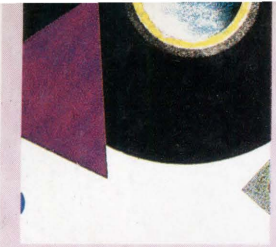


STORAGE

Kingston Subsystem/ CMD Host Adapter

- Workgroup Integration Strategies: UNIX™ Versus VMS™
- Building Workstations A La Carte
- Tips And Techniques For Data Caching

Canada Post International Publications Mail (Canadian Distribution) Sales Agreement No. 546135

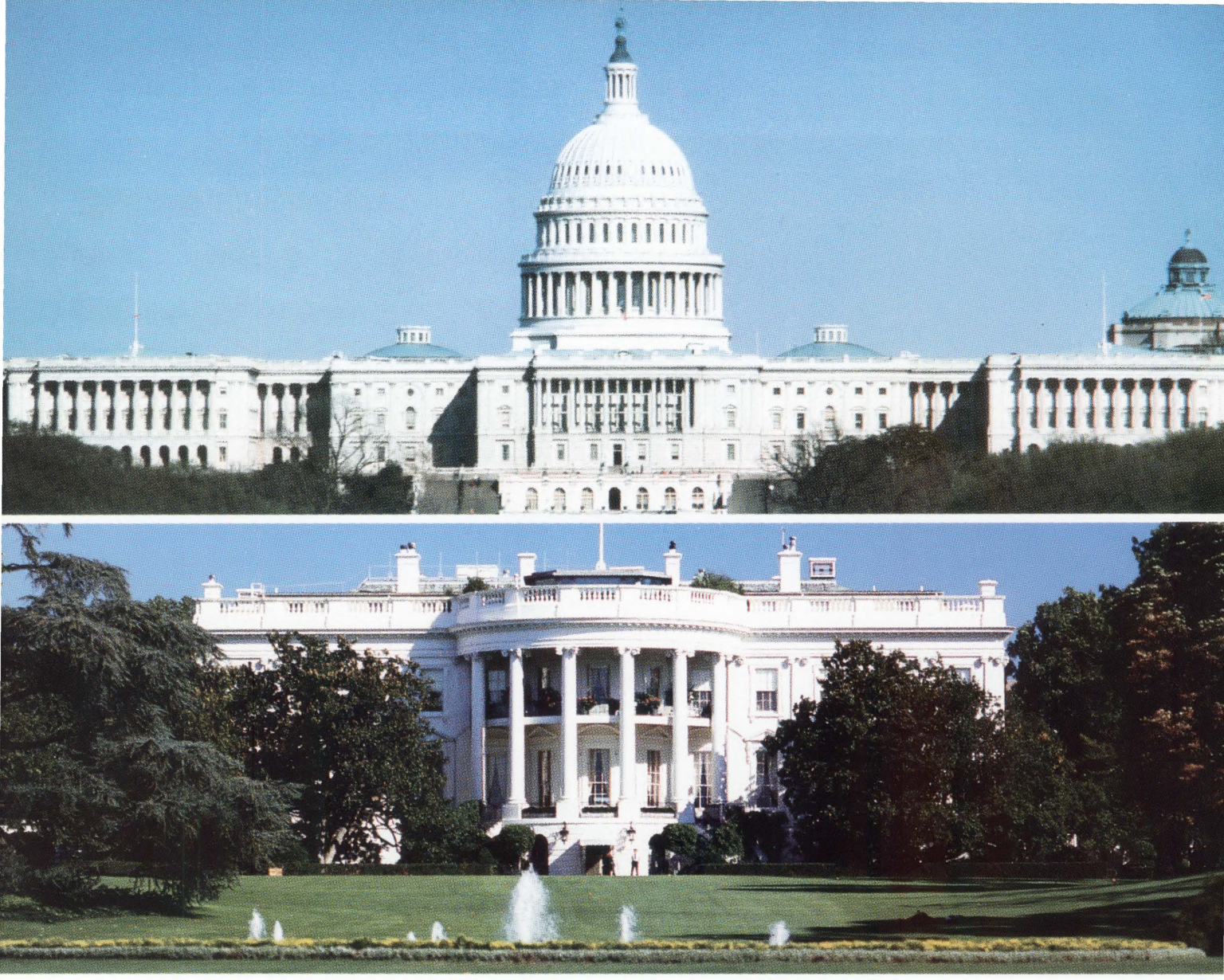
OCTOBER ■ 1990

DEC Professional

An Independent Magazine from Professional Press

$4.00 ■ VOL. 9, NO. 10

Managing Your Document Flow



Let's just say Calendar Manager has helped put other Houses in order.

Whether you're scheduling meetings for the Executive branch and House committees or for company executives and the summer picnic committee, the problems are pretty much the same.

CALENDAR MANAGER™

Getting all the right people, in the right room, with the right equipment, at the best time is nearly impossible.

Especially on short notice.

Except with Calendar Manager™ from Russell Information Sciences.

In just a few seconds, with only a few keystrokes, Calendar Manager scans the schedules of all prospective attendees, finds the first commonly available time and notifies each person. Simultaneously, Calendar Manager reserves an appropriate meeting room and all the necessary equipment and services.

What used to take hours or even days of phone tag is done in a flash.

And Calendar Manager doggedly follows-up with reminders at log-in and "ticklers" just prior to the meeting as well, as daily, weekly and monthly schedule summaries for every user on the network.

Customers report that Calendar Manager is the "most used" software on their system and that productivity gains rival that of word processing and E-Mail.

Now that's the way to run a company or a country.

Calendar Manager... It's about TIME!

For more information, call or write today.

RUSSELL INFORMATION SCIENCES, INC.

25201 Paseo de Alicia, Suite 111, Laguna Hills, CA 92653. Phone: (714) 768-5000.

Calendar Manager is a trademark of Russell Information Sciences, Inc.

CIRCLE 347 ON READER CARD

Take a Closer Look: 2.0 GB of Storage in a 3½" Form Factor.

When ARDAT™ released the first PYTHON™ DDS DAT drive for computer data storage, we knew we were on to something big. High capacities. High performance. And high quality.

Great Technology Comes In Small Packages Too.

Now, with ARDAT's advancements in miniaturization and LSI, the world's first DAT drive with a SCSI interface is available in a 3½ inch form factor. The PYTHON DAT model 4320NT offers unmatched system integration capabilities-no other multi-gigabyte device comes close-not even 8mm tape.

Introducing True Computer Grade DAT II.

The new PYTHON DAT model 4320NT uses the same computer grade DAT design and firmware found in ARDAT's original PYTHON family of DAT systems. No belts. No spring levers. Microprocessor controlled direct drive reel motors. And, no mechanical mode changes.The PYTHON DAT model 4320NT, truly the only 2.0 gigabyte tape drive on the market today engineered specifically for computers, without using adapted audio or video tape mechanisms.

So, take a closer look. Find out more about True Computer Grade DAT II. Call ARDAT, an Archive Company at:

1-800-FAST-TAPE

ARDAT™
AN ARCHIVE COMPANY

See us at COMDEX, Booth # 1108.

1650 Sunflower Avenue • Costa Mesa, CA 92626

©1990 Archive Corporation. ARDAT, the ARDAT logo, PYTHON, True Computer Grade DAT are trademarks, and Archive is a registered trademark of Archive Corporation.

CIRCLE 326 ON READER CARD

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

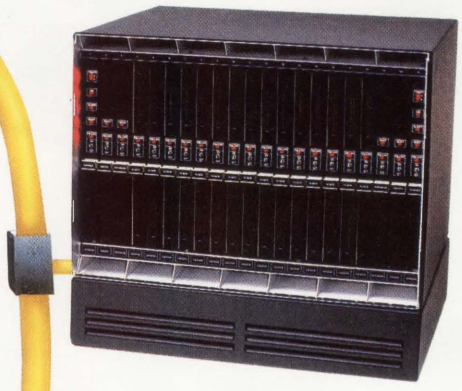
Only 3.5" high, the ELS-48 provides up to 48 ports, and runs 38.4 Kbps on all ports simultaneously. Fully LAT-compatible with extended DECserver command set, it offers unmatched performance at a low price.

MORE ports

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

MORE throughput

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



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

MORE than just LAT

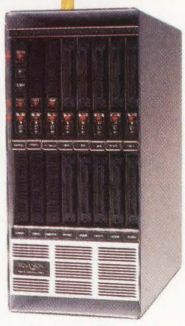
If you're in a multi-vendor environment, it's easy to network your VAX terminals and PCs with non-Ethernet hosts, or share modems and printers. Connections to non-LAT devices are made transparently without packet delays, providing fast response even during peak traffic periods.

MORE dependability

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

MORE wiring choices

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



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

MORE user-friendly

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

MORE space-saving

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

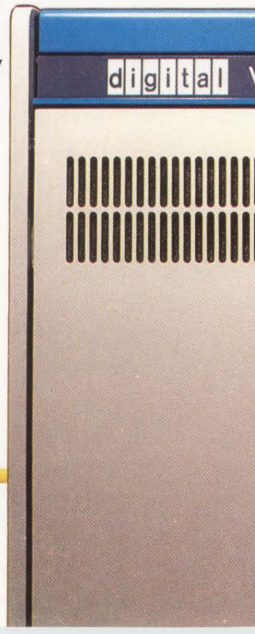
MORE networking features

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

MORE value

When you compare our long list of features, reputation for reliability, high performance, the 3-Year Warranty and expandability with our price advantage (as low as $135 per port), why buy another DECserver?

Call 1-800-328-2729 today for information on our 30 day evaluation program and compare for yourself.



EQUINOX

TERMINAL SERVERS · DATA SWITCHING SYSTEMS · MULTI-USER PC UNIX BOARDS

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

Equinox 3 year warranty

All trademarks are the property of their owners ©1990 Equinox Systems Inc.

CIRCLE 125 ON READER CARD

DEC Professional

Contents

OCTOBER 1990 VOL. 9, NO. 10

OFFICE SYSTEMS

38 DOCUMENT MANAGEMENT
Elaine L. Appleton
In another effort to promote its Network Application Support™ (NAS) services as the solution to commercial computing problems, Digital has put together a Document Management program intended to soothe the labor pains businesses suffer when complex documents come to life. The clock is ticking while Digital and third parties develop the pieces of the program. In today's business environment, in which teamwork is crucial but ever more difficult, technology that truly and easily links one person's work with another's will be welcome.

46 WORKGROUP INTEGRATION STRATEGIES
Bradford T. Harrison
Local area network integrators in the Digital environment are up against tough choices. Should they go with the low cost and widespread support of industry-standard TCP/IP-UNIX-NFS solutions, or should they build on their installed and highly functional VMS-based solutions? Should they favor gateways for subnetwork interconnection, or should they implement routers and parallel protocol stacks? Any real network configuration will probably involve a combination of these technologies.

ON THE COVER:
Illustration by Jim Serfass, Bethlehem, PA.

FEATURES

58 PERFORMANCE: DATA CACHING DEMYSTIFIED
Rick Cadruvi and Evelyn Vigil
Data caching is a mechanism that improves access to information by using a faster intermediate medium to save the most commonly accessed information. A myriad of caching mechanisms is available for VAX/VMS as options within VMS or as products from other sources. A system manager must understand the choices and must apply the mechanisms that offer the best disk performance for the user community and its applications.

Continued on page 4.

This magazine is not sponsored or approved by Digital Equipment Corporation. *"DEC" and "VAX" are registered trademarks of Digital Equipment Corporation, which is the owner of the trademarks "DEC" and "VAX" and the source of all "DEC" and "VAX" products. For other trademarks of Digital Equipment Corporation, see page 157.*

CONTENTS

Continued from page 3.

DEPARTMENTS & COLUMNS

Publisher
Carl B. Marbach
'90s Computing Arrives.....10

Editorial
Dave Mallery
Keeping VMS In The '90s.....12

ULTRIX™
Philip E. Bourne, Ph.D.
ULTRIX V4.0, Part 2.....92

Digital Watch
Brian O'Connell
A Server By Any Other Name.....100

Let's C Now
Rex Jaeschke
VAX C And Program Sections, Part 1.....110

Field Service
Ron Levine
Service Search.....118

DCL Dialogue
Kevin G. Barkes
DSNlink™:
On-Demand Software Support.....122

Workstations
David W. Bynon
Workstations A La Carte.....126

The Mac Connection
Al Cini
Mirror For The Mac.....132

Back End
John C. Dvorak
The Man In The Machine.....160

Letters.....16

ARISTALK.....20

Product Watch.....24

Products.....138

Used Equipment.....154

Classified.....154

Product Showcase.....156

Advertisers Index.....158

DEC PROFESSIONAL DP LABS TESTING CENTER

FROM THE LAB

The Frugal Connection
Barry Sobel.....68
How do you connect a third-party disk drive to a Q-bus MicroVAX™ system without making an expensive move to DSSI™? We used Kingston Technology's DC101-S removable subsystem and CMD Technology's CQD-240/TM Q-bus-to-SCSI adapter board.

Dynamic Tape Accelerator Revisited
David B. Miller.....74
When we reviewed Touch Technologies' Dynamic Tape Accelerator last year, our test results were low compared to BACKUP results for most systems. When we retested the product on our MicroVAX II and VAX 8800, we discovered that different hardware and software configurations, system tuning and system load all contribute to differences in performance.

Measuring Your Machine
David W. Bynon.....80
A capacity planning and performance measurement tool, ISA Solutions' ISA/ResponseMaster precisely measures system response time and application performance without burdening the CPU.

Penless Plotting
George T. Frueh.....86
Da Vinci Graphics' RasterPro 720 penless desktop plotter uses a 24-pin dot-matrix print head rather than ink pens. It emulates the HP 7475A plotter and a host of printers.

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

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

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

BPA dda ABP

THE NEW LAN BRIDGE THAT'S BLOWING BLACK BOXES OUT OF THE WATER.

Take aim at high prices and build a great value. Install new Intersect™ software and its two Ethernet® boards on any IBM® PC or compatible. In minutes, you'll create an intelligent, fully compliant IEEE 802 Media Access Layer bridge from an existing PC for as little as $1,495.

INTERSECT™
LAN BRIDGE
EXCLUSIVE BENEFITS

- Runs on an existing PC to cut costs.
- Software and cards are easy to expand, maintain and upgrade.
- Compatible with all existing Ethernet networks and bridges.
- Dynamically learns node information to cut administration requirements.

Using proven industry-standard architecture, your cost-efficient bridge will be a snap to upgrade, easy to maintain, and simple to administer.

To boost forwarding and filtering rates, just re-install Intersect on a faster PC. Let Intersect give you more time to manage with its self-diagnostic start-up, automatic loop detection, and ability to dynamically learn node locations.

Intersect is also very versatile. Thin and thick Ethernet as well as twisted pair connections will trim cabling expenses and bridge dissimilar media.

Intersect is compatible with Novell,® 3Com,® Ungermann-Bass,® Banyan,® TCP/IP, XNS, LAT,™ DECnet,™ or ISO traffic. It's also compatible with your current, expensive Ethernet bridges.

So make your own big splash for very little cash. Phone us at **1-800-368-5283.**

persoft®

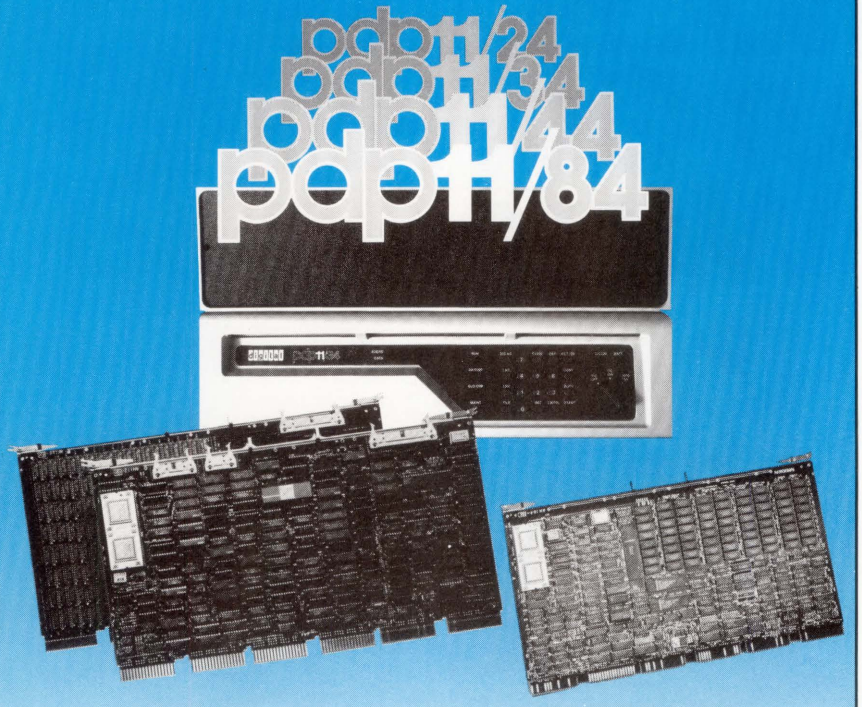
ACCESS THE POWER YOU NEED.™

© 1990 Persoft, Inc. All Rights Reserved. Specifications subject to change without notice. Persoft is a registered trademark and Intersect a trademark of Persoft, Inc. IBM PC, Novell, 3Com, Ungermann-Bass, Banyan, DECnet, LAT, and Ethernet are trademarks of their respective companies.

CIRCLE 153 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

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 238 ON READER CARD

DEC Professional

Founded in 1982

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

EDITORIAL

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

DP LABORATORY & TESTING CENTER

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

DESIGN & PRODUCTION

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

CIRCULATION

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

MARKETING

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

PROFESSIONAL PRESS, INC.

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

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

VAXBI USERS:

Unattended Backup with Three Significant Advantages

From Clearpoint, of Course!

1.

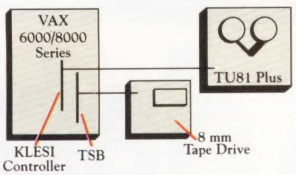
Flexible configuration and field upgradability

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

2.

Parallel operations with TU81 Plus and TSB tape devices

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



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

3.

More comprehensive diagnostics

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

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

The Clearpoint Difference

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

Call or write to receive:

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

CLEARPOINT

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

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

CIRCLE 181 ON READER CARD

You're looking at your largest technology investment. What a shame you've had to expend most of it working around the limitations of conventional databases.

Fortunately, Ingres has changed all that by introducing the first intelligent database.

We call it intelligent because it helps organizations operate more intelligently. In short, it gives you the ability to manage not just data, but knowledge and objects as well.

The unique Ingres Knowledge Management™ facility lets you manage business policies or

1080 Marina Village Pkwy., Alameda CA 94501 (Corp. Headquarters) • 1801 Rockville Pike, Suite 200, Rockville MD 20852 • 5650 Yonge St., Suite 1700, North York, Ontario M2M 4G3. Ingres, Intelligent Database, K

Finally. A database
to free-up all this va

rules—and referential integrities—inside the database server. Because this information is centrally enforced and managed, you get complete control of your data and its integrity. And your programmers don't have to write rules and referential integrities in each application.

ledge Management and Object Management are trademarks of Ingres Corporation. © 1990 Ingres Corporation.

An unlimited number of rules can be stored in the server. And features like unlimited forward chaining and recursion mean that rules fire when expected.

Ingres Object Management™ gives you the ability to manage types of data that are difficult or impossible for conventional databases. User-defined datatypes—like geographic coordinates or manufacturing tolerances—are stored and used within the database server. They can even be manipulated using standard SQL.

Rather than wasting time converting data to fit the constraints of your database, you can teach your database to understand data the way your organization uses it. So your data becomes more relevant to how you do business, and your database more useful than ever.

And as if this weren't enough, the Intelligent Database™ also features improved data management capabilities, giving you enhanced performance for OLTP, decision support and distributed processing.

The net result: the Ingres Intelligent Database lets you model the real world—your business—like no other database in existence.

So remember. When you want to get the most out of your most valuable hardware, you have only one intelligent choice.

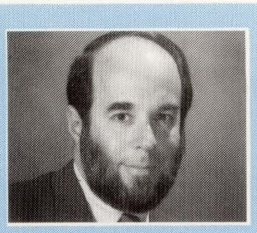
Call 1-800-4-INGRES to find out more.

Ingres

Intelligent database. Intelligent decision.

ntelligent enough luable hardware.

CIRCLE 328 ON READER CARD



PUBLISHER

Carl B. Marbach

'90s Computing Arrives

Until now, standards, open computing, the client/server architecture, UNIX and interoperability have been just words and promises. But they're starting to pay off with the new ideas formed with these enabling technologies.

For example, I recently saw a real-time spreadsheet. It looked standard at first, but it used X on a DECstation 3100 running ULTRIX, and the user interface was Motif. If you haven't seen Motif, go to your local DEC office and get a demo of this OSF standard user interface with icons, pull-down menus and a multi-button mouse. While Motif is attractive, it's the features of the spreadsheet, made possible by OSF standards, that make it special.

The real-time features are enabled by the ability of this spreadsheet to have a value in any cell specified by a process running anywhere on the network. This means, for example, that I can have a program that monitors the water level in a reservoir and outputs that value continuously to a spreadsheet that calculates values based on the water level monitored by the process. If I choose to display a graph of those calculated values, it would change as the water level goes up or down — in real-time.

Another feature enabled by these technologies is a cell function that can be a call to an external program. This is a variation on the real-time feature. In this case the value of a cell is determined by a process external to the spreadsheet. The value could be a database call, a numerical calculation, a user input, and so on. This process doesn't have to be on the same computer that's running the spreadsheet. It can be anywhere on the network.

The spreadsheet takes advantage of the tremendous computational power of some of the RISC processor workstations on the market. For this type of computing, RISC machines will run circles around CISC implementations such as the 386, 486, 030 or 040.

As impressed as I was with the implementation of a "simple" spreadsheet that isn't so simple, I know that it's the first of many innovative tools that we can expect from the technology of the '90s. It's surprising that so many established software companies aren't moving in this direction. There's a framework, an infrastructure, that will let us do things that weren't possible before and use powerful platforms from many vendors, all at reduced prices. Why aren't these vendors taking advantage of what's being offered?

Some are protecting their current position. Adopting a new technology means making the old one obsolete, which may be viewed as an admission that what you now have isn't the best. I'd advise these firms that you can get away with no progress for awhile, but in the long run people will find a better product elsewhere.

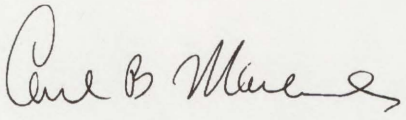
Others may not be able to visualize where computing is going in the '90s. They contend that the "new technology" hasn't yet produced gains and that there are no users of this new technology doing serious computing — and thus maybe there never will be. To them I'd say that just as nature abhors a vacuum, applications will flow to a technology that offers significant opportunity.

Some vendors are waiting to see where the market is going. I'd remind them that followers are often losers. Leaders define and make the software we'll use tomorrow.

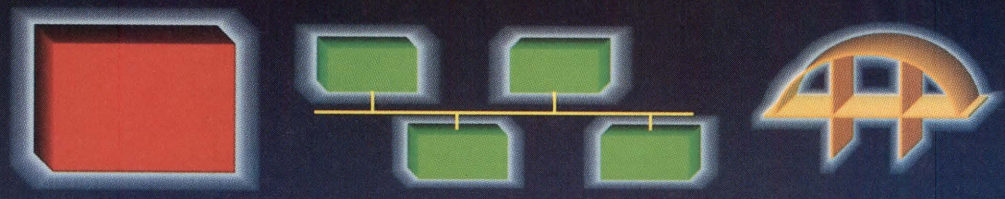
While it's true that software makes or breaks a technology, there's no doubt about the outcome for LAN-based computing. The only question is, how long will it take until the software steamroller comes along — six months, one year, two years?

The DEC market is ready. The tools are in place. There are DECstation and DECsystem RISC machines and VAX-based CISC machines — each runs ULTRIX, and the VAX can run VMS as well. Newer versions of VMS will cooperate with ULTRIX just as well as other ULTRIX/UNIX machines will.

Software is arriving and will continue to appear at an increasing rate. Computing for the '90s is here. If you aren't ready, it'll pass you by.

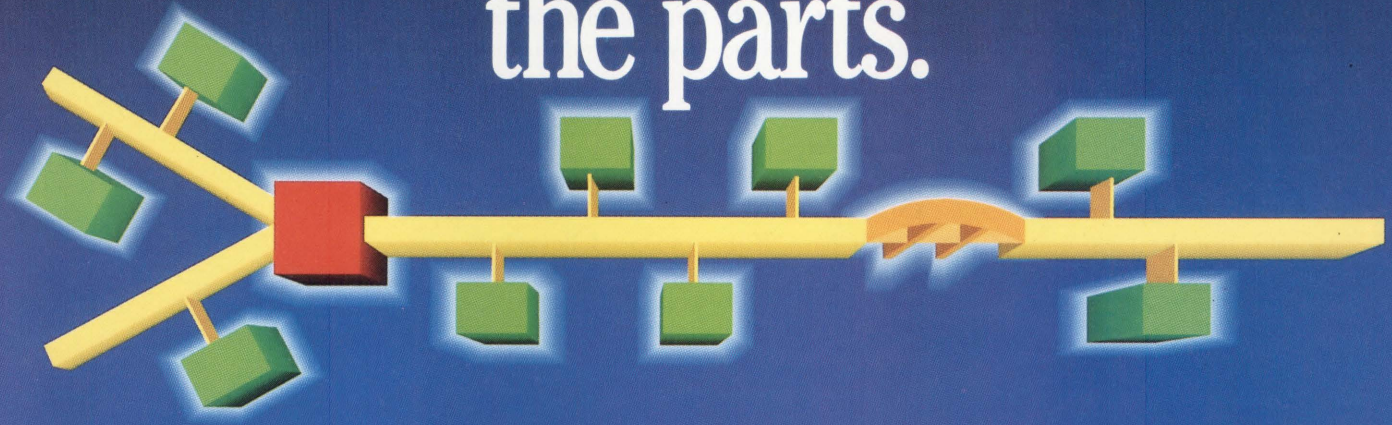


You can monitor some of the parts



Routers Segments Bridges

...or the sum of the parts.



You worked hard to create a single, integrated network. Now you discover most network monitors narrowly focus on a single, stand-alone part of the whole system.

There are monitors just for bridges. Others just for routers. Some concentrate on segments. Or T1 lines.

What are you supposed to do? Buy and install four different systems and try to correlate the data yourself?

LANCE is a better solution. It's the one totally integrated system that monitors your entire network from end to end—including all the segments, routers, bridges and T1's in between.

Using one central LANCE workstation, you can:

- View systemwide information on all network activity including peak load, packet problems, bandwidth utilization and collisions and errors.
- Set and monitor alarm thresholds for cable shorts, duplicate IP addresses, stations going silent and new stations.
- Automatically test cables at preset time intervals with a built in TDR (Time Domain Reflectometer).
- Collect and analyze statistical data needed to support decisions on system architecture and allocation of system resources.
- Anticipate and troubleshoot problems before users are affected.

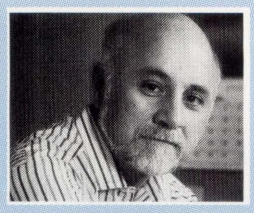
LANCE does it all.

Call to arrange a demonstration. You'll see that when you monitor the sum of the parts the benefits really add up.

Micro Technology

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

CIRCLE 143 ON READER CARD



EDITORIAL

Dave Mallery

Keeping VMS In The '90s

I recently was a member of a panel of customers at a meeting of DEC field service managers for the Middle Atlantic States region. In our area, it's easy to like DEC field service. However, when the subject digressed from field service to other areas, some interesting remarks were made.

The most compelling was from a gentleman who represented a large government contractor. The system he is directly responsible for is about 50 times the size of Professional Press' cluster, and that's just a drop in the bucket for his entire corporation.

The subject turned to layered product prices. I was amazed when he announced that his company couldn't afford such luxuries as shadowing and striping because the software is too expensive. Whoa! This is a *Fortune* company. He suggested that DEC emulate Sun Microsystems in its software pricing strategies — i.e., give it away to sell more hardware.

As I've said before, loss of layered product penetration in VMS is loss of account control and, ultimately, loss of customers. Keeping VMS in the '90s will be a matter of economics, of balancing the value of the current cumulative investment against the cost and future values of alternatives. The more that layered products are woven into the fabric of an organization, the harder it will be to pry them loose. The real value to DEC in these layered products may not be in the licensing revenue they bring today but in how they shield the downstream revenues in the next few years. People may decide to keep VMS in 1993 not because of any technical factor but because they can't do without one or more layered products.

I have a less radical option: Reflect the devaluation of mips/VUPS in the price of the layered product. For instance, a product that sells for $20,000 for a 1,200-unit license should devaluate in the same ratio that the 1,200 units of CPU power have. If that product followed the cost-per-VUP curve with our VAX 8800, it now would sell for about $2,500.

LOGICRAFT STANDS FOR SENSATIONAL SERVERS

Excellent network servers! That's what Logicraft is all about. Logicraft servers give your workstations and terminals all of the advantages they weren't born with. Run PC applications, access PC based CD-ROMs, emulate an IBM® 327X or send and receive faxes from any DEC® or Sun® desktop.

Logicraft network servers allow you to integrate Novell® or Token Ring LANs plus MS-DOS®, OS/2™ and SCO Unix™ applications with your DEC and Sun workstations and terminals.

For the world's best servers, call Logicraft at **(603)880-0300.**

LOGICRAFT

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

Products mentioned herein are trademarks and/or registered trademarks of their respective companies.

CIRCLE 141 ON READER CARD

VISTA. To change

Yesterday's servers are no match for today's problems. Simply connecting "A" to "B" just won't cut it. With more and more pressure placed on maximizing budgets, the need to get the most out of new hardware is essential.

When it's your time to change, discover VISTA. It's a lesson in poetry.

To change or not to change, that is the question.
Whether it is nobler in mind to suffer
the limitations of networking plans
that leave no room for future advances
or to take steps to insure that you can
always use a product that enhances
your existing networking strategies
is a question that has some urgency.

Oh, to have the power to change direction
with modularity unrestricted
and realize capabilities expanded
in a space of such streamlined proportions.
A concept so full of totality
can someone make it a reality?

Advanced Architecture for Optimal Expandability

VISTA is quite simply the most advanced communications server ever developed. Its modular architecture allows you to add option cards as your needs change.

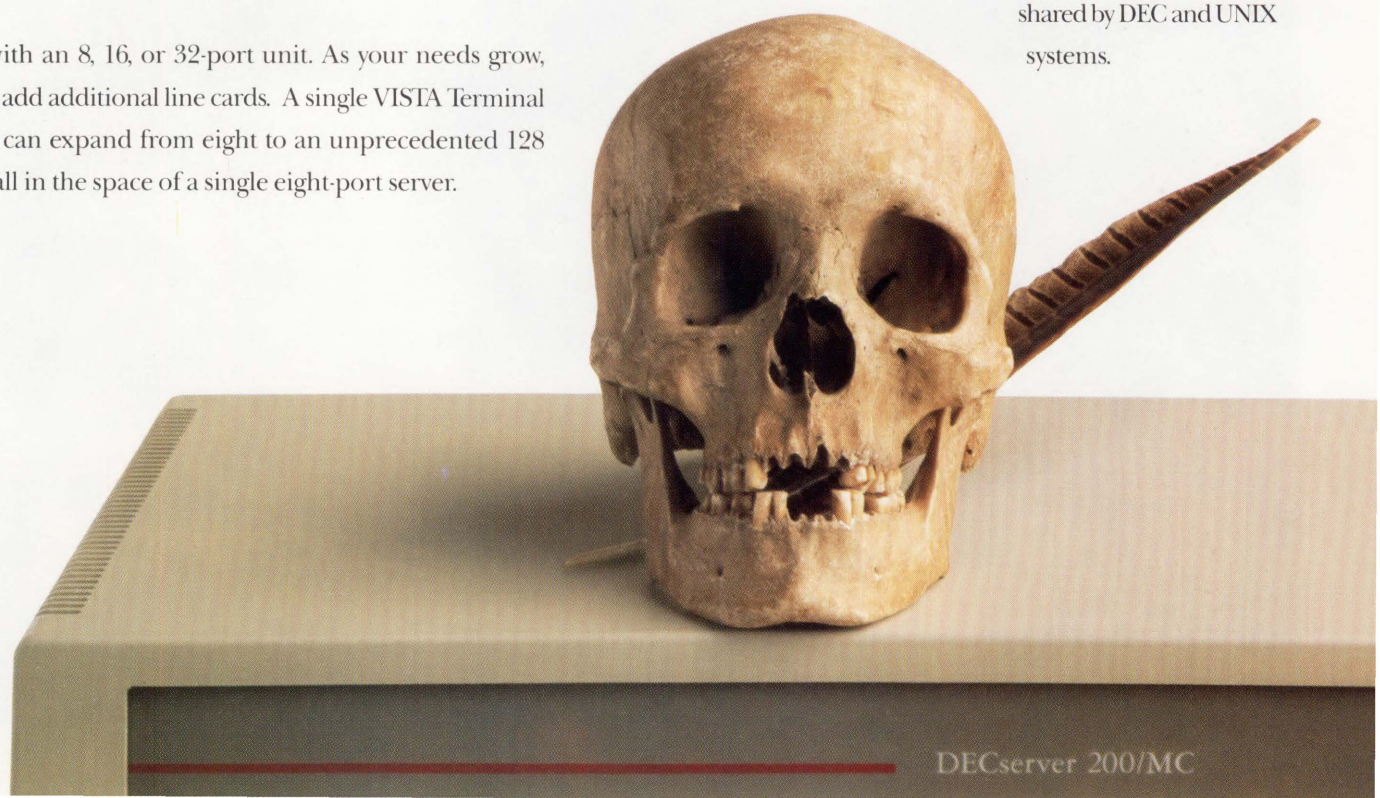
Start with an 8, 16, or 32-port unit. As your needs grow, simply add additional line cards. A single VISTA Terminal Server can expand from eight to an unprecedented 128 ports, all in the space of a single eight-port server.

Not Just LAT-Compatible but DEC Compatible

VISTA is 100% LAT-compatible. No exceptions or excuses. Beyond LAT, VISTA delivers DECserver emulation — command for command, function for function.

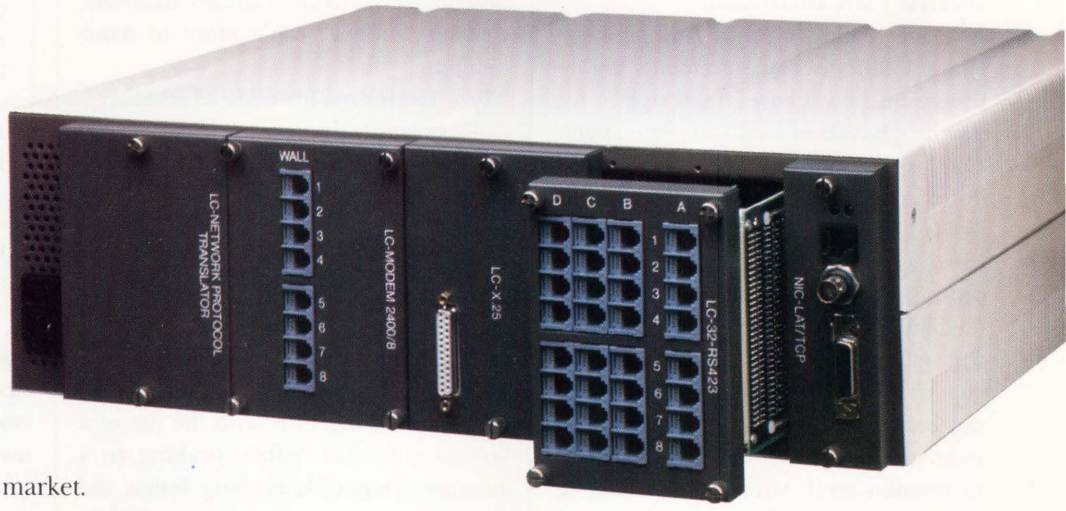
The Most Robust TCP/IP and Dual-Protocol Support

VISTA delivers high performance TCP/IP. Our full-function implementation is second to none. VISTA is ready to support either LAT, TCP/IP, or provide dual protocol support. You'll be able to connect to DEC and UNIX systems simultaneously or define network printers that are fully shared by DEC and UNIX systems.



or not to change.

A Wide Range of Options for Advanced Communications



With Advanced Communications Cards, VISTA takes you beyond conventional terminal server functionality.

