that may have been busy at the time of the original call). On the receiving end, pages can be stored for “gang output” to a laser printer or, for security, printed by individuals who have clearances and passwords to view sensitive transmissions.

An add-in fax board or standalone fax processor is a stripped-down facsimile device, a fax machine without an optical scanner and output

imager. However, by using the resources of a host computer, a fax board or fax processor easily can exceed the capabilities and quality of a standalone unit. These machines replace the optical scanner with software that converts ASCII text files, such as those produced by a word processor, into graphical form.

Advanced units can merge the converted ASCII text with previously scanned images in various graphic formats, enabling a user to “construct,” for example, a business letter consisting of a scanned logo, ASCII text and a scanned signature. Business letters can be composed, edited and transmitted without requiring “real” stationery or letterhead. The local laser printer connected to the fax unit can be directed to output a copy of the letter for filing. This procedure eliminates the need to generate a hardcopy printout of a document solely for the purpose of facsimile transmission.

The document then can be sent to hundreds of locations merely by programming the fax processor's dialer to retransmit the image to a supplied list of telephone numbers. Incoming transmissions can be stored, routed or output to various devices.

In addition to convenience, software-driven “scanning” of documents to be transmitted and the imaging of documents on laser printers result in much higher resolution than that available on standalone units, where the built-in optical scanner is the weak link in the quality chain. Very few built-in standalone facsimile scanners actually hit the 200- x 200-dpi specification, even though the thermal or xerographic imagers on the devices can hit the mark.

Even more impressive gains in quality are being achieved by manufacturers who are forsaking traditional digitized facsimile images. These firms are developing “hyperfax” machines that translate the images to be transmitted into the PostScript page-description language.

ONE FREQUENTLY OVERLOOKED aspect of facsimile transmission is its graphical nature. Text transmitted by facsimile is no longer text; it's a graphic representation of the ASCII characters. Files containing facsimile images can't be manipulated by text-oriented applications.

In instances in which the textual nature of documents must be maintained, electronic mail or text file transfers among computer systems are required.

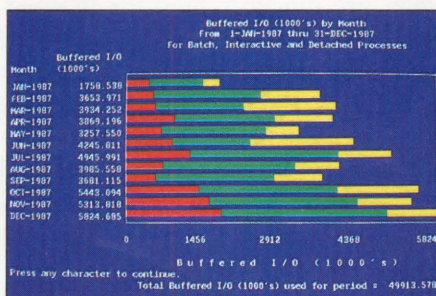
Even this is changing, however. Optical character recognition (OCR) technology is becoming available in advanced facsimile processing equipment, as well as software capable of translating the textual components of a PostScript-encoded document into an ASCII file. —Kevin G. Barks



# ARSAP™

## The system accounting product that stacks the DEC™ in your favor.

With ARSAP you can do it all. Everything from capacity planning to performance management to project accounting. ARSAP was designed to work with VMS, so you don't need to change your operating procedures to put this comprehensive system to work for you. And because of its exclusive options, ARSAP is the most efficient and powerful system accounting product available today.



Analyze historical data to plan system resources required for future growth.

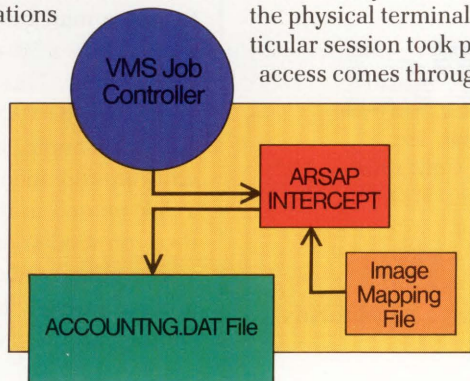
### Disk Management and Global System Reporting aid long-term capacity planning.

With ARSAP, you can generate easy-to-read bar chart capacity reports for any accounting statistic available from VMS, including CPU time, memory utilization, buffered I/O's, direct I/O's, connect time, and more. And our disk management reports identify amount of space allocated to each user and total amount of free space remaining.

Manage users and control project costs using ARSAP reports.

### Selective Image Accounting reduces accounting files by as much as 90%.

Only ARSAP allows you to select and report on the specific applications you choose, instead of the familiar "all or nothing" alternative offered by other systems. This valuable option saves thousands of I/O's to your system disk and reduces the space requirements of accounting files by as much as 90%!



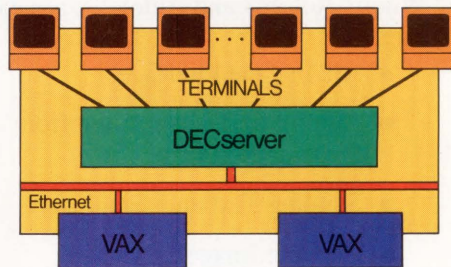
### Terminal Reporting tracks usage for control and troubleshooting.

ARSAP's exclusive terminal reporting feature lets you track usage and locate the physical terminal on which a particular session took place, even when access comes through virtual terminals, Intergraph™ workstations or DECservers (LATs).

Use "ARSAP Intercept" to automatically select image data for software reporting.

### Get the details on ARSAP today.

ARSAP (version 6.0) is the product of 11 years of system accounting design. No other software package is better suited to your DEC system or your system accounting needs. Only ARSAP offers you a complete solution. For more information about how ARSAP can meet *your* needs call GEJAC today.



ARSAP gives you the "evidence" to effectively allocate limited hardware among users.

**1-800-43ARSAP**  
(1-800-432-7727) • (301) 725-2500



Mail the coupon below to GEJAC, INC.  
8643 Cherry Lane, Laurel, MD. 20707

Name \_\_\_\_\_ Title \_\_\_\_\_  
 Company \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
 Telephone \_\_\_\_\_

Send information on:

<input type="checkbox"/> Chargeback	<input type="checkbox"/> Performance Evaluation
<input type="checkbox"/> Project Accounting	<input type="checkbox"/> Capacity Planning
<input type="checkbox"/> Resource Management	<input type="checkbox"/> Software Package Reporting
<input type="checkbox"/> Printer Forms Tracking	<input type="checkbox"/> Other

I have these VAX/VMS systems:  
 # of systems \_\_\_\_\_ Model #s \_\_\_\_\_



Wilco and ViTel present



## FULLY INTEGRATED TURNKEY TELEX/FAX TO VAX SOLUTIONS

Wilco's stand-alone *Autofax* and *Autotelex* are dynamic message management software systems which allow you to receive *AND* send fax and telex directly at your desk-top terminals. If incorporated with ViTel International's advanced telecommunications delivery network you receive all the components necessary to solve your messaging operation needs. Together we provide a host of administrative, management and operational services not found anywhere else. You can avoid needless frustration while saving substantial time and money.

Wilco's *Autofax* and *Autotelex* are easy to learn and use systems which allow for:

- All-In-One Interface
- Automatic Transmission from Existing Software
- Sending Text and Graphics
- Flexible Image Library
- Address/Directory Facilities
- 30/Day Money Back Trial Period
- 24-hour Maintenance Support

Users can connect to ViTel's value-added network and benefit from:

- Low Cost Delivery
- Multi-path Routing
- Improved Image Quality
- International Electronic Mail
- Departmentalized Billing
- 24-hour Customer Service

For more information on how we can improve your communications efficiency and lower your costs call us today.



# Wilco

International, Inc.  
New York, New York  
Tel: (212) 269-3970  
London, England  
Tel: (01) 374-4313

# ViTel

International, Inc.  
Mill Valley, California  
Tel: (415) 332-5134  
Tokyo, Japan  
Tel: (03) 779-3788

New York

London

Tokyo

Sydney

California

CIRCLE 373 ON READER CARD

### PC To VAX To Fax

There's good news for Digital installations that support Macs and PCs on a network. Via terminal emulation, microcomputers can access minicomputer-based fax products.

At Colgate Palmolive Company, New York, 400 PCs and 350 Macs access a Biscom unit, according to Shelly Borak, associate director of Global Business Systems. The Macs on an AppleTalk network connect to a DECnet network with a Kinetics FastPath box (Kinetics is now owned by Novell). Mac users send messages to the Biscom box via terminal emulation. In many cases, Borak says, users create word processing documents offline. Pacer Software's PCLink transfers the files from the desktop, uploads them to the VAX and puts them in VMS Mail. The files are faxed from VMS Mail.

Stephen Gabelnick, group leader of Computer Applications at the Chemical Technology Division of Argon National Laboratory, Argon, Illinois, reports that Mac users at Argon access a Biscom unit by terminal emulation by going through Microsystems Engineering's (MEC) Mass-11 FaxMail interface. According to MEC, a fourth-quarter release of FaxMail will run standalone without requiring Mass-11.

fax software application into existing or commonly used word processing or office automation programs is familiarity to the user. Fax operation commands are integrated into the commonly used application menu structure. If a vendor doesn't offer the desired integration, organizations can write programs to facilitate ease of use.

MicroVAX users can reap the benefits of electronic fax with products that provide fax communications on a board. System managers can designate a MicroVAX as a fax server, installing multiple fax boards in a single machine.

Some products allow incoming Group III facsimile transmissions to be output to a printer. Group III facsimile transmissions arrive at 200 dots per inch (dpi) and therefore must be padded to accommodate the 300- x 300-dpi image required for laser printers. This process is handled internally by the VAX-fax product.

For example, a VAX-fax front-end unit can store incoming fax messages on a disk housed in the front-end unit and then, on request, output the message to a laser printer attached to the front-end unit's controller. It's important that incoming messages be stored so that, if the



# DEC<sup>®</sup> PRINTER CLONES AT BIG SAVINGS WITH A RISK-FREE PURCHASE PLAN

You can purchase with assurance from Taneum. On top of nationwide factory maintenance, installation support and manufacturer's warranty, we seal the deal with a money-back guarantee! That's what we mean by risk-free!

**Save thousands!** Fully compatible with DEC's LG01 line printers, Taneum printers are available at 450, 600, 800 or 1200 lines per minute. And the savings are dramatically significant. For example, you can buy Taneum's high speed 1200 lpm printer at the price of DEC's 600 lpm LG01. And for bigger savings yet, Taneum's new TCP 640 at 450 lpm sells for under \$5000!

**Features you won't get from DEC.** You not only save thousands of dollars per machine, Taneum gives you all the features of the LG01 plus extra no-cost features like business graphics, forms drawing, bar code, fast 16.7 cpi compressed printing and other options.

**Rugged Reliability.** These aren't just any printers. We modify the renowned Mannesmann Tally 600 series print engines for full DEC LG01 compatibility. And Taneum printers are backed by the nationwide Mannesmann Tally factory service organization. (The same team that manufactures the DEC printers.)

And remember, Taneum can fill your printer needs even if LG01 compatibility isn't required. We also provide Dataproducts, Printronix, Centronics or QMS compatibility.

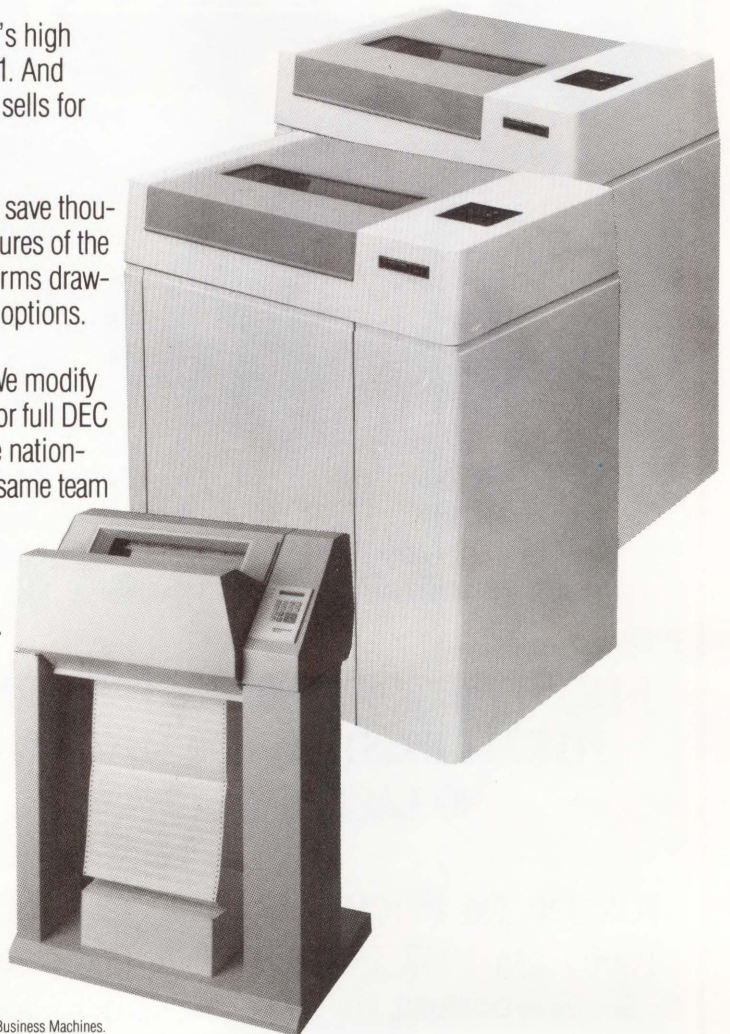
**Act Now!** Here's your opportunity to save thousands of dollars and get more features in the bargain. Pick up the phone and call us toll free at 800 VAX PRNT.

**800-829-7768**

or (206) 251-0711.

P.S. LG01 OEM ribbons at great savings.

For IBM AS/400 systems or 3270 environments, the same great savings apply.



DEC and VAX are registered trademarks of Digital Equipment Corp. IBM is a registered trademark of International Business Machines.

## Taneum Computer Products

See us at DEXPO West 203 S.W. 41st Street, Renton, WA 98055. (206) 251-0711.

CIRCLE 263 ON READER CARD



DEC UNIBUS\* USERS:

Twice the performance  
at half the price!



#### N1100 PLUS

- 4 Mbytes DRAM
- 8 KBytes Cache
- Hardware Floating Point
- Memory Management

#### N1100

- 2 Mbytes DRAM
- Memory Management
- Serial Line Unit
- Universal Boot ROM

J-11\* POWER FOR OPTIMUM PERFORMANCE  
FITS ALL EXISTING PDP 11/04/24/34s  
NO BACKPLANE CHANGE

FOR SPECIAL PRICING ON N1100, CALL OLIVIA AT  
(800) 233-1837 IN CALIFORNIA (714) 261-8811

See us at COMDEX, Las Vegas, Nov. 13-17, Booth WO934

**NISSHO**  
ELECTRONICS

17320 Red Hill Avenue, Suite 200, Irvine, California 92714 · FAX (714) 261-8819, TLX 181-308

\*UNIBUS and \*J-11 are registered trademarks of DIGITAL EQUIPMENT CORPORATION

CIRCLE 163 ON READER CARD

printer runs out of paper, the messages remain intact.

#### Innovation

Baylock contends that more powerful fax users will want to get familiar with the network services offered by providers such as MCI, Telenet and Western Union. "In the near future, the bulk of innovation will come from the network service providers," he says.

Baylock points out that MCI has delivered a series of distinct services for fax users to experiment with under the MCI fax service family. Two services using the traditional circuit-switched MCI network in conjunction with network intelligence are Basic Fax-to-Fax and Toll-Free Fax, which uses 800 inbound service. Security features, such as ID codes, calling restrictions, preset destination numbers and cost control (i.e., accounting codes and call-detail reports), are provided.

Western Union offers OfficeAccess for VAX, an integrated applications program that links Digital users with EasyLink, the company's worldwide electronic messaging service. The software supports VMS Mail and ALL-IN-1 users, as well as VAX users who haven't implemented a mail program, according

#### Companies Mentioned

Adobe Systems Inc.  
1585 Charleston Rd.  
Mountain View, CA 94039  
(415) 961-4400  
CIRCLE 567 ON READER CARD

MCI Fax Business Cntr.  
2000 M St.  
N.W. Washington, DC 20036  
(800) 888-3FAX  
CIRCLE 563 ON READER CARD

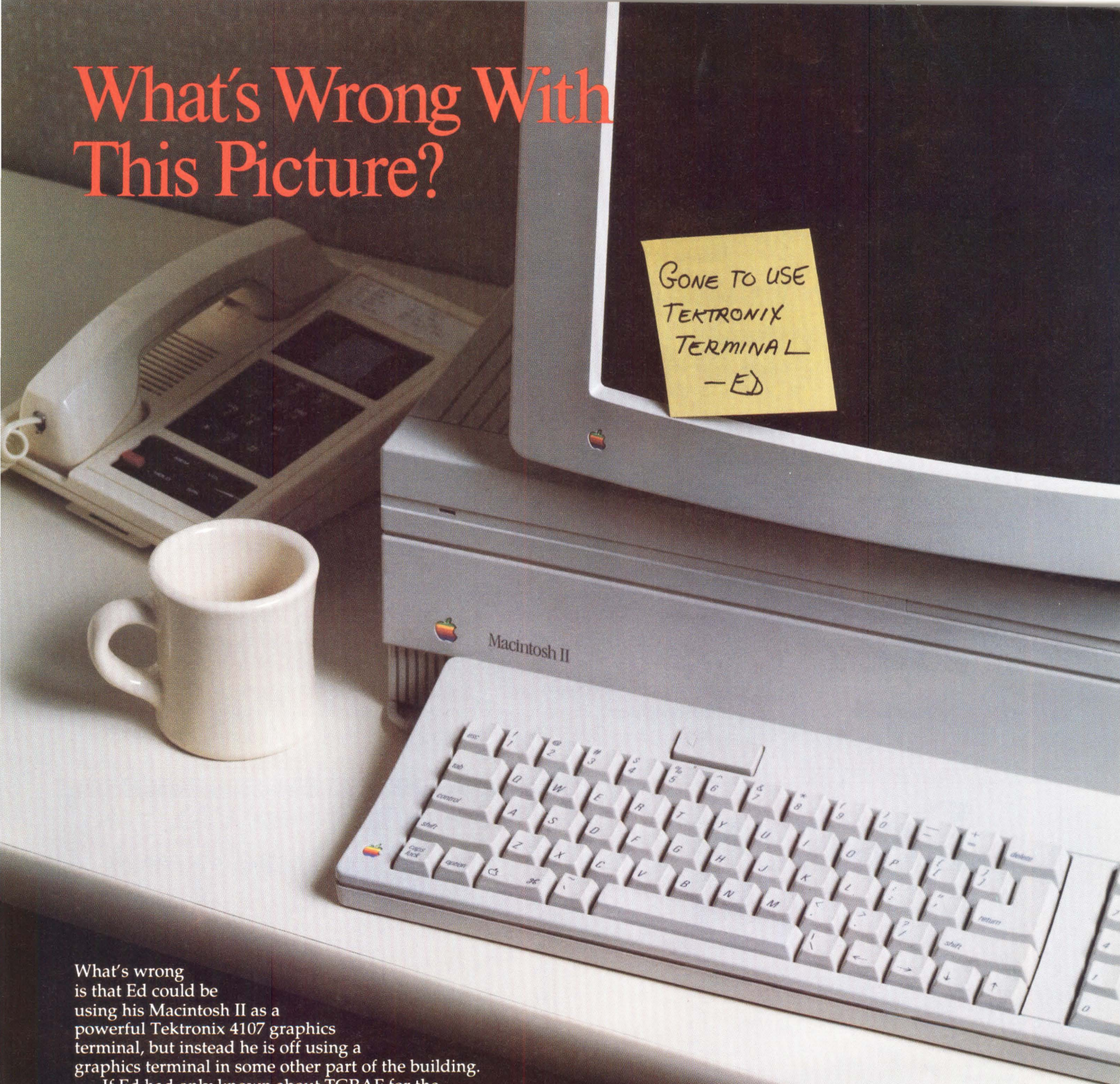
Novell Inc.  
122 E. 1700 S.  
Provo, UT 84606  
(801) 379-5900  
CIRCLE 561 ON READER CARD

Pacer Software Inc.  
7911 Herschel Ave., Ste. 402  
La Jolla, CA 92037  
(619) 454-0565  
CIRCLE 562 ON READER CARD

Telenet Communications Corp.  
12490 Sunrise Valley Dr.  
Reston, VA 22096  
(703) 689-6000  
CIRCLE 407 ON READER CARD



# What's Wrong With This Picture?



What's wrong is that Ed could be using his Macintosh II as a powerful Tektronix 4107 graphics terminal, but instead he is off using a graphics terminal in some other part of the building.

If Ed had only known about TGRAF for the Macintosh II, he could at this very instant be logged on to his company's mainframe, right from his desktop with his Macintosh II. Ed could now be running any one of a hundred or so host applications, with his MAC II and TGRAF combination operating as a powerful graphics terminal.

Grafpoint, a leader in Tektronix terminal emulation, now has a powerful 4107 software emulator for the Macintosh II. TGRAF for the Macintosh is a comprehensive emulator that supports all the display features of a Tektronix 4107 terminal in both asynchronous (RS-232-C) and networking communication environments.

TGRAF has the powerful and seamless user interface that Macintosh users have come to expect. TGRAF supports Multifinder, cut & paste, pull-down menus, separate text windows with scroll bars, plus powerful graphics terminal features such as graphics displayed in sixteen on screen colors, full 640 x 480 resolution, 12 bit addressable space, etc.

Find out today what it takes to transform your Macintosh II into a powerful, full-featured graphics terminal. Call us at 1-800-426-2230, in California 1-408-446-1919.

\*\* 30-day no-risk trial available. TGRAF - in addition to the Macintosh product is available for PCs, PS/2s, and workstations.

Apple and Macintosh are trademarks of Apple, Inc. Grafpoint and TGRAF are trademarks of Grafpoint. Tektronix is a trademark of Tektronix, Inc.



**GRAFPPOINT**<sup>TM</sup>

1485 Saratoga Avenue  
San Jose, California 95129

Please circle 114 for demonstration. Please circle 275 for additional product information.



## VAX-Fax Vendors

Biscom Inc.  
85 Rangeway Rd.  
Billerica, MA 01821  
(508) 670-5521  
CIRCLE 400 ON READER CARD

Data & Control Equip.  
Corp.  
Soundview Towers, Ste. 1B  
50 Glenbrook Rd.  
Stamford, CT 06902  
(203) 359-5737  
CIRCLE 401 ON READER CARD

Data Processing Design  
1400 N. Brasher St.  
Anaheim, CA 92807  
(714) 779-7468  
CIRCLE 402 ON READER CARD

Digital Management  
Group Ltd.  
4711 Yonge St., Ste. 600  
North York, ON M2N 6K8  
(416) 225-7788  
CIRCLE 404 ON READER CARD

Microsystems Engineering  
Corp. (MEC)  
2400 W. Hassell Rd., Ste. 400  
Hoffman Estates, IL 60195  
(312) 882-0111  
CIRCLE 493 ON READER CARD

Talon Technology Corp.  
1819 Firman Dr., Ste. 137  
Richardson, TX 75081  
(214) 680-9913  
CIRCLE 406 ON READER CARD

TRT Telecommunications Corp.  
1331 Pennsylvania Ave.  
Ste. 1100  
N.W. Washington, DC 20004  
(202) 879-2200  
CIRCLE 408 ON READER CARD

Vitel Int'l Inc.  
100 Shoreline Hwy., Ste. A190  
Mill Valley, CA 94941  
(415) 332-9851  
CIRCLE 409 ON READER CARD

Western Union Corp.  
1 Lake St.  
Upper Saddle River, NJ 07458  
(201) 818-5000  
CIRCLE 410 ON READER CARD

Wilco Int'l Inc.  
61 Broadway  
New York, NY 10006  
(212) 269-3970  
CIRCLE 411 ON READER CARD

to the company.

Corporate fax systems, according to industry participants, consume minimal overhead on the VAX, typically less than 1 percent. Other benefits of electronic fax include control of fax use and record-keeping capability, as well as elimination of the hidden costs of manual fax, such as time to print a document, walk to the fax and wait during transmission.

SYSTEM MANAGERS MUST consider the needs of their companies before opting

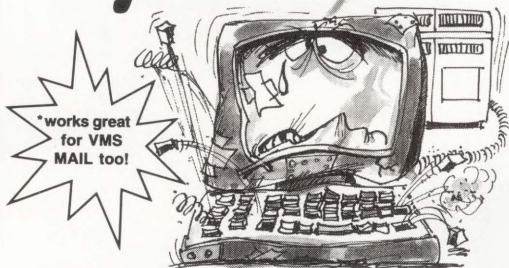
to purchase fax equipment or fax service. For example, Argon's Gabelnick discovered that his front-end fax unit didn't support Greek and scientific symbols, which are common in documents that come from his division.

Also consider whether you want to transmit text only or require graphics support. In the same way that vendors are producing printers that support the reproduction of complex text and graphical documents, fax vendors are moving toward the support of page-description

languages such as Adobe's PostScript for the transmission of graphics-intensive information.

Further down the road, industry analysts expect the increased use of fax to drive the demand for color transmissions and faster transmission speeds. For now, feature-rich devices and network service offerings give the system manager creative latitude in deciding how fax can best serve his organization. —Lynn Haber is a Boston-based freelance writer specializing in computer and communications technology.

# Don't tax your VAX.



Let it relax.

You will too, when you standardize with **Mail Call™**, the E-Mail "front-end" software for ALL-IN-1® systems that lets PC subscribers work off-line 95% of the time. So long to sapping the power of your VAX. Bye-bye to back-ups and bottle-necks. Connect just for pick-up and delivery. **Mail Call**. At one low fee for unlimited PC subscribers (you *don't* pay as you grow). "Snail crawl" or **Mail Call**. You choose. Then call 1-800-2-MAIL-22 today for more information.



Corporate Software to extend your VAX-ALL-IN-1 System\*

Capcomm Software, Inc. • 26 Journal Square, Suite 1003 • Jersey City, NJ 07306  
1-800-2-MAIL-22 • In NJ call 1-201-795-1500 • Telex 467632  
NOW 100% RAS-compatible

CIRCLE 323 ON READER CARD

## 123 emulation for VAX/VMS

File Range Copy Move File Print Graph Data Translate Utilities Menu  
Global Insert Delete Erase Titles Window Status

abc graph demonstration worksheet

Graph title: Advent Online Knowledge  
Vertical title: (Thousands)  
Horizontal title: (Fiscal Quarters)

Region	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Jul-Sep
Atlanta	65500	41100	56600	67000	67000
Boston	88900	84900	78500	95300	95300
Chicago	12660	23500	44200	48900	48900

## abc spreadsheet for VAX

If your 123 users have been looking for more spreadsheet power, abc is a solution that is totally upward compatible with 123 versions 1 and 2.01. Move applications easily to the VAX. Accurate macro and formula translation. No retraining. Familiar commands and screens. The closest 123 emulation offered for VAX/VMS.

Better information sharing and communications. More memory and storage capacity. Easier access to centralized databases. Centralized control and backup.

And with tools like file linking, macro recording and debugger, an ORACLE interface and advanced graphics capability, you win!

Try our 45-day demo. \$75.00 gives you the full abc system in a simple installation. To order your demo, call 1-800-876-4123, or contact:

AOK Software Products  
1305 Wiley Road, Suite 102  
Schaumburg, IL 60173



123, Oracle, abc are trademarks of Lotus Development, Advent Online, Oracle Corp.

CIRCLE 270 ON READER CARD



# Win Up To \$1000

## Submit Prize-Winning Paper Theme: Software Security

Deadline: November 30, 1989



*VAX PROFESSIONAL*, the technical journal for VMS systems, wants to consider your paper on *SOFTWARE SECURITY* for publication.

Describe in a 200- to 500-word outline:

- Your software security problem
- The steps you took to solve it
- The reasons for taking those steps
- The benefits from your solution
- A description of the software you wrote to implement the solution

The *VAX PROFESSIONAL* Review Board will select the top three ideas for publication in the *April 1990* issue. Its members comprise:

- an expert in system management and connectivity
- a manager of software systems programming
- a DCL expert
- a senior software engineer
- a manager of operating systems development
- the computer facility director at an Ivy League university

**Winners will be notified by mail:**

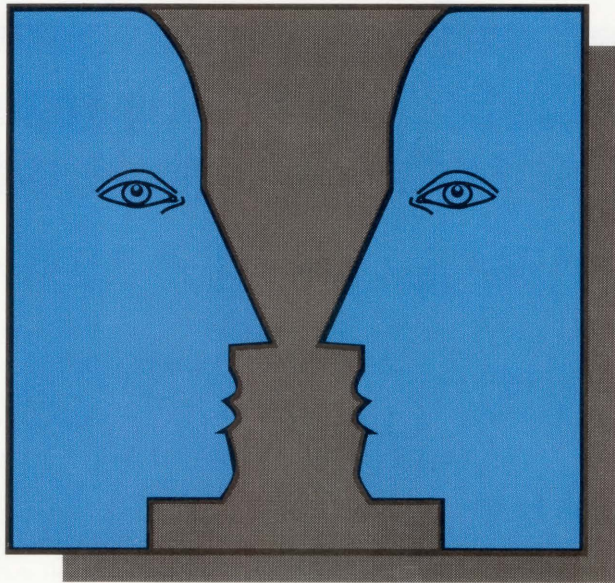
**1ST PRIZE — \$1000**  
**2ND PRIZE — \$750**  
**3RD PRIZE — \$500**

Submit your outline to:  
Karen Detwiler, Managing Editor  
*VAX PROFESSIONAL*  
101 Witmer Road  
Horsham, PA 19044

Include your name, address, company and a daytime phone number. To obtain a copy of the *VAX PROFESSIONAL* author's guidelines and programming guidelines, call Karen Detwiler at (215) 957-1500.



*Only Your System Manager Will Know For Sure If Boston Business Computing's VCL And EDT+ Are On Your ULTRIX System.*



# Is It UNIX Or VMS?

The scenario: You're a longtime VMS user. VAXs proliferate at your site. But DECsystems and DECstations have started showing up and cohabiting with your VAXs. Now you're faced with using two operating systems and two different editors. What's more, you need to be productive on the ULTRIX machines quickly.

A crash course in ULTRIX will help. But another way to flatten the learning curve is to use tools such as EDT+, an EDT for ULTRIX, and VCL, a command language implementing a large subset of VAX DCL commands on ULTRIX systems. Both of these are available from

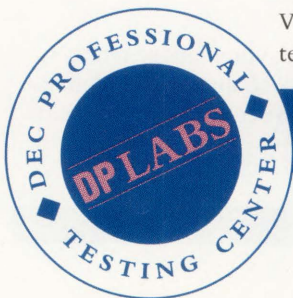
Andover, Massachusetts-based Boston Business Computing Ltd. (BBC).

We tested EDT+ V4.20 and VCL V2.7.4 on our DECsystem 3100 running ULTRIX V3.0, Rev. 7.

For installation, you need to create a temporary directory to hold the distribution files. Extract the files from the tape with the tar utility. An install script puts the executables in the correct directories and sets up the help library. You're ready to go in a few minutes.

It pays to study the READ.ME files supplied with both products. The manual is written generically to accommodate MS-DOS and general UNIX users. The

DAVID B. MILLER





# MAX YOUR VAX.

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

digital VAX

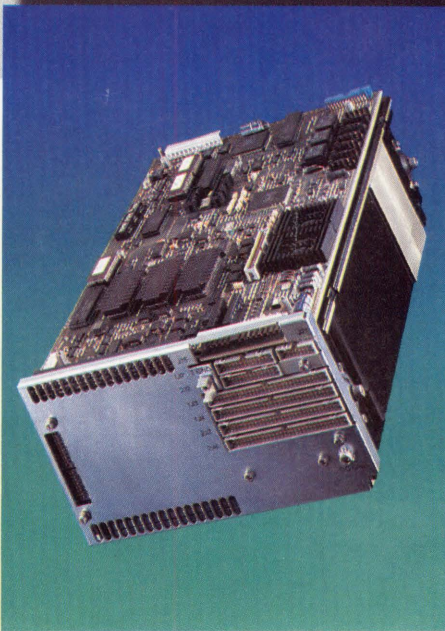
## **Sabre™ Disk Drives**

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 or write to:

Imprimis Technology  
12501 Whitewater Drive  
Minnetonka, MN 55343

*See Sabre at DEXPO WEST booth 1650.*

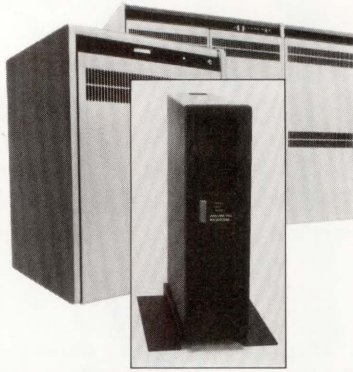
**CIRCLE 233 ON READER CARD**

All registered and unregistered trademarks are the sole property of their respective companies.

**IMPRIMIS**



# NOW! Computer/Fax integration for your VAX<sup>®</sup> System



FAXCOM<sup>®</sup> automates fax delivery, from your VAX computer system all the way to customers' fax machines.

Unlike PC fax boards, the FAXCOM is a true multi-user system solution. You can transmit invoices, purchase orders and other documents from any terminal on your VAX system or network, via the FAXCOM controller, to any Group III fax machine worldwide. The FAXCOM will even store in memory your standard business forms and merge them with data files for transmission.

## FAXCOM

- eliminates the time and overhead of regular mail
- connects to your VAX without hardware modifications
- tracks documents to destination
- improves document quality by eliminating optical scanning

Get the competitive edge NOW with BISCOM's computer-automated fax delivery system — the FAXCOM.

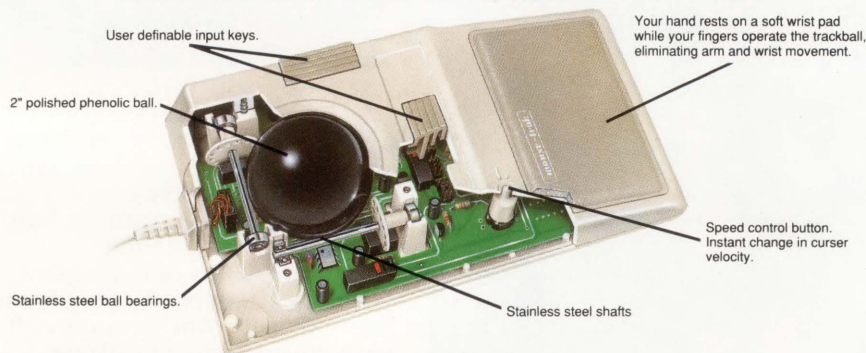
### VAR INQUIRIES INVITED

# BISCOM

BISCOM, Inc.  
85 Rangeway Road, N. Billerica MA 01862  
Tel: (508) 670-5521 FAX: (508) 671-0095

CIRCLE 266 ON READER CARD

## MOUSE-TRAK. THE BEST CURSOR CONTROL IN THE WORLD FOR ONLY \$179.



- **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**<sup>®</sup>

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

CIRCLE 365 ON READER CARD

## FROM THE LAB

### EDT+ and VCL

**PLATFORMS:** ULTRIX, UNIX, MS-DOS-based computers

**PRICE:** EDT+, single-user license from \$295 to \$4,995, depending on system; VCL, single-user license from \$195 to \$4,995, depending on system

### BOSTON BUSINESS COMPUTING LTD.

#### HEADQUARTERS:

3 Dundee Park  
Andover, MA 01810  
(508) 470-0444

**FOUNDED:** 1983

**PRODUCT LINE:** EDT+, VCL and Desk Executive

**OWNERSHIP:** Private

CIRCLE 551 ON READER CARD

READ.ME files contain enhancement and update information not found in the manuals.

### Using VCL

Invoking VCL with no command-line arguments puts you into the VCL interactive environment. The familiar DCL \$ prompt appears, and suddenly things look very much like VMS. A -v argument can be attached to the VCL command to start VCL in verify mode. Also, a command file name can be passed as an argument to VCL. The command file will be executed, but you won't enter an interactive session. The command file contains VCL commands and looks like a DCL command file.

During a VCL session, you can use a large subset of DCL-like commands. Figure 1 lists DCL commands supported by VCL.

Unsupported commands include DCL commands needed for administrative functions, interprocess communication, layered product use, queue, privilege, resource and RMS file management, run-time routines and system services.

The commands supported by VCL, however, will prove to be those used frequently by most users. Figures 2 and 3 show the results of using the DIR/SIZE/

DEC PROFESSIONAL





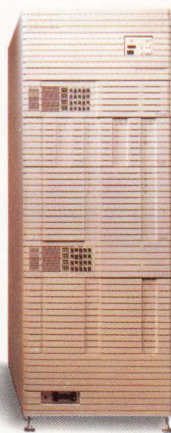
## For The Latest Concept In Storage Subsystems, We Took A Page From The Past.

Performance Arrays from System Industries offer the DEC market a monumental development: tiered storage.

As you can see, we obviously weren't the first people in the world to develop a tiered storage architecture. However, we are the first to put it to work in data storage. With SI's tiered approach, you can now get significantly higher performance and increased capacity for your VAX or VAXcluster.

On the top tier you'll place your few very hot files like indexes, pointers and page and swap files. Here our zero access time solid state disk eliminates bottlenecks even when I/O request rates reach several hundred per second.


The middle tier contains more data but still sees high demand for interactive and application files.



Our fast small spindle capacity rotating disk drives handle the demanding pace of 100-200 I/Os per second by spreading data across more spindles for quick access.

The bottom tier is where the bulk of your data ends up. There's lots of it but you don't need it as frequently. Our 1.728 GB disk drive has capacity to spare and easily handles the typical demand of 30-40 I/Os per device.

It all stacks up to the best performance/capacity ratio in the DEC data storage industry. So call us at **800-333-2220** and we'll do something monumental for you. You can bet your camel on it.

 **SYSTEM INDUSTRIES**



# TPU for UNIX and DOS.

Introducing nu/TPU from a/Soft.

nu/TPU gives you one hundred powerful TPU subroutines for faster and easier UNIX and DOS applications development. EVE, EDT, and VI interfaces are all included plus multiple windows, its own programming language, and unlimited extensions. You can import your customized VAX TPU programs to your UNIX or DOS system without change. nu/TPU comes with one year of free hotline support, 30 day money-back guarantee, free TPU library exchange, our technical bulletin board for news, interface code samples, and our TPU open forum. Call us for more technical details.

(508) 683-4369



a/Soft Development, Inc.  
1353 Salem Street  
North Andover, MA 01845



nu/TPU is a trademark of a/Soft Development. VAX is a trademark of Digital Equipment Corporation. UNIX is a trademark of AT&T. MS-DOS is a trademark of Microsoft.

CIRCLE 353 ON READER CARD

## FROM THE LAB

Figure 1.

:= CONTINUE DIFFERENCES ENDSUBROUTINE GOTO MERGE PURGE SEARCH SUBROUTINE	= COPY  HELP MOUNT READ SET SUSPEND	@ CREATE DIRECTORY EOD IF ON RECALL SHOW TEACH	APPEND DEASSIGN DISMOUNT EOJ INQUIRE OPEN RENAME SORT TYPE	ASSIGN DECK DUMP EXECUTE LEXICALS PHONE REPLY SPAWN UNIX	CALL DEFINE EDIT EXIT LIBRARY PRINT RETURN STOP WAIT	CLOSE DELETE  GOSUB LOGOUT  RUN SUBMIT WRITE
SET	CONTROL PROTECTION	DEFAULT TERMINAL	HOST VCL	MESSAGE VERIFY	ON	PASSWORD
SHOW	DEFAULT STATUS USERS	DEVICES SYMBOL VCL	LOGICAL SYSTEM VERSION	NETWORK TERMINAL	PROCESS TIME	PROTECTION TRANSLATION
						PROMPT
						QUEUE

### DCL commands supported by VCL.

DATE and SHOW SYSTEM commands.

If you need an ULTRIX command in the event there's no VCL equivalent, running VCL in PASSTHRU mode will cause commands not recognized by VCL to be sent to the operating system. Issuing the **ls** command, for example, won't cause an error message from VCL in PASSTHRU mode. You'll get a UNIX-style directory listing.

VCL creates an environment that looks very similar to the familiar VMS/DCL environment. For example, ULTRIX directory names are appended with `.dir` as in VMS. You specify file names just as you would in VMS; node and version information is ignored by VCL. The wildcard asterisk (\*) and percent (%) are supported. Command recall for the last 128 commands is available. Line-editing functions such as CTRL-A to toggle between overwrite and insert modes are supported.

Logical names and symbols are implemented. Logical-name definition is supported, with up to 10 levels of iteration. However, logical name search lists aren't implemented.

Symbols can be up to 255 characters long. Local and global symbols are created, as in DCL, with combinations of quotation marks (") and a colon (:), or equal sign (=). Symbols can be abbreviated by separating the basic part of the symbol from the optional portion with an asterisk (\*), as in DCL. Foreign com-

mands can be set up with symbols, as well. Parameters can be passed to images invoked with foreign commands. Symbol substitution is performed with an apostrophe ('), quotation marks (") and an ampersand (&) as the situation requires.

Logical, comparative, numeric and string operators are supported. Lexical functions are included. For example, `F$PARSE` returns a full file specification. `F$LENGTH` returns the length of a string. `F$LOCATE` returns the offset of a substring within another string.

VCL's capabilities will allow you to write command procedures as you're accustomed to writing them in DCL. Command files can be given the `.COM` extension and are invoked by placing an at sign (@) in front of the command-file name.

Command-file execution can be verified with the `SET [NO]ON` command. Decisions and branching are supported with the `IF`, `GOTO` and `GOSUB` commands.

Error messages take on the VMS four-part format. Each message consists of the facility where the error occurred, the severity of the error, an identification abbreviation string and a text description of the message.

VCL's `HELP` facility looks and acts like VMS `HELP`. In PASSTHRU mode, the UNIX `man` command can be entered to access UNIX manual pages.



**BEST 4GL**



1 9 9 0

digital review

**TARGET  
AWARDS**

N O M I N E E

# DRAMATIC DIFFERENCES

## Our 4GL/DBMS Packs Pure Power To Solve Today's Challenges

**N**o other 4GL/DBMS in the marketplace today can match the dramatic performance capabilities of UserBase.

UserBase features innovative 4GL technology, including relational joins of RMS files and support for symmetrical multiprocessing. These are just two examples of how we make application development faster and end-user processing more efficient.

With UserBase, no other tools (such as COBOL and BASIC) are required to develop and maintain even the most sophisticated and comprehensive applications. In fact, UserBase is the direct result of 15 years of developing extensive end-user applications for thousands of customers worldwide. Today, UserBase is the foundation of an impressive list of application packages ready to be delivered to you - bottom line proof of UserBase's extensive capabilities.

Designed exclusively for VAX systems, UserBase optimizes systems capabilities and throughput and ensures compatibility with future VAX hardware and software, with strict and consistent adherence to VMS standards.

While UserBase provides a complete 4GL development environment, it is also compatible with existing applications developed through standard 3GLs. Whether a designer or an end-user and you're ready to get productive,

**CALL (619) 745-6006**

Ask for our free booklet "Choosing a VAX/VMS 4GL"

**UB USER  
BASE**

See us at  
DEXPO West  
Booth #1346

CIRCLE 366 ON READER CARD

2235 Meyers Avenue • Escondido, CA 92025-1070 • (619) 745-6006 • FAX (619) 432-8126 • Dealers Worldwide

UserWare International is a subsidiary of Pioneer Computer Group, Ltd. UserBase is a trademark of UserWare International, Inc.  
VAX, VMS are trademarks of Digital Equipment Corporation.



```

$ directory/size/date
Directory [sales.ejg]
.cshrc                0                21-NOV-1988 08:24
.edtold              8                12-SEP-1988 10:40
.login              566             21-NOV-1988 08:23
backup.dir          1024            29-MAR-1988 10:52
backup.zoo          555520         23-JUN-1989 10:43
command.            3                12-SEP-1989 10:40
commands.           972             12-SEP-1989 10:41
commands.bak        972             12-SEP-1989 10:20
dirs.com            1092            21-NOV-1988 08:29
dirsd.              0                12-SEP-1989 10:43
doc.zoo             642176          12-OCT-1988 15:13
err.out             3001            20-OCT-1988 14:58
flowcon.com         2016            21-NOV-1988 08:29
install.com         5849            21-NOV-1988 08:29
letter.csa          1087            1-SEP-1988 15:35
letter.ljh          1109            1-SEP-1988 15:35
login.com           557             21-NOV-1988 08:32
makrel.com          4626            21-NOV-1988 08:29
outline.sty         0                13-APR-1989 15:24
pop.com             1355            21-NOV-1988 08:29
press.zoo           215937          28-SEP-1988 10:48
push.com            1911            21-NOV-1988 08:29
set.                514             12-SEP-1989 10:08
show.               376             12-SEP-1989 10:09
shsys.             2415            12-SEP-1989 10:42
swap.com            1255            21-NOV-1988 08:29
syslogin.com        261             21-NOV-1988 08:29
test_vcl.com        8173            21-NOV-1988 08:29
update.com          2968            21-NOV-1988 08:29

Total of 29 files, 1455743 bytes.
    
```

Figure 2: An ULTRIX directory listing as shown by VCL.

Help can be customized. You can add additional text to the supplied help file. A utility, MAKEHELP, supplied with the package, creates a new help library.

A problem with VCL help on the DECsystem 3100 required that we use the MAKEHELP utility to build the initial help library. This was easy to do. The problem will be corrected in a future VCL release.

**EDT+ Exercise**

No one makes a hobby of learning new text editors and word processors. If you have one you like, you stick with it. Unfortunately, you won't find EDT on an ULTRIX system. BBC has eliminated this problem with EDT+.

EDT+ looks and feels every bit like VAX/VMS EDT. It employs keypad, no-keypad and line-editing modes. The keypad layout is equivalent to a VT-series terminal. Journaling and initialization files are supported.

In addition to standard EDT features, EDT+ offers a number of enhancements. EXECUTE and SHELL commands allow you to leave EDT+ (permanently or temporarily) to execute system commands.

Insert/Overwrite options are available. A SAVE command lets you save your file without leaving EDT+. The EDIT command allows you to replace the contents of your main buffer with another specified file.

Differences between DEC EDT and EDT+ are small. The SET [NO] TRUNCATE command isn't implemented, and neither are the commands XLATE,

DUPC, DLWC, SET TERMINAL and SHOW TERMINAL. Keypad definitions are terminated by either a period (.) or by the end of the definition. Decimal or Original line qualifiers aren't allowed in line mode.

Maximum file size can be up to half of available disk space, or 16,777,214 lines. EDT+ can use 80 buffers.

EDT+ help works like VAX EDT help. Pressing the PF2 key displays the EDT keypad on your terminal. Pressing any key except the space bar displays help about that key.

DOCUMENTATION IS CLEAR and understandable. Differences between BBC's and DEC's products are pointed out. VCL documentation does a good job of telling you what you can and can't do with the subset of DCL it implements.

EDT+ and VCL are also available for MS-DOS-based microcomputers. If you have a mixed shop of VMS, UNIX/ULTRIX and MS-DOS machines, EDT+ and VCL can help unify your environment and lend it consistency.

EDT+ and VCL may not be accepted well by hard-core ULTRIX purists — that's not the audience targeted by BBC's offerings. However, if you're a VMS loyalist, or if VMS commands are the ones you know best, and you now have to contend with the ULTRIX universe, EDT+ and VCL may be what you need to get over the learning hurdle. ■

```

$ show system
USER  P1D  %CPU  %MEM  SZ  RSS  TT  STAT  TIME  COMMAND
ejg   607  49.0  5.7   288  179  p2  R    0:00  ps aux
ejg   606  27.0  1.5   120  41   p2  S    0:00  /bin/csh -c ps aux
mjj   605  3.9   0.5   9    7    p0  S    0:00  sleep 10
ejg   582  2.8   6.0   276  188  p2  S    0:02  vcl
root  508  1.8   1.4   73   37   p2  S    0:04  rlogind
mjj   476  1.3   2.1   130  59   p0  S    0:09  -csh (csh)
root  76   0.3   4.2   207  132  ?   S    0:03  /etc/rwhod
root  62   0.2   0.3   5    3    ?   S    0:06  /etc/update
root  475  0.1   1.4   73   37   p0  S    0:01  rlogind
root  65   0.0   0.6   32   12   ?   S    0:01  /etc/cron
ejg   509  0.0   1.6   119  44   p2  I    0:01  -csh (csh)
root  71   0.0   2.2   96   64   ?   I    0:00  /etc/inetd
root  1    0.0   8.1   283  260  ?   I    0:00  init
root  75   0.0   8.3   361  264  ?   I    0:00  /usr/lib/sendmail -bd -qlh - om
root  0    0.0   0.2   0    0    ?   D    0:01  swapper
root  100  0.0   3.2   122  97   ?   I    0:00  /usr/lib/lpd
root  102  0.0   2.3   86   68   co  I    0:00  -e console (getty)
root  2    0.0   0.7   2016  0    ?   D    0:00  pagedaemon
root  101  0.0   2.9   152  86   ?   I    0:00  /etc/elcsd
daemon 46   0.0   2.0   78   58   ?   I    0:00  /etc/syslog
    
```

Figure 3: VCL's show system display.



# With System 1032, now it's easy to get a grip on 25 billion long-distance call-minutes.

How does the US Sprint network modeling group keep track of some 25 billion call-minutes a year? Quite simply, in split seconds with System 1032 from CompuServe Data Technologies.

Using System 1032 4GL/RDBMS VAX software, the US Sprint network modeling group created an extensive network modeling system that increased the speed and efficiency of its work in forecasting and planning for the growth of US Sprint's vast fiber-optic communications network.