- Slide our X.25 WAN Card into our server and witness the highest performance, full function LAN-based PAD on the market.
- Slide our Hayes-compatible VISTA Modem Card into our server and enjoy LAN access to eight dial-in/dial-out modems.
- Slide our Network Protocol Translator Card into our server and actually extend the reach of your existing LAT-only DECservers to UNIX systems via our innovative and transparent LAT to TCP/IP translation.

True value-added benefits available only within VISTA.

Embrace Change for a Change

Instead of fearing tomorrow's technologies, VISTA provides a platform that allows new technologies to coexist side-by-side current strategies. New VISTA line cards will bring entire new applications right onto your LAN.

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

Exercise your Power to Change.

Purchase a VISTA Server on a full 30-day trial and, if you're not completely satisfied, return it without any obligation. That's Datability's 100% Customer Satisfaction Program. And, for a limited time only, trade in your old server through Datability's "The Power to Change" Trade-in Program. Call immediately for complete details.

© Copyright, 1990, Datability Software Systems, Inc.

All product names are registered trademarks of their respective manufacturers.

CIRCLE 115 ON READER CARD

I'M READY TO CHANGE.

SEND ME MORE INFORMATION ABOUT "THE POWER TO CHANGE" TRADE-IN PROGRAM

Name _____

Title _____

Company _____

Address _____

City _____ State _____

Zip _____ Telephone _____

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

See us at INTEROP Booth #640 and UNIX EXPO Booth #1407

DATABILITY
THE POWER TO CHANGE℠

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

LETTERS

GOING FOR BROKERS

In Dave Mallery's "Guts And Money" (June 1990), several statements create the vision of a whores' marketplace for potential buyers of used DEC equipment. One is the author's use of the word "broker." According to *Webster's New World Dictionary*, broker means "a person hired as an agent in making contracts, selling stocks, etc." What about the credibility of the company representing the equipment it's selling? Brokers come and go in the marketplace. Try to find the broker from whom you purchased your machine when the boards are out of revision level, when DEC refuses to take it under maintenance or when your license is rejected by DEC. Cross your fingers and hope the "small" amount of money you so wisely spent for your company doesn't go up in smoke with your machine.

What you should be telling potential customers about used DEC equipment is that they should seek out not brokers but reputable dealers that own the machines they sell and can stand behind unforeseen hardware problems — problems that are numerous, costly and can create potential hardships for companies under deadline. The savings to users are still fruitful, but the comfort level is tremendous when doing business with companies that will still be around to stand behind their contractual commitments. Users should seek any vehicle that will make their investment both cost-effective and a wise business decision. Seek out a company that has credentials you can take to the bank: for example, DDA or CDLA membership — organizations that uphold high standards for doing business.

Unfortunately, the author's theory of guts and money may end up giving him potential lawsuits and "cheap" hardware that his "broker" can't afford to stand behind.

Myra Levine, Wholesale Marketing Representative
El Camino Resources, Ltd.
Irvine, California

PROFESSIONAL PURCHASING

I was deeply disappointed with "Guts And Money" by Dave Mallery (June 1990) and would like to express some very significant concerns.

My first concern is with the use of a so-called broker. After speaking to a number of reputable stocking dealers, the general consensus is that they aren't only annoyed at this article but also agree that it's extremely misleading. Everyone agrees that a broker can possibly save the buyer a dollar or two, but this article should have explored the possible consequences of using a broker. What happens when the machine comes in dirty, untested, incomplete, and ineligible for maintenance? More important, what happens if the machine is defective or goes bad while it's being installed? How many brokers will clean, retest and reconfigure to satisfy a customer's needs?

Another concern deals with the possibilities of the machine being defective. What broker will correct the problem — in fact, what broker has the capabilities, knowledge or financial means available to help the customer solve this problem?

A third concern is an incomplete follow-through on the VAX 8700-with-upgrade transaction mentioned in the article. How would the transaction have turned out if the order had been written for an 8700 and then upgraded to the 8800? Would there have been problems with, for example, licensing and rev levels? More important to the buyer, what would have been the total cost of that transaction? I can almost guarantee that by the time the machine was completely up and running and under maintenance, I could have beaten the total price you would have paid.

I'd expect that a publication named *DEC PROFESSIONAL* would be concerned with customers' needs and satisfaction and that more thought would have been given to the article before it was published. At Doyle Computer we take great pride in our high standards and the ethics we use in conducting business, and our DDA and CDLA memberships support our practices and contractual commitments.

There are great saving in the used DEC marketplace, but before customers make decisions on these investments they should evaluate the total transaction and then go with a company that shows a great deal of professionalism in the used DEC marketplace. Unfortunately, the article didn't relay this information to the customer and could be more detrimental than beneficial.

Jeffrey A. Morgan, General Manager
Doyle Computer Marketing Inc.
Minneapolis, Minnesota

Dave Mallery: Our broker, who worked for a fixed-percentage commission, was a founding member of the Digital Dealers Association. He is a reputable

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

NOW THAT 10GB FITS ON AN 8MM TAPE, WHAT ARE YOU WAITING FOR?

You don't need to wait hours to change tapes.

You don't need to wait months for other storage technologies to catch up.

One 8mm tape drive will already deliver more than they promise.

It's the digital CY-8200, now with optional data compression. And you can get it exclusively from Contemporary Cybernetics Group.

With data compression, the CY-8200 can quadruple the amount of data you can load on an 8mm cassette that fits neatly in your shirt pocket. Meaning the already tremendous savings in man hours, media costs, storage and shipping are multiplied by four.

Until now, the best 8mm drive on the market stored an impressive 2.5 GB per tape at speeds up to 15 MB per minute.

True "Plug-And-Play" Compatibility With:

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

and more...

Our data compression option allows you to write up to 10 GB per tape at up to 60 MB per minute. Completely unattended.

Of course, the data compression feature is switch-selectable, so you can turn off data compression to read and write standard 8mm tapes.

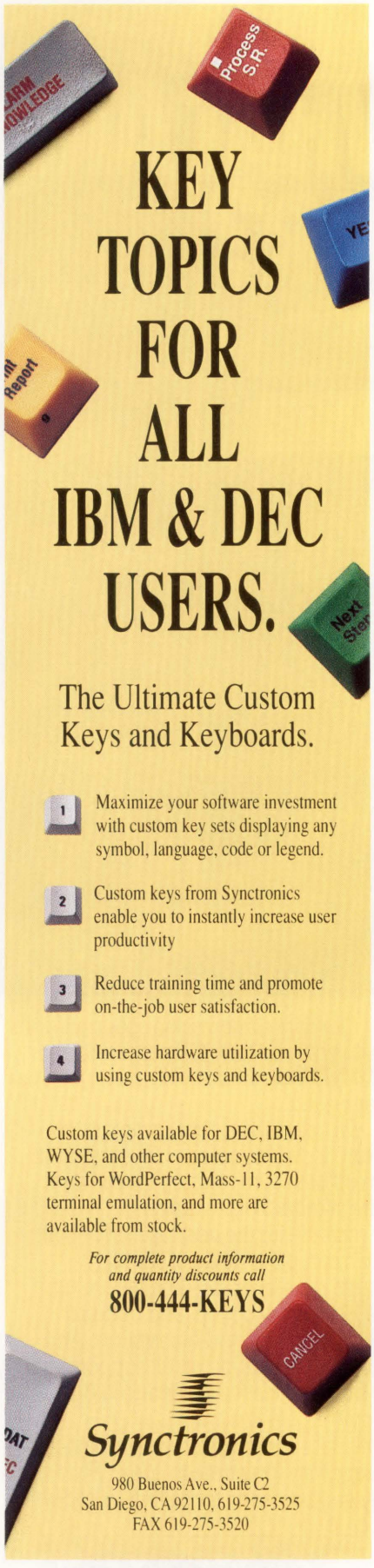
Plus it's a simple upgrade for the best tape drive built: our CY-8200. Offering a complete range of standard interfaces, a 2-line, 40-column display option, and optional security card encryption. And assuring you of full support and a 12-month warranty from the leader in advanced 8mm helical scan technology.

The CY-8200 with data compression will remain the best value in data storage for a long time to come. So now you've got many good reasons for calling us today at (804) 873-0900 and no good reason for waiting.

CONTEMPORARY CYBERNETICS Group

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

CIRCLE 112 ON READER CARD



CIRCLE 162 ON READER CARD

businessman with whom I've transacted business for a decade. Professional Press is a member of DDA and fully supports the professional standards it espouses.

The machine we purchased was integrated at one of the most reputable houses in the country. It arrived clean, in rev level, fully tested and integrated, and was on DEC service within 24 hours. It's running nicely.

DEC PROFESSIONAL is truly concerned with its readers' needs. Every fact in the article is true and verifiable. This exercise was intended to "put our money where our mouth is" and see whether a machine of that size (VAX 882CC-AP) could be purchased in that price range ($85,000). Not to tell our readers exactly what we did would be to fail them most seriously.

TALK ABOUT ALISA

In "VAXshare In DEC LanWORKS For Macintosh" by Al Cini (July 1990), the author compares LanWORKS to Alisa Systems' AlisaTalk. The trouble is, he makes the comparison between the file and print servers of the then-unreleased LanWORKS and the released-in-November-1988 AlisaTalk V3.2.

No one from the magazine called us for any information. If they had, they would have found out that AlisaTalk V3.3 was planned for shipment shortly after the article was published. And the AlisaTalk V3.3 file and print servers have all of the features the author claims as advantages of the LanWORKS servers over AlisaTalk. Furthermore, we have AlisaTalk V3.4, which uses the new faster AppleTalk for VMS, ready to ship now. All we're waiting for is the paperwork from Apple.

I protest the policy of comparing unreleased products from one company against released products from another. Such comparisons are risky for two main reasons:

First, the unreleased product is subject to change, and the changes can materially affect performance, cause a feature to be deleted, change the user interface, and so on. When the unreleased product is released, it can be quite different, possibly rendering the comparison incorrect and unfair. And if the review assumes the product will be released by press time, you can get nailed by schedule slippages, and the article can backfire.

Second, there may be developmental versions of competitive products in the works, and one may even get released *before* the unreleased product being reviewed. If the "dark horse" is materially better, or even about the same, you can lose in three ways: the comparison can be unfair to the other product, you can damage your relationship with the other company and you can damage the introduction of the other product.

Robert B. Denny, President
Alisa Systems Inc.
Pasadena, California

Al Cini: It's a well-known fact that the file server component of DEC LanWORKS for Macintosh is based on Alisa Systems' AlisaShare, which is found in AlisaTalk. Thus it was natural to draw comparisons between the two products. However, the article was never intended as a comparison between DEC LanWORKS for Macintosh and AlisaTalk. We'll soon discuss the new capabilities of AlisaTalk and similar products in The Mac Connection.

MAXSERVER MISDIAGNOSIS

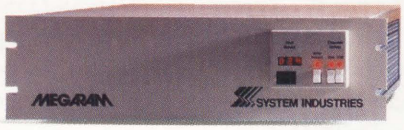
In the Report From Dr. R., "Rigel-Powered VAX 4000" (July 1990, page 22), Dr. R. examined the wrong patient. He referred to the "R6000-powered MAXserver" from DEC when in fact DEC doesn't have a product named the MAXserver.

MAXserver is a registered trademark of Xyplex Inc. It refers to our family of multifunction, multiprotocol terminal, printer and communication servers.

Kathleen Coleman-Goodwin,
Manager of Corporate Communications
Xyplex Inc.
Boxborough, Massachusetts ■

Boost System Performance Up To 50%.

With MegaRam* solid state disk from System Industries, your VAX and VAXcluster system performance promises to really take off. That means I/O bottlenecks are now virtually a thing of the past, as you handle your processing load like never before.



This ultimate solution is based on the fastest storage technology available. In fact, MegaRam's solid-state performance can exceed 500 Q I/Os per second. So, by putting your hottest files on MegaRam, you now get faster terminal response time, faster application run time, and faster completion of batch jobs, too. Just ask Silicon Graphics, Inc., Ingres Corporation, LASHCO, Inc., and many others who've accelerated their VAX performance with MegaRam.

MegaRam also lets you purchase only the capacity you need. In fact, SI's MegaRam starts at an affordable 32 MB with optional battery and disk backup. DEC's smallest solid-state disk configuration is 128 MB. That means MegaRam can spell real savings.

MegaRam is offered as a part of SI's Performance Array sub-systems for a complete tiered storage solution. We also offer a full range of System Engineering services that includes a free analysis of your current installation in order to identify I/O bottlenecks. So, if you want to increase system performance up to 50%, don't get all fired up, simply call SI at **800-333-2220**.

*Manufactured by Imperial Technology, Inc., the leaders in solid-state disk technology.

SYSTEM INDUSTRIES

CIRCLE 211 ON READER CARD

ARISTALK

EDT IN A SUBPROCESS

QUERY:

Sasan Kasra *(SIG 41/MESS 491)*: I need to invoke an EDT session in a subprocess. I'd like to preprocess keyboard input before letting EDT get a hold on it.

The subprocess is created via lib$spawn and has two mailboxes assigned to its SYS$INPUT and SYS$OUTPUT channels. When first invoked, EDT checks SYS$INPUT to make sure it's a terminal. Because the mailbox doesn't qualify, the EDT image exits with error. The only way to get EDT to run in the subprocess is not to assign SYS$INPUT to anything and let it default to the terminal. That's fine, except it won't allow for keyboard preprocessing.

REPLIES:

Andrew Bell *(SIG 41/MESS 492)*: Use TPU/EVE. It emulates EDT reasonably well and gives you so much more. There's a procedure in the back of the EVE manual that shows how to run EVE in a subprocess.

Chuck Viau *(SIG 41/MESS 493)*: Invoke EDT in the spawn command with a /NOINI switch. EDT won't attempt to query or alter the terminal driver. You then can issue line commands from whatever you've assigned as SYS$INPUT.

CDD IN COBOL

QUERY:

Marty Johnson *(SIG 45/MESS 574)*: We converted our database schema from CDD (DMU definitions) to CDD/Plus and found our compile times went from five to 10 minutes to 30 to 90 minutes. We're using COBOL V4.2A and CDD/Plus V4.1 on VMS V5.3. DEC support said, "Please submit an SPR."

The compiles went from 1,500 to 2,000 direct I/Os and 4,000 pagefaults to 35,000 to 60,000 direct I/Os and 60,000 pagefaults. The 60,000 pagefaults resulted after we increased the working sets to 20,000 pages. Multiple compiles increase compile time exponentially, with most of the time in MWAIT caused by locking contention. So all compiles are done via a batch queue with a job limit of one. With more than 500 modules to compile and an expected completion time of 13 days, this is unacceptable, to say the least.

Any ideas on how to speed the compiles? I've already recommended that DEC loan us a couple of ESE-20s and a 9000 until they fix the problem, but the managers have no sense of humor.

REPLY:

Philip Gravel *(SIG 45/MESS 578)*: If you have telephone support from DEC and don't receive what you believe is an adequate response, ask for the manager on duty. Tell him your problem and why you believe their reply is inadequate. Also let your sales representative know that you're dissatisfied.

We had a problem with a purchase from DEC that didn't live up to its advertised performance for our applications. We let our salesperson know that we were unhappy. DEC engineering acknowledged that architectural differences are responsible for the performance hit. We have to make an additional purchase to resolve it — but at a steeply discounted price.

DISABLE LOGOUT MESSAGE

QUERY:

Thomas W. Turner *(SIG 37/MESS 1366)*: The message that's sent when you log out of VMS is interfering with the operation of my modems. Can this message be disabled?

REPLIES:

Richard B. Gilbert *(SIG 37/MESS 1367)*: You must have very strange modems. As far as I know, the message can't be suppressed. You can do a STOP/ID=0, which kills your process without a message. This isn't the same as a normal logout, but it will work.

NIK *(SIG 37/MESS 1368)*: The message can't be suppressed, but it can be eliminated. It requires a patch to SYS$SYSTEM:LOGINOUT.EXE.

How To Use ARIS/BB

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

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

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

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

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

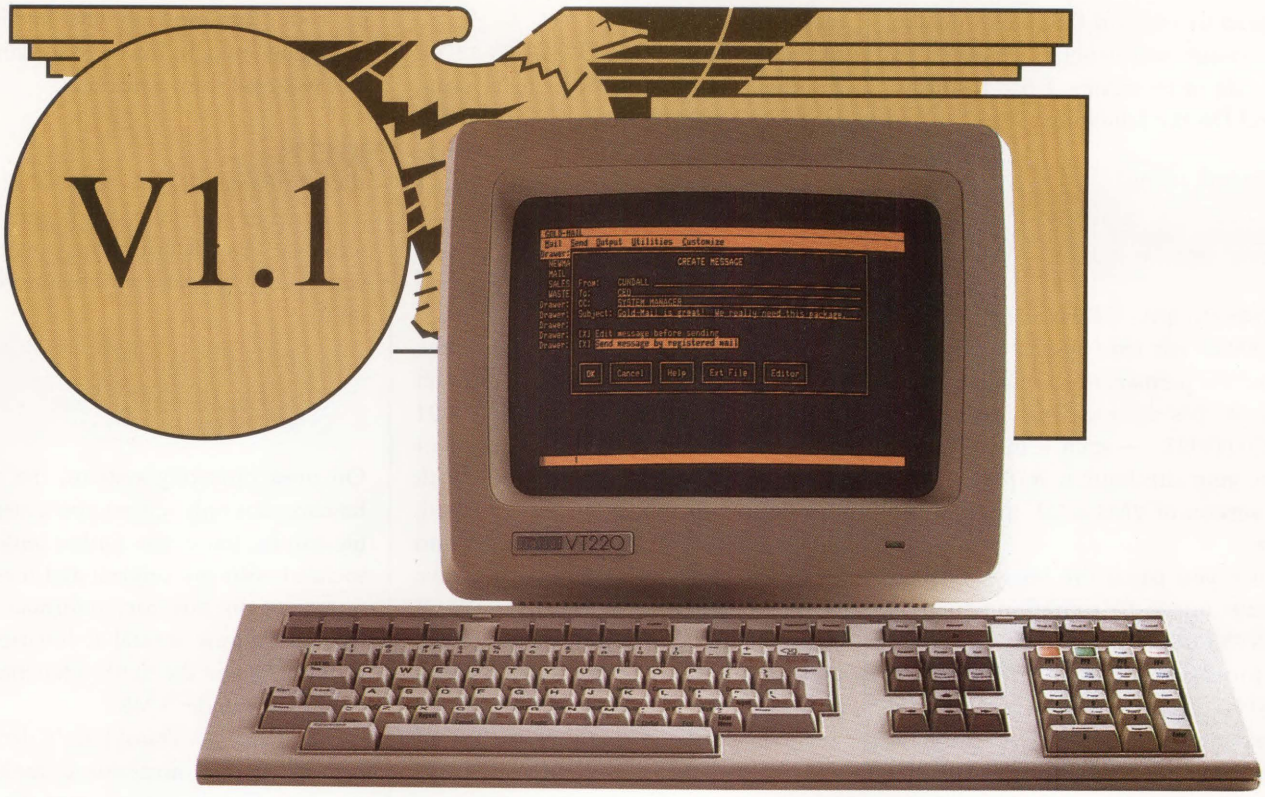
The ARIS/BB symbol appears at the beginning of each article when the program is downloadable. *VAX PROFESSIONAL* programs are available to subscribers of *VAX PROFESSIONAL* only. For subscription information, contact Phyllis Chandler at (215) 957-1500 9 a.m. - 5 p.m. Eastern Time. Use these recommendations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

XMODEM and Kermit are available.

SIG Identification

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

23	MicroVAX
37	VMS
41	Applications
45	Programming Languages/AI
101	Miscellaneous



Gold-Mail™

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

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

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

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

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

800-843-1317

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.
WordPerfect is a trademark of WordPerfect Corp.

CIRCLE 114 ON READER CARD

I need to confirm that we're on the same "image wavelength." (There's so much talk of frequency, I had to throw that in.) Do the following:

```
1. Version of VMS.
$ SHOW SYSTEM
2. Check-sum of SYS$SYSTEM:LOGINOUT.EXE.
$ CHECKSUM SYS$SYSTEM:LOGINOUT.EXE
$ SHOW SYMBOL CHECKSUM$CHECKSUM
```

SYS$SYSTEM:LOGINOUT.EXE does a SYS$PUT rab (rms system service) to the process permanent output file, your terminal. It's un-redefinable through SYS$OUTPUT — such a pity. If, and only if, your checksum is 3676927304 and your version of VMS is 5.2, then see the Figure.

Once you patch the image, rename the new image to something such as SYS$SYSTEM:MY_LOGINOUT.EXE. The processes that will use the new LOGINOUT.EXE should define the logical name LOGINOUT to the new image name, preferably in the LGICMD file:

```
$ DEFINE LOGINOUT-
  SYS$SYSTEM:MY_LOGINOUT.EXE
  ! default is /PROCESS
```

Now DCL will be tricked into running MY_LOGINOUT.EXE when the $LOGOUT is issued. The process uses the original to get into VMS and the special MY_LOGINOUT.EXE to get out. Basically, what we're doing is replacing the CALLs to the routine that outputs the message with NOPs.

Dave DesRoches *(SIG 37/MESS 1370)*: Another possibility exists if you're using Hayes-compatible modems. If I don't modify the factory setup, I get strange results from the modems. Sometimes I can't even use them.

The setup sequence I use is:

```
AT&F&C1&D3E0Q1S0=2&W
```

The key commands in regard to the VAX appear to be E0 and Q1. E0 turns off Echo commands to the terminal. Q1 turns off result code values being sent from the modem to the terminal. With the VAX, if these values aren't changed, the system and the modems can get into an infinite loop of trying to say goodbye and/or hello to each other. The VAX sends the logout message, then the modem sends a result code back. This triggers the VAX to ask for the username, and the cycle continues.

FLUSHING LOGFILE BUFFERS

QUERY:

Michael A. Baydoun *(SIG 101/MESS 777)*: I have a program that's sometimes run from a batch job. In this case the program output goes to a log file, not a terminal. Sometimes this program hangs (bug), and I really need to see the last thing it did. Can I force the program to write all buffered I/O to disk before I kill it? Can I force it at certain key points in my code? Just knowing what line it's on isn't good enough. I need to see key data that was read from a mailbox.

REPLY:

Phil Anthony *(SIG 101/MESS 778)*: If it's a C program, the following fragment inserted at critical points may work for you. Test it to make sure before relying on it:

```
#include <stdio.h>
int handle; int dup(), close();
handle = dup (fileno (stdout));
  close (handle);
```

On most operating systems, the dup( ) function not only returns you a duplicate file handle, but it also flushes buffers associated with the original and forces an update of the directory information. In fact, that's how several C libraries I've seen implement the fflush( ) function. It's worth a try under VMS.

Incidentally, fileno( ) isn't declared, because most C distributions implement it as a macro in stdio.h. But it's used, because I've seen systems and situations in which the file handle associated with standard output isn't 2.

MICROVAX OR VAXSTATION?

QUERY:

Greg Grotyohann *(SIG 23/MESS 247)*: I have two VAXstation 2000s. When I create a symbol using the F$G ETSYI ("HW_NAME") lexical, one system returns the value MicroVAX 2000 and the other says VAXstation 2000/GPX. How can I change the MicroVAX to say VAXstation?

REPLIES:

Stan Huhman *(SIG 23/MESS 248)*: It's probably a hardware ROM change. We had the same problem when a VAXserver 3300 became a MicroVAX 3300 after the CPU board failed and DEC replaced it with a slightly wrong one. It wouldn't have bothered me, except LMF wasn't pleased.

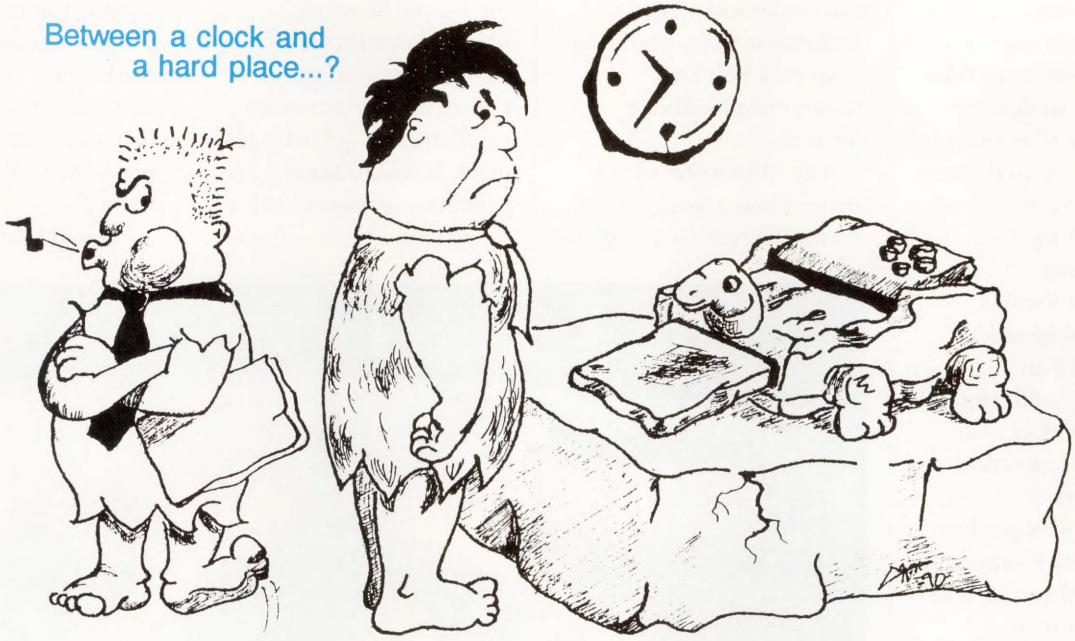
Richard B. Gilbert *(SIG 23/MESS 249)*: The difference between a MicroVAX 2000 and a VAXstation 2000 is a jumper on the CPU board. I'd call field service and ask them to fix it. ■

FIGURE.

```
$ SET DEF SYS$LOGIN                          ! home sweet home, NOT SYS$SYSTEM
$ COPY SYS$SYSTEM:LOGINOUT.EXE []            ! for me?  you shouldn't have.
$ PATCH LOGINOUT.EXE                         ! anesthetic completed.
PATCH> SET MODE INSTRUCTION                  ! scalpel!
PATCH> EXAM 4C89                             ! will make the incision here.
...CALLS  #01,@#7FFEE188                     ! aka. SYS$PUT, if not, then PATCH>
                                             ! EXIT
PATCH> REPLACE 4C89                          ! replace instruction
OLD> 'CALLS #01,@#7FFEE188'                  ! confirm you know what you're
                                             ! replacing,
OLD> EXIT                                    ! say yes I know.
NEW> 'NOP'                                   ! what shall I replace it
                                             ! with?...MASTER.
NEW> EXIT                                    ! a bunch of NO oPerations, however
                                             ! many it takes.
PATCH> UPDATE                                ! write the new and improved image.
PATCH> EXIT
$ TYPE LOGINOUT.JNL                          ! rewind and fast forward. Just in case
                                             ! you forget.
$ DEFINE LOGINOUT SYS$LOGIN:LOGINOUT.EXE
$ LOGOUT                                     ! no message
```

LOGOUT.DOC

HOW LONG CAN YOU ALLOW PALEOLITHIC MACHINES TO CRUNCH YOUR BOTTOM LINE



Time is money and time lost while waiting to use the FAX machine, dialing and re-dialing FAX numbers and finally waiting for the document to be transmitted to its final destination not only represents a loss of productivity but lost opportunities; surely, your employees have better things to do than being 'between a clock and a hard place'.

That's why we created AutoFAX - the **VAX-To-FAX** product that allows VAX users to send and receive FAX's directly from their VAX terminal through WordPerfect, WPS Plus, The Command Line Interface, VMS Mail and All-In-1's E-Mail.

AutoFAX even allows documents to be merged with forms and delivered to distant FAX machines in portrait or landscape modes. Consider these great features:

- alternate document routing
- least-cost document routing
- priority and delayed document delivery
- forms and text merge
- advanced presentation attribute support
  ie: bold and underline, etc.
- LN03/HP Laserjet emulation
- FAX Forwarding
- on-line transmission status
- usage accounting

Wilco

Wilco Communications Inc.
201 Rock Road, Glen Rock, NJ 07452
Tel (201)612-9414 Fax (201)612-9419

CIRCLE 174 ON READER CARD

Find out how AutoFAX can decrease your costs. Call Wilco today:

1-800-878-2266

VAX, VMS Mail, LN03, and WPS Plus are registered trademarks of Digital Equipment Corporation. WordPerfect is a registered trademark of WordPerfect Corporation. HP Laserjet is a registered trademark of Hewlett-Packard Company

New York	Bermuda	London	Stockholm	Tokyo	Hong Kong
201-612-9414	809-295-8777	71-374-4313	8-710-0075	03-434-3355	5-810-5556

Building Bridges

Xyplex And Vitalink Team To Create Interoperable WAN Bridges

The lack of a unifying interoperability device that links remote bridges among different vendors has led to an alliance of two networking companies to develop such a product. The result is the MAXserver 6510 Remote Bridge Card, co-developed by Xyplex and Vitalink Communications.

Xyplex and Vitalink teamed up in response to user requests for an interoperable, multivendor networking product over wide area networks (WAN). The MAXserver 6510 card, although a Xyplex product, uses the Vitalink Communication Protocol on the WAN link to interact with Vitalink's Translan bridges and Transpath bridge/routers — the most widely installed remote bridges on corporate networks. The MAXserver 6510 also supports a variety of WAN interfaces, including V.35, RS-422 and RS-423, while incorporating Xyplex's Interactive Protocol Optimization (IPO). IPO prioritizes time-sensitive protocols and ensures their timely transmission, compressing LAT as part of the process.

In addition to standard remote bridge functions, the MAXserver 6510 provides interactive trafficking capabilities among workstation users. A typical workstation group might include asynchronous terminals, printers, PCs or UNIX workstation users who need to access a host LAN or corporate backbone network.

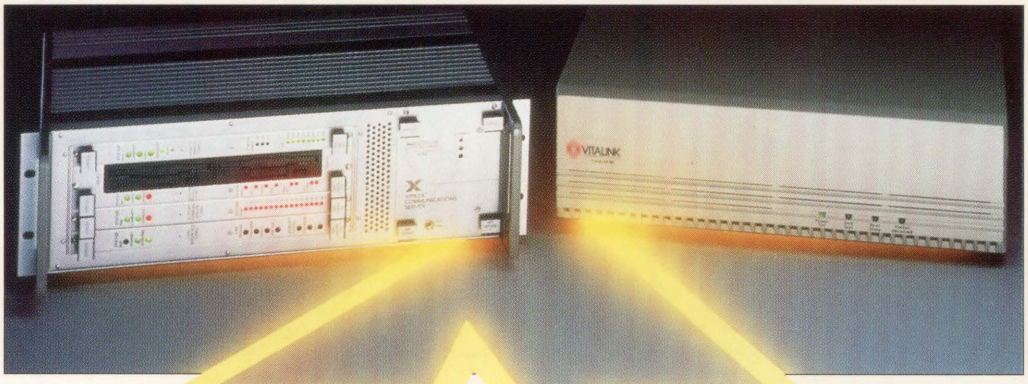
The MAXserver 6510 is inserted into a single slot of the MAXserver 5500, 5000 or 4500 communication server chassis. The card also can link with another 6510 or to Vitalink's Translan bridges or Transpath bridge/routers. Other cards available for the MAXserver Lanbus chassis include eight- and 16-port multiprotocol terminal server cards, a network printer server card for Centronix and Dataproducts printers, a LAN interface card that can be configured for redundant LAN connections and the MAXman network management card.

The 6510 also supports the Simple Network Management Protocol (SNMP) and local and remote console access for configuration and management. Software loading and parameter management for the 6510 can be run from any VAX/VMS, ULTRIX or UNIX host. All MAXserver chassis use front-loading cards and support Xyplex's "hot-swapping" capability for ease of configuration and maintenance.

Optional redundant network connections are available. The 6510 and the server chassis are backed by Xyplex's standard three-year warranty.

"Through [Xyplex and Vitalink's] combined efforts, we feel the 6510's performance is increased," says Greg Ferguson, Xyplex vice president of sales and marketing. "Because Xyplex users are interactive, the 6510, for example, is able to prioritize LAT and TELNET traffic."

The MAXserver 6510 Remote Bridge costs $4,000. According to Ferguson, Xyplex will provide functionalities such as terminal server cards, LAN interface cards or printer server cards for an as-yet-undetermined price.



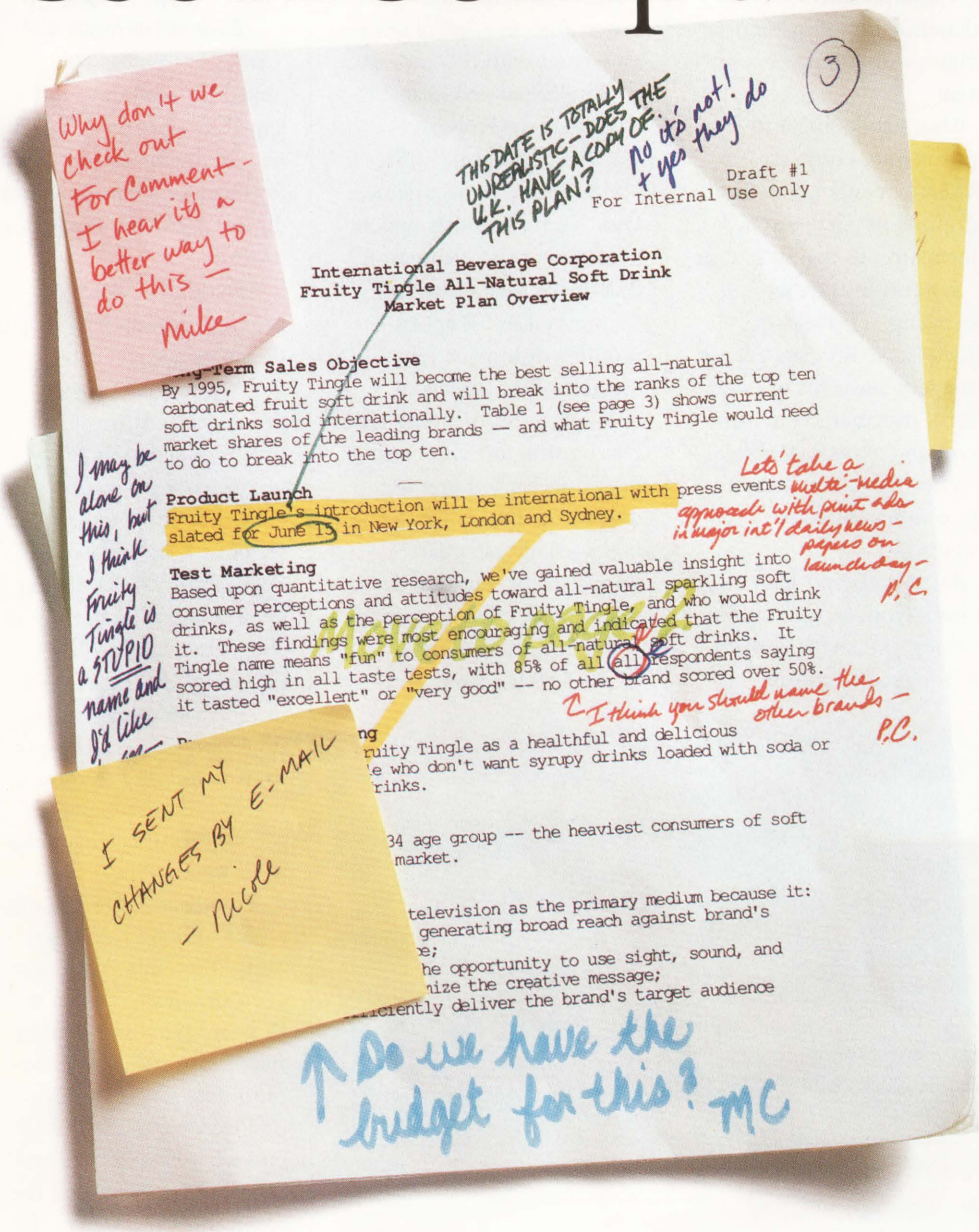
The 6510
Remote Bridge Card, co-developed by Xyplex and Vitalink, provides WAN-link interoperability through the Vitalink Communication Protocol.

FOR MORE INFORMATION

Xyplex Inc.
330 Codman Hill Rd.
Boxborough, MA 01719
(508) 264-9900
Circle 419 on reader card

Vitalink Communications Corp.
6607 Kaiser Dr.
Fremont, CA 94555
(415) 794-1100
Circle 420 on reader card

Does Anybody Around Here Know How To Use A Computer?



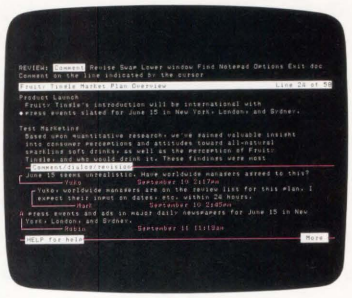
For sheer inefficiency, few processes in business today rival that of the document review process.

Days after leaving the author's hands, the document comes back covered with handwritten comments, sticky notes and references to orphan e-mail messages. Or, worse yet, the document never comes back at all.

All in all, it's not a very productive way to work. Fortunately, Access Technology of 20/20 spreadsheet fame has done something to improve the document review process:

We've computerized it.

Our new software program, ForComment,® allows you to electronically share documents with reviewers, who make their comments on-line as they read.



ForComment keeps a permanent record of who said what when. All comments are organized into the document, so the author can focus on shaping the text, rather than chasing paper.

ForComment supports VAX®/VMS,® DECNET,™ ALL-IN-1™ Office Software, PC-LAN's and most popular word processors, including WordPerfect® and WPS-Plus.®

Isn't it time you reviewed the way you review your documents? Call us at **508-655-9191** for a hands-on demonstration of ForComment.

Access Technology
A CompuServe Company
ForComment®

© 1990, Access Technology, Inc. All rights reserved. Trademarks are the property of their respective holders.

CIRCLE 183 ON READER CARD

Midrange Management

Gejac's ARSAP V7.0 Provides Comprehensive Data Center Management Software For Midrange Systems

The latest version of Gejac's data center management software for VMS and UNIX platforms provides a comprehensive management solution for midrange systems. Because ARSAP V7.0 has significantly fast run rates, it doesn't require modifications to existing systems or procedures to operate efficiently. It's inexpensive enough to meet the requirements of systems such as the VAX 3000 and 6000 and has the features and performance to handle the data associated with large, mainframe-based distributed networks such as those based on the VAX 9000.

ARSAP operates on VMS-based systems, regardless of the other hardware built into the network. It accepts system accounting data from non-VMS systems. ARSAP processes and incorporates the "foreign" data into its database as another network node and produces reports independently of machine design or operating system origin.

After processing and reporting are complete, ARSAP's open architecture transports its database information to mainframe or PC systems for further processing. This allows ARSAP to satisfy data center management needs in mixed, distributed environments and allows a site to interface its system accounting to other software systems.

ARSAP doesn't have to be built from separate utility products. ARSAP's features are accessed from one automated user interface.

ARSAP's disk management features make the system more efficient. These features monitor disk-use procedures to control costs associated with disk storage.

The Expanded Disk Management Reports Capability pinpoints disk consumption by username. Disk Trend Reports update management of changes in disk-space usage patterns. Summary Disk Reports monitor disk space remaining and other aspects of disk-space use. Volume Disk Discounting provides cost discounts for volume use of disk space. Disk Shadowing manages and safeguards important or sensitive data and provides disk reporting and billing capabilities.

ARSAP has been optimized for medium- and large-site operation. Specific site parameters are "tuned" for more efficient operation during ARSAP's installation process.

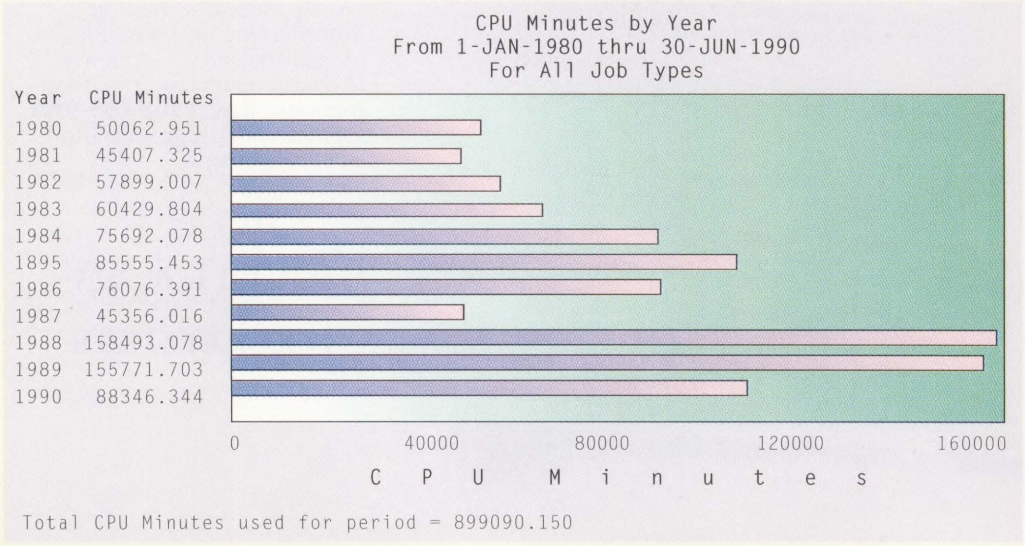
In addition, ARSAP provides automatic Privilege Grants to securely and flexibly control project privileges and Automatic Project Validation Entry to incorporate project files generated by external systems. It has improved Real-Time Data Logging to keep accounting files up to date, User-Defined Accounting to handle specific unique accounting situations, and a Special Applications Capability to monitor specific resources and account for special applications use.

New Batch Job Features are included. Queue and Shift Discounts encourage even use of the system and Project Switching Within Batch Jobs provides maximum charging flexibility.

Prices for ARSAP V7.0 range between $4,000 and $50,000, depending on the application and size of the system.

FOR MORE INFORMATION

Gejac Inc.
8643 Cherry Ln.
Laurel, MD 20707
(301) 725-2500
Circle 403 on reader card



Gejac's ARSAP data center management software provides multiyear capacity monitoring.

Different Minds, Different Views, One Solution:
New Lab Manager™

In today's computerized environment, the ability of a LIMS to conform to standard hardware and database platform demands is equally as important as its ability to improve productivity in the lab. That's why we developed our new Lab Manager LIMS.

Lab Manager LIMS — For the Laboratory Director

Our New Lab Manager with advanced core LIMS functionality includes features like the MATRIX reporting command and a windows-based ad hoc report writer, enabling the chemist or occasional user to generate complex laboratory reports or graphical plots in a few easy steps. And a new event triggering facility provides automatic distribution of LIMS reports to the requesting source, based on any change in LIMS sample or test status.

Lab Manager LIMS — For the Information Systems Manager

The key to laboratory data connectivity within your company is an SQL pipeline to Rdb/VMS*or ORACLE*. Designed with strict adherence to the SQL ANSI standard, the SQL pipeline provides you with complete access to LIMS information, enabling you to develop new or integrated applications using the commercial 4GL tools you are most comfortable with. And our Cooperative Marketing Partnership (CMP) with DEC* means responsive support for you.

Lab Manager LIMS—a fully integrated database management system with the built-in flexibility to meet your evolving computing standards.

Lab Manager LIMS. The one solution for both Laboratory and Information Systems Management. Demand to see more information today. Contact Beckman Instruments, Inc., 90 Boroline Road, Allendale, NJ 07401, (201) 818-8900.

BECKMAN

*DEC and Rdb/VMS are trademarks of Digital Equipment Corporation.
*ORACLE is a trademark of Oracle Corporation.
Lab Manager is a trademark of Beckman Instruments, Inc.

CIRCLE 275 ON READER CARD

Networking Suite

Process Software's Modular Suite Of TCP/IP Networking Protocols Links VAXs And Other Systems

Process Software, manufacturer of communications and networking software products, announced version 2.0 of TCPware for VMS, a modular suite of TCP/IP networking protocols. TCPware for VMS supports VMS V4.0 through V5.3 and provides networking between VAXs and other systems.

With the new version, any or all of the TCPware for VMS components can be started or stopped as often as desired without having to reboot the system. The number of connections is unlimited, restricted only by the number of processes and system memory. A DECwindows transport layer for TCP/IP allows DECwindows applications on VMS V5.3 to use the protocol suite for communication with other systems.

TCPware for VMS features a QIO programming interface for access to the TCP/IP and UDP layers, a socket library and related subroutines for application programming, and concurrent operation with DECnet, LAVcs and LAT. All components operate with DEC Ethernet/802.3 hardware and are compatible with UNIX, ULTRIX and other TCP/IP systems.

"TCPware V2.0 has many new features designed to enhance networking performance and management," says Bernie Volz, engineering manager at Process Software. "For example, selectable Domain Name Services support simplifies management by distributing information throughout the network."

The networking protocol suite consists of file transfer networking services (FTP-VMS), a network file system (NFS-VMS), mail transfer networking services (SMTP-VMS) and virtual terminal networking services (TELNET-VMS).

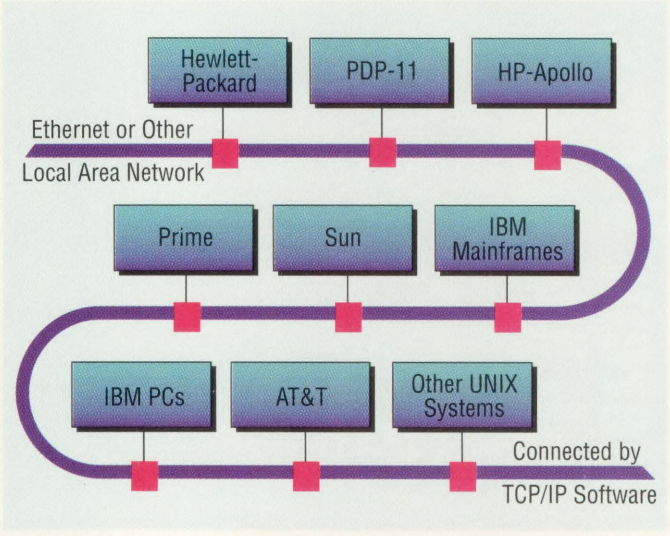
FTP-VMS provides file transfer networking by implementing TCP/IP and FTP networking standards. An interactive VMS help facility and support for multiline recall and keypad definition aid the user. FTP-VMS contains user and server FTP functions and supports account, password and file ACL protection.

NFS-VMS implements an NFS server that allows authorized NFS clients transparent access to files on a VMS system. It maps between the remote NFS file system and the VMS file system. System integrity is maintained through support of UIC and ACL directory and file protection and restriction of system access to clients that appear in an export database. A multithreaded design provides high performance with low processor overhead.

SMTP-VMS provides mail transfer networking by implementing the TCP/IP SMTP networking standard. ARPA internet address and message formats are supported. Using VMSmail, SMTP-VMS provides a transparent user interface and VMSmail command support. It defers mail delivery to unavailable hosts and automatically notifies the user of incoming mail or undeliverable mail.

TELNET-VMS provides virtual terminal networking by implementing the TCP/IP and TELNET networking standards. Like FTP-VMS, it contains an interactive VMS help facility and supports multiline recall and keypad definitions. It also includes TELNET-layer subroutine interfaces.

TCPware for VMS products are modular, so you can select any or all of the services. Each product includes TCP-VMS software, which provides lower-layer network services. The base price including all available services on a VAXstation 3100 is $1,155.



Process Software's TCPware for VMS networking protocol suite operates with computers that support TCP/IP.

FOR MORE INFORMATION

Process Software Corp.
959 Concord St.
Framingham, MA 01701
(508) 879-6994
Circle 401 on reader card

Welcome To The Wide Open Spaces Of Progress.

Welcome to a 4GL/RDBMS world that lets you decide how to build and run an unlimited range of applications without the usual limits. Without the usual constraints.

Take a seat and let us explain.

To begin with, the PROGRESS 4GL lets you build with incredible efficiency while giving you the control of a full-structured programming language.

When the name of the game is development speed, you've got it. When the name of the game is control, you've got it. When the project calls for both, you've got both.

And just to make sure you like the view, you've also got a menu-driven application builder, ANSI-standard SQL and 3GL access if you want it. You've got a true distributed RDBMS with client/server architecture and two-phase commit. You've got multi-threaded, scalable performance on large multi-processor systems.

But stay seated, there's more.

PROGRESS ties together data across different operating systems, networks and databases. It lets you port applications without modification across UNIX, VAX/VMS, OS/2, DOS (even 640k PCs) and CTOS/BTOS with AS/400 coming soon. PROGRESS applications run unchanged over distributed networks using TCP/IP, DECnet, NetBIOS and SPX/IPX. They even update Oracle, Rdb, RMS and PROGRESS databases simultaneously.

#1 In The Last Three Datapro User Surveys 4GL RDBMS

What it all adds up to is 40,000 installations in 30 countries covering every conceivable application. Plus the #1 rating for efficiency, reliability, and overall user satisfaction in Datapro's last three surveys.

So find a phone and call **800 FAST 4GL** to find out about the PROGRESS Test Drive and the full Datapro report on PROGRESS.

Once you step into our world, you'll never want to leave.

Progress Software Corporation
5 Oak Park, Bedford, MA 01730
Telephone 617 275-4500
Fax 617 275-4595

PROGRESS is a registered trademark of Progress Software Corporation.

Datapro, UNIX, VAX/VMS, OS/2, DOS, CTOS/BTOS, AS/400, TCP/IP, DECnet, NetBIOS, SPX/IPX, Oracle, Rdb, and RMS are registered trademarks of their respective manufacturers.

PROGRESS®

The Usual Limits Don't Apply.™

CIRCLE 236 ON READER CARD

Securing Network Data

Datamedia Padlocks System Resources With Its Netmate Workstations And Securecard Network Security System

As corporations begin to migrate data from a central computer site to thousands of workstations across the globe, LAN managers are left with the headache of ensuring network security and managing individual workstation access. Computer viruses, unauthorized access and data theft are a few of the network security problems that threaten the enterprisewide environment.

One response to these challenges comes from Datamedia, which added three new systems to its Netmate group of security-enhanced workstations. It also announced enhancements to its Securecard Network Security System, a system for managing access to workstation and network resources. Securecard relies on its workstation/user authenticity architecture to let administrators specify access levels to system resources for a variety of user authority levels.

"We enhanced our Netmate product in direct response to user requests," says company President Guy Daniello. "To our surprise, we discovered that user concerns overseas are more prevalent than here in the U.S. Europe is less free-wheeling in terms of sharing information. Overall, there's a great need for restricted user access across network systems."

FOR MORE INFORMATION

Datamedia Corp.
20 Trafalgar Sq.
Nashua, NH 03063
(603) 886-1570
Circle 414 on reader card

Datamedia's Netmate/dx25, Netmate/dx33 and Netmate/dx425 are based on the Intel 25-MHz 80386, 33-MHz 80386 and 25-MHz 80486 processors. They're available in diskless, floppy and hard-drive configurations. The three workstations include integrated support for Securecard.

The Netmate/dx25 achieves processing speeds of up to 6 mips and can support a variety of networked applications, including financial analysis, graphic-based office systems and distributed database applications. The Netmate/dx33 can run at processing speeds of up to 8 mips and supports networked applications such as financial trading. The robust Netmate/dx425 chugs along at 11 mips and supports a broad range of programs ranging from complex real-time financial modeling systems to multiuser CAD/CAE.

All three workstations are designed for connectivity. Fully compatible network drivers are available for prominent networking systems such as DEC's LanWORKS (fomerly called PCSA), NFS and NetWare.

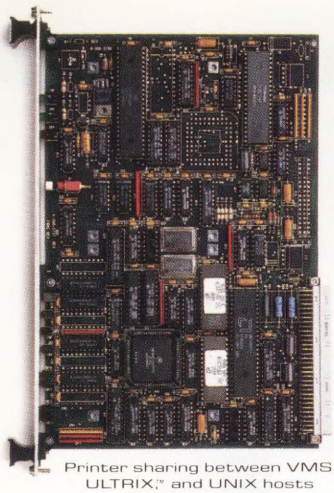
Datamedia's Netmate/dx25 LAN workstation achieves processing speeds of up to 6 mips.

In addition to a compact design and the Securecard reader, the workstations feature 2 MB of system RAM (4 MB on the dx425), a 64-KB high-speed memory cache on the Netmate/dx25 and dx33, and 8 KB of internal on-chip cache memory on the dx425. The Netmate line of workstations comes with integrated IDE and SCSI support and features IBM PS/2 and DEC LK250-style keyboards in six languages.

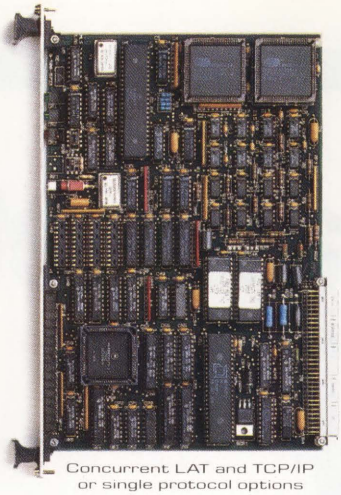
Datamedia's Securecard Network Security System V2.11 has added network password translation and multiple profile support for the Novell NetWare and Sun PC-NFS environments. Workstation and corporate ID management features have been added to Securecard to protect computer networks from intentional abuse. Netmate workstations can be configured to boot only if a Securecard is inserted into the system and can be configured further to limit access to specific local and network resources.

The Netmate/dx25 costs $3,995 (diskless), $4,295 (floppy) and $5,020 (40-MB hard drive). The Netmate/dx33 costs $5,195 (diskless), $5,495 (floppy) and $7,190 (100 MB). The Netmate/dx425 costs $7,695 (diskless), $7,995 (floppy) and $9,690 (100 MB).

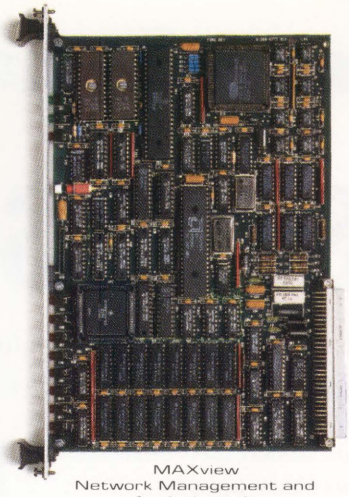
Securecard V2.11 costs $500. Individual 64-KB user-programmable Securecards cost $50.



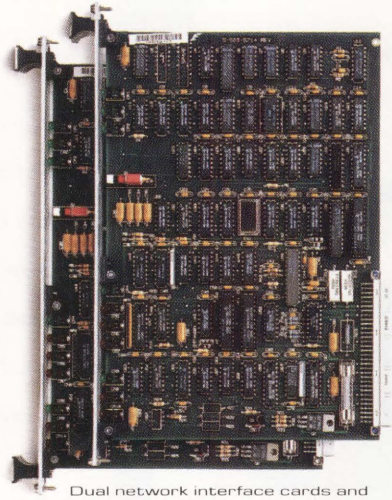
Printer sharing between VMS, ULTRIX,™ and UNIX hosts



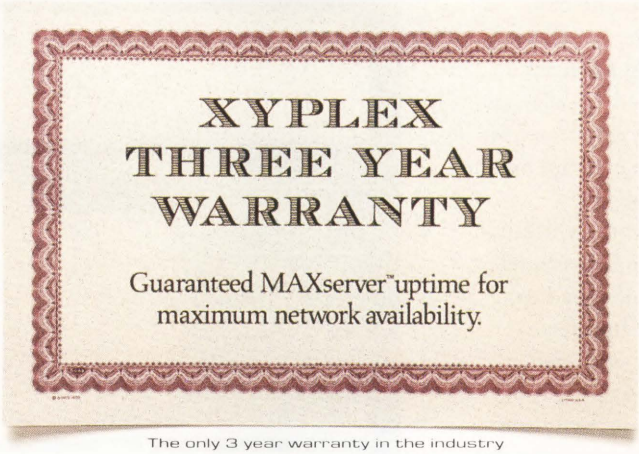
Concurrent LAT and TCP/IP or single protocol options



MAXview Network Management and Analysis tools



Dual network interface cards and power supplies provide fail over redundancy



The only 3 year warranty in the industry

TRY TO FIND THESE CARDS IN A TRADITIONAL DEC.

In an attempt to find a terminal server that provides a winning hand of benefits—high reliability, high flexibility, and fault tolerance—network managers like yourself have traditionally gone to DEC.™ Understandable. However, if you come to Xyplex instead, we'll give you a much better deal.

First of all, you get your choice of terminal server card options—8 or 16 ports with concurrent LAT™ and TCP/IP protocols. Plus a choice of network printer cards with either a Centronics® or Dataproducts® printer interface. All cards feature MAXserver's® unique "HOT SWAP" capability to keep your network up and running while you add or replace modules.

Secondly, you get unprecedented fault tolerance with dual LAN interface cards for back-up network connections. Plus a redundant power supply with automatic failover. And with MAXview™ Network Management and Analysis Tools you can reconfigure nodes or monitor and diagnose hardware or software problems faster than ever before.

Best of all, you get the industry's only 3 year warranty.

So, next time you're in the market for terminal servers don't start with the DEC stacked against you. Come to Xyplex first.

For more information call

1-800-338-5316

Or write, Xyplex, Inc., 330 Codman Hill Road, Boxborough, MA 01719

Name _____

Title _____

Company Name _____

Address _____

City _____ State ____ Zip _____

XYPLEX

CIRCLE 175 ON READER CARD

Super Spreadsheets

Execucom Systems' Paradigm Combines The Benefits Of Spreadsheets, Financial Modeling And Artificial Intelligence

Spreadsheet users often want more than just a spreadsheet. They want an integrated software package that combines the benefits of spreadsheets, financial modeling and AI. Management might call it wishful thinking. Execucom Systems calls it Paradigm.

Paradigm is a workstation-based business intelligence tool designed to provide the business community with the software to analyze its current productivity and forecast its future potential.

"Paradigm possesses the look and feel of a spreadsheet," says Execucom Product Manager Steve Murchie. "Data can be grouped together, information can be updated and sent back to storage — all done on the fly through Paradigm. The difference is Paradigm has a language that spreadsheets don't. Our modeling language has a functionality that a cell-oriented spreadsheet doesn't have."

Paradigm runs on a variety of DEC hardware, including the VAXstation 3100 Models 30/38/48 and the DECstation 2100 and 3100. Paradigm also runs DECwindows on VAX/ULTRIX, RISC/ULTRIX and VAX/VMS platforms.

Paradigm requires a minimum of 3 MB of free RAM on the VAX or 4 MB of free RAM on RISC-based platforms. Execucom recommends a minimum of 8-MB base memory. As for database environments, Paradigm supports Rdb V3.1 (via SQL Services) and Oracle's SQL* Plus V2.1.

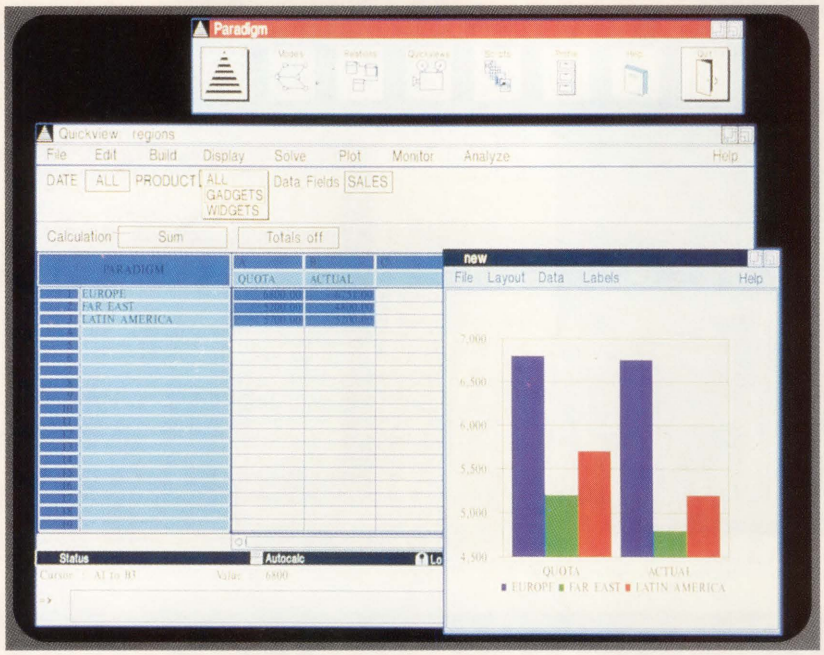
According to Murchie, Paradigm is the first workstation-specific application to integrate financial modeling analysis, AI and a GUI. Execucom has taken DEC's NAS strategy to heart, applying business intelligence applications to Paradigm through ALL-IN-1 office integration technology. You can interact with the DECwindows-based GUI and manipulate data through familiar, spreadsheetlike matrices or through a nonprocedural financial modeling language. Digital contributed dollars and design to Paradigm, says Murchie.

Paradigm offers a unique function called Quickviews that provides an automatic data-browsing capability. Quickviews lets you examine data in a variety of formats. A simplified SQL query mechanism lets you gain easy access to local and remote databases.

Another variation on the common spreadsheet format is Paradigm's spreadsheet-like model entry, the underlying language of which is English rather than the cell algebra employed by spreadsheet developers. Paradigm provides AI capabilities that offer a powerful analytical tool.

Additional software features include pull-down menus, icons and dialog boxes, connectivity to corporate data, and compound document support, providing the integration of reports, text and graphics into a single package.

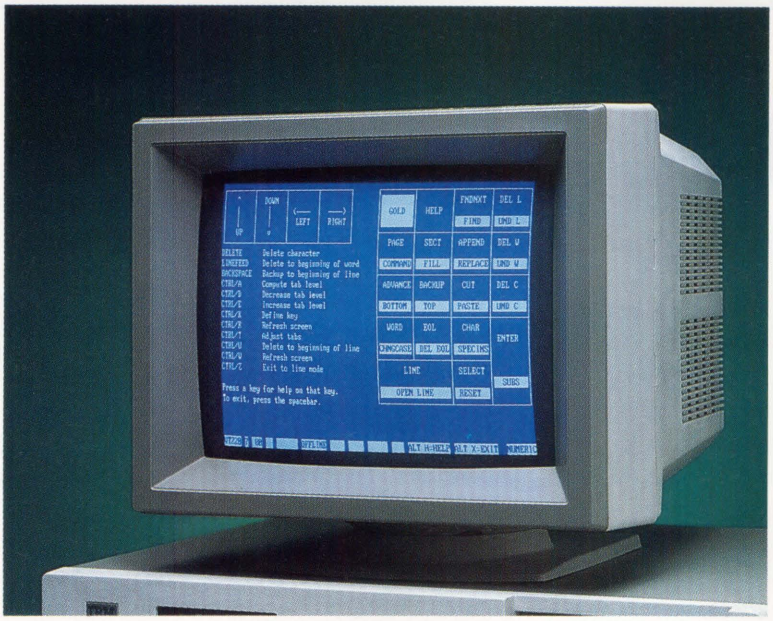
Paradigm is priced at $1,500.



Paradigm's Quickviews function lets you examine information in relational tables easily.

FOR MORE INFORMATION

Execucom Systems Corp.
108 Wild Basin Rd.
Austin, TX 78746
(512) 327-7070
Circle 415 on reader card



EM320

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

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

VT320 EMULATION

EM4105

EM4105 is a sophisticated Tek 4105/DEC VT320 terminal emulator that converts your IBM PC into a color graphics workstation. EM4105 costs thousands less than a dedicated graphics terminal.

- *4107 Extensions Including 16/64 Colors*
- *Pan/Zoom*
- *High Resolution Hardcopy*
- *Mouse Cursor Control*
- *4010/4014 and VT640 Emulation*
- *640 × 350 EGA Support*
- *640 × 480 VGA and EGA Support*
- *Plotter Support*
- *All EM320 Features*
- *Network Support*

4105 EMULATION

All EM products feature network support:

- *DECnet**
- *SUN PC-NFS**
- *FTP PC/TCP**
- *Novell NCSI*
- *3COM BAPI**
- *Datability RAF*
- *Wollongong WIN/TCP*
- *Excelan Telnet API*
- *Ungermann-Bass Net/One**
- *Möbius*

**Multisessions*

All trademarks acknowledged.

Interested in a 30 day evaluation? Call (303) 447-9251

Diversified Computer Systems, Inc. 3775 Iris Ave. Suite 1B, Boulder, CO 80301 FAX: 303-447-1406

Providing Terminal Emulation Productivity Tools Since 1983.

CIRCLE 120 FOR INFORMATION ON VT320 EMULATION. CIRCLE 349 FOR INFORMATION ON 4105 EMULATION.

SmarTerm Gets Smarter

Persoft's SmarTerm 340 Moves VT340 Terminal Emulation To The Head Of The Class

Persoft has introduced SmarTerm 340, the latest addition to its SmarTerm line of DEC terminal emulation software for PCs. SmarTerm 340 enhances the VT340-level graphics of the earlier SmarTerm 240 and combines them with other features to provide precise emulation of the VT340.

SmarTerm 340 supports VT340 ReGIS 16-color graphics, including VT241 four-color and VT240 monochrome graphics emulation. It provides virtually all features of the ReGIS graphics command language, including macrographs, polygon fill, shading and size and height control of characters. It provides true horizontal resolution of ReGIS graphics on register-compatible VGA and selected enhanced EGA systems with multifrequency, multiscanning monitors.

SmarTerm 340 supports page memory, report sequences and DEC character sets. It also provides an easy-to-use interface, international support and network functionality. The terminal emulation software is available in single- and multiuser versions. The multiuser version, SmarTerm 340 for File Servers, lets you share software on a network file server and access information simultaneously.

SmarTerm 340's page memory feature lets you keep up to 144 lines of the most recently displayed text in memory at 80 or 132 columns. Report sequences exchange information about the PC's terminal state with the host. DEC Technical, National Replacement, Multi-National and ISO LATIN-1 character sets are supported.

Other features include an interface comprising pull-down menus, online help screens and an automated installation procedure. International support via code page-handling and character translation during file transfers also is included.

Several options are available in a network environment. SmarTerm 340 for File Servers provides network support through a multiuser copy residing on a file server and includes the emulation and communication features of the single-user version.

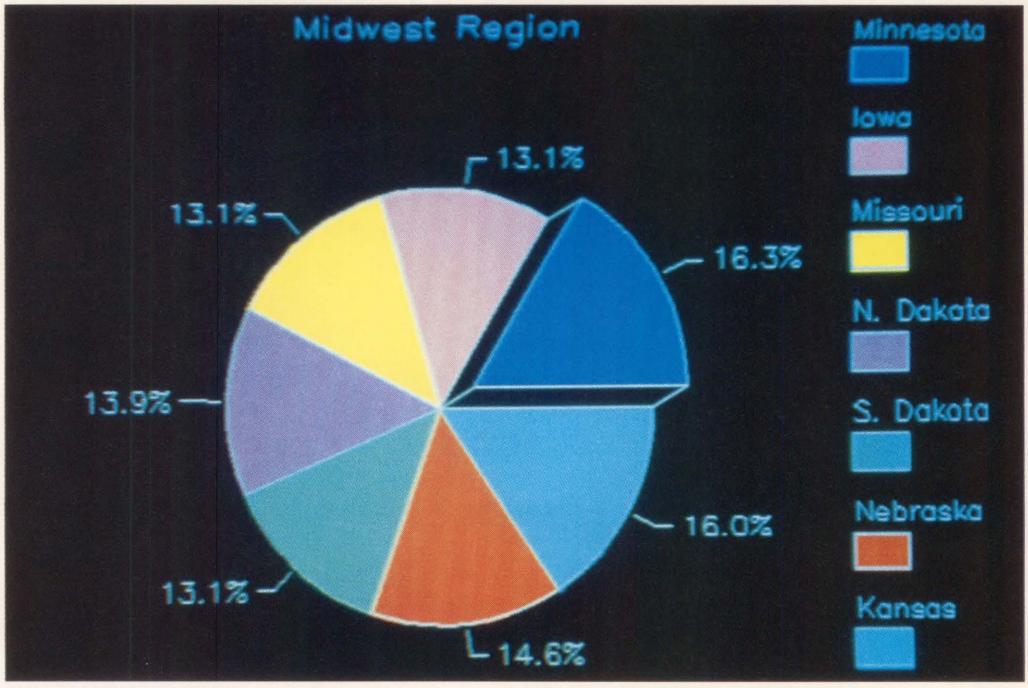
FOR MORE INFORMATION

Persoft Inc.
465 Science Dr.
Madison, WI 53711
(608) 273-6000
Circle 402 on reader card

Both versions of SmarTerm 340 include the company's implementation of LAT, which is licensed from DEC. This implementation uses 33 KB of memory on the PC, is unloadable from memory and is compatible with Novell NetWare. SmarTerm 340 also can run on many networks, such as Excelan, IBM LANACS and 3Com.

SmarTerm 340 requires an IBM PC or compatible running DOS V2.1 or later. The DOS version for the SmarTerm 340 for File Servers depends on the network operating system requirements. SmarTerm 340 requires a VGA or EGA graphics card.

SmarTerm 340 costs $349. SmarTerm 340 for File Servers costs $1,495 and supports five concurrent users and unlimited nodes. Additional license packs supporting five users each are available. Site licenses for a larger number of concurrent users or for multiple servers are also available.



Persoft's SmarTerm 340 emulates the 16-color ReGIS graphics of the VT340.

Try MultiNet TCP/IP, NFS Client & Server For Free.

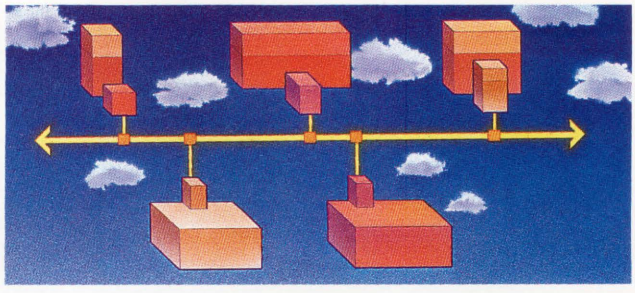
MultiNet – Destined To Be The New Standard.
After your 30-day free trial of TGV's MultiNet™ Software, you'll be converted – just like the other VAX® managers who are enjoying MultiNet's unchallenged performance, lower maintenance costs, and simplified network management.

Effortless Installation. Installation is simple. We utilize VMSINSTAL. And our documentation follows the DEC® format. Our evaluation kit contains an installation tape and reference guide that leads you through 7 easy steps to complete installation and configuration of the industry's fastest TCP/IP.

Quality No-Risk Network Solution. MultiNet comes with a special kind of guarantee – the guarantee of a product implemented by the same experts who delivered the first TCP/IP for VMS,® the first VMS/NFS Server, and the world's first and only NFS Client for VMS. MultiNet's guaranteed quality means lower maintenance requirements. That means lower maintenance fees – as much as 50% lower maintenance than what you're paying now – a win-win situation.

Trade-In Offer. Apply up to 100% of the value* of your current board or host-based TCP/IP toward your purchase of MultiNet software. So you can enjoy up to 6 months of free support with your standard MultiNet software maintenance agreement.**

Superior Support and Maintenance. TGV provides support beyond that of the typical software company. Our support staff provides assistance in configuring mixed environments and diagnosing problems in local and wide area networks. Superior support that is unparalleled in the industry – as a result, many of our customers have offered to act as references.



Sound incredible? Call us for references and your FREE, NO-RISK 30-day MultiNet evaluation kit.

1-800-TGV-3440

TGV™

Destined To Be The New Standard.
See us at INTEROP Booth #1408

*Not to exceed 50% of your MultiNet license fee. **If your TGV annual support agreement is signed within 60 days after the purchase of MultiNet, an additional 90 days will be added to the standard 90 days which are included with every new license – a total of 6 months of free support. TGV and MultiNet are trademarks of TGV, Inc. VAX and VMS are registered trademarks of Digital Equipment Corporation.

TGV, Inc., 603 Mission St., Santa Cruz, CA 95060. Tel (408) 427-4366. FAX (408) 427-4365. ©1990 TGV, Inc.

CIRCLE 367 ON READER CARD

Simply looking at the fu

At Emulex, we've always felt that the key to success was having a dynamic, cohesive plan, and ensuring its follow-through. It's not enough to tell you we're thinking about the future. We have to chart it, guide it, and deliver an advantage.

From the beginning, that's exactly what we've done. Since 1979, our dedication to innovation and quality has made our products the standards by which others are judged. Our design superiority has, in fact, helped define the direction of the storage, communications, SCSI, and related custom markets. From disk controllers that gave the PDP-11 an unprecedented storage capability, the first controller with a universal PROM, and a DSA-compatible controller for ESDI an SMD drives. To the first SMDI VAX storage arrays, disk drives with a native SDI interface—and our upcoming, advanced LAT TCP/IP terminal servers, communications servers, and SCSI tape and disk subsystems.