**Think Big.** "The total breadth of the data that System 1032 can handle on our network performance is of a staggering magnitude," said Michael Kovich, manager of database design.

Network performance data alone amounts to more than 1.5 million bytes a day, 365 days a year.

**Think Fast.** "What's important to us is that this mass of data be assessed and made available every morning like clockwork. So the software system's efficiency, reliability and quality help us meet our goals and objectives using the most up-to-date information."

Ease of use in the VAX environment and its host language interface are additional pluses for System 1032.

According to Kovich, "System 1032 was far easier for us to learn and also much quicker in what we wanted it to do. The first time we used it, we were building datasets within 30 minutes."

**Think System 1032.** If you have a large, sophisticated RDBMS application you need to get a grip on, do what US Sprint did: call on System 1032 from CompuServe Data Technologies.

## **CompuServe<sup>®</sup>** **Data Technologies**


1000 Massachusetts Avenue  
Cambridge, MA 02138

Think Big. Think Fast.  
Think System 1032.

1-800-USE-1032 Ext. 500

8-6 p.m. EST

CIRCLE 153 ON READER CARD



Michael Kovich  
Manager of Database Design  
Network Modeling Group  
US Sprint



*Disappointed With Your Tape Drive Performance?  
Touch Technologies' Dynamic Tape Accelerator Reduces  
Time Spent On Tape Operations.*

# Speeding Your Drive

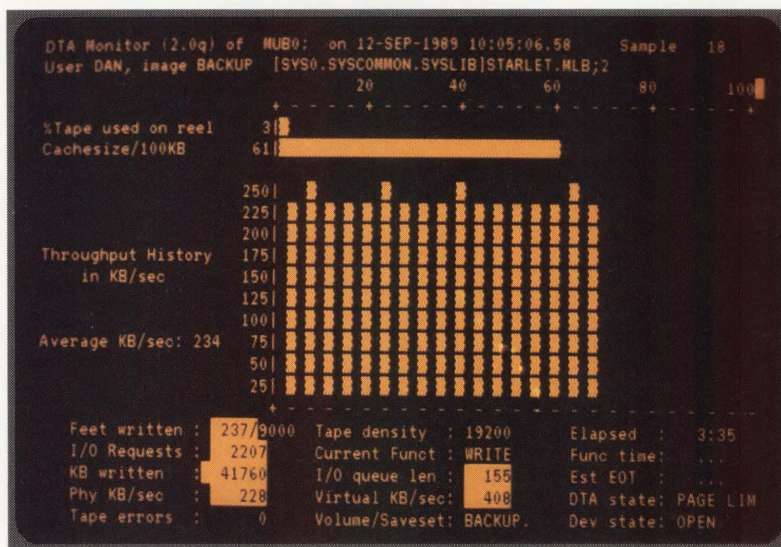


Figure 1: DTA's monitor provides real-time data and graphic displays on tape use and device speed.

Claims and reality often clash when you talk about device performance. For example, you might buy a tape drive based on its rated speed only to be disappointed when BACKUP takes much longer than you expected.

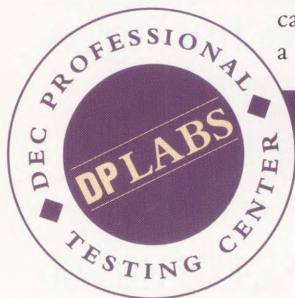
To provide relief for slow tape drives, San Diego-based Touch Technologies offers Dynamic Tape Accelerator (DTA).

DTA controls the flow of data to the tape device. Large amounts of data are cached and released to the tape drive at a constant rate. When data is scarce and

slow to move to the tape drive, DTA maintains the steady data-flow rate by adding data from the cache to the data being sent. Touch Technologies claims that DTA lets tape drives run at their full rated speed, whether they're streaming or start/stop units.

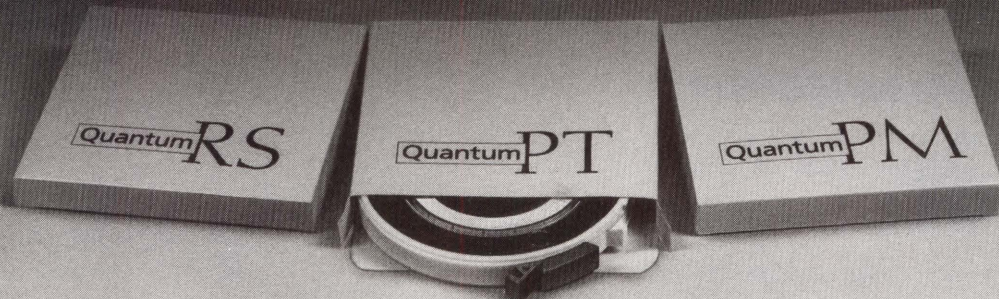
We tested V2.0p on a MicroVAX II running VMS V5.1-1. DTA was tested on a System Industries nine-track tape drive (a Storage Technology non-caching 1,600/6,250 bpi drive) and Micro Technology Exabyte drives. DTA supports

DAVID B. MILLER





# POWER TOOLS.



Now you have the power to automate your VAX resource management tasks with the Quantum system management tools.

Your VAX systems need effective management to maintain efficiency and performance. Quantum system management tools are what you need for time-saving, cost-effective control of your VAX systems.

#### **QUANTUM RS for VAX Resource Accounting and Chargeback**

With Quantum RS, you'll have an easy-to-learn and easy-to-use means to track and charge costly computer resources on multiple levels. Quantum RS accounts for usage by node, username, account, project, tasks, terminal, image, queues, workstations, disk device, and user-defined entities. Quantum RS allows users to switch projects or charge numbers without logging out.

#### **QUANTUM PT for VAX Dynamic System Tuning**

Improve VAX response time with Quantum PT, the dynamic system tuner that will get the most throughput from your memory or CPU constrained system. With an adjustable control program, you're able to tailor the tuner to your site specific needs. Real-time displays and statistical reporting allow you to validate that your system resources are being used efficiently.

#### **QUANTUM PM for VAX Performance Monitoring and Capacity Planning**

Improve your system's efficiency with Quantum PM. Capable of collecting and reporting on configuration, CPU, I/O, and

memory statistics, Quantum PM is a powerful tool for demonstrating system usage patterns, troubleshooting and capacity planning. Flexible data collections can run for multiple nodes from a central control point.

All Quantum system management tools are menu-driven, and offer scripting capabilities, data displays, user-defined reports and presentation quality graphics. Find out why there are over 2,000 users worldwide using Quantum system management software products!

To qualify for a FREE trial, call us TOLL-FREE at 1-800-232-5215. In Massachusetts or outside the U.S.A., call 617-982-0200. When it comes to managing your VAX systems, we're sure to make a powerful impression.

**BRAINTREE**  
*Technology Inc.*

600 Cordwainer Drive, Norwell, MA 02061-1619 TEL (617) 982-0200 FAX (617) 982-8076

Computer Information Systems, Inc. (CIS) is the development corporation of the Quantum software product line. VAX is a trademark of Digital Equipment Corporation.

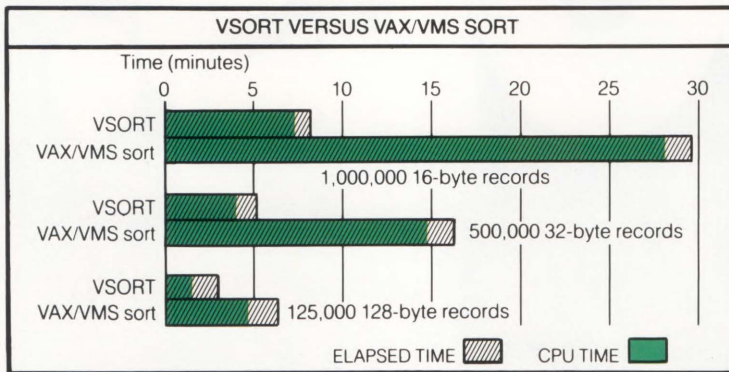
CIRCLE 361 ON READER CARD



# 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 161 ON READER CARD

FROM THE LAB

## Dynamic Tape Accelerator

**PLATFORMS:** VAX/VMS systems running VMS V4.0 or later

**PRICE:** Primary licenses range from \$1,995 for MicroVAXs and workstations to \$5,995 for a cluster. Support is available at an additional cost

**TOUCH TECHNOLOGIES INC.**

### **HEADQUARTERS:**

9990 Mesa Rim Rd., Ste. 220  
San Diego, CA 92121  
(800) 525-2527

**PRODUCT LINE:** Software performance tools

**FOUNDED:** 1982

**OWNERSHIP:** Private

CIRCLE 412 ON READER CARD

TK50s, TK70s and TA90s. Optical disks, if configured as tape devices, also can be accelerated with DTA.

### **Let's Accelerate**

Installation is simple. The distribution is BACKED UP to a directory of your choice. A startup command file is included to set up logical names and symbols.

DTA doesn't accelerate devices immediately after installation. You control DTA's behavior using one of three command files.

1. *PRE\_ACCEL.COM* doesn't accelerate a device but allows you to use DTA's *MONITOR.COM* to view statistics relating to tape speed and use. We used *MONITOR.COM* to measure DTA's performance during the tests we conducted.
2. *ACCEL.COM* starts the DTA driver. You invoke *ACCEL.COM* for each of your tape devices. All tape operations for each accelerated tape device will be affected. You can use DTA's *MONITOR* to measure the results.
3. *DEACCELL.COM* decelerates a tape device. All operations return to normal speed as with *PRE\_ACCELL.COM*. *DEACCELL.COM* disables the *MONITOR* facility.

You can view your tape drives' activ-



# Thinking Laptop PC's?

# Think Again.

We all know the laptop PC can be complex. The PC is a computer which requires a lot of training and support. Its moving parts may increase the likelihood of failure. The programs that run on PC's must be licensed, updated and distributed. Controlling information on each PC can be an intricate task.

The Colleague laptop terminal, an alternative to the laptop PC, offers a simple solution to host access. We can all use a little less complexity.

The Colleague is an inexpensive, light weight, full screen terminal that is easy to carry and a 15 hour battery means the charger can stay home. The modem included with every terminal comes with MNP which means a reliable, error free connection even over cellular telephones. The 20 Auto-connect channels with phone numbers and log-ons allows a friendly host connection to be established by simply plugging in the phone line and turning on the Colleague.

The Colleague Plus adds word processing, capture and send routines, and nonvolatile file storage. This means it can capture on-line information, edit a file at any time, or send a file back to a host.

Think about the Colleague alternative. Support is simplified with a minimal training program, fewer questions from the field, and an excellent reliability record. Program updates and changes in information can be quickly and efficiently implemented at the host without distributing disks to the field. Most of all, we can concentrate on our profession and make the computer work for us.

Increase productivity, not complexity.

Random's evaluation program even makes it easy to try a Colleague.

Call 1-800-553-6773

**Random**<sup>®</sup>  
CORPORATION

581 Northland Blvd • Cincinnati, Ohio 45240  
513-825-0880



ity with DTA's MONITOR feature. A sample screen is displayed in Figure 1. You must specify the device you want to monitor. The device to monitor must be PREACCElERated or ACCElERated for the monitor to work.

We ran tests using a nine-track tape drive at densities of 1,600 and 6,250 bpi and on our 8mm Exabyte drives. A MicroVAX II was the host processor. No batch jobs or interactive users were on the system. The BACKUP qualifiers used

using various BACKUP qualifiers, such as /[NO]CRC, /GROUP\_SIZE and /BLOCK\_SIZE with DTA to optimize performance. Tables are included to specify densities and tape lengths for special devices such as the 8mm Exabyte cartridges. A summary of popular tape devices and their maximum rated data

transfer rates is included to let you measure DTA's performance against claims made by the drive manufacturer.

DTA is easy to install and use. If you do a lot of tape work, it would pay to get an evaluation copy of DTA, test it and see the improvements you can achieve at your site. ■

**“**  
**You control DTA's behavior**  
**using one of three**  
**command files.**  
**”**

in Trials 2 and 3 of each test were those suggested by Touch Technologies in the DTA manual. The results are shown in Figure 2.

Our experience with DTA provided better results when used with nine-track drives than with Exabyte 8mm drives. We ran DTA on systems that were quiet. Your results may vary depending on your equipment, workload and when you run BACKUP.

THE DOCUMENTATION INCLUDES a brief overview of DTA concepts. A chapter is devoted to recommendations for

Micro Technology Inc.  
 5065 E. Hunter Ave.  
 Anaheim, CA 92807  
 (714) 970-0300

CIRCLE 492 ON READER CARD

Storage Technology Corp.  
 2270 S. 88th St.  
 Louisville, CO 80028  
 (303) 673-5151

CIRCLE 460 ON READER CARD

System Industries Inc.  
 560 Cottonwood Dr.  
 Milpitas, CA 95035  
 (408) 432-1212

CIRCLE 521 ON READER CARD

**Figure 2.**

Nine-Track Tape at 1,600 bpi		
Special Backup Qualifiers	Avg. KB/sec. as Reported by MONITOR.COM	State (Preaccelerated, Accelerated)
NONE	50 46	Preaccelerated Accelerated
/NOCRC	59 64	Preaccelerated Accelerated
/NOCRC /BLOCK=16384	63 68	Preaccelerated Accelerated
Nine-Track Tape at 6,250 bpi		
Special Backup Qualifiers	Avg. KB/sec. as Reported by MONITOR.COM	State (Preaccelerated, Accelerated)
NONE	51 46	Preaccelerated Accelerated
/NOCRC	104 123	Preaccelerated Accelerated
/NOCRC /BLOCK=16384	105 135	Preaccelerated Accelerated
Exabyte 8mm Cartridge Tape		
Special Backup Qualifiers	Avg. KB/sec. as Reported by MONITOR.COM	State (Preaccelerated, Accelerated)
NONE	24 30	Preaccelerated Accelerated
/NOCRC	87 85	Preaccelerated Accelerated
/NOCRC /BLOCK=40960 /GROUP=0	82 82	Preaccelerated Accelerated

BACKUP results obtained without/with tapes being accelerated and with various combinations of BACKUP qualifiers. The figures were gleaned from DTA's MONITOR.COM real-time reporting facility.



# OPTICAL ILLUSION

## *Solution*

**It's not an illusion.** Perceptics Corporation, the leader in VAX/VMS optical storage subsystems, has the solution to your data storage needs. The Perceptics LaserSystem and LaserStar subsystems offer true magnetic disk emulation, and can give you hundreds of gigabytes of on-line storage from one subsystem.

The reality is that no one in the industry can give you a more proven product with these features and this much storage capacity. Perceptics has over 500 optical subsystems in use worldwide and is a leader in optical disk jukebox subsystems. The Perceptics subsystems allow the optical storage device to be used as a "plug and play" peripheral.

**LaserSystem** is a complete, integrated, ready-to-use optical disk subsystem, including write-once read-many (WORM) optical disk drive, SCSI host adapter and industry standard LaserWare optical disk software. Media, installation, and on-site maintenance services are also available.

LaserSystem stores up to 2.4 gigabytes of data on a removable cartridge and features true magnetic disk drive emulation, so existing software and

applications require no modification to access the massive storage capacity of optical disks.

**LaserStar** extends the emulation features of LaserSystem to the optical disk jukebox, allowing on-line access of up to 338 gigabytes of data, using the same VAX/VMS transparent file system as LaserSystem.

Applications include:

- CAD/CAM Storage and Retrieval
- Records Management
- Medical Imaging
- Seismological Data Storage
- Large On-Line Database
- Satellite Image Storage

## perceptics

725 Pellissippi Parkway  
Knoxville, TN 37922  
615/966-9200  
FAX 615/966-9330

LaserStar, LaserSystem and LaserWare are trademarks of Perceptics Corporation.  
VAX, VMS and MicroVAX are trademarks of Digital Equipment Corporation.



# Meet the #1 Software for a Growing Family

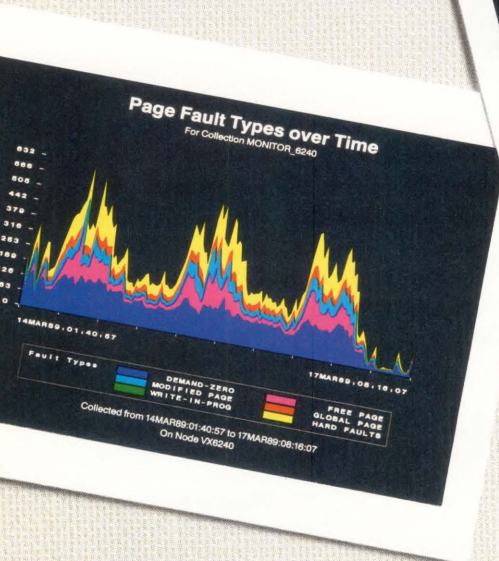
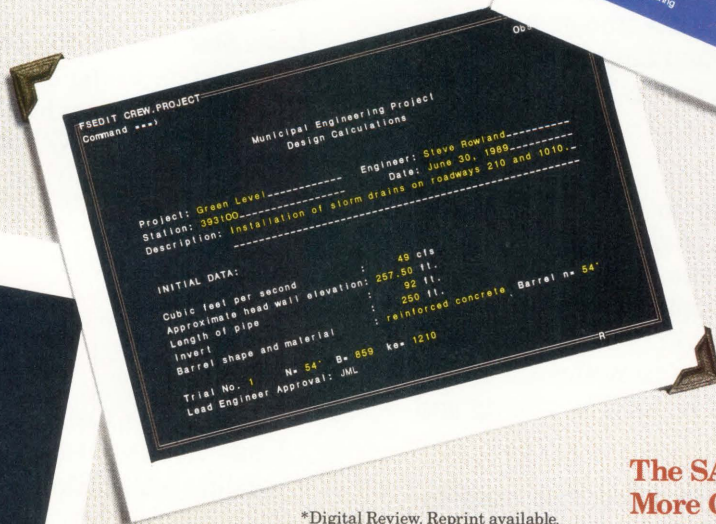
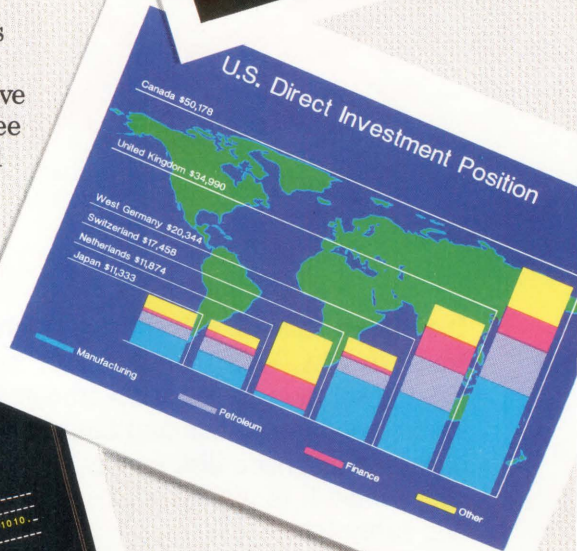
The more you rely on the expanding family of VAX™ computers, the more you need the SAS® System—the leading data analysis and graphics software in the VAX market. No other software has the power and flexibility to handle *all* your data management, analysis, and presentation needs. Across the entire range 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) 467-8000. 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.

**digital**™ Cooperative Marketing Program



SAS Institute Inc.  
SAS Circle □ Box 8000  
Cary, NC 27512-8000  
Phone (919) 467-8000  
Fax (919) 469-3737

1 9 9 0  
digital review  
**TARGET AWARDS**  
NOMINEE

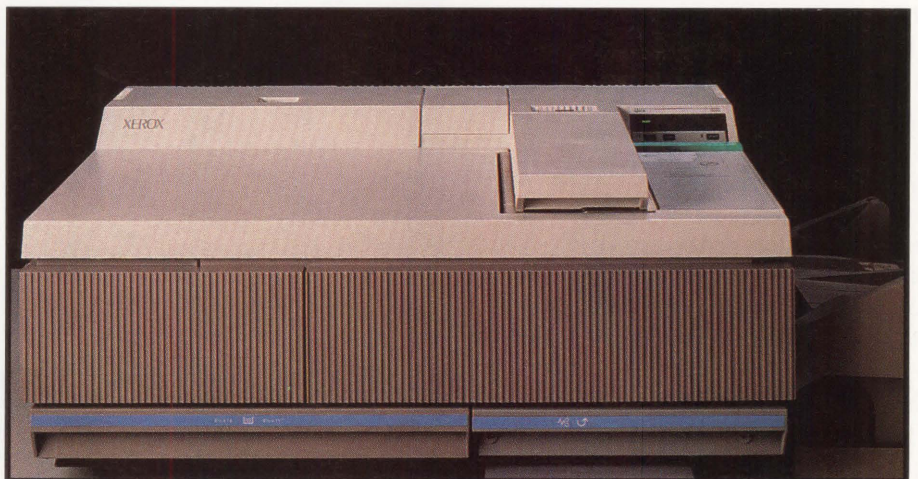


# Printing Across Multivendor Environments

*The Xerox 4045  
Laser CP Model 150  
Is Ideal For  
Multivendor Setups.*

If your company is trying to standardize on one type of laser printer but can't find one compatible with its PCs, VAXs, Hewlett-Packard systems and IBM mainframes, consider the Xerox 4045 Laser CP Model 150 laser printer, from Xerox Corporation of Stamford, Connecticut.

The 4045 comes standard with Centronics parallel, RS-232C and Dataproducts 2260 serial interfaces and can be configured to work with DEC and HP hosts, as well as IBM PCs and compatibles. The 4045 supports ASCII, ISO, EBCDIC and IBM PC coding schemes. Interface hardware is available from Xerox that lets your model 150 operate in an IBM System 34/36/38 environment or in an IBM 3270/SNA configuration. Part of the interface controller's function is emulation of the IBM printer standard for the



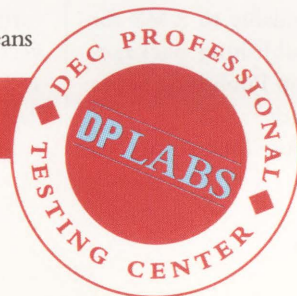
applicable environment.

The standard version of the 4045 supports two emulation modes: Xerox 2700 and Diablo 630. The 2700 is a laser printer. The 630 is a daisywheel-type impact printer. A subset of the Diablo's Extended Character Set/All Purpose Interface (ECS/API) configuration is supported. However, not all of the 630 functions are supported — a result of the difference between mechanical and electronic printing methods.

The Laser 4045 is configured by means

*The Xerox  
4045 printer  
can be configured  
for a variety  
of hosts.*

**BARRY SOBEL**





of a removable configuration cartridge composed of four switch banks labeled A through D, each containing eight switches. The switches let you set up the printer for parallel or serial operation and set the emulation mode, baud rate, data flow control, the default printer font and other control options so that the 4045 works with your host system.

**The 4045 uses an Intel 80186 microprocessor.**

Three suggested default settings are provided in the documentation set for the printer: parallel Centronics, parallel Dataproducts and serial asynchronous. The RS-232C serial port on the Laser CP is configured as data terminal equipment (DTE). This means that because your host port probably is set up the same way, you'll need a null-modem cable, i.e., one in which pins 2 and 3 and optionally pins 6 and 20 are crossed. Alternatively, you can use a straight-through cable and a modem eliminator adapter, available at most computer and electronics stores.

### Specifications

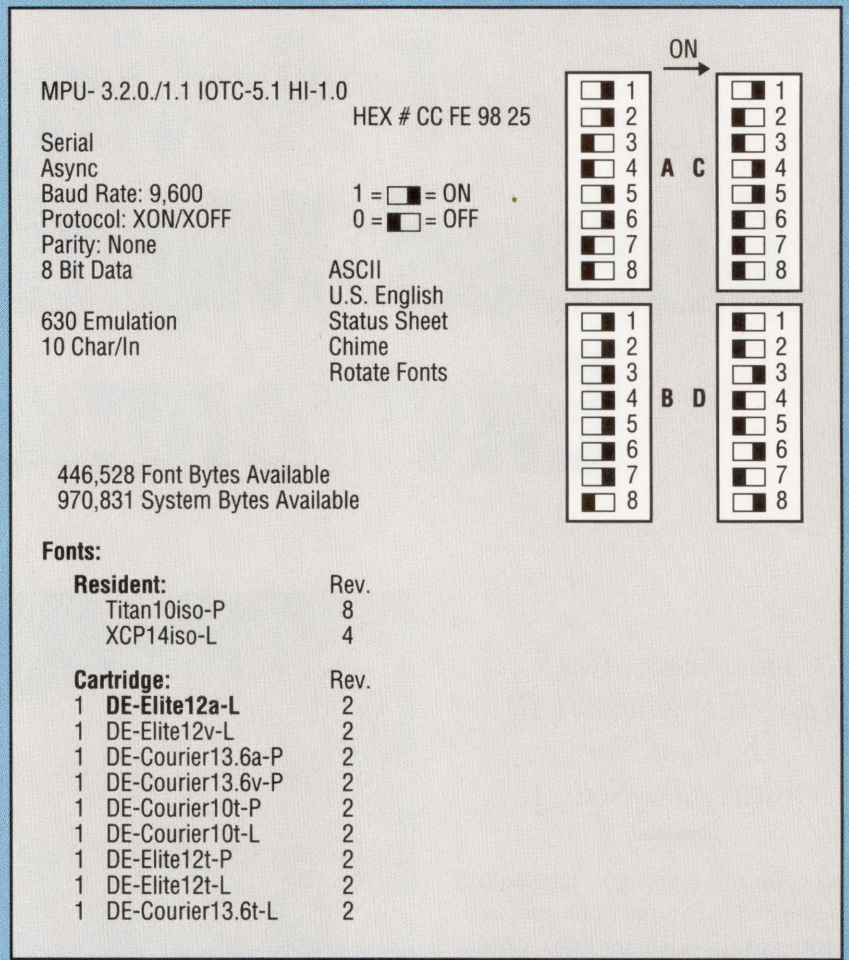
The 4045 is billed as a compact printer. It's 19.5 x 40.5 inches, including the optional receiving tray. This compares with 20.8 x 25 inches for a DEC LN03A and 18 x 32.1 inches for an HP LaserJet series II. Additional space is needed around the printer to provide adequate ventilation.

The 4045 prints at a speed of 10 pages per minute. It's rated for use at 15,000 pages per month. Graphics can be printed with a resolution of 300 dpi.

The 4045 uses an Intel 80186 microprocessor. It comes standard with 1 MB of RAM and is expandable to 2 MB for use with desktop publishing packages such as Xerox Desktop Publishing Series from Ventura Publisher.

The Laser CP can use fonts from four

Figure.



The Xerox 4045 configuration sheet is a useful installation tool.

sources. There are two resident internal fonts: Titan10iso-P for portrait orientation and XCP14iso-L for landscape printing. Font cartridges are available with several fonts to a cartridge. You also can download fonts from tape or disk from your host system.

Also available are "personality" cartridges to emulate the HP LaserJet Plus/500 Plus and the Epson FX80/100 dot-matrix printer. Raster-to-graphics conversion is possible using the X-Graph cartridge, which enables acceptance of vector commands from applications such as SAS Institute's SAS/Graph and Autodesk's AutoCAD.

Information about the printer's opera-

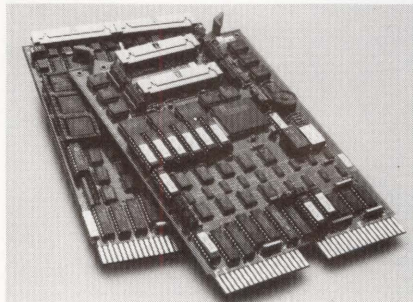
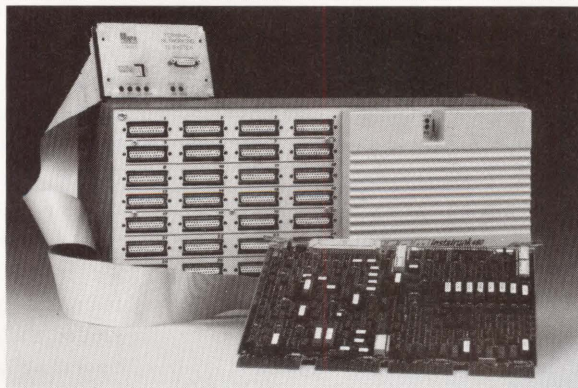
tion can be found on the 4045's control panel. There are indicators for conditions such as Add Paper, Add Dry Imager (toner) and Clear Paper Path. There are switches for Reset, Offline and Last Page. One difference from other printers is that the LED next to the Offline switch lights when the printer is offline, not online. A two-digit display provides status codes that can help diagnose possible printing problems.

### Installation

We installed the 4045 on the Lab's MicroVAX II via our Datability Software Systems Vista terminal server. It was a serial hookup using the null-modem



# WE HAVE WAYS OF MAKING DEC TALK.



Only DILOG offers such a wide variety of comm solutions.

Ethernet? The DCS-1000 server lets you connect 8 to 128 terminals. It's like having up to 16 DECserver 200 systems in one compact enclosure, at a fraction of the cost.

T-1 subsystems? The CQ2010 uses one slot in your Q-Bus system to connect up to 128 DHU or 64 DHV terminals. Besides reducing the number of controllers from 8 to 1, it lowers costs by using existing twisted-pair wiring, instead of expensive cables.

Direct connect line cards? DILOG single-board controllers let you connect up to 16 lines to VAX, PDP-11, LSI-11, MicroPDP-11 and MicroVAX systems.

If you want your DEC system talking, talk to DILOG today.

**DILOG**  
DISTRIBUTED LOGIC CORPORATION

**1-800-DILOG32**  
(Outside CA)

Corporate Headquarters  
1555 S. Sinclair Street  
Anaheim, CA 92806  
(714) 937-5700

U.S. Sales Offices: Anaheim, CA (714) 937-5700. Santa Clara, CA (408) 986-0224. San Diego, CA (619) 458-0542. Indianapolis, IN (317) 841-3751. Cleveland, OH (216) 292-3475. Pittsburgh, PA (412) 531-5622. So. Plainfield, NJ (201) 757-2211. Red Bank, NJ (201) 530-0044. Nashua, NH (603) 595-0453. Washington, DC (703) 742-8285. In Canada call: (416) 677-5410. DEC, DECserver, Q-Bus, DHU, DHV, VAX, PDP-11, LSI-11, MicroPDP-11 and MicroVAX are trademarks of Digital Equipment Corporation. Ethernet is a registered trademark of Xerox Corporation.

See us at DEXPO West Booth #1420

CIRCLE 311 ON READER CARD



cable. We used the default serial setup using 630 emulation mode. We changed the default settings from 7 bit/even parity to 8 bit/no parity to work with the Vista.

To remove the configuration cartridge and any font cartridges you may have installed, take the printer offline. After the switch settings on the configura-

“

**The copier won't function simultaneously with the printer in operation...**

”

tion cartridge are changed, power the printer off and on or perform a soft reset for the new settings to take effect. A soft reset is performed by holding down the Reset button on the front panel while simultaneously pressing the Offline button. The printer then will print a Configuration Sheet showing the current printing parameters and highlighting the current default font in bold characters.

If an optional font cartridge is installed, you'll see a list of all fonts in that cartridge. If one of these fonts is selected as the default, it will be highlighted. A diagram of the settings of the four switchbanks is included on the Configuration Sheet (see Figure). A Sheet is printed at each powerup or soft reset of the 4045.

In Diablo 630 mode, the Model 150 receives printer-control and format commands from the software package used.

Your software must contain a 630-compatible print driver or at least a generic driver to function properly with the Laser CP. You may have to experiment with the settings on the configuration cartridge to get the results you want.

### Performance

We tested the printer on many documents of various formats and length. They printed as expected, based on the configuration choices we made. To avoid jamming, it's important that you fan the paper and load it with the curl side up. The Xerox 4045 prints on plain, pre-drilled and letterhead paper, preprinted forms, labels, transparencies and xerographic envelopes.

The 4045 has four cartridge slots next to the configuration cartridge slot available for font cartridges. Setting switch B:7 on the configuration cartridge on, you tell the printer to use the first font in the font cartridge you've installed in the first slot to the right of the configuration cartridge as the default font. Setting switches B:7 and B:8 on will select the first font in the second slot to the right as the default font. There's no provision for selecting fonts from cartridges in the third and fourth cartridge slots as the defaults.

We tried installing Xerox's DEC LN03 Technical Fonts cartridge in the first font slot and setting the configuration cartridge to use its first font as the default. The change took effect and our document printed without a hitch.

CONSIDERING THAT THE 4045 is from Xerox, it isn't surprising that the tested model came with the copier option. There's a standard automatic-feed cop-

## Xerox 4045 Laser CP Model 150

**PLATFORMS:** Any host system using RS-232C, Centronics 100 or Dataproducts 2260 interface; optional interface hardware available for IBM mainframes

**PRICE:** From \$4,995 to \$6,695, depending on options; IBM interface hardware additional

### XEROX CORPORATION

**HEADQUARTERS:**

P.O. Box 1600  
Stamford, CT 06904  
(203) 329-8700

**FOUNDED:** 1949

**PRODUCT LINE:** Business products and systems and financial services

**OWNERSHIP:** Public

**REVENUES:** About \$16.4 billion (1988)

CIRCLE 466 ON READER CARD

ier on top of the printer that copies originals from 3 x 5 inches to 8 1/2 x 14 inches. The copier won't function simultaneously with the printer in operation (indicated by PLEASE WAIT on the control panel). You must wait for the READY light, which appears after printing stops. We tested this option and it worked smoothly, producing quality copies.

You can purchase an optional feeder/stacker from Xerox that allows you to print up to 750 sheets before reloading. Other options include additional font memory and IBM interface hardware.

Documentation consists of two 8 1/2- x 5 1/2-inch ring binders and user and reference manuals. The user manual includes basic setup and installation, an operating guide, font descriptions and sample documents. The reference manual provides a detailed explanation of operation, special installation situations and even a short technical tutorial. Both volumes are clear, complete and well-organized.

The Xerox 4045 Laser CP is worth considering for your laser printer of choice, especially if you're in a multivendor environment. ■

### Companies Mentioned In This Article

**Autodesk Inc.**  
2320 Marinship Way  
Sausalito, CA 94965  
(415) 332-2344  
CIRCLE 478 ON READER CARD

**Datability Software Systems Inc.**  
322 8th Ave., 11th Fl.  
New York, NY 10001  
(212) 807-7800  
CIRCLE 473 ON READER CARD

**Dataproducts Corp.**  
P.O. Box 746  
Woodland Hills, CA 91365  
(818) 887-8000  
CIRCLE 472 ON READER CARD

**Epson America Inc.**  
23530 Hawthorne Blvd.  
Torrance, CA 90505  
(213) 373-9511  
CIRCLE 467 ON READER CARD

**Intel Corp.**  
3065 Bowers Ave.  
Santa Clara, CA 95051  
(408) 987-8080  
CIRCLE 468 ON READER CARD

**SAS Institute Inc.**  
SAS Cir., Box 8000  
Cary, NC 27512  
(919) 467-8000  
CIRCLE 479 ON READER CARD



# OPENWARE™

FOR VMS™

## Have your VAX™ and NFS™ server, too.



Give your NFS users transparent access to unlimited VMS resources without consuming your VAX.

Unlike other NFS/VMS products, CMC's OpenWare for VAX and MicroVAX™ systems combines feature-rich TCP/IP software and high-speed intelligent Ethernet controllers. TCP/IP protocols are off-loaded from the VAX, leaving it free to process other user applications.

CMC's NFS for VMS is set up and managed like any other native VMS application while offering the full range of NFS services: automatic file conversions, support for disk quotas and user privileges, performance-tunable caching, system- and user-level security and full PC-NFS services. All easily installed using Digital's standard VMSINSTALL. And your CMC VAX/VMS hardware products can be installed, supported and maintained by Digital Equipment Corporation.

The OpenWare family of products offers a full range of local area network solutions. It provides a common set of user services such as file sharing, electronic mail and terminal emulation for DOS, UNIX®, and now VMS. And, perhaps most important, OpenWare comes with CMC's outstanding service and support.

Open up your VAX. With OpenWare from CMC.

**1-800-CMC-8023**

CIRCLE 225 ON READER CARD

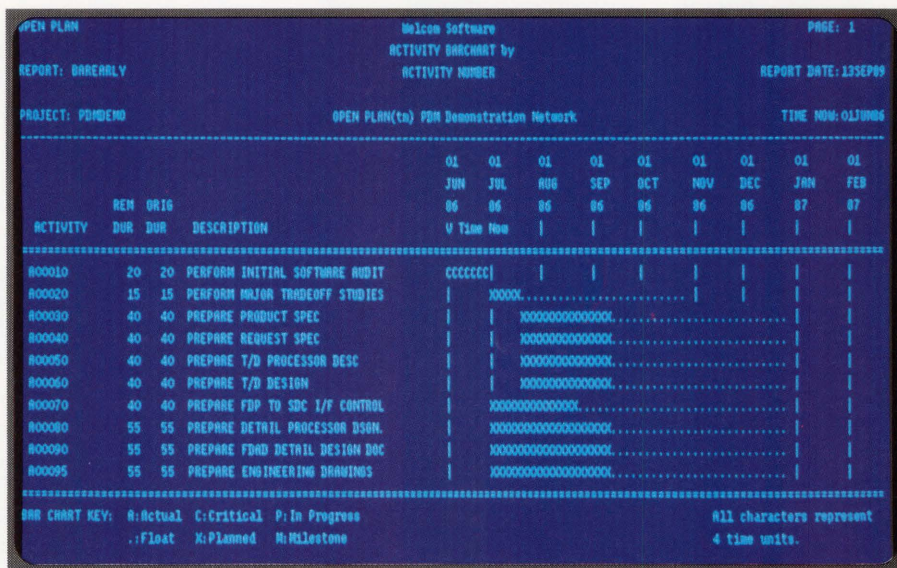
**Communication Solutions From Rockwell**  
125 Cremona Drive, Santa Barbara, CA 93117  
PHONE: 805/968-4262 1-800-CMC-8023  
FAX: 805/968-6478 TELEX: 240876

OpenWare is a trademark of CMC. NFS is a trademark of Sun Microsystems, Incorporated. VMS, VAX, and MicroVAX are trademarks of Digital Equipment Corporation. UNIX is a registered trademark of AT&T. © 1989 CMC.



*Welcom Software Technology's Open Plan Is An Efficient And Easy-To-Use Software Package That Helps Meet The Needs Of Projects And Project Managers Of All Types.*

# WELCOM PLANNING

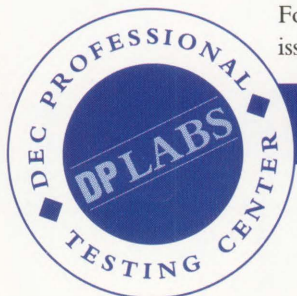


The bar chart is one method Open Plan uses to display reports.

Projects come in many shapes and sizes, but all projects have one need in common: the properly timed execution of the many individual activities that make up the project. Open Plan, from Welcom Software Technology of Houston, helps meet the needs of projects and project managers of all types.

Open Plan is a menu-driven high-end project-management software system for the VAX. It uses Recital Corporation's Recital database for its data dictionary. For a Lab review of Recital, see the April issue.

We ran Open Plan on LABDOG::, the Lab's MicroVAX II. Our distribution contained Recital and Open Plan. All files are restored from tape using BACKUP. A command procedure OPLAN.COM is used to define the Recital and Open Plan environments when Open Plan is started. Logical names contained in OPLAN.COM must be modified if you install the software in directories other than the default directories included in the distribution. You also must modify OPLAN.COM if you need to use non-local printers.



GEORGE T. FRUEH



# Want to expand your VAX 3100 memory without scrapping your original board?

## Plug into Dataram.



To expand your VAX 3100 memory, you often have to do two things: spend a lot of money and scrap your original memory board.

Then there's the Dataram solution. One we think you'll like more.

Dataram lets you choose from four different memories: 8MB, 12MB, 16MB, and the unique 24MB version. Using your original DEC memory board, you can build to the configuration of your choice. What's more, you'll find that Dataram generally offers the lowest priced memory available.

Providing great memory values and protecting your original investment are just two of the reasons why Dataram should be your memory company.

### **A Complete Line of 100% DEC-Compatible Memory Products.**

For over 22 years, Dataram has developed the highest quality memory products in the industry. Today, we offer a full line of memory for DEC's VAX, MicroVAX/VAXstation II, 2000, 3X00, 3100, DECstation, DECsystem, UNIBUS, and Q-Bus.

And when you buy from Dataram, you enjoy the reassurance of our Lifetime Guarantee and Express Spares Program.

# **DATARAM**

**For today's best memory values, call toll-free.**

**1-800-822-0071**

(In NJ, call 1-609-799-0071)

DEC, VAX, MicroVAX, DECstation, VAXstation, UNIBUS, and Q-BUS are trademarks of Digital Equipment Corporation.

See us at  
Booth #633

**DEXPO'89**  
WEST

CIRCLE 374 ON READER CARD



The installation creates directories for user work areas and for project databases. Each user must have an individual work directory created for him. A personal copy of OPLAN.COM allows you to tailor each user's environment. Installed this way, users share project databases, but each user has his own work area. You can set up personal project database areas, as well.

Pay attention to the user account quotas recommended to run Recital and Open Plan. Set them to at least the minimum recommended amounts. All quota settings are clearly documented.

### Starting A Project

When Open Plan is first started, the Open Plan main menu is displayed. The first step in creating a new project with Open Plan is to create an entry for the project in the project directory. This is done by first selecting Data Entry from the main menu. Selections are made using the numeric keypad. From the Data Entry menu, then select Activity Details (see Figure 1).

Open Plan responds by prompting you for the name of a project. Typing

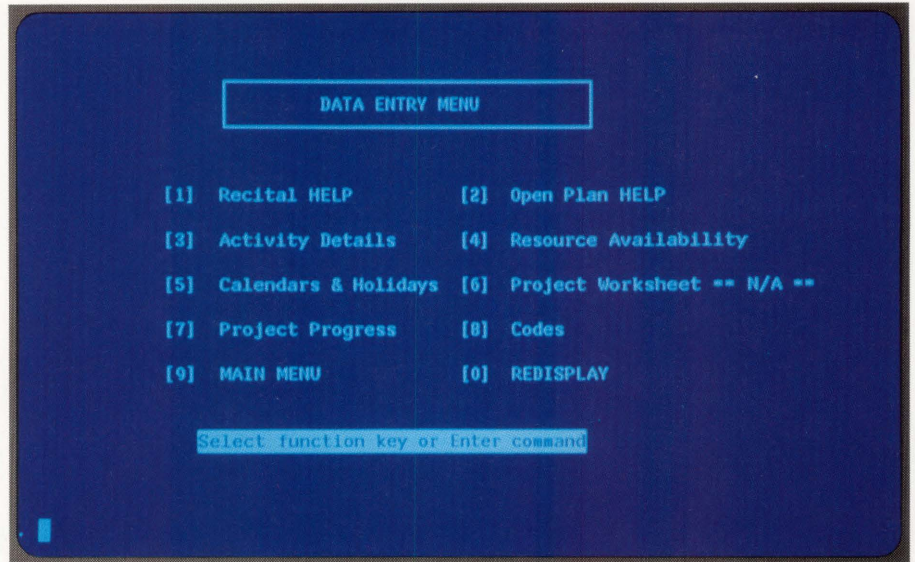


Figure 1: Data Entry menu selected from main menu.

an asterisk (\*) as the first character returns you to the Data Entry menu. Typing a question mark (?) displays a list of projects from which you may select.

Two projects, ADMDEMO and PDMDEMO, are supplied with Open Plan. ADMDEMO uses the arrow diagramming method (ADM) for representing logical relationships among project activities, while PDMDEMO uses the precedence diagramming method (PDM).

Projects using ADM representation define activities as arcs (or arrows) between events (or nodes). Each activity in a project is identified by a beginning I node signaling the start of the activity, and an ending J node signaling the activity's completion.

Projects using PDM representation represent the activities themselves as nodes and the relationships between them as arcs. This method resembles classic flowcharting or algorithm formation.

If you enter a new project name, Open Plan tells you there's no entry in the project directory and asks if you want to create one. Entries in the project directory must contain the project name, whether the project is ADM or PDM and if the project uses micro scheduling for scheduling a project in time units shorter than one day.

Optional project directory information includes a description of the project,

time now, original project start and project target finish dates. When entering a date, bear in mind that Open Plan's default input date format requires day/month/year: November 1, 1989, for example, is entered as 01/11/89.

Three two-letter codes — NL (not later than), NE (not earlier than) and ON (equal to) — can be used as options for specifying how Open Plan interprets the project target finish date.

The project directory also lets you specify a calendar file to schedule valid working days, a resource availability file that contains all resources available for the project, and code 1 and 2 files for sorting or subtotaling.

### Activity Information

After a project directory entry has been created, you can enter information for each activity that makes up the project. This information is entered in an activity-maintenance screen. Activities are usually entered in the initial setup of a project but may be added as the project proceeds.

Each activity in a project has a unique ID for establishing its logical relationship to other activities. For PDM projects, the ID may contain six alphanumeric characters.

For ADM projects, the activity is identified using two six-character fields called

## OPEN PLAN

**PLATFORMS:** Any VAX running VMS V4.6 or later; a TK50 tape drive for software installation; a VT terminal or 100% compatible or a VT340 with ReGIS support if on-screen graphics are required; Recital V5.4A or later and accompanying Recital/Library

**PRICE:** From \$18,000 to \$180,000, depending on CPU. (Price includes Recital database.)

## WELCOM SOFTWARE TECHNOLOGY

### HEADQUARTERS:

15995 N. Barkers Landing, Ste. 275  
Houston, TX 77079  
(713) 558-0514

**FOUNDED:** 1984

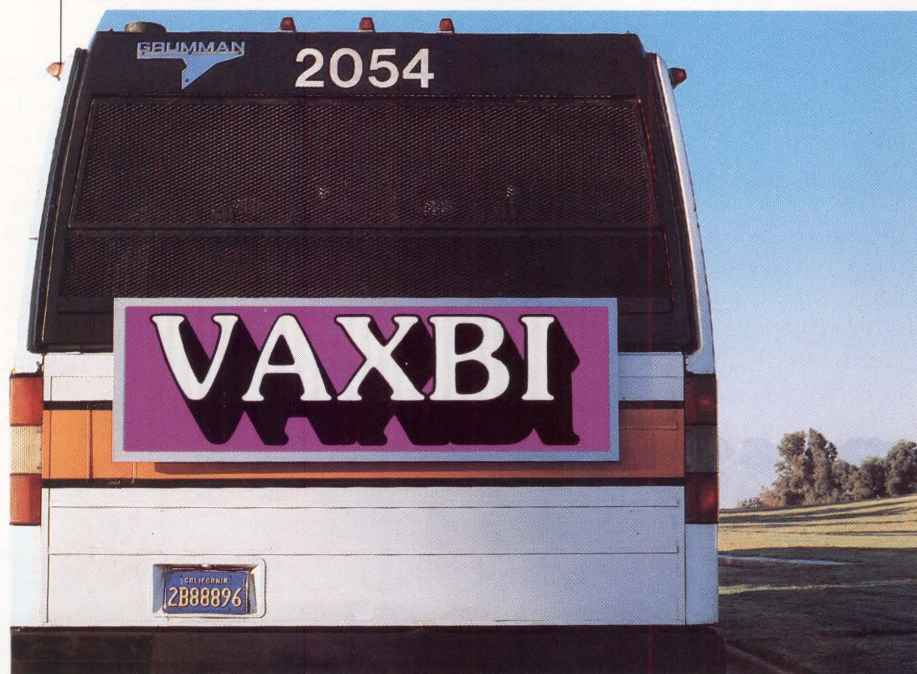
**PRODUCT LINE:** Project-management software

**OWNERSHIP:** Private

CIRCLE 405 ON READER CARD



# IF YOU'RE NOT BACKING UP WITH MEGATAPE, YOU'RE MISSING THE BUS.



## THE ONLY VAXBI BUS BACKUP DEVICE YOU CAN BUY.

**I**t's sort of ironic that so many big, powerful VAX systems have to get by with little, slow cartridges or reel-to-reel drives for disk backup.

Wouldn't it be great if somebody offered a high-capacity cartridge drive with a direct, high-performance attachment to the VAXBI Bus?

Now, somebody does. Presenting MegaTape's GT-88/6 8mm cartridge subsystem. A breakthrough that lets high-end VAX users enjoy the enormous capacity of 8mm without bus adapters or other bottlenecks. The result is far greater capacity and convenience than 9-track streamers—at a fraction of the cost.

Each GT-88 cartridge stores up to 2 gigabytes of data, costs around \$10, and fits easily into your shirt pocket.

Exabyte-compatible data formatting lets you interchange cartridges with virtually any other 8mm subsystem.

MegaTape's proprietary MBI-102 controller is completely TMSCP-compatible, and lets your system zip through backup chores using your standard VMS or Ultrix backup utilities.

### **NOW: 8MM ON VAXBI BUS. ANOTHER MEGATAPE EXCLUSIVE!**

The GT-88/6 subsystem for the VAXBI Bus offers something else that's crucially important, too: support capability built on nearly a decade of advancing the state of the backup art.

So if you'd like your VAX backups to really fly, there's only one place to catch the Bus: MegaTape.

P.S. We also offer the industry's "best buy" QBUS and Unibus subsystems, too!

VAX, VAXBI, QBUS, Unibus, VMS and Ultrix are trademarks of Digital Equipment Corp.

© 1989 MegaTape Corporation.

### **MEGATAPE CORPORATION**

1041 Hamilton Road  
Duarte, CA 91010-0317  
(818) 357-9921 • Telex: 510 600 7131  
Telefax: (818) 357-2369



THE GREAT LEAP FORWARD IN BACKUP.



ACTIVITY MAINTENANCE SCREEN

Activity ID A00010

Description  
PERFORM INITIAL SOFTWARE AUDIT

Duration 20

Activity Type

Calendar 1

CODES

1 383850 2 1440M Budget Cost

Forwards Backwards Add Update Delete Rename Search Exit / HELP  
1 Help 2 Successors 3 Resources 4 Chain 5 Show Fields  
6 Browse 7 Progress 8 9 0 Redraw Screen

Predecessors

Early Start ... 06/02/86  
Early Finish ... 06/27/86  
Late Start ... 06/02/86  
Late Finish ... 06/27/86  
Scheduled Start 01/02/95  
Scheduled Finish 01/27/95  
Baseline Start . / /  
Baseline Finish 06/27/86  
Actual Start . / /  
Actual Finish . / /  
Progress Type . .  
Progress Value . 0  
Expected Finish / /  
Total Float ... 0  
Free Float ..... 0

TARGETS

Start / /  
Finish / /

Press any Key .

Figure 2: Open Plan's activity-maintenance screen with Show Fields selected.

the I node and J node. This is in accordance with standard project-planning terminology. The I node represents the event that marks the beginning of an activity, while the J node represents the event that marks the end of the activity. The I and J nodes are entered at the bottom of the activity-maintenance screen.

Information contained within an activity record includes an activity description of 30 characters, transits (for ADM networks) to indicate a time lag among activities, budgeted cost for the activity, and targeted start and finish dates with the NL, NE and ON options. These factors are required to calculate the critical path of a project and to perform time analyses.

### Function Keys

Open Plan provides a set of commands that are initiated from single keystrokes called function keys. The function keys are the keypad keys 0 through 9. Function-key commands are displayed at the bottom of the screen when viewing activity information.

Function-key commands include [1] Help, [4] Chain, [5] Show Fields and [7] Progress. Figure 2 is the activity-maintenance screen with Show Fields selected.

Help screens are available at any time for both ADM and PDM projects. The chain command lets you go to the rec-

ord for any successor and predecessor of an activity. Show Fields displays additional fields for the current activity shown in the activity-maintenance screen. Progress allows you to review or update the progress screen for the activity.

The command words shown above the function-key commands on the screen can be accessed by typing the first letter of the word. For example, typing F (Forwards) displays the record of the next activity in the file. Typing R (Rename) lets you change an activity's ID.

After you've entered information about an activity, you can return at any time to update or change any item of activity information. Typing U (Update) allows you to update the activity information currently displayed on the screen.

### Time Analysis And Reporting

After progress and activity information has been entered, a time analysis can be performed. Open Plan calculates early and late start dates, early and late finish dates, and free and total float time. With this information and information in auxiliary data files such as calendars and holidays, Open Plan can perform a time analysis to produce a "best forecast" for an activity.

Current status information such as changing costs, critical path fluctuations

and delivery delays can be entered to "progress" a project. Current progress information can be entered using Open Plan's project-progress menu. This information enables Open Plan to create a revised time analysis of a project.

Open Plan contains a set of built-in standard reports, many of which provide user-defined sorting and selection criteria. Also provided is Open Plan's Report Writer, a command-driven report-writing language that allows flexibility in creating customized reports.

Open Plan lets you produce reports on the screen, to a printer or plotter, or to disk. Compatible plotters and printers include the HP7440A Colorpro 8-pen plotter and the LA210 printer. The screen on page 110 is an example of a bar chart produced by Open Plan. Critical and planned paths of the project are illustrated by activity number.

TECHNICAL DOCUMENTATION provided with Open Plan consists of a user's guide and a reference guide. The first half of the user's guide walks you through Open Plan's menus and provides a tour using the demonstration projects ADMDEMO and PDMDEMO. The second half discusses creating a resource-availability file, project cost control, producing hardcopies project logic drawings and system management.

The reference guide describes in detail Open Plan data structures, resource scheduling and aggregation, issues in micro scheduling and Open Plan's Report Writer. It also explains the Report Writer commands and functions, how to produce graphic reports, and standard file structures.

Welcom's Open Plan project-management system is an efficient and easy-to-use software package that should make project management more manageable.

Recital Corp.  
85 Constitution Ln.  
Danvers, MA 01923  
(508) 750-1066  
CIRCLE 403 ON READER CARD





# The New Wyse WY-185. It's what you wanted from DEC.

Our new WY-185 is fully compatible with DEC's VT320. But it also gives you everything that you wanted in the VT320—and didn't get.

For example, we give you a 15 x 12 character cell for full VT320 compatibility. But Wyse also has a second mode, a 10 x 20 cell, which they don't. Amazingly, that gives the WY-185 from Wyse better resolution and better soft font compatibility with DEC's VT220 than their own VT320.

More examples? Our flicker-free,

borderless screen results from an 85 Hz refresh rate and overscanning (vs. only 60 Hz and no overscanning). Our 15 function keys can be programmed from the keyboard. Theirs can't be. And our keyboard has the comfortable touch Wyse is known for.

Of course you also get advanced design and ergonomics—plus a lower price. In short, all the things that have made Wyse both the leader in DEC compatibles and the number one independent terminal maker.

The new Wyse WY-185. It has the features, performance and price you've always wanted from DEC. And have always got from Wyse. Instead. For complete specifications, please call.

**1-800-GET-WYSE**  
(1-800-438-9973)

**WYSE**  
■ ■ ■ ■

WYSE is a registered trademark and WY-185 is a trademark of Wyse Technology. DEC, VT220, and VT320 are registered trademarks of Digital Equipment Corporation.

**CIRCLE 339 ON READER CARD**



## DIGITAL WATCH

Evan Birkhead

# DEC's Mainframe Power Play

Digital has invested a great deal in Aquarius, its VAX 9000 mainframe project. Facing financial turmoil and decreasing profits, Digital is hoping the VAX 9000 will be its power play, an exclamation point to punctuate a year that featured an overhaul and re-direction of its entire line of processors.

In January, the low end was resurrected with the introduction of RISC workstations and PCs. In July, the midrange was reconstructed with the VAX 6000 series and new RISC/ULTRIX server/processors. Despite the relative success of these product lines, the company stopped just short of layoffs in mid-September and offered employees incentives to leave the company while others shifted departments. The fat-trimming policies will affect about 30 percent of the employees by 1992.

This month, the high-end VAX 9000 series is scheduled to debut in customer sites in its single-processor configuration. The machine eventually will expand to four processors in single and dual cabinets. Do you remember DECtop? Then welcome to the Big Top. The VAX 9000 is a gigantic, powerful, top-of-the-line system. Each processor will have the power of 30 VAX 11/780s. The product is based on a new internal 500 MHz cross-point switch architecture. It will cluster with existing VAXs and generate I/O throughput speeds that rival IBM's. It gives Digital a fighting chance with customers who need 3090 processing power. And this time, Digital's financial future is on the line.

### The OLTP Big Top

The VAX 9000's Big Top arena is the red-hot, glamorous world of OLTP, the

Digital has invested a great deal in Aquarius, its VAX

**“  
The VAX 9000 is a gigantic, powerful,  
top-of-the-line system.  
”**

carnivallike cross-industry application in which DEC is a strong contender behind IBM and Tandem Computers. In preparation for the VAX 9000's entrance, DEC spent much of the summer making improvements to DECtp and associated application-development systems, and in a controversial move it bundled run-time Rdb with VMS. Rdb is the proprietary database that's pivotal to DEC's OLTP applications.

Digital reports that DECtp, its extensive patchwork of VAX transaction processing solutions, has generated \$1.5 billion of business. Its OLTP business as a whole has increased at a 50 percent rate each year over the past few years. In other words, the VAX 9000 is joining a team

that's already scoring.

There's also a huge market for mainframe applications beyond OLTP, as Digital will attest. The 9000 series will come in configurations for scientific and commercial markets. Clustered VAX 6000s already have solved many companies' high-end processing problems, and Digital will be careful to prevent the 6000 from stepping on the 9000's toes. The 6000 series badly beat the supposedly higher-end — and now defunct — VAX 8000 series in price/performance benchmarks.

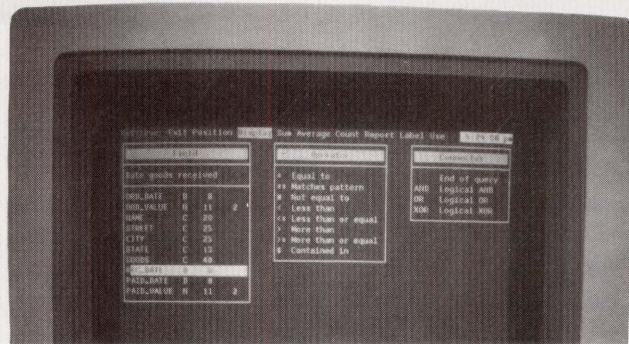
However, the premise of Digital's mainframe solution involves incremental corporate growth. The VAX 9000, for example, will become an integral part of

FIGURE .	
Class	System
Mainframe	VAX 9000 Series
Minicomputer/Server	VAX 6000 Series DECsystem 5800 (ULTRIX only)
Low-End Multiuser	MicroVAX 3000 Series DECsystem 3100, 5400 (ULTRIX only)
Workstation	VAXstation 3000 Series DECstation 3000 Series and 2100 (ULTRIX only)
Microcomputer	DECstation 286 and 386

*From high to low end, customers now can select from these processing units.*



VAX 8830



# Now dBASE users have someplace to grow.



When PC users need more power, now they can have it. Recital™ is the first RDBMS and 4GL for VAX systems that's totally upward-compatible with Ashton-Tate's dBASE.™ It's also compatible with Clipper™ and FoxBASE.™ So you can move applications and associated data directly from PC to VAX/VMS.™ Maintain and modify your applications using the same familiar syntax and commands.

No retraining and no reprogramming. Recital runs on UNIX systems, too.

You give yourself a whole new growth path. Solve your connectivity problems. Integrate your information processing. Protect your software investment. In short, you achieve all the benefits of a LAN solution, without the limitations.

And Recital includes tools like a report writer, screen painter, transparent access to RMS files, an integral data dictionary, popup calendars, calculators, pick lists, note pads and much more. All on a VT-type terminal! All without any additional programming or modifications to existing dBASE applications!

Try our 30-day license. Our special 30-day license gives you the full Recital system to use for an entire month. It's so compatible you'll have it running in an hour. The rest of the month, it just grows on you. To order your 30-day license, contact Recital Corporation, 85 Constitution Lane, Danvers, MA 01923. Telephone (508) 750-1066.

**Recital**  
CORPORATION

## The first dBASE-compatible RDBMS for VAX.

VAX and VMS are trademarks of Digital Equipment Corporation; FoxBASE is a trademark of Fox Software; Clipper is a trademark of Nantucket Corporation; dBASE is a trademark of Ashton-Tate; Recital is a trademark of Recital Corporation. Copyright 1989 Recital Corporation. All rights reserved. All trademarks are the properties of their respective companies.

CIRCLE 328 ON READER CARD



## Interview: Inside The VAX 9000

The VAX 9000 series, introduced on October 24th, isn't a mainframe in the classic sense. Its architecture is that of a giant VAX with mainframe-caliber throughput, rather than a DECsystem 10 or IBM 3090 mainframe. This high-powered VAX was made possible by breakthroughs in several areas, most notably innovations in semiconductor packaging and an extensive upgrade to the VAX instruction set. This radical design concept is scalable down to CMOS-based VAXs and eventually will trickle down to establish a fundamentally new VAX family platform for the 1990s.

Several weeks prior to the public announcement, *DEC PROFESSIONAL* interviewed Digital's Vice President of High-Performance Systems Robert M. Glorioso. This session provided technical information on the VAX 9000's internals and specifications.

### The Box

Stressing that a mainframe isn't just mips, Glorioso categorizes the VAX 9000 in the mainframe class, because it meets the complex criteria of high performance and high throughput, coupled with extensive availability and system management capability. The air-cooled computer also has a redundant intelligent power system and sophisticated diagnostics. "We haven't done a lot of direct comparisons," explains Glorioso, "but [the performance] is a little ahead of the 3090."

Initially, there are five configurations of the VAX 9000 series:

**Model 210** — This will be the first configuration available. The 210 is a single CPU with a System Control Unit (SCU) board. Digital benchmarked the CPU at a geometric mean of 30 times the processing power of a VAX 11/780. The SCU is an innovative high-speed crossbar switch used in lieu of a system bus that connects processor-to-processor and processor-to-memory and I/O at 500 MB/seconds per port.

The SCU provides a more than sufficient bandwidth for most transaction processing applications. Each 210 uniprocessor is capable of achieving 70 transactions per second in a standard debit/credit benchmark.

Glorioso projected the price of a base system "in the ballpark of \$1 million." The Model 210 is expected to be a temporary solution, soon to be upgradable to the more elegant Model 400 series. But the same processor is the fundamental unit of both the 210 and 400s.

**Model 410** — This more expensive single-processor version will become the base VAX 9000 model in the near future. The cabinet is one-foot taller than that of the 210 to accommodate a redundant power system and a cooling unit for an additional processor. When one power supply fails, the other is fully equipped to carry a complete load.

**Model 420** — This uses the same cabinet as the 410 but adds an additional processor that runs in parallel via the SCU, and an additional power system and cooling unit.

**Models 430 and 440** — These are the three- and four-processor configurations of the VAX 9000, which add another system cabinet with space for two processors and associated peripherals — essentially two Model 420s.

### The Chips

The small system box and routine air-cooling mechanism were made possible by the invention of a new semiconductor manufacturing and packaging technology that allows 30 times greater density of chip intelligence on a circuit board. While reducing the propagation delays between integrated circuits and the circuit board, the technology dissipates enough heat to alleviate the need for an expensive cooling system. Digital claims to have invested \$1.5 billion of its R&D capital on this project alone.

The interconnection of chips is accomplished with a device called the High-Density Signal Carrier (HDSC), which can carry up to 72 dense semiconductor devices on a five-by-five-inch unit. The insulating layers of the HDSCs are a polyimide and the conducting layers are copper. The HDSCs are mounted on Multi-Chip Units (MCUs) that connect

*Continued on page 120.*

an overall clustering expansion strategy. Many customers will be prepped with a site map that has a VAX 9000 at the hub and VAX 6000 systems that are clustered as add-ons.

"Almost all of the 6000s we sell will be clustered," acknowledges Bob Glorioso, Digital's vice president of high-performance systems. In an ideal scenario, Glorioso envisions clustered 6000s and 9000s at each headquarters supplemented by MicroVAXs and other smaller systems at branch offices.

Growing with these incremental configurations can be as robust as adding IBM mainframes to IBM mainframes, but more cost-effective, Glorioso suggests. In fact, many of Digital's largest customers are buying VAX 6000s to expand their 3090 installations.

### Strengths And Supports

Dual operating systems are part of the VAX 9000's strength. The mainframe will run VMS as well as ULTRIX. But vis-a-vis IBM, Digital cites the system's superiority in networking, clustering and price/throughput performance. Digital has a strong customer base in non-OLTP applications in the *Fortune* 1000, government, academic and scientific/engineering sites. When these sites eventually find the need for OLTP applications or OLTP-style environments, they logically will expand their VAXclusters.

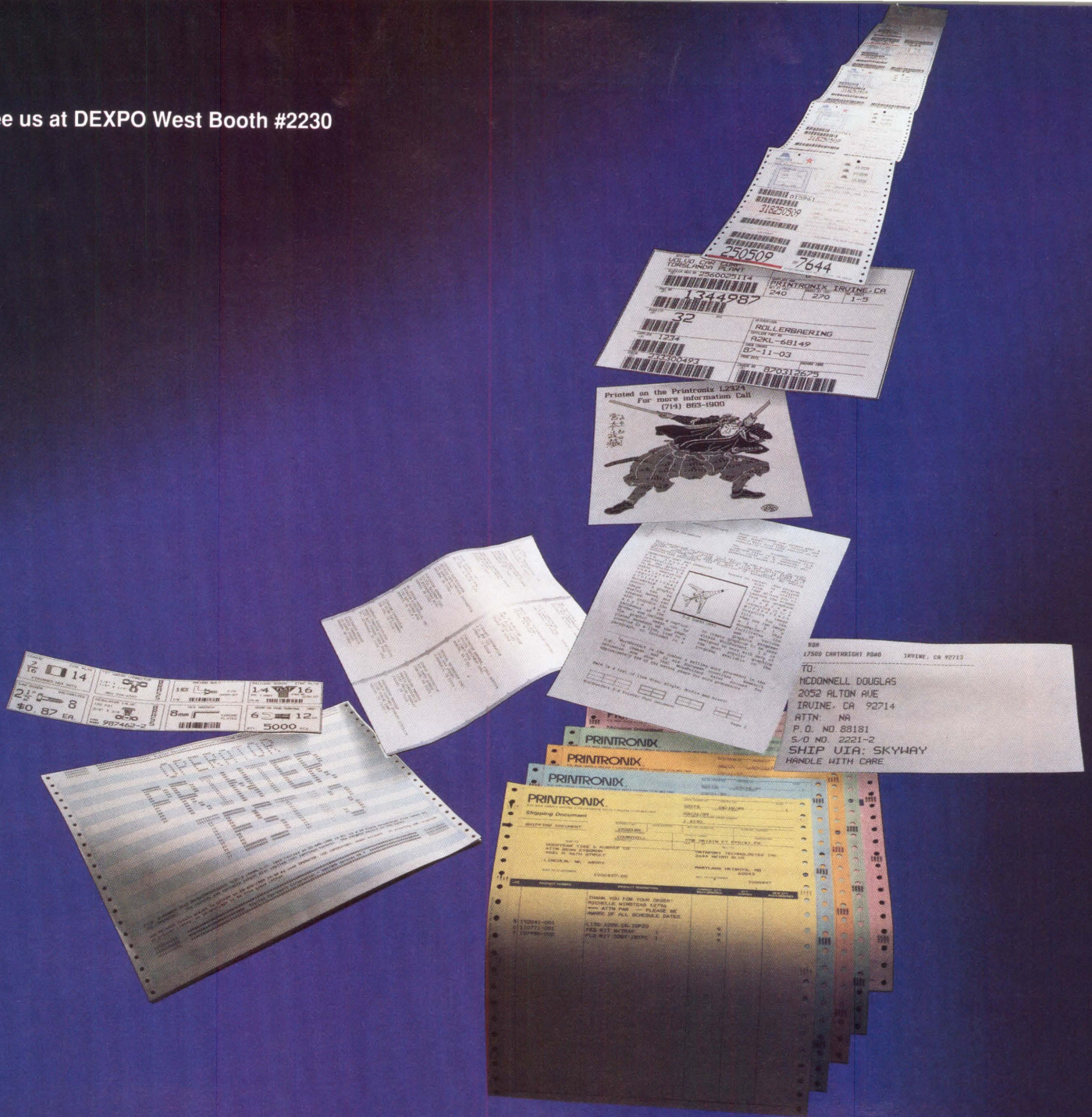
Digital has learned a great deal about mainframes since the days of the DECsystem 10 and 20 dinosaurs. Industry old-timers will see few similarities in architecture or strategy. This time around, Digital is backing its machine with high-performance peripherals and software.

Superclusters, for example, improve upon CI-based clusters by doubling the number of VAX processing nodes that can be supported and by exponentially increasing the clustering I/O bandwidth. In addition, Superclusters link CI-clustered nodes over wide distances.

A more powerful series of RA-series



See us at DEXPO West Booth #2230



# When you want to look good on paper... Look to **PRINTRONIX®.**

**Printer Products for Reliable Printing Solutions.**

17500 Cartwright Road, P.O. Box 19559, Irvine, CA 92713  
Telephone: (714) 863-1900 TWX: (910) 595-2535 FAX: (714) 660-8682

FOR MATRIX LINE PRINTERS, CIRCLE 136. **800-826-3874** FOR PAGE PRINTERS, CIRCLE 134.

## PRINTRONIX AUTHORIZED DISTRIBUTORS:

CANADA  
AHEARN & SOPER, LTD.  
(416) 675-3999

West IA, MN, ND,  
SD, West WI  
DYTEC NORTH  
(612) 645-5816

AL, FL, GA, LA, MS,  
NC, SC, TN  
GENTRY ASSOCIATES  
(407) 859-7450

NYC & LI, No. NJ  
LOGON, INC.  
(201) 288-0300

So. NJ, East PA,  
DE, DC, MD, VA  
MESA TECHNOLOGY CORP.  
(301) 290-8150

AZ, CO, So. ID, MT,  
NM, UT, West TX, WY  
PAR ASSOCIATES, INC.  
(303) 394-2772

CT, ME, MA, NH, RI, VT  
MESA, NORTHEAST  
(508) 458-4100

PUERTO RICO  
COMPUTEC SYSTEMS  
CORP.  
(809) 766-1502

So. IL, KS, MO, NE  
DATAPORT  
TECHNOLOGIES, INC.  
(314) 739-0665

AK, CA, No. ID, NV, OR, WA  
GROUP THREE  
ELECTRONICS, INC.  
(213) 781-9222

KY, MI, OH, West PA, WV  
LOWRY COMPUTER  
PRODUCTS  
(313) 229-7200

NEW YORK (UPSTATE)  
NACO ELECTRONICS  
(716) 624-1800

No. IL, IN, East WI, East IA  
PEAK TECHNOLOGIES  
(312) 255-0707

AR, OK, TX (except El Paso)  
USDATA ASSOCIATES, INC.  
(214) 680-9700



disk drives optimized for the VAX 9000 and potent new RISC-based HSC controllers are also part of the VAX 9000 support.

Digital's vector-processor boards, previously anticipated for the VAX 6000 announcement and now in a holding pattern until next spring, will play a significant role. VAX FORTRAN 6.0, with a vectorizing compiler, should be ready at the same time. Even 3090s often are configured with an optional Vector Facility (VF) that enables them to run supercomputing software programs.

An accompanying water-cooled system was deemed too costly by the VAX 9000 development team, particularly after the initial air-cooled systems performed so efficiently. Ironically, the more

dramatic — and wetter-sounding — code name Aquarius stuck to the project, while the co-project name Aridus was dropped.

However, Digital is expected to in-

“

***If Digital wanted to grow up to be just like IBM, this is as close as it has ever come.***

”

*Continued from page 118.*

the processor to the HDSCs. The MCUs are mounted on 25- x 25-inch planar modules, each of which can maintain mainframe-equivalent throughputs.

### **“New” Instruction Set**

To establish the performance boost for a true generation leap, Digital's engineers isolated the core VAX instruction set, including 80 percent of the most used opcodes and optimized it to the VAX 9000 gate structure. The conversion didn't involve reducing — or RISCing — the instruction set but more accurately hardwiring it into a single-cycle instruction set. The resulting data paths are heavily pipelined. The other 20 percent of complex instructions execute with microcode as always, while the single-cycle instructions can execute in parallel.

“We've also added 63 vector instructions,” claims Glorioso, explaining that the four scalar processors of the 9000 series eventually will be upgradable with vector boards.

### **The XCD**

The XCD is a new high-speed dual-directional channel that connects the CI directly to the XMI, quadrupling the throughput performance of Digital XMI controllers. The VAX 9000 systems are fully participating members of VAXclusters, and DEC is marketing the machines as upgradable via clustering 6000s and 9000s. Multiple CI buses can be connected to the machine via multiple star couplers.

Faster throughput will be aided by disk striping, a technology introduced with the new series of RA drives at the 9000 announcement.

The VAX 9000 can incorporate four XMI nodes and up to 14 VAXBI buses (which have been enhanced with a new Ethernet adapter). Each XMI represents one complete I/O subsystem.

THE VAX 9000 research started with a team of four in 1983 and eventually became “one of the longer projects” in Digital history, according to Glorioso. The project didn't expand to include large numbers of engineers and planners until last year, when an internal position paper began circulating at Digital. The paper was aptly titled “Mainframe of Mind.”

The new technologies it delineated — particularly the VAX instruction set and the chip set — were a significant change in the mind sets of DEC employees. But the best thing about the mainframe of mind is the part that didn't change: It's still a VAX.

roduce an accompanying ULTRIX-only server system based on the Mips Computer Systems R6000 chip set that will pack the power of 50 to 65 VAX 11/780s.

WITH THE DEMISE of the VAX 8000 series, a case can be made that the Digital product line is as sleek as it ever has been. And the numbering scheme almost makes sense (see Figure).

The three rings of the Big Top are the low-end, midrange and high-end systems that were re-established in 1989 and now are poised for the 1990s. The high-end VAX 9000 series holds the key to snaring IBM's OLTP market share.

If Digital wanted to grow up to be just like IBM, this is as close as it has ever come. The company offers the same range of computer products, peripherals and software, plus extensive service and support. And in the mainframe world, the Digital name is delivered at a far lower cost than IBM's: VAX 9000-series prices will start below \$1 million. ■

### **Companies Mentioned In This Article**

Mips Computer Systems Inc.  
928 Arques Ave.  
Sunnyvale, CA 94086  
(408) 720-1700

**CIRCLE 388 ON READER CARD**

Tandem Computers Inc.  
19333 Vallco Pkwy.  
Cupertino, CA 95014  
(408) 725-6000

**CIRCLE 558 ON READER CARD**



When your computer automated plant is already operating 24 hours a day, it's not easy to find ways to boost productivity. That's why Dupont's Maitland, Ontario plant went

# "AT DUPONT, WE USE 1ST-CLASS EXPERT SYSTEMS TO MONITOR OUR PROCESS CONTROL FACILITIES. THE CHEMISTRY IS JUST RIGHT."

—Dr. M. W. Zaky, Senior Engineer

first class—1st-CLASS Expert Systems that is. The result: productivity increased by more than \$300,000 the first year.

To get these savings, Dupont needed to deploy the expertise of their experienced chemical engineers into an easy-to-use VAX-based expert system.

The solution was 1st-CLASS FUSION,<sup>™</sup> a powerful expert system with a number of

unexpected features. A unique visual rule tree. Easy linkage to other programs, including 1-2-3<sup>®</sup> and dBase.<sup>®</sup> And a spreadsheet-like interface.

Prices begin at \$1495 for 1st-CLASS FUSION<sup>™</sup> for DOS or OS/2 and at \$5500 for the DEC VAX.<sup>®</sup> 1st-CLASS HT<sup>™</sup> is only \$2495. Each comes with free deployment of your applications.

Isn't it time you went 1st-CLASS?

See why INFOWORLD rated 1st-CLASS Expert Systems the best expert system shell tested. Call 1-800-872-8812 today for your \$20 tutorial diskette. Or order now, and get a 60-day money-back guarantee.

NAME \_\_\_\_\_  
TITLE \_\_\_\_\_  
COMPANY \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_  
TELEPHONE \_\_\_\_\_



**1st-CLASS**  
Expert Systems, Inc.

DP/D/11/9  
526 Boston Post Road 150 E, Wayland, MA 01778 (508) 358-7722



## WORKSTATIONS

David W. Bynon

# Workstations For OLTP

Occasionally, a company will ask me to apply new technology to an old application. The firm will claim that money is no object; it just wants a better way to get the job done. What the company really wants, however, is a better-quality job for less cost.

A customer came to me recently for ideas on how to improve data entry speed and accuracy for a government survey contract. I created an exact duplicate of the multipage survey form using DECwindows User Interface Language (UIL). Each page was represented in a large window.

The government survey form contained many fields, such as yes/no check boxes, multiple choice and fill in the blanks. I duplicated each of them with standard UIL widgets, i.e., pushbuttons, radio controls and text. UIL made the task easy, because the standard widgets were easy to describe. I used C to link the DECwindows entry screen with an Rdb database.

Using DECwindows for data entry, the data entry operator can move easily from field to field with the mouse, arrow keys or tab key. Transferring information from the survey form to the computer is fast and easy, because the layout of the form being processed is duplicated on the screen. There's no confusion between the form being entered and the entry form on the screen. Furthermore, for entry items such as check boxes, it's much easier for the operator to point and click at a box than to maneuver the cursor to the correct field and enter an X.

### Beyond Data Entry

This exercise with DECwindows and my VAXstation has implications beyond ba-

sic data entry. Could workstation technology, using off-the-shelf software tools such as UIL, CDA, ACMS, DBMS, Rdb and CDD Plus, be used for Online Transaction Processing (OLTP)? Without a doubt, yes.

A workstation is probably the best user interface/transaction processing tool available. Consider the possibilities in industries such as automobile insurance or credit banking, where stored images of pictures, letters or checks play a major role. With a workstation, you can view these scanned and stored images before completing a transaction — such as cutting a claim check or reinstating an overdue account.

I'm not suggesting that workstations replace the standard character-cell terminal in high-volume OLTP applications such as an airline reservation system. But the workstation can support components of a transaction system that requires information to make decisions.

The workstation can provide much more than just a productive user interface. Today's workstations, such as the DECstation 3100, have enough raw processing power to both service the user interface needs and get information to and from the host database machines.

In a network client/server environment, a workstation removes the user interface burden from the host system. In an OLTP application, the entry/query software shouldn't run on the host system and be displayed on the workstation. This would defeat a major benefit of using the workstation. The complete user front end should run on the workstation, then send data and requests to the database server and receive information back from the database server.

With this scheme of using workstations for OLTP, you must consider how transactions will get to the database machines for processing. This shouldn't

present a problem. DECnet and ACMS are adequately suited to the task. Although ACMS is written for use with DECforms and TDMS, agents can be developed to interface with other forms systems such as FMS. Developing an agent for DECwindows shouldn't be a problem.

### VAXcluster SCS

Another way to transfer critical data is to use VAXcluster System Communication Services (SCS). SCS provides the most important function of clustering: unified interprocessor communication. SCS facilitates communications among all cluster members. In essence, it's a message formatter for the various cluster components.

Cluster communication is facilitated through the CI port driver (PADRIVER) or the NI port driver (PEDRIVER). Information transmitted over the cluster medium comes from system applications, or SYSAPs. For example, the disk class driver (DUDRIVER), the tape class driver (TUDRIVER), the MSCP Server and the Connection Manager are SYSAPs.

SYSAPs communicate with one another. In other words, the MSCP SYSAP on one node communicates with the MSCP SYSAPs on other nodes. The SYSAP communication messages are formatted by System Communication Services and are passed along to the respective port driver.

A little-publicized fact is that user-written SYSAPs can use System Communication Services to pass information. To do so, simply write a driver to send and receive message packets (records) to and from your applications.

Workstation OLTP might not be here now, but its arrival is inevitable. You can bank on it. ■



# MICROVAX 3500/3600 PERFORMANCE TOOLS.

Visit us at booth #1300  
DEXPO West 89  
Disneyland Hotel  
Anaheim, CA  
Nov. 7-9 1989



**A matched set of solutions.** Our new line of MicroVAX 3500/3600 controllers is precision-tuned to boost your system's performance. Every detail has been quality-engineered. For example, special extractor handles are FCC compliant, while providing optimum cable management and full compatibility with BA 213 cabinetry.

Each controller has a high-performance, micro-processor engine that can push the speed barriers of MicroVAX technology. The full set is backed by the best support team in the industry, and you can choose the best tool for your needs:

**QD24 Disk Controller** . . . supports up to four ESDI drives with transfer rates up to 15MHz. Full MSCP implementation. Standard and custom drive geometry configurations and on-board diagnostics allow simultaneous multiple drive formatting and verifying.

**QD34 Disk Controller** . . . supports up to four SMD-E disk drives of any capacity, with transfer rates up to 3.0MB/sec. Full MSCP functionality and our standard on-board diagnostics.

**QT14 Tape Coupler** . . . for Pertec-interfaced tape transports. Choose TMSCP or TSV05 emulation. Standard or adaptive transfers.

**QS09 Async Multiplexer** . . . emulates 16 full modem-controlled lines of DHV11 emulation in one slot. Standard and non-standard baud rates and other parameters are programmable.

**Free tool catalog!** For more information about these and other Emulex products, return this magazine's reply card or call Emulex toll free!



Call (800) EMULEX-3, or  
(714) 662-5600 in California

Emulex Corporation  
3545 Harbor Blvd.  
Costa Mesa, CA 92626



Regional Offices: Anaheim, CA (714) 385-1685 Atlanta, GA (404) 587-3610  
Teaneck, NJ (201) 836-3717 Chicago, IL (312) 490-0050 Dublin, CA (415) 829-1170  
Burlington, MA (617) 229-8880 Washington, DC (703) 264-0670  
International Offices: Paris 134-65-9191 Tokyo 3-234-8951 Toronto (416) 673-1211  
Bracknell 344-484234 Munich 89-3608020 North Sydney 2-957-1669

MicroVAX is a registered trademark of Digital Equipment Corp.  
©1988 Emulex Corporation Inc.

CIRCLE 110 ON READER CARD



# Ethernet Performance Truths

Network performance is a multidimensional problem.

Hardware design and architecture, protocol design and architecture, types of protocol activity (connectionless and connection-oriented) and queuing delay within software (in the controller hardware and on the host operating system and host network software) are just some components of the problem.

Most network users analyze performance by saying, "The network is slow, therefore there's a performance problem." There's some truth in this logic, except that slow response, which is the typical user complaint, has nothing to do with overall performance. The system and network could be running at peak efficiency and processing data packets at blazing numbers per second. If the response is slow on an individual basis, however, network performance generically is categorized as slow.

## Measurement Myths

Assessing performance on Ethernet networks is tricky. Ethernet, predominantly hardware, gets blamed for many performance problems. Sometimes this is justified, but most often Ethernet's performance depends directly on other collateral components that have little to do with how Ethernet moves data around.

One big problem with Ethernet performance involves myths propagated for many years by "studies" of Ethernet performance. Many of these studies are theoretical and don't consider the actual way Ethernet works. One study a few years ago claimed that an Ethernet network degrades at 37 percent of line utilization at 3 Mbps (*not* 10 Mbps — this is frequently misinterpreted) using mini-

**“One big problem with Ethernet performance involves myths propagated for many years by “studies” of Ethernet performance.”**

mum packet length. There are some interesting items to note about the study:

1. When packet sizes were 256 to 512 bytes, cable use was near 100 percent. Only when the packet size dropped to minimum packet size did the performance drop to 37 percent.
2. The analysis wasn't complex and was considered preliminary.
3. Performance was for a 3-Mbps network in a fixed environment.
4. The analysis was theoretical and didn't necessarily encompass live network performance.

There have been other theoretical studies. Practically all early studies were made against the known configuration issues of the initial Ethernet specification (3 Mbps). Some transmission rules, electrical timeframes and other figures in the Ethernet specification are "hard" and specific to Ethernet configurations. Some of these rules are difficult to model because of lack of technique or other type of modeling method. Thus, substitutes were introduced that were similar but that didn't work like Ethernet in a live environment. This means that many theoretical studies that have caused performance myths made performance assumptions that aren't accurate in a live 10-Mbps environment, for example:

1. One assumption is that Ethernet's 1-persistent CSMA/CD (a station is ready to transmit when the channel or cable is busy and will send its data when the

channel is free with a probability of 1) is similar to models of non-persistent CSMA/CD (the station waits a random amount of time if the channel is busy). Some studies model p-persistent CSMA/CD, which assumes that the station will transmit immediately with probability p and otherwise will wait to transmit.

The problem is that modeled data for non-persistent protocols shows that low-load networks deteriorate, but high-load networks perform better. This isn't how Ethernet works: It's 1-persistent, and that changes the entire modeling metric.

2. Many models assume a simple distribution of data on the network that's typically Poisson. This assumes a relatively reasonable network behavior. Real networks don't behave.
3. Stations on modeled networks are equally spaced, or at least predictably spaced. How often does that happen on a real Ethernet? Even with its configuration rules, Ethernet and 802.3 rules frequently are violated by vendors and customers.
4. Host system and host controller buffering are given rules that help simplify the model. This isn't realistic, because different operating systems, different implementations of the same networking software, different controller software drivers and different controller I/O queuing buffers vary dramatically among sys-



# Build Your Spreadsheets With 20/20, And What Does It Get You?

DATATRIEVE™

1-2-3.

ALL-IN-1™

WordPerfect®

ORACLE®

Rdb™

PowerHouse®

WPS-PLUS™

INGRES

Excel

MASS 11™

Vivid™

It gets you better access to data.

When you run 20/20 on your VAX™ computer, your people can spend their time performing useful spreadsheet analysis. Instead of rekeying data, reformatting files or burdening MIS with data retrieval requests.

20/20 is the only integrated spreadsheet that connects to databases, WP programs, PC spreadsheets and to a host of other application programs.

So your people can actually pull the data they need for analysis directly into the 20/20 spreadsheet. *Without ever leaving 20/20.*

And no spreadsheet integrates as tightly with ALL-IN-1™ Office Software.

You can explore the value of 20/20 with our Evaluation Kit offer. Simply return the coupon below. Or, even easier, phone us at (508) 655-9191.

I'd like to receive a 20/20 Evaluation Kit. Please have a sales rep contact me.

I'd like your informative booklet about 20/20.

I'm a VAR/dealer/distributor.

Name \_\_\_\_\_

Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

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

Telephone \_\_\_\_\_

Model VAX \_\_\_\_\_

Send to Access Technology, Two Natick Executive Park, Natick, MA 01760-2030.

Access  
Technology  
A CompuServe Company

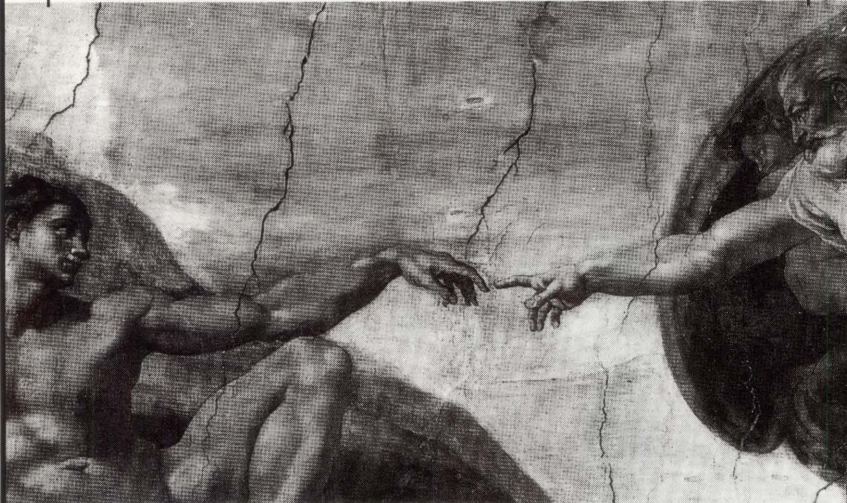
20/20™

Trademarks are the property of their respective holders.



# TCP/IP

## Created by Design



### Powerful New Ways To Network DEC With UNIX

The only way to take complete advantage of networking all your DEC systems to UNIX is with TCP/IP products designed to utilize the full power of DEC's operating system and architecture. Inspired TCP/IP designs from Process Software Corporation integrate **VMS, RSX, RT-11, and TSX** into your network -- with built-in performance, modularity, reliability, and ease of use and learning that is unmatched in the industry!

Customers value our popular TCP/IP products because they are built using DEC's own design rules. This means quicker installation, faster operation, and better performance than you imagined possible—even on new DEC operating system versions and CPU models:

**50% higher transfer rates    40% lower CPU loading**

All major protocols are supported -- FTP (file transfer), TELNET (virtual terminal), SMTP (mail), NFS, socket library, UDP, QIO interface, and more. You can optimize your system and insure your future growth potential by selecting and buying just the functions you need. There is no need to purchase or maintain special hardware. Your existing investment is protected because we support all DEC Ethernet hardware on all VAX and PDP-11 systems and run concurrently with DECnet, LAT, and LAVC.

Start enjoying the most astounding price/performance TCP/IP networking products available anywhere. Call Process Software Corporation today! **Ask for ext. #516.**

**800-722-7770** 508-879-6994 FAX 508-879-0042

**PROCES** SOFTWARE

DEC, DECnet, LAT, LAVC, RSX, RT-11 and VMS are trademarks of Digital Equipment Corporation. UNIX is a trademark of AT&T.

tems and vendors. The effect is that no two systems, even with the same hardware and host networking software, can be buffered the same. This affects whether data is buffered properly or lost because of lack of buffers.

5. Fairness in acquiring the network channel is assumed in most network models. This simply isn't true in real life. I know of one workstation vendor that has changed the backoff timer on collision detection to make its system attempt to reacquire the network faster than other systems. This is great if you're that system, but it's grossly unfair to other systems on the cable that follow the rules. If stations don't follow the definition, which happens often, the network is unfair and will react much differently than predicted.

6. Ethernet is used by many protocols, documented and undocumented. This means that there's a great spread in packet sizes on a protocol-by-protocol basis, as well as in how often the packets are generated by the host (interarrival packet gap). Many theoretical models use one or more fixed packet sizes to show two or three possible ranges of performance. But at a split second in time, there may be a myriad of network packet sizes, arrival gaps and other performance-affecting issues.

7. Another assumption is that the size and population of the network are static. Live networks don't fit defined quantities with known available MIPS on CPUs, well-behaved software, and so on.

The bottom line is that there's very little Ethernet performance measurement data that's reliable for a live network. What is worse, some of the theoretical performance data we rely on may be tainted toward metrics that have nothing to do with how Ethernet works. This means that configuration rules in some situations may be too conservative or too optimistic. It even may mean that Ethernet performance is very different from what many studies show.

### What To Believe

So then, what should you believe about Ethernet performance?

CIRCLE 152 ON READER CARD



# ARTEMIS™ TEAM.

NEW  
FROM  
METIER

## MAKE YOUR PEOPLE STAND OUT.

**Introducing ARTEMIS Team. Resource management software that helps you make the best use of your skilled people—so you can handle multiple projects more effectively, more efficiently.**

If you manage a highly-skilled team of people working on tasks across multiple projects, you know the challenge of continually juggling priorities and assignments. Only through optimal use of your personnel, matching skills and proficiencies to project tasks, can you get the job done right—and on time.

Proper allocation of your limited professional staff directly impacts a project's success—and its bottom line. Project management tools that focus on planning and scheduling of tasks, rather than people, aren't enough.

ARTEMIS Team, from Metier, turns your most valuable resource, skilled people, into your most outstanding asset.

ARTEMIS Team helps you identify

and prioritize skill requirements for your team's activities across many projects. This way, you can maximize their impact by assigning and scheduling according to the skills proficiency and availability of each individual.

ARTEMIS Team's interactive Gantt chart helps you respond quickly to any change in priority or staff requirements. Using Team's integrated time sheet, you can easily track the progress and cost at any level—project, phase or activity.

Team's forecasting feature allows you to project future manpower and skills requirements, so you can quickly pinpoint staff overload and underload conditions.

Metier is the world leader in project management—and now resource management. ARTEMIS Team is the first comprehensive tool for computer-aided resource management and is available for the DEC® VAX® and 386-based PCs.

Put ARTEMIS Team to work on your team, and make your people—and yourself—stand out.

For information, return the coupon or call:

**1-800-777-7100.**

**CIRCLE 128 ON READER CARD**

**METIER**  
*Artemis Team*

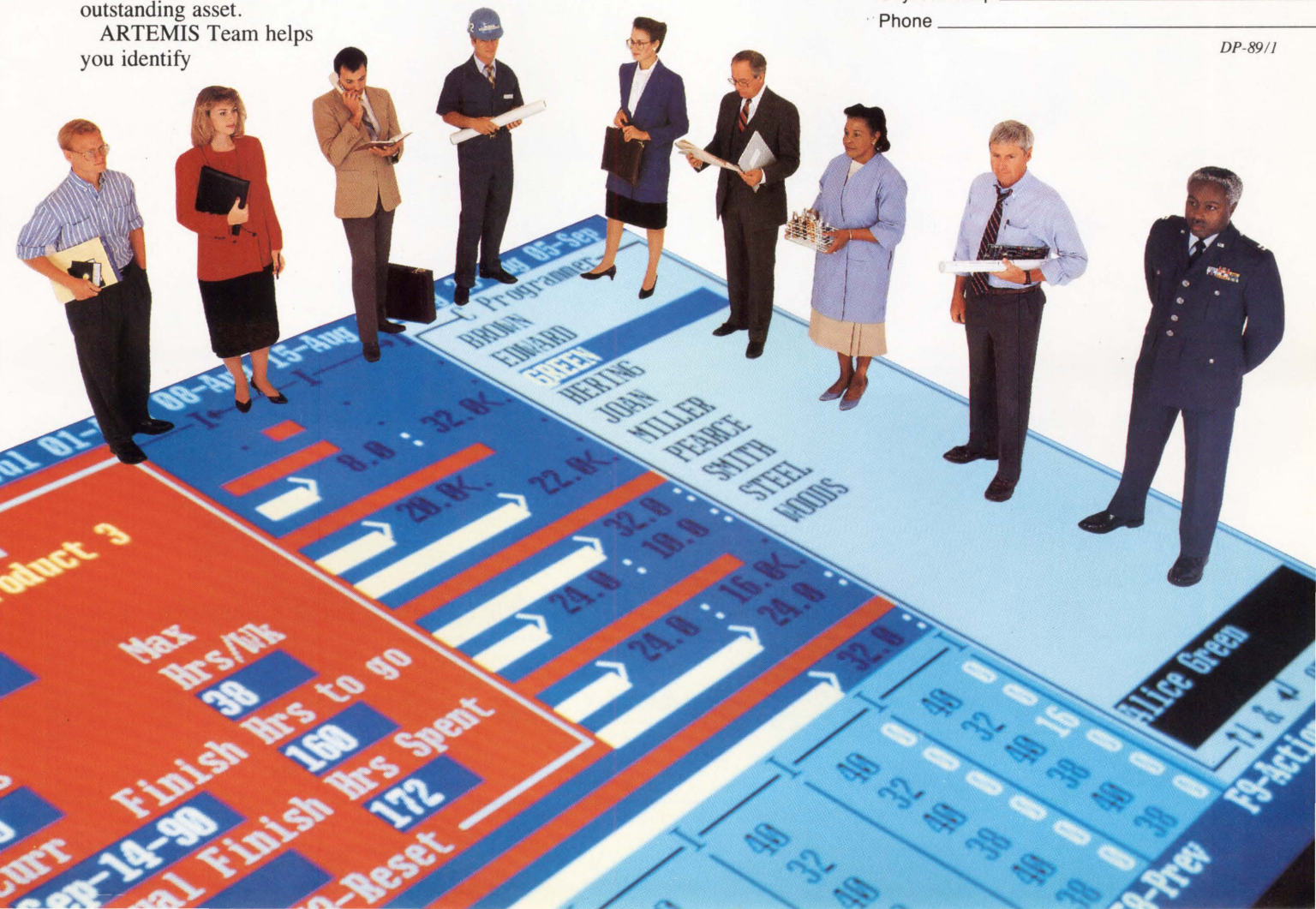
"First in computer-aided resource management."

ARTEMIS is a trademark of Metier Management Systems, Ltd. DEC and VAX are registered trademarks of Digital Equipment Corporation. Monitor courtesy of CompuAdd.

Return coupon to: **ARTEMIS Team; Metier Management Systems; 2900 North Loop West, Suite 1300; Houston, TX 77092.**

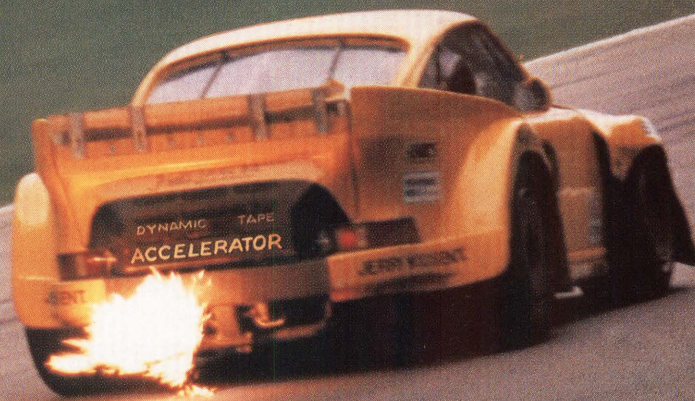
Name/Title \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City/State/Zip \_\_\_\_\_  
Phone \_\_\_\_\_

DP-89/1





# Accelerate Your Tapes To *STREAMING* Speeds!



Complete with  
sophisticated Tape  
Monitoring System (TMS)!

## DYNAMIC TAPE ACCELERATOR™

Have you ever watched the tapes on your tape drive try to *stream*? The tapes go back-and-forth and back-and-forth...*shoeshining* your data. Don't you wish these tapes would go *faster*?

Your wish has just come true...

Touch Technologies' Dynamic Tape Accelerator makes tape drives start...and then accelerate to full speed.  
*That's fast. That's streaming fast!*

With the Dynamic Tape Accelerator, all applications...all VMS utilities...and yes...even VMS backup finishes faster!

With this revolutionary software you'll see faster backup operations, less operator waiting time, and more system availability time. Dynamic Tape Accelerator is completely safe and 100% compatible with VMS backup. No DCL or application code changes are necessary.

Why spend two, three, six or more hours each day waiting for your slow tape drives to complete...when you could be accelerating your tapes to *streaming* speeds!

Experience the performance of high speed streaming for yourself! Order a Dynamic Tape Accelerator "Evaluation Kit" today! All orders are shipped Federal Express and come complete with a full graphic Tape Monitoring System (TMS), media, and documentation.