It's our commitment to leadership. And it's backed by over 150 Emulex design

You need

3545 Harbor Blvd., Costa Mesa, CA 92626, (800) EMULEX-3 or (714) 662-5600 in California • North American Offices: Anaheim, CA • Reston, VA (703) 264-0670 • Schaumburg, IL (708) 605-0888 • Houston, TX (713) 981-6824 • Canada (416) 673-1211 • Interna

This advertisement refers to various products by their trade names. In most, if not all cases,
©1990 E

ture has no advantage.

engineers driven to provide high-performance solutions that consistently expand and redefine "state-of-the-art." In-house VLSI chip designs so superior that even our competitors use them. The depth and breadth of a product line that provides solutions to the DEC, UNIX, IBM PC, and SCSI arenas. A devotion to R&D fueled by over 10% of our revenues each year. And a growing, global presence that continually delivers the Emulex advantage to the world.

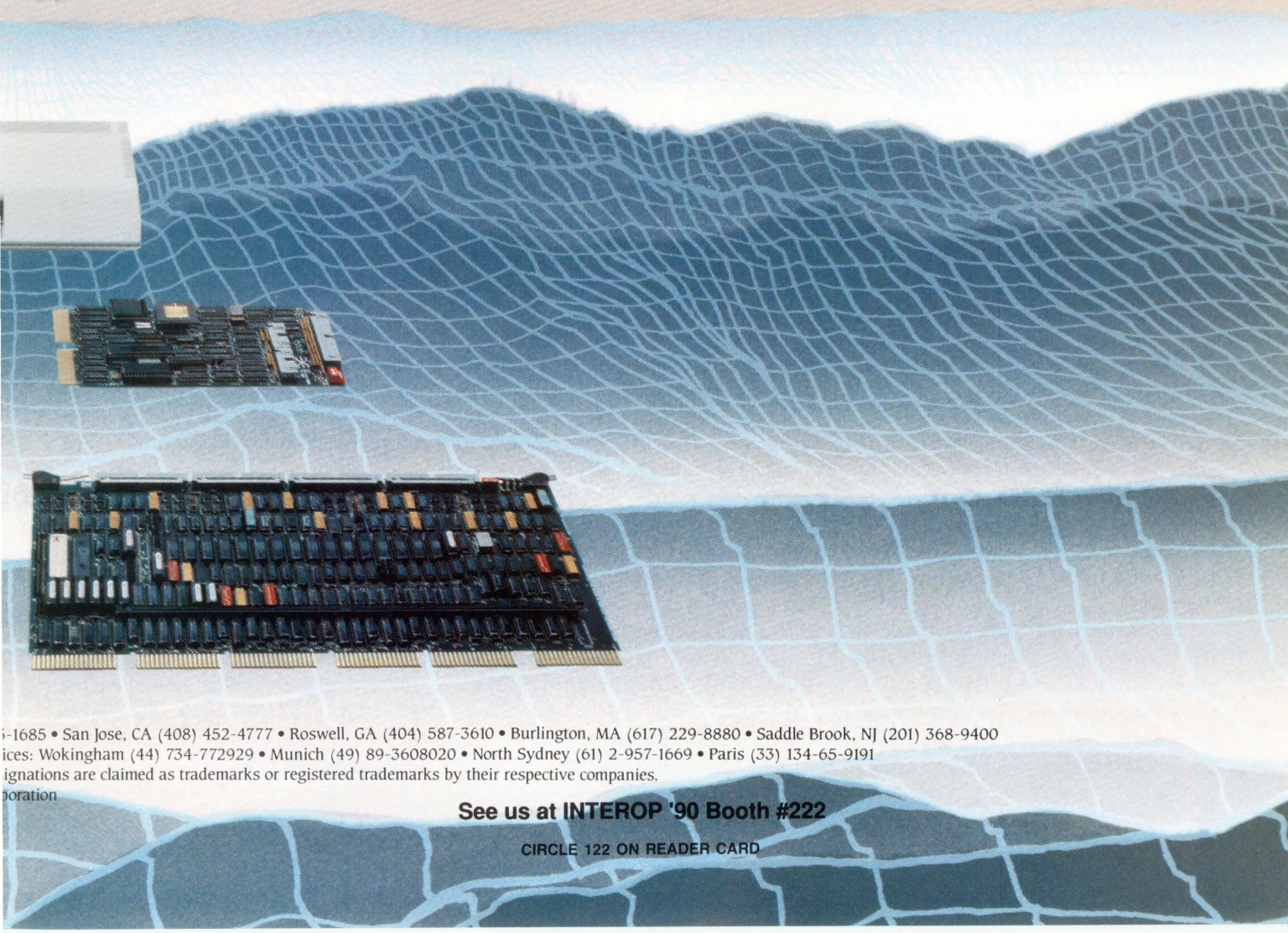
It's all part of the Emulex plan. A plan derived to offer you an ongoing advantage found nowhere else. A plan from the company with the resources and technology to deliver nothing less than complete, across-the-board solutions. A plan that is reviewed and renewed on a daily basis. A plan driven by the need to succeed. And exceed.

In short, a plan that works to your advantage. By design.

EMULEX®

Advantage By Design.™

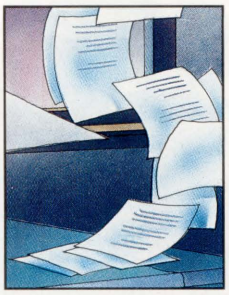
a design.



-1685 • San Jose, CA (408) 452-4777 • Roswell, GA (404) 587-3610 • Burlington, MA (617) 229-8880 • Saddle Brook, NJ (201) 368-9400
ices: Wokingham (44) 734-772929 • Munich (49) 89-3608020 • North Sydney (61) 2-957-1669 • Paris (33) 134-65-9191
ignations are claimed as trademarks or registered trademarks by their respective companies.
oration

See us at INTEROP '90 Booth #222

CIRCLE 122 ON READER CARD



DOCUMENT MANAGEMENT

This Digital program soothes the labor pains businesses suffer when complex documents come to life.

ELAINE L. APPLETON

IT HAS BEEN SAID THAT CHARLES DICKENS could write page after page of his novels not only with quill pen and by candlelight but also in the midst of entertaining visitors. He earned a few pennies per page — enough per word to spur the prolific writer to spin ever-lengthier yarns.

Now, it seems, we can't write so easily. The longer the document, the more complex — and expensive — it is to produce. Not only do everyday business documents contain monumental amounts of information, but also it sometimes takes hundreds of people to put them together.

Despite the complexity and expense, this is what modern businesses do, to a greater extent, each year: They churn out thousands of memos, reports, technical documents, books, white papers, proposals and legal briefs. You name it, they write it down, diagram it, chart it, graph it, and soon will add video and voice to it. The quill pen exists, if your company is old enough, in a glass case in the founder's office.

In another effort to promote its Network Application Support (NAS) services as the solution to commercial computing problems, Digital has put together a Document Management program intended to soothe the labor pains businesses suffer when they attempt to birth complex documents. These contractions pulse across all kinds of businesses. In fact, Digital spokespeople seem to believe that these problems are at the heart of all commerce.

Document Management Dreams

"We look at publishing as the bloodstream of an enterprise," says Delip Phadke. You might say Phadke has a stake in this, since he's Digital's product marketing manager for publishing systems. But Digital isn't alone in its push into what some analysts call "fourth-wave publishing." Hewlett-Packard, IBM and dozens of software companies are experimenting with ways to transform enterprisewide publishing from a nightmare into a pleasant dream of seamless integration. The reason this niche exists? You could call it human nature.

Few of us who use computers haven't misplaced a file. Then, we rummage through floppies, scan file names on our hard disks or consign the network manager to a hot place. Ultimately, we lose files completely — or get the wrong version to the wrong place at the wrong time, causing even more trouble. Multiply your difficulties by the number of people in your corporation, and you'll have some idea of the extent of the

problem. The theory behind document management is to solve problems of lost files, version control, data linking, complex documents and other publishing conundrums.

At its simplest, document management is common sense. Says Geoffrey James, Digital's document management marketing manager, "Document management is one of those terms people use a lot and say, well, yes, I want document management. What's the alternative? To have unmanaged documents."

In reality, however, document management isn't so easy to achieve. Phadke insists that the network is critical for electronic publishing. Yet experience has shown that networking applications without managing the process doesn't lead to desirable results — you can spawn different versions of the same document to different people all over an enterprise, causing mass confusion.

Digital's solution to the resulting lost productivity and money is many-tentacled. Consider document management as solving two basic problems. The first and simpler problem is to allow creation of complex documents that include a variety of data formats such as text, graphs, images, voice and video. The second and more difficult problem is to create a smooth and secure technological strategy that will help editors, authors, reviewers, artists, engineers and managers work together from various locations on one project.

At the heart of Digital's Document Management program is its Compound Document Architecture (CDA) strategy, which lets you create compound documents across a network, i.e., pulling charts into DECwrite documents, for instance, from one client or server into another client. CDA works with text, graphics and images. There are plans to include voice, animation and video in the future.

Software Strategy

The Document Management program is basically a software strategy. That strategy pulls most of its components from third-party software houses with which Digital has worked closely. Broadly speaking, those components include:

1. Workflow management.
2. Structured document libraries.
3. Content-based retrieval.
4. Knowledge linking.

Workflow Management — This is the foundation upon which the other components rest. Workflow management, in this case implemented with ODMS, a data management package from Odesta, schedules and tracks the document creation process. James describes workflow managers this way: "They provide the ability to set the order in which documents get worked on. They keep track of who the document belongs to at any given point in time. They allow an editor or head writer to say, 'Here's how we're going to work on all the pieces of this document.' "

That editor knows all the individual deadlines, who reviews and who approves. Implied in that is the ability to warn people when things are late and the ability to accommodate changes that

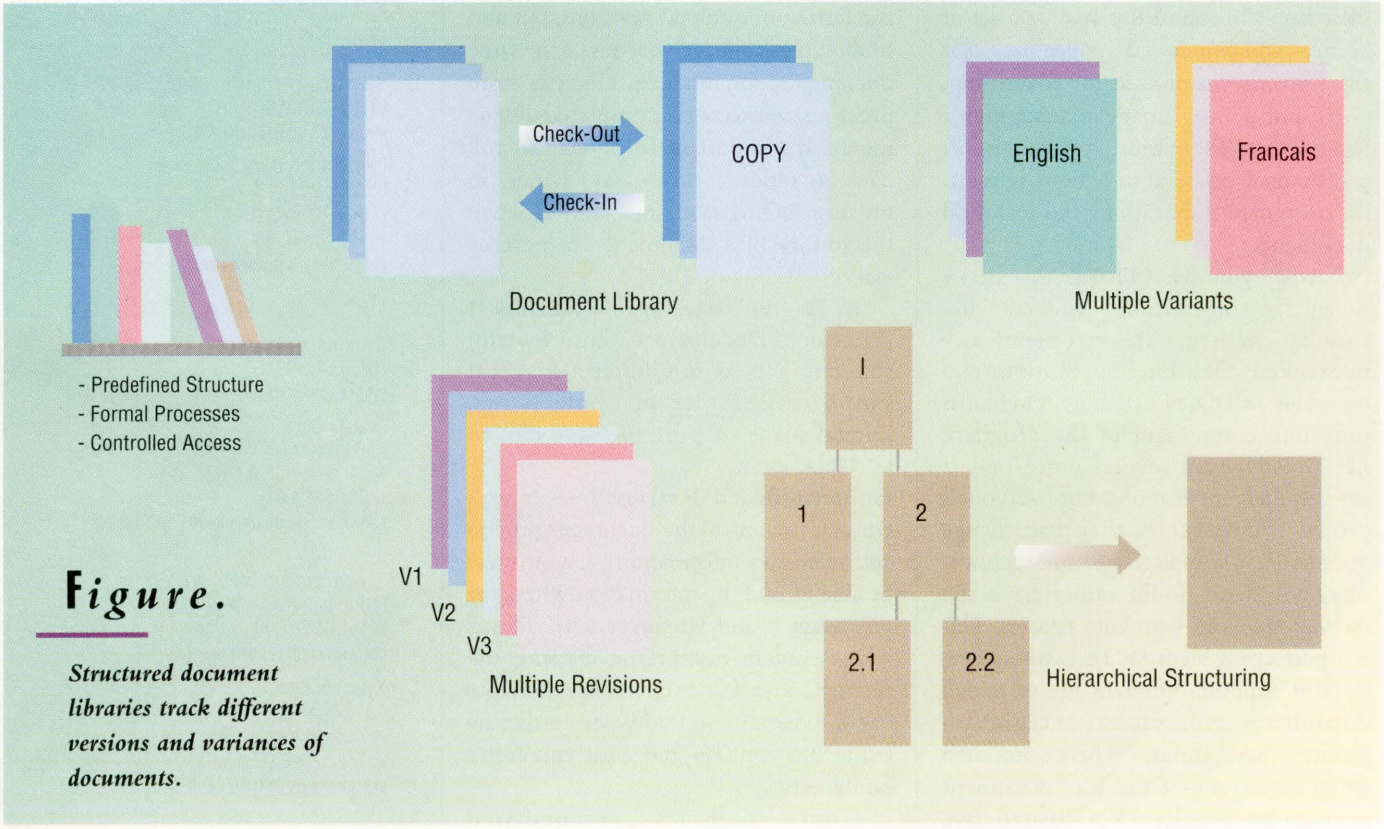


Figure.

Structured document libraries track different versions and variances of documents.

might take place as a result of the creative process.

ODMS supports an object-oriented, client/server environment on VAX servers with Mac and VT clients. Odesta plans to support all NAS clients in the future, including VMS and RISC workstations as well as MS-DOS and OS/2 desktops. This should occur by mid-1991.

DIGITAL SUPPORTS content-based retrievers in a variety of forms.

At the ODMS core is proprietary relational database technology called Helix, which supports text and BLOBs (binary large-object field types for document and image management). On top of Helix is the ODMS application services layer, which provides access control and security, version control and revision-tracking, and a relational tree structure. On top of this layer is a set of vertical and horizontal applications that the firm has customized for advertising, correspondence, image management, legal work, pagination, procurement, professional office automation, requests for proposals, publications and technical documents.

"Aha!" you say. "There's that tricky word: 'customization.'" Indeed, customization is a cornerstone of any networked publishing application, and especially of Digital's strategy. Odesta, as only one component of the program, has already built several more-or-less off-the-shelf applications, but everyone's process is different. Rather than change your process completely to suit technology, you'd no doubt rather have the technology work with your process. This is a perfect problem for Digital to solve, since it supports Digital's desire to sell consulting and systems integration services. Says James, "There's no such thing as an out-of-the-box document management program. You have to have in place the kind of field resources and infrastructure to support this kind of customization."

Structured Document Libraries — The second part of Digital's custom strategy is a structured document library where all documents reside — whether completed, partially completed or just being started. Such a library is designed to provide security. Says James, "The model for workflow management isn't moving documents, it's leaving them inside a structured library that's very secure." He adds, "The purpose of document management is to reduce the proliferation of numerous uncontrolled documents, and that really is the highest security you can get." Structured libraries are analogous to "real" libraries — you check in and check out documents, leaving an audit trail behind you (see Figure).

"Structured libraries must do more than old file management tools," explains James. "They must track different versions and variances of documents." James is referring not only to revisions, but also to multiple-language versions of the same documents, for instance. Libraries store previous versions of completed documents. It's important to be able to roll back to older versions, says James, in instances of litigation, for example, when the history of a document can be crucial.

In Digital's strategy, its EDCS II (Electronic Document Control System) software acts as this library. EDCS II supports VMS servers and clients. Digital plans to port the software to ULTRIX soon.

Content-Based Retrieval — It isn't enough to control the document process and store the information — you must be able to find the information whenever you want it and wherever it is. This is where content-based retrievers enter the picture. Says Phadke, "With content-based retrieval you find what you know exists, but you also find what you didn't know exists."

Digital supports content-based retrievers in a variety of forms. The technology has been evolving for several years. The theory is to allow you to find information stored on the network based on all text or images that exist in files, as opposed to searching for data solely by filenames or keywords. Digital offers four products:

1. BASISplus, from Information Dimensions. BASISplus can act as a "corporate reference library," says James. "Imagine all the writers in a company and all the company's databases collected in one place so that everyone can get access to all of the information," he suggests. BASISplus is a good retrieval system for large amounts of information. It has

For More Information

Datalogics
441 W. Huron St.
Chicago, IL 60610
(312) 266-4444
CIRCLE 452 ON READER CARD

Excalibur Technologies Corp.
2300 Buena Vista S.E.
Albuquerque, NM 87106
(505) 764-0081
CIRCLE 493 ON READER CARD

Gescan Int'l Inc.
P.O. Box 12599
Research Triangle Park, NC 27709
(919) 460-3100
CIRCLE 494 ON READER CARD

Information Dimensions Inc.
655 Metro Pl. S.
Dublin, OH 43017
(614) 761-8083
CIRCLE 495 ON READER CARD

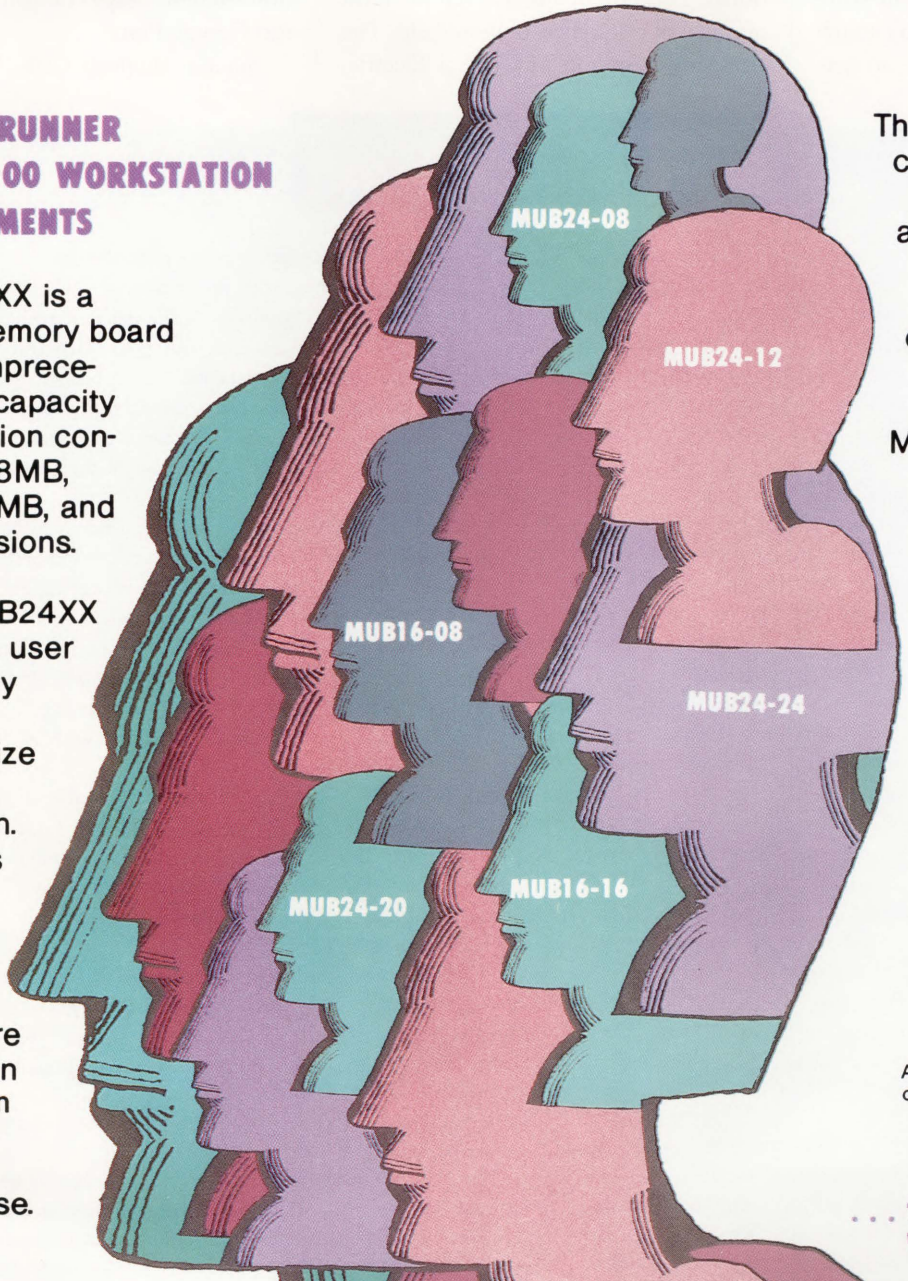
Interleaf Inc.
10 Canal Park
Cambridge, MA 02141
(617) 577-9813
CIRCLE 453 ON READER CARD

Odesta Corp.
4084 Commercial Ave.
Northbrook, IL 60062
(708) 498-5615
CIRCLE 491 ON READER CARD

Verity Inc.
1550 Plymouth Ave.
Mountain View, CA 94043
(415) 960-7600
CIRCLE 492 ON READER CARD

Xyvision Inc.
101 Edgewater Dr.
Wakefield, MA 01880
(617) 245-4100
CIRCLE 454 ON READER CARD

MEMORY UNBOUND



THE FORERUNNER IN ALL 3100 WORKSTATION ENHANCEMENTS

MUB24XX is a unique memory board with an unprecedented 5 capacity configuration consisting of 8MB, 12MB, 20MB, and 24MB versions. Versatility of the MUB24XX allows the user to perfectly tailor the memory size to his/her application. Memory is available in 4MB increments, giving more accuracy in the system configuration than anyone else.

The MUB16XX is the single connector set companion to the MUB24XX. Available in 4 configurations – 4MB, 8MB, 12MB, and 16MB the 3100 station can be perfectly stacked to the users needs.

MUB24XX and MUB16XX are the only boards you will ever need to add for a competitive edge on your 3100 workstation.

Call to Order
1-800/UNBOUND
in California
714/843-1895

- Lifetime Warranty
- Overnight exchange program
- Phone Line Technical Support
- Shipping from Stock

FAX: 1-714/843-0627

All products are registered trademarks of their manufacturer

UNBOUND

. . . THE FORERUNNER IN ALL 3100 WORKSTATION ENHANCEMENTS

CIRCLE 258 ON READER CARD

MULTIPLICITY

handled up to 34 GB of data at a time, James reports.

Digital considers BASISplus a horizontal application for fast text retrieval on a proprietary database. You can store images and graphics, but you can't search on the images themselves, only on textual descriptions of them. The product automatically indexes and archives relevant documents.

2. Gescan V4.0, from Gescan International. This product offers even the most nominal of researchers obvious help. The company, a spinoff of General Electric, claims that the newest version processes 60 to 240 million character comparisons per second to help you find data using "any word, phrase, number or combination thereof," says company spokesperson George Potter.

Since it supports CDA, Gescan users

Natural Language Interfaces

For three decades, computer scientists have tried to give computers a more natural, Englishlike interface. The first breakthrough in this challenge came in the form of a computer programming language when Grace Hopper, a U.S. naval officer, invented COBOL. Although COBOL can't be compared with the natural language interfaces available today, it was the first exercise in using Englishlike statements to command a computer. From COBOL, the natural language concept was born.

While the study of natural language hasn't produced a standard computer language, it has spawned several natural language interfaces. A natural language interface is an end-user tool for querying relational databases. It's the result of increased end-user accessibility to relational databases, especially in the departmental processing environment.

Because they increase productivity, relational databases are an essential component in the decision-making process of most large corporations. For this reason, end-user computing based on access to relational databases has increased significantly. At the same time, MIS is beginning to understand the shortcomings of current database tools, especially where the end-user is concerned. Most relational database tools are developed for programmer productivity, not for end-user access.

Although the typical programmer is content to use a standard database language such as SQL or a 4GL, these tools are difficult for the average person to master. A database language such as SQL doesn't follow a natural syntax. For example, if I wanted to know how many automakers build convertible car models, I'd ask: "Who makes convertibles?" In a language such as SQL, I'd have to enter a statement similar to SELECT DISTINCT CARS.MANUFACTURE, CARS.NAME, CARS.TYPE FROM CARS WHERE CARS.TYPE="CONVERTIBLE". Even though this database query is very simple, I have to know SQL, the database schema and the meaning of the database attributes. Most database languages and 4GLs don't take into account the three primary obstacles that stand between the end-user and the database: syntax, structure and semantics.

A natural language interface is the blending of two sciences: linguistics and artificial intelligence (AI). Linguistics, the study of language, deals with language syntax (grammar). All languages, including programming languages, have their own syntax, which dictates the structure of a sentence or command. The more specialized the syntax, the more difficult a language is to learn. SQL and most 4GLs, for example, use a syntax that's unlike English and that most users find difficult to learn. Englishlike syntax is the first issue that a natural language interface must address.

AI plays two important roles in a natural language interface. First, AI is used to maintain knowledge of the database structure. This is necessary to keep the user from having to learn and understand the logical structure of the database, i.e., tables, rows and fields. Second, AI manages the semantics between the language and the database. This keeps the user from having to understand the database designer's model, which may or may not fit the user's exact need for information.

A natural language interface must be able to understand user queries in English. In doing so, it must understand parts of speech, complete sentences, pronoun references, verb tenses, poorly defined references, misspellings, and the many nuances of the English language. Because a natural language must be intelligent, it must have an expandable common-sense knowledge base about the world in which we live. The knowledge base must be expandable so that you can teach it about your application, such as the unique vocabulary of your industry.

Also, a natural language interface must be able to reason. If it doesn't reason, you can't teach it the rules of your database or application. A natural language interface must have an internal representation system that lets it interpret questions. This internal representation is the system's model of the world. It lets the computer understand English queries.

Finally, a natural language interface must have common sense. Without common sense, a natural language interface can't answer such everyday questions as "What's today's date?" Common sense is also necessary to answer ambiguous questions such as "Who's the leading workstation manufacturer?" Common sense tells the natural language interface that "leading" describes the workstation manufacturer that sells the most workstations.

Although natural language interfaces seem to be narrowly focused on relational database technology, they aren't limited to this application. A natural language interface can be applied to any application that requires the user to enter commands, simple or complex. There may soon come a day when speech recognition and natural language merge to form what this user hopes will be the next major advance in user interfaces. Can you imagine striking up a conversation with your VAX?

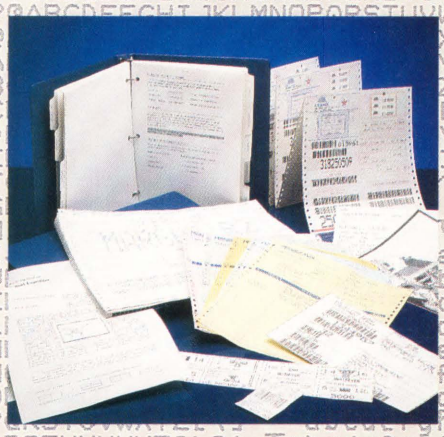
"Computer, shut down in five minutes."

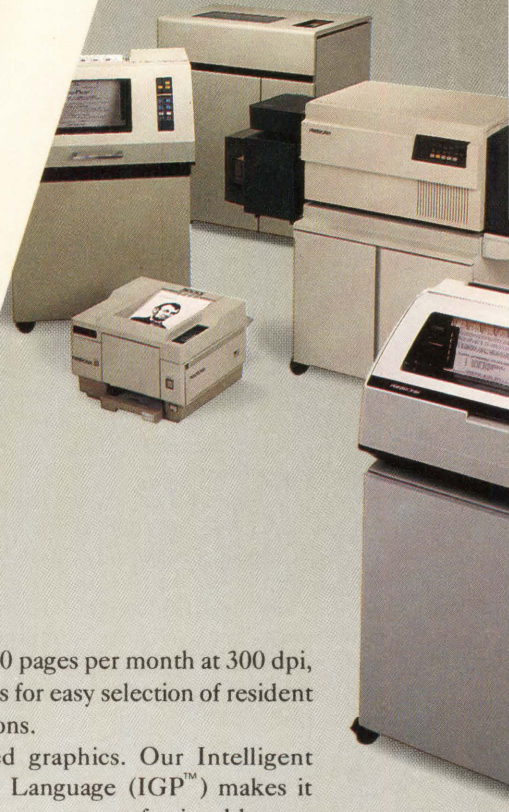
"But Dave, there are users logged in. Do you want me to kill their processes?"

"Yes."

Imagine the possibilities. —*David W. Bynon, Workstations Editor*

It's Time We Were Up Front With You.





Worldwide, more Printronix Matrix Line Printers serve DEC systems than all other brands combined, so chances are you use Printronix. For years, you've seen us in the back office, printing data processing reports, engineering code and bar code labels.

Never paid much attention? That's OK. That just means we're doing our job – quietly, quickly and efficiently. Delivering 6-part forms without bunching and tearing. Printing bar code labels hour after hour.

Yes, we've been in the back office for years. And although it's been great, it's time to tell you what's new. Features like RibbonMinder™ to tell you when to change the ribbon. So the 6,000 reports you just printed won't have to. Extra quiet printers to go up front, next to the people who need them, to silently print at speeds up to 1200 lpm while you talk on the phone.

We also have 24 ppm Page Printers with LN03 PLUS™ and TEK®4010/4014 emulations. With LED technology, which has a higher reliability record than most laser printers, thanks to fewer moving parts and lower operating temperatures. For fewer repairs. Shorter down time. With the highest duty cycle available, our field-proven Page Printers now deliver 120,000 pages per month at 300 dpi, with dual built-in disk drives for easy selection of resident fonts and alternate emulations.

It's also likely you need graphics. Our Intelligent Graphics Page Description Language (IGP™) makes it easy to produce imaginative reports, professional letters, and labels – with eye-catching charts, graphs, logos, electronic forms and bar codes. And both our Matrix Line Printers and Page Printers speak the same IGP language.

And with our exclusive distributor network, you can count on full support worldwide. For every Printronix printer you'll need. Back office, and front.

PRINTRONIX®

The Power Behind The Printed Page

For Further Information About Our Powerful Printers
Call **1-800-826-3874** ©1990 Printronix

CIRCLE 155 For Matrix Line Printers. CIRCLE 156 For Page Printers.

Complying With CALS

An oft-told story among Pentagon staffers credits U.S. Navy Vice Admiral Joseph Metcalf as the founding father of the Department of Defense's (DoD) ambitious Computer-Aided Acquisition and Logistics Support (CALS) initiative. It seems the admiral, after reviewing a new Navy cruiser, discovered more than 20 tons of support documents and file cabinets onboard. Aghast at the additional ballast, Metcalf sputtered, "I find it mind-boggling. We do not shoot paper at the enemy." Soon afterward, legend has it, the DoD launched a program to automate military hardware documentation.

It isn't uncommon for a defense project's documentation to outweigh the resulting weapon by a three-to-one margin. According to Kevin Cavanaugh, director of marketing at Xyvision, the B1-B bomber has generated "more than 250 tons of technical documentation," a total of 1 million pages that set the tax-paying public back $3 billion. Numbers like that led the DoD to try to reduce the back-breaking paperwork load.

CALS is an initiative cosponsored by industry leaders and the DoD to ultimately eliminate paper-intensive support for weapons systems by integrating and distributing technical information in computer-accessible form. Its backbone is a set of standards developed by the DoD that calls for the submission of all military documents in electronic form. Compliance with the CALS initiative has been required of government contractors since January 1.

Digital's CALS Commitment

According to John Giudeci, marketing manager for electronic publishing solutions at Digital, "CALS is something we take very seriously. We have created a CALS coordinating office to promote its implementation."

Digital's Network Application Support (NAS) and Compound Document Architecture (CDA) provide the framework for the company's implementation and delivery of technical documentation through CALS. NAS allows applications to share networkwide services and information transparently. CDA provides an architecture to exchange compound documents across heterogeneous computing environments.

According to Giudeci, Digital offers a rich variety of CALS products that comply with standards and support both NAS and CDA. Its DECwrite compound document editor incorporates text, graphics, images and supported application data into a document. DECwrite's LiveLink capabilities can link it with other CDA applications. Digital's DECview3D is a technical illustration package that provides 3-D graphics rotation, manipulation and annotation capabilities, enabling conversion of 3-D CAD files (IGES) to 2-D drawing (CGM) files. DECview3D can interact with DECwrite through LiveLink, incorporating engineering design drawings into a DECwrite document.

Digital also offers CALS conversion software publishing packages through three Cooperative Marketing Program (CMP) vendors that comply with CALS Phase I. Datalogic's Technical Publishing Environment (TPE) runs on VAX/VMS and provides high-end, sophisticated batch publishing capabilities for complex documents in the CALS environment. Interleaf's Technical Publishing Software (TPS) provides WYSIWYG publishing for VAX/VMS and ULTRIX workstations. Interleaf also offers a CALS Preparedness Package for VAX/VMS environments. In addition, Xyvision's Parlance WYSIWYG workstation-based CALS software package is geared to RISC/ULTRIX environments.

Although CALS is currently focused on providing text and graphics documents, industry observers envision a CALS technology that will manipulate the electronic exchange of entire databases. Giudeci states that CALS Phase II is "aimed at the sharing and exchanging of databases." However, legal issues on rights and liabilities among companies must be resolved, he explains.

Standards Phased In

According to Mora Meehan, Interleaf's CALS product manager, military folklore aside, CALS was officially christened on September 1, 1985, through a memo to the Pentagon from then Deputy Secretary of Defense William H. Taft IV. Subsequent meetings among the DoD top brass led to a CALS blueprint in 1988.

CALS was to be divided into two phases. Phase I targets, through standards, the exchange of weapons information between the DoD and the contractor for a given project. Phase II accommodates the online access to that information. The DoD has developed its own moniker for the as-yet undeveloped Phase II program: Central Integrated Technical Information Service (CITIS).

As Phase I has met the need to standardize digital document/data exchange, the focus has shifted to technical documentation, where standards have already been established. Each standard adheres to the principles established by MIL-STD-1840A, the umbrella CALS standard that specifies text, graphics and communications formats used in the preparation and delivery of digital documentation. A handful of dominant standards currently linked with CALS includes Initial Graphics Exchange Specifications (IGES), Standard Generalized Markup Language (SGML), Computer Graphics Metafile (CGM) and CCITT Group IV. IGES is the key specification for product definition data standards, while SGML is the dominant text and document editing standard. CGM is the standard for encoding technical illustrations and raster image exchange, while CCITT Group IV accommodates fax transmissions and coding standards.

According to Giudeci, the avalanche of standards in CALS Phase I can be traced to the vague guidelines established by the DoD, a common complaint among CALS product developers. "Last year alone," he notes, "there were over 1,600 standards to work with."

The DoD has now moved on to Phase II, often referred to as the "concurrent engineering" phase. Concurrent engineering extends automation specifications to affect the way data, standardized in Phase I, is managed by contractors.

The DoD is betting that an evolving Phase II Product Definition Exchange Standard (PDES) will prove to be its unifying standard. PDES extends the IGES standard by further defining all of the data elements associated with a CALS product over its entire life cycle.

PDES will enable the U.S. to compete globally on a broader level, according to U.S. Department of Commerce Under Secretary Deborah Wince-Smith. Wince-Smith believes that PDES will allow large and small companies to share data descriptions among design, engineering, manufacturing and marketing groups as well as with customers, suppliers and contractors. "We consider PDES to be a key enabling technology for restoring American leadership in global markets," Wince-Smith says.

Having taken measures in reducing the mountains of documentation that threatened to sink battleships, CALS now sets its sights on a wider playing field. By the year 2000, the CALS program will focus on industry/government data sharing for all data requirements and will rely heavily on the high-tech community for the strategies and solutions necessary to implement CALS on a multi-industry, global basis. —*Brian O'Connell, East Coast Editor*

can store documents that contain graphics and images as well as text. A combination software package and hardware-based parallel processing accelerator, Gescan obviates the need for indexing, which the company claims

KNOWLEDGE linking is the intelligent integration of data across applications.

speeds processing. The company positions it for financial analysis, competitive and real-time analysis, news wire analysis, litigation support and, of course, document management tasks.

3. PixTex and Savvy/TRS, from Excalibur Technologies. James calls PixTex an "electronic filing cabinet." To use PixTex, you scan images into its database. The software builds a search index that links bitmapped images with text files. You then search on those text files to retrieve an image. PixTex, which is supported only on Digital platforms, is limited to small personal and workgroup databases. The Savvy/TRS text retrieval system, which also runs only on Digital platforms, performs high-speed search and retrieval operations on ASCII files anywhere within a system or network. It can learn text from any source, including tapes, CD-ROM disks, OCR scanners, keyboards and existing databases.