*Dynamic Tape Accelerator is available for all VAX/VMS-based tape subsystems.*

Contact Touch Technologies today at

**(800) 525-2527**



**TOUCH TECHNOLOGIES, INC.**

Dynamic Tape Accelerator is a trademark of TOUCH TECHNOLOGIES, INC.  
VAX/VMS is the registered trademark of Digital Equipment Corporation.

9990 Mesa Rim Road, Suite 220  
San Diego, CA 92121

(619) 455-7404 • FAX: (619) 455-7413

CIRCLE 165 ON READER CARD  
See us at DEXPO West Booth #200



1. It's difficult to test Ethernet performance for any class of situation. Setting up an office environment showed that short packets with lots of stations (more than 90 on one segment) close together was more efficient than the same number of stations far apart in clumps. Other studies have shown that this is a function of collision resolution issues: The closer the



**Ethernet Performance  
is a much-maligned and  
misunderstood subject.**



stations, the faster collisions are resolved and data resumes on the network. Therefore, even issues such as how far apart nodes are affect real network metrics.

2. Generating packets from one host to another for testing in a real environment requires premeasurement for each situation. Collection systems on an Ethernet generate predominantly short packets (64 bytes average) and therefore are easy to predict and measure. Larger, interactive networks generate many small packets (64 to 128 bytes) and occasionally larger ones (1 KB or more). But the interval for generation of short versus long packets varies greatly among networks and applications. Longer packets increase the efficiency of the network, keep the total packet count down and reduce the possibility of collisions. To understand a network, data has to be collected for a while to model the network properly and understand what the traffic size mix looks like.

3. Improperly built controllers that don't follow the rules cause network performance estimation to be inaccurate. This makes the network unfair and causes performance degradation in some networks.

4. Ethernet performance is one issue and network software protocol performance is another. The Ethernet channel can

handle up to 10 Mbps (a low number of systems with large packet sizes will demonstrate this). Few software packages were architected originally with Ethernet access issues in mind. As a result, Ethernet performance usually is good. The problem is with software overhead, interrupt latency, queuing problems and other issues on the host system. Some packages, such as DECnet, implement flow control. Other protocols don't, and they demonstrate completely different metrics. All have varying performance in Ethernet configurations, depending on a mass of variables.

**Performance Tips**

There are other, less-tangible Ethernet performance issues. Here are some suggestions for a high-performance Ethernet taken from my examination of recent live studies and my own experiments with a multisegment analyzer.

1. Keep packet lengths as long as possible. This reduces collision contention and reduces protocol overhead (more user bytes per protocol overhead per packet).

2. Keep cable lengths short and connect distributed systems with bridges or buffered repeaters, not bit repeaters. Divide your systems into functional groups, and keep the traffic localized to that segment for that group.

3. Keep systems close together. Closer systems require less time to resolve collisions and will decrease overhead on the network. A 500-meter segment requires about 10 microseconds for round-trip delay; a 23.4-meter segment requires vir-

tually no delay.

4. Ensure that vendors have followed the rules on such things as backoff timers and channel acquisition timing. An unfair network configuration doesn't perform consistently in a positive manner for all systems connected.

5. Keep the theme of the Ethernet to a particular class of application. Real-time doesn't mix with commercial applications. If mixed, the performance of both will suffer, especially under load.

6. Controllers should be able to buffer several packets at a time. The more buffering available, the better the performance.

7. Packet gapping may be an issue for some protocol types. If a high-speed system produces back-to-back packets between two systems on the Ethernet, the slower receiver may not have enough transition time between interrupts to capture the next packet on the network. By increasing the gap interval between packets, the link is slightly slower, but there may be fewer retransmissions, which increases network performance. Some software packages can adjust the packet gap between transmitted packets.

ETHERNET PERFORMANCE is a much-maligned and misunderstood subject. Don't confuse the problems of Ethernet performance with network software performance, queuing delay in operating systems, bus latency, bus contention or any of a group of possible problems that contribute to network performance and delays. Most important, don't get caught up in hype: Insist on performance fact. ■

**Readings On Ethernet Performance**

Boggs, David R., Mogul, Jeffrey C. and Kent, Christopher A. "Measured Capacity of an Ethernet: Myths and Reality." ACM Press, SIGCOMM '88 Symposium (Aug. 88), pp. 222-234.

Gusella, Ricardo. "The Analysis of Diskless Workstation Traffic on an Ethernet." UCB/CSD 87/379, Computer Science Division, U of Ca. at Berkeley (Nov. 87).

Schock, John F. and Hupp, Jon A. "Measured Performance of an Ethernet Local Area Network." Communications of the ACM 23, 12 (Dec. 80), pp. 711-721.

Takagi, Hideaki and Kleinrock, Leonard. "Throughput Analysis for Persistent CSMA Systems." IEEE Transactions on Communications COM-33, 7 (Jul. 85), pp. 627-638.



# Service Selections: DEC, TPMs And Self-Maintenance

Not long ago, maintenance services were exclusively the manufacturer's domain. Then came the independent third-party maintenance (TPM) industry, and now there's self-maintenance. The maintenance services provided by these industry segments can be divided into three major categories:

1. Preventive maintenance — performed on a scheduled basis.
2. Corrective maintenance — activated when necessary to return a system to full operational status.
3. Predictive maintenance — finding potential problems before they affect system performance in an attempt to achieve zero downtime.

## Perfect Fit

Each type of maintenance organization has its advantages. One type works better for some users, another works better for other users. Some users have switched back and forth looking for a perfect fit.

Buying external maintenance services from either Digital or a TPM means that you're freed from maintenance responsibility. Service costs are generally fixed (with contract service, you know how much maintenance will cost on a yearly basis), and employee turnover, training and direct and indirect expenses are the service vendor's problems, as are test-equipment costs, tools, diagnostics, spares, repairs and service calls.

OEMs and TPMs usually have large technical staffs and several levels of technical support backup. They may be more experienced in system maintenance and troubleshooting and better equipped to handle a variety of mixed-vendor equipment, with the necessary parts and docu-

mentation, than the self-maintainer.

On the other hand, the self-maintenance route gives you complete control over your maintenance program. After the initial investment, costs are generally lower for the same level of in-house service. Further, the in-house technician is more familiar with the equipment and system. Staffing, training, parts inventory and the service coverage day are set up according to your requirements.

Self-maintenance, however, doesn't mean 100 percent self-sufficiency. Digital, a TPM or a depot-repair facility can be used for backup service, technical training, spare parts kits or component/board-level repair tasks. Some depots and field service providers even supply remote troubleshooting support.

TRW's Customer Service Division provides an example of this type of end-user support. "TRW has specifically targeted the self-maintainer with a number of service products and support offerings," according to Sam Work, director of TRW's Training Center.

Most self-maintainers set up some sort of hybrid service program. Preventive maintenance, initial troubleshooting and first-level repair (usually limited to board replacement) are done in-house, with outside assistance for additional services and tasks. Complete self-maintenance just isn't cost-effective for most users.

## The TPM View

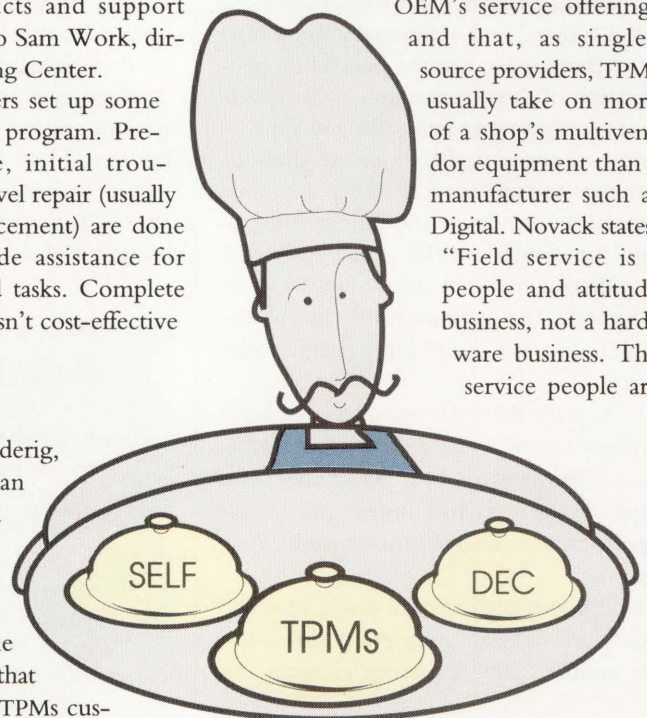
According to Joe Mulderig, president of Grumman Systems Support, a large TPM, one benefit of switching to a TPM is a 10 to 30 percent lower price for the same type of service as that provided by an OEM. TPMs custom-tailor service contracts to provide

single-source responsibility for the types of equipment at your site. Thus, you don't pay for more service than you need. You also can obtain uniform quality of service for the various types of equipment at your site, rather than varying quality from multiple service suppliers.

"How can any manufacturer provide an unbiased quality analysis of a competitor's product?" asks Andy Michuda, general sales manager at Control Data Technical Services Division (CDC), the largest TPM in the Digital market. The OEM uses service to gain control of an account, while a TPM offers an objective view and sees service as the end product, not a steppingstone to future sales, says Michuda.

Bert Novack, president of McDonnell Douglas Field Service, echoes these views. He also feels TPMs offer a more customized approach at less cost than the

OEM's service offerings and that, as single-source providers, TPMs usually take on more of a shop's multivendor equipment than a manufacturer such as Digital. Novack states, "Field service is a people and attitude business, not a hardware business. The service people are





# The advantage to our 8mm tape drive is written across our face.



1 9 9 0

digital review  
**TARGET AWARDS**  
N O M I N E E

**G**et the tape backup system that makes it easy to find out the facts. Our CY-8200 has a 2-line, 40 column LCD option that gives you *complete* status information. In easy-to-read, precise format, you see transfer rate, command under execution, unused tape in megabytes, and the ECC rate indicating backup integrity. No guesswork... just the facts.

**State-of-the-art helical scan technology.** You get all the advantages of advanced helical scan technology, operating speeds of up to 15 Mb per minute, 2.3 Gb of formatted capacity on a single 8mm tape, major time savings from unattended backup, and tremendously reduced media and storage expense. All at

*The industry's most advanced 8mm backup system.*



### True "plug and play" compatibility with...

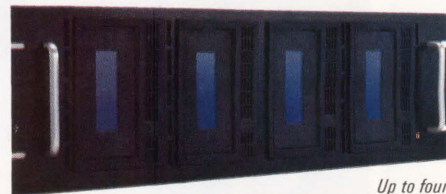
Alpha Micro	DEC	Prime
Altos	NCR	Pyramid
Apollo	PC/AT-MS-DOS	Sun
Data General	PC/AT-SCO Xenix	Unisys

...and more

an unsurpassed price/performance ratio.

**Total flexibility, total support.** The CY-8200 can be configured to meet all your site requirements. Choose from tabletop or 19" rack mounting options, hard disk combinations, and cable lengths up to 80 feet. The CY-8200 subsystems provide turn-key solutions for a wide variety of systems, such as true plug-and-play compatibility with direct interface to Pertec standard 9-track tape controllers.

And nobody matches our support. The CY-8200's full 12-month warranty includes unlimited technical support, direct from our in-house engineering and technical support group.



*Up to four CY-8200 drives can be mounted in our standard 19" rack.*

For full information on the CY-8200 high-speed, high-capacity, 8mm tape subsystem call us at (804) 873-0900.

CONTEMPORARY  
**CYBERNETICS**  
*Group*

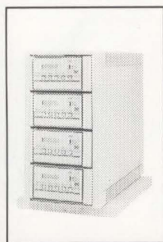
11830 Canon Boulevard  
Newport News, Virginia 23606  
(804) 873-0900  
FAX (804) 873-8836  
CIRCLE 234 ON READER CARD



# 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

CIRCLE 186 ON READER CARD



## Beat the system.

If lucky guesswork is your only defense against potential VAX®/VMS® system hardware failure, you're taking a big gamble.

You need a sure thing: Pro-Guard® and Rx-Link<sup>SM</sup> from ESS. Pro-Guard will monitor a system 24 hours a day, watching the error logs, sounding the alarm for developing hardware problems. Rx-Link takes it from there, with remote diagnostics and a telephone link to national technical support engineers...even automatic ordering of spare parts!

Call ESS at (414) 255-4634 for details...and don't delay. Because you never know when your number may be up.



Electronic  
Service  
Specialists Ltd.  
A Bell Atlantic Company

N 92, W 14612 Anthony Ave.  
Menomonee Falls, WI 53051  
(414) 255-4634 Fax: (414) 253-3262  
International Fax: (414) 253-3300

VAX and VMS are registered trademarks of Digital Equipment Corporation.  
Pro-Guard is a registered trademark and Rx-Link is a registered servicemark of Electronic Service Specialists, Ltd.

CIRCLE 380 ON READER CARD

backed up with tools and technology, but if the attitude is wrong, the customer isn't served."

"Customers want multivendor, multiservice capabilities," insists Bell Atlantic Customer Service President Michael Chamberlain. "That's what independents do best. Customer demands are complex and constantly changing. Independents have the flexibility to react to customer demand because they have built their business by servicing the products of many vendors."

The independent service provider should never lose sight of the fact that the user is concerned about who will service what equipment. This is an advantage for the TPM, thinks Chamberlain. "We must continue to emphasize our single-source capability across many vendor lines while maintaining an impartial stance on equipment selection."

"The TPM offers service on all add-on peripherals, thus broadening the purchasing options of the user," says Bryant Johnson, director of services at National Support Group. "For example, there may be 10 to 12 disk-drive products on the market compatible with DEC systems, but Digital may support only half of them."

Maintech, a successful Digital systems independent service company, provides an umbrella of services to its customers in addition to the standard field-service fare. Product-installation services, operating-system software maintenance and development and marketing of software-utility and applications products for the operations manager are the types of offerings Maintech and other TPMs provide that add value to the service dollar.

Frank D'Alessio, vice president and general manager of Maintech, states that the customer also wants a balance between the remote watchdog and the availability of on-site professionalism. Many OEMs oversell what can be done via remote analysis, getting away from the on-site FE concept, believes D'Alessio. TPMs are still willing to provide on-site FEs at a reasonable cost. Most believe there's only so much that can be done



# WHERE DO YOU GO WHEN YOUR PRODUCTS ARE NO LONGER ON DECK?



## 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 120 ON READER CARD



## Companies Mentioned In This Article

Bell Atlantic Corp.  
1600 Market St.  
Philadelphia, PA 19103  
(215) 963-6000  
CIRCLE 535 ON READER CARD

British Columbia Telephone Co. (BCTC)  
3777 Kingsway  
Vancouver, BC V5H 3Z7  
(604) 432-2151  
CIRCLE 568 ON READER CARD

Control Data Corp.  
8100 34th Ave. S.  
Minneapolis, MN 55425  
(612) 851-4131  
CIRCLE 534 ON READER CARD

Decision Data Service Inc. (DDSI)  
1 Progress Ave.  
Horsham, PA 19044  
(800) 654-DDSI  
CIRCLE 536 ON READER CARD

Efficient Field Service Corp.  
11 School St.  
N. Chelmsford, MA 01863  
(508) 251-7800  
CIRCLE 386 ON READER CARD

Grumman Systems Support Corp.  
90 Crossways Park W.  
Woodbury, NY 11797  
(800) 922-1225  
CIRCLE 569 ON READER CARD

Maintech  
1133 Avenue of the Americas  
New York, NY 10036  
(212) 827-2603  
CIRCLE 570 ON READER CARD

McDonnell Douglas Field Service Co.  
1801 E. St. Andrew Pl.  
Santa Anna, CA 92705  
(714) 250-1000  
CIRCLE 537 ON READER CARD

National Support Group  
17171 Park Row  
Houston, TX 77084  
(713) 579-6969  
CIRCLE 577 ON READER CARD

TRW  
Customer Service Div.  
15 Law Dr.  
Fairfield, NJ 07006  
(201) 575-7110  
CIRCLE 385 ON READER CARD

Unisys Corp.  
P.O. Box 500  
Blue Bell, PA 19424  
(215) 542-4011  
CIRCLE 538 ON READER CARD

via remote troubleshooting.

Keith Starliper, customer representative at Efficient Field Service Corporation states that, "With a TPM the customer gets a relationship of a different flavor. The user is much closer to the trained person who does the actual service on the account instead of mainly dealing with a dispatcher or other middleman."

Perhaps the best argument for using a TPM can be found in a sales pitch from Decision Data Service, an independent service provider primarily in the IBM market and now also in the Digital market. One of its brochures states, "Most equipment vendors' revenues are derived from sale of hardware. We generate revenue by providing service. So we have to be good at what we do. Others offer service because it helps sell hardware. We concentrate on service because that's our business: We do it because we want to. Who has a greater stake in keeping you up and running?"

### An OEM's Angle

Digital believes that independent maintenance suppliers' overstate their claim of being the only one-source solution. Digital can point to its long history of servicing mixed-vendor systems, network installation and support, as well as its Desktop Service Solutions and Enterprise Services as proof that it's fully able to handle all your servicing needs on Digital and non-Digital products.

Will O'Brien, corporate strategic marketing manager for Field Service, says that Digital takes a two-fold approach to supplying non-Digital product service. Digital site FEs are cross-trained on a variety of products and support almost all of the user's equipment on a Digital system or network. Digital also will call on vendors to supply a factory-trained FE (from either an OEM or a TPM) on products not supported by its staff.

As for providing better service on its equipment, who knows Digital products better than Digital, asks Nick Houpis, a Digital Field Service spokesperson. "We have invested heavily in advanced serv-

ice technologies like AI and expert systems and our Customer Support Centers. And we have over 27,000 service people worldwide to support our customers."

### Cases In Point

Technology Development Corporation, Arlington, Texas, builder of hardware and software test sets for government and military defense, recently switched from Digital field service to CDC, a TPM. Computer Center Supervisor David Baker reports that Digital did a good job but was expensive. Cost was the primary consideration for changing service vendors. "CDC was cheaper and, while no new or additional services were added with the change in vendors, its service window is a little longer."

Baker has placed four systems, all in the VAX 700 series, under contract to CDC and plans to add a VAX 6000 Model 210 in the near future. He admits initial concern about leaving the manufacturer. "We were worried about the quality of CDC's engineering staff, level of expertise, lack of remote diagnostic service, and ability to supply parts adequately. But we visited their facility and got a good feeling. There have been no major problems so far."

At TicketQuik, a division of Southland, Dallas, Maintech won out over Digital. TicketQuik placed four VAX 750s and three VAX 725s under a service agreement in April.

Dave Lam, software development manager, cites Digital's response time as the most important reason for the switch. "It was taking two to four hours for a technician to call us back, and then we had to wait for his arrival."

Since Maintech has been on-board, Lam states that response time has greatly improved. "Maintech FEs usually return our calls within 15 minutes. So far we have had only one late-night emergency. And the FE was at our site within 45 minutes of receiving our trouble call in the middle of the night."

Some users, however, switch from





**As exciting as a 3-ring circus...**

**NOW run 9 programs from one VT100, VT220 or VT320 Terminal!**

**W**ith Polestar Windows™ you can have as much activity going on as a 3-ring circus. You can have nine programs running at once from one VAX/VMS terminal. That's why users get so excited about the boost to productivity Polestar Windows provides.

Polestar Windows gives you so many exciting options that make your working environment more pleasant and productive!

- Like switching from one program to another simply by pushing a button.
- Like being able to leave whatever program you're working on and returning to it at exactly where you left off.
- Like working on one program while others are running in the

background, ready to replay their output when you are.

- Like having the option of concentrating on one program full screen or monitoring the progress of up to nine windows at a time.
- Like being able to arrange the windows to exactly suit your needs simply by using your arrow keys.
- Like setting up your work environment just once and then recalling it whenever you want. Your programs will load automatically with your windows as you arranged them.

All this without spending money on new hardware and without changing your software applications. You get the power of a windowing workstation at a fraction of the cost.

Only \$495 for the first terminal and 25% off for each additional terminal.

To order or for more information, phone toll-free:

**1-800-535-2389**

**Polestar  
Windows™**



by Polestar Software  
109½ W. Broadway  
Fairfield, IA 52556  
FAX (515) 472-4932

VT100, VT220, VT320, and VAX/VMS are trademarks of Digital Equipment Corporation.

**See us at DEXPO West Booth #3115**

CIRCLE 376 ON READER CARD



TPM service to Digital service. Baxter Dade Division, part of Baxter Healthcare, Miami, used Digital service for about five years, switched to a TPM for about one year, and now is back with Digital. Jerry Katz, manager of interactive computer services, says, "We left Digital for two main reasons: cost, and their refusal to cover third-party add-ons. We always

respected their quality of service, but their pricing was just too high and their attitude wasn't acceptable."

Another problem Baxter Dade had with its previous DEC service was constant FE changeover. With its TPM, Unisys, it had one FE for a year.

But Baxter Dade felt that, while the Unisys FEs were good at maintaining the

systems and knowledgeable about the equipment, the company didn't maintain a satisfactory level of parts inventory. As a result, it required more time to fix problems, because Unisys would repair the faulty unit rather than replace it, as Digital had. For this and other reasons, the company decided to give Digital another try.

According to Katz, the biggest advantage of going back to Digital was the ability to put all of its systems under one umbrella contract. With three VAX 6000 Model 300s, five 700-series machines and three MicroVAXs connected in Miami and in plants around the world, multiple service vendors weren't the way it wanted to go. "We didn't want to have several vendors servicing different pieces of equipment on a cluster. We didn't think any one TPM could handle it all, and some of the systems are still under warranty."

"We went back to Digital's service because they now seem to realize that they aren't the only game in town. They've brought their pricing structure down to competitive levels. And there seems to be an attitude change — their local field service office will now support our third-party add-on equipment to get our account," says Katz.

### Help Yourself

What about doing service yourself? Prince Rupert Grain (PRGL), Vancouver, British Columbia, has tried them all: Digital service, TPM service and in-house maintenance. The company has eight VAX 750s and 10 R81s at two locations.

According to systems manager Alex Yovanovich, "Originally, we left Digital's service arm because their FEs were usually unfamiliar with our older equipment. Their new people did well on newer hardware but didn't know our generation of equipment. When a technician came to our site, we more often than not had to help him sort out the problem. Also, DEC never seemed to have the needed part with them."

PRGL replaced Digital's maintenance with a local TPM, British Columbia Tele-

DEC/VAX

# "We Saved 53 Days On A 61 Day Project Thanks To S/COMPARE- HARMONIZER™"

#### Sound Unbelievable?

That is the actual experience of an S/COMPARE-HARMONIZER user as described in a leading industry publication. (We would be happy to give you more details.)

ALDON Computer Group's S/COMPARE-HARMONIZER is an easy-to-use software integration system that simplifies the process of applying custom changes to new releases of packaged software.

S/COMPARE-HARMONIZER users say it can save you 70% to 80% of the time your programmers have to spend on the tedious task of identifying custom changes and integrating them into new releases.

S/COMPARE-HARMONIZER is also advocated by programmers and auditors for the purpose of ensuring adequate change control. It provides you with a simple method to create documentation of all changes you make to source code.

ALDON Computer Group is an industry leader in producing software quality assurance and change management tools. The firm was founded in Oakland, California in 1980. Today, ALDON products are in use worldwide at over 1000 sites.

#### See For Yourself.

S/COMPARE-HARMONIZER can be as valuable to you as it has proven to be to so many other DEC/VAX users at their sites. Call us today for your free trial and then start planning what you will do with all the time you save.



428 13th Street  
Oakland, CA 94612  
(800) 825-5858  
(415) 839-3535  
FAX (415) 839-2894



# DEMAX DLB TUNES VAXES 1,000,000 TIMES A DAY AND SAVES MY SANITY EVERY HOUR.

It's no wonder that DEMAX's Dynamic Load Balancer (DLB) is the number one VAX tuner worldwide, tuning VAXes more than a million times a day.

Before DLB, I used to spend more time manually tuning my VAX for varying system demands, than I spent really managing systems.

You know the kind of situation, you've got lots of users running lots of small applications, a few users running a few big applications, and then everybody running everything.

And all the time I'd be going crazy, continually trying to balance the system load.

Then I discovered DEMAX's (DLB) system and my life hasn't been the same since. DLB checks on the performance of each of my VAXes about a thousand times a day, keeping them balanced and tuned.

It works without supervision and continually monitors system performance parameters; picking up on processes that cause bottlenecks, then balancing the system to handle more processes simultaneously and to significantly speed throughput.

And because DLB is covered by the DEMAX Pledge, they won't require changes to VMS to run, they stick to

DEC standards and if I have any questions I just call their customer support center and talk to experienced system managers.

Maybe that's why more than 1000 DEC system managers count on DLB to safely tune their VAXes over a million times a day.

To find out how DEMAX can help you, simply call, 1-800-283-3629 and request a free trial.

## DEMAX

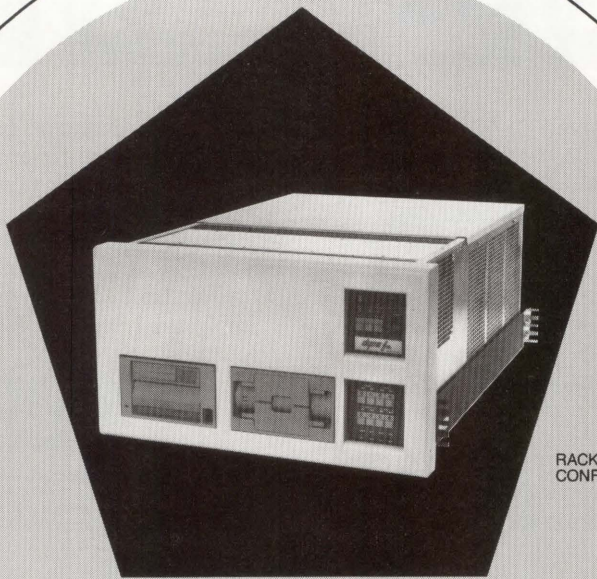
*System Software Solutions.*

Dynamic Load Balancer, DLB, DEMAX and DEMAX Software are all trademarks of DEMAX Software. DLB was developed by Touch Technologies, Inc., of San Diego. VAX and VMS are trademarks of Digital Equipment Corporation.



CIRCLE 344 ON READER CARD





RACKMOUNT CONFIGURATION

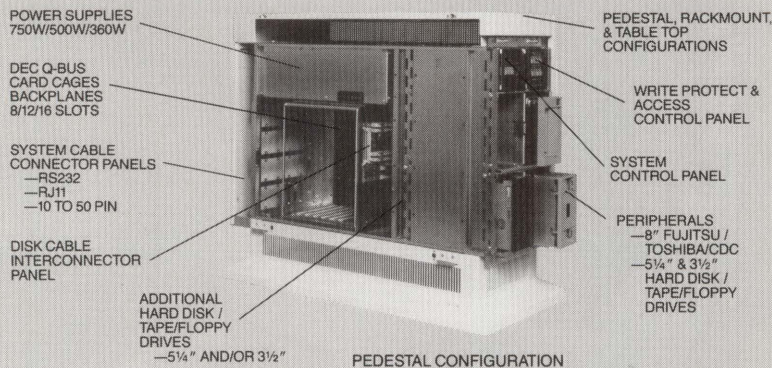
## DEC\* BA123\* Compatible Enclosure

- ◊ Mounting For Up To 5 Full Height 5¼" Peripherals
- ◊ 750 Watts Of Power To Support Up To 16 Slots
- ◊ Pedestal, Rackmount, and Table Top Configurations

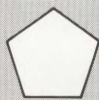
The SE105 enclosure furnishes system integrators and OEM's with a flexible alternative to the DEC BA123 enclosure.

Using the wide variety of standard Dyna Five peripheral mountings, power supplies, and accessory components, you can customize an enclosure to meet your specific requirements.

Call us today for more detailed information.



PEDESTAL CONFIGURATION



**dyna five**  
CORPORATION

See us at  
DEXPO West  
Booth #1813

173 Freedom Avenue ■ Anaheim, CA 92801  
(714) 525-8795 ■ FAX (714) 525-9310

\*Trademarks of Digital Equipment Corporation

phone (BCTC). "We were very pleased with their service and support. They provided us with superior service at about half the cost of what we were paying DEC. They also usually had the parts that were needed. The BCTC response time was good and our downtime showed significant improvement," states Yovanovich.

Yovanovich says another advantage of going to a TPM was the help provided in adding third-party equipment. The TPM turned out to be a good source of parts, advice and consulting.

But BCTC had problems with Digital. It had to stop competing in the service business to remain a reseller of Digital's equipment. When this happened, PRGL decided to go the in-house route.

PRGL is now in its second year of self-service and has found that downtime has decreased again. This isn't because service is better, but because it can take advantage of windows of opportunity in production time to schedule maintenance. Costs are so low they're unbelievable, says Yovanovich.

"We use outside help to repair boards when needed, but we've found it better to throw out bad boards and replace them. On the 750s, parts are cheap. We used to pay DEC \$2,000 per month for maintenance. This went down to \$1,000 per month with the TPM. We can buy a whole 750 and use it for spare parts for about \$2,500. That's cheap!"

Asked to summarize what advantages he's found in self-maintenance, Yovanovich says, "Service has improved now that it's in-house. This isn't a slight on Digital or the TPM, it's just an advantage you gain when you can schedule your preventive maintenance and downtime around your production time and have the service people standing by. And parts availability is never a problem. By stocking our own, we can access them quickly."

The only drawback Yovanovich has noticed in the self-maintenance endeavor is that Digital salespeople don't call much anymore. So PRGL must find out for itself what's coming in Digital hardware and software. ■



# ARCHIVE\*SQL

## The Perfect Solution

### For An Overworked Database

#### ARCHIVE\*SQL is the Data Archiving/ Retrieval Solution built specifically for your Oracle database.

Over the years your database has become loaded down with hundreds of tables and data elements, packed with thousands of records, accessed by multiple Oracle applications. Your database has slowed down. Functionality isn't what it should be. Managing and protecting critical data has become a nightmare. All this is costing you time and money. You need ARCHIVE\*SQL, from Computertime.

ARCHIVE\*SQL is the software solution to a cluttered, overloaded, slow-running database.

ARCHIVE\*SQL is a total data, file, and media management facility that saves you time by automating your archiving/retrieval operations. It speeds up the system by allowing you to free-up space within your database by removing infrequently used data elements, records and tables. It saves you money by letting you selectively store them on less expensive media such as tape or optical disk.

ARCHIVE\*SQL is much more than just a backup system. ARCHIVE\*SQL allows you to store any portion of your database, and any combination of data elements you want. You control everything... what to store, where to store it, and for how long. And it's easy to do because the same SQL language used with the Oracle database is used to specify archiving and retrieval operations.

End-users, database administrators, and application developers have total control over archiving and retrieval requests. You can make ad-hoc requests at any time, or schedule repetitive archiving/retrieval procedures just once.



ARCHIVE\*SQL allows system managers, and operators, detailed execution control, and frees-up their time for other important tasks. Operator intervention may even be reduced to simply the physical mounting of the media on which the data is to be archived, or retrieved. ARCHIVE\*SQL automatically knows the format to store the information in, and on which media to store it. It even handles off-site archive media management, selection and tracking automatically.

ARCHIVE\*SQL catalogues all archiving/retrieval operations so you always know what is stored, where it is, and what has happened to your data at all times. You can even add comments to the on-line catalogue. Of course the catalogue is stored in your Oracle database.

ARCHIVE\*SQL protects your data against accidental loss, theft, or unauthorized intrusion. Multiple encryption techniques, including DES, are provided as standard features. A unique feature of ARCHIVE\*SQL allows you to link your own encryption routine to the system for even greater security.

ARCHIVE\*SQL can automatically make additional copies of all archived data on different media. If data is lost recovery is automatic. Even the on-line catalogue can be totally rebuilt.

ARCHIVE\*SQL data compression features can save money by greatly reducing the amount of storage media required. You can even add your own compression techniques to ARCHIVE\*SQL.

ARCHIVE\*SQL is powerful, flexible, and easy to use. Menu, or command line context-sensitive help facilities are standard.

**Best of all,**  
**ARCHIVE\*SQL works**  
**with ALL your**  
**standard**  
**NON-ORACLE files**  
**as well.**

ARCHIVE\*SQL is a tool that gives you the control over data you've always wanted.

DON'T TAKE OUR WORD FOR IT!  
SEND FOR A TRIAL COPY OF ARCHIVE\*SQL TODAY.  
CALL (514) 633-9900 OR WRITE:

COMPUTERTIME NETWORK CORPORATION  
10340 Cote de Liesse  
Montreal, Quebec H8T 1A3  
Tel: (514) 633-9900  
Fax: (514) 633-9886

ORACLE is a registered trademark of Oracle Corporation

COMPUTERTIME

CIRCLE 167 ON READER CARD

5401 Eglinton Ave. W. Suite 115  
Toronto, Ontario  
M9C 5K6  
Tel: (416) 622-4070  
Fax: (416) 622-4054







mand procedure contains a novel twist: It displays the directory name at the bottom of the terminal screen in reverse video, making navigation far easier. (See Figure or SETDEF.DOC in the DCL download area of ARIS/BB.)

More important, the .COM file shows how to use terminal-escape sequences. This code can be dropped into other procedures without much effort.

If you want to make the DCL a tad more elegant, consider using the F\$FAO lexical function instead of the fixed space strings contained in the file.

### ALL-IN-1 For The Poor

Bill Bailey, manager of academic and administrative systems at North Carolina A&T State University, passed along a DCL menu system modeled after ALL-IN-1.

Although the code is too large to publish, we've placed PMA-1 (Poor Man's ALL-IN-1) in the DCL download area of ARIS/BB for those of you looking for a way to manage users who aren't familiar with the normal VMS DCL environment. The component procedures and documentation are in one large file named PMA.DOC.

Bill is very active in VAX teleconferencing. He frequents the FidoNet VAX area and USENET's info.vax conference and even runs his own BBS in which he offers support for PMA-1.

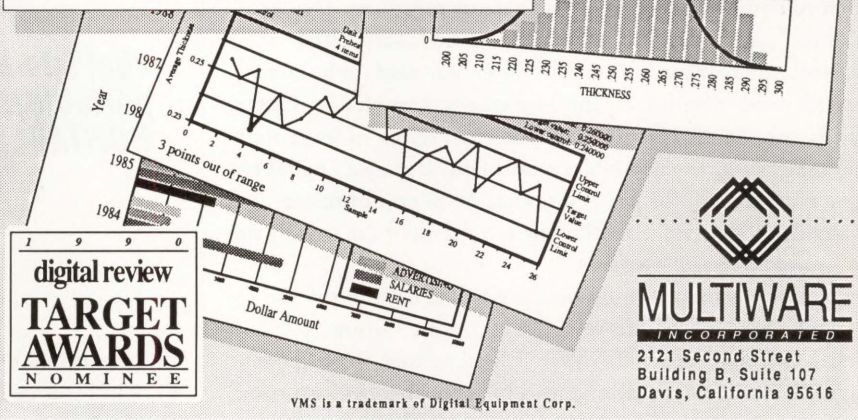
FOR AN "I LOVE DCL" sticker (the supply is dwindling) or a copy of a listing of all DEC-related FidoNet public bulletin-board systems in the U.S., send a self-addressed, stamped #10 business envelope to DCL Sticker and/or BBS List, Kevin G. Barkes Consulting Services, 4107 Overlook St., Library, PA 15129. You also can get the BBS list by downloading it directly from my SYS\$OUTPUT BBS, (412) 854-0511. The system supports 1,200 and 2,400 baud and is available 24 hours per day. Look in the "new uploads" area. — *Kevin G. Barkes is a Library, Pennsylvania-based independent consultant specializing in VAX systems software, management, tuning and training, as well as commercial database publishing systems.*

## New Graphics Package!

### Announcing PREP

- **EASY TO USE** - learn to make charts like the ones shown here in minutes
- **HIGH QUALITY** - This ad was produced by PREP exactly as you see it
- **INEXPENSIVE** - List price for a single VMS CPU license: \$1500 to \$4000

Call 1-800-522-0202 for more info  
(In California call 916-756-3291)



VMS is a trademark of Digital Equipment Corp.

CIRCLE 268 ON READER CARD

## 2 PM SUNDAY. The Steaks Were Sizzling And The VAXes Were Frying

One sultry Sunday while the gang was firing up the barbecue, the temperature in the computer room was quietly rising to 120 degrees. By Monday, hardware, software, and customer services were cooked.

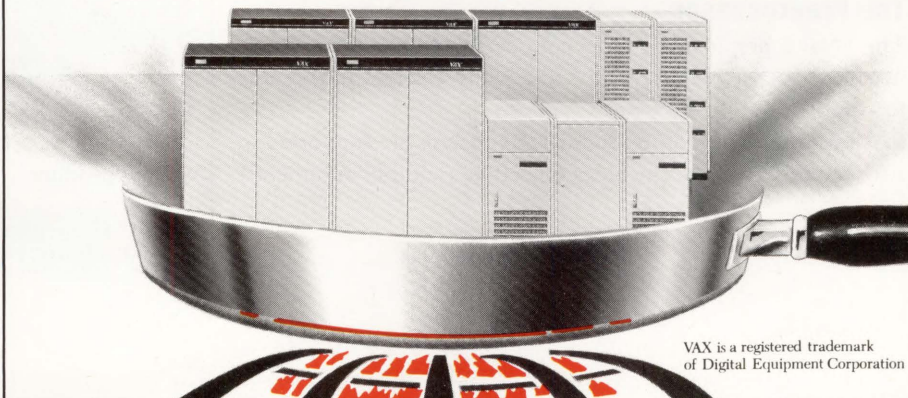
If you'd rather not take the heat you need SAM, the intelligent 24-hour protection system. SAM is uniquely designed to monitor computer room conditions, detect problems in temperature, power, water and more, and alert users.

Only SAM can automatically perform a graceful and orderly computer shutdown to maintain data integrity and prevent hardware damage.

Before you reach the boiling point, call Intra Computer at (212) 947-5533 and find out about SAM.

**INTRA**  
COMPUTER INC.

875 Ave. Of Americas New York, NY 10001 (212) 947-5533 Fax: (212) 947-5984



VAX is a registered trademark of Digital Equipment Corporation

CIRCLE 169 ON READER CARD



## LET'S C NOW

Rex Jaeschke

# VAX C V3 And The ANSI Standard, Part 2

*Editor's note: In Part 2 of a two-part series, C Editor Rex Jaeschke examines how Digital's new VAX C compiler stacks up against the proposed ANSI C Standard.*

Before commenting on VAX C's status regarding ANSI conformance, some qualifying remarks are necessary. First, as of press time, there wasn't a final ANSI C Standard, although it's expected soon. Second, to the best of my knowledge, Digital has made no claims verbally, in its manual set or in its promotional material of being ANSI-conformant. Because Digital has no real competition for its C compiler, ANSI conformance (real or imagined) isn't yet a marketing requirement (as it is in the very competitive DOS world.)

Digital is well-represented on the ANSI C committee and on the newly formed Numerical C Extensions Group (NCEG), which I founded earlier this year. I believe that VAX C eventually will be ANSI-conformant. This probably will be soon, because the POSIX standard points to the C standard, and government contracts soon will require POSIX conformance, if they don't already. It's a matter of having development resources, a set of delivery priorities and, most important, a formal government validation suite from the National Institute of Standards and Technology (NIST). There will be no such suite until sometime after the final Standard is accepted by ANSI.

## Compiler Options

The only option that approximates ANSI mode is `/STANDARD=PORTABLE`. This warns about a lot of situations that really are errors in strict ANSI mode. The most common is the mixing of pointers and integer types and the mixing of pointers to one type and pointers to another, including different levels of indirection. According to ANSI C, this only can be done via an explicit cast. So if you plan to develop code that's to be ANSI-compliant (maximally portable), you'd better use `/STANDARD=PORTABLE` religiously and take notice of the output produced.

## The Preprocessor

The ANSI C preprocessor varies considerably from existing products, and VAX C will have to make many changes in this area to conform.

- At least the required minimum 1,024 macros are supported in a source module. This includes objectlike (without arguments)

“  
**...if you plan to develop code that's to be ANSI-compliant (maximally portable), you'd better use `/STANDARD=PORTABLE` religiously and take notice of the output produced.**  
 ”

and functionlike (with arguments) macros.

- Logical source lines up to the required 509 characters are supported.
- The minimum 31 macro arguments are supported.
- Macro recognition has a bug not related to ANSI C. It violates K&R. Consider the following (perverted but legal) example:

```
#include <stdio.h>

#define M1() test()

main()
{
    int (M1());    /* valid declaration */

    M1();    /* macro call */
    (M1()); /* NOT a macro call */
}

test()
{
    printf("Inside function test\n");
}

/* the following function definition is valid since
(declarator) is the same as declarator on its own. */

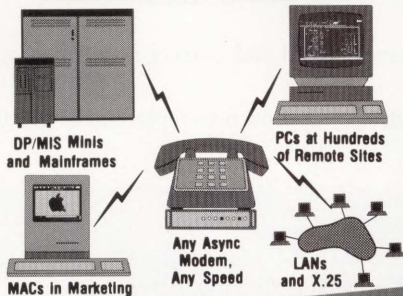
(M1)()
{
    printf("Inside function M1\n");
}
```

should produce:

```
Inside function test
Inside function M1
```



# BLAST Complete Communications, ONE Software Package.



**NEW! Remote Control**

PC, MAC, UNIX, XENIX, VAX, and more. Link 30 popular operating systems. Connect and manage file transfers around the office or around the world.

#### RIGHT OUT OF THE BOX

Use regular modems, V.32, new high speed modems, X.25, LANs . . . BLAST links them all.

#### FOR INSTANT NETWORKS

Link two computers or 2000 . . . with

- One easy, identical interface
- One set of commands
- One powerful script language
- One reliable program

#### WITH ALL THE FEATURES

- Bulletproof file transfer
- Terminal Emulators - VT 100/220, etc
- Scripting for customized routines
- PC to PC Remote Control
- Fully automated operation
- Unbeatable noise resistance

#### API HOOKS TO LINK BLAST TO YOUR PROGRAM

- Over 50,000 users worldwide
- Top-Notch technical support

**Call 800-24-BLAST**

APPLE	MACINTOSH
IBM PC-XT, AT, PS/2	MS-DOS, SCO XENIX, UNIX V
UNIX Systems	UNIX V.3, 4.2, 386
DEC	VMS, RSX, RT-11, ULTRIX
DATA GENERAL	DOS, MPOS, RDOS, AOS/VS
HARRIS	VOS, UNIX, XENIX
HEWLETT-PACKARD	MPE, RTE, UNIX
IBM	VM/CMS/MVS/TSO
PRIME	PRIMOS
UNISYS	BTOS, CTOS, UNIX
WANG	VS OS, MS-DOS
. . . plus many more	



## BLAST

Communications Research Group

5615 Corporate Blvd. • Baton Rouge, Louisiana 70808

**800-24-BLAST (504) 923-0888**

CIRCLE 174 ON READER CARD

# For A Fast DBMS Call RAIMA And Start Screaming.



db\_VISTA III combines relational with network model database technology for building applications that are so fast - *they scream!*



Quickly develop faster applications...*15 times faster retrieval than a relational DBMS alone!*\*\* db\_VISTA III remains fast, even when application size and complexity increase.

For greater programming flexibility, productivity, portability and high performance...Call for db\_VISTA III and start building applications that *scream!*

**1-800-db-RAIMA** (That's 1-800-327-2462)

db\_VISTA III is the choice of C programmers worldwide, including APPLE, ARCO, AT&T, EDS, Federal Express, Hewlett-Packard, IBM, NASA...

**db\_VISTA III Specifications:** Single & Multi-user. Automatic recovery. Automatic referential integrity. Relational B-tree indexing. Network Data Model. Relational SQL query and report writer. Complete revision capability. PRO-C code generator. Complete C source code is available. No Royalties.

**Operating systems\*:** VMS, UNIX, BSD, QNX, SunOS, XENIX, MS-DOS, MAC, MS Windows, OS/2 compatible. **Most C Compilers supported.** LANs\*: 3COM, Novell, Banyan, Appleshare

\*\*Call for the benchmarks. \*Other environments supported; call for complete list.

**db\_VISTA III**™  
Database Development System



D  
P  
11  
9

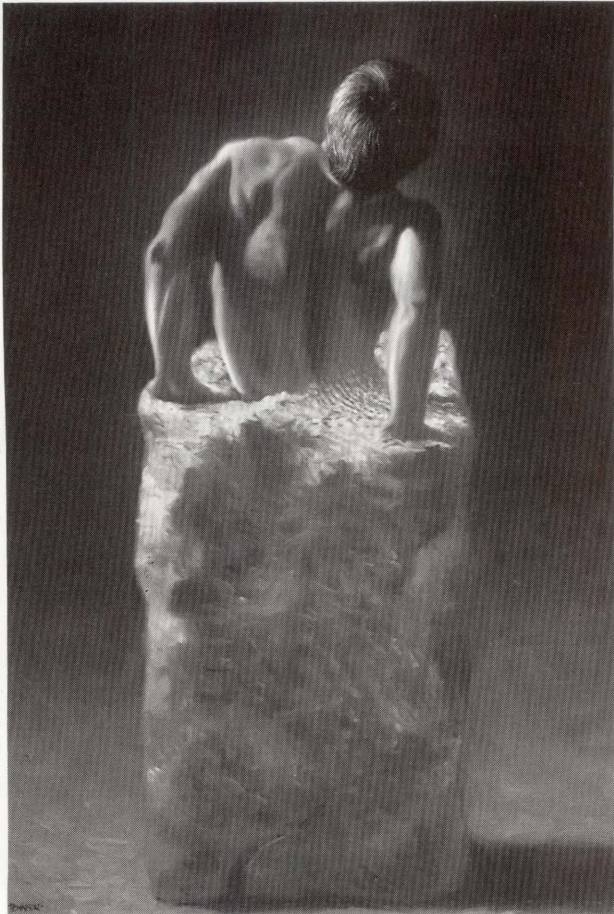
**RAIMA**™  
CORPORATION

Raima Corporation 3245 146th Place S.E., Bellevue, WA 98007 USA (206)747-5570 Telex: 6503018237 MCI UW FAX: (206)747-1991 Texas: (214) 231-3131 International Distributors: U.K.: (0992) 500919 Germany: 07127/5244 Switzerland: (01)725 0410 France: (1)46092828 Benelux: 31(02)15946 814 Sweden: (013)124780 Italy: 045/584711 Norway: 47 244 88 55 Denmark: (2)887249 Singapore: 468 3888 Australia: (02) 959 5122 Japan: (03)473 7432 Taiwan: (02)511 3277 Mexico: (83) 57 35 94 Brazil: (0192) 52 9770 Colombia: 57 1 218 9245 Argentina: 54 1 313 5371 Chile: 56 2 696-4308 Uruguay: 92 19 37 Caribbean: (809) 834 4069 Central America: (506) 28 07 64 © Copyright Raima Corporation 1989

CIRCLE 258 ON READER CARD



# Graphic Outlook Breaks the Spreadsheet Mold



## Finally a VAX Spreadsheet that Lets You Take Control

**You're in charge** . . . Graphic Outlook breaks the mold and for the first time lets System Managers regulate the number of simultaneous spreadsheet users on the VAX. And thanks to our bidirectional gateway to Lotus, users can choose to work either on the VAX or PC.

**It's easy** . . . Graphic Outlook takes Lotus users only 10 minutes to learn – yet it's incredibly powerful (65,535 rows & columns, over 100 functions).

**Our graphics are unsurpassed** . . . you'll be amazed. And our limited-use licensing fees will save you money.

**So what are you waiting for?** Just call for our Demo Kit. Try Graphic Outlook today. Take control tomorrow. (805) 968-3838



See us at DEXPO West Booth #511  
**Stone Mountain Computing**

42 Aero Camino, Suite 209, Goleta CA 93117

Lotus is a registered trademark of Lotus Development Corp. VAX is a registered trademark of Digital Equipment Corp.

CIRCLE 246 ON READER CARD

A call to a macro with arguments requires the source token immediately following the macro name to be a left parenthesis, but it isn't. Therefore, no call to that macro should be detected. However, VAX C incorrectly produces a diagnostic as it attempts to recognize a macro call that's improperly formed.

Of course, this is a minor glitch, because calling a macro and a function version of the same thing in the same scope is probably bad style.

- Macro calls must have a fixed and correct number of arguments as required.
- VAX C uses the UNIX pcc approach to replacement in strings in macros, as follows:

```
#include <stdio.h>

#define PR1(arg)      printf("arg = %d\n", arg)
#define PR2(x)       printf("character = >%c<\n", 'x')
main()
{
    int total = 100;
    int value = 200;

    PR1(total);
    PR1(value);

    PR2(a);
    PR2(b);
}
```

An ANSI compiler should produce the output:

```
arg = 100
arg = 200
character = >x<
character = >x<
```

VAX C produces:

```
total = 100
value = 200
character = >a<
character = >b<
```

ANSI outlaws this behavior because a source token can't contain another source token. Because a string literal and a character constant are tokens, they can't be considered to contain formal parameter names. Because this practice is widespread and useful, ANSI provided the stringize preprocessor operator (#) instead. VAX C doesn't support this operator yet.