4. Digital has signed a technology agreement with Verity to develop an as-yet-unnamed data management tool that would link content-based retrieval directly into other applications. Phadke sees this future development as complementary to NAS. He says, "With NAS, we offer networkwide services that other applications link to and utilize." Some of the benefits to arise from such technology, he claims, will include automatic prioritizing of e-mail and the ability to create or inherit an expert system that prioritizes data for you. Verity produces Topic, a content-based retrieval system designed for networked environments.

Knowledge Linking — The future development arising from the Verity agreement is philosophically aligned with knowledge linking, the fourth component of Digital's Document Management program. Knowledge linking is the intelligent integration of data across applications. It can occur in two different ways.

The first is CDA LiveLink, which exists today. The second, hyperinformation, is a planned technology. Digital has demonstrated some applications of hyperinformation. For instance, says James, you could link a mail message inviting you to a meeting to the calendar appointment for the meeting, and then link the appointment to notes about the meeting. "It allows you to associate the right information with the correct project," he says. Adds Phadke, "You have essentially a repository of related information all in one place no matter where it is on the network."

THE CONCEPT OF HYPERLINKS, HYPERTEXT, hyperinformation, or, as Apple Computer has named it, HyperCard isn't new. Yet it hasn't been done seamlessly across a network, and if Digital can pull it off quickly the company will have a technology that offers solid benefits to workgroups, departments and perhaps an entire enterprise.

The clock is ticking while Digital and third parties develop the pieces of its Document Management program. They all sound like good ideas, and some of the existing pieces have been shown to be substantial technology. In the modern business environment, where teamwork is crucial but ever more difficult, technology that truly and easily links one person's work with another's will be welcome. — *Elaine L. Appleton is a Newburyport, Massachusetts-based writer specializing in computer technology.*

ARTICLE INTEREST QUOTIENT
Circle On Reader Card
High 488 Medium 489 Low 490

IEEE-488
Instrument Control

Test and Measurement
Monitoring and Control
Laboratory Automation

VAXstation 3100/MicroVAX3100

- External SCSI ⟷ GPIB box
  - 64K RAM frees SCSI bus
  - Built-in DMA
- GPIB11 VMS driver software
- Interactive development utility
- Program with FORTRAN or C
- Existing GPIB11 programs run without modification

MicroVAX, Q-BUS, UNIBUS

- DMA or programmed I/O boards
- GPIB11 drivers in source code for VMS, ULTRIX, RSX, RT, VAXeln, and UNIX

Quality

- Free customer support
- 30-day money-back guarantee
- 2-year warranty

Call for *FREE* Catalog
(512) 794-0100
(800) IEEE-488 (U.S. and Canada)

NATIONAL INSTRUMENTS®
The Software is the Instrument®
6504 Bridge Point Parkway
Austin, TX 78730-5039

JAPAN (03) 788 1922 • UNITED KINGDOM (06) 355 23 545
FRANCE (1) 4865 3370 • GERMANY (89) 80 7081
ITALY (2) 4830 1892 • SWITZERLAND (056) 82 18 27
CIRCLE 302 ON READER CARD

Workgroup INTEGRATION STRATEGIES

A look at two different approaches to integration: Industry-standard TCP/IP-UNIX-NFS technology versus VMS-based solutions.

Bradford T. Harrison

ALTHOUGH MACS AND PCS BROUGHT many new and important productivity tools to the desktop, the problem of how to integrate these systems so that common files, printers, disks and other resources could be shared quickly arose. Thus AppleTalk and PC LANs were born.

Parallel to this activity, the industry-standard workstation ascended to power on the network. Though workstations became available from a variety of computer companies, it was upstart Sun Microsystems that proved the most successful in the burgeoning market. Sun, lacking the resources of the established computer manufacturers, set about assembling workstations and networks of workstations at the lowest possible cost by implementing off-the-shelf hardware and public domain software. Thus, open systems were born.

In the shadow of Sun's success, the dominant computer manufacturers have developed competing general-purpose workstation technology based on the same open industry standards. Workstation prices are dropping fast, and standard PC application programs such as Lotus 1-2-3 and WordPerfect are becoming available on these low-cost platforms. Sun in particular is betting on the continuation of the trend, attempting to establish its Sparc architecture as the next standard hardware platform in the same way that the Motorola MC68000 established the Mac and the Intel 8086 established the PC.

However, the Mac and PC markets remain strong. The strength of traditional microcomputer-related companies such as Apple Computer, Compaq Computer, Microsoft and Novell promises a continued healthy market for products such as DOS, MacOS, NetWare and OS/2. The issue thus becomes how to integrate these various environments while remaining flexible enough to grow the network in unforeseeable directions.

We'll look at two different approaches to integration, though any real network configuration will be a combination of the two.

The first uses industry-standard TCP/IP-UNIX-NFS technology as much as possible to integrate Mac and PC LANs with industry-standard workstation products. The goal is to keep nonindustry-standard protocols local to the machines using them while retaining every machine's ability to access resources across the network. This leads to the issue of gateways versus routers and whether communications protocol stacks should coexist on the same machine.

ISORM Layer	Dominant Standard		
Application	NFS	X Window System	PostScript
Presentation	XDR		
Session	UNIX Facilities		
Transport	TCP		
Network	IP		
Link	Ethernet		
Physical			

Figure 1: The dominant industry standards at each layer of the International Standards Organization's Reference Model (ISORM).

The second favors an extremely high degree of integration and functionality among Macs, PCs and workstations by basing the network on proprietary hardware and software solutions and integrating the industry-standard, Mac and PC products into the architecture with less open solutions. An LAVc configuration is used to show the sophistication and functionality of such an approach. It's more expensive, but the advantages may outweigh the cost.

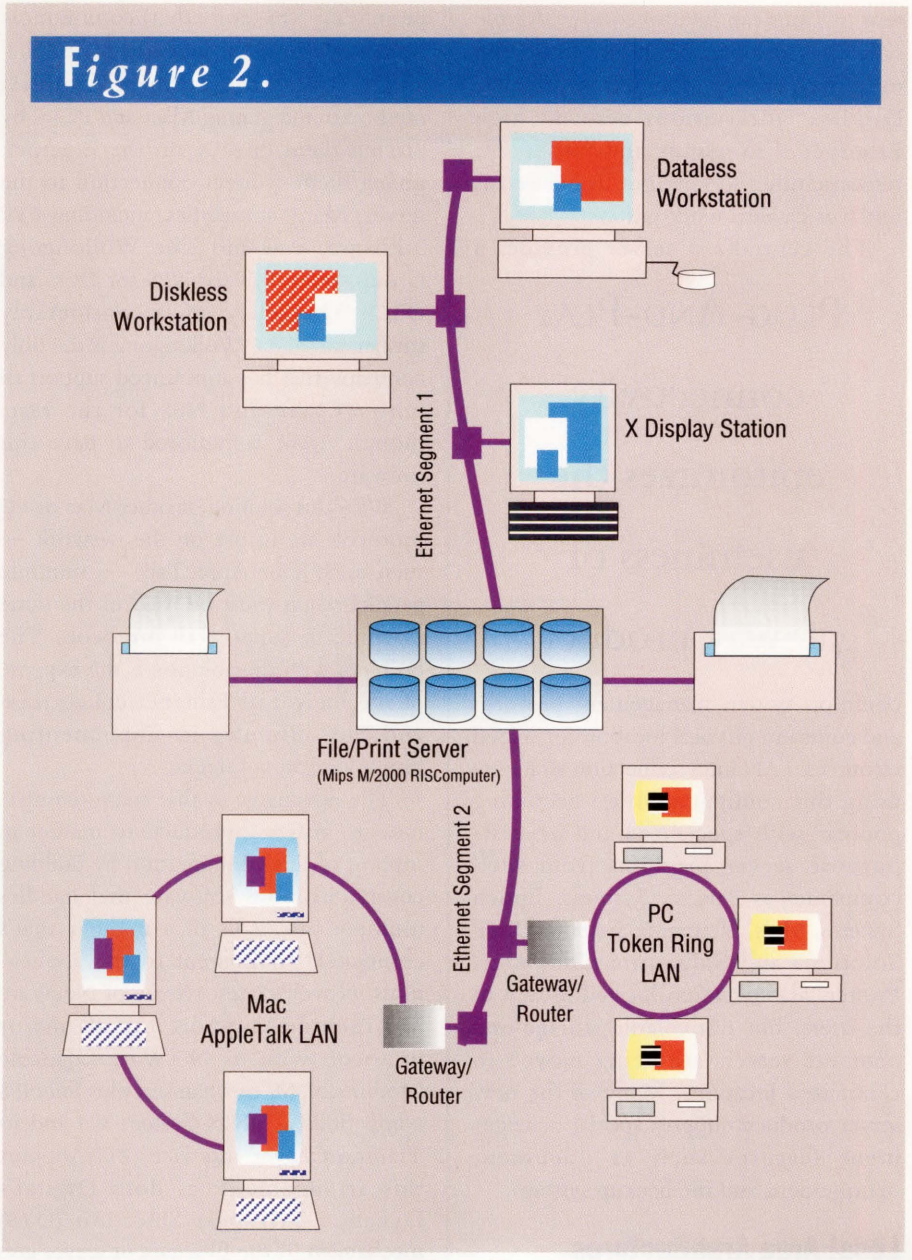
Industry-Standard Core

Figure 1 shows the dominant industry standards at each layer of the International Standards Organization's Reference Model (ISORM). In the journey toward Open Systems Interconnect (OSI), communications products are becoming more specific in adherence to the requirements at each layer, and products are fitting more neatly into the layers. In the "horizontal" approach to networking, products operating at each layer can be upgraded as OSI compatibility comes online without affecting the layers below. Digital is providing the same migration, but from a more vertical point of view: replacement of multiple layers at once. It's interesting to note, however, that Digital has announced support for TCP/IP alongside OSI in future releases of DECnet.

Figure 2 shows a hypothetical integration of Mac, PC and workstation LANs using the core communications standards. At the center of the configuration is a file/print server, such as the Mips M/2000 RISComputer system. Built around an industry-standard VMEbus, the system can support up to eight SMD disks, two SCSI controllers, four Ethernet segments and four serial I/O controllers.

As a server, the Mips system is configured with several gigabytes of disk space, 8 MB of memory, two Ethernets, TCP/IP and RISCos (Mips' UNIX, which includes support for NFS). Two laser printers are supported via the serial ports. These would probably be Adobe PostScript-compatible — one for large engineering drawings and one for high-volume daily activity. Both printers are accessible to all nodes.

Figure 2.



An industry-standard TCP/IP-NFS network.

The workstations may come from any workstation vendor. TCP/IP-NFS compatibility is available from all major suppliers, including Digital, HP-Apollo, IBM and Sun. In Figure 2, the workstations are connected to Ethernet Segment 1. One workstation is configured to be dataless, meaning that all applications are available locally and the workstation need only go out over the Ethernet for data files. All paging and swapping occurs to the local disk. When the workstations are configured as dataless, many more workstations may be supported on a single server, since there's less activity over each Ethernet.

Diskless workstations, on the other hand, have no local nonvolatile storage support so must boot and perform all application access, data file access, and paging and swapping over the network. If the Ethernet or Ethernet controllers prove to be the bottleneck, another segment can be added, and half of the

workstations can be moved to it. All file systems available to a diskless workstation must be remotely mounted under NFS. Diskless workstations demand high Ethernet throughput and fast server response times so tend not to be used as much as dataless workstations.

The centralized server provides a common system management platform and common physical location for shared resources. LAN interconnection strategies using this configuration are becoming popular with specialized and general-purpose server products from such companies as Auspex Systems, Epoch Systems, Mips, NetFrame Systems, Omni Solutions and Solbourne Computer. Printers are still often located locally to the users, but nonvolatile storage and compute servers are being moved to centralized locations. Many of the new server products support special management features such as document management and file backup systems.

PLUG-AND-PLAY connectivity epitomizes the usefulness of gateway products.

Local Area Architectures

In Figure 2, Ethernet Segment 2 supports a Mac LocalTalk/AppleTalk LAN and a PC Token Ring LAN, possibly running under Novell's NetWare. For each subnetwork there are three methods of integrating the individual nodes into the NFS environment. One is to eliminate the gateways and subnetworks altogether and place the individual machines directly on the Ethernet cable. Another is to provide support for NFS in the gateway itself. The third is to provide NFS capability on the individual nodes and use a router to keep the local protocols isolated from the extended LAN while permitting NFS (and other) communications to occur over the extended LAN.

Of course the cleanest, simplest method of integrating Macs and PCs is by placing them directly on the Ethernet, giving them a direct connection to the server. Many companies, including FTP Software, Sun and The Wollongong Group, offer TCP/IP-NFS for DOS and OS/2. The selection is considerably smaller for Macs. Wollongong is the only company that has announced support of both TCP/IP and NFS for the Mac, though Apple is rumored to have this software.

With this solution, if other Mac or PC protocols are in use on the network — such as SPX or AppleTalk — multiple parallel stacks must be used in the same machine to support all protocols. The problem with this solution is the expense of the individual Ethernet connections and the difficulty in implementing multiple protocol stacks.

The advantage is that many companies are bringing products to market in support of this configuration by building communications software that handles multiple protocols in a manner that's completely transparent to the applications. Novell's latest release of NetWare 386 includes support for all major protocols with its NetWare Loadable Module (NLM) mechanism, plus full NFS compatibility. UNIX System V.4 and its Transport Layer Interface (TLI) support this arrangement, as does Digital's Dynamic Transport Selection (DTS) mechanism. If the Ethernet or server gets bogged down in all the protocols, a more distributed architecture can be implemented using additional servers and bridges.

Slick Solutions With Gateways

The second approach, use of gateways that support NFS, provides a quick and easy solution that contrasts with the use of multiple protocols on a single, extended LAN. For example, with the GatorBox from Cayman Systems, a LocalTalk/AppleTalk network is supported under NFS with no change required to either the Macs or the server. The gateway, when configured with GatorShare software, automatically fields AppleTalk packets and establishes an NFS connection with the server for each Mac making file read/write requests.

For large Mac installations, this is a very solid solution. The plug-and-play connectivity epitomizes the usefulness of gateway products. No special software is required other than for use with the gateway, and the gateway can easily be configured to support special features such as enhanced security and the Simple Network Management Protocol (SNMP).

For printing, Mac users can switch to terminal emulation mode and remotely log into the server to print their files (also supported by the gateway). Or, software can be installed on the server that supports AppleTalk communications, such as the Columbia AppleTalk Package (CAP), allowing each Mac to establish its own connection with the server when it wishes to print. However, if you decide to begin special software installations, then you're moving away from the plug-and-play utility of gateway products and toward more distributed solutions.

Routing And Encapsulation

Providing specialized file and print access to the server by individual Macs on a LocalTalk LAN is a bit more complicated and involves installation of software on the server as well as routing or gateway capabilities. Many hardware and software products are available for LocalTalk-to-Ethernet connectivity. They support either translation from AppleTalk packets on the LocalTalk network to EtherTalk packets on the Ethernet network or encapsulation of AppleTalk packets within IP or DECnet packets and transport-layer services for communications with the server.

Gateway and routing products are available from Apple, Cayman, Network Resources, Shiva, Ungermann-Bass, Webster Computer and Wollongong. As the terminology has evolved, a gateway device operates above the network layer, while a router operates at the network layer and a bridge operates at the data link layer. The Cayman

VAX DEVELOPERS and MANAGERS — ***PLEASE!***

Help Get This Man Off Our Backs!

Do you know this man? His name is Dr. Leon Presser, our corporate founder and president. And he is making our lives *very difficult.*

You see, thirteen years ago he formed Softool Corporation, and developed a family of products that revolutionized the way companies manage change in programming environments. Today, our CCC® (Change and Configuration Control) remains the **reference standard** by which all change management tools are measured, with more than a thousand installations worldwide (many for Fortune 500 firms like Boeing, Chemical Bank, Credit Lyonnais, Eastman Kodak, GE, Grumman and JPL). CCC is also the *de facto* standard for defense departments worldwide.

So, you'd think he'd be pleased, right?

Not him. Not *our* boss.

He called us in the other morning and really let us have it.

"Now look. We have the greatest tool for change and configuration management ever developed by mankind. Why isn't CCC on every manager's wish list? Why aren't the phones ringing off the hook? I can't sleep at night knowing our products **could be helping people** and they don't even know it. Maybe we've been trying too hard to sell bits and bytes when we should have been talking productivity, control, quality, and dollars-and-cents benefits."

He stood up and began pacing back and forth behind his desk. "No, wait–it's even more than that. Don't you realize what we're selling here? It's not just elegant code–everyone already knows about our **proven features for development *and* maintenance,** *(our boss likes to speak in bullets):*

- Impact Analysis
- Version Control
- Vendor Code Management
- Migration Control
- Parallel Development
- Software Audit Reports
- DoD-2167A and Ada Support
- Interfaces to CASE tools and other products

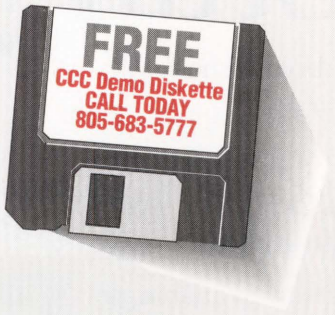
"No my friends, we offer our beleaguered colleagues in industry much more than even our **multi-platform availability,** including Digital (VMS, ULTRIX and RISC), IBM (MVS and VM), UNIX, and PC's (DOS and OS/2). Not to mention our legendary **post-sales service & support**–no other company even comes close."

The boss paused and got that far-away look in his eyes, the one that usually means more work for us. Then he sat back down and quietly said, "What we offer, above all, is **peace of mind.** Think about it. When programmers install CCC, they eliminate all that repetitive tracking of changes. Their boss, the manager, gets an unprecedented level of control over projects, and their financial people get a solid return on their investment, while insuring the company's software assets. **Everybody wins.**"

Finally, he fixed each of us with "the look" and ended: "Now if you guys can't sell *that,* you don't belong here."

So we made a slick demo diskette, which we want to send you free. Just boot it up, and we think you'll be amazed to discover what you've been missing. The boss calls it "peace of mind," remember?

So, please. Call us. Like today. We can use some peace of mind, too.



digital Independent Software Vendor

SOFTOOL CORPORATION

"The Change and Configuration Management Experts"

340 South Kellogg Avenue, Goleta, CA 93117 Telephone: (805) 683-5777
Telex: 658334 Fax: (805) 683-4105

Offices in Chicago, Los Angeles, New York, San Francisco, and Washington, D.C.
Subsidiaries in France, Germany, and the United Kingdom
Trained representatives in Australia, France, Israel, Italy, Malaysia, Singapore, and Spain

CIRCLE 233 ON READER CARD

product is a good example of gateway activity at the application layer (support for NFS) and transport layer (support for TCP and UDP).

Classification of other products is more difficult because of the use of encapsulation. Removing an AppleTalk packet from a LocalTalk frame and translation to an EtherTalk packet for insertion into an Ethernet frame is a clear example of router activity. But encapsulation of an AppleTalk packet within an IP packet involves the use of TCP or UDP at the transport layer and so suggests gateway capabilities. Encapsulation, as implemented in such products as Webster's MultiGate, may occur in both directions across gateway/router products: IP packets may also be encapsulated within AppleTalk packets so the Mac may itself support TCP/IP. In this example, the Mac is providing the UDP or TCP service, and the router is only responsible for de-encapsulation of the IP packet and insertion of it into the Ethernet frame (or, conversely, encapsulation of the IP packet within the AppleTalk packet and insertion into the LocalTalk Frame).

Tunneling

Further, a technique called tunneling is typically accomplished between cooperating gateways. Tunneling is the encapsulation of packets in DECnet, IP or some other packet type for the passing of the packets through those networks. For example, Cayman supports tunneling between LocalTalk/AppleTalk networks by establishing a TCP/IP connection across an extended LAN or WAN and encapsulating AppleTalk packets within IP packets. On the other end, the Gatorbox strips off the IP packet and sends the AppleTalk packet on its way. Using this technology, only IP packets appear on the network backbone, simplifying network monitoring and providing better network management. The GatorBox includes a feature called filtering that allows the network manager to select which zones appear to Mac users across a tunnel.

This example also provides a good illustration of the high overhead that can be added to a network with gateway products. Router conversion from AppleTalk to EtherTalk packets for transmission across the Ethernet is faster because the Macs provide the transport-layer services directly on the LocalTalk networks.

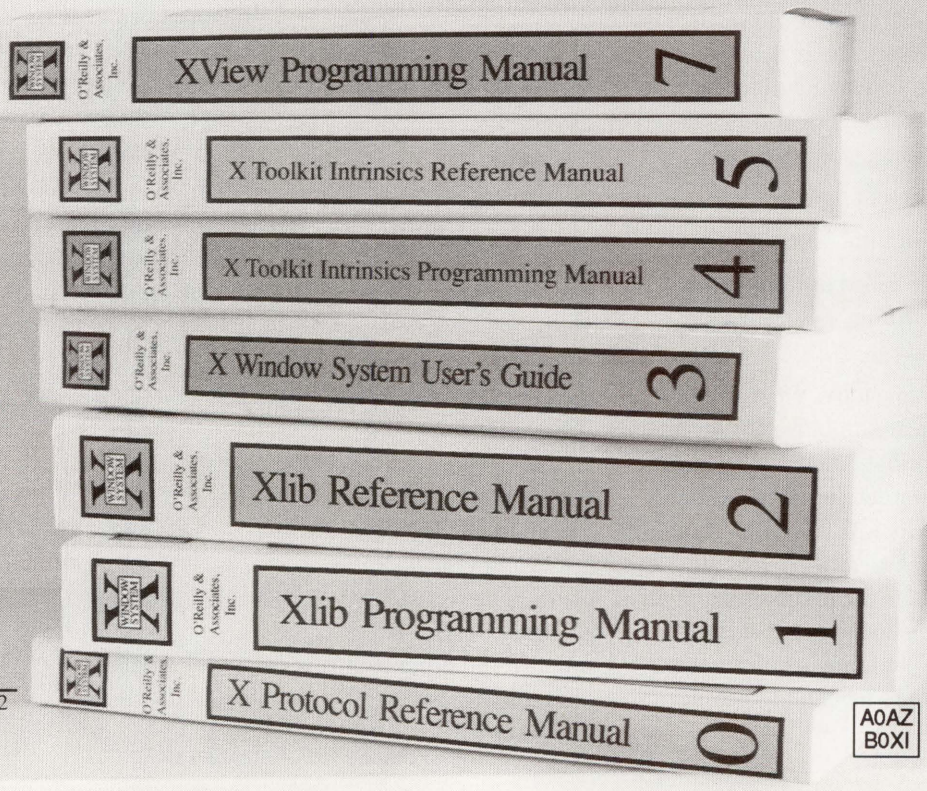
Encapsulation techniques are also used on PC LANs. For example, Wollongong's WIN/Route for DOS turns a PC into a router, accepting packets from the PCs on the PC LAN that are running WIN/TCP software supporting an IPX or NetBIOS interface to the LAN. IP packets are encapsulated in the PC LAN packet and placed into the PC LAN. The packets are fielded by the PC running the routing software. The IP packet is stripped from the LAN packet and then transmitted onto the Ethernet. Both

Stuff yourshelf.

Fill your shelf with the definitive guides to the X Window System from O'Reilly & Associates. An X Quick Reference is now available, and Motif versions of Volumes 3 and 4 will be available this fall. The books are comprehensive, easy to use, and loaded with examples, tutorials, and helpful hints.

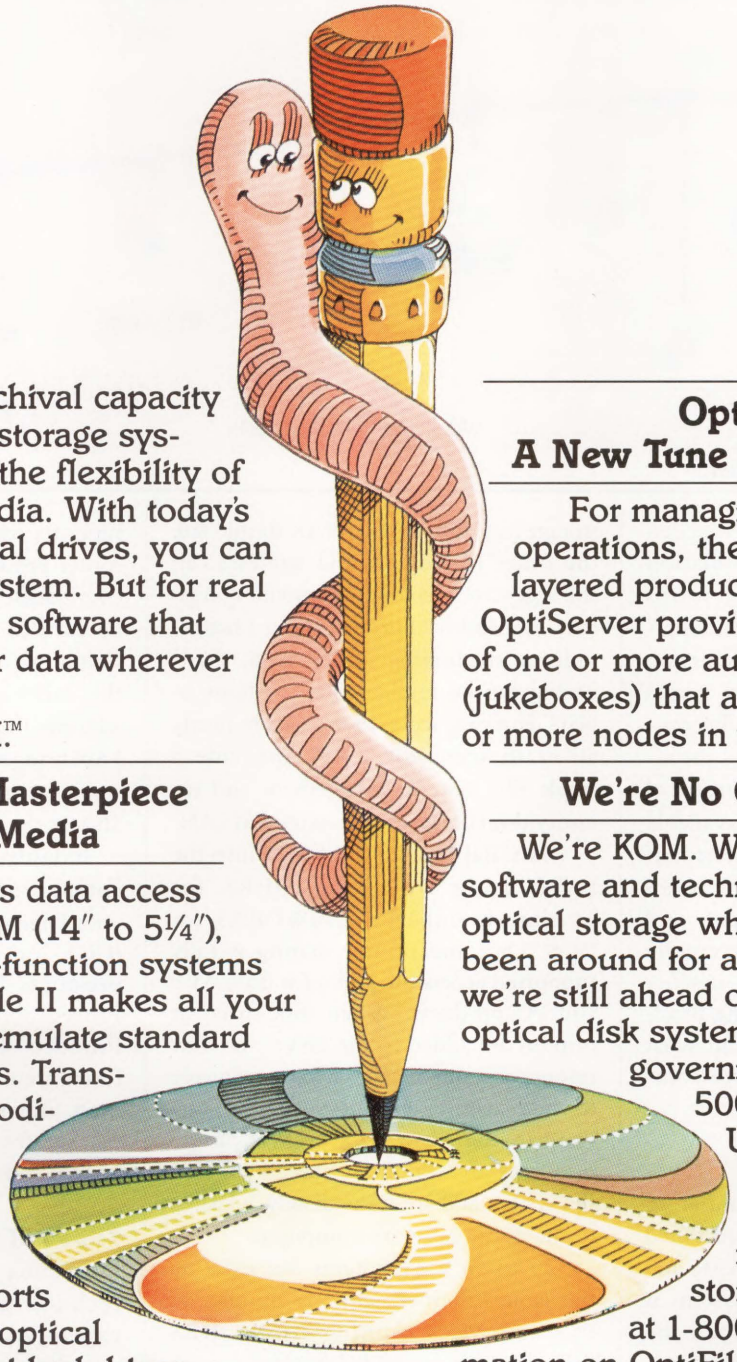
For orders or a free catalog of all of our books, please contact us.

O'Reilly & Associates, Inc.
632 Petaluma Avenue • Sebastapol, CA 95472
1-800-338-6887 • 1-707-829-0515
CIRCLE 244 ON READER CARD



A0AZ
B0XI

ANNOUNCING THE LATEST TWIST IN OPTICAL STORAGE.



You need the archival capacity of a WORM optical storage system. And you want the flexibility of erasable optical media. With today's multi-function optical drives, you can have both in one system. But for real flexibility, you need software that lets you access your data wherever it's stored.

That's OptiFile II.™

OptiFile II: A Masterpiece In Mixed Media

OptiFile II allows data access from multiple WORM (14″ to 5¼″), erasable, and multi-function systems *concurrently.* OptiFile II makes all your optical disk drives emulate standard magnetic disk drives. Transparently. Without modifications or impact to your operating system or your applications software.

OptiFile II supports the widest range of optical products, from individual drives to large capacity jukeboxes. From single host environments to large networks. OptiFile II supports VMS including VAXclusters, and SunOS systems.

OptiServer: A New Tune For Your Jukebox

For managing your jukebox operations, there's OptiServer,™ a layered product onto OptiFile II. OptiServer provides user-level control of one or more automated disk libraries (jukeboxes) that are connected to one or more nodes in your network.

We're No Optical Illusion

We're KOM. We pioneered the software and technology that makes optical storage what it is today. We've been around for almost 20 years and we're still ahead of our time, providing optical disk systems to aerospace, government, and Fortune 500 companies in the United States, Europe and Canada.

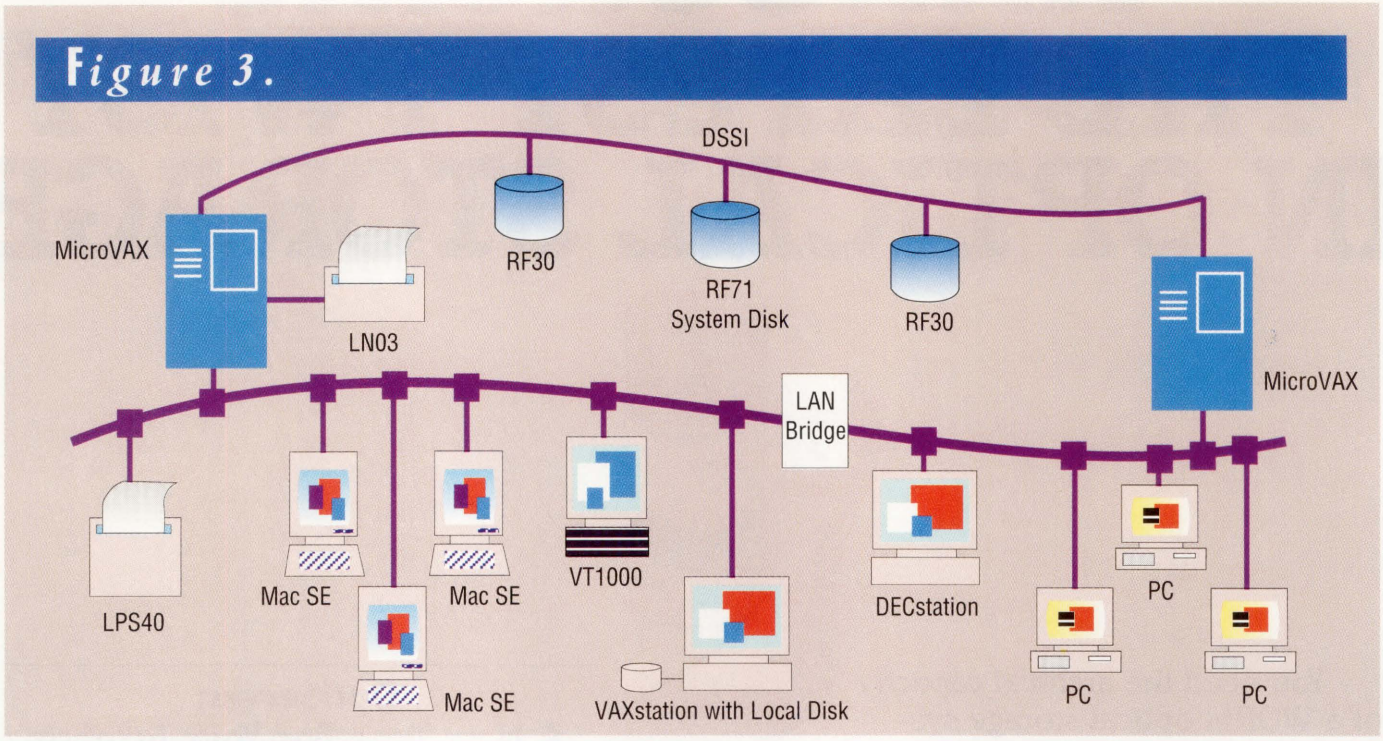
Get the right combination in optical storage. Call KOM today at 1-800-668-1777 for information on OptiFile II and OptiServer.

KOM INC

127 Walgreen Road, Carp, Ontario K0A 1L0, Canada
Toll Free: 1-800-668-1777 Phone: 1-613-831-8350
FAX: 1-613-831-8353

OptiFile II and OptiServer are registered trademarks of KOM, Inc. VAX and VMS are registered trademarks of Digital Equipment Corp. SunOS is a registered trademark of Sun Microsystems.

CIRCLE 368 ON READER CARD



A full-featured Local Area VAXcluster.

Wollongong and FTP support PC access to NFS servers via this encapsulation method, though Wollongong warns about possible performance limitations.

The gateway versus router distinction and the attendant functionality versus performance considerations are becoming more important as protocols proliferate on the network. Multiprotocol routers are becoming widely available from many companies. In particular, Advanced Computer Communications (ACC), Cisco Systems, Proteon and Wellfleet Communications are rapidly introducing a variety of high-performance LAN bridging and routing products. The evolution is paralleling what has already occurred in wide area communications.

Bells And Whistles?

Figure 3 shows a network similar to Figure 2. It represents a more distributed approach and is based on VAX/VMS and VAXcluster technology. The system is considerably more expensive, and the benefits are well-known to DEC users.

In the dual-host MicroVAX configuration, both servers and satellites can boot from a common disk connected to the storage bus. If one MicroVAX should fail, the other MicroVAX and satellites can still access the system disk, providing high data availability. Further, using Phase II volume shadowing under VMS, shadowing can be implemented without an HSC, ensuring access to the data in nearly all crash scenarios. LAVcs provide a single file, system management and security domain across the extended LAN.

Macs and PCs are integrated into the LAVc using DEC LanWORKS for Macintosh and DEC LanWORKS for DOS. Disk and printer sharing is fully supported across the LAVc for both Mac and PC products. When disk space or printers are added to the LAVc, the new resources immediately become available to the machines with no change in software to the Macs, PCs or VAX. New resources are seamlessly integrated into the system and are immediately available to the entire network computer.

Up to 96 VMS systems can exist on the same Ethernet, and any number of PCs and Macs running LanWORKS software can be added to the system using DECnet for communications with the cluster. Digital also encourages connections via its PC servers and supports use of Mac-to-VAX gateway/router products. If an Ethernet becomes overloaded with traffic, LAN bridges can be used to localize traffic. LAN bridges simply pass Ethernet frames through to the other side if it's known that the addressed node exists on the other side. LAN bridges are usually self-learning, and some, such as ACC's ACS 2100, support SNMP.

Industry-standard TCP/IP-UNIX-NFS components are integrated into LAVcs with Digital's VMS/ULTRIX Connection (UCX) or with one of the competing products from Network Research, Process Software, TGV or Wollongong. Products supporting UNIX-VMS platforms are one of the fastest growing and most important segments of the Digital market from the perspective of both Digital and the third party.

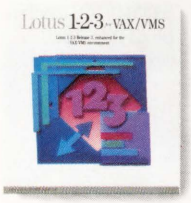
Files For All

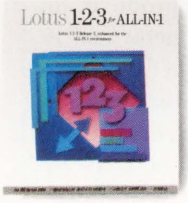
Integrating workgroups with VAXcluster technology is straightforward but expensive. The system management, security and high degree of hardware integration may be reasons enough to integrate workgroups via VAXclusters, but equally important is Digital's

You've seen the others. Now you can have the original.

Introducing Lotus® 1-2-3® for VAX®/VMS® and Lotus 1-2-3 for ALL-IN-1.® The first VAX spreadsheets that don't claim to be *like* 1-2-3. They *are* 1-2-3. So users across your entire network can share the same files, applications, macros and data, whether they use a PC, VT™ terminal, or VAXstation.™

Both are fully compatible with all other 1-2-3 releases. But each is optimized to take full advantage of its specific Digital™ environment. So you get transparent access to Digital's Rdb/VMS® relational database from within your worksheet. Along with full use of 1-2-3 in the DECwindows™ environment.





To find out how Lotus 1-2-3 for VAX/VMS can work for you, contact your DEC® Sales Representative.

Or call **1-800-343-4040** and ask for extension #525.

After all, why use a spreadsheet that claims to be like 1-2-3 when you can use 1-2-3?

Lotus 1-2-3 for VAX/VMS

Code AAZ

© 1990 Lotus Development Corporation. All rights reserved. Lotus and 1-2-3 are registered trademarks of Lotus Development Corporation. DEC, VAX, VMS, ALL-IN-1 and Rdb/VMS are registered trademarks. VT, VAXstation, Digital and DECwindows are trademarks of Digital Equipment Corporation.

CIRCLE 319 ON READER CARD

Network Application Support (NAS) technology, by which files and applications may be shared among many different machines. Using LanWORKS and UCX, a single file is sharable by Mac, PC, UNIX and VAX/VMS applications. Even compound document architectures are supported.

But the same multivendor functionality is appearing in the UNIX environment as well, though the capabilities tend to be more primitive. For example, Keyword Office Technologies recently announced support for all UNIX platforms with its "mail-enabled" document interchange software. Using these utilities, plain text and multimedia documents can be shared among editors used on DOS, Mac, OS/2, UNIX and VMS machines.

Using these utilities on a server such as that shown in Figure 2, all Macs and PCs can edit files with roughly the same degree of integration offered under NAS, including support for many word processing and other popular applications programs. Conversion occurs via e-mail. A user mails a document to someone else or back into his own account, specifying the conversion that's to occur. The document is then available for use with the editor to whose format the document has been converted.

THE TREND IN THE DIGITAL ENVIRONMENT is toward a combination of UNIX and VMS systems. The convenience of VMS-based solutions is in many cases worth the extra cost; in others, it isn't. We may be witnessing a migration away from VMS and toward UNIX systems as equivalent UNIX functionality comes online, where multivendor connectivity and standards are resulting in lower costs and in fully connected and functional computing environments. Digital is offering a full range of products to integrate the two environments and is accelerating ULTRIX product development to ensure that the company remains competitive in this important market. Where the migration from VMS to UNIX will end is the million-dollar question, and you'll find as many answers as there are product managers at Digital.

This is why Digital will continue to prosper and remain competitive, despite its recent financial problems. It can offer all the bells and whistles with VMS, or it can fully support the industry-standard environment. Digital is handling all levels of user sophistication and the full range of user budgets. VMS offers elegance, simplicity and services. Or, you can go it alone in the UNIX world, bridging the two environments to whatever degree you see fit.

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

For More Information

Adobe Systems Inc.
1585 Charleston Rd.
Mountain View, CA 94039
(415) 961-4400
CIRCLE 449 ON READER CARD

Advanced Computer Communications
720 Santa Barbara St.
Santa Barbara, CA 93101
(805) 963-9431
CIRCLE 425 ON READER CARD

Auspex Systems Inc.
2952 Bunker Hill Ln.
Santa Clara, CA 95054
(408) 970-8970
CIRCLE 426 ON READER CARD

Cayman Systems
26 Landsdowne St.
Cambridge, MA 02139
(617) 494-1999
CIRCLE 427 ON READER CARD

Cisco Systems Inc.
1525 O'Brien Dr.
Menlo Park, CA 94025
(415) 326-1941
CIRCLE 428 ON READER CARD

Compaq Computer Corp.
P.O. Box 692000
Houston, TX 77269
(713) 370-0670
CIRCLE 429 ON READER CARD

Epoch Systems Inc.
8 Technology Dr.
Westboro, MA 01581
(508) 836-4300
CIRCLE 430 ON READER CARD

FTP Software Inc.
26 Princess St.
Wakefield, MA 01880
(617) 246-0900
CIRCLE 431 ON READER CARD

Intel Corp.
3065 Bowers Ave.
Santa Clara, CA 95051
(408) 987-8080
CIRCLE 432 ON READER CARD

Keyword Office Technologies Ltd.
2816 11th St. N.E.
Calgary, AB T2E 7S7
(403) 250-1770
CIRCLE 433 ON READER CARD

Lotus Development Corp.
55 Cambridge Pkwy.
Cambridge, MA 02142
(617) 577-8500
CIRCLE 434 ON READER CARD

Microsoft Corp.
1 Microsoft Way
Redmond, WA 98052
(206) 882-8080
CIRCLE 423 ON READER CARD

Mips Computer Systems Inc.
950 deGuigne Dr.
Sunnyvale, CA 94086
(408) 720-1700
CIRCLE 435 ON READER CARD

Motorola Inc.
1301 E. Algonquin Rd.
Schaumburg, IL 60196
(708) 576-5518
CIRCLE 412 ON READER CARD

NetFrame Systems Inc.
1545 Barber Ln.
Milpitas, CA 95035
(408) 944-0600
CIRCLE 436 ON READER CARD

Network Research Corp.
2380 N. Rose Ave.
Oxnard, CA 93030
(800) 541-9508
CIRCLE 457 ON READER CARD

Network Resources Corp.
2450 Autumnvale Dr.
San Jose, CA 95131
(408) 263-8100
CIRCLE 437 ON READER CARD

Novell Inc.
122 E. 1700 S.
Provo, UT 84606
(801) 379-5900
CIRCLE 438 ON READER CARD

Omni Solutions Inc.
381 E. Evelyn Ave.
Mountain View, CA 94041
(415) 966-1024
CIRCLE 439 ON READER CARD

Process Software Corp.
959 Concord St.
Framingham, MA 01701
(508) 879-6994
CIRCLE 401 ON READER CARD

Proteon Inc.
2 Technology Dr.
Westborough, MA 01581
(800) 545-7464
CIRCLE 440 ON READER CARD

Shiva Corp.
155 2nd St.
Cambridge, MA 02141
(617) 864-8500
CIRCLE 532 ON READER CARD

Solbourne Computer Inc.
1900 Pike Rd.
Longmont, CO 80501
(303) 772-3400
CIRCLE 441 ON READER CARD

TGV Inc.
603 Mission St.
Santa Cruz, CA 95060
(408) 427-4366
CIRCLE 458 ON READER CARD

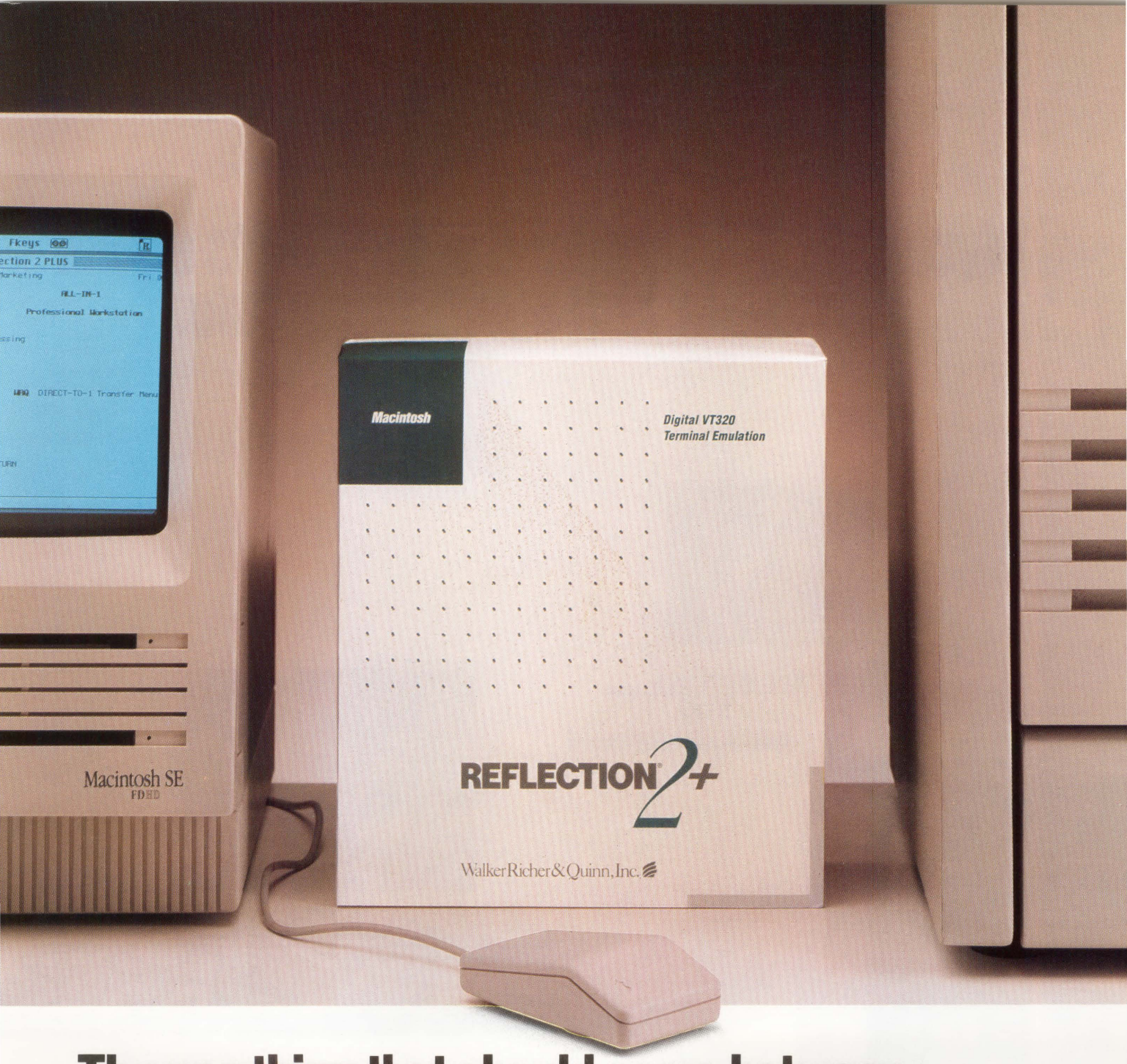
Ungermann-Bass Inc.
3990 Freedom Cir.
Santa Clara, CA 95054
(408) 496-0111
CIRCLE 533 ON READER CARD

Webster Computer Corp.
2109 O'Toole Ave., Ste. J
San Jose, CA 95131
(408) 954-8054
CIRCLE 442 ON READER CARD

Wellfleet Communications Inc.
15 Crosby Dr.
Bedford, MA 01730
(617) 275-2400
CIRCLE 443 ON READER CARD

The Wollongong Group Inc.
1129 San Antonio Rd.
Palo Alto, CA 94303
(415) 962-7200
CIRCLE 444 ON READER CARD

WordPerfect Corp.
1555 N. Technology Way
Orem, UT 84057
(800) 321-4566
CIRCLE 445 ON READER CARD



The one thing that should come between your Mac and your VAX.

The one thing you want between your Macintosh and VAX computers is a fast, accurate terminal emulator.

So try the new Reflection 2 PLUS for the Macintosh. It takes full advantage of both the VAX and the Mac, letting you get the most out of each computer.

Access your VAX with Reflection's thorough VT320 emulation. Of course, the familiar VT320 keystrokes still work, but the addition of Macintosh user friendliness makes tasks easier to accomplish. Issue commands quickly with pulldown menus. Cut and paste complicated VAX filenames to save time and reduce errors. Use MultiFinder to monitor VAX Mail in the background.

Transfer Macintosh and VAX files quickly with Reflection's proprietary file transfer software. It's included free of charge.

Don't put just any terminal emulator between your Mac and your VAX. Get Reflection 2 PLUS for your Macintosh. Call us toll-free and ask about our money-saving introductory offer.

1-800-872-2829

Walker Richer & Quinn, Inc.

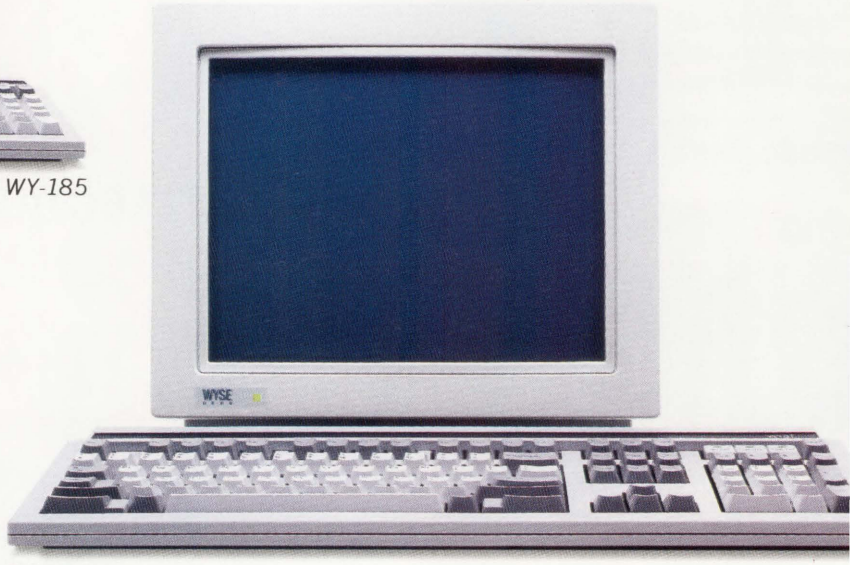
2815 Eastlake Avenue E., Seattle, WA 98102
206.324.0407 FAX 206.322.8151
Zeestraat 55, 2518 Den Haag, The Netherlands
+31.(0)70.356.09.63 +31.(0)70.356.12.44 FAX

Reflection is a registered trademark of Walker, Richer & Quinn. All other trademarks are property of their respective holders.

CIRCLE 172 ON READER CARD

Wyse sets the standard in terminals again. And again. And again. And again.

WY-185



WY-150

WY-370

Wyse became the number one manufacturer of general purpose terminals by repeatedly redefining the state of the art in terminal design. Not just in one category, but across the board. And with the four terminals that make up our fourth generation, we've done it again. ■ Each one represents the ultimate achievement in its class. Our WY-150 sets the standard for alphanumeric monochrome terminals. The WY-370 brings unprecedented functionality in color. And the WY-185 is the most advanced DEC-compatible. ■ Our newest entry, the WY-160, offers a combination of features found in no other monochrome terminal. It lives up to Wyse's well-known ergonomic standards, with its full-screen overscan, fast refresh rate and high resolution. It has the flexibility to support more than 16 ASCII, ANSI and PC emulations, as well as PC and Tektronix graphics. And it raises performance standards with the fastest baud rate in the industry, plus a dual-session capability that allows you to access two hosts simultaneously. ■ Of course, the reason we keep raising our standards is to meet yours. And since we make more terminals to fit more system configurations than anybody else, we're sure to have the one that fits yours best. Call us at 1-800-438-9973. Because if you thought you'd seen everything in terminals, we have four reasons to look again.

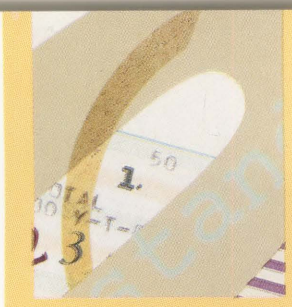
THE WORLD IS GETTING WYSE.

WYSE

1 800 GET WYSE

CIRCLE 226 ON READER CARD

WY-160



PERFORMANCE

Data Caching Demystified

Rick Cadruvi and Evelyn Vigil

Understanding The Mechanisms That Offer Optimum Disk Performance In The VAX/VMS Environment.

Data caching is a technique available in many forms in the VAX/VMS computing environment to improve disk performance. Caching is a mechanism to increase the speed of access to information using a faster intermediate access medium to save the most commonly accessed pieces of information. Disk data caching uses high-speed memory to save the most commonly accessed disk blocks.

Three areas of VAX/VMS — memory-management caches, file system caches, and RMS caches — provide caching mechanisms designed to improve overall system performance by decreasing the need to use disks as the primary source of data.

VAX/VMS Caching

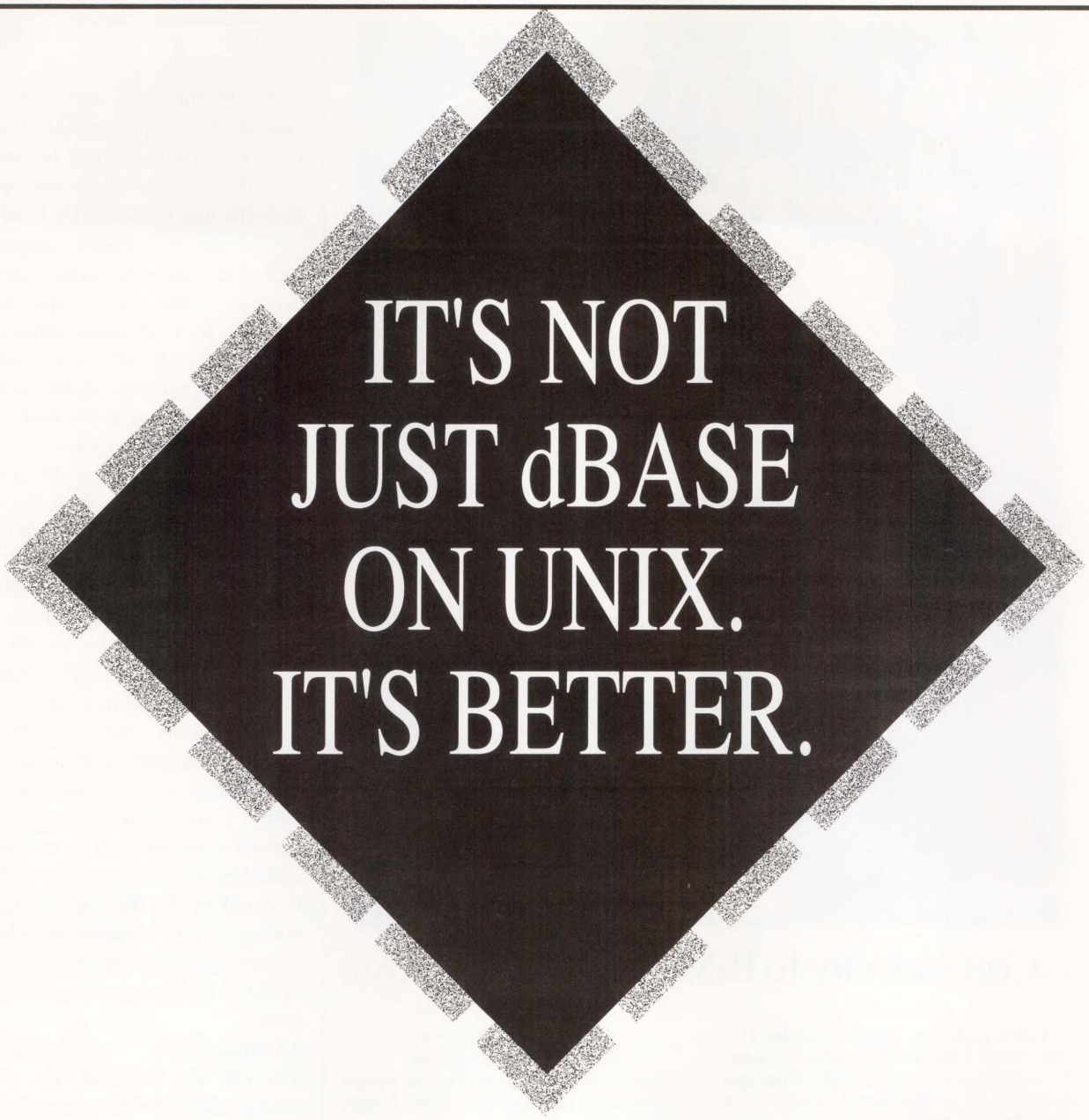
Memory-Management Caches — Since VAXs are virtual memory machines, program codes and data don't necessarily reside in physical memory. The alternate source of program information is the disk. The process of moving program information to or from the disk is called page faulting. Since disk access is slow relative to physical memory, the VAX/VMS memory-management code implements two forms of disk data caching.

The first form of data caching is the modified page list. This list is made up of a small amount of physical memory — the size of which can be controlled by the system manager — used to cache virtual memory that has been modified by programs. The modified list acts as a cache between process working sets and the paging store on disk. If a working set becomes full and pages must be removed to make room for others, disk I/O can be avoided by putting those pages on the modified list rather than writing them directly to the paging store on disk. Later, when those pages are needed by the process again, they can be retrieved from the modified list. This potentially can save two disk I/Os when paging of process memory for modified pages is necessary.

The second form of data caching used by VAX/VMS memory management is the free page list. This list is made up of a small amount of physical memory — which also can be controlled by the system manager — to cache read-only process memory. The free list functions similarly to the modified list, acting as a cache between process working sets and the paging store on disk. The free list potentially can save one disk I/O when paging of process memory is necessary.

File System Caches — The file system provides several special-purpose caches designed to eliminate disk I/O resulting from the management of the disk file structure by VAX/VMS. These caches are collectively referred to as Extended Queue I/O Processor (XQP) caches. They can be classified as disk data block-oriented caches in paged dynamic memory (such as the directory cache, file header cache and bitmap cache) and lookaside list caches in nonpaged dynamic memory (such as the extent cache, FID cache and quota cache).

- Directory Cache — In a system using multiple levels of subdirectories, very large directories and/or many directories, the directory cache is vital to file system performance. Directory scans represent a substantial amount of overhead during any file-open operation. On a very active system with a lot of interactive



Yes, it runs your dBASE, FoxBASE and Clipper applications on UNIX, XENIX and AIX (also VAX/VMS and ULTRIX.) But that's only the beginning of Recital. It's a complete relational database and 4GL for developer and end users alike. It's also got a powerful data dictionary. SQL interface and over 350 additional commands.
And oh yes, there's one more advantage...you can have it today.

Call now 508/750-1066.

Recital™

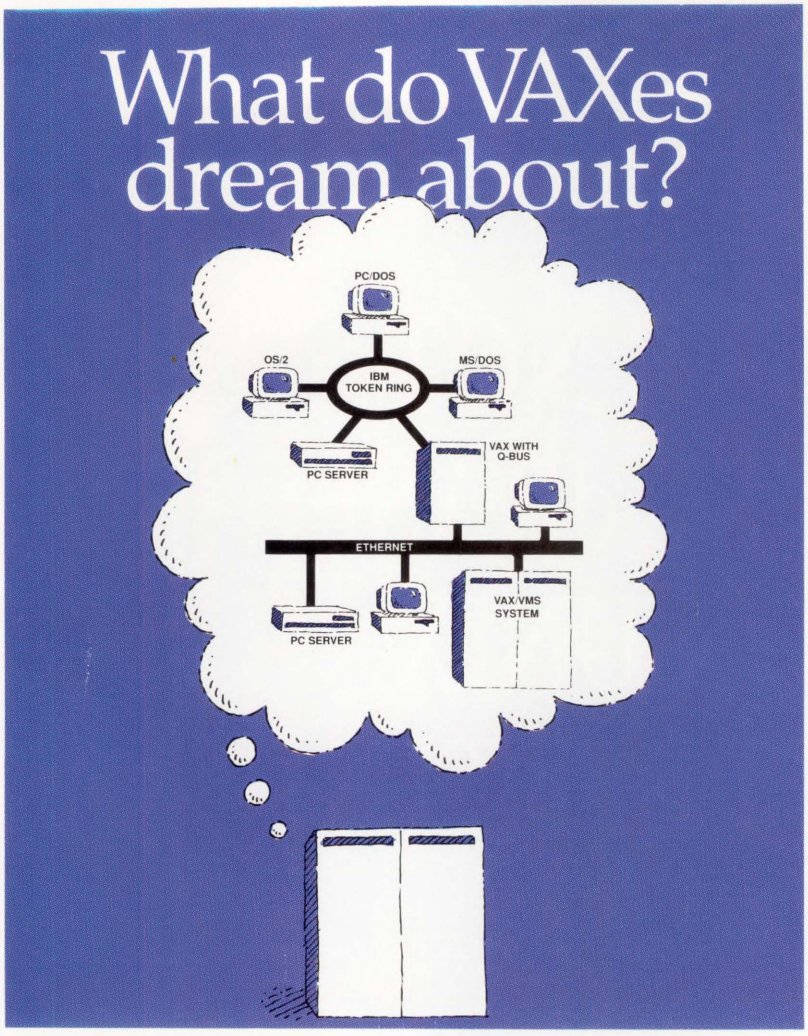
The world's most compatible database.

In the Americas:
Recital Corporation Inc.
85 Constitution Avenue
Danvers, MA 01923
Tel. 508/750-1066
Fax 508/750-8097

International:
Recital Corporation Ltd.
Southbank Technopark
90 London Road
London, SE1 6LN U.K.
Tel. 01/401-2727

All trademarks are the properties of their respective companies.

CIRCLE 231 ON READER CARD



...Connectivity to IBM Token Ring LANs

That's what they can get with the I* for Token Ring from InterConnections.

I* is a complete solution that provides LAN Manager and MS-Net file and print services between PCs on IBM Token Ring and Q-bus based VAXes. (Token Ring Adaptor and netbios software provided by Simpact Associates, Inc.)

PSc and VAX/VMS share the same files

You enjoy seamless file sharing and print services between your PCS and VAX/VMS systems running at the speed of the Local Area Network. Files on your VAX appear as standard PC files to workstation users, and VMS/RMS files to VAS users.

I* is extremely flexible

Terminal servers and LAN servers can all access the same VAX/VMS system using the same network as I*. This means that PCs can simultaneously access other PCs, VAXes, and host computers on the network.

Because I* is a VAX/VMS solution, no additional PC software is required, making I* very cost effective.

The customer support you expect from a leader

Support for I* is among the best in the industry with unlimited telephone support and system upgrades direct from InterConnections.

InterConnections is a leading developer of software and services for network integration and management for large multi-vendor customers. Our network approach is currently in use by over half of the Fortune 500 companies in America.

For more information about I* for Token Ring and a FREE color "VAX/PC Dream Poster" call (800) 950-5773.

For a FREE color poster call (800) 950-5773

INTERCONNECTIONS

14711 NE 29th Place Bellevue, WA 98007 (800) 950-5773 (206) 881-5773 FAX (206) 867-5022

CIRCLE 135 ON READER CARD

users, the file-open rate easily can approach 10 file opens per second. If directory data isn't cached, file opens can incur dozens of additional read operations from the disk to locate the desired file.

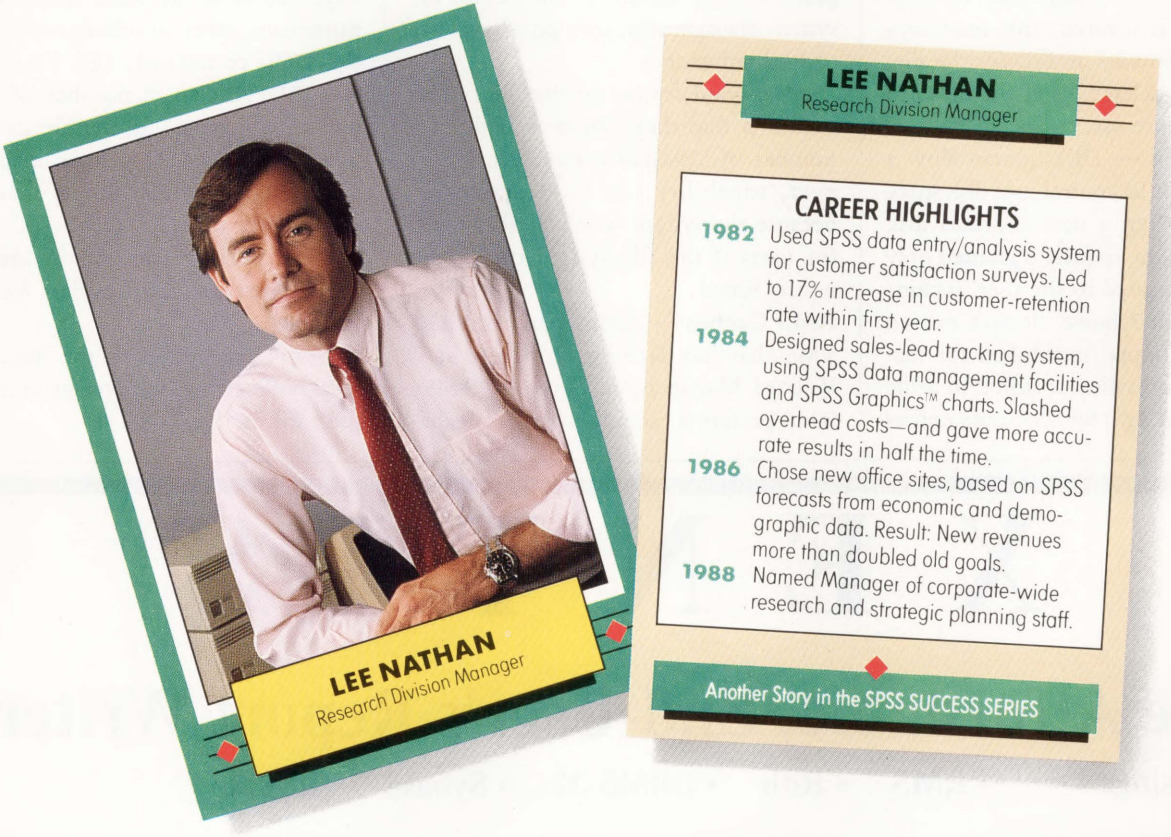
The directory cache comprises two caches, the directory index cache and the directory data cache. The directory index cache is an index constructed by the XQP to describe the contents of directory data blocks. It allows the XQP to find the data it wants more quickly. The directory data cache is a cache of actual data blocks from directory files. Having this data available in memory helps eliminate I/O to the disk for doing directory lookups to access files.

- File Header Cache — Each file on the disk is associated with at least one file header, which contains the file's name, organization, ownership, location on the disk and other information the file system must know to access the file.

The file header cache is used to store the contents of file headers in memory. When a file is opened or a window control block updated, or even when file attributes are referenced, the file's header is stored in the file header cache. The saving in I/O requests is substantial, because all the file information is readily available from memory while the file is in use.

- Bitmap Cache — Every disk contains a special file, BITMAP.SYS, that helps manage available space on the disk. It's often referred to as the allocation bitmap for the disk. Each time a file requires additional space, the bitmap must be accessed to determine where space is available. On the other hand, when a file is deleted, the space it occupied must be recorded in the bitmap so that it can be used for other files. The bitmap cache is used to avoid having to read the allocation bitmap from disk when a file extent is requested.
- Extent Cache — Like the bitmap cache, the extent cache is used to eliminate disk I/O during the allocation or de-allocation of disk space. The extent cache maintains a list of available disk blocks for allocation. It's checked before scanning the allocation bitmap when a new piece of disk space is to be allocated.

Put us on DEC and we'll make you Manager of the Year.



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

SPSS is a registered trademark of SPSS Inc. SPSS-X and SPSS Graphics are trademarks of SPSS Inc. VAX, VMS, All-In-1, DATATRIEVE and Rdb are trademarks of Digital Equipment Corporation. 20/20 is a trademark of Access Technology. ORACLE is a trademark of Oracle Corporation. Ingres is a trademark of Relational Technology, Inc.

CIRCLE 160 ON READER CARD

When a file is deleted, the blocks that it allocated can be added to the list.

Though this cache may reduce file system disk I/O, it tends to cause the file system to create fragmented files, which has a more substantial negative effect on performance than any gains achieved by the cache.

■ FID Cache — Every file on a disk is identified by a unique numeric identifier called a file ID (FID). When a file is deleted, its FID is available to be reassigned to another file. The FID cache is a list of FIDs available for assignment to files. When a file is created, this memory-resident list provides an FID for the file. When a file is deleted, its FID is added to this list for future use.

■ Quota Cache — Disk quotas allow a system manager to control user disk space allocation. When a user allocates disk space to a file, the request is granted only if all space allocated to the user, including the current request, doesn't exceed the limit, or quota, established for that user. This information is stored in a file called QUOTA.SYS, with separate entries for each user.

The quota cache is used to cache disk quota file entries. If disk quotas are enabled and there are a lot of entries in the quota file, this cache can be very important in terms of XQP performance. This cache is used to save the XQP from having to scan the quota file every time a file is created or extended.

The special-purpose file system caches are vital to file system performance, but they only address a small subset of I/O channel traffic. But while they don't, in practice, truly eliminate disk I/O for file system management, they go a long way toward reducing it.

One good feature of the file system caches is that they can be tuned via a number of SYSGEN parameters. However, tunability can be a drawback, because the system won't perform well for users if the file system caches are poorly tuned.

RMS Caches — Another area of VAX/VMS that has caching built into it is Record Management Services (RMS). RMS performs caching via two mechanisms: RMS directory caching and global buffers.

■ RMS Directory Cache — This cache serves a function similar to the file system directory cache. It allows RMS to eliminate calls to the XQP for directory processing.

■ RMS Global Buffers — These are the primary caching tools that come to mind when considering the caching capabilities in RMS. RMS global buffering is an optional mechanism that may be specified by the system manager for files expected to be accessed frequently by numerous users simultaneously. With the DCL command, SET FILE/GLOBAL_BUFFER=n, a number of global buffers appropriate for the file are specified. This causes RMS to maintain that many sharable data buffers in virtual memory for that file.

Guidelines for selecting the appropriate number of global buffers for a file include:

1. Set global buffers to the number of local buffers times the average number of users for the file.

XENTIS®

The Affordable, End-User's Report Writer.

Accessing: • **RMS** • **Rdb** • **DBMS-32** • **Sybase** • **Ingres**

XENTIS, the world's leading independent VAX-based report writer since 1980, is simple enough for the end-user, yet powerful enough for the MIS professional. Unique features include:

- Compatible with numerous databases
- Ability to position fields
- "Point and shoot" selection of files and fields
- Optimized for fast execution
- User-defined title line and column headings
- Displays report format during preparation
- On-screen Help available
- Direct access to XENTIS Dictionary and CDD

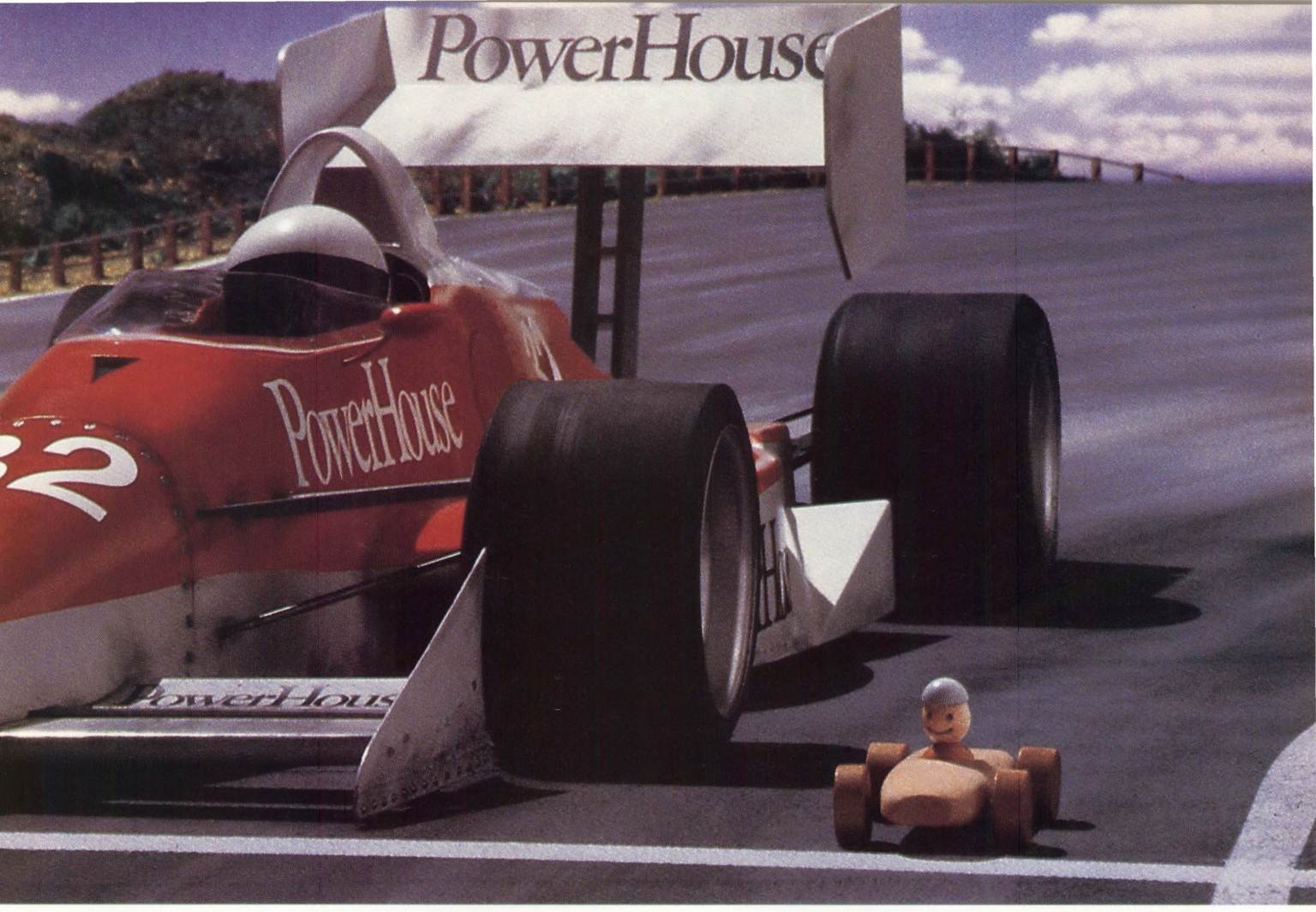
For all your report writing needs, there is only one report writer-XENTIS . . . it's that SIMPLE!

Call now for your **FREE** demonstration:
(206)343-0447

PARK SOFTWARE INC.
83 South King Street, Suite 820
Seattle, Washington 98104
Phone: (206)343-0447 FAX: (206)682-6866

XENTIS is a product of Park Software, Inc. VAX, DBMS-32, and Rdb; Sybase, and Ingres are registered trademarks of Digital Equipment Corporation, Sybase, Inc. and Ingres, Inc. respectively.