- The following non-benign macro redefinitions are accepted but should be rejected:

```
#define MACRO1 10
#define MACRO1 20          /* error */

#define MACRO2(a, b) (a, b)
#define MACRO2(a, b) (b, a) /* error */

#define MACRO3 10
#define MACRO3(a) a        /* error */
```



# INTRODUCING THE TERMINAL SERVER YOU THOUGHT DEC WAS GOING TO ANNOUNCE.

## 16-Port DECserver Due This Summer; Uses LAT, TCP/IP

MAYNARD, Mass. — DEC is slated to announce this summer a 16-port terminal server that supports both LAT and TCP/IP, according to sources.  
The introduction of the DECserver 300

### The MAXserver 1000 Series.

You thought DEC™ was going to deliver both LAT™ and TCP/IP in the same 16-port box. And you thought it was going to be priced very affordably.

Well, DEC didn't do it. But Xyplex®, the leader in multi-protocol communication servers, did. Introducing the MAXserver™ 1000 Series. It's got every feature you were hoping for. Including LAT and

TCP/IP, and a great price. Plus it's got a lot of other features DEC never even dared to offer:

- An incredibly compact package that's 1/3 the size of the DECserver™ 300.
- A network connection that can tell whether it's thickwire or ThinWire™ and adjust automatically.
- A self-loading version that's host-independent so your VAX™ works less.
- All with Xyplex's 3-year warranty, the best in the industry.

And in case you want just LAT after all, we've still got DEC beat. The MAXserver 1000 Series includes a LAT-only version. For hundreds of dollars less than DEC. And with the ability to grow into TCP/IP later.

So if you want the industry's best 16-port terminal server, forget DEC. The real news is at Xyplex. To learn more, call our toll-free number today. Or write Xyplex, Inc., 330 Codman Hill Road, Boxborough, MA 01719.

**1-800-338-5316**



Xyplex



■ The new token pasting preprocessor operator (**##**) isn't supported. Instead, the old UNIX approach of treating **a/\*\*/b** as the token **ab** is followed. ANSI C requires a comment to be replaced by one space rather than no space.

■ Understandably, the predefined macro **\_\_STDC\_\_** isn't, because the compiler doesn't claim to be ANSI-conformant. Many compilers are defining **\_\_STDC\_\_** to be 0, and this has created a stir among vendors and developers. The attitude is that if you're not conforming, don't define **\_\_STDC\_\_** at all, rather than define it with a non-standard value. A conforming implementation sets **\_\_STDC\_\_** to 1.

■ The preprocessor seems to handle the notion of allowing directives to be broken at any point using the backslash/new-line notation. However, one situation wasn't handled correctly. For example:

```
#define M7 \  
1000  
  
#define M\  
8 1000  
  
#define \  
M9 1000      /* VAX C rejected */  
  
#def\  
in\  
e M10 "The quick brown fox"
```

ANSI C permits any source line to be so continued, allowing even keywords, identifiers and operators to be broken over multiple lines. This mainly is to allow for machine-generated code and isn't intended to let humans write code in this way.

■ ANSI requires that when a macro definition refers to itself directly or indirectly that it not recurse. For example, in:

```
#define f() (a(), f())
```

the macro expands to a function call, not to another (indefinite) macro call. VAX C recursively evaluated macros until a predetermined stack overflow occurred, in which case it stopped and produced an error message.

■ The predefined macros **\_\_DATE\_\_**, **\_\_TIME\_\_**, **\_\_FILE\_\_** and **\_\_LINE\_\_** are defined and have the correct format. They can't be the object of an **#undef**.

■ The preprocessor (incorrectly) insists that the **#** in directives be in column 1. However, it does permit horizontal white space between the **#** and the directive name as required.

■ Extraneous tokens following directives on the same line are correctly diagnosed and not ignored.

■ There's a problem in the "phases of translation" regarding token recognition. For example:

```
#define DBG /\n*\n\nf()
```

```
{  
DBG      printf("test\n"); /*...*/  
}
```

should produce an error but doesn't. The definition of **DBG** is required to be seen as the start of a comment that doesn't end until the second to last line.

■ A comment was (incorrectly) allowed to be started in one file and ended in another (via **#include**). However, attempting to continue logical lines across headers was diagnosed correctly.

■ The **sizeof** operator isn't recognized in **#if** expressions. ANSI C permits this but doesn't require it.

■ Enumerations constants, casts and floating-point constants are prohibited correctly from **#if** expressions.

■ Division by zero in **#if** expressions produces a warning and True is assumed. This is a quality-of-implementation issue.

■ The preprocessor operator **defined** is accepted in both forms (with and without parentheses) as required. Note that **defined** is *not* a keyword. The only restriction on its use as an identifier is that you can't have a macro by that name in an **#if** expression, because it will be interpreted as the operator.

■ The **#elif** directive is supported.

■ The minimum eight levels of conditional inclusion (e.g., **#ifdef**) are supported.

■ ANSI C requires that a matching set of **#if** and **#endif** directives (possibly with **#else** and **#elif**) must be in the same source file. They can't be nested in headers. VAX C requires this of **#if** and **#endif** but not **#else**.

■ The new style **#include MACRO\_NAME** directive is supported. However, **MACRO\_NAME** is required to expand to the **<...>** or **"..."** form first.

■ The standard headers are protected properly from being preprocessed more than once, and they can be included in any order. One exception is **assert.h**, which is permitted to be included many times and do different things each time.

■ The minimum eight levels of nested headers are supported. In fact, at least 20 levels were accepted.

■ The **#error** directive isn't supported yet, but you still can use it to produce the same effect. After all, it's supposed to force a diagnostic, and that's what you get whether it's supported or not.

## The C Language

■ Concatenation of adjacent string literals isn't supported yet. This will be useful when the stringize preprocessor operator **#** is available.

■ Bit-fields are permitted in unions without first being inside structures, as permitted.

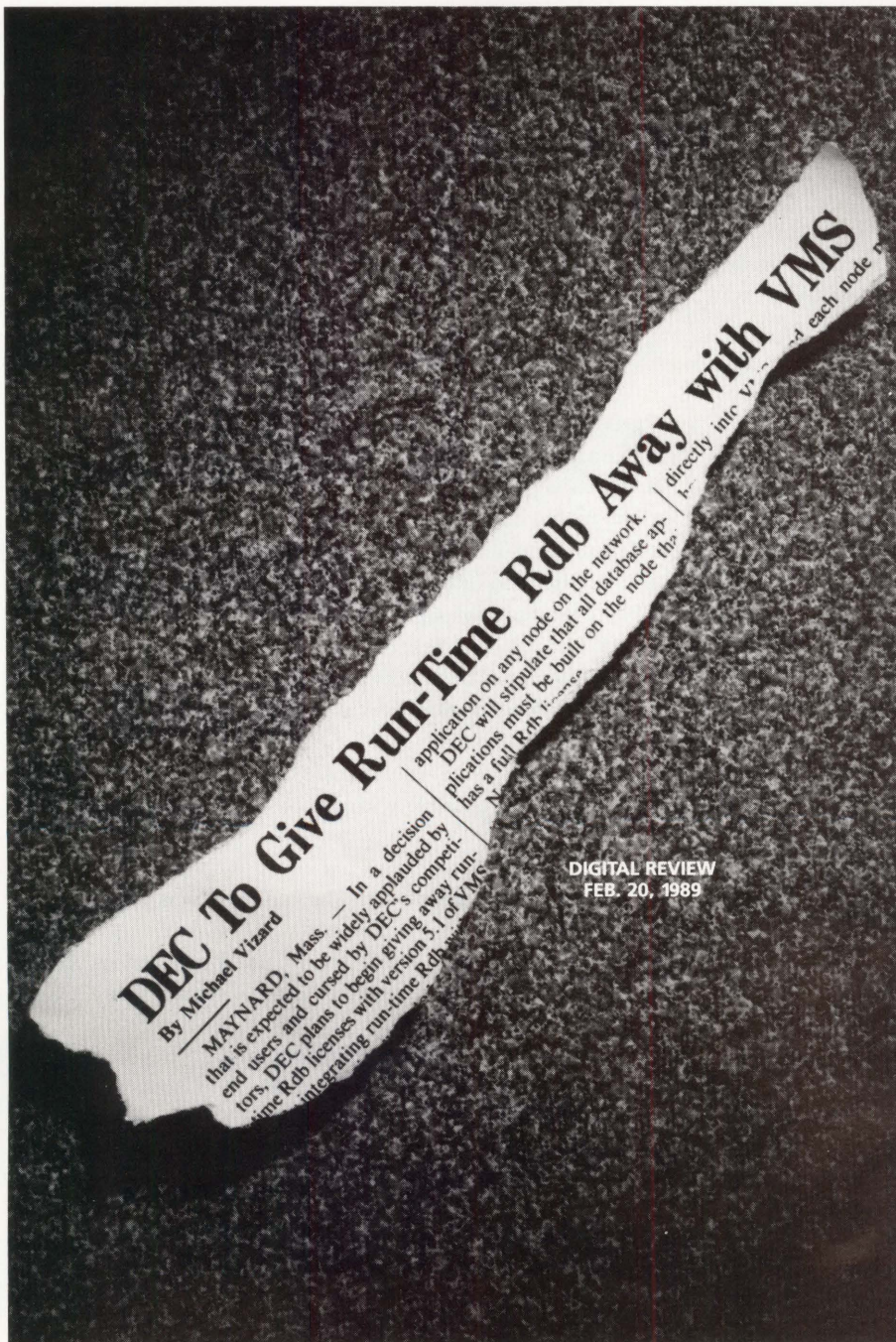
■ Automatic aggregates can have initializer lists.

■ **const** and **volatile** are supported.

■ The new keyword **signed** isn't supported.



# Rdb and FOCUS 4GL: One is free, the other pays for itself.



Now that runtime Rdb is free\*, you need an application development system to make it work. FOCUS 4GL is the perfect complement to Rdb because FOCUS pays for itself in a fraction of the time of any other VAX application development product. Whether you need a transaction system to create and maintain Rdb data, or a decision support system with reporting, graphics, statistics, and spreadsheet, only FOCUS gives you a complete solution for all your Rdb applications.

#### COMPLETE APPLICATION DEVELOPMENT FACILITIES

FOCUS comes with a complete development toolset ready to work with Rdb. In addition to code generators and user-oriented screen and window painters, the FOCUS data management language lets you complete your application without having to rely on COBOL, C, or other 3GLs. And since FOCUS for VAX was designed for your VAX system, it is DSRI-compliant and works with ALL-IN-1, CDD/Plus, DECwindows and CIT products.

#### APPLICATION CONNECTIVITY AND PORTABILITY

FOCUS gives you access to all structures permitting you to load your Rdb tables directly from RMS or DBMS files as well as any other database on your VAX or IBM mainframe. And of course, all FOCUS applications are portable between VAX and IBM mainframe, UNIX workstations, HP, Wang, and PC. Your users can even have access to all IBM mainframe databases like IMS and DB2 without ever leaving the VAX.

#### RECOGNIZED #1 VAX 4GL

FOCUS for VAX was recognized as the best 4GL by the readers of *Digital Review* winning the prestigious Target Award in 1989. We've also been recognized by Digital as a Cooperative Marketing Program (CMP) participant since 1985. IBI offers local help-line, national hotline, education, and consulting services from 50 offices worldwide to insure your success with FOCUS.

For more information on FOCUS for Rdb, write Information Builders, Inc., 1250 Broadway, N.Y., N.Y. 10001. Or call (212) 736-4433, Ext. 3700.

\*Rdb runtime only license is packaged with VMS. Media documentation and services are sold separately.

**digital**™ Cooperative Marketing Program

**FOCUS**  
Information Builders, Inc.

This advertisement refers to numerous software products by their trade names. In most, if not all cases, these designations are claimed as trademarks or registered trademarks by their respective companies.

CIRCLE 235 ON READER CARD



- Unions can't have an initializer.
- **long float** still is accepted as a synonym for **double**.
- The **long double** type isn't supported, although the floating-point suffix **L** (and **l**) are (but then are interpreted as **double** anyway).
- The new floating-point constant suffixes of **L** (and **l**) and **F** (and **f**) are supported.
- The new unsigned integer suffix **U** (or **u**) are supported and can be used with **L** (or **l**) in the eight possible combinations of order and casing.
- Trigraphs aren't supported yet.
- The new-style function declarations and definitions are supported and can cause different code generation as permitted. For example, **floats** aren't widened to **double** in the presence of a prototype containing **float**. However, **chars** and **shorts** continue to be widened to **int** because of the longword alignment requirement of the stack.

## The Run-Time Library

All of the dummy identifier names in prototypes have non-standard names. Implementers are required to start their private names with either two underscores or an underscore and a capital letter. For example, the prototype for **sqrt** must be:

```
double sqrt(double __x)
```

or:

```
double sqrt(double _X)
```

but not:

```
double sqrt(double x)
```

because a programmer also is permitted to have a macro by the name **x**.

### assert.h

- The **assert** macro is supposed to be a **void** expression, but it isn't. It currently expands to a statement rather than an expression and is limited in how it can be used.

### ctype.h

- **ctype.h** contains the non-standard macros **isascii**, **\_tolower** and **\_toupper**.
- The prototypes for **toupper** and **tolower** incorrectly specify a **char** argument. It should be **int**.
- There appear to be no function versions of the **is\*** routines in the library, only macros. There are no prototypes for them. ANSI C requires function versions and, optionally, safe macro versions.

### errno.h

- Numerous extra **errno** macros of the form **E\*** are supported

as permitted.

- **errno** is defined as a global **int** as permitted. ANSI C also permits it to be a macro expanding to a modifiable lvalue expression.

### float.h

- This header is completely conforming.

### limits.h

- This is almost conforming except for the missing multibyte macro.

### locale.h

- This header is missing and consequently is support for locales.

### math.h

- This header is in very good shape but has a few non-standard functions declared along with a typedef name.
- There are no **float** or **long double** versions of the standard math library. ANSI C doesn't require these but does reserve names for such functions.

### setjmp.h

- **setjmp.h** is required to be a macro but isn't.

### signal.h

- The macro **SIG\_ERR** is missing. Instead, the non-standard **BADSIG** is provided.
- The macro **SIGABORT** is missing.
- Various non-standard macros, structure templates and functions are defined or declared.
- The prototype for **signal** is incorrect and doesn't match the library manual. The first token should be **void** instead of **int**. This problem has been acknowledged by Digital.
- The prototype for **raise** is non-standard in that it permits extra (optional) arguments.
- The type casts in the macros **BADSIG**, **SIG\_DFL** and **SIG\_IGN** aren't strictly compatible with the prototype for **signal**.

### stdarg.h

- This header is conforming. The old-style version **varargs.h** also is provided.
- To make sure you don't try to use both **stdarg.h** and **varargs.h** in the same scope, a series of **#undef** directives is included in each.
- The definitions of **va\_start** and **va\_arg** go beyond ANSI C requirements. ANSI C states that if the right-most fixed argument has a narrow type or you attempt to get a narrow type using **va\_arg**, the results are undefined. In VAX C, the behavior is well-defined.

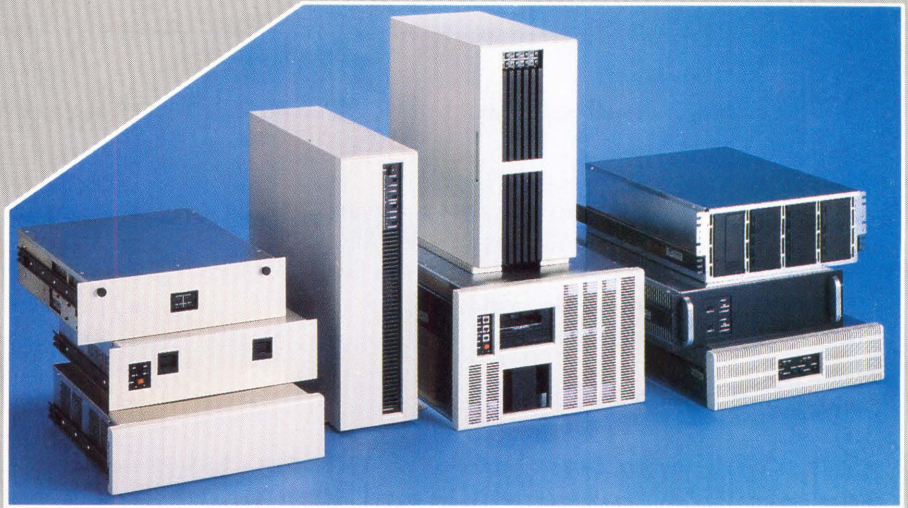
### stddef.h

- The typedef name **wchar\_t** is missing.

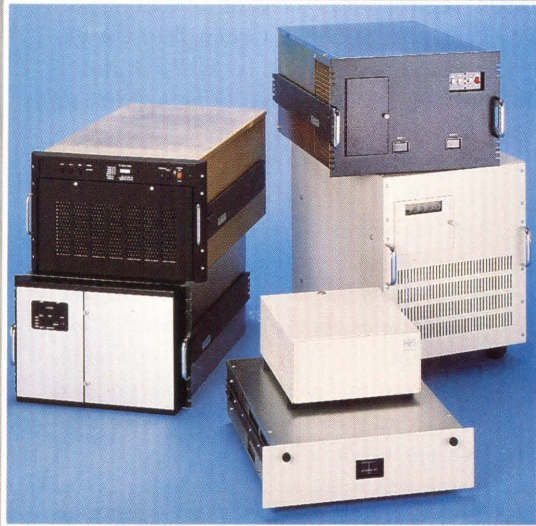


# SIGMA ENCLOSURES

## PERIPHERAL



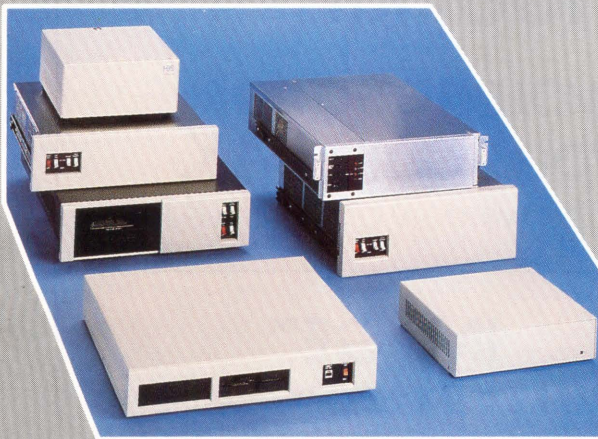
## RUGGEDIZED



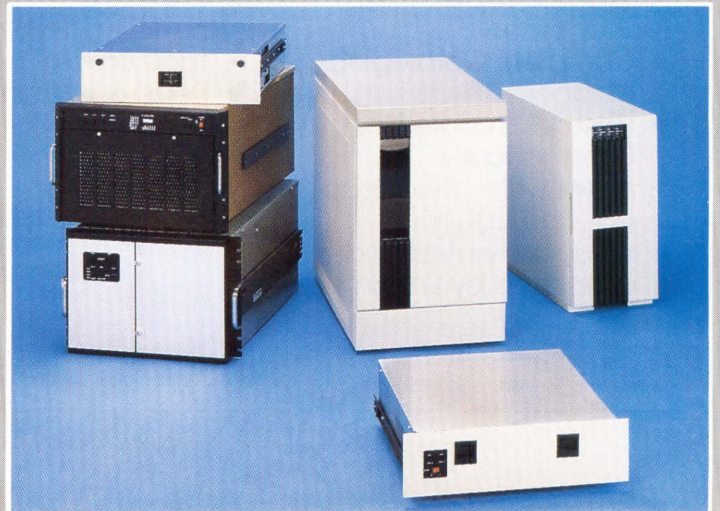
## SYSTEMS



## PROCESSOR



## REMOVABLE



**Sigma Information Systems**

3401 East La Palma Avenue, Anaheim, California 92806  
(714) 630-6553 • TLX 298607 SGMA • FAX (714) 630-5417

CA (714)547-2889 MN (612)435-6550 TX (800)521-3007  
(408)241-3770 NH (603)526-6909 (817)265-4661  
CO (800)521-3007 NM (800)521-3007 UT (800)521-3007  
MD (301)670-8601 NV (702)258-8005 WA (408)241-3770

Belgium (02)7204973 Italy (392)4459351 Switzerland (038)514343  
Finland (3580)52711 Norway (4702)685230 Taiwan (02)835-0152  
France (3314)7862504 Spain (346)3503144 U.Kingdom(0372)378811  
Greece (301)9514944 Sweden (08)282730 W.Germany(2202)52042  
Holland (3404)27211 International Sales Office: (4122)7825001

Trademarks: DEC, MSCP, TMSCP (Digital Equipment Corp.)

CIRCLE 265 ON READER CARD

See us at DEXPO West Booth #1470



■ **errno** no longer should be declared here. It's in **errno.h**.

#### **stdio.h**

- **stdin**, **stdout** and **stderr** aren't macros as required.
- There are several non-standard macros and functions.
- **fopen** and **freopen** have variable argument lists.
- **rewind** returns **int** instead of **void**.
- The **rename** function is missing.

#### **stdlib.h**

- This header is in very good shape.
- There's some debate as to whether or not **EXIT\_SUCCESS** should be 0 (as implemented) or 1. The **exit** function (starting with V3.0) accepts 0 and turns it into a 1 anyway. So whether or not **EXIT\_SUCCESS** is 0 or 1 doesn't matter if you only use it as an argument to **exit**.
- The multibyte typedef, macro and functions are missing.
- Several non-standard names are present.
- **rand** has a return type of **int** instead of **void**. However, the manual provides no description of a return value, therefore it's possible there isn't any.

#### **string.h**

- **strerror** has been extended to include a variable argument list.
- The **strcoll** function is missing.

■ The **strxfrm** function is missing.

#### **time.h**

- The typedef **size\_t** and the macro **CLOCKS\_PER\_SEC** are missing.
- Several non-standard functions and names exist.
- The function **strftime** is missing.

VAX C V3.0 isn't ANSI-conforming, but neither is any other compiler I've seen, including those that claim to be and even set **\_STDC\_** to 1.

The state of VAX C regarding the standard isn't a disgrace. In fact, it's quite good and perhaps above average from my experience with other mainstream compilers. It's well-positioned in that direction and those extensions/changes of immediate and greatest utility already have been implemented.

Readers are encouraged to submit C-related comments and suggestions to Rex Jaeschke, 2051 Swans Neck Way, Reston, Virginia 22091 or via e-mail to [uunet!aussie!rex](mailto:uunet!aussie!rex). —Rex Jaeschke is an independent consultant, author and lecturer. He's DEC PROFESSIONAL's representative on the ANSI C Standards Committee and the U.S. Representative for ISO, as well as editor of the Journal of C Language Translation, a quarterly publication for C implementers. His new book, *Mastering Standard C*, will be available from Professional Press this month.



## The Tape Tool Kit

*Everything you need for handling tapes on a VAX.*

*(But we don't wash the window of the drive)*

### TRAP™

Affordable Tape Management

- ▶ Complete Cataloging of tapes
- ▶ Find and restore files automatically
- ▶ Never write over a backup tape again
- ▶ All documented and supported by Edison Software

### CONVERT™

- ▶ The standard since 1982 for handling IBM & foreign tape on VAX
- ▶ Read & write IBM labeled tapes instantly.
- ▶ Handles packed and binary fields
- ▶ Accurate & reliable

### IMAGE™

- ▶ Copy VMS backup tapes bypassing bad blocks
- ▶ Copy backups for off-site storage & protection
- ▶ Edit any tapes

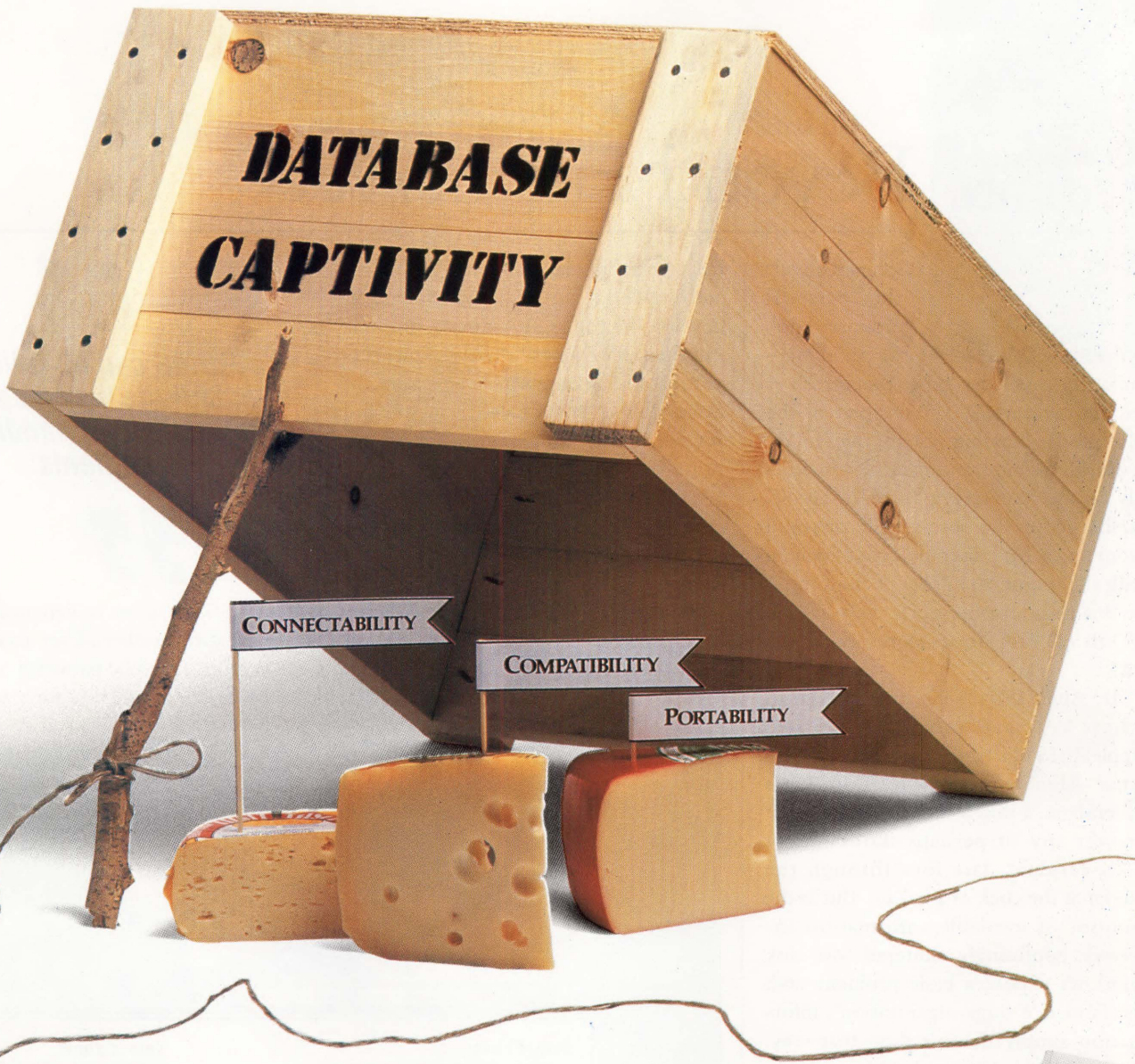
**EDISON**  
SOFTWARE SYSTEMS

P.O. Box 211  
Metuchen, New Jersey 08840  
(201) 906-1321

TRAP, Convert and Image are trademarks of Edison Software Systems. VAX is a registered trademark of Digital Equipment Corp. IBM is a registered trademark of International Business Machines Corp. All rights reserved.

CIRCLE 269 ON READER CARD





## HOW TO AVOID THIS TRAP ON VAX!

Their ads may promise Portability, Compatibility or Connectability...but it's really an invitation to sacrifice close hardware integration and performance – for a captive database environment.

**PowerHouse®**, on the other hand, lets VAX users avoid this captive database trap!

**PowerHouse** – with its high degree of integration to Rdb and RMS – is the most widely specified 4GL development environment on VAX. Because **PowerHouse** doesn't need to call in 3GLs to complete the job.

**PowerHouse StarBase™** – the fully DSRI compliant SQL RDBMS – gives you the option

of choosing a 3rd party database with superior distributed performance, including VAX cluster support, and advanced data integrity features. And since both **PowerHouse** and **StarBase** have full read/write to both Rdb and RMS, there is no need to expend critical development resources migrating your existing applications – if it makes economic sense to work with them where they now reside.

So, don't take the bait – choose integrated VAX performance over database captivity – choose **PowerHouse** and **StarBase**.

**1-800-426-4667\***

CIRCLE 221 ON READER CARD

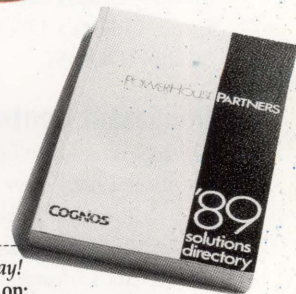
Performance so powerful that over 500 vertical applications and services have been developed by **PowerHouse Partners**.

I'll choose **FREEDOM** any day!  
Please send me information on:

- \_\_\_\_\_ PowerHouse & StarBase, the fully integrated VAX development solution (including a catalogue of PowerHouse applications).
- \_\_\_\_\_ PowerHouse Partners Program – the best in the business!

Attach business card and mail to: \* **Cognos Corporation**,  
2 Corporate Place, I-95 Peabody, MA 01960  
or photocopy and FAX to: (508) 535-1328

More than the leading 4GL – the best integrated development environment on DEC.



**COGNOS®**



## THE MAC CONNECTION

Al Cini

# Beyond File Servers

Compared with other personal computers, locating and manipulating disk files on a Macintosh is remarkably easy. A familiar part of the Macintosh operating system, the Finder, displays programs and data files pictorially on the Mac screen as readily recognizable icons. To access a file or run a program, a Mac user points at its icon with the mouse and presses a button.

But large organizations can't live on 80-MB PC disk drives alone. Enter the VAX.

By AppleTalk—connecting the Mac to a host VAX and using a VAX-based AppleShare file server such as Alisa Systems' AlisaShare or Pacer Software's PacerShare, a host VAX/VMS system can deliver any of perhaps thousands of VAX-resident data files through the Finder at the click of a mouse. But as the amount of available information increases, confusingly cluttered Mac disk windows expose a basic problem with the Finder: A large organization's information simply doesn't flow that way. Enter Odesta's Document Management System (ODMS).

### Document Control

ODMS is an intelligent alternative to a traditional file server that not only accepts and delivers data files as the user needs them but also tracks and controls them. Based on Odesta's Mac-based Double Helix DBMS, ODMS can be tailored to model the way a specific organization handles documents. We'll talk about ODMS tailoring later. For now, let's look at an example ODMS application.

At a newspaper, topics of interest to

the readership are conceived by editors and assigned to writers. Writers, in turn, develop the topics into articles and submit them for editorial review. The written material is caught in a development cycle, alternately reviewed by editors and revised by the author until suitable for printing.

At our hypothetical newspaper, an author (Mike) first logs onto the organization's VAX/VMS-based ODMS document server by launching the ODMS client application on his Mac (see Figure 1). ODMS can be configured to present each user with a completely different view of the document library, perhaps

“  
...ODMS can be tailored to model the way a specific organization handles documents.”

denying write access to certain articles to specific staff members. User access to the ODMS server can be password protected.

Mike can ask ODMS for a list of the

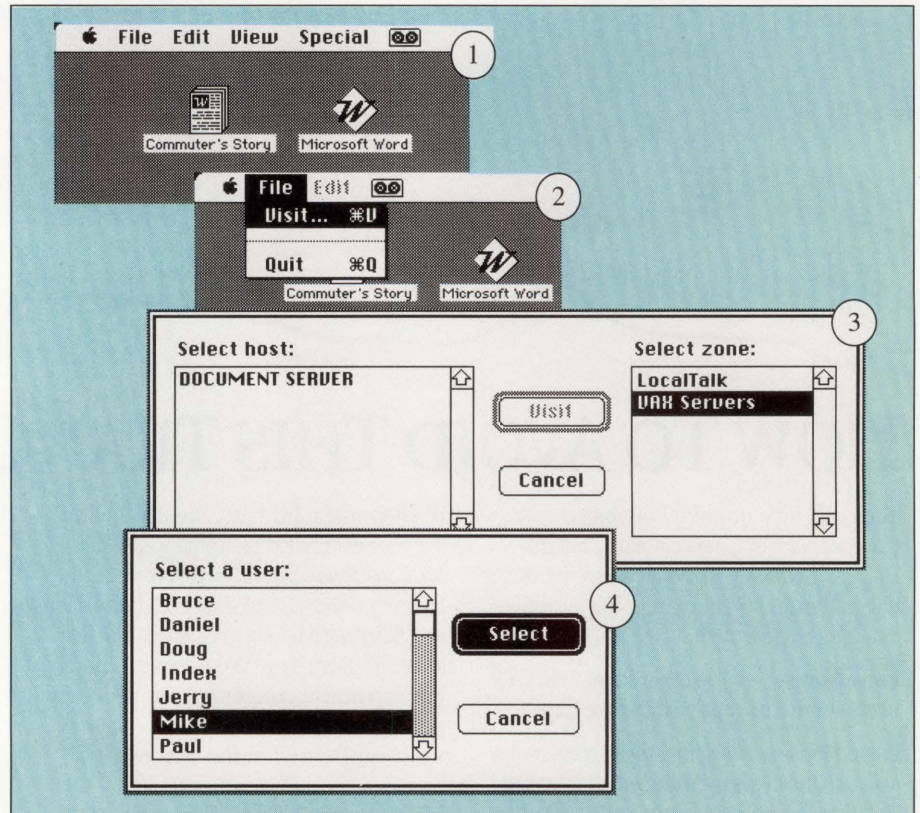
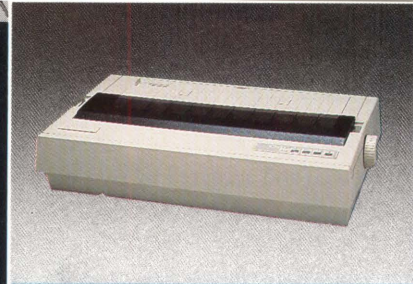


Figure 1: Starting with the Mac desktop, Microsoft Word, and a word processing document (1), we launch the ODMS client software (2) and “visit” an ODMS server (3) as the registered user Mike (4).



# C.I.TOH

**You've heard  
this before**



C1-2500 DEC-Compatible  
Dot Matrix Printer



CIT 328 Video Display Terminal



CIT 334 ET Graphics Terminal



CIT 344 ET Graphics Terminal



CI-1000 Line Printer

**In fact,  
we've been  
saying it for  
years**

**U**nlike other companies, we don't change our slogan every year to get your attention. We don't have to. After all, there is no better way to satisfy current customers and attract new ones than to make full-featured products with the highest standards of reliability and quality.

C. Itoh's wide range of printers, terminals and other peripheral products are chosen again and again by business users worldwide who need versatile products they can consistently depend on.

Call us at (800) 347-2484 and ask about our versatility, reliability and quality. We like repeating ourselves.

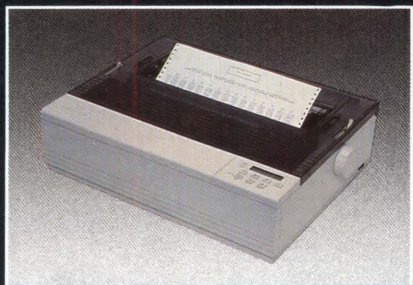
**C.I.TOH**  
C. Itoh Electronics, Inc.



CI-400/800 Matrix Line Printers



CIT-X Window Terminal



CI-5000 High Speed 18-Wire Printer



Mega Series Ion Deposition Printers

**We build more in  
so you get more out.**

CIRCLE 231 ON READER CARD

2505 McCabe Way, Irvine, CA 92714

See us at DEXPO® DAILY booth #1256.



subjects assigned to him, and an editor can ask for a list of articles submitted by authors for his review (see Figure 2, page 158). In our newspaper example, ODMS won't allow an author to submit an article directly for publication unless re-

viewed and accepted by two editors. The editor in chief can ask the ODMS server at any time for a list of assigned topics without submitted articles or for a report on articles pending review by editors. These are handy things to know if you're

trying to unjam your organization.

Selecting the example "Suburbia Means Traffic" topic, Mike can save a Mac document, such as "Commuter's Story" (the Microsoft Word word processing document), directly into ODMS

## Apple And Digital: What's Coming

It's widely known that, in response to growing customer demand, Apple and Digital have been working together to develop a family of Macintosh-VAX/VMS networking products. The big questions are What and When? Based on technical information presented at developers' conferences and DECUS since the relationship between Apple and Digital was first announced in January 1988, we can sketch a general outline of what someday may be known as VMS Services for the Macintosh.

**Terminal Emulation** — Significantly advancing the state of the art established by Apple's MacTerminal VT100 terminal emulator when the Mac was introduced in 1984, you can expect an updated VT320-style terminal emulator from Apple and Digital. The delivery of advanced VT340 ReGIS and Tektronix graphics capabilities probably will be left to third parties such as White Pine Software and Synergy Software, among others (see Table).

Apple and Digital already have announced that support for Digital's Local Area Transport (LAT) networked terminal services soon will be a part of Apple's Comm Toolbox, so you can expect to find a LAT connection feature in the Apple/DEC terminal emulator and eventually in third-party products as well. At first, LAT support probably will require that your Mac be connected directly to an Ethernet network. Future releases may extend this capability to Macs on Apple's LocalTalk LAN connected to an Ethernet via an AppleTalk bridge such as a Cayman GatorBox or a Kinetics FastPath (now

owned by Novell).

Do you need networked terminal support from your LocalTalk-connected Macs now? It's available today as the Alisa Terminal part of Alisa Systems' AlisaTalk for use with White Pine Software's Mac241 or Synergy Software's VersaTerm. Pacer Software's Pacer-Link also fills the bill and will work with any Mac-based terminal emulator, as well as with PacerLink's VT220 terminal emulator.

**DECwindows** — Apple already is demonstrating an impressive X Window System (Digital customers can read that as DECwindows) server for the Mac operating system, with an interesting "rootless" display mode that maps X directly onto the Mac desktop via the Mac's window manager. Used in conjunction with Apple's MultiFinder, this feature slickly integrates X into the Mac's user environment. You can expect that when the jointly developed Mac X server is delivered, it also will be fully DECwindows compatible, including support for all DECwindows fonts.

If you can't wait for these developments, White Pine Software has been showing its Mac-based DECwindows for nearly a year, with color capability planned for release before the end of the year.

**File and Print Services** — Digital has purchased the rights to use the networked file and printer services found in AlisaTalk. We can expect these file and printer services in the final Apple/DEC product. It's to be hoped that the release will include long-requested security features such as support for ACLs. We can expect a tight integration between

this product and the file server found in Digital's VMS Services for MS-DOS. Until then, an AlisaTalk purchase seems a safe bet. Digital has stated that it will be easy to move Mac files stored on an AlisaShare or PacerShare volume to Digital's file server.

**Database Services** — CL/1 is software that runs on a "client" Mac within a Mac application, such as HyperCard, and on a "server" VAX/VMS system in conjunction with a relational database or RMS files. It permits the Mac application to execute SQL statements on the VAX server, transparently fetching or

*Continued on page 156.*

T

### TABLE

Capability	Apple/DEC Product Elements	Third-Party Alternatives
Terminal Emulation	<b>MacTerminal</b> (Apple), future product enhanced to offer VT320 support with LAT	<b>Mac241</b> (White Pine Software) <b>VersaTerm</b> (Synergy Software)
DECwindows	<i>MacX</i> (Apple) X server with DECwindows compatibility	<b>eXodus</b> (White Pine Software)
File and Print Services	Apple Filing Protocol (AFP) file services Digital print services	<b>AlisaTalk</b> (Alisa Systems) <b>MacRAF</b> (Datability Software) <b>Pacer Share</b> , <b>PacerPrint</b> (Pacer Software)
Database Services	<b>CL/1</b> (Apple, Network Innovations) SQL Services (DEC)	<b>SequeLink</b> (TechGnosis) <b>Oracle</b> (Oracle) <b>DB-Library</b> (Sybase)
Electronic Mail Bridges	Access to VMS mail X.400 user agent	<b>MailMate</b> (Alisa Systems) <b>AlisaMail</b> (Alisa Systems) <b>PacerPost</b> (Pacer Software)

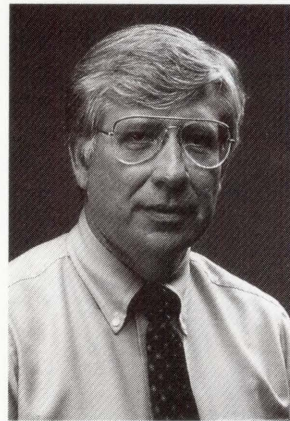
*Apple and Digital are developing Mac/VAX products, as are third parties. Items in bold are currently available. Items in italics have been shown or discussed publicly and should be available in early 1990. Items in regular type are "futures" with no specific timetable.*



*“Every professional interested in Engineering Graphics should go to the Invitational Computer Conferences.”*

—LOYD TARVER—  
EXECUTIVE DIRECTOR,  
WORKSTATION MARKETING  
INTERGRAPH CORPORATION

Because in every major market of the world the Engineering Graphics Series of the ICCs give the desktop engineering professionals what they need to know about



graphics workstations, application software, color printers/plotters, monitors, image processors and other associated products.

In one day, through product demonstrations and technical seminars, attendees learn the latest technology and

discuss their application requirements. Manufacturers have the opportunity to meet one-on-one with volume buying large end users, OEMs and systems integrators to demonstrate their products and reinforce their commitment to customer support on a regional basis.

“By Invitation Only,” guests attend free of charge. Manufacturers share the low cost with a minimum investment of time and sales effort.

**JOIN THE 1989/90  
ENGINEERING GRAPHICS SERIES**

**U. S. LOCATIONS**

September 25, 1989 Tysons Corner, (D.C.) VA	February 6, 1990 Dallas, TX
October 12, 1989 Irvine, CA	April 19, 1990 Troy (Detroit), MI
December 6, 1989 Newton, MA	May 21, 1990 San Jose, CA

**EUROPE LOCATIONS**

May 10, 1990 Munich, W. Germany	May 21, 1990 London, England
May 15, 1990 Paris, France	

**ASK ABOUT THE ASIA/PACIFIC SERIES!**

For more information contact: Invitational Computer Conferences, a division of Dataquest, 3151 Airway Ave., C-2, Costa Mesa, CA 92626, Telephone: (714) 957-0171, Telex: 5101002189 ICCDQ, FAX: (714) 957-0903.



CIRCLE 370 ON READER CARD



Continued from page 154.

storing data into the server's database. CL/1 is available for the Mac and the VAX from Apple's subsidiary, Network Innovations.

A similar offering from Digital, SQL Services, works only with Digital's Rdb/VMS relational database. It won't be available until later next year.

The Apple/DEC offerings notwithstanding, third-party database-server alternatives still may be worth consideration. CL/1 offers only ANSI-standard SQL and is oriented toward query-intensive decision-support applications. If you plan to build an in-house transaction processing system and would like the performance edge offered by the enhanced SQL syntax of your relational database, SequeLink from TechGnosis might make more sense.

**Mail** — The Apple/DEC joint product efforts in this area are a bit hazy, although both companies have promised X.400 support. The underlying technology required to link Mac and VMS mail products — and even bridge this electronic mail technology with PROFS mail on an IBM mainframe — exists today in Digital's Mailbus product family. With mail client software rumored to be built into the next

major release of the Mac operating system (System 7), it isn't hard to imagine Apple and Digital providing a mail bridge to VMS (and beyond) as part of their product. Digital recently introduced its VAX-based X.400 mail server for multiple desktops, and the X.400 Mac client is expected next year.

Meanwhile, Alisa Systems and Pacer Software have both announced VAX/VMS-based mail bridges for Microsoft Mail V2, available before the end of this year.

Apple and Digital are developing a tightly integrated family of Mac-VAX/VMS networking software products and are planning to offer them with full support and customer services. While the complete package may not be available until mid-1990, CL/1, for example, is available from Apple now, and its X server should be available by early 1990.

As spokespersons for both companies repeatedly have said, and as the thousands of people who have connected Macs to VAXs successfully already know, there's no need to wait. Many capabilities, from terminal emulators to DECwindows to database servers, are available from Independent Software Vendors today.

(see Figure 3). Like a file server, ODMS stores the Mac document on the VAX. Beyond a mere file server, ODMS allows editors and authors to find and retrieve

the document through whichever Mac "view" makes sense to their job function. When a document is retrieved, its creator Mac application automatically is


launched with the retrieved document opened and ready on the Mac screen. When the document is closed, ODMS automatically stores any revisions. In look-and-feel terms, ODMS is very much a Finder alternative.

## Behind The Scenes

ODMS is a "client-server" application, its client portion implemented as a Mac application and its server portion written to run either on a dedicated server Mac or as a process under VAX/VMS. The network connection between the client and the server is based on Apple's AppleTalk network protocol, running over either a common Ethernet network or a combination of Ethernet-LocalTalk using a product such as a Cayman Gator-Box or a Kinetics FastPath (now owned by Novell). LocalTalk is Apple's twisted-pair LAN.

The ODMS client software is written to run in conjunction with Apple's MultiFinder, a special version of the Finder that allows several Mac applications to be active simultaneously. This ODMS/MultiFinder partnership allows Mac applications to be launched seamlessly from within ODMS, sparing the inconvenience of moving documents to

**\$295**




**VersaTerm-PRO**  
emulation/communications application

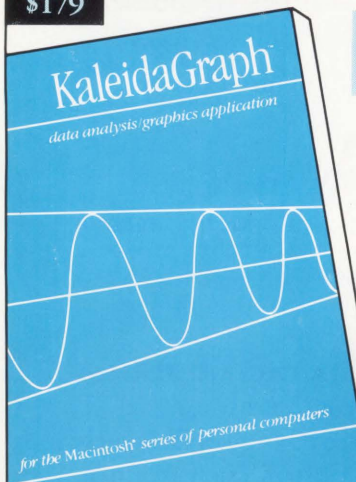
MACWORLD Magazine  
World Class Award Winner

**Access text and graphics mainframe applications from one easy-to-use program**

- **EMULATE** industry standard text and graphics terminals, including the DEC VT100, 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.

developed by  **Abelbeck Software**

**\$179**




**KaleidaGraph**  
data analysis/graphics application

for the Macintosh series of personal computers

**Import data, analyze the data, and generate scientific and business graphics from one easy-to-use program**

- **FLEXIBLE** data import facilities
- **FAST** operation (5 to 20 times faster than Cricket Graph™ version 1.2)
- **LARGE** data sets supported (32,000 data points per variable)
- **FEATURES** including: curve fitting; log, linear, polar and probability plots; high-resolution printing
- **PROGRAMMABLE** RPN Calculator and Algebraic Formula entry.

 **SYNERGY SOFTWARE**

2457 Perkiomen Ave., Reading, PA 19606, 215-779-0522

CIRCLE 228 ON READER CARD



# If You're A DEC Professional, Don't Miss DB/EXPO '90.

## FREE ADMISSION TO THE EXHIBITS!

Featuring:

- Mainframe, DEC, UNIX and Micro DBMSs
- Distributed Database Products
- Object-Oriented Tools and DBMSs
- CASE Products and 4GLs
- Expert Systems and Natural Languages
- Gateways, Connectivity and Communications Products

More than 130,000 feet of exhibit space, with over 250 exhibits, including: **DEC, Informix, Oracle, Computer Associates, Sybase, McCormack & Dodge, JYACC, Cognos, Cincom, Metaphor, HP, and RTI,** among others.



**"For the DEC community, the design, use and accessibility of database is likely to become one of the dominant issues of the 1990's. Digital's movement toward transaction processing means that databases will become even more important for system managers and the users they serve."**

Lou Pilla, Managing Editor, *DEC Professional*

## OUTSTANDING TECHNICAL CONFERENCE:

Covering:

- DEC Database Futures
- Putting DEC Database Technology to Work.

Speakers include: Chris Date, Vaughan Merlyn, Michael Stonebraker, Richard Finkelstein, Colin White, and Jeff Tash, among others.

# Yes,

I want to attend. Please send me information and registration materials for DB/EXPO '90 to be held March 27-29, 1990 at the Moscone Center in San Francisco.

- Send me \_\_\_\_\_ FREE EXHIBIT PASSES.
- Please send me information on exhibiting.
- Please send me information on the conference sessions and details on early registration DISCOUNTS.

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

Company \_\_\_\_\_

Street \_\_\_\_\_

City, State and Zip \_\_\_\_\_

Telephone \_\_\_\_\_ FAX \_\_\_\_\_



NDN Enterprises, 289 S. San Antonio Road, Suite 204, Los Altos, CA 94022. (415) 941-8440. FAX (415) 941-2066.

## THE NATIONAL DATABASE EXPOSITION AND CONFERENCE DATABASES, TOOLS AND CONNECTIVITY

MARCH 27 - 29, 1990 • MOSCONE CONVENTION CENTER • SAN FRANCISCO, CA



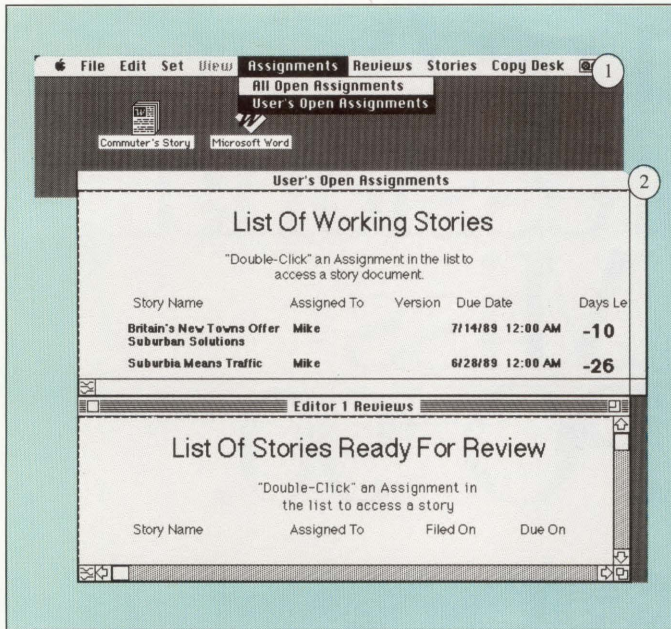


Figure 2: Mike reviews his assigned topics (1). At this point, the editor has nothing to edit (2).

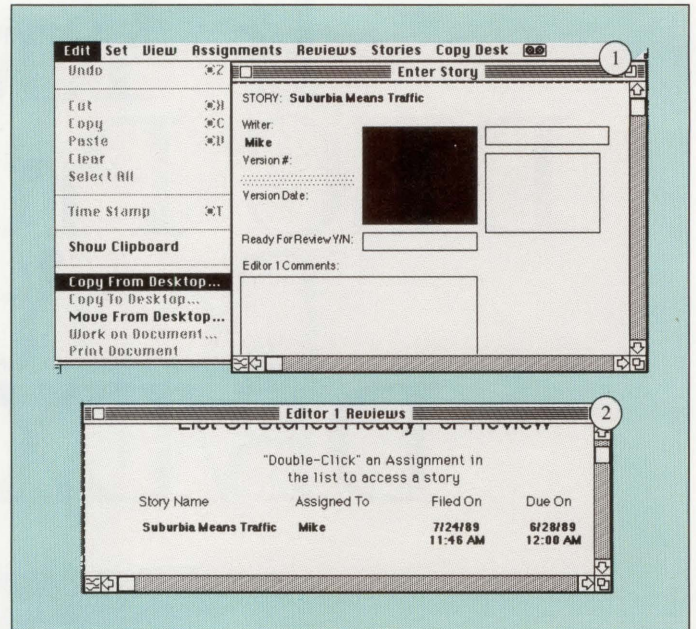


Figure 3: Mike can submit his Microsoft Word document file directly to ODMS (1). ODMS stores it on the host VAX and notifies Editor 1 that the article is ready for review (2).

and from the server as a separate step. But it will take more than a 1-MB Mac to deliver the ODMS goods. Odesta recommends a hefty minimum 4 MB of mem-

ory on the client Mac system.

A client version of ODMS is available for use at simple VT-style terminals. While lacking the full document-review capabilities of a Mac, the VT-based client software can be used to obtain document status reports or to fetch and retrieve VMS files to and from the ODMS server.

Like its first cousin, Helix VMX, the ODMS server is implemented as a VMS process. Documents are stored in a "collection file" on the VAX in an ODMS-proprietary format.

### Building An ODMS Application

Like Double Helix databases, ODMS applications are developed using an icon-driven CASElike design tool. The ODMS application-development software anticipates many of the features found in Odesta's latest Double Helix III database product, including HyperCardlike control buttons and numerous display-performance enhancements.

Odesta isn't making the application-development component of ODMS available as part of the product. ODMS customers must purchase completely developed ODMS applications from Odesta.

The purchase price, ranging from \$10,000 to \$30,000 and higher, includes custom application development. Odesta soon will offer these services through authorized VARs and consultants. The sale of the development software directly to users is still in the future.

Odesta has been working closely with Apple and Digital in developing its Helix product family and plans to incorporate developments from the Apple/DEC alliance — such as the Compound Document Architecture (CDA) — in future releases of its products. If Odesta sticks to its plans, a future ODMS user should be able to retrieve and work with a Mac word processing document from a VT terminal (or DECwindows-based VAX workstation) with automatic document conversion to/from WPS-Plus (or DECwrite) as appropriate.

THE BIGGEST PROBLEM with ODMS is the way Odesta describes and presents it. Documentation on the product and Odesta's application tailoring services is

## ODMS

**PLATFORMS:** A Mac network with a Mac host or a Mac/VAX network with a VAX host and Mac clients

**PRICE:** \$20,000

### ODESTA CORPORATION

**HEADQUARTERS:**  
4084 Commercial Ave.  
Northbrook, IL 60062  
(312) 498-5615

**FOUNDED:** 1982

**PRODUCT LINE:** A range of business software products for information management, access and analysis in standalone and networked Mac and VAX environments

**OWNERSHIP:** Private

**BRANCHES:** San Francisco

CIRCLE 471 ON READER CARD



# Reach Out And Touch Everyone.

You can do it three different ways. With three unique products for the Mac-to-DEC electronic messaging and mail marketplace. Each available from Alisa, the originators of Mac-to-VAX connectivity software.

First, there's Alisa MailMate/QM.™ An easy-to-use Macintosh bridge from CE Software's QuickMail to DECnet mail. It's a truly cost-effective way for people on a local Mac network to reach out and touch everyone on DECnet mail.

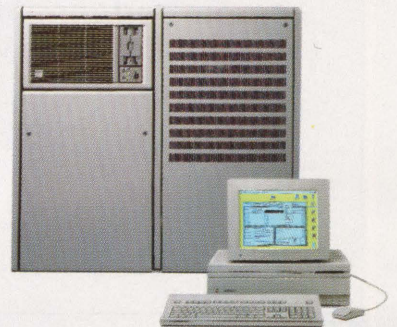
Next, consider Alisa MaxNotes.™ A Mac-based electronic conferencing program that speaks the DECnet VAX Notes protocol, and supports everything VAX Notes does. And you don't have to know or use any commands. Just point and click with your mouse.

Then there's AlisaMail.™ A VAX-based, store-and-forward electronic mail and directory system that connects Macs and PCs with Microsoft Mail to a host of other corporate mail systems.

It makes adding new gateways and servers to increase your mail connectivity simple. Because the Alisa Information Switch,™ the heart of AlisaMail, provides a common set of message services for mail gateways and servers. It's a corporate E-mail solution that only comes first class.

So there you have it. New electronic messaging and mail capabilities which can be literally at your fingertips.

And if you push the right button, everyone will be touched.



Alisa Systems Inc.  
We keep everybody talking.™

See us at DEXPO West Booth #2321

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.



## Companies Mentioned In This Article

Alisa Systems Inc.  
221 E. Walnut St.,  
Ste. 175  
Pasadena, CA 91101  
(818) 792-9474  
**CIRCLE 514 ON READER CARD**

Apple Computer Inc.  
20525 Mariani Ave.  
Cupertino, CA 95014  
(408) 996-1010  
**CIRCLE 560 ON READER CARD**

Cayman Systems  
26 Landsdowne St.  
Cambridge, MA 02139  
(617) 494-1999  
**CIRCLE 469 ON READER CARD**

Datability Software Systems Inc.  
322 8th Ave., 11th Fl.  
New York, NY 10001  
(212) 807-7800  
**CIRCLE 473 ON READER CARD**

Microsoft Corporation  
P.O. Box 97017  
Redmond, WA 98073  
(206) 822-8080  
**CIRCLE 470 ON READER CARD**

Network Innovations Corp.  
20863 Stevens Creek Blvd.,  
Ste. 200  
Cupertino, CA 95014  
(408) 257-6800  
**CIRCLE 580 ON READER CARD**

Novell Inc.  
122 E. 1700 S.  
Provo, UT 84606  
(801) 379-5900  
**CIRCLE 561 ON READER CARD**

Oracle Corp.  
20 Davis Dr.  
Belmont, CA 94002  
(415) 598-8219  
**CIRCLE 384 ON READER CARD**

Pacer Software Inc.  
7911 Herschel Ave.,  
Ste. 402  
La Jolla, CA 92037  
(619) 454-0565  
**CIRCLE 562 ON READER CARD**

Sybase Inc.  
6475 Christie Ave.  
Emeryville, CA 94608  
(415) 596-3500  
**CIRCLE 574 ON READER CARD**

Synergy Software  
2457 Perkiomen Ave.  
Mt. Penn, PA 19606  
(215) 779-0522  
**CIRCLE 381 ON READER CARD**

TechGnosis Inc.  
621 N.W. 53rd St.  
Boca Raton, FL 33487  
(407) 997-6687  
**CIRCLE 383 ON READER CARD**

Tektronix Inc.  
P.O. Box 1000  
Wilsonville, OR 97070  
(503) 685-3180  
**CIRCLE 476 ON READER CARD**

White Pine Software Inc.  
94 Rt. 101A  
Amherst, NH 03031  
(603) 673-8151  
**CIRCLE 382 ON READER CARD**

sparse, inconsistent and rife with meaningless and confusing acronyms and pedantic "software architecture" buzzwords. It's to be hoped that Odesta will bring ODMS documentation up to the high standards it has set for its Mac-based

Helix products.

At this stage, ODMS is almost as much a service as a product. Users can't purchase the development tools, and they need to contract ODMS application development to Odesta — a fairly pricey

proposition.

Although an ODMS purchase decision isn't to be entered into lightly, you should consider it if your organization has grown beyond the capabilities of mere file servers. ■

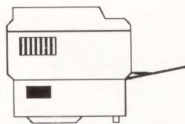
## SCRIPTSERVER™

### New PostScript Printing Software for VAX/VMS

- PostScript print spooler
- Supports PostScript printers from multiple vendors
- Converts ASCII to PostScript
- Supports LAT, PCSA, SNA

Questions about PostScript Printing? . . .

**Call NOW!**



## 800-477-0348

for Info & Evaluation Demo



## GrayMatter

*Software & Consulting*

Seattle, Washington

CIRCLE 115 ON READER CARD

# eXodus

The X Window System server that frees your Macs to talk to any computer.

**eXodus is the first X Window System server designed specifically for the Macintosh OS.**

eXodus is Multifinder compatible and works over DECnet and TCP/IP networks. It's from White Pine Software, leader in Macintosh connectivity with highly successful Mac-to-VAX VT series terminal emulators, file transfer, and graphics conversion packages.

The price for eXodus is only \$499 and site licenses are offered.  
Available immediately.



WHITE PINE SOFTWARE

94 Rt. 101A, P.O. Box 1108, Amherst, NH 03031. 603-886-9050

CIRCLE 253 ON READER CARD



# With PacerLink, your stand-alones don't.



Connecting all your Macs and PCs to the corporate VAX is nothing new. Doing it in one easy step — without having to piece together several vendors' products — is new.

PacerLink *simplifies* micro-to-VAX connectivity.

To begin with, PacerLink gives you a wide range of connectivity options over several different networking configurations. It supports micros connected directly to Ethernet (EtherTalk or TCP/IP protocols) and RS-232C, and to LocalTalk bridged to Ethernet.

PacerLink provides both PC and Mac users multi-window terminal

emulation, file transfer, virtual disk and print services. Multiple windows, corresponding to multiple terminal emulation sessions, are all continuously updated by the VAX.

**digital**™ Acme Office Information System  
ALL-IN-1  
Professional Workstation

WP Word and Document Processing  
EM Electronic Messaging

*PacerLink provides complete access to ALL-IN-1 menu choices with a single click or keystroke.*

And PacerLink makes it easier for all micro users to interact with the VAX. Mac users see their icon-based, mouse-driven interface, while PC users get a familiar, menu-driven structure. Everyone can begin working without additional training.



*PacerLink connects Macs and IBM PCs (and compatibles) to many hosts, including DEC VAX (VMS and ULTRIX) and several UNIX systems.*

There's more. Add PacerShare, and you make the VAX an AppleShare-compatible file server giving shared, transparent file access to both micro and VAX users. Add PacerGraph, and you extend graphic emulation capabilities to the VT240/241 standard.

For more information on how you can connect all your micros to the VAX in one easy step, call our West Coast office at (619) 454-0565 or our East Coast office at (508) 898-3300.

**Pacer  
SOFTWARE**



# PRODUCTS

*Editor's Note: All of the companies that appear in this month's Products are DEXPO West 89 exhibitors. Their booth numbers are indicated, so plan to visit them.*

## Cognos Demonstrates PowerHouse StarBase

Cognos Inc. will exhibit PowerHouse StarBase, its advanced SQL RDBMS, at DEXPO West 89. Its multiversion record-management and optimistic record-locking schemes provide high throughput for multi-user applications. Distributed applications can be developed using the product's PowerHouse StarNet component, which provides access to remote databases across DECnet and TCP/IP networks.

Cognos also will preview its CASE product solution, as well as a version of PowerHouse StarGate, which will provide access to

Oracle databases on VAX/VMS and In-Quizitive for the PC and VAX, a user report writer with pop-up menus and a report painter.

In addition, Cognos will demonstrate its new management reporting and data analysis tool known as Power Play, which lets users view and report on summarized corporate information from mainframe, minicomputer and microcomputer databases. PowerHouse 4GL, PowerHouse Architect, PowerHouse PC V5.11, LOAD/PowerHouse and the 20/20

Database Connection also will be demonstrated.

For more information, contact Wendy Rajala, Cognos Inc., 3755 Riverside Dr., Ottawa, ON K1G 3Z4; (613) 738-1440. Visit Booth No. 1400.

Circle 507 on reader card

## VAX/FAX Transmits Word-11 Documents

Data Processing Design Inc. announced the total integration of Word-11VAX to Digital Management Group's VAX/FAX, a VAX-to-fax networking solution.

VAX/FAX allows the transmission of Word-11 documents as faxes. They can be sent directly from the terminal to eliminate hardcopy. VAX/FAX reduces phone costs, requires no black box, outputs laser quality and produces an automatic status report to give an

## DEXPO West 89

Join in the DEC computing excitement at the Disneyland Hotel in Anaheim, California, where DEXPO West 89 will convene with an array of vendors, products and DEC computing professionals Tuesday, November 7, through Thursday, November 9. From 9:00 a.m. to 5:00 p.m. each day (4:00 p.m. Thursday), attendees can enjoy the products, solutions and technologies that will take them into the next decade.

More than 350 exhibitors are expected to draw at least 12,000 attendees to one of the biggest DEXPOs ever. Exhibiting vendors will stress multivendor connectivity as DEC computing enters the 1990s. To reflect the age of open systems and developing standards, DEXPO will feature products that link DEC to IBM, Hewlett-Packard and Apple, as well as the latest VMS/ULTRIX enhancements and networking breakthroughs.

Don't miss the premiering Hewlett-Packard Solutions Center that will highlight the growing importance of HP's RISC-based UNIX computing for VAX managers. Another of this year's attractions is the expanded Apple-Digital Integration Center, which allows hands-on evaluation of DEC-to-Apple connectivity.

DECUS will be held at the Anaheim Convention Center during DEXPO. A free shuttle bus will run between DECUS and DEXPO from 8:00 a.m. to 5:30 p.m. daily. DECUS attendees will be admitted to DEXPO at no cost.

Professional Press, publisher of *DEC PROFESSIONAL*, *HP PROFESSIONAL*, *VAX PROFESSIONAL* and *MIDRANGE SYSTEMS*, will exhibit at Booth No. 1246. Plan to visit us there.

For more information about DEXPO, contact Expoconsul Int'l Inc., 3 Independence Way, Princeton, NJ 08540; (609) 987-9400.



DEXPO goes west to the Disneyland Hotel, Anaheim, California.



accurate reporting of faxes started, accepted, pending or rejected. VMS Mail and ALL-IN-1 users also can send faxes from their terminals.

The company also will demonstrate Gold-Mail, a VMS electronic mail package that features pull-down windows with accelerator keys.

For more information, contact Collette Cundall, Data Processing Design Inc., 1400 N. Brasher St., Anaheim, CA 92807; (714) 970-1515. Visit Booth No. 1269.

**Circle 489 on reader card**

### **AOK Releases V2.4.2 Of AOK.abc Spreadsheet**

AOK Software Products Inc. will exhibit Release 2.4.2 of the AOK.abc spreadsheet at DEXPO West 89. New features include revised I/O routines, resulting in average processing-time improvements of 25 percent. It also features new color ReGIS and color Tektronics Graphics for improved presentations of eight graphics types, as well as PostScript graphics.

Log-log and Semilog X-Y graphics are now graph options. And the addition of the Worksheet Global Default command enables users to create default printer, director and form settings.

AOK.abc is a fully Lotus-compliant spreadsheet for VAX/VMS users featuring full Lotus macros, macro recording, debugging, spreadsheet linking and more than 150 built-in @ functions.

For more information, contact AOK Software Products Inc., 1305 Wiley Rd., Ste. 102, Schaumburg, IL 60173; (312) 884-7123. Visit Booth No. 2652.

**Circle 505 on reader card**

### **AlisaMail Has VAX/VMS-Based Server For Microsoft Mail**

Alisa Systems Inc. announced AlisaMail, which consists of a VAX/VMS-based server for Microsoft Mail 2.0, a transparent two-way gateway to VMS Mail and an SQL-based Information Switch, which is the heart of the system. The combination provides a high-capacity and high-reliability server for Microsoft Mail, plus seamless access to a variety of mail systems (e.g., ALL-IN-1, X.400, PROFS) through DEC's MailBus.

The Information Switch provides a common set of messages and directory services for mail gateways and servers. Messages and attachments are stored on a relational database instead of in separate VMS files. Only one copy of a message is needed for multiple

recipients. Its accounting features log every message transaction. With this data, the Information Switch can generate a variety of statistical reports on such things as delivery delays plus message traffic load.

Pricing is VAX CPU-based and ranges from \$10,000 for five-VUP-class VAXs to \$26,000 for 22-VUP-class VAXs.

For more information, contact Suzanne Young, Alisa Systems Inc., 221 E. Walnut St., Pasadena, CA 91101; (818) 792-9474. Visit Booth No. 2321.

**Circle 514 on reader card**

### **Systems Strategies Demonstrates ezBridge**

Systems Strategies Inc. will exhibit ezBridge File Transfer/Mail connectivity software at DEXPO West 89. The demonstration will feature the transfer of data between Systems Strategies' booth and IBM's booth.

ezBridge is a menu-driven connectivity product designed to provide electronic mail, file transfer, remote job submission and virtual printing between VAX systems and IBM midrange systems (AS/400 and System/38). In this demonstration, an attendee's mail will be sent either from an AS/400 to a VAX or vice versa using ezBridge. To send a message, the attendee can go to either booth, from which an operator will send the mail. After the mail is sent, the attendee can walk to the other booth and provide the operator with the password. The attendee's message will become queued and await pickup.

ezBridge is priced from \$2,000 to \$20,000. For more information, contact Lynn Tusa, Systems Strategies Inc., 225 W. 34th St., Ste. 500, New York, NY 10001; (212) 279-8400. Visit Booth No. 418.

**Circle 500 on reader card**

### **nu/TPU Features Multiple Windows And Buffers**

a/Soft Development Inc. announced the nu/TPU for DEC's RISC platforms, including the DECstation 2100 and DECsystem 5400/5800.

nu/TPU is a full implementation of DEC's TPU with features that include multiple windows and buffers, user-definable interfaces, a high-level procedural language, 92 built-in editing procedures, flexible keyboard mapping, EVE and EDT editing interfaces, automated error recovery and on-line help. The EVE and EDT interfaces retain complete functionality, as found in the VMS version. Customized extensions for the EVE and EDT

## **AbilityVMS Allows Easy Disk, File And Process Management**

Whether you are new to VAX management or an expert, VAX management can be made easier with AbilityVMS™, the first "Second Generation" system software product for VAX/VMS, available from AVAIL Technologies, Inc.

AbilityVMS is the VAX management environment where *Disk, File and Process management* is made easier and more productive, allowing effective management of and increased performance from VAX system resources.

AbilityVMS is the perfect balance between power and ease of use, providing powerful DCL commands for in-depth, detailed investigation and correction of important VAX system resource allocation and consumption situations, while also incorporating a topical menu interface for quick analysis and repair.

Some AbilityVMS features and benefits for busy VAX managers include:


- Reduce VAX mgt work load up to 30%
- Monitor detailed and complex process information quickly and easily
- Recover up to 27% of disk resources
- Locate and easily correct potential VMS file security breaches or risks
- Analyze volume info disk by disk
- Manage and control disk space utilization for one, some or all disks
- Identify and correct file ownership mismatches and inconsistencies
- Track system resource consumption by user, group or all users
- Plus much, much more!

VAX managers may obtain an evaluation copy of AbilityVMS or additional product information by contacting:

**AVAIL Technologies, Inc.**  
19800 MacArthur Blvd., Suite 500  
Irvine, California 92715-2421

Phone 714-955-0685 • Fax 714-955-2367

Please call AVAIL today, toll free at:

 **800-634-6552**

Visit AVAIL Technologies at DEXPO West '89  
Booth #2811

Avail - to be of use, worth, benefit or advantage; effective use or help.  
© 1989 AVAIL Technologies, Inc. All rights reserved.  
AbilityVMS, the AVAIL logo, and "VAX management made easier" are trademarks of AVAIL Technologies, Inc. All rights reserved.  
VAX, VMS, VAX/VMS are trademarks of Digital Equipment Corp.

**CIRCLE 369 ON READER CARD**



section files can be used on ULTRIX machines with nu/TPU. VI users can use the VI keypad interface to take advantage of nu/TPU's extendible nature. nu/TPU is available for all DEC RISC- and VAX-based machines running ULTRIX and for DEC's IBM-compatible PCs.

For more information, contact James R. Graf, a/Soft Development Inc., 1353 Salem St., N. Andover, MA 01845; (508) 683-4369. Visit Booth No. 335.

**Circle 509 on reader card**

### Acucobol-85 Available On VAX And RISC Lines

Acucobol Inc. will exhibit the Acucobol-85 for the VAX and RISC lines. Acucobol-85 brings many applications to the MicroVAX II and III, VAX 11/780/3300/3400/3500/8200/8800, DECstation 2100/3100 and the DECsystem 5400/5810/5820.

Acucobol-85 brings VAX/VMS COBOL applications to DEC RISC-based machines. The process involves recompiling VAX COBOL applications only once in Acucobol-85. The applications then can be run on any of the DEC RISC machines. The number of ap-

plications available to these users is increased. In addition to supporting more than 150 hardware platforms under AIX, NETBIOS, UNIX, ULTRIX, XENIX and VMS, Acucobol-85 features its own built-in interactive source debugger and supports pop-up windowing, color and line drawings directly. Acucobol also features fast compile, screen and file speed. For more information, contact Pamela L. Coker, Acucobol Inc., 7950 Silverton Ave., Ste. 201, San Diego, CA 92126; (619) 271-7097. Visit Booth No. 3019.

**Circle 504 on reader card**

### TransPath Interconnects Dispersed LANs

Vitalink Communications Corporation announced the TransPath product line, a family of TCP/IP routers that incorporate the capabilities of Vitalink's LAN bridge products. The TransPath 530 and 550 are high-performance bridge/routers for interconnecting token ring networks. The Transpath 350 is a high-performance bridge/router for interconnecting Ethernet LANs.

The TransPath routers build on the capabilities of Vitalink's LAN bridges. They inter-

connect geographically dispersed LANs over common carrier transmission lines. They provide dynamic bridging and routing on a single port and best-path routing in networks of both bridges and routers as well as true interoperability of Ethernet and token ring networks. TransPath translates the link layer protocols, enabling Ethernet devices to communicate on a peer level with token ring devices using TCP/IP.

Prices for the TransPath family begin at \$14,000.

For more information, contact Randy Fardal, Vitalink Communications Corp., 6607 Kaiser Dr., Fremont, CA 94555; (415) 795-6178. Visit Booth No. 2644.

**Circle 503 on reader card**

### Emulex Arrays Feature RA-Compatible Drives

Emulex Corporation announced a family of Standard Disk Arrays that features Emulex's eight-inch Standard Disk Drives (SD89x), which are plug-compatible with DEC's RA-series drives. Because the drives use DEC's Standard Disk Interface (SDI), no software modifications, external protocol converter or

## STOP!

... Unauthorized access to your Computer System



- Password / Callback / Time of Day Access
- Remotely Configurable
- Audit Trail
- Utilizes Existing Modem and Software
- Economical

### CALTA Computer Systems Ltd.

101, 7180 - 11th Street S.E.  
Calgary, Alberta, Canada T2H 2S9  
(403) 252-5094

**CIRCLE 306 ON READER CARD**

## DON'T GET ZAPPED!

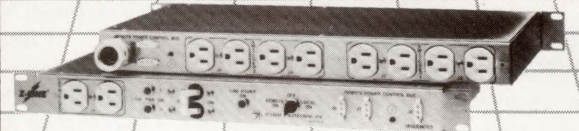
High inrush current can **destroy** your sensitive VAX CPUs and peripherals in less time than it takes to flip a switch.

### THE SOLUTION?

Power up with **Z-LINE TPC 115-10 MTD™** the smallest power distribution and control system available.



### POWER UP WITH



Our proprietary **Multiple Time Delay™** circuitry sequences your power-up to **protect** your systems from the spikes and surges that **destroy your hardware and erase your data.** And our remote on/off and emergency shutdown **gives the power control back to you.**

All Pulizzi Engineering MTD™ controllers are **compatible with DEC and UPS systems.**  
**PRICED FROM \$436 TO \$305**

**DON'T WAIT UNTIL IT HAPPENS, CALL TODAY!**

See us at DEXPO West Booth #1801  
**PULIZZI ENGINEERING INC.**

3260 S. Susan Street Santa Ana, CA 92704-6865 (714) 540-4229 FAX (714) 641-9062

**CIRCLE 252 ON READER CARD**



# Even with a protocol analyzer, you have a limited view of your LAN.



If you're responsible for managing or maintaining a LAN, you need a tool that will do more than just fix a problem after it occurs. That's where Spider's Monitor and Analyzer come in. They provide continuous monitoring and sophisticated analysis capabilities for Ethernet and IEEE 802.3 networks—so you can manage your LAN, not just react to it. They provide you with the information essential for proactively managing your network, including event alarms, packet filtering, protocol decodes and more—presented in an easy to interpret and use format.

To learn more about how SpiderMonitor and SpiderAnalyzer can help you better manage your network call 1-800-447-7807, or simply send in the coupon.

## Protocol Analyzers vs. SpiderMonitor & SpiderAnalyzer

Features	Protocol Analyzer	SpiderMonitor 220	SpiderAnalyzer 320
Continuous monitoring in simultaneous modes		•	•
Per station statistics		•	•
Event detection alarms		•	•
Security monitoring		•	•
Performance monitoring		•	•
Trend analysis		•	•
Traffic simulation	•	•	•
Data filtering	•	•	•
Low level decodes	•	•	•
High level decodes	•	•	•
User-definable decodes	•	•	•
Price	\$18-30,000	\$8-14,000	\$10-17,000

CIRCLE 247 ON READER CARD

Yes, I want to learn more about the SpiderMonitor and SpiderAnalyzer.

- Send more information.
- Send more information and a demo disk  5¼"  3½"
- Have a sales representative contact me for an on-site demonstration.

Name \_\_\_\_\_ Title \_\_\_\_\_  
 Company \_\_\_\_\_  
 Address \_\_\_\_\_ City \_\_\_\_\_  
 State \_\_\_\_\_ Zip \_\_\_\_\_ Phone \_\_\_\_\_

## SPIDER SYSTEMS

Spider Systems Incorporated, 12 New England Executive Park,  
 Burlington, MA 01803 617-270-3510 FAX: 617-270-9818





elaborate cabling schemes are required.

The SD89x consists of a Head Disk Assembly (HDA), a high-capacity power supply, Emulex-designed native SDI drive electronics and an intelligent user panel packaged in a quarter rack tray. The drives appear to the host and to all DEC DSA disk controllers as RA-series drives. By eliminating the external protocol converter, the drives are self-contained, which streamlines packaging and increases capacity per square foot. Up to 15.7 GB of formatted storage can be contained in a 60-inch cabinet. The drives are available in formatted capacities of 663 MB and 873 MB.

Prices range from \$11,644 to \$226,396. For more information, contact Dan Reese, Emulex Corp., 3545 Harbor Blvd., Costa Mesa, CA 92626; (714) 662-5600. Visit Booth No. 1300.

**Circle 515 on reader card**

### Automatic Parallelizing Ada Compiler From Convex

Convex Computer Corporation announced Convex Ada, its automatic parallelizing Ada compiler. The parallelizing feature of this compiler allows Ada programs to take advan-

tage of the Convex parallel processing capabilities without programmer intervention.

Convex Ada provides the automatic parallelization features available in Convex FORTRAN and C as well as new features. The task-spreading capability allows Ada tasks to run on multiple CPUs. The Ada debugger has been enhanced to allow debugging of both parallel and multitasking applications.

Prices range from \$30,000 for a C120 to \$50,000 for a C240.

For more information, contact Alison Peoples, Convex Computer Corp., 3000 Waterview Pkwy., Richardson, TX 75080; (214) 497-4226. Visit Booth No. 1228.

**Circle 508 on reader card**

### Information Builders Ships Focus For SQL Server

Information Builders Inc. announced a complete application-development and decision-support front end for the Ashton-Tate/Microsoft SQL Server. The Focus for SQL Server, an optional read/write interface for PC/Focus for OS/2, delivers the full functionality of the SQL-based RDBMS server through the Focus language and tool set.

PC/Focus for OS/2 offers report writing application development, business graphics and communications facilities identical to and compatible with Focus systems for mainframe, UNIX, VAX, HP, DOS and LAN environments. It supports the expanded memory and multitasking capabilities of OS/2. Focus for SQL Server allows all PC/Focus facilities to be used transparently with SQL Server and Focus databases. A complete Focus/SQL Server system requires OS/2 1.0 or later, PC/Focus for OS/2 3.1a and the Focus for SQL Server interface.

The Focus for SQL Server interface costs \$395 per four users.

For more information, contact Keith Toleman, Information Builders Inc., 1250 Broadway, New York, NY 10001; (212) 736-4433. Visit Booth No. 2800.

**Circle 511 on reader card**

### MEC Demonstrates Internodal Mail Package

Microsystems Engineering Corporation (MEC) will exhibit its new I-Mail software at DEXPO West 89. The software was developed for companies that must send revisable compound

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.

See us at Dexpo West '89 Booth #123



33 BOSTON POST ROAD MARLBORO, MA 01752 USA (508) 460-9206 FAX (508) 481-9187

**CIRCLE 352 ON READER CARD**

## XENTIS The Report Writer

- Works with RMS files under VAX/VMS
- Unique 3 window "Display Mode"
- Easy to use for programmers and non-programmers alike
- Interactive display
- Extensive report options

**Now interfaces with DBMS & Rdb!**

... prompt  
... fast execution  
... works with XENTIS/Dictionary or CDD

To learn more about XENTIS and our full-featured evaluation copy, call (206) 343-0447

See us at DEXPO West Booth #2114  
**Park Software, Inc.**

P.O. Box 31529, Seattle, Washington 98103-1529

**CIRCLE 379 ON READER CARD**



documents to other users on the DEC network. The software works with DEC's Message Router, so you can access other mail systems, as well. It can run standalone or in an ALL-IN-1 environment. I-Mail is for companies using VAXs for the creation of such documents as technical manuals, proposals and specifications that must be reviewed by many people.

MEC also will demonstrate FaxMail. It lets you send faxes from your terminal at high resolution with fast transmission time. You can queue documents and defer sending until off-peak hours as well as send faxes that include graphics. FaxMail works with Biscom's Faxcom 1000 Plus hardware unit.

For more information, contact Carol Karels, Microsystems Engineering Corp., 2400 W. Hassell Rd., Ste. 400, Hoffman Estates, IL 60195; (201) 592-6633. Visit Booth No. 1570.

**Circle 493 on reader card**

### Persoft Expands DECnet-DOS Network Capabilities

Persoft Inc. announced that it has expanded its DECnet-DOS network capabilities with CTerm, a WAN service of DECnet-DOS. Persoft's SmarTerm 220 and 240 terminal-emulation software products now have high-speed access to VAX/VMS hosts in WANs. The CTerm protocol enables text and graphics terminal-emulation users to create and maintain multiple host sessions from a single IBM PC or compatible to one or more hosts on a DECnet network. CTerm support is in addition to the LAT protocol. A combined driver lets you mix CTerm and LAT sessions. SmarTerm 220 and 240 offer full keyboard emulation and a macro language that allows a single keystroke to replace multiple keystroke operations. SmarTerm 240 emulates the 16-color ReGIS graphics of the VT340.

SmarTerm 220 is priced at \$195, and SmarTerm 240 is priced at \$345. CTerm support is included.

For more information, contact Mary Bigus, Persoft Inc., 465 Science Dr., Madison, WI 53711; (608) 273-6000. Visit Booth 121.

**Circle 496 on reader card**

### PacerShare For DEC RISC-Based Systems

Pacer Software Inc. announced support for PacerShare, an AppleShare-compatible file server software product, on DEC's RISC-based systems. PacerShare enables a DECstation or DECsystem running ULTRIX Worksystem Software (UWS V2.0) to function as a file server for a Mac network.

By implementing the AppleTalk Filing Protocol on the DECsystem and DECstation, PacerShare offers file-serving functionality equivalent to that provided by Pacer in the VAX (VMS or ULTRIX) environment. A Mac user transparently can use AppleShare to store files on a RISC-based system, where they're accessible to UWS and Mac users. Files stored on a RISC-based system appear to the Mac user as icons that can be accessed in the Mac style. UWS users can directly access files

they see on a DECsystem or DECstation with the UNIX interface.

PacerShare is an extension of PacerLink. PacerLink with PacerShare is priced from \$2,400 per VAX or RISC-based CPU based on the number of concurrent sessions.

For more information, contact David Ryter, Pacer Software Inc., 7911 Herschel Ave., Ste. 402, La Jolla, CA 92037; (508) 898-3300. Visit Booth No. 2315.

**Circle 516 on reader card**



# WHY THE 1990 CENSUS IS COUNTING ON VIKING DATA ENTRY

When the U.S. Census is taken in 1990, data will be key-entered with Viking software. About 106 million households will be asked as many as 60 questions per person. Viking Data Entry (VDE) system will be used to record responses.

VDE software was selected because it is...

- Very efficient; far exceeding Census Bureau specifications.
- High-speed data entry; maximizing operator productivity.
- Error-sensitive; increasing accuracy, reducing costly reruns and delays.
- Easy to learn; virtually eliminating operator training time.

These are just a few qualities you'll learn to count on from all Viking products: Forms Manager (VFM), Data Manager (VDM), Control System (VCS), as well as VDE. **Now** available in a new Version 3.0 release on multiple computer platforms.

Contact us for all your data entry and screen form management software:

**Viking Software Services, Inc.**,  
4808 East 67th Street, Suite 100,  
Tulsa, OK 74136-4959.

PHONE: (918) 491-6144;  
FAX: (918) 494-2701.



**VIKING**  
SOFTWARE SERVICES

**CIRCLE 300 ON READER CARD**



## Network Research Shows Fusion Network Software

Network Research Corporation (NRC) will exhibit Fusion Network Software V3.3.7 at DEXPO West 89. This version of Fusion features advanced security options for VAX/VMS TCP/IP users that reduce the risk of infiltration from hostile networks or hosts.

Fusion for VMS supports VMS LOG-INOUT, giving system administrators control over user log in access. An NRC-developed application, net\_secure, lets administrators block access to the VMS hosts without affecting the user environment. Combinations of services, nets, subnets and individual hosts can be flagged to be accepted or rejected.

For more information, contact Network Research Corp., 2380 N. Rose Ave., Oxnard, CA 93030; (805) 485-2700. Visit Booth No. 641.

Circle 495 on reader card

## Micro Technology Shows 6200 Series Array

Micro Technology Inc. will exhibit its 6200 Series storage and backup array on-line with a

complete VAXcluster at DEXPO West 89. The 6200 is an HSC-based storage system using 5 1/4-inch magnetic disk array technology that includes automatic backup with imbedded 8mm tape cartridge. A fully configured 6200 stores 20 GB of data on disk with 20 GB of tape backup in one footprint.

Micro Technology designs, manufactures, sells and supports enhancement products for the VAX OEM and user market, including network-management systems, high-end and midrange storage devices and tape-backup systems.

For more information, contact Tom Raimondi, Micro Technology Inc., 5065 E. Hunter Ave., Anaheim, CA 92807; (800) 999-9MTI. Visit Booth No. 1434.

Circle 492 on reader card

## Primavera Exhibits VAX Version Software

Primavera Systems Inc. will exhibit new releases of Primavera Project Planner (P3), Primaveraision and Parade performance-measurement software at DEXPO West 89.

P3 V3.11 is designed to integrate schedul-

ing, resource management and cost control. It now includes custom plotting in view, import and export to 20/20 and Oracle, project-specific configuration and other enhancements. Primaveraision V3.11, Primavera's graphics package, creates full-color, presentation-quality bar charts and network logic diagrams for project coordination and management review. Parade V1.1 is fully integrated with P3's schedule, resource and cost data. The software satisfies DoD and DOE performance-measurement specifications and can produce WBS and cost-performance charts on-screen and by printer or plotter.

For more information, contact Susan Torzolini, Primavera Systems Inc., 2 Bala Plaza, Bala Cynwyd, PA 19004; (215) 667-8600. Visit Booth No. 2626.

Circle 497 on reader card

## MCBA Exhibits New Release Of Classic Software

MCBA Inc. will exhibit a new release of its MCBA Classic Accounting, Distribution and Manufacturing software at DEXPO West 89. The release provides such PC-type capabilities

# UNINET™

DEXPO BOOTH  
2622

*Best Prices, Quality, and  
Service with new Technology*



*Imagine a Desktop Workstation  
with more than 2 serial ports  
and a parallel port.*

**High Performance SLAT™s  
"SCSI LAT™s" with parallel port**

4 serial/ 1 parallel DECSTATION ULTRIX  
8 serial/ 1 parallel DECSTATION ULTRIX

**WORKSTATION MEMORY  
SCSI DISK SYSTEMS**  
for DECstation™, VAXstation™,  
MAC™, and SUN™ Extended Warranty

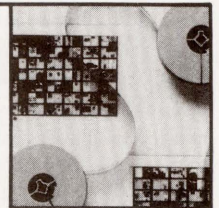
OUTSIDE CALIFORNIA (800) 433-6784  
INSIDE CALIFORNIA (714) 546-1100  
FAX (714) 546-3726

uninet@cpd.com uninet!zardoz!uninet

DECstation™, VAXstation™, LAT™ are trademarks of Digital Equipment Corporation.  
SUN™ is trademark of Sun Microcomputer. Mac™ is trademark of Apple Computer.  
SLAT™ is trademark of UNINET™.

CIRCLE 278 ON READER CARD

## This publication is available in microform.



UMI reproduces this publication in microform: microfiche and 16 or 35mm microfilm. For information about this publication or any of the more than 16,000 periodicals and 7,000 newspapers we offer, complete and mail this coupon to UMI, 300 North Zeeb Road, Ann Arbor, MI 48106 USA. Or call us toll-free for an immediate response: 800-521-0600. From Alaska and Michigan call collect 313-761-4700. From Canada call toll-free 800-343-5299.

Please send me information about the titles I've listed below:

\_\_\_\_\_

\_\_\_\_\_

Name \_\_\_\_\_

Title \_\_\_\_\_

Company/Institution \_\_\_\_\_

Address \_\_\_\_\_

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

Phone (\_\_\_\_\_) \_\_\_\_\_

**U·M·I** A Bell & Howell Company  
300 North Zeeb Road, Ann Arbor, MI 48106 USA  
800-521-0600 toll-free  
313-761-4700 collect from Alaska and Michigan  
800-343-5299 toll-free from Canada



# MAX VAX BACKUP



**Maximize your VAXcluster® backup** without maximum expense. Introducing LAGO Systems' new LS/200T 8mm 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 360 ON READER CARD**



Introducing

# ASYNCSERVER™



Now\*

You can dial into your VAX/VMS™ system with the modems you already own and use AppleTalk™-based network products like AlisaTalk™, PacerShare™, and Helix VMX™ over ordinary, asynchronous terminal lines!



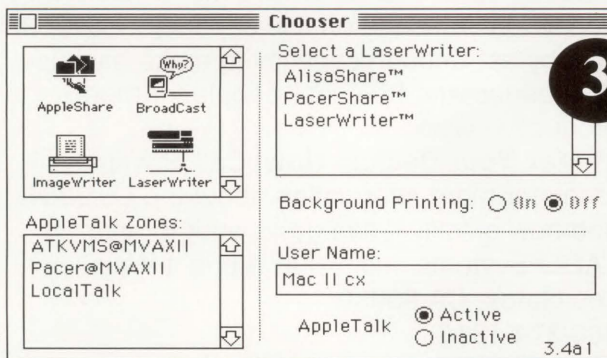
## 1 Start ASYNCSERVER on your VAX™

- DECserver™-compatible
- Uses hardware you already own - No special devices required



## 2 Activate ASYNCSERVER on your Macintosh™

- Start it with our Desk Accessory
- Use our AutoStarteR "init" to boot your Mac right into your network



## 3 Choose the file servers, laser printers, mail bridges, and database engines in your AppleTalk network!

- From home or on the road
- Over inexpensive local asynch lines

AlisaTalk, AppleTalk, DECserver, Helix VMX, PacerShare, and VAX/VMS are registered trademarks of other companies.

## \* You can order ASYNCSERVER Now!

Just \$595 for MicroVAX II systems, \$995 for MicroVAX III systems, and \$1895 for high-end VAX systems - and NO CHARGE for the Macintosh client software! Call (609) 596-4360 to order your copy NOW for 24 hour shipment!



MasterCard® and Visa® orders accepted.



COMPUTER METHODS CORPORATION

525 Rt. 73 South - Suite 300  
Marlton, NJ 08053  
Phone: (609) 596-4360 Fax: (609) 596-4362 AppleLink: D2280

CIRCLE 106 ON READER CARD



as pop-up windowing and fast task switching for VAX systems. In addition, customizable menus and on-line help make MCBA software easier to use.

Because the features are incorporated at the system level, even MCBA customers with heavily modified packages should be able to incorporate the upgrade into their existing installation. MCBA packages run on the VAX, Wang VS and HP 3000; a range of UNIX- and XENIX-based computers, including the NCR Tower, Altos and 286/386-compatibles; and PC-MS/DOS LANs.

For more information, contact Shannon Donnelly, MCBA Inc., 25 W. Broadway, Glendale, CA 91204; (818) 242-9600. Visit Booth No. 1566.

Circle 491 on reader card

### Raxco Exhibits Several New Products

Raxco Software Inc. will exhibit several new products at DEXPO West 89.

The Rabbit-11 Caching and Virtual Disk System allows portions of memory to be used as high-speed disks and caches. You can specify the data to be kept in the cache or allow Rabbit-11 to allocate the most frequently accessed files into the cache automatically.

Archiving VAX/VMS files with the Rabbit-10 Archive and Retrieval System lets you extend disk hardware resources and improve performance by moving files to less expensive media. You can archive and retrieve files through a simple menu interface modeled after a library card-catalog system.

With Raxmaster System Performance Management, the areas critical to system performance — CPU, I/O and memory — are proactively managed. Applications critical to the success of the company are supported by consistent, optimal VAX/VMS performance. For more information, contact Denise Hudson, Raxco Software Inc., 2440 Research Blvd., Ste. 200, Rockville, MD 20850; (301) 258-2620. Visit Booth No. 424.

Circle 513 on reader card

### Star\*Draw Runs On ReGIS And Tek Terminals

Procyon Computer Systems announced Star\*Draw V3.40. Star\*Draw is an interactive device-independent VAX/VMS-based graphics drawing program. It lets you create drawings using an on-screen menu system on all ReGIS and Tek terminals. A driver has been added for the GraphOn 407HR terminal that displays 256 colors simultaneously in a resolu-

tion of 1,024 x 768.

Star\*Draw's menu-driven interface offers the same interface, regardless of terminal. A drawing can be created on one terminal and edited on another. It uses a virtual terminal of 32,767 x 32,767 pixels and 10 bits deep for 1,024 displayable colors. It treats text as blocks that can be moved, modified or edited with the built-in text editor. You can create and import fonts. It can run either standalone or linked into a program at the graphics kernel. A

VAXstation version will be announced at DEXPO West 89.

Prices for Star\*Draw range from \$4,995 for a single-user license to \$23,995 for an unlimited-user license on a VAX 8800.

For more information, contact Ann Rade-maker, Procyon Computer Systems, 31255 Cedar Valley Dr., Ste. 300, Westlake Village, CA 91362; (818) 991-2766. Visit Booth No. 713.

Circle 498 on reader card

## SAVE DISK SPACE

### Reduce file sizes up to 90%!

NEW FCX File Compression software lets you recover thousands of blocks of disk space, yet keep your data online, simply by storing some of your files in compressed format. FCX combines the latest data compression techniques with the speed and reliability required in VMS environments.

- Increase available disk space without adding hardware
- Speed up file transfers and reduce transfer costs
- Exchange compressed files between VMS and MS-DOS
- Reduce time lost due to retrieving files from tape
- Keep more files online

Many files may be compressed together for easier management or transfer to other systems. When expanded, files will retain the VMS file structure of the original files.

Available for VAX/VMS and MS-DOS systems.

Call for a free evaluation package.

\* VAX and VMS are trademarks of Digital Equipment Corporation. MS-DOS is a trademark of Microsoft Corporation.

**ICS** Innovative Computer Systems, Inc. (609) 779-1422  
72 CROOKED LANE • CHERRY HILL, NJ 08034

CIRCLE 319 ON READER CARD

## REPRINTS?

If you would like reprints of any article or advertisement, contact Reprint Resources  
155 Commerce Drive  
Fort Washington, PA 19034  
(215) 643-9143  
FAX (215) 643-9164



## 8mm Helical Scan Technology Available For BI-Bus

Aviv Corporation announced 8mm helical scan Exabyte drives for the BI-bus. Aviv's AB 8202 contains two Exabyte drives and a TMSCP controller that's interface-compatible with the DEC KLESI-B tape adapter.

The AB 8204 is an expanded version of AB 8202 and has four drives. It provides unattended backup of 9 GB of data on four cartridges. AB 8204 maintains a throughput of 880 KB per second. You can back up 9 GB in fewer than three hours. The TMSCP controller has 1 MB of cache memory. The multitasking or multithreading architecture of the controller can keep six drives streaming, resulting in 220 KB per second. Aviv AB 8202 shares the KLESI-B adapter with TU81 and RV20 while retaining the full functionality of the tape or optical drive.

The AB 8202 is priced at \$18,000.

For more information, contact Haim Brill, Aviv Corp., 26 Cummings Park, Woburn, MA 01801; (617) 933-1165. Visit Booth No. 1542.

**Circle 506 on reader card**

## Mod 110 Features Up To Four Modular Connectors

Mod-Tap System announced a wall plate using AT&T 110 contact clips. The Mod 110 Plate uses 110-style insulation displacement contacts (IDC). No wire stripping is necessary. The Mod 110 Plate comes in single- and double-gang versions. Both are made of UL 94 V-0 rated plastic.

The product features up to four modular connectors of various polarizations including modular jacks, 3270 baluns, BNCs, fiber and video in a single-gang plate. The double-gang version comes with up to eight positions or four positions and one IBM data connector. By using the IDC 110 contacts, you just align and punch down: The tool removes the excess wire. It can be used with 22-26 AWG solid wire. It standardizes installation when used with the Mod-Tap 110 Patch Panel.

For more information, contact S. Miles, Mod-Tap System, 285 Ayer Rd., Harvard, MA 01451; (508) 772-5630. Visit Booth No. 217.

**Circle 494 on reader card**

## Target->Batch Features Failover Mode

Target Systems Corporation announced a new version of Target->Batch job-scheduling software for VAX/VMS system managers and production scheduling departments. Target-



*Aviv Corporation's AB 8202 8mm helical scan drive.*

>Batch is used to submit production jobs and job streams at pre-established dates and times with error trapping and management reports.

The new version of Target->Batch adds multiple job dependencies that allow the scheduling of jobs that depend on the successful completion of the preceding job. VAXcluster failover mode has been added for transparent operations if one member of a cluster fails or is shut down. This feature saves operation time and ensures that production jobs will continue to be submitted as scheduled.

Target->Batch is priced from \$4,995 to \$9,995 per CPU. Multiple-CPU discounts and VAXcluster licenses are available.

For more information, contact Kate Brady, Target Systems Corp., 33 Boston Post Rd. W., Marlboro, MA 01752; (508) 460-9206. Visit Booth No. 123.

**Circle 501 on reader card**

## Raima Enhances Database Development System

Raima Corporation announced the db\_Vista III database-development system for the VAX. db\_Vista III offers applications developers a combination of relational and network model technologies to build applications that feature fast access, flexibility and portability to many environments.

db\_Vista III supports VMS, UNIX, QNX, OS/2, MS-DOS, MS-Windows, the Mac and others. Applications port across environments, increasing productivity and lowering development costs. It features db\_VISTA 3.1, a database engine; db\_Query 2.1, an SQL-based query and report writer; and db\_Revise 1.0, a database restructure program. This release provides enhancements for VAX platforms, including DAL, a database access language

utility, and support for foreign and user-defined character sets. The system is written in C and supports any C environment.

Prices start at \$5,985.

For more information, contact John W. Bryant, Raima Corp., 3245 146th Pl. S.E., Bellevue, WA 98007; (206) 747-5570. Visit Booth No. 2013.

**Circle 499 on reader card**

## Xyplex Announces Terminal Server Family

Xyplex Inc. announced the standalone MAXserver 1000 Series terminal servers, the newest addition to the company's family of MAXserver Communications Servers.