CIRCLE 304 ON READER CARD



NO CONTEST.

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

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

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

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

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

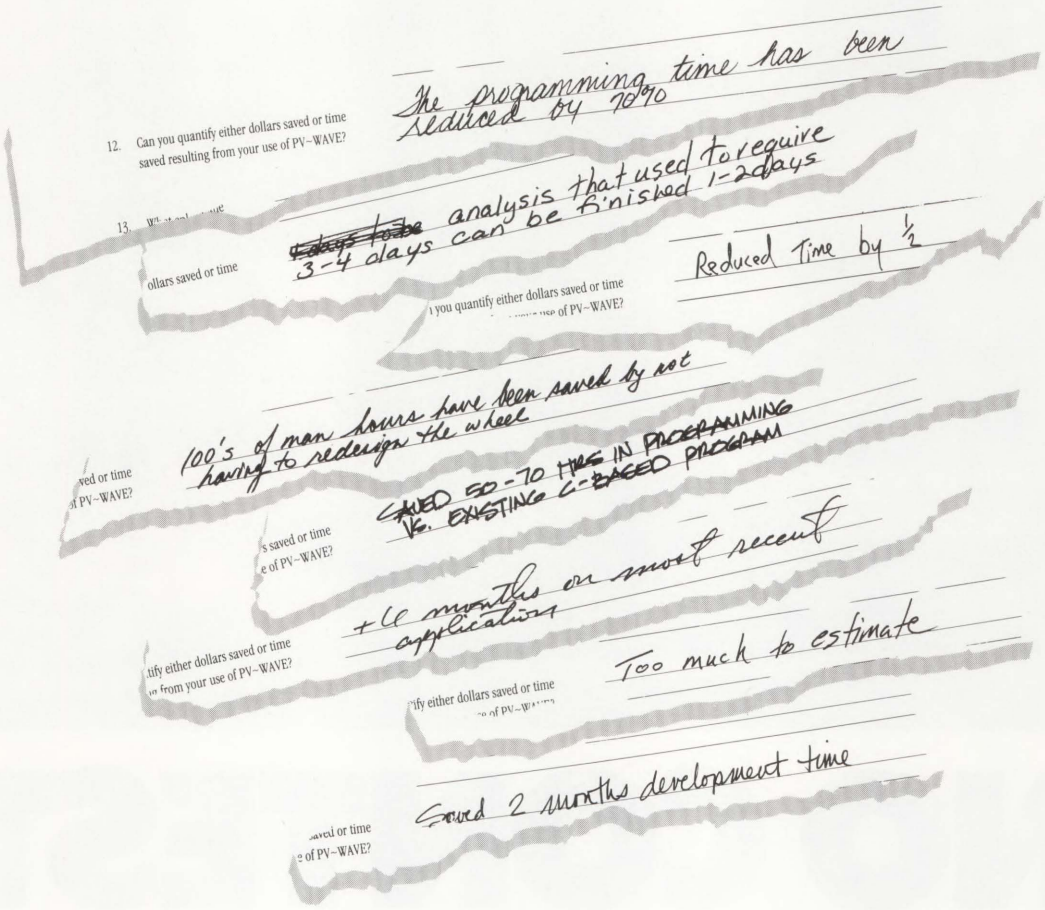
COGNOS®

Real Tools. Not Toys.

CIRCLE 108 ON READER CARD

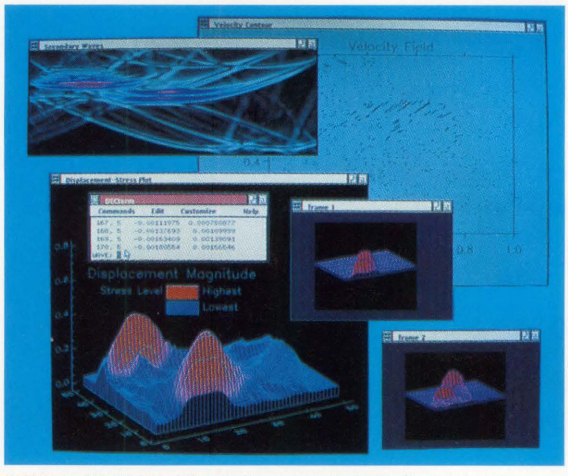
© 1990, Cognos. PowerHouse is a registered trademark and StarBase is a trademark of Cognos.
The other trade names referenced are registered, trademarked or service marked by their respective manufacturers.

Productivity ?
The Engineer's Definition:



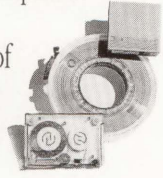
PV~WAVE
Visual Data Analysis Software

▲ Results taken from Precision Visuals 1990 Customer Survey.
▼ Non–destructive test analysis courtesy of National Institute of Standards and Technology.



PV~WAVE combines dynamic graphics, image processing, and powerful array–manipulation capabilities. Ideal for engineering analysis of data from tests, experiments, simulation, or processes on your Sun, DEC, HP, and Silicon Graphics computer.

Discover for yourself the productivity power of PV~WAVE. Call us at **1/800–447–7147** to qualify for a free evaluation copy.



PrecisionVisuals®

PV~WAVE; Sun; DEC, VAX; HP; and Silicon Graphics; are registered trademarks of Precision Visuals, Inc.; Sun Microsystems, Inc.; Digital Equipment Corporation; Hewlett–Packard: and Silicon Graphics Inc., respectively

CIRCLE 295 ON READER CARD

2. For indexed files, use the number of keys plus two or more to allow caching of at least one bucket per key plus the root bucket and an extra data bucket.
3. For indexed files accessed by primary key, specify enough buffers to hold the entire primary index plus at least one bucket per key and at least one data bucket.

Files that are frequently updated and files accessed from several nodes of a VAXcluster aren't good candidates for global buffers, because there's a lot of overhead involved with managing the buffers in these cases. A very large indexed file, in which reserving enough memory to cache the entire index would be unaffordable, also is a poor candidate for RMS global buffers.

Controller-Based Caching

Aside from these VMS techniques, other sources offer additional caching solutions. Several disk drive manufacturers are now designing disk data caching into their disk controllers. Caching controllers include a small amount of dedicated memory that's used for storing the data from recently accessed logical disk blocks. Thus, if another I/O request is received soon for the same logical blocks, the blocks are more readily available. Disk head seek time, rotational latency and data capture time can be avoided by supplying the data directly from the cache memory in the controlling device.

This solution doesn't take system memory away from other applications. Another positive factor is that there's no need to analyze which files or records are the best candidates for caching. The decision criteria are fully automated within the controller firmware.

The results of controller-based caching are usually superior to RMS global buffers, because all file data read from the disk is available for prompt reread.

Three major drawbacks are:
1. The amount of memory in the controller for this purpose is usually somewhat limited, so data stays in the cache for only a short time.
2. This solution doesn't reduce or eliminate heavy traffic on the I/O channel and the bus.
3. The capital outlay is notable.

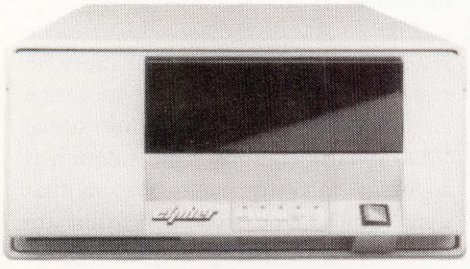
RAM Disk

A RAM disk is a portion of host system memory that's dedicated to the task of storing data in a form that looks to the system like a standard, file-structured disk device. (This discussion excludes separate solid-state devices.) This form of caching is useful for files known to be frequently read by many users. It also makes sense for applications that involve short bursts of high-volume data gathering, such as satellite telemetry, in which the data is subsequently written to a more permanent mass storage device such as disk or tape.

One advantage of this approach is the great speed with which I/O requests can be serviced. Read requests for data that's stored on this pseudodevice can be satisfied without any traffic on the communications bus or the disk I/O

ADS
APPLIED DIGITAL SYSTEMS INC.

ADS, a leading supplier of DEC and SUN compatible sub-systems, announces VS3100 compatibility with CIPHER's M995 GCR CacheTape 1/2" tape drive.



NEW

ANSI/IBM Standard 1600, 3200 and 6250 bpi densities

Industry standard Cipher interface, or SCSI option

1 MB of Cache Memory

Compatible with QBUS, UNIBUS, VS3100, DS3100, SUN Microsystems

Relieves host of most error management responsibility

Streams on start/stop software providing faster backup times

Easy to use autoload and autothread features

Increased reel capacity - to 270 MB

Fairport, NY 14450
716-377-7000 FAX 716-377-5544

McLean, VA 22102
703-749-7711 FAX 703-893-9787

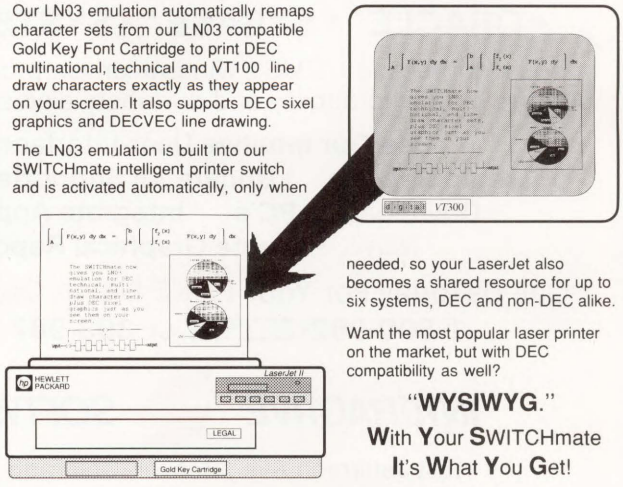
CIRCLE 323 ON READER CARD

WYSIWYG

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

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

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



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

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

Gold Key ELECTRONICS, INC.

18 Lamy Drive, P.O. Box 186, Goffstown, NH 03045 (603) 625-8518

SWITCHmate, Digital, DEC, DECVEC, LN03, VT and LaserJet are trademarks of their respective owners.

CIRCLE 131 ON READER CARD

subsystem.

Since a power failure or system crash causes the contents of system memory to be lost, backup of files stored on a RAM disk must be stored elsewhere.

Some RAM disks include a delayed write-through feature. This means that if information stored in the RAM disk is modified, it's written to the backup copy later. Of course, the updated data could be lost if the system crashed before the write-through completed.

An obvious cost of a RAM disk is that some system memory must be permanently assigned for the device. Equally important but not so obvious is the cost of the system manager's time and attention to manage the RAM disk.

A recent innovation in caching technology is a software cache that offers the advantages of both controller-based caching and a RAM disk. This all-software approach uses some of the host system memory to cache most-frequently and/or most-recently accessed disk blocks. An I/O request that might take a normal device driver substantial time to complete can be satisfied by a software cache system typically in less than one-tenth of the time.

Notice that a software cache is concerned with blocks, as is controller-based caching, and not with files, as RAM disks or RMS global buffers are. This means that if a small number of blocks in a very large file are frequently accessed, those blocks can be cached and quickly available from memory in lieu of the disk without a large space requirement for the whole file.

This approach uses host system memory, as does a RAM disk. This means that when an I/O request is satisfied from the cache, the entire disk subsystem, including the communications bus, can be avoided.

In most cases, software caching is invisible to users and applications. It simply intercepts I/O requests directed toward any disk device on the system, satisfying them from the memory-resident cache if possible.

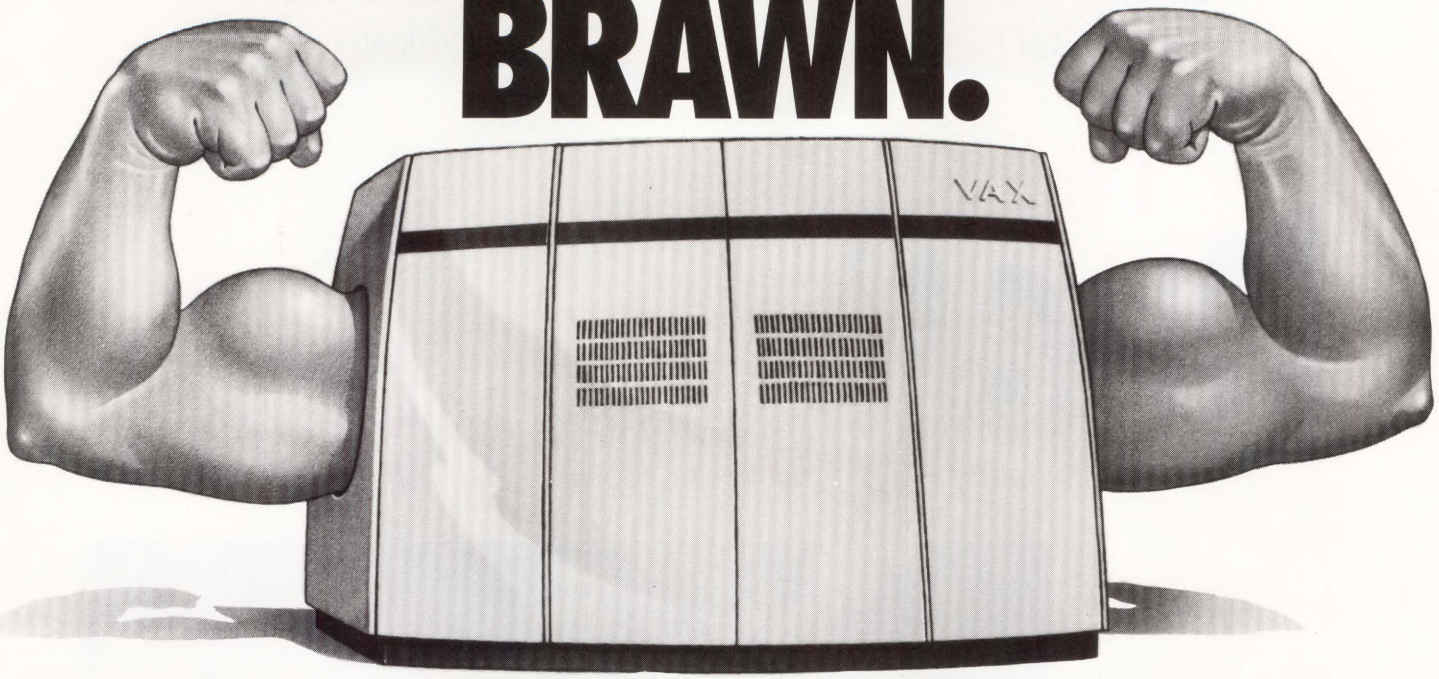
Since the data is stored in main system memory, it's reasonable to be concerned about the vulnerability of the data in case of power failure or system crash. For this reason, software cache systems with write-deferred features should be avoided. If a software cache system is characterized as a write-through cache, then it handles write I/O operations by updating the data on the disk immediately.

Like a RAM disk, most software cache systems require that system memory be reserved for caching. This reduces the amount of memory available for normal VAX/VMS operations. One solution is to use a software cache system that dynamically allocates and de-allocates memory for caching, depending on system workload.

A myriad of caching mechanisms is available for VAX/VMS systems. A system manager must apply the mechanisms that offer the best disk performance for the user community. *—Rick Cadruvi is vice president of development and Evelyn Vigil is director of research at Executive Software International in Glendale, California.*

CIRCLE 133 ON READER CARD

YOU'VE GOT THE BRAWN.



NOW FOR THE BRAINS.

From them, you get muscle. Now get the brains your VAX wasn't born with.

Get a Virtuoso Performance.

Virtuoso masterminds your disk operations for speed, reliability and shared data access, even across VAXclusters.

Only Virtuoso lets you use physical or pageable memory, whole or partial volumes, local or networked files. Our disk striping and interleaving across multiple devices map out the fastest routes to your data. Our hardware error simulation verifies error recovery on your system.

Virtuoso means static, dynamic and HOT FILE caching, and read and write caching clusterwide. For your security Virtuoso provides data encryption, access controls and a windows-oriented workbench to monitor and control disk activity. Virtuoso reports on your file system and your disk and file I/O operations. Our caching statistics help you maximize our intelligence. For all these reasons and more, the smart money's on Virtuoso.

Shadow Yourself.

If a System or Quorum Disk fails, SHADOW won't. SHADOW Disk Mirroring for VMS automatically takes over and keeps your critical applications running. You're notified of problems through VMS OPCOM and when the drive is repaired, SHADOW brings it up to date.

You can control, monitor, and make changes to SHADOW sets dynamically from anywhere in your network, while SHADOW Read Load Balancing increases your processing speed. SHADOW works with Virtuoso to shadow files, partial volumes, or files across a network.

Avoid Crash Courses.

PSS and EPSS Performance Simulation are clever enough to test applications before they go live, on terminal loads greater than your system may physically have. EPSS tests from an external system for 100% pure results. PSS and EPSS offer random think time and input substitution, a windows-oriented workbench, and response time event analysis. Local, dial-in, LAT and X29 terminal sessions are all supported.

Make More Smart Moves.

Thinking about security? Recorder monitors terminal input and/or output. For interactive helpdesk operations and security, Watch lets you view and modify terminal sessions as they occur.

Your VAX can exercise its full potential. Just pick our brains. Call 201-798-6400 for free trial copies of systems software from ASCI.

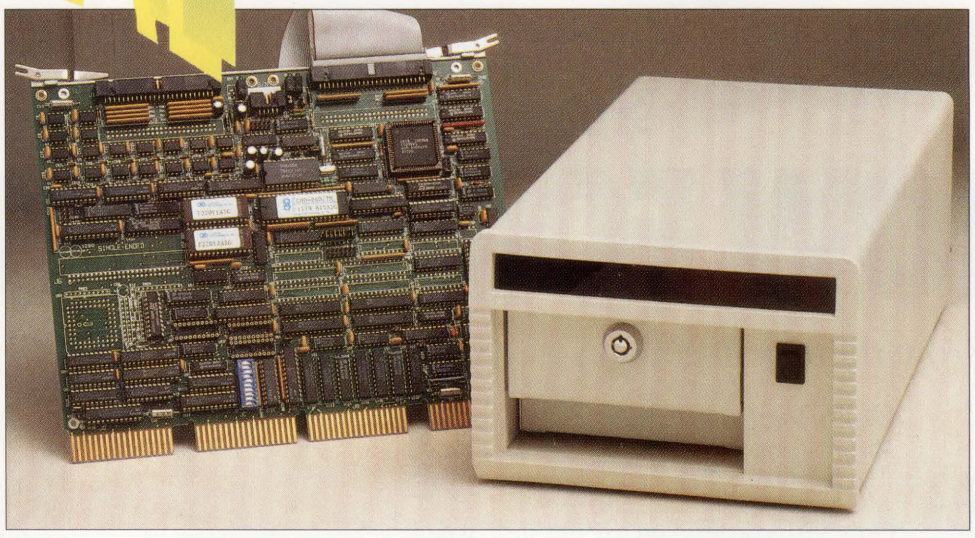
A S C I
ADVANCED SYSTEMS CONCEPTS, INC.
The Brains Behind The Brawn
33-41 Newark St., Hoboken, NJ 07030
201-798-6400 FAX: 201-798-9203

All trademarks mentioned are properties of their respective holders. Copyright 1990 Advanced Systems Concepts, Inc.

CIRCLE 363 ON READER CARD

Bringing Together SCSI And The Q-Bus With Kingston Technology's DC101-S Removable Subsystem And CMD Technology's CQD-240/TM Q-Bus-To-SCSI Host Adapter.

THE FRUGAL CONNECTION



There are times when you want to connect a third-party disk drive to a Q-bus MicroVAX system without making an expensive move to the Digital Storage Systems Interconnect (DSSI) architecture. This means obtaining a KFQSA Q-bus-to-DSSI adapter and either an RF30 or RF71 Integrated Storage Element (ISE) or Removable Storage Element (RSE) subsystem with a capacity of 150 MB or 400 MB, respectively. This can be expensive. For example, it costs more than $6,000 for the "small" drive if you need an extra cabinet.

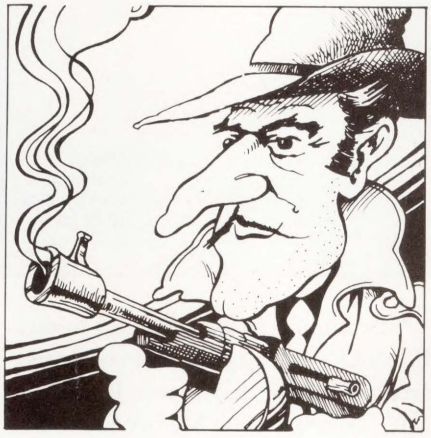
A third-party solution looks attractive at this point. This scheme means getting a disk subsystem that uses one of the three industry-standard device interfaces: ESDI, ST506 or SCSI. Kingston Technology provided DP Labs with its removable, lockable subsystem, the DC101-S (S for SCSI). We installed the product on our MicroVAX II. To do this we used a Q-bus-to-SCSI adapter board from CMD Technology.

Kingston manufactures the subsystem but not the drive. The DC101 is designed to house a 3 1/2-inch drive. The

BARRY SOBEL

DEC PROFESSIONAL DP LABS TESTING CENTER

Kill idle jobs on your VAX



With ***HITMAN***, you can free terminal lines and plug security leaks by kicking inactive users off your VAX. No more terminals left logged in overnight or on weekends. No more dialup lines tied up because somebody forgot to log off.

You're in control. Simply set your site-specific parameters and turn HITMAN loose. It's like having an assistant who works 24 hours a day and always follows your orders. HITMAN is a "set it and forget it" tool to help you manage your VAX.

You can set a system-wide maximum idle time as well as set times for individual users, images and UIC groups. You can even set idle times for DIALUP processes separate from LOCAL!

You can warn idle users before you strike. HITMAN lets you give them one or more messages. And you can define the text of the messages and the times at which they are sent.

HITMAN sends a termination message to the users it kills. And, it can even mail them a detailed message after it kills them!

You control who gets hit. You can protect up to 256 users so they won't be hit even if they're completely inactive. You didn't REALLY want to shoot the president's ALL-IN-1 process did you? HITMAN also lets you protect images, terminals and UIC groups.

Sneaky users can't hide from HITMAN. Even if they use small amounts of CPU to look active, you can set thresholds on CPU time and Buffered I/O's to catch them.

HITMAN is **safe to use** since only interactive processes are checked. Idle parent processes with active sub-processes aren't touched either.

Your data is protected because HITMAN allows images to write their data buffers to disk and release their locks before it terminates them.

You'll always know what HITMAN's doing because it logs warnings, hits and errors to a disk file and sends you a message every time it terminates someone.

You can prevent user complaints by testing HITMAN before you turn it loose. In watch mode, HITMAN writes messages to the log file but doesn't warn or terminate processes so nobody knows it's there. That lets you decide who to protect and what idle times to set by checking the log file.

HITMAN is eliminating waste and plugging security leaks at 770 VAX/VMS sites in the United States, Canada, Europe and Australia. It's solidly engineered and proven in the field by system managers like yourself. And, HITMAN V5.0 works perfectly on VMS 5.4!

A single CPU license is only $695. And, a **site** license is only $895! To order your copy, call Alan at (403) 263-1151.

Or, call now to arrange your FREE no-risk, no-hassle 30-day trial

NEW
Version 5.0

FREE 30-day Trial

Still $695 (single CPU)

Saiga Systems, Suite 215, 801 - 6th Street S.W., Calgary, Alberta, CANADA T2P 3V8 **(403) 263-1151**
FAX (403) 264-5718

CIRCLE 364 ON READER CARD

removable feature is attractive for security reasons, as you can remove and lock up your sensitive files nightly if you choose to isolate them on this drive. Kingston ships the subsystem with or without the drive of your choice. Or, you can do it yourself. We received the kit with a Maxtor LXT-200 drive installed. This drive has a 200-MB (formatted) capacity and a stated 15 ms access time. The drive added $1,005 to the price of the unit.

The DC101 houses a shock-isolated drive carrier. A digital display on the front of the drive provides status information. The key lock in the front of the drive carrier provides physical security and a palpable indicator of proper seating in the chassis. An optional solenoid interlock prevents removal of the drive carrier during head parking. Since our unit came with this feature, I tried removing the carrier without waiting until the drive had spun down. It wouldn't budge. The DC101 is also protected from electrostatic discharge.

Subsystem Connection

Because we hooked the drive to our MicroVAX, we needed a Q-bus-to-SCSI adapter board. We obtained a model CQD-240/TM quadwide Q-bus/SCSI Host Adapter from CMD. The CQD-240 supports disk and tape drives — a handy option, since we intend to get our hands on SCSI-based tape drives in the near future.

The adapter features many options, such as single-ended and differential SCSI. Our Kingston is a single-ended device. It supports 18- or 22-bit Q-bus addressing. We used 22-bit; 18-bit is used with LSI-11-based systems. The CQD-240 can be used with any DEC system, including PDP, LSI and ULTRIX-based systems that use DU and/or MU DEC device drivers. Our CQD-240 supports up to four disk and three tape drives.

Maxtor Corp.
211 River Oaks Pkwy.
San Jose, CA 95134
(408) 432-1700
CIRCLE 418 ON READER CARD

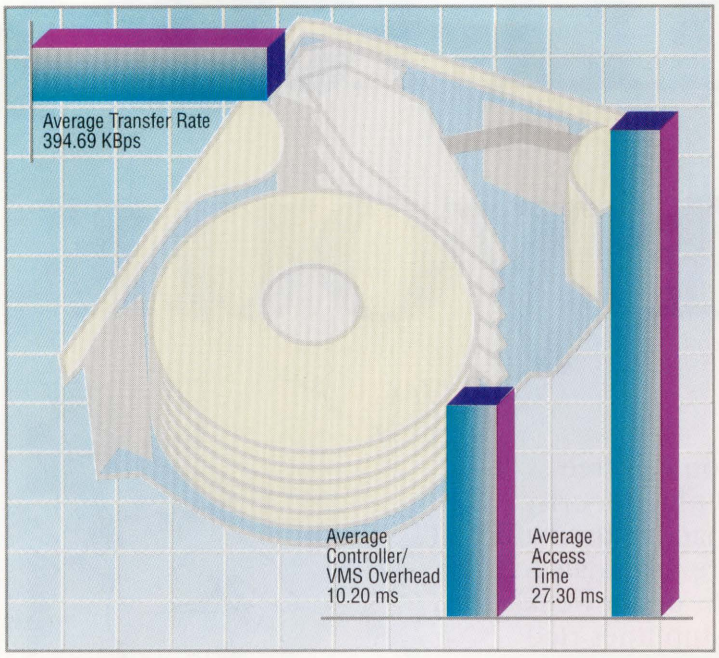


Figure: We ran our Disk Benchmark program to evaluate the performance of the Kingston disk/CMD controller combination.

After finding an available slot in our MicroVAX, our first step was to select the correct Control and Status Registers (CSR) address so our MicroVAX could communicate with the controller. CMD provides an installation manual that shows a list of supported addresses. To find which address you'll need to set the board to, go into SYSGEN and type CONFIGURE at the SYSGEN> prompt. You'll receive a DEVICE> prompt at which you enter UDA,n (UNIBUS Disk Adapter) where n is the number of adapters (controllers) you'll have on the system, including the adapter you're installing. Since we already had three UDAs on our system, we entered:

```
DEVICE> UDA,4
```

When you CTRL-Z, you'll see the new device listed with a CSR address. This should correspond to one of the addresses listed in the CMD manual. This is the one you'll need to set on the board.

If you haven't used CONFIGURE before, talk to your system manager. Once you find the correct address, set it by installing the correct combination of jumper plugs: switches 1 though 5 for a disk unit and 6 through 10 for a tape unit.

Each SCSI device on the bus requires a unique SCSI ID. The controller is called an Initiator, while tape/disk drives are called Targets. The Target IDs for disks run from 0 through 3. Tape Target IDs begin at 4. SCSI ID 7 is reserved for the Initiator, the CQD-240. This scheme corresponds to the four-disk, three-tape capacity on the adapter. We set the SCSI ID to 2. The documenation for the CQD-240 is full of tables and diagrams, including a map of the board, so you won't have to go on an expedition to find the jumpers.

There are two other settings to note. The default mode is single-ended. You'll need to make a change to support differential SCSI. We also left a jumper shunt out of jumper block W3 to ensure that terminator power was disabled. The Kingston provides power.

The CMD Disk Utility Program can format and configure a disk. Because our Kingston was shipped formatted, we didn't need to go into it.

SCSIwatch

SCSIwatch, or Tape Monitor Utility (TMU), is an optional software package designed by CMD to work with its Q-bus and UNIBUS SCSI host adapters that support Tape Mass Storage Control Protocol (TMSCP) devices. We received the package with our CQD-240.

Installation is straightforward with

It's True

True Color

16.7 million active colors for your DEC computer. That's what our new 24-bit 1024 x 1024 True Color Graphics Display Controller delivers.

True 32-bit Power

The VCT-Q is the first Q-bus single board graphics controller to feature the new TMS 34020 32-bit intelligent graphics processor. Fill rate is 7 Mpixels per second. True color vector drawing speed ranges from 350,000 pixels per second for 10-pixel vectors to 3,500,000 pixels per second for 500-pixel vectors.

True DEC Q-Bus Compatibility

It supports everything from the LSI-11/23 to the MicroVAX 3900.

True Single Board Implementation = True Economy of Scale

The VCT-Q only takes one Q-bus slot. You now have freedom of choice for your liberated slots. Which of course means you're free to run multiple VCT-Qs if you like.

Truly Comprehensive Software Support

Software support is available for VMS, Ultrix, RT/TSX, and RSX :

+ X Windows server for Ultrix and VMS (DECwindows client compatible).
+ CTP Graphics Subroutine Package, which supports user written applications through standardized calling sequences to an on-board subroutine set.
+ VCT Standard Software Package, which includes initialization, test, image save/restore, and test pattern generator/demo.
+ C compiler, cross-assembler, and loader for user-written 34020 applications.

True Expertise

At Peritek we have more than ten years of experience in designing and supporting graphics solutions for the DEC market. Technical support is just a phone call away.

Truly Your Only Alternative

If your application requires high performance color graphics, and you want a partner, not a vendor, then Peritek is the only choice. We offer the widest range of graphics controllers available for DEC Q-bus and Unibus computers.

True Value

We think you'll be pleasantly surprised at the price.

Call now for more information: **(415) 531-6500.**
On the East Coast: **(516) 798-1919.**

Background color is an unretouched photograph of an image produced by the VCT-Q.

Other brand and product names are trademarks or registered trademarks of their respective companies.

Peritek

Peritek Corporation
5550 Redwood Road
Oakland, California 94619
(415) 531-6500
FAX: (415) 530-8563

Intelligent Color Graphics Systems and Software

CIRCLE 185 ON READER CARD

VMSINSTAL. You must first set a jumper on the controller to enable TMU. You'll then see a pseudodevice on your system, MUx255, where x is your controller designation. SCSIwatch communicates through this pseudodevice to the controller.

After installation, you must run two .com files: tmusetup and tmustartup. The command procedure tmusetup.com defines two foreign commands — one to run the utility and the other to run the License Registration facility. You must run the latter, providing it with information about your copy of the program and the password you're given in the package. The command procedure tmustartup.com installs the program image with the SHARED and PRIVILEGE attributes.

TMU provides continuously updated information about your current tape operation (the default interval is 10 seconds). Type TMU at your system prompt to activate the display. To change the default display interval, type the command followed by the interval in seconds, for example, TMU 5 for a five-second display interval. The information displayed will be the Device Name, Vendor ID (vendor name), Revision Number, Current Condition, Sense Status, Remaining Tape (in MB) and %Rewrite, %ECC.

Current Condition displays "normal" conditions such as Read, Write, Rewind and Unload. Sense Status provides information such as Not Ready, Medium or Hard Error, or Unit Attention. %Rewrite, %ECC provides the percentage of blocks that were rewritten during a Read operation or the number of Blocks recovered during a Read respectively.

CTRL-C puts you in command mode displaying a tmu> prompt. At the prompt you can enter commands to spawn a subprocess, enter a DCL command directly (with the syntax tmu> dcl dcl_command), or change the display interval. Typing tmu> exit returns you to the display. To stop TMU, enter CTRL-Z.

TO EVALUATE THE PERFORMANCE of the Kingston disk/CMD controller combination, we ran our Disk Benchmark program (see "Disk Benchmark" by David W. Bynon, October 1988). Our results are shown in the Figure. We also installed a system on the DC101 and booted up the MicroVAX without a problem.

If you're looking for an easy way to bring SCSI and the Q-bus together, Kingston and CMD might have a solution for you. ■

CQD-240/TM

PLATFORMS: Any DEC Q-bus system; supports DEC's MSCP and TMSCP protocols

PRICE: $2,150, plus $250 for SCSIwatch

CMD TECHNOLOGY INC.

HEADQUARTERS:
3851 S. Main St.
Santa Ana, CA 92707
(714) 549-4422

PRODUCT LINE: DEC-compatible controller products

FOUNDED: 1986

OWNERSHIP: Private

CIRCLE 417 ON READER CARD

DC101-S

PLATFORMS: Any system with interface capability to SCSI, ESDI or ST506

PRICE: $1,395, plus the cost of the drive

KINGSTON TECHNOLOGY INC.

HEADQUARTERS:
3023 S. Harbor Blvd.
Santa Ana, CA 92704
(714) 545-6887

PRODUCT LINE: Disk subsystems and memory products

FOUNDED: 1988

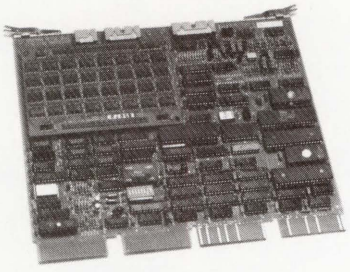
OWNERSHIP: Private

CIRCLE 416 ON READER CARD

- Synchronize Multiple Computers
- Precision Data Time Tagging

Bancomm's PC03Q Qbus Time Code Translator is a convenient, precision means of synchronizing MicroVax or LSI-11 computers to each other and/or to a primary time standard (ie. GPS satellite time receiver).

PC03Q Qbus Time Code Translator



- Multiple code formats.
- Real time and non-real time rates; forward & reverse.
- Microsecond resolution (real time).
- Programmable time coincidence strobes.
- Programmable heartbeat interrupts.
- External time capture strobe.
- VMS device driver.
- Remote and local I/O brackets.

Contact us for more information:

BANCOMM
DIVISION OF DATUM, INC.
6541 Via del Oro
San Jose, CA 95119
TEL (408) 578-4161
FAX (408) 578-4165

Qbus, MicroVax, LSI-11, and VMS are trademarks of Digital Equipment Corporation.

CIRCLE 358 ON READER CARD

Now under ALL-IN-1®, there's one for all.

Now everyone in your VAX/VMS office can tap into the power of WordPerfect® 5.0 graphics, styles, text boxes with shading and virtually endless printer support... without leaving ALL-IN-1®.

With WordPerfect Integration for ALL-IN-1, WordPerfect 5.0 can become the default editor for word processing, electronic messaging and time management. It also becomes a "known file format." So all integrated editors like WPS Plus® and EDT® can access, edit and use text from any document stored in WordPerfect format. Or vice versa.

And whether you use graphic terminals or character terminals, WordPerfect 5.0 lets you see your graphics in preview, once you've included them in WordPerfect documents. Graphics are represented on character terminals by using a line draw approximation or a mosaic of downloaded soft characters. So even the dumbest terminals can see what they've been missing.

With WordPerfect 5.0, you have what you need to make your documents look great. Just use the 115,000-Word Speller to spot typos and correct spelling mistakes. And if you're at a loss for words, WordPerfect's Thesaurus can give you a screenful. WordPerfect 5.0 also offers multiple font support and file format compatibility with other platforms supported by WordPerfect.

WordPerfect 5.0 for VAX/VMS and WordPerfect Integration for ALL-IN-1. More and more these days, we're becoming the one for all.