The MAXserver 1000 Series includes three 16-port standalone models: the MAXserver 1100 LAT terminal server, the MAXserver 1500 LAT-TCP/IP Telnet terminal server and the MAXserver 1800 host-independent, self-loading multiprotocol terminal server. The MAXserver 1800 features a 3 1/2-inch floppy drive that can load the LAT and TCP/IP Telnet software for all 1000 Series terminal servers. The MAXserver 1000 Series features 16 RJ-45 modular jacks that support a variety of cabling topologies for connecting video terminals, serial printers and PCs. It offers line speeds of up to 38.4 KB, full modem control, a self-adjusting ThinWire and ThickWire network connection and a compact footprint.

The MAXserver 1100 costs \$3,395, the MAXserver 1500 costs \$3,795 and the MAXserver 1800 costs \$4,395.

For more information, contact Kathleen Coleman-Goodwin, Xyplex Inc., 330 Codman Hill Rd., Boxborough, MA 01719; (508) 264-9900. Visit Booth No. 2830.

**Circle 512 on reader card**

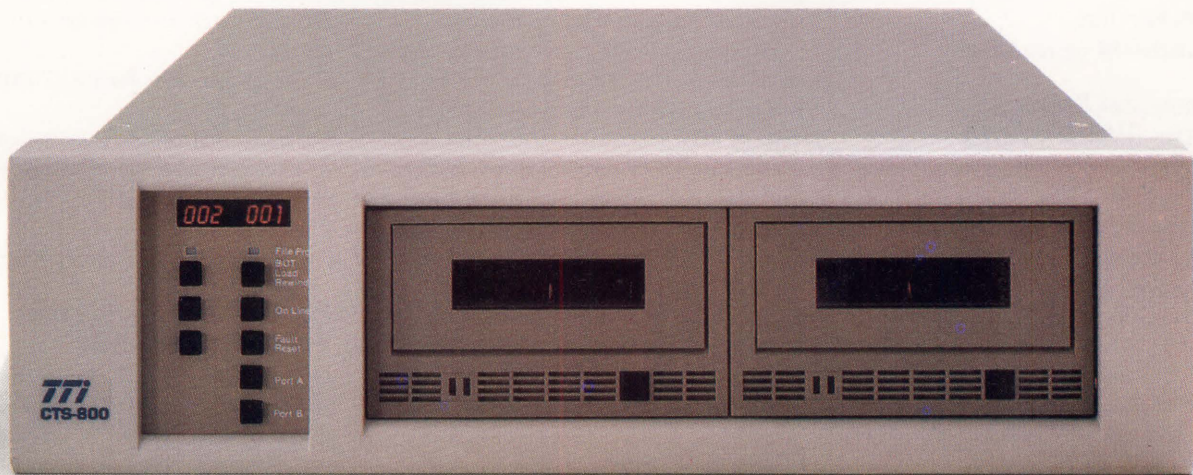


# Backing up a VAXcluster can be reel slow.

See us at DEXPO West  
Booth #2818



# 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.

**TRANSITIONAL  
TECHNOLOGY, INC.**

**European Sales Office.** Transitional Technology, Suite 2, Kennett House, 108/110 London Road, Headington, Oxford OX3 9AW. Phone: 0865 741345.

VAXcluster, HSC and TA79 are trademarks of Digital Equipment Corporation.

CIRCLE 261 ON READER CARD



## NuBus-To-Q-Bus Adaptor Unites Mac With Q-Bus

Bit 3 Computer Corporation announced the Model 455 NuBus-Q22bus Adaptor, a NuBus-to-Q-bus adaptor that unites the Mac with the Q-bus environment. Because the adaptor makes the Mac compatible with the Q-bus, you have the full resources of the Mac to use as a bus master in Q-bus applications.

The processing power of the Mac, coupled with its graphics, I/O capabilities, communications and software support, makes it a good Q-bus system processor or coprocessor. Random access read/writes are transferred from the NuBus to the Q-bus for memory and I/O cycles. Interrupts are supported. The adaptor consists of two printed circuit cards. One fits inside the Mac, the other fits inside a Q-bus card cage. The cards are connected with a round EMI shielded cable. The Mac can be used as the bus master or as one of several bus masters in a multi-processor Q-bus application.

The product is priced at \$2,695.

For more information, contact M.D. Lonnon, Bit 3 Computer Corp., 8120 Penn Ave. S., Minneapolis, MN 55431; (612) 881-6955. Visit Booth No. 3119.

**Circle 484 on reader card**

## Beck Computer Systems Announces RMSEDV V2.1D

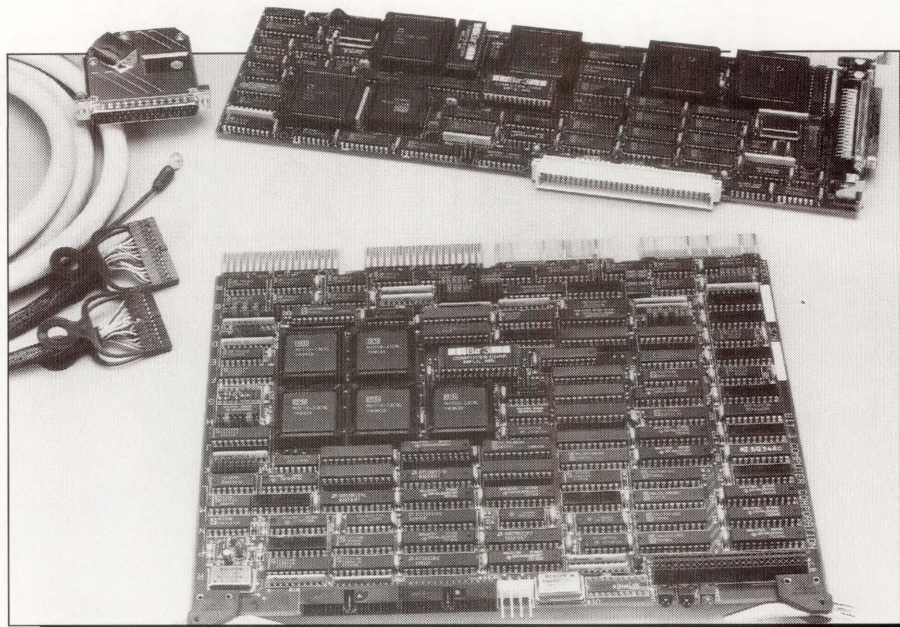
Beck Computer Systems announced RMSEDV V2.1D. RMSEDV lets you modify, display or print data from any RMS file, eliminating the need to write file-maintenance programs. It accesses indexed, relative and sequential files and supports all data types and the CDD.

RMSEDV is completely interactive or command file-driven, and it determines all file attributes automatically. This allows the use of all index keys for access to records. The syntax lets most tasks be performed with one-line commands. Even such complex operations as converting a file from one format to another or creating a data-entry screen are performed with just a few commands. With a single command, you can display variables and data on-screen. As records are retrieved or modified, RMSEDV will display the current values.

The product costs from \$995 to \$9,600.

For more information, contact Gary D. Beck, Beck Computer Systems, 5372 Long Beach Blvd., Long Beach, CA 90805; (213) 428-2894. Visit Booth No. 117.

**Circle 550 on reader card**



*Bit 3 Computer Corp.'s Model 455 NuBus-Q22bus Adaptor.*

## EMC's Maxport Is 5800 Series Compatible

EMC Corporation announced that Maxport, its high-performance disk drive, is fully compatible with DEC's RISC-based 5800 series as well as DEC's 6000 series processors.

Maxport provides a 16-ms seek and a maximum of 11.5 GB in the same footprint as a rack of RA81s. The product features a series of diagnostic and upgrade features not available on DEC's current drives and provides a number of service programs handled through EMC's 33 local field service offices located throughout the U.S.

For more information, contact Steve Hedge, EMC Corp., 171 South St., Hopkinton, MA 01748; (508) 435-1000. Visit Booth No. 2826.

**Circle 531 on reader card**

## Investigator Plus Provides Management Control

Absolute Security Inc. announced Investigator Plus for VAX/VMS, designed to provide management control, security and audit capabilities for the VAX/VMS environment without affecting system performance or hindering user activities. The product runs on an MS-DOS-compatible workstation attached to the VAX/VMS system through either an RS-232 or an Ethernet connection.

With early warnings of corruption, Investigator Plus prevents data loss. It alerts the system manager and provides reports of the exact lines of code altered. It also offers the option of keeping the changes or restoring the

file to its original state and in each case maintains a history of alterations to the files. It's designed to work without user intervention. By providing 24-hour watch over monitored files, it provides up-to-date information in the form of alerts and reports of system file changes.

Investigator Plus for VAX/VMS is priced at \$8,500.

For more information, contact Carol Riddle, Absolute Security Inc., 63 Great Rd., Maynard, MA 01754; (508) 897-1991. Visit Booth No. 434.

**Circle 542 on reader card**

## Personal Mobius Features VT220/320 Emulation

Fel Computing will exhibit Personal Mobius at DEXPO West 89. This new member of the Mobius product line is especially for end users. Personal Mobius features VT220/320-compatible terminal emulation, file transfer, a virtual file system, printer support and automatic installation.

Fel Computing's Mobius product line supports 3Com, Ungermann-Bass, InterLan and Western Digital Ethernet adapters, as well as serial communication over modems, multiplexers and any WAN. The same Host Mobius program on the VAX handles these connection types simultaneously.

For more information, contact Kathryn Merriam, Fel Computing, 10 Main St., Williamsville, VT 05362; (802) 348-7171. Visit Booth No. 206.

**Circle 488 on reader card**



## Avail Technologies Shows AbilityVMS

Avail Technologies Inc. will exhibit AbilityVMS at DEXPO West 89. AbilityVMS is a system software product designed to aid in VAX management by making important system resource information available quickly and easily.

AbilityVMS focuses on disk, file and process management, allowing efficient management of and increased performance from VAX system resources. It achieves this with a topical point-and-shoot menu interface for quick analysis and repair while providing DCL commands for in-depth, detailed investigation and correction. It monitors detailed and complex process information quickly and easily; recovers up to 27 percent of disk resources; locates and corrects potential VMS file security breaches or risks; analyzes volume information disk by disk; manages and controls disk space use; and identifies and corrects file ownership inconsistencies.

Pricing starts at \$250 for VAXstation licenses (media and documentation separate). For more information, contact Michael S. Sigourney, Avail Technologies Inc., 19800 MacArthur Blvd., Ste. 500, Irvine, CA 92715; (800) 634-6552. Visit Booth No. 2018.

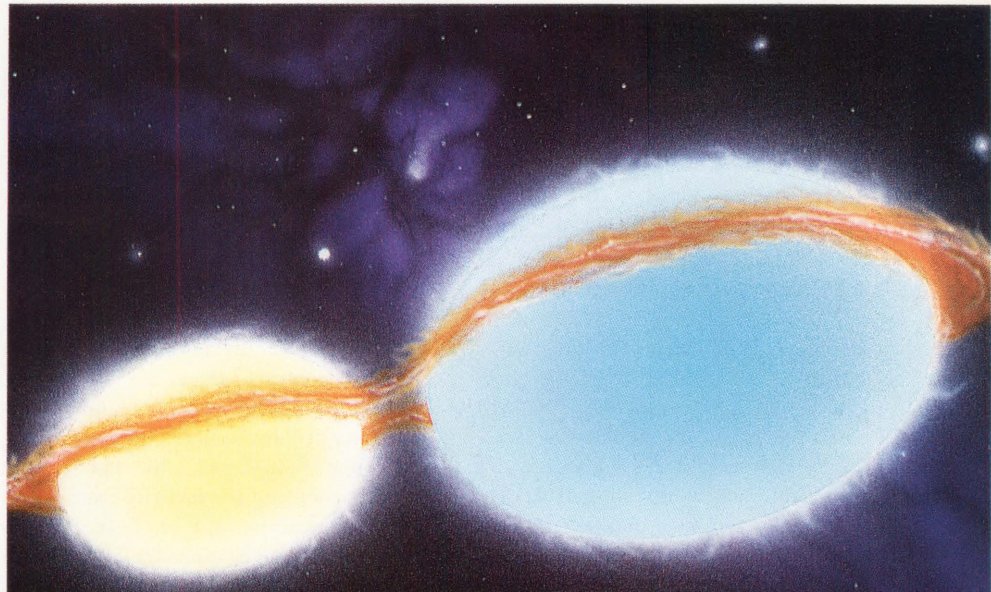
Circle 482 on reader card

## Control:Manufacturing Features Material Management

Cincom Systems Inc. announced release 6.4 of Control:Manufacturing. It features new and enhanced capabilities, including distributed multisite material management, a new engineering change control (ECC) module and functional enhancements to primary and advanced modules.

A major thrust of the release is support for a distributed, multisite manufacturing management information system. The object is to provide operational independence and management accountability for individual plants while implementing a single, companywide manufacturing management information system. The distributed system can encompass multiple processors or one processor with multiple databases. Enhancements include interplant sourcing definition, MRP-generated transfer schedules, transfer order management and consolidated inventory availability. For more information, contact Ronald R. Hank, Cincom Systems Inc., 2300 Montana Ave., Cincinnati, OH 45211; (513) 662-2300. Visit Booth No. 2747.

Circle 485 on reader card




VAX/VMS Network Software

# A NEW STAR IN NETWORK SECURITY.

*Now, there are even more reasons to make FUSION® an integral part of your VAX/VMS environment. When you install FUSION, you protect your sensitive network data from unwanted access, including potential viruses. System Administrators can block outside access to entire networks or subnetworks. FUSION's NetSecure can even shut down all new connections.*

*Because this happens at the transport level (TCP/IP), FUSION is extremely flexible without violating DARPA specifications. And FUSION validates users via the standard VMS LOGINOUT procedure. Other new features on the latest release of FUSION include increased performance and new network print features, such as the ability to spool a VMS print queue to a remote terminal server.*

*Maximum security, plus maximum power. Without losing functionality or control. Where there's energy and illumination, you'll find FUSION.*

 network  
research  
corporation

See us at  
DEXPO West Booth #641

2380 North Rose Avenue, Oxnard, CA 93030  
Toll Free: (800) 541-9508 ■ In CA: (805) 485-2700  
FAX: (805) 485-8204 ■ TELEX: 297579 NRCO UR

FUSION is a licensed trademark. Other trademarks: VAX, VMS, Digital Equipment Corporation



## LightDisk Rivals Winchester Performance

Summus Computer Systems announced the LightDisk rewritable magneto-optical disk drive for DEC systems. With the LightDisk, users with such needs as augmenting disk capacities, offloading databased files and providing high-capacity backup for archiving can have the convenience of removable media and performance approaching that of a Winchester drive.

The LightDisk has a capacity of 600 MB (300 MB per side) on a double-sided cartridge. Average seek time is less than 90 ms and user data transfer rates are 680 KB per second. The magneto-optical technology combines high performance and capacity with media designed to withstand real-world environments. Because it's read and written to by a beam of light, it doesn't suffer the wear of magnetic media. The LightDisk conforms to the continuous composite ISO standard format essential for data interchangeability among vendors.

The LightDisk for the Q-bus is priced from \$7,495.

For more information, contact Phil McCutchen, Summus Computer Systems, 17171 Park Row, Ste. 300, Houston, TX 77084; (713) 492-6611. Visit Booth No. 1217.

Circle 520 on reader card

## DISC Expands Its DBL Synergy Family

Digital Information Systems Corporation (DISC) announced new products in the DBL Synergy line. DBL Synergy is a business software-development language that preserves the power and versatility of a 3GL but provides the efficiency and productivity expected of fourth-generation utilities. DBL Synergy products and applications developed with DBL Synergy are portable across VMS, UNIX, MS-DOS, TSX-32, XENIX, ULTRIX, AIX, CTIX, LANs and other operating systems.

DBL Synergy Developers' Toolkit V2 is a set of utilities that enables developers to give their applications a current interface. The DBL Synergy Information Control System (ICS) makes non-compatible file structures

transparent, allowing programmers and users to combine, exchange and integrate data from differing file types. The DBL Synergy Configuration Management System (CMS) consists of the Polytron Version Control System and PolyMake utilities. The version control system provides control over the configuration of a developer's source code and documentation. DBL Synergy File Interfaces are object modules that can replace DBL-ISAM routines in the DBL run time. Down To Earth Business Systems V3 is a set of 13 accounting and business modules.

For more information, contact Beth Callahan, Digital Information Systems Corp., 11070 White Rock Rd., Ste. 210, Rancho Cordova, CA 95670; (916) 635-7300. Visit Booth No. 411.

Circle 545 on reader card

## Camintonn's CMX-2410 Achieves 32 MB Of Memory

Camintonn Corporation announced the CMX-2410, a 24-MB memory board for the VAXstation 3100. The CMX-2410 offers System 30 users a simple upgrade to full ca-

## 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

# 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.

 **BPA MEDIA INTELLIGENCE**

CIRCLE 166 ON READER CARD



capacity (32 MB) of system memory.

With the 24-MB CMX-2410, 32 MB can be achieved without discarding the 4-MB daughterboard. The other 4 MB is on the motherboard within the VAXstation 3100. The complete line of Camintonn boards for the VAXstation 3100 System 30/System 40 includes the CMX-810/1210/1610/2410 (8, 12, 16 and 24 MB respectively).

The CMX-2410 is priced at \$12,695.

For more information, contact Geneva J. Zagamaga, Camintonn Corp., 2332 McGaw Ave., Irvine, CA 92714; (714) 553-0247. Visit Booth No. 1370.

**Circle 543 on reader card**

### **Lease-A-Course Allows Training Customization**

Bernstein & Associates Inc. (B&A) announced Lease-A-Course. The product is for VAX/VMS users who want to do their own training but lack high-quality training materials.

You can choose from one of B&A's pre-built courses or customize your own course using B&A's Build-A-Course. With Build-A-Course, you can design your own three-, four- or five-day course by choosing from a group of more than 84 modules. A manual then is published from your specifications. You can duplicate the materials for your site as many times as you like.

The course materials are leased for one year and are priced at \$15,000 for a three-day course, \$18,000 for a four-day course and \$20,000 for a five-day course.

For more information, contact Bernstein & Associates Inc., 3 Dunwoody Park, Ste. 103, Atlanta, GA 30338; (404) 392-1488. Visit Booth No. 2738.

**Circle 483 on reader card**

### **Dilog's LAT Server System Provides Low-Cost Support**

Dilog announced the DTS-1000, a modular LAT server system that provides a low-cost way to connect from eight to 128 terminals to DEC Ethernet networks.

The DTS-1000 terminal server system architecture separates the network interface from the terminal connectivity hardware, placing each of these functions on separate card modules that are inserted into a communications chassis. The system is built around the DTS-1000 Base Unit, a rack-mountable or tabletop enclosure that contains up to five modular expansion cards. One system slot houses an Ethernet-compatible network in-

terface card and four slots house from one to four asynchronous line cards for connection of user terminals and other devices.

An eight-port DTS-1000 with one Ethernet interface card and one RS-323 line card costs \$3,499. A 128-line DTS-1000 system with one network interface card and four 32-line RS-423 line cards costs \$14,996.

For more information, contact Judie Dutton, Dilog, 1555 S. Sinclair St., Anaheim, CA 92806; (714) 937-5700. Visit Booth No. 1420.

**Circle 529 on reader card**

### **Compu-Share Announces DECwindows Implementation**

Compu-Share Inc. will exhibit its Human Resources Management Module, a commercial application of DECwindows technology, at DEXPO West 89. This windowing implementation features the ability to recall scanned images of supporting source documents. These might include resumes, letters of recommendation and government forms.

Other new features include a G/L budgeting module integrated with Access Technology's 20/20 spreadsheet. Compu-Share's financial accounting and wholesale distribution offerings include General Ledger, Accounts Payable, Accounts Receivable, Order Entry, Inventory Control, Purchasing, Payroll and Fixed Assets. All software is written exclusively for the VAX/VMS platform. For more information, contact Stephen G. Sargent, Compu-Share Inc., 5214 68th St., Lubbock, TX 79424; (806) 794-1400. Visit Booth No. 1356.

**Circle 486 on reader card**

### **Datability Announces 16-Port Line Card**

Datability Software Systems Inc. announced a 16-port line card for its Vista Communications Platform. The line card lets you configure a LAT-compatible Vista Server with 16 ports. Vista lets you select any combination of eight-, 16- or 32-port line cards for insertion into four slots in a single Vista chassis. With four 32-port cards, a Vista server can support 128 users in the space of a DECserver 200, which has an 8-port capacity. The line card makes possible a 16-port Vista server that costs \$4,299.

The company also will exhibit other new products at DEXPO West 89, including TCP/IP NIC, X.25 and on-board eight-modem line cards for the Vista server, a se-

rial-to-parallel converter and new RAF software capabilities

For more information, contact Jim Gallagher, Datability Software Systems Inc., 322 Eighth Ave., New York, NY 10001; (212) 807-7800. Visit Booth No. 2200.

**Circle 473 on reader card**

### **Data Retrieval TextBook Manages Text And Images**

Data Retrieval Corporation announced TextBook Online Manuals, an application system that uses a free-form full-text database to manage large amounts of reference information and images online.

TextBook lets you store, update, search and retrieve reference information in paper or book format. After transferring text and images into a database via a scanner or word processing application, you can search and retrieve information by any word or phrase. Search facilities include a table of contents. A word index is generated by the software that captures and lists all words entered in the database and reflects changes made.

TextBook runs on all VAX/VMS and IBM MVS/CICS systems. Prices begin at \$9,300 for non-graphics and \$14,925 for graphics-capable applications.

For more information, contact Kelly Keyes, Data Retrieval Corp., 8989 N. Deerwood Dr., Milwaukee, WI 53223; (414) 355-5900. Visit Booth No. 625.

**Circle 523 on reader card**

### **DDA Promotes Used DEC Equipment**

The Digital Dealers Associations (DDA) will exhibit at DEXPO West 89. DDA promotes the use of used DEC equipment.

DEC resellers are encouraged to visit DDA to learn about joining this trade association. The association aims to ensure DEC users that they're dealing with responsible companies. DDA has established orderly growth in the secondary market for DEC products. Meetings are held twice each year, with programs geared to advance members' professional skills and business practices. An increasing number of services are available to members. A *DDA News* newsletter is published quarterly.

For more information, contact Willah Weddon, Digital Dealers Association, 107 1/2 S. Main St., Ste. 202, Chelsea, MI 48118; (313) 475-8333. Visit Booth No. 135.

**Circle 487 on reader card**



## VAX-Alert Monitors VAX System Activities

Data Center Software Inc. announced the latest in its line of system-management utilities, VAX-Alert. The VAX-Alert VAX system monitor continuously monitors predefined system activities and notifies appropriate personnel of such activities via VMS Mail or Broadcast. VAX-Alert automatically can remedy certain problem areas. A log file of all VAX-Alert activities can be generated.

Batch and output queues can be monitored for such statuses as paused, stopped, stalled or executing. Optionally paused or stopped queues can be restarted automatically, eliminating the need for operator intervention. Inactive users can be logged off after a preset interval, improving system security and freeing unused ports. VAX-Alert can monitor devices for device errors and availability. When error thresholds are detected, operations staff can be notified automatically. Free disk space can be monitored, warning users of disk-space problems.

VAX-Alert costs from \$395 to \$995, depending on CPU.

For more information, contact Data Center Software Inc., 70 Herrick St., Beverly, MA 01915; (508) 922-5500. Visit Booth No. 427.

**Circle 544 on reader card**

## I/O Express Improves Disk Access Performance

Executive Software Inc. will exhibit I/O Express, an automatic disk access tuning utility, at DEXPO West 89. I/O Express uses disk data caching to achieve performance gains in disk access. It dynamically determines which disk blocks to keep in cache using a proprietary algorithm that automatically adjusts to the requirements of the applications being run.

Executive Software also announced Diskeeper/Plus on-line disk defragmentation software. The company offers 18 specialized versions of the defragmenter, which also can be customized for an individual site. It features full compatibility with Ingres and provides defragmentation of user and directory files on-line when users are active on the system, with no possibility of file access conflicts. It works with third-party disk controllers, even when full VMS DSA architecture isn't supported. The product runs on any supported VAX/VMS system.

Diskeeper/Plus ranges in price from \$250 to \$8,000, depending on configuration. For more information, contact Jeff Hodgson,

Executive Software Inc., 2219 Broadview, Glendale, CA 91208; (818) 249-4707. Visit Booth No. 226.

**Circle 490 on reader card**

## Intra's SAM2010 Protects Computers

Intra Computer Inc. announced the SAM2010. It can power down a host computer system when such environmental conditions as heat, humidity, smoke or water endanger the computer.

The SAM2010 can be mounted in a standard 19-inch RETMA rack. It includes a digital temperature display, two temperature probes, nine inputs for sensors and four software-controllable relay outputs that can be used to power-down a system and activate auto-dialers or other warning devices. Environmental conditions are logged and monitored by the host system to ensure that they are in safe operating range. If not, the host alerts users and repair personnel, shuts down software and powers-down the computer if conditions become critical. SAM2010 communicates through a standard RS-232 asynchronous serial port available on all VAX computers and can be connected through a terminal server.

The product is priced from \$4,395 to \$5,980.

For more information, contact Intra Computer Inc., Dept. DXW89, 5th Fl., 875 Avenue of the Americas, New York, NY 10001; (212) 947-5533. Visit Booth No. 2757.

**Circle 532 on reader card**

/300 Series, Multiflow's second generation of VLIW systems, is an upgradable family offering peak performance from 53 to 215 mips and from 30 to 120 Mflops in 64-bit precision. Trace systems support applications for customers in scientific and engineering fields such as mechanical and electrical CAD, signal and image processing, finite element analysis, computational fluid dynamics, computational chemistry, plasma physics, neural networking and seismic surveying.

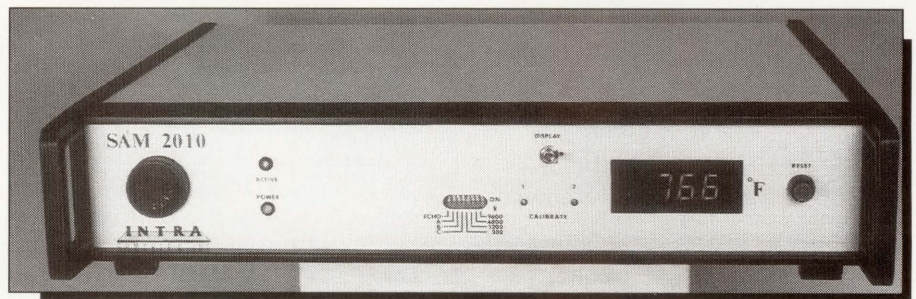
For more information, contact Mike Bernhardt, Multiflow Computer Inc., 175 N. Main St., Branford, CT 06405; (203) 488-6090. Visit Booth No. 2110.

**Circle 518 on reader card**

## Automatic Printer Selection Enhances Switchmate II

Gold Key Electronics Inc. announced internal programming for the Switchmate II Intelligent Printer Switch model SW6-ID2. The Switchmate II, developed for printer sharing in DEC environments, provides automatic shared access to one or two printers for up to six systems.

The new release features protection from the loss of print data by automatically verifying that printers are operational before and after each print job. Printer verification makes printer sharing an option for real-time reporting and remote access printing applications without the risk of lost data because of an offline or malfunctioning printer. When printer failures are detected, transfer of subsequent print data to the printer is suspended,



*Intra Computer Inc.'s SAM2010 can power down a host computer system.*

## Trace Systems Offer VMS Environment

Multiflow Computer Inc. will exhibit its Trace family of departmental supercomputers at DEXPO West 89.

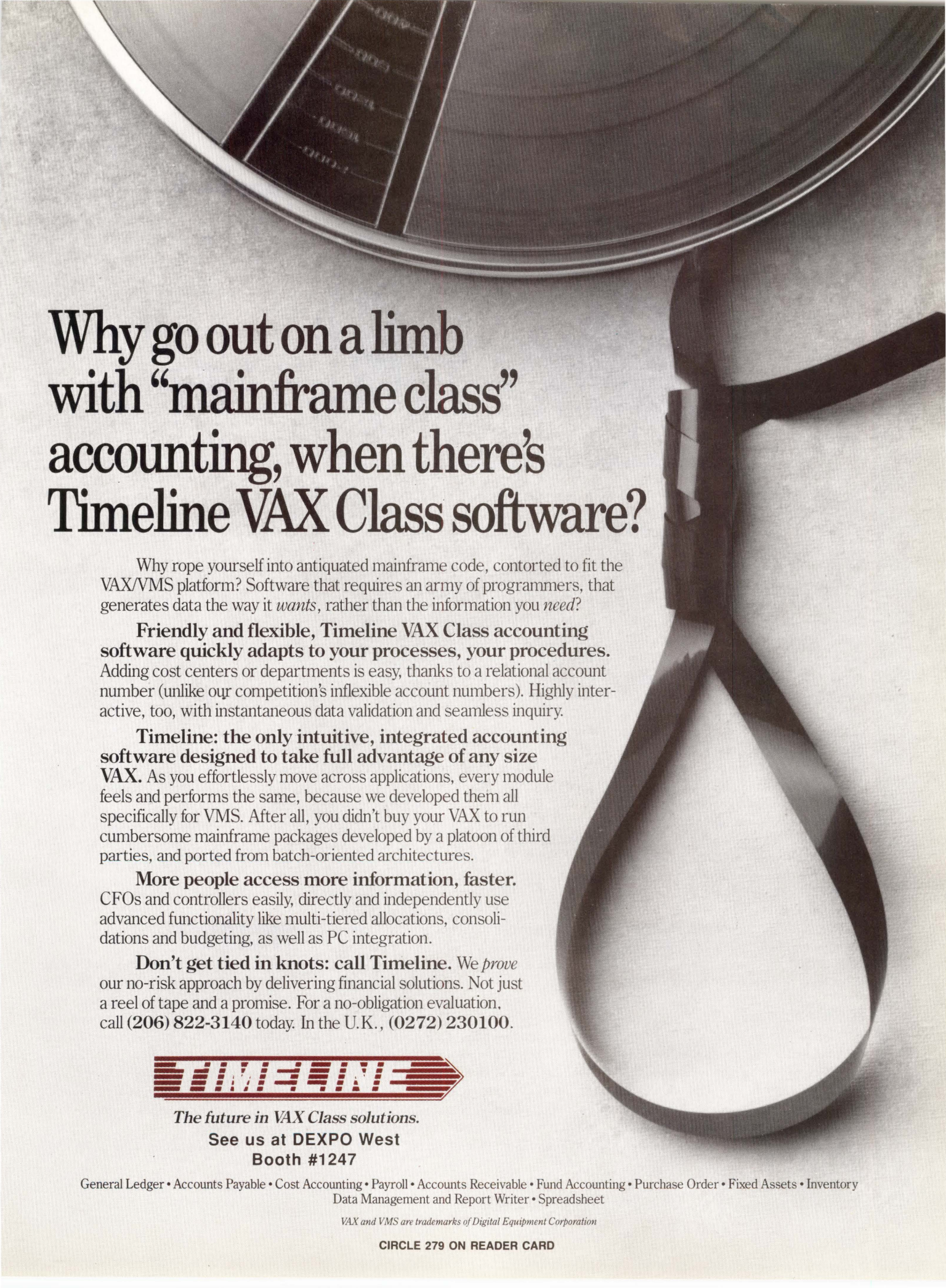
Trace systems offer a full VMS environment, including EDT, DCL, DECnet, DEC FORTRAN and VMS system services. The

and operators are alerted via panel lights.

Switchmate II program updates are free for those under warranty or service contracts. Program updates for other units cost \$50. For more information, contact Deirdre Branch, Gold Key Electronics Inc., 11 Cote Ave., Goffstown, NH 03045; (603) 625-8518. Visit Booth No. 2007.

**Circle 546 on reader card**





# Why go out on a limb with "mainframe class" accounting, when there's Timeline VAX Class software?

Why rope yourself into antiquated mainframe code, contorted to fit the VAX/VMS platform? Software that requires an army of programmers, that generates data the way it *wants*, rather than the information you *need*?

**Friendly and flexible, Timeline VAX Class accounting software quickly adapts to your processes, your procedures.** Adding cost centers or departments is easy, thanks to a relational account number (unlike our competition's inflexible account numbers). Highly interactive, too, with instantaneous data validation and seamless inquiry.

**Timeline: the only intuitive, integrated accounting software designed to take full advantage of any size VAX.** As you effortlessly move across applications, every module feels and performs the same, because we developed them all specifically for VMS. After all, you didn't buy your VAX to run cumbersome mainframe packages developed by a platoon of third parties, and ported from batch-oriented architectures.

**More people access more information, faster.** CFOs and controllers easily, directly and independently use advanced functionality like multi-tiered allocations, consolidations and budgeting, as well as PC integration.

**Don't get tied in knots: call Timeline.** We *prove* our no-risk approach by delivering financial solutions. Not just a reel of tape and a promise. For a no-obligation evaluation, call (206) 822-3140 today. In the U.K., (0272) 230100.



*The future in VAX Class solutions.*

**See us at DEXPO West  
Booth #1247**

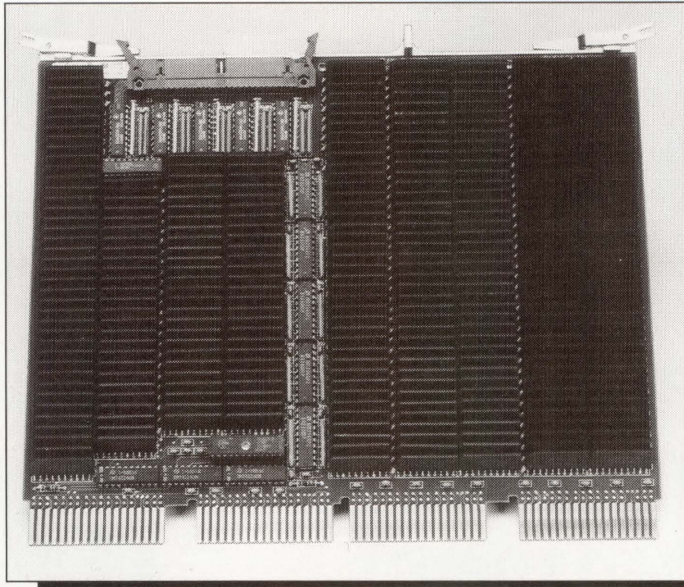
General Ledger • Accounts Payable • Cost Accounting • Payroll • Accounts Receivable • Fund Accounting • Purchase Order • Fixed Assets • Inventory  
Data Management and Report Writer • Spreadsheet

VAX and VMS are trademarks of Digital Equipment Corporation

**CIRCLE 279 ON READER CARD**



*Chrislin Industries' CI-MIV32 can enhance any member of the MicroVAX 3000 series.*



### **Sequelink Supports SuperCard Applications For The Mac**

TechGnosis Inc. announced that its Sequelink product now fully supports Mac applications created with the SuperCard personal software toolkit from Silicon Beach Software.

Sequelink consists of a set of software modules that allows seamless, cooperative processing between the Mac and host environments in a network. It can add value and functionality to customized business applications created with the SuperCard toolkit by providing a transparent way to use the full set of SQL services, delivered by one or more database servers on one or more networks, within the VAX/VMS environment. Sequelink allows access to online transaction-processing capabilities as well as vendor-specific extensions in the database through user-programmable applications.

Prices for a typical VAX/Mac installation are \$4,995 for the server module and \$200 to \$700 for each connected workstation.

For more information, contact Peter Goossens, TechGnosis Inc., 1 Park Pl., Ste. 340, Boca Raton, FL 33487; (407) 997-6687. Visit Booth No. 2300.

**Circle 522 on reader card**

### **CI-MIV32 Enhances MicroVAX 3000**

Chrislin Industries Inc. announced the CI-MIV32. It allows the maximum capacity of 64 MB of memory in any MicroVAX III backplane with only two cards. In BA123 and BA312 chassis, two quad slots are freed for other peripheral devices.

The CI-MIV32 can enhance any member of the MicroVAX 3000 series. The 32 MB is obtained on one board without piggyback boards or additional plug-in modules for added reliability. The CI-MIV32 is hardware- and software-compatible with any MicroVAX III and is available in configurations of 8, 16 and 32 MB. Word size is 32 bits and access time measured from CAS is 60 nanoseconds. Power requirements at +5V is 1.8A for the 32-MB option. The product comes with a lifetime parts and labor warranty and a 24-hour repair/replacement policy.

For more information, contact Chrislin Industries Inc., 31352 Via Colinas, No. 101, Westlake Village, CA 91362; (818) 991-2254. Visit Booth No. 1657.

**Circle 510 on reader card**

### **Racal-InterLan NI6510 Increases Performance**

Racal-InterLan Inc. announced the NI6510, a 16-bit Ethernet network controller initially targeted at performance-sensitive networks using Novell NetWare workstations and servers. An externally mounted switch lets you configure the controller to run PC AT-based NetWare systems on either thick or thin Ethernet.

Through the use of bus-mastering techniques and advanced design features, the NI6510 offers performance increases. The bus-master controls the bus to transfer data efficiently to and from host memory, thereby improving overall performance of networked applications. The initial set of software drivers is workstation and server drivers for

Novell NetWare 286 V2.15, a NetWare V2.15 client driver with TCP/IP, menu-driven diagnostics and a boot ROM driver for use with diskless PCs. In addition to a driver-development kit, drivers are forthcoming for such networking operating systems as LAN Manager and 3+ Open.

The NI6510 is priced at \$495.

For more information, contact Mark Williams, Racal-InterLan Inc., 155 Swanson Rd., Boxborough, MA 01719; (508) 263-9929. Visit Booth No. 236.

**Circle 519 on reader card**

### **SmartStar Supports New VAX/VMS Features**

SmartStar Corporation announced the SmartStar Applications Development Environment V5.3, a 4GL software product.

The release supports new VAX/VMS features and offers connections to new relational databases. Database connections are provided for Oracle, Interbase and the Sharebase Server/8000. Support for RMS and Rdb/VMS file structures has been expanded. Oracle users can take advantage of such SmartStar features as SQL-based report writing with statistical aggregates and the capability to create cascaded scrolling region applications without resorting to syntax or programming. SmartStar supports a new pass-through feature that enables the experienced Oracle user to use non-standard, Oracle-specific commands from within the SmartStar environment. Support for RMS file structure has been enhanced to include aspects found in a database operating system, such as RMS journaling. This enables data consistency to be enforced for RMS files.

For more information, contact David Baum, SmartStar Corp., 120 Cremona Dr., Goleta, CA 93116; (805) 685-8000. Visit Booth No. 1260.

**Circle 547 on reader card**

### **Interlink Manages SNA And DECnet**

Interlink Computer Sciences Inc. will exhibit the ability to manage SNA and DECnet networks from a single console at DEXPO West 89. Interlink's SNS/NETconnect, used with Interlink's SNS/SNA Gateway, provides real-time accessibility to standard DECnet network management tools (NCP) for monitoring, controlling, testing and configuring DECnet networks from a single IBM NetView console.

SNS/NETconnect uses NetView



(NPDA) to report DECnet events with IBM alert formats and screens. The network operator views events that occur in the DECnet network displayed in real-time on the console and can respond to situations that require action.

For more information, contact Peri Thompson, Interlink Computer Sciences Inc., 47370 Fremont Blvd., Fremont, CA 94538; (415) 657-9800. Visit Booth No. 1334.

**Circle 517 on reader card**

### **ECAP Enhances Outpost Printer Utility**

ECAP Systems Inc. announced a new version of Outpost, its PostScript printer utility.

Outpost is now available in two flavors: the original VMS verb and a print symbiont implementation. It has an enhanced menu system and is network- and cluster-compatible. You can define and save multiple document profiles that set margins, default font, leading and other layout parameters. Special setup sequences required by particular printers can be specified through Outpost.

Outpost prices start at \$400 for Micro-VAX II or 3100.

For more information, contact Eric Covington, ECAP Systems Inc., 83 St. Euphemie, Casselman, ON K0A 1M0; (613) 764-3889. Visit Booth No. 616.

**Circle 530 on reader card**

### **Direct-To-1 Provides ALL-IN-1 Interface**

Walker Richer & Quinn Inc. announced Direct-To-1, an interface between PCs running the company's Reflection and ALL-IN-1. A complement to Reflection, Direct-To-1 provides PC file-transfer capabilities to ALL-IN-1 office-automation facilities.

With Direct-To-1, ALL-IN-1 users can send files to and from the PC without leaving ALL-IN-1. Through Reflection, you can transfer ASCII, Binary or IMAGE files between the VAX and the PC while remaining in the ALL-IN-1 environment. You can transfer WPS-Plus, WordPerfect and DECdx formatted files. File transfers can be sent over any asynchronous connection or to the more than 20 networks supported by Reflection.

With Reflection's multitasking feature, Direct-To-1 allows file transfers to proceed to ALL-IN-1 on the VAX while you're working in foreground on the PC. Direct-To-1 requires Reflection 2, 2 Plus, 4 or 4 Plus V3.4 or later; ALL-IN-1 V2.3 or later; and VAXLINK.EXE uploaded to the VAX.

The product costs \$2,500 per VAX. For more information, contact Carolyn Bakamis, Walker Richer & Quinn Inc., P.O. Box 31876, Seattle, WA 98103; (206) 324-0350. Visit Booth No. 1211.

**Circle 548 on reader card**

### **System Industries Debuts Performance Arrays**

System Industries will exhibit SI Performance Array data storage subsystems, which incorporate solid-state disk technology in a standard configuration, at DEXPO West 89.

The Performance Arrays, which provide up to 665 I/O per second throughput and capacities ranging from 2 GB to more than 10 GB, are based on the concept of tiered storage. In a tiered storage architecture, files are arranged to match how frequently a file

## **Allied Telesis adds more functionality in the DECnet environment.**

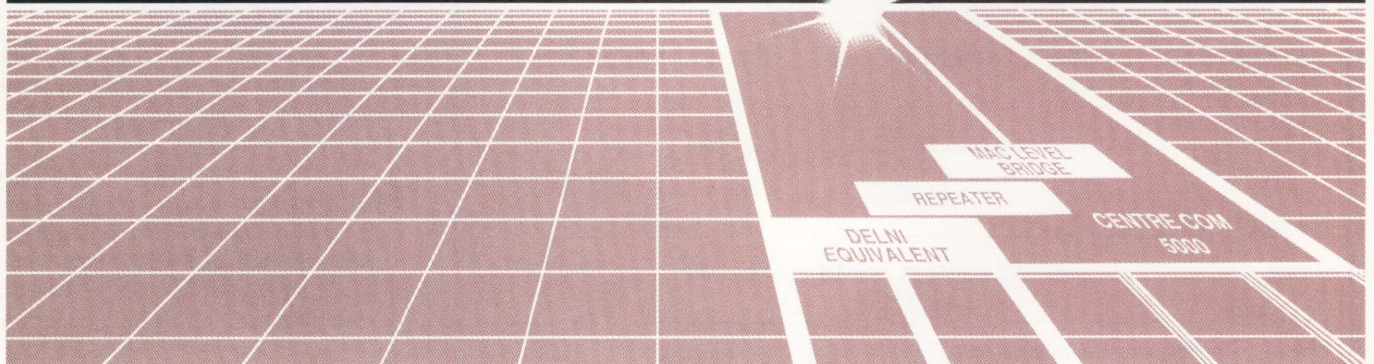
Allied Telesis is a specialist in Ethernet building blocks, adding more modular plug-in functionality and allowing more configuration options. Allied Telesis AT-5000 is a unique Multimedia Concentrator offering IEEE 802.3 Ethernet based repeaters, transceivers, fiber optics and MAC layer bridge options. Repeater and transceiver modules can be mixed within the same chassis. ATI also offers single, dual, and multiport transceivers and repeaters.



# Allied Telesis Inc.

627 National Avenue  
Mountain View, CA 94043  
(415) 964-2771  
FAX: (415) 964-0944

*Excellence in Connectivity*



**CIRCLE 358 ON READER CARD**



# BUILD YOUR COMPUTER LIBRARY DEC Professional

**ORDER NOW!  
Supplies Are limited!**

## Back Issue Sets Now Available!

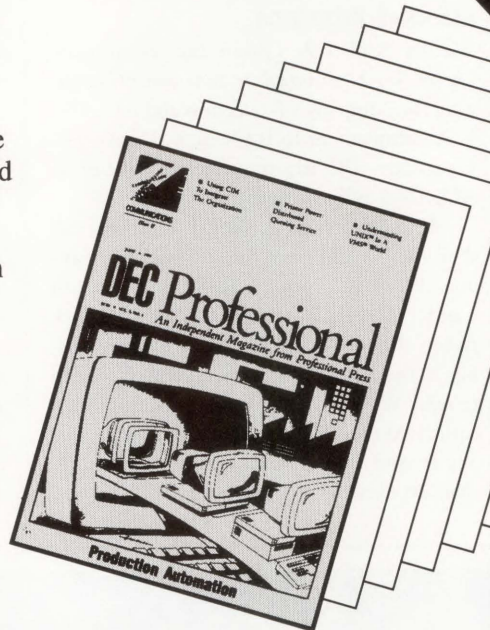
DEC users read our magazine from cover to cover, use it and reuse it to help solve daily problems, improve their professional skills, and widen their perspectives.

Now you can build your computer library, receive issues you missed and replace well-worn copies.

Order over 50 back issues of DEC Professional, July 1983 to present, as a set and save.

**Order Now! Supplies Are Limited!**  
(Offer limited to US and Canada Only.)

**TO ORDER CALL (215) 957-1500 with your credit card information. Or complete and return the order form below. Prepayment must be included with your order.**



▼ Clip and Send ▼

▼ Clip and Send ▼

## BACK ISSUE ORDER FORM - DEC Professional

Please send \_\_\_\_\_ set(s) of over 50 back issues of DEC Professional. \$200 for each set ordered. Includes shipping by surface mail. Add \$10 for each set delivered to Canada.

PLEASE MAKE PAYMENT IN U.S. DOLLARS AND DRAWN ON A U.S. BANK.  
Offer Limited to US and Canada only.

Check enclosed for \$ \_\_\_\_\_

Charge to:  VISA  MASTERCARD  American Express

Account # \_\_\_\_\_ Ex. Date \_\_\_\_\_ / \_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_

NAME \_\_\_\_\_  
PLEASE PRINT

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

COUNTRY \_\_\_\_\_ TELEPHONE ( \_\_\_\_\_ ) \_\_\_\_\_

**Mail completed form with payment to:**

**PROFESSIONAL PRESS INC., P.O. Box 218, Horsham, PA 19044-0218**

is accessed to the I/O performance of the device.

Also being shown is the MegaRam-SDI solid-state disk that supports direct connection to HSC40/50/70 and KDB50 controllers. Other products on display will include System Industries' complete family of tape products, including models that support direct connection to the HSC.

For more information, contact Brian Edwards, System Industries, 560 Cottonwood Dr., Milpitas, CA 95035; (408) 432-1212. Visit Booth No. 1312.

**Circle 521 on reader card**

## Demax Software Releases Enhanced System Utilities

Demax Software announced new releases of Securepak, the Dynamic Load Balancer, Pakmanager and Squeezeapak.

Securepak release 2.0, a security-management tool that enhances VAX/VMS security, has a password manager that reports, analyzes and identifies primary and secondary password exposures. Dynamic Load Balancer release 2.0, a performance-tuning utility for VAX/VMS systems, contains a systems-efficiency index that tracks values affecting performance and computes an efficiency coefficient at regular intervals.

Squeezeapak release 3.1 is an online disk-defragmentation utility that offers an improved user interface for better file handling and defragmentation capabilities.

Pakmanager release 2.1, a disk-management system for automating the identification and recovery of wasted disk space, features reporting capabilities, including space usage analysis.

These releases support VMS V4.2 or later. For more information, contact Susan Renner, Demax Software, 999 Baker Way, Ste. 500, San Mateo, CA 94404; (415) 341-9017. Visit Booth No. 419.

**Circle 528 on reader card**

## Texas Instruments Expands Impact Printer Line

Texas Instruments Inc. (TI) announced five impact printers that bring enhanced forms printing to the high and low ends of TI's Omni 800 printer line.

The 8900 Series Models 8930, 8920 and 8920C are for use in shared-resource, forms-intensive environments. They can print six-to-nine-part forms at up to 600 cps with an 18-pin printhead. Models 8930 and 8920 are wide-carriage printers that combine forms



handling with printer and paper-handling characteristics. The Z-Axis Control printhead controller detects a form's thickness and adjusts the printhead position. The Page Finder avoids misaligned pages by sensing right and left margins. The 8900 Series Models 830 and 835 are workstation printers with paper-handling features for low-end forms and personal printing needs. These nine-pin printers can handle five-part forms at speeds up to 300 cps.

The Model 8930 costs \$2,545, the Model 8920, \$2,345, and the Model 8920C, \$2,445. The Model 830 costs \$579, the Model 835, \$829.

For more information, contact Texas Instruments Inc., Data Systems Group, P.O. Box 202230, DSG-278, Austin, TX 78720; (800) 527-3500. Visit Booth No. 227.

**Circle 502 on reader card**

### **Polestar Software Launches Windows Software For VTs**

Polestar Software announced Polestar Windows, which expands the capabilities of VT100/220/320 terminals on VAX/VMS systems. It provides nine multitasking windows on one terminal. No hardware upgrades or software rewriting are necessary.

Polestar Windows runs on VAXs from the MicroVAX 2000 to the VAX 9000. The development objective for Polestar Windows was to create a fluid and seamless environment for VT terminal users. It gives you control over the position and number of windows displayed. Programs can be left running in the background and can be brought back on screen at any time, suspended and re-entered at the same point. Procedures for setting up programs and windows can be automated. Switching from one program to another is performed with two keystrokes. Windows can be relocated using arrow keys.

A single-user license for Polestar Windows costs \$495.

For more information, contact David McGinnis, Polestar Software, 109 1/2 W. Broadway, Fairfield, IA 52556; (515) 472-2445. Visit Booth No. 3115.

**Circle 392 on reader card**

### **Excelan Supports SCO UNIX System V, Release 3.2**

Excelan Inc. announced a version of its LAN WorkPlace TCP/IP networking software ported to SCO UNIX System V, Release 3.2. As with Excelan's LAN WorkPlace products for DOS, OS/2, XENIX and Mac systems, this product gives PC users direct and simplified access to a complex array of information

and applications typical of large-scale LANs.

LAN WorkPlace software lets you share network resources such as printers and disk drives and facilitates file transfer throughout an industry-standard LAN. The product will support popular distributed file systems as they become available for the SCO UNIX environment. LAN WorkPlace products are designed to run in conjunction with Excelan's high-performance EXOS series of intelligent Ethernet controllers, including the 205T for AT bus systems and 215T for MicroChannel systems on standard or thin Ethernet and the 205L for AT systems on standard Ethernet or LattisNet networks.

LAN WorkPlace for SCO UNIX System V, Release 3.2 costs \$695.

For more information, contact Peter Troop, Excelan Inc., 2180 Fortune Dr., San Jose, CA 95131; (408) 473-8361. Visit Booth No. 2514.

**Circle 575 on reader card**

### **LSI-X.25 VAX/VMS Ethernet FEP Improves X.25 Communications**

Microtronix Datacom Ltd. announced the LSI-X.25 Ethernet front-end processor (FEP). Based on DEC's LSI series of Cabinetry and Boards along with Microtronix software, the FEP is connected to DEC's Ethernet LAN.

To meet the requirements of VAX users, the LSI-X.25 accommodates up to 128 terminals. It also can facilitate DECnet DDCMP links over the X.25 network. The network interface can consist of up to five X.25 links capable of transmitting data at 19.2 Kbps. The main feature of the LSI-X.25 is that it coexists with DECnet or any other Ethernet application and makes use of the VAX/VMS Ethernet driver. The FEP monitors all three layers of the X.25 protocol, so the burden of communications processing is removed from the host, resulting in significant performance gains. The FEP is transparent to the host, which treats any remotely connected terminal as if it were an ordinary dial-up modem connection on a standard asynchronous port.

For more information, contact Karen Auzins, Microtronix Datacom Ltd., 125 Bessemer Rd., London, ON N6E 1P9; (519) 681-3430. Visit Booth No. 2036.

**Circle 390 on reader card**

### **Servio Logic Announces GemStone For DEC Platforms**

Servio Logic Development Corporation announced a version of its GemStone object-oriented DBMS for DEC workstations and systems. GemStone is now available for the RISC-based DECstation 2100/3100 and the

DECsystem 3100/5400/5810/5820 running ULTRIX.

GemStone offers the benefits of an object-oriented DBMS in a way that provides platform and configuration independence through its client/server architecture. The server software operates on the host — a DECstation 2100/3100, DECsystem 3100/5400/5810/5820, VAX, Sun-3/4 or an IBM RT workstation — and includes a computationally complete object-oriented programming language, OPAL, for data definition and manipulation. You can reside on any of the computers operating as servers or clients or on an IBM PC or Mac II. Applications can be written in procedural languages such as C or FORTRAN or in object-oriented languages such as Smalltalk or Ada.

Prices range from \$22,000 for a one- to four-user license on a DECstation 2100 to \$87,000 for a one- to 64-user license on a DECsystem 5820.

For more information, contact J. Michael Connell, Servio Logic Development Corp., 15220 N.W. Greenbrier Pkwy., Ste. 100, Beaverton, OR 97006; (503) 629-8383. Visit Booth No. 3118.

**Circle 434 on reader card**

### **Output Technology Exhibits DEC-Compatible Printers**

Output Technology Corporation will demonstrate its two newest DEC-compatible printers at DEXPO West 89. The 560DL offers DEC LA 210 and 120 emulation, and the model 2132 offers DEC 210 emulation.

The 560DL is a 560-cps two-headed dot-matrix printer geared for companies with heavy printing requirements. Features include front-panel menu programming, built-in bar codes, data buffers up to 20 KB, convenient front and bottom paper feed, multipitch printing, full international character set, serial and parallel interfaces, plus Epson, DEC and IBM Proprietary XL emulation.

The model 2132 full-featured line printer offers speeds of 300 lpm in draft mode and 350 lpm in high-speed draft. Features include built-in bar codes, dot-addressable graphics, serial and parallel interfaces, plus Epson FX 286e, IBM Proprietary XL, Printronix P6000 and DEC LA 210 emulation.

The 560DL costs \$1,995. The model 2132 costs \$3,995.

For more information, contact Marie Hartis, Output Technology Corp., E. 9922 Montgomery, Spokane, WA 99206; (509) 926-3855. Visit Booth No. 216.

**Circle 391 on reader card**



## Precision Visuals Announces PicSure Plus Interface

Precision Visuals Inc. will demonstrate PicSure Plus 3.0 at DEXPO West 89. PicSure Plus 3.0 features a Lotus 1-2-3-style interface and other enhancements.

The increased functionality offers users of DEC workstations, MicroVAXs and low-end minis sophisticated presentation graphics. PicSure Plus is a menu- or command-driven system for producing presentation-quality graphics. Features include a simplified Lotus 1-2-3 menu interface, new presentation-graphics options, special data and data-analysis features, and new charting techniques.

The company also will demonstrate a PicSure Plus/ALL-IN-1 package. It lets ALL-IN-1 users produce sophisticated presentation graphics and charts within the ALL-IN-1 framework. The charts can be integrated into word processing documents for final publication to more than 100 output devices. For more information, contact Chris Logan, Precision Visuals Inc., 6260 Lookout Rd., Boulder, CO 80301; (303) 530-9000. Visit Booth No. 1712.

**Circle 393 on reader card**

## Advanced CPU Upgrades For VAX 8600/8650

Nemonix Inc. will show its advanced NX860 Series of CPU upgrades for the VAX 8600/8650 at DEXPO West 89. The upgrades boost performance of a VAX 8600 up to 78 percent and a VAX 8650 up to 38 percent. The result is mip performance exceeding that of DEC's 6000 Model 210/310/410 single-processor CPU.

The NX860-XLC consists of an accelerator module and a cache and translation buffer upgrade and is compatible with the VAX 8600. The NX860-CTU is a cache and translation buffer upgrade for the VAX 8600/8650. The NX860-XL is an accelerator module for the VAX 8600. All upgrades are transparent to existing software and are fully hardware-compatible.

In support of the VAX-to-Mac connection, Nemonix will show its line of CPU accelerators, video cards and combined accelerator/video cards for the Macintosh Plus and SE. Nemonix CPU accelerators improve the performance of a Mac SE up to four times. For more information, contact Peter Cholakis, Nemonix Inc., 106 South St., Hopkinton, MA 01748; (508) 435-9087. Stop by Booth No. 2805.

**Circle 394 on reader card**

## Peritek Announces VCL-Q For Q-Bus-Series Computers

Peritek Corporation announced the VCL-Q for MicroVAXs and LSI-11s, a high-resolution, high-speed graphics display controller combined with a 68030 CPU on a single Q-bus full-height board.

VCL-Q display resolution is 1,024 x 1,024 x 8 bits/pixels primary graphics with a 1,024 x 1,024 x 4 bits/pixels graphic overlay. Display memories can be expanded to 2,048 x 1,024 pixels. The VCL-Q contains an ACRTC and provides 23 on-board drawing functions. Display timing is flexible, supporting almost any screen resolution from 64 to 1,024 pixels at 30 Hz or 60 Hz vertical and 15.7 KHz to 58 KHz horizontal refresh rate. The board supports hardware pan and zoom and smooth vertical scrolling. The VCL-Q has an advanced color map controller that converts the primary and overlay graphics data into 24-bit analog output signals. The controller also supplies an independent 2-bit graphics cursor with crosshair and 64 x 64 bit map functions.

Pricing begins at \$4,870.

For more information, contact Nancy Hurwitz, Peritek Corp., 5550 Redwood Rd., Oakland, CA 94619; (415) 531-6500. Visit Booth No. 223.

**Circle 387 on reader card**

## Giga Vault 650 Offers Drive Reliability

See First Technology Inc. announced the Giga Vault 650 optical drive system for Q-bus and UNIBUS. The drive operates on the principle of thermomagnetic recording. It's reliable because nothing comes in contact with the media, which is read by a laser beam.

The subsystem interfaces to the computer through a SCSI host adapter that provides total emulation and makes the optical system look like a DU device to the operating system. A different host adapter is used for Q-bus and UNIBUS systems. The drive provides 594 MB of formatted memory in a 5 1/4-inch cartridge. Average search time is about 60 ms. Data is accessed randomly. The media weighs six ounces, so it can be removed and stored in a remote location for security. The drive can be mounted into a 5 1/4-inch slot in the main chassis or purchased in a cabinet with a self-contained power supply.

The product costs \$7,195 for Q-bus and \$7,595 for UNIBUS. It comes with a one-year warranty.

For more information, contact Karen Martin, See First Technology Inc., 4655 Old Ironsides

Dr., Ste. 100, Santa Clara, CA 95054; (408) 748-7717. Visit Booth No. 221.

**Circle 576 on reader card**

## Asynchserver Lets Mac Users Dial Into VAX/VMS

Computer Methods Corporation announced the Asynchserver, a Mac-VAX/VMS connectivity product designed with the Portable Macintosh in mind.

Asynchserver is VAX-based software that lets Mac users dial into a VAX/VMS system and use Mac-VAX connectivity products such as AlisaTalk, PacerShare and Helix VMX over ordinary asynchronous terminal lines. Because Asynchserver is based on AppleTalk for VMS, it lets a client Mac communicate with the AppleTalk-based facilities in your organization through the VAX host. For users connected locally over dedicated, asynchronous lines, Asynchserver offers low-cost AppleTalk networking using existing VAX terminal port hardware. Asynchserver also delivers AppleTalk services to Mac users over ordinary dial-up lines using existing modem equipment.

Asynchserver is licensed for use on a single VAX CPU. A license costs from \$595 for a MicroVAX II to \$1,895 for a VAX 6xxx.

For more information, contact Anthony V. Caraffa, Computer Methods Corp, 525 Rt. 73 S., Ste. 300, Marlton, NJ 08053; (609) 596-4360. Visit Booth No. 2306.

**Circle 475 on reader card**

## Dataram Memory Boards Enhance 3100 Series

Dataram Corporation announced four completely compatible memory upgrades, including a 24-MB expansion board, for the VAXstation, MicroVAX and VAXserver 3100. The design maximizes chassis space and allows room for the 24-MB expansion board.

The DR-3100VS 8-, 12-, 16- and 24-MB memory-expansion boards offer the 3100-series user many configuration options. They're priced below comparable DEC products, so you can purchase 3100s with minimum 4- or 8-MB memory, then cost-effectively upgrade your memory capacities. Dataram offers a lifetime warranty, a 30-day no-obligation trial period and an Express Spares Program.

The DR-3100VS memory-expansion boards are priced at \$5,400 (8 MB), \$7,200 (12 MB), \$9,600 (16 MB) and \$13,800 (24 MB). For more information, contact Dataram Corp., P.O. Box 7528, Princeton, NJ 08543; (609) 799-0071. Visit Booth No. 633.

**Circle 539 on reader card** ■



digital

digital

# 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 MVII Inventory!!*



Boston Boards  
&  
Systems



Boston Boards  
&  
Systems

# '89 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!!**

**TRADES  
WELCOME**

**SPECIAL:  
8000 SPARES**

**WE ALSO BUY NEW & USED  
EXCESS \*DEC INVENTORY**

FAX: 617-585-6211

TELEX: #920-038BBS \*Digital is a registered trademark of Digital Equipment Corporation



KENNEDY



digital

digital



# BUY, SELL, RENT DEC/VAX

- ◆ New and used equipment
- ◆ DEC maintenance guaranteed
- ◆ 3- to 12-month rental terms
- ◆ Purchase accruals
- ◆ Immediate delivery

"Since 1966"

**dda**  
DIGITAL  
DEALERS  
ASSOCIATION



Equipment Corporation

26319 I-45 North, The Woodlands, TX 77380

**TEL: 800-288-1846**

FAX: 713-292-1474

**We buy surplus DEC/VAX**

**WE BUY, SELL, LEASE & TRADE**

**WE WILL PAY**

**\$\$ CASH \$\$**

for your surplus DEC and  
DEC compatible Hardware

See us at DEXPO West - Booth Number 2604  
November 7-9, 1989

**MICRO VAX II and MICRO VAX III  
SYSTEMS IN STOCK**

MENTION THIS AD AND RECEIVE A  
"DEXPO SPECIAL" DISCOUNT!

Call For A Free Catalogue

(612) 884-6601

FAX (612) 884-6652



**Minnecomputers, Inc.**

**dda**  
DIGITAL  
DEALERS  
ASSOCIATION

9555 James Avenue South • Minneapolis, MN 55431

**Get the Efficiency Advantage!**

**KA630**

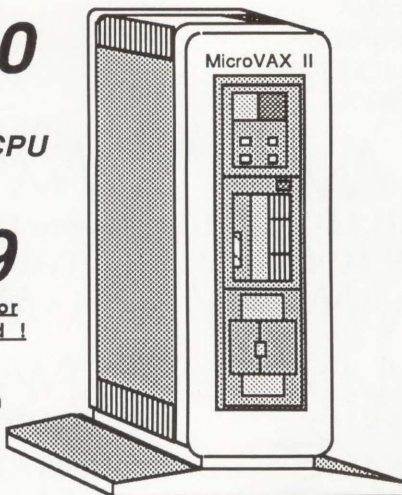
(M7606)

**Micro Vax II CPU  
Repair**

**\$1089**

Includes parts/labor  
and Fast turnaround!

For immediate attention  
include your purchase  
order and ship to:



See us at DEXPO West Booth #414



**EFFICIENT FIELD  
SERVICE CORP**

Or Call

800-257-4745

508-251-7800 InMA

508-251-4882 FAX.

11 School St. N. Chelmsford, Ma. 01863

The above are trademarks of digital equipment corp.

## Your Single Source for DEC<sup>®</sup> Maintenance Requirements

**DEC Depot Repair, Service Training, Spare Parts,  
Technical Support & Diagnostics**

- 1-Year Warranty on all Equipment Sales & Repairs
- PDP 8 to VAX 8800, and Peripherals Coverage
- 5 Day Standard Turnaround on Repairs
- Optional 24 hr. Emergency Repair
- Swap/Exchange Program
- Kit Leasing or Rentals
- Flat Rate Repair Prices/Volume Discounts
- Upgrades and ECOs at No Additional Cost
- Training, at Your Facility or ESS's
- An Inventory in Excess of 100,000 Items
- Same Day Shipments on Purchases
- Optional 24/7 Coverage
- CDC\* Depot Repair & Spares
- VAX System Integrity Monitor Software
- Media Conversions, Data Recovery, & Remote Diagnostics

**Call Us For Quotes**

**PHONE: 414-255-4634**

**FAX: 414-253-3262**

**TELEX: 260183 ESS LTD MEFS**

**dda**  
DIGITAL  
DEALERS  
ASSOCIATION



**ELECTRONIC SERVICE SPECIALISTS**


N92 W14612 Anthony Ave., Menomonee Falls, WI 53051

\* registered trademark of Digital Equipment Corp. A Bell Atlantic Company \* registered trademark of Control Data Corp.

**ESS Is Your Answer For DEC Repairs & Spares**



**CALIFORNIA DREAMIN'?**




Permanent and contract positions are now available for experienced DEC Professionals in the areas of

**DEC VAX/COBOL • DEC System Internals**  
**Systems Management • Operations**  
**Data Communications**

Offered exclusively through  
**EMJAY Computer Careers**  
 3901 Westlry Place, Suite 102  
 Newport Beach, CA 92660  
 Call 714/851-1441 or  
 Mail or FAX your resume today!  
 FAX: 714/851-6308

CIRCLE 232 ON READER CARD

IBMtap(es)  
 on  
 VAX(es)

Labeled or Unlabeled  
 Read or Write  
 Multi-volume, OS or DOS  
 Multiple datasets per volume  
 TA90's, VMS V4.x and V5.x

\$595 or call for corporate license

CRYSTAL SYSTEMS (919) 922-2287  
 3429 Mill Run Lane, Pfafftown, NC 27040



CIRCLE 193 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**  
 

EAST COAST WEST COAST  
 (516) 273-7777 (206) 392-9878

CIRCLE 203 ON READER CARD

**Sr. Programmer Analysts**  
**\$35 to \$60K**

We are the preferred vendor to a number of Fortune 500 companies whose ongoing needs continue to generate challenging consulting opportunities for DP professionals.

Join one of our teams in state-of-the-art projects and expand your 2+ years experience in one or more of the following disciplines: 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 Carol English at 1 (800) 444-4918 or Sarah Terry at 1 (800) 444-4917. **WESSON, TAYLOR, WELLS, Dept. DP-11, P.O. Box 1587, Camden, SC 29020.** Equal Opportunity Employer.



CIRCLE 381 ON READER CARD

**LN03 Logos, Signatures & BARCODE fonts**

custom graphics font files for  
**DECpage and WPS-Plus**  
 and most VAX/VMS applications

Signatures	\$ 160
Logos or 1/2 Width Letterheads	\$ 280
Full Width or Master Letterheads	\$ 450
Dept Letterhead from Master	\$ 250
Barcode 39 (standard sizes)	\$ 150

**Start producing results tailored to your corporate image.**

call: **(800) 448-5688**

**The Corporate IMAGE**

CIRCLE 345 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



CIRCLE 195 ON READER CARD

**Kill Idle Processes**

With **HITMAN**, you can free terminal lines and plug security leaks by logging inactive terminals off your VAX. **HITMAN** is safe and easy to use. And, it works under VMS 5.0!

**\$695**

**SAIGA Systems**  
 Suite 215, 801 - 6th Street S.W.  
 Calgary, Alberta, Canada T2P 3V8  
**(403) 263-1151**

CIRCLE 209 ON READER CARD

**Used DEC equipment is a bargain**



Most used equipment is maintained under contract with either Digital or a third party maintenance firm and will carry a warranty as to its working condition.

(313) 475-8333

DIGITAL DEALERS ASSOCIATION  
 See us at DEXPO West Booth #135  
 107 S. Main St. • Ste. 202 • Chelsea, MI 48118

CIRCLE 208 ON READER CARD

**DATA CONVERSION SERVICES**  
**OVER 1,500 FORMATS SUPPORTED**

*Conversions from tape to disk, disk to disk, disk to tape, Mag-Tape*  
 800/1600/6250 BPI

**We can do all DEC formats:**

- RSX11M • RT11 • TSX Plus • \*VAX/VMS
- MASSII • WORD-II • WORDMARC • DECDX • ALL-IN-1 • TK50 • PCBASE • WORD PROCESSORS • CP/M • MS/DOS.

**Call 1-703-330-6478**  
**1-800-326-9129**  
**FAX 1-703-330-7904**

\*Registered trademark of Digital Equipment Corporation.

CIRCLE 183 ON READER CARD



## Create Special Characters for Your VT200/300 Series



The Character Set Editor CSE allows you to create pointers, logos, or pictures for screen display or printing on an LN03.



**\$795**  
Any VAX

**Pamet Systems, Inc.**  
989 Main St.  
Acton, MA 01720  
(508) 263-2060



Demo (508) 263-3978 FAX (508) 263-4158

CIRCLE 229 ON READER CARD

**BUY, SELL, RENT, LEASE,  
AND TRADE FROM YOUR**

# BEST

**DEC SOURCE!**

- \* We sell complete systems, peripherals, and modules at better prices and with immediate availability.
- \* We are currently looking for BI systems, cluster gear, and peripherals. We buy for cash and will pay YOU the best price in the country.
- \* We rent/lease systems and peripherals for 1 week to five years, including VAX, MicroVAX, terminals, and BI systems. Call us for a quote ("If you don't lease from us, you are paying too much!")

**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 205 ON READER CARD

Highest tech crt at lowest price  
**The Link MC5**

**\$405**



**Features:**

- ANSI, ASCII, PC Term
- Virtual terminals - runs 2 hosts *simultaneously*
- Interchangeable keyboards (VT320, ASCII, EPC)
- Two serial ports and a PC compatible parallel printer port
- 78 Hz refresh
- External brightness and contrast controls
- Flat screen
- Green, amber, or white screen with full overscan
- 24, 25, or 50 line display • 80 or 132 columns

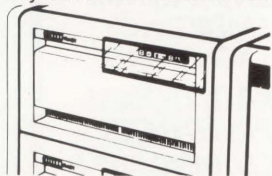
Call Stu to place your order or for more info  
**602 997-0997 fax 602 997-1688**

1st Solutions, 11460 N. Cave Creek Rd. #12 Phoenix, AZ 85020

CIRCLE 236 ON READER CARD

## PROTECTIVE COVERS

Use our 1/8" Hard Acrylic Covers to Protect Your VAX Systems From Accidental Shutdown



RA-60 .....	\$13	RM-05 .....	\$13
RA-81 .....	\$13	11750 .....	\$18
RA-82 .....	\$13	11780 .....	\$18
RA-90(New!) .....	\$13	MICRO-VAX .....	\$13
TU-81 .....	\$13	MICRO-VAX(Full) .....	\$15

**1-800-445-8296**  
FAX 313-335-5337

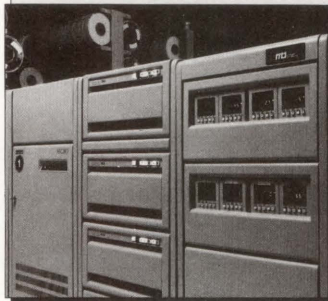


**DATACOVER INC**  
675 South Saginaw, Suite 200  
Pontiac, MI 48053  
313-332-7997

CIRCLE 204 ON READER CARD

SUCCESSFUL MANAGERS SELECT

**mb** Disk Drives  
FOR THEIR **minicomputer** COMPUTERS...



...HERE'S WHY:

- 100% DEC Compatible
- Highest Performance
- Lowest Price per MB
- Highest Capacity—up to 2.2 GB per Drive
- Lowest Maintenance Cost
- On-site Maintenance
- Highest Reliability

**mb** SYSTEMS AUTOMATION (614) 447-0100

mb SYSTEMS AUTOMATION is a registered trademark of Digital Equipment Corporation. mb and DEC are registered trademarks of Digital Equipment Corporation.

CIRCLE 377 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 202 ON READER CARD

## INFORMATION

Rates: 1 time: \$650  
3 times: \$600  
6 times: \$550  
12 times: \$500

Size: 1/9 page — 2<sup>3</sup>/<sub>16</sub>" x 2<sup>3</sup>/<sub>4</sub>"

Camera ready mechanical required.

Typesetting and composition available.

For more information call  
**Mary Browarek at**  
**(215) 957-1500.**

## Sun memory

3/60 3/80 386i 4/110

**SPARCstation1**

Memory upgrades with lifetime warranty available and on sale now.

**PINNACLE**  
TECHNOLOGIES  
INCORPORATED  
Sacramento, CA.

**1.800.825.7466**

In CA (916) 641-6220

\*Sun, 3/60, 3/80, 386i, 4/110 and SPARCstation 1 are reg. trademarks of Sun Microsystems Inc.

CIRCLE 217 ON READER CARD

## cim

**Training and Implementation**

- ▶ Manufacturing Applications Assistance
- ▶ Information Systems Implementation & Assistance
- ▶ On-Site Training
- ▶ Site Management Assistance
- ▶ Performance And Capacity Management

For More Information Call:

**(206) 485-HELP (4357)**  
**(800) 999-4VAX (4829)**

**CONTINUUM™**  
A WASHINGTON CORPORATION

CIRCLE 211 ON READER CARD



# LOCKWOOD GREENE

Planners/Engineers/Architects/Managers

## PROGRAMMER/ANALYST THROUGH SYSTEM ARCHITECT

Meet the challenge of tomorrow with one of the most respected planning, engineering, architectural and construction management firms in the world today—Lockwood Greene. With a staff of over 1500 and a history of achievement that spans over 150 years, Lockwood Greene offers rewarding assignments, excellent opportunities for advancement, and comprehensive benefits. Experienced professionals are currently being sought for the following positions:

Several computer systems positions are available for professionals with experience in manufacturing, process control and real time systems. Experience in 'C' required. The qualified applicant will be able to work both as an individual contributor and as part of a team and should be comfortable with multiple assignments. Experience should include all project life cycle activities from functional specification through start up.

Please submit a resume and salary requirements in confidence for immediate consideration.

LOCKWOOD GREENE ENGINEERS, INC.  
P.O. Box 491  
Spartanburg, SC 29304

Lockwood Greene Recruiting number:  
(800) 752-5630, ext. 1218

AN EQUAL OPPORTUNITY EMPLOYER M/F/H/V

# codex MODEMS MUXES

SAVINGS DIRECT FROM THE DISTRIBUTOR

DIAL-UP		LEASED LINE		MUXES	
2205	208A/B	2340	9600 BPS	6003-4	4Ports
2221	201B/C	2341	9600Multi Pt.	6003-8	8 Ports
2234	V.22+MNP	2362	14,400 BPS	6015	4-16 Ports
2238	V.22 Card	2382	19,200 BPS	6216	Digital Mux
2260	V.32	2500	Network	6228	Digital Mux
2264	New V.32 With MNP	&	Diagnostic Modems	6740	All Models
		2600		6745	

**ANP** Advanced Network Products, Inc.

- Great Pricing
- 1 Yr. Warranty
- Large Inventory
- Technical Support
- Fast Delivery
- Free Codex Catalogue



Authorized Distributor

33 East Glenside Ave.  
Glenside, PA 19038  
Support 215•572•0111

CIRCLE 375 ON READER CARD

## POWER PROBLEMS?

### POWER LINES TALK — WE TRANSLATE!

- WORLDWIDE DIAGNOSTIC SERVICES
- DATA COMMUNICATIONS • TELECOMMUNICATIONS • LANS
- DATA PROCESSING • MAINFRAMES • ENVIRONMENT • EMI/RFI/TEMP
- INFRARED SCANNING • PRE-SITE PLANNING • COMPUTERIZED REMOTE MONITORING
- GROUNDING • EMERGENCY SYSTEMS • UPS • LIGHTNING PROTECTION

SPOON & ASSOCIATES  
INDEPENDENT COMPUTER POWER CONSULTANTS

301 ALICE COURT, VERNON HILLS, IL. 60061  
PH 708-680-4410 FAX 708-680-8510

- PRO 350/380 MEMORY BOARDS
- DISK DRIVES - BIG & FAST FOR PRO
- RAM-DISK Software for Micro/R SX, 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

dca

\* Registered trademark of Digital Equipment Corporation

VAX INSTRUCTION SET (SPI/BETA). Asking \$5200. Z Tech, (813) 823-9081.

# CIM POSITIONS

## FACTORY/PROCESS AUTOMATION

Positions utilizing DEC and other computers, networking, programmable logic controllers, distributed control systems, etc. US based positions, all fee paid. Use a headhunter who specializes!

KEN COVA, COVA AUTOMATION SERVICES  
5371 Shannon Park Drive, Dublin, Ohio 43017  
FAX: 614/792-3525 PHONE: 614/792-6662

## XCL from Z Tech

Makes DCL More Funtional & Flexible

XCONV: EBCDIC/ASCII, VFC/Stream  
XMATH: Decimal Arithmetic (+, -, X, +, ^)  
XFUNC: I/O, Symbols, pseudo/CONT  
XINFO: JPI, DVI, SYI, PMS, and UAI

(813) 823 - 9081

ZTech, 3856 Neptune Dr, St. Petersburg, FL 33705

**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.

REMTEC FUJITSU 2294K. 336MB, \$1,295. (415) 463-3511.

TOSHIBA MK186FB-168MB \$695. Fully Guaranteed. (415) 463-3511



# ADVERTISERS INDEX

Reader Service Number	Page	Reader Service Number	Page
322	1st Class Expert Systems	156	Logicraft, Inc.
353	a-Soft Development	120	Maintech, A Division of
160	Access Technology		Volt Delta Resources
250	Access Technology		133
276	Aldon Computer Group	121	MCBA
220	Alisa Systems		79
358	Allied Telesis	123	MegaTape Corp.
155	Andataco Computer Peripherals		113
270	AOK Software Products	371	Mesa Technology
166	Applied Information Systems		73
369	AVAIL Technologies, Inc.	128	Metier Management Systems
249	BGL Technology Corp.		127
350	Bear Computer Systems	124	Micro Technology, Inc.
266	BISCOM, Inc.		11
174	BLAST/Communications	331	Micro Technology, Inc.
	Research Group		2
		170	Microsystems Engineering Corp.
297	Boston Business Computing		67
361	BRAINTREE Technology, Inc.	147	MOD-TAP System
244	Burr-Brown Corporation		6
231	C.Itoh Electronics	268	Multiware
225	Communications Machinery Corp.		141
306	Calta Computer Systems	277	Net/Access Products Division
102	Camintonn Corporation		43
323	Cappcomm Software, Inc.	292	Network Research Corp.
216	Chrislin Industries		175
151	Clearpoint, Inc.		Networking Applications.....supplement
221	Cognos Corporation	163	Nissho Electronics
153	CompuServe/Data Technologies		86
188	Computer Associates	307	Norm De Nardi Enterprises
378	Computer Information Systems		157
106	Computer Methods Corporation	355	Oregon Software
167	Computertime Network Corp.		78
234	Contemporary Cybernetics Group	129	Pacer Software
243	Data Processing Design		161
296	Data Processing Design	379	Park Software
107	Datability Software Systems		166
374	Dataram	175	Perceptics Corp.
344	DEMAX Software		103
311	DILOG	287	Peripherals
329	Diversified Computer Systems		46
314	Dyna Five Corp.	131	Peritek Corporation
269	Edison Software		59
380	Electronic Service Specialists	132	Persoft, Inc.
157	EMC Corporation		5
109	Emulex Corporation	376	Polestar Software
110	Emulex Corporation		135
161	Evans, Griffiths & Hart	172	Precision Visuals, Inc.
189	Executive Software		27
310	Falco Data Products	134	Printronix, Inc.
113	GEJAC, Inc.		119
260	Gold Key Electronics	136	Printronix, Inc.
114	Grafpoint		119
275	Grafpoint	152	Process Software Corporation
115	GrayMatter Software		126
233	Imprimis Technology	238	Programmed Intelligence
235	Information Builders		29
319	Innovative Computer Systems	252	Pulizzi Engineering, Inc.
117	Interactive Software		164
169	Intra Computer	258	Raima Corp.
370	Invitational Computer Conference		143
324	ISA Solutions, Inc.	135	Random Corp.
365	ITAC Systems, Inc.		101
119	Kea Systems Ltd.	190	Raxco, Inc.
360	Lago Systems		12
		328	Recital Corporation
			117
			SAS Institute
			104
		265	Sigma Information Service
			149
		138	SmartStar Corp.
			I.F. Cover
		247	Spider Systems
			165
		242	SPSS
			47
		246	Stone Mountain Computing
			144
		140	Summus Computer Systems
			I.B. Cover
		141	Syntronics
			18
		228	Synergy Software
			156
		256	System Industries
			93
		263	Taneum Computer Products
			85
		352	Target Systems Corp.
			166
		279	Timeline
			179
		165	Touch Technologies
			128
		354	Toyo Spectrum Corp.
			191
		261	Transitional Technology Inc.
			173
		186	TriLogic Corp.
			132
		305	Unbound
			34
		278	Uninet
			168
		366	UserWare International
			95
		300	Viking Software Systems
			167
		368	Visentech Systems Inc.
			69
		143	Walker Richer & Quinn
			25
		291	Western Union
			55
		253	White Pine Software
			160
		373	Wilco International
			84
		159	WordPerfect Corp.
			81
		339	Wyse Technology
			115
		150	Xyplex
			145

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 Berman, Associate Publisher  
(215) 957-1500

Mark Durrick, Eastern Regional Manager  
David Beardslee, Southwest Regional Manager  
A.G. Germano, Northwest Regional Manager

### MID-ATLANTIC (215) 957-1500

Mark Durrick, Eastern Regional Manager  
Dan Mainieri Jr., Senior Account Executive  
Connie Mahon, Account Executive  
101 Witmer Road  
Horsham, PA 19044  
FAX (215) 957-1050

### NEW ENGLAND (617) 861-1994

Alonna Doucette, Regional Sales Manager  
Kristi Wesslen, Account Executive  
238 Bedford St., Ste. 3  
Lexington, MA 02173  
FAX (617) 861-7707

### MIDWEST & SOUTH (312) 747-0600

Richard E. Julius, Regional Sales Manager  
20180 Governors Hwy., Ste. 201  
Olympia Fields, IL 60461  
FAX (312) 747-0707

### NORTHERN CALIFORNIA & NORTHWEST (415) 873-3368

A.G. Germano, Northwest Regional 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, Southwest Regional Manager  
Karin Altonaga, District 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

Phyllis Chandler, Advertising Services Manager  
Mary Browarek, Classified Ad Manager  
Cathy Dodies, List Rental Manager  
Jane L. Hope, List Rental Sales

# DEC Professional



Looking at color video printers? Be sure you see Toyo. Yes, other leading video printers offer the same big B-size output, the same 300 dpi resolution, and the same wide range of beautiful colors. But when most people compare, they choose Toyo.

Our free comparison kit will show you why. It will also give you some ideas on what to look for in a video printer. We think you'll see some important differences in output quality, features, specs, and support.

For example, compare special printing effects. Without going back to the computer, the Toyo video printer can print any one color pass, reverse black and white, adjust tones, make extra copies, and enlarge, center or designate print location.

Compare installation. While other printers can be difficult to install, the Toyo printer simply plugs in. Answer a few menu questions, and you can print beautiful color copies from

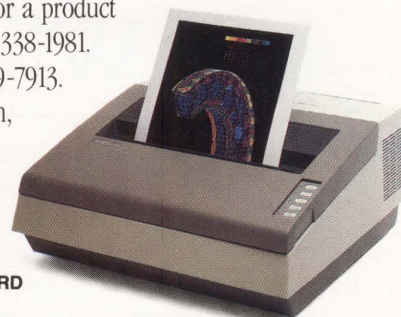
any popular graphics display or image processing system (up to 1280 x 1024 resolution). And you can pre-set eight different displays (different brands, different resolutions) to share one Toyo printer.

Compare support. Toyo gives you a toll-free hotline, comprehensive documentation, and a full one-year warranty.

For your free comparison kit, circle our readers' service number. For a kit or a product demo, call toll-free 1-(800) 338-1981.

In California, call (408) 739-7913.

Toyo Spectrum Corporation,  
2934 Corvin Drive, Santa  
Clara, CA 95051, Fax:  
(408) 720-9643.

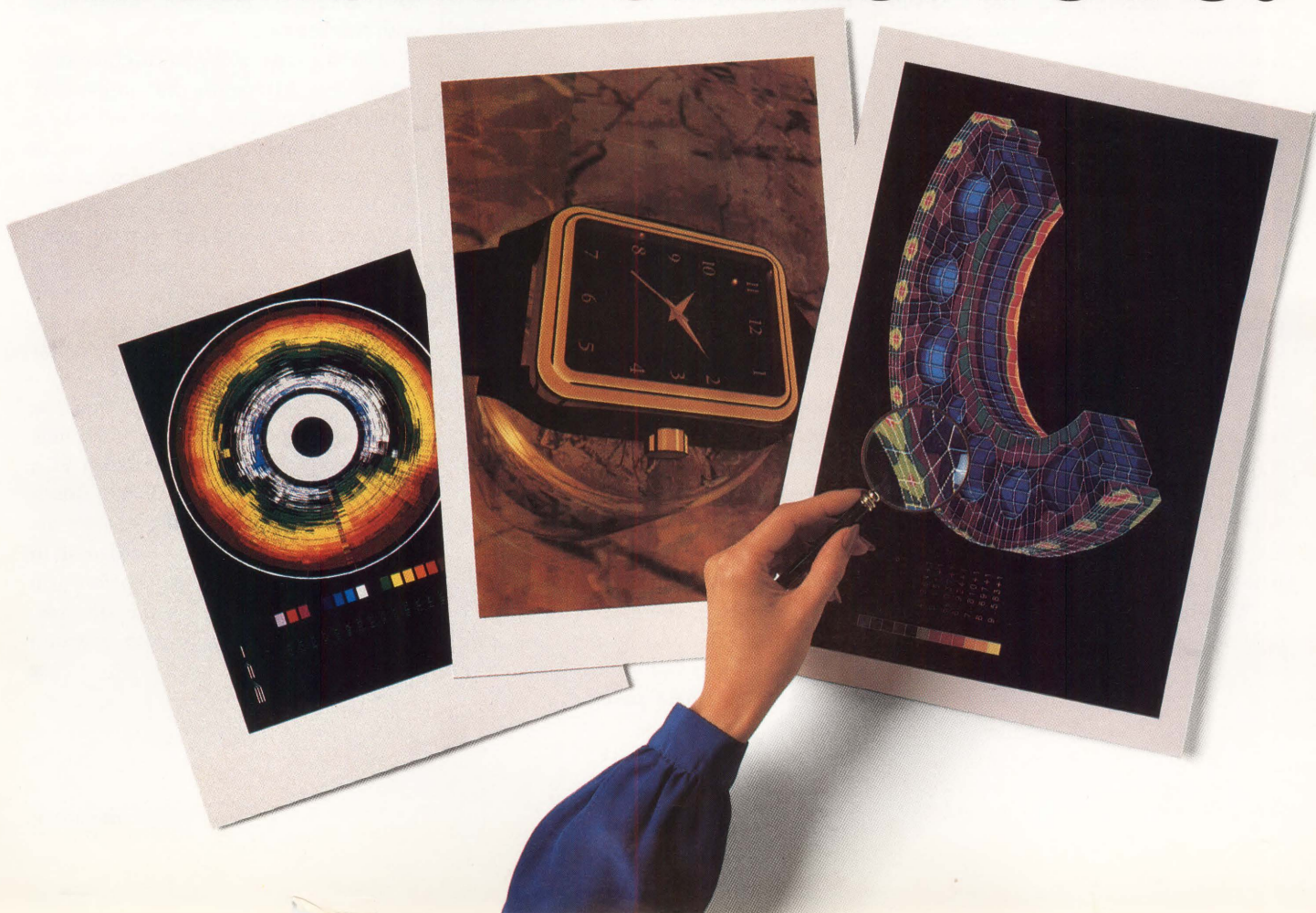


CIRCLE 354 ON READER CARD

**TOYO**  **SPECTRUM**  
*See the difference.*  
Now ETHERNET Compatible

©1988 Toyo Corporation

# COMPARE ALL THREE. CALCOMP. SEIKO. TOYO.





## BACK END

John C. Dvorak

# Where's Your Laptop?

business travellers are using them. Eventually anyone who goes anywhere will need one to communicate with the office. This will become increasingly clear as reliance on electronic mail and fax becomes a permanent part of the modern office milieu.

Among my favorite laptops are the Zenith SuperSport 286 machines, the Zenith MiniSport, the NEC Ultralite, and the Toshiba 1000 and 1600. I intend to look more closely at the Compaq SLT and the Elographics DynaBook. I don't include in this category any machine that looks like a laptop but requires full AC power to operate. A laptop should be able to run on batteries and be used on an airplane. These machines are great on coast-to-coast flights.

There are five primary considerations when buying a laptop: appearance, weight, power, display readability and battery life.

**1. Appearance** — Appearance and overall design are indications of the care the company has for the machine. They also affect your relationship with it. If people laugh at you for using the world's ugliest computer, you'll probably be reluctant to use it on an airplane. If, on the other hand, you have a sleek modern machine that you're proud of, you'll use it just to show it off, put in those extra hours of work and be a big shot at your company. Companies that buy their employees laptops should recognize the status aspect of certain machines.

**2. Weight** — You have two choices: light and heavy. A new category of ma-

chine called the notebook computer should weigh in at four pounds or less. This category was invented by NEC with its nifty 4.4-pound Ultralite and followed by Zenith with its MiniSport. Both

“  
***A laptop should  
be able to run on  
batteries and be used  
on an airplane.***  
”

machines are in the \$2,000 and higher range.

The all-time lightweight classic is the Toshiba 1000. Weighing about 6 1/2 pounds, it includes a 3 1/2-inch floppy, unlike the notebook computers. The NEC uses plug-in storage modules and the Zenith uses a new two-inch disk. The Toshiba sells for less than \$1,000 but suffers from a hard-to-read display.

A possible third category may emerge. A company called Poqet introduced a vest-pocket-sized, full MS-DOS machine. This diminutive machine will be the perfect emergency computer. Unfortunately, it costs nearly \$2,000. Atari has a similar little machine for under \$1,000. I expect to see more notebook and pocket-style machines in 1990. The notebook computer will be the more important category.

**3. Power** — The more power you have, the more weight you have to carry. This may not be the case by this time next year when more laptops incorporate the new 2 1/2-inch hard drive.

This drive can pack 40 MB of storage into the size of a cigarette pack. Newer chips and fancier circuits also mean using the more powerful 286 and 386 chips in a lightweight laptop.

But for now, figure on having to lug 11 or more pounds if you want a high-speed hard-disk-based laptop. The leaders are the Zenith SuperSport and the Toshiba 1600. They can do almost anything a full desktop machine can do, except color graphics.

**4. Display readability** — Flat-screen technology has been improving slowly, and the back-lit active matrix LCD is now very usable, even in dark surroundings. Unfortunately, there's a tradeoff. Go to Hawaii, sit on the beach and try to read the back-lit Zenith display. It gets washed out by the sun. Meanwhile, the normally hard-to-read Toshiba 1000 looks great with this lighting.

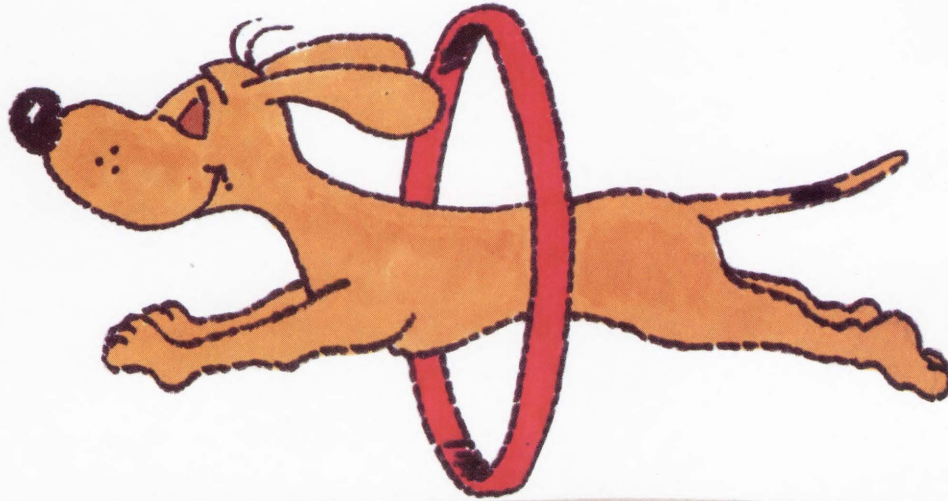
Zenith has developed a combo screen for its new MiniSport that supposedly corrects this problem, but it will take a trip to Hawaii to test it. To use any of these machines in a dimly lit airplane you absolutely must have a back-lit screen.

**5. Battery life** — Unless you fly trans-Pacific, you shouldn't need more than two hours of battery power for airplane use. There are plenty of sockets in airports and elsewhere that can be used for emergency charging.

When buying your laptop, spend as much time as possible with each machine you're considering. With desktop PCs, one 25-Mhz 386 VGA machine is about the same as another. But that's hardly the case with laptops. Each is different in every way. So take your time before you select one. And to be on the safe side, check to see how easily your selection can be resold. ■



# If your data storage vendor can't do this for you, call us.

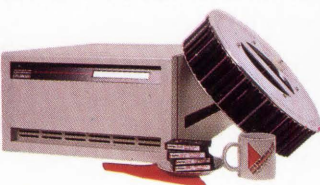


At Summus Computer Systems, we do it every day. For clients like Lockheed, NASA, Chevron, GE, and others. Clients who demand exceptional service with their high-capacity data storage products. Why do they choose Summus? Because we offer more.

## MORE STORAGE SOLUTIONS

**UNATTENDED BACKUP**—The **GigaTape**™, our 8mm helical-scan tape drive, gives you 2,000 megabytes of capacity. A single compact 8mm data cartridge can replace fifteen 150-megabyte tapes for less than two cents per megabyte.

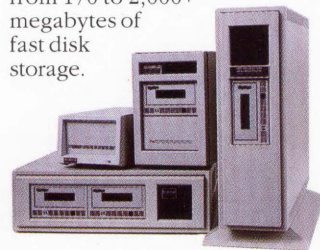
**REAL UNATTENDED BACKUP AND ARCHIVING**—No matter how large your system or network, our **JukeBox-Library**™ provides the most cost-effective solution available



today. Using the same 8mm helical-scan technology as our **GigaTape** and our own advanced autoloading carousel, you can have on-line access to 125 to 1,000 gigabytes of data in a compact 19" rack-mount.

**ERASABLE OPTICAL**—The **LightDisk**™ magneto-optical drive delivers 600 megabytes in a rugged, removable cartridge. It also features ISO standard data formatting for easy media interchangeability between similar magneto-optical drives.

**HIGH-CAPACITY HARD DISKS**—In our **GigaBox**™ series you can have from 170 to 2,000+ megabytes of fast disk storage.



**GigaBox** subsystems are also available with integrated tape or optical drives for backup.

## MORE CONNECTIONS

Summus is your single source of compatible data storage subsystems for DEC, Macintosh, PC, and Sun computers. Our **GigaSafe**™ backup software for PCs is compatible with Novell Netware; the Mac version works with AppleShare. Both feature optional ANSI standard data formatting, allowing you to read and write data between all of these systems.

## MORE SUPPORT

You want answers. Now, not later. That's why we provide toll-free technical support. And our award-winning National Support Group offers on-site service for our products, or entire computer systems, in most U.S. metropolitan areas.

## MORE RELIABILITY

Our well-tested drives are backed by a **30-day money-back guarantee** and a one-year warranty. Extended warr-

anties, 24-hour replacements, and our exclusive upgrade programs are also available to protect your investment.

## MORE OPTIONS

With our ten years of experience in systems integration, we can custom integrate just about any data storage system you can imagine.

## MORE VALUE

Even with all of these services, our prices are very competitive. Both purchase and lease options are available. Need the right solutions to your data storage needs? Just ask us to perform. Call us today.

**1-800-255-9638.**



**SUMMUS**®  
**COMPUTER SYSTEMS**  
YOUR STORAGE SOLUTIONS COMPANY  
17171 PARK ROW • HOUSTON, TX 77084 • 713/492-6611 • FAX: 713/492-0092



# Share to win.



**I**n business, sharing is crucial to winning. Sharing means efficiency. Higher productivity. Better decision making.

And our VISTA terminal server's unique technology gives you a clear competitive advantage.

#### Digital News calls VISTA "Tops in the field."

Central to VISTA technology is the VCP-1000. Its modular, open architecture provides easy network expansion, protocol independence and great performance.

With five open slots on the chassis, you can configure your network for more ports and more functions whenever and however you need to.

Start with our 100% LAT compatible NIC and an 8-port line card, for instance. You'll get DECserver functionality PLUS open architecture for expandability. Then add a 32-port card when you want to expand. Or an X.25 card. Or a modem line card with eight fully functional modems.

Or switch your VISTA NIC to TCP/IP, or even a dual protocol card featuring LAT and TCP/IP. Since VISTA is truly protocol independent, you get automatic compatibility with other cards you add. Here is the sharing you've been waiting for.

#### VISTA shares better than a DECserver.

Talk about performance! VISTA's high-end speed is 38.4k bps, with a character throughput of 100,000 cps. Compare that with DEC products!

And consider this: if you want to expand your network to 128 ports, you'd need eight DECserver 300s. Or just one VISTA. Our expansion cards come with 8, 16 or 32 ports.

#### You'll like the price. And the service.

Whether you are configuring for 8 ports, 128 ports, or any number in between, you'll be glad to find that VISTA's cost per port is as low as \$118. That is among the lowest in the industry.

Since networking is Datability's *only* business, our technical staff is trained in problem-solving, and can handle your service needs quickly.

If you have a question, we'll get you the answer. And if you need a part, card or unit, our 24-hour "hot swap" program will get one there overnight.

#### Share to win with Datability.

Linking your users and resources together is the first step to sharing. Helping you adapt, maintain and improve the link is the next step. At Datability, we're working for you and with you. Teaching computers to share.

Call us toll-free: 1-800-DIAL-DSS. In New York call (212) 807-7800. FAX (212) 463-0459. Or mail this coupon today.

**Yes**, send me more about VISTA and Datability's 100% customer satisfaction program.

Name \_\_\_\_\_

Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

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

Telephone ( ) \_\_\_\_\_

**DATABILITY**  
*Teaching computers to share.™*

322 Eighth Avenue, New York, NY 10001  
Boston • San Francisco • Chicago • London