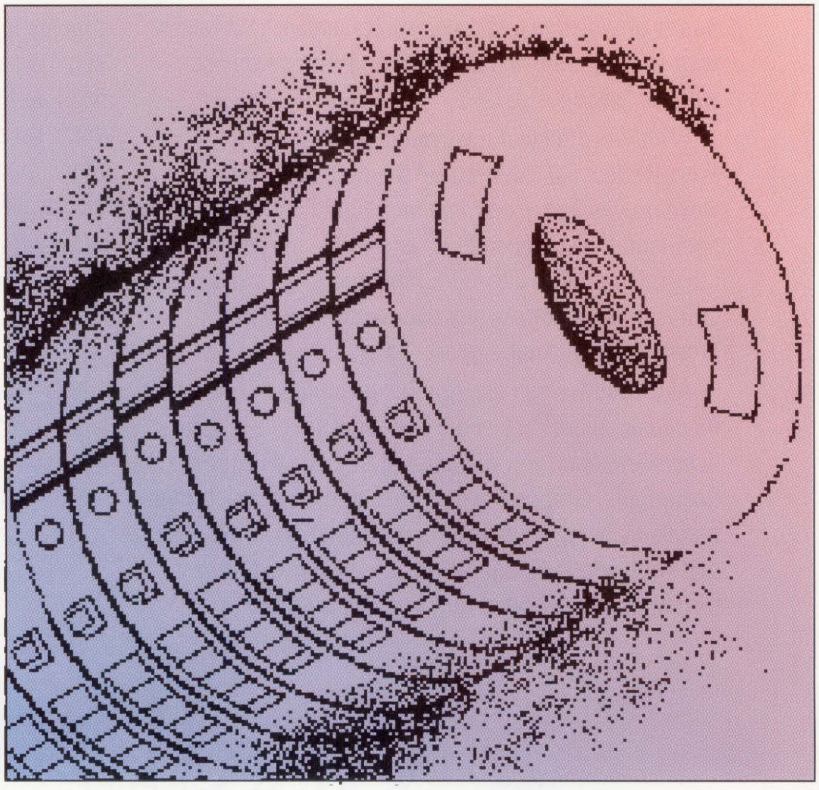
WordPerfect
CORPORATION
1555 North Technology Way, Orem, Utah 84057
Tel: (801) 222-5500 Fax: (801) 222-5577

WordPerfect is a registered trademark of WordPerfect Corporation in the United States. All other brands and product names are trademarks or registered trademarks of their respective companies.
©1990 WordPerfect Corporation.

CIRCLE 317 ON READER CARD

Tested On Our MicroVAX II and VAX 8800, Touch Technologies' Dynamic Tape Accelerator Improved The Performance Of Tape Operations.

Dynamic Tape Accelerator Revisited



When we reviewed Touch Technologies' Dynamic Tape Accelerator (DTA) last year ("Speeding Your Drive," November 1989), our test results were low compared to BACKUP results for most systems. Dan Esbensen, president of Touch Technologies, has encountered a number of interesting and not-so-obvious performance puzzles with DTA customers. Esbensen visited our Lab to give us a hand in running the tests again.

Dynamic Tape Accelerator is a software program that controls the flow of data to the tape device. It's marketed and distributed by System Management Software.

We ran a series of tests with a mixture of hardware to provide a variety of scenarios and discovered how different hardware and software configurations, system tuning and system load all can contribute to differences in performance. One of the following configurations may

DAVID B. MILLER

DEC PROFESSIONAL DP LABS TESTING CENTER

Sometimes close just isn't good enough.

We'll get right to the point.

If you buy a LAT product, make sure it's officially licensed. That means the company which produced your product has the definitive LAT technology as developed by Digital. It's your assurance of a LAT product which is fully compatible, interoperable and current with Digital's latest LAT specifications.

If your present supplier of LAT products doesn't have a Digital LAT technology license, ask them why.

As Digital's licensing agent, we make the LAT protocol available to anyone who wants it. Companies like those listed below have made a clear commitment to products that work flawlessly in LAT networks — today, tomorrow and the next day. They have Digital's LAT specification. They have a LAT license. Accept nothing less from your supplier.

Look. It's not that non-licensed LAT products are bad. It's just that it's nice to know that when it really counts, your LAT product will work the way it's supposed to.

That's what a LAT license is all about.

Meridian

TECHNOLOGY CORPORATION

Communicate with us!

15965 Manchester Road, Suite 102
Saint Louis, Missouri 63011 USA
Tel # 314.394.1600
Fax # 314.394.1567

Licensed LAT Suppliers

3 COM Advanced Computer cisco CDC/ITIS Division DataMedia Develcon Forest Computer Gandalf Gemini IDEA Courier Infotron Interlink Micronetics Motorola Penril DataComm Persoft Racal Milgo Spider Systems Stratus STRTC TCI Thursby Ungermann-Bass WRQ Xylogics Xyplex

OFFICIAL LAT LICENSE LAT MERIDIAN TECHNOLOGY

LAT is a trademark of Digital Equipment Corporation.

CIRCLE 182 ON READER CARD

Figure.

Drive	Controller	Original KBps	KBps With DTA
STC	Wespercorp	184	214
STC	Aviv	207	253
Tristar	CMD SCSI	137	163
Drive	**Controller**	**Original KBps**	**KBps With DTA**
STC	Aviv	168	201
Tristar	CMD SCSI	116	126
Drive		**Original KBps**	**KBps With DTA**
MT		225	242

When tested in the Lab, Dynamic Tape Accelerator took advantage of our MicroVAX II's 16 MB of memory to speed tape operations.

come close to what's in your shop.

We tested DTA on LABDOG::, our MicroVAX II. It has 16 MB of memory and Seagate Technology Wren V and Wren VI disk drives with an Andromeda Systems ESDI caching controller. A Kingston Technology 3 1/2-inch SCSI disk subsystem was also part of our system. We ran tests using a Storage Technology (STC) 2920 50-ips, noncaching nine-track tape drive and a Tristar Technology 4mm DAT drive. Tests with nine-track tape were run with a Wespercorp TapeDimension/Q-bus CacheCoupler and with an Aviv TFC 935A controller. The Tristar DAT drive and Kingston disk drive were daisy-chained and connected to LABDOG:: via a CMD Technology CQD-240/TM SCSI tape/disk controller. LABDOG:: runs VMS V5.3-1.

For three tests we BACKed UP SYS$LIBRARY, consisting of 64,989 blocks, from our Wren VI system disk. Our BACKUP account's UAF parameters were tuned to match the settings recommended by DEC in the *VMS V5.2 New Features Manual*. No other users were on the system when the BACKUPs were run. The only other nonsystem process running with BACKUP was DTA's tape monitor utility, which allowed us to view the performance and progress of the drives. All nine-track BACKUPs were done at 6,250 bpi. We used the following command for this set of tests:

```
BACKUP SYS$LIBRARY:*.*
tape:DTABCK/SAVE/NOCRC/BLOCK=40960/
  GROUP=0/LABEL=DTA
```

The results are shown at the top of the Figure. When we ran the original DTA tests in November 1989, LABDOG:: had only 9 MB of memory. You need excess memory to allow DTA to perform caching properly. With 16 MB of memory, DTA could perform better. Without accelerating the drive, DTA's monitor graph, displaying KBps rates every 10 seconds, had a lot of peaks and valleys. When acceleration was enabled, DTA took advantage of LABDOG::'s extra memory to cache data. Performance quickly reached a level at which it stayed for the duration of the test.

Esbensen has encountered a number of cases in which DTA's performance was significantly enhanced when system managers set their tape controller's high-speed switch to high speed for tape drives that can handle multiple speeds. Some managers apparently aren't aware of their controllers' and drives' capabilities and configurations. Esbensen has also run into at least one case in which the DIP switch settings outlined in the controller's documentation were the opposite of the actual switch layout. Before putting DTA onto your system, it might be helpful to reread your tape and disk-drive manuals.

For the next two tests, we did an image BACKUP of our Kingston SCSI disk drive to the nine-track STC tape with the Aviv controller and to the Tristar 4mm DAT drive on the CMD controller. The Kingston drive was a VMS system disk. The results are shown at the center of the Figure.

For the last test, we used our VAX 8800 with 64 MB of memory. Our sys-

For More Information

Andromeda Systems Inc.
9000 Eton Ave.
Canoga Park, CA 91304
(818) 709-7600
CIRCLE 523 ON READER CARD

CMD Technology Inc.
3851 S. Main St.
Santa Ana, CA 92707
(714) 549-4422
CIRCLE 525 ON READER CARD

Kingston Technology Inc.
3023 S. Harbor Blvd.
Santa Ana, CA 92704
(714) 545-6887
CIRCLE 416 ON READER CARD

Seagate Technology Inc.
920 Disc Dr.
Scotts Valley, CA 95067
(408) 438-6550
CIRCLE 528 ON READER CARD

Tristar Technology Inc.
10 Reuten Dr.
Closter, NJ 07624
(201) 784-1557
CIRCLE 531 ON READER CARD

Aviv Corp.
26 Cummings Park
Woburn, MA 01801
(617) 933-1165
CIRCLE 524 ON READER CARD

Exabyte Corp.
1685 38th St.
Boulder, CO 80301
(303) 442-4333
CIRCLE 526 ON READER CARD

Micro Technology
5065 E. Hunter Ave.
Anaheim, CA 92807
(714) 970-0300
CIRCLE 527 ON READER CARD

Storage Technology Corp.
2270 S. 88th St.
Louisville, CO 80028
(303) 673-5151
CIRCLE 529 ON READER CARD

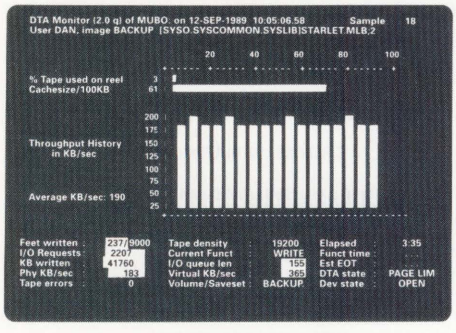
Wespercorp
17032 Murphy
Irvine, CA 92714
(714) 261-0606
CIRCLE 530 ON READER CARD

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

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

Twice the speed
FlashDAT can halve backup time because it incorporates Touch Technologies' world-famous Dynamic Tape Accelerator (DTA). DTA keeps tapes streaming continuously at optimal speed by smoothing the uneven data transfer from VMS BACKUP.

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



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

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

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

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

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

Try FlashDAT for 28 Days at no risk!

Call Today!
800-325-3700

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

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

**1.3GB Q-bus version.*

CIRCLE 345 ON READER CARD

¡Hot stuff!

TCPware™. High-performance TCP/IP for DEC.

If the method you're using for networking your DEC VAX or PDP-11 systems to UNIX is too slow, try a shot of TCPware. Our powerful, modular family of high-performance TCP/IP network products is guaranteed to pep things up.

No matter what your application, you'll get faster file transfers, snappier windows, and quicker keyboard response. Only TCPware is built in strict conformance with DEC's own design rules — without the spaghetti code that bogs down ported TCP/IP software. As a matter of fact, TCPware zips files through the network up to 50% faster than other systems, according to our benchmark data.

And TCPware performs, no matter how much your system grows. All of TCPware's modular products share the same high-quality kernel code, providing you with assured compatibility with present and future DEC operating systems.

With TCPware, your investment pays off in more than just speed: TCPware is the price/performance leader. So you can count on the best return on your investment.

TCPware. If you're working on a DEC/UNIX network, it's the spice of life.

PROCES SOFTWARE

Call today for our report on TCPware's benchmark performance. We'll send it out faster than you can say "¡Jalapeña!" 800·722·7770, 508·879·6994, FAX 508·879·0042

TCPware is a trademark of Process Software Corporation. DEC, VAX and PDP are trademarks of Digital Equipment Corporation. UNIX is a trademark of AT&T.

CIRCLE 157 ON READER CARD

tem disk is a System Industries SI83. We used a Micro Technology (MT) MA24 8mm Exabyte drive hanging off of an HSC50 to do a BACKUP of the 8800's SYS$LIBRARY, which consisted of 116,459 blocks. The 8800 also runs VMS V5.3-1. The results are shown at the bottom of the Figure.

> ***"Some managers aren't aware of their controllers' and drives' capabilities and configurations."***

These test results point out that you need to be aware of your system configuration, level of tuning and system load when judging a product. DTA can significantly improve the performance of your system's tape operations. After careful consideration of your system, you might give DTA a try to see what it can do for you. ■

Dynamic Tape Accelerator

PLATFORMS: VAX systems running VMS V4.0 or later

PRICE: Primary licenses range from $1,995 for MicroVAXs and workstations to $5,995 for a cluster

TOUCH TECHNOLOGIES INC.

HEADQUARTERS:
9990 Mesa Rim Rd., Ste. 220
San Diego, CA 92121
(800) 525-2527

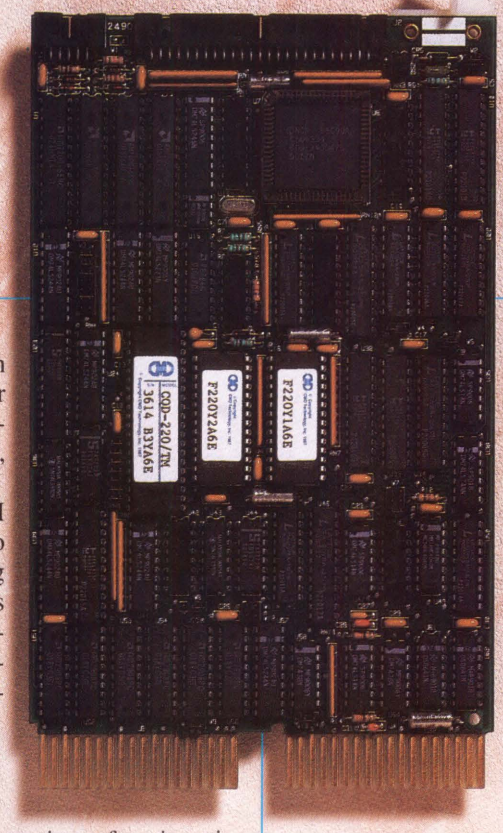
CIRCLE 539 ON READER CARD

FOR PURCASING INFORMATION:
System Management Software Inc.
2304 Huntington Dr., Ste. 248
San Marino, CA 91108
(818) 309-1020

CIRCLE 400 ON READER CARD

C M D N U M B E R O N E I N S C S I

THE ONLY SCSI HOST ADAPTER YOU'LL EVER NEED



CMD Is Revolutionizing The Way You Can Add SCSI Peripherals To Your VAX, MicroVAX, or VAXstation!

Just One Board
Install just one CMD multi-function disk and tape SCSI adapter in your Q-bus or Unibus backplane for unmatched performance, reliability, and versatility.

With CMD's extensive SCSI technology you can combine up to 14 disk and/or tape devices running under one firmware set. This allows your SCSI disks and tapes to operate in harmony, optimizing bus usage while increasing speed and reliability.

***For Absolutely The Highest Performance . . .* Demand CMD**
CMD SCSI host adapters have proven time after time, in documented benchmark tests, to be the fastest available. Even faster than SMD or ESDI.

By carefully choosing the highest performance adapter, you can significantly increase the overall throughput of your DEC system, maximizing your computing investment.

***By Far* The Most Versatile**
CMD has written the book on offering incredible value-added features to our SCSI host adapters—unavailable anywhere else. These include:

- **True Multi-Hosting**
  Equivalent in everyway to DSSI with substantially more throughput at a fraction of the price.
- **Hardware Shadowing**
  CMD's Super Shadow capability leaves all others in the dust and can now offer the attributes of fault tolerance and increased data availability.
- **Software Enhancements**
  Expand the productivity of your SCSI peripherals:
  - *SCSIwatch Screen Monitor Software.* Indispensible for tracking the operation of DAT or Exabyte drives.
  - *SCSI Online Format.* Format disks or optical cartidges as a background task—on line!
  - *SCSI Library Manager Jukebox Software.* Complete robotic and cartridge control for erasable, WORM, DAT stackers, or carousels.
  - *SCSI Pass-Through.* To integrate scanners, printers, etc.

***All This* Backed By A Company With A Single Dedicated Focus**
CMD Technology has become the number one provider of DEC compatible SCSI host adapters by focusing all of our energy on providing you with the best hardware and software solutions. And our future is even brighter with soon to be released VAXBI and VAXstation board level products.

To learn more about CMD products call:

800-426-3832
Inside CA call 714-549-4422

CMD TECHNOLOGY INC.
The Leader in SCSI Technology

3851 S. Main Street, Santa Ana, CA 92707

© 1990 CMD. DEC, Q-bus, Unibus, DSSI, MicroVax, VAX, VAXstation, and VAXBI are trademarks of Digital Equipment Corporation. Exabyte is a trademark of Exabyte Corp.

ISA Solutions' ISA/ResponseMaster Precisely Measures System Response Time And Application Performance.

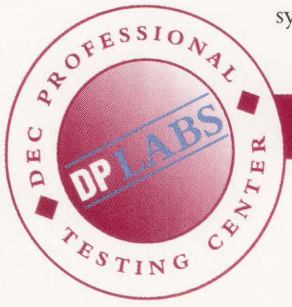
Measuring YOUR Machine

One of the most difficult tasks of system management involves quantifying and measuring system performance. There are two methods of doing this: job completion time and system response time.

Job completion time most often is used in batch environments in which the elapsed time of the job is important. Elapsed job time, in the VAX/VMS environment, is measured and recorded by system accounting.

In an interactive timesharing environment, it's necessary to measure system response time. This information isn't available from system accounting, and getting it represents a formidable challenge to the system manager. Software that tries to measure system response time is very complex and introduces an additional load to the system.

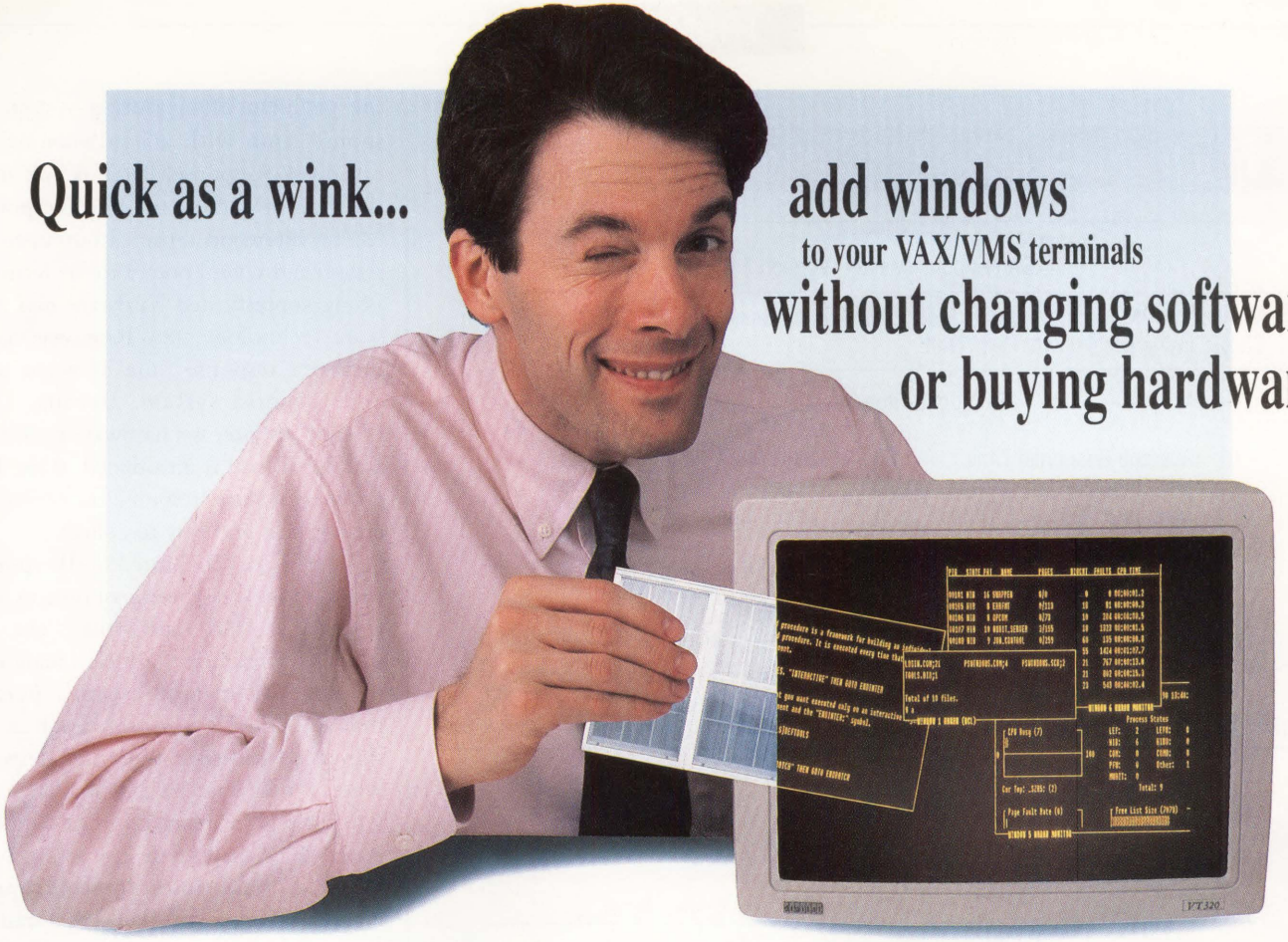
ISA Solutions has effectively addressed



DAVID W. BYNON

Quick as a wink...

add windows
to your VAX/VMS terminals
without changing software or buying hardware



Now Polestar Windows™ software instantly upgrades your VT100, VT220, VT320 terminals, compatibles, or emulators. So you get 90% of the productivity benefits of DECwindows at less than 10% of the cost. Just load Polestar Windows onto your system and you're ready to go.
Without altering your software.
Without adding hardware.
Without retraining.

True Windowing

- Lay out up to nine application windows onyour screen at once. It's like having different parts of your application spread out on your desk for easy viewing and monitoring.
- Switch between application windows at any time using the hot-key. Saves you time loading and unloading programs and menus.
- Focus on one application while others run to completion in the background. No more waiting for the computer to catch up with you.
- Quickly "cut and paste" information from one window to another.
- Have your "desktop" set up for you whenever you start work. Your programs will load automatically with each available window for instantaneous use.
- Secure your terminal when you have to leave it temporarily. A password gets you back in; your applications are just as you left them.
- Get print-outs of your application screens.

"30% increase in productivity"

"For the users we have with Polestar Windows, I estimate that we've seen a 30% increase in productivity. If there's one product they would never let go of, it's this one, and that's the truth of the matter."

—Bill Bitzer
Director of Administrative Computing
Colby-Sawyer College
New London, New Hampshire

NEW VERSION 2!
NOW WITH
- VIEWPORTS
- CUT AND PASTE
- PRINT SCREEN
- TERMINAL LOCK-OUT
- CURSOR WINDOW

Compare the cost!

Only $495 for one terminal (much less in quantities) for Polestar Windows vs. the major cost of implementing DECwindows.

TO ORDER OR FOR MORE INFORMATION, PHONE TOLL-FREE: 1-800-535-2389

International enquiries; call United Kingdom 695-50504

POLESTAR SOFTWARE

Polestar Windows™

by Polestar Software
109½ West Broadway
Fairfield, Iowa 52556 (515) 472-2445

© 1990 Polestar Software, Inc. Polestar Software, Inc. is a member of the Software Intelligence Group of Companies, the leading suppliers of VAX system utility software in Europe and Australia.
VT100, VT220, VT320, VAX/VMS, DECwindows and DEC are trademarks of Digital Equipment Corporation.

CIRCLE 241 ON READER CARD

Figure 1.

```
                    ISA/ResponseMaster  Version 2.2

Monitoring ON, Monitoring OFF, Clear Data, Trigger Select, Default Select
Show Timing Breakdown, Help, Quit:

                        Response Time Results

  Average Response Time   = 1.36      Samples Averaged  = 92
  Maximum Response Time   = 10.00     Timer Overflows   = 0
  Minimum Response Time   = 0.25      Last Sample       = 0.36

  -Current Monitor Mode-              -Selected Trigger Set-

     MONITORING ON.                          <3>
```

The ISA/ResponseMaster option menu.

Figure 2.

```
                    ISA/ResponseMaster  Version 2.2

Modify Value, Store, Retrieve, Initialize to Factory, Quit:

                      Modifiable System Variables.

  1. Max Valid Count          = 655.35   Max Time (> not averaged)
  2. Min Valid Count          = 0.25     Min Time (< not averaged)
  3. Short Format Mode        = N        Enable/Disable Short Display
  4. Short Format Row         = 22       Short Mode Row Position
  5. Skip Chars               = 15       Ignore Initial N Chars
  6. Keyboard Atten. Char     = 29 (^])  Keyboard Attention Character
  7. Min. Toss Mode           = N        Please Consult Instructions
  8. Refresh Char             = 23 (^W)  Set Refresh Char. 0 = Disabled
  9. Low Limit Stat Line      = 24       Lower Line Exclusion Area
  10. High Limit Stat Line    = 24       Upper Line Exclusion Area
  11. Ignore Control Chars    = Y        Character values less than 32
  12. Ignore Space Chars      = Y
  13. Type Ahead On           = N
  14. Screen Idle Time        = 0.20
  15. Clear Statistics        = Y        Clear Statistics on Power Up
  16. Special terminator      = 0 (^@)   0 = normal terminator processing
  17. High resolution timer   = N
```

The default settings menu.

the problem of measuring system response time with a hardware device called ISA/ResponseMaster. A box about the size of a modem, ISA/ResponseMaster intercepts terminal output to the system and system output to the terminal. Using sophisticated hardware and software technology, ISA/ResponseMaster measures response time between users and the host system. Because ISA/ResponseMaster is a hardware device, no additional load is introduced to the host system. End-user response measurements are accurate and easy to collect.

The theory behind ISA/ResponseMaster involves the measurement of a transaction. ISA claims that "the end user's viewpoint is the most meaningful measure of an application's performance." ISA/ResponseMaster is designed to measure the time between when a user enters a key sequence and when a reply is received from the computer. This may seem easy at first, but ISA/ResponseMaster must properly identify which keystrokes start a transaction and which host replies end one.

Setting Your Yardstick

ISA/ResponseMaster comes preconfigured to measure transactions in the ALL-IN-1 and ACMS environments. We tested ISA/ResponseMaster on a MicroVAX running VMS V5.3, an Emulex Performance 4000 terminal server and ALL-IN-1 V2.3.

ISA/ResponseMaster installs easily. You only need a screwdriver. An additional RS-232 cable and an RJ11/MMJ-to-DB25 adapter may also be required.

ISA/ResponseMaster supports any RS-232 terminal that uses ANSI escape sequences, i.e., all DEC terminals and clones. It supports baud rates up to 19.2 Kbps. The baud rate and all other communication parameters are controlled via DIP switches. A straight-through cable must be used to connect the terminal to ISA/ResponseMaster. The original terminal cable connects to the second port. Power is provided by an external power supply.

Once the cable connections are made, the DIP switches set and power switched

FREE WEEKENDS FOR VAX™ MANAGERS!

Not long ago, a major client called our offices for advice on improving his VAX/VMS™ disk performance.

"Right now, I spend my weekends backing up and restoring disks," he said. "If I don't, my users complain about the system's poor performance and slow response times."

Unfortunately, his situation is inherent with VMS™. It's called *fragmentation.*

DISK FRAGMENTATION

That's when files (and free space) are scattered in pieces around the disk.

Needless to say, accessing, extending and creating files takes longer than it should. Over time, a lot longer.

And cleaning up this mess in the traditional manner can take from 4 to 6 hours — per disk!

A SHIFT FROM TRADITION

Now there's a way to "defragment" your disks that's safe, easy to use, and most importantly, does so without operator intervention.

That's right! *No intervention!*

ANNOUNCING DISKEEPER/Plus the online defragmenter from Executive Software.

DISKEEPER/*Plus*™ works in the background — converting fragmented files and spaces to contiguous ones while user jobs are running — with no data loss or system intervention.

DISKEEPER/*Plus* provides dramatic performance gains in as little as two to five minutes of CPU time per day. And in most cases pays for itself within the first month of use.

Why spend weekends defragmenting disks the traditional way? For details, send the coupon below or call us today.

DISKEEPER/*Plus*.
Because you've got better things to do with your time.

Executive Software
701 N. Brand Blvd.
Glendale, CA 91203-1242

800-VAX-HELP ext. 2340
in California call: (818) 547-2050 ext. 2340

CIRCLE 246 ON READER CARD

FREE FILE FRAGMENTATION ANALYSIS UTILITY

If you are a VAX/VMS System Manager, return this coupon today and receive your FREE copy of Executive Software's Fragmentation Analysis Utility, complete with instruction manual.

If you've ever wondered

1. How many of my files are fragmented?
2. Which are my most badly fragmented files?
3. What is the average state of file fragmentation on my disks?

Now is your chance to find out, for FREE.

Executive Software
800-VAX-HELP ext. 2340

NAME _____ TITLE _____

COMPANY _____ PHONE _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

Software supplied on 9 track Mag tape.
Call if TK 50 cartridge is required.

☐ Send me info about **DISKEEPER/*Plus*** Customized Online Defragmenter, the Three Time Target Award Winning disk defragmenter for VAX/VMS.

Copyright © 1990 Executive Software International. All Rights Reserved. **DISKEEPER/*Plus*** is a trademark owned by Executive Software International. **VAX, VMS** and **VAX/VMS** are trademarks owned by Digital Equipment Corporation.

ANNOUNCING: DISKEEPER/Plus 4.0 IS AVAILABLE NOW!

on, operation can be checked by pressing the Menu button on the front panel. If ISA/ResponseMaster is connected correctly, pressing the Menu button summons the option menu (see Figure 1). The option menu also can be summoned by entering the default menu key sequence (CTRL-]) on the keyboard.

Stimulus And Response

ISA/ResponseMaster can be used for several applications, including online transaction processing (OLTP), network delay, office automation and program development. In the Lab I used it to measure ALL-IN-1 transactions and network delay.

Because ISA/ResponseMaster comes preconfigured for ALL-IN-1, it wasn't necessary to change any of the system variables for the ALL-IN-1 response testing. The 17 system variables are modified by accessing the default settings menu (see Figure 2).

I conducted the ALL-IN-1 transaction response test by writing an ALL-IN-1 script that performed 100 ALL-IN-1 tasks. The script then was executed standalone on the system to collect a baseline average response. Next I used the User Environment Test Package (UETP) to simulate a user load of 10, 15 and 20 users while executing the ALL-IN-1 test script. As expected, with each load progression the average response time increased.

For the second test, network load, it was necessary to change several parameters. These included the trigger, the number of leading characters to be ignored, and the exclusion area. A trigger is the keystroke that tells ISA/ResponseMaster to begin transaction timing. To measure network echo response time, any key could be the trigger. For forms-based products such as ACMS and ALL-IN-1, ISA/ResponseMaster can be configured to ignore leading characters (typically cursor positioning information) before watching for the transaction terminator.

To measure network response, the Skip Chars parameter must be set to zero; by default, it's set to 15. Finally, by default, ISA/ResponseMaster excludes activity to the 24th display line in measuring transactions. This is because ALL-IN-1 and most other forms-based products use the 24th line for status. Hence, output to the 24th line by ALL-IN-1 and ACMS doesn't indicate the end of a transaction. The Low/High Limit Stat Line parameters must be set to zero for this test.

To conduct the network load test, I isolated ISA/ResponseMaster on a private Ethernet network consisting of a MicroVAX, a terminal server and two PCs running DECnet-DOS/LanWORKS (formerly called PCSA). I first tested network response by pressing several hundred keyboard keys. The average host echo was 0.35 seconds. Next, I used the LanWORKS PERMIT command on one of the PCs to serve its hard disk to the other PC. I then used a wildcard file copy from one PC to the other and started the same keyboard response test. After pressing several hundred keys again, I checked the stats from ISA/ResponseMaster. The new average host echo time was 0.89 seconds.

> ***"ISA/ResponseMaster is one of those rare computer devices that works right after you plug it in and turn it on. It was almost unnecessary to read the documentation."***

ISA/RESPONSEMASTER is one of those rare computer devices that works right after you plug it in and turn it on. It was almost unnecessary to read the documentation. However, for as well-made as ISA/ResponseMaster is, I was disappointed that ISA didn't provide more examples of ISA/ResponseMaster's capabilities. For instance, the documentation doesn't mention how to benchmark ALL-IN-1, ACMS applications or any other application, for that matter. This is unfortunate, because not all users will have this expertise.

ISA/ResponseMaster is an important capacity planning and performance measurement tool. Unlike DEC's SPM, VPA and PCA software monitors, ISA/ResponseMaster precisely measures system response time and application performance without placing an additional burden on the CPU. While ISA/ResponseMaster isn't a replacement for these software products, it's a valuable tool for a professional's toolbox. ■

Emulex Corp.
3545 Harbor Blvd.
Costa Mesa, CA 92626
(714) 662-5600
CIRCLE 455 ON READER CARD

ISA/ResponseMaster

PLATFORMS: Any platform that runs RS-232/RS-423, ASCII communications, VMS, ULTRIX, UNIX or a multiuser timesharing system

PRICE: $1,295

ISA SOLUTIONS

HEADQUARTERS:
5550 W. Touhy Ave., Ste. 204
Skokie, IL 60077
(708) 677-3530

PRODUCT LINE: ISA/ResponseMaster, ISA/ResponseMaster-Host, ISA/NetMaster, ISA/SysMaster, ISA/TaskMaster

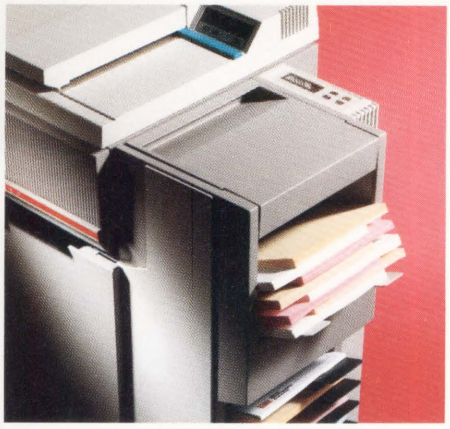
FOUNDED: 1985

OWNERSHIP: Private

BRANCHES: Chicago

CIRCLE 456 ON READER CARD

While Other Laser Printers Claim To Put Business On Paper...



The ERGOPRINT 610 Takes Care of Business

The ERGOPRINT™ 610 from BDT is the first laser printer with integrated sorting/duplicating and offset stacking.

Designed specifically for mid-range and network printing, the user-friendly 610 makes its mark on efficiency, saving both time and money, while responding to a multitude of office needs.

For a simple solution to shared-environment printing with hands-off form handling and increased productivity, put the ERGOPRINT 610 to work for you—today!

BDT ingenuity...taking care of business for you.

For more information, or VAR inquiries, call: 1-800-FIND BDT

BDT

Takes Care of Business

BDT Products Inc.
17152 Armstrong Avenue
Irvine, California 92714
Tel.: (714) 660-1386 · Telefax: (714) 474-0480

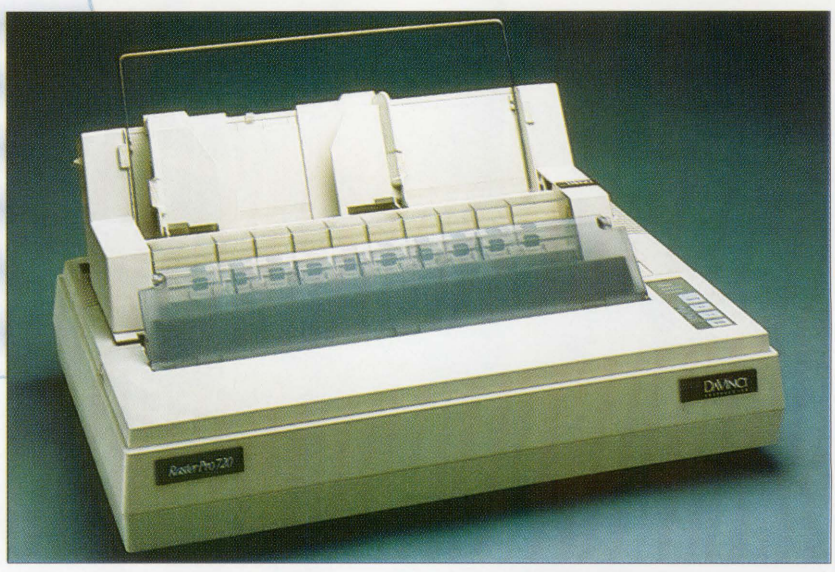
The ERGOPRINT 610 is performance personified, with...

- 6 main input drawers, 10 lockable output bins, and a 550 sheet offset stacker.
- a versatile quick-change from a 3000 cut-sheet capacity to 300 envelopes and 1100 sheets.
- capability to print legal, letter, and executive size cut-sheets — 16 to 24 lbs.
- capability to imprint on transparencies, labels, and color sheets.
- up to 5 full hours of complete unattended operation.

CIRCLE 350 ON READER CARD

PENLESS PLOTTING

Da Vinci Graphics' RasterPro 720 Penless Plotter Converts Vector-Based HPGL Plotter Specifications Into An Optimized Raster Format.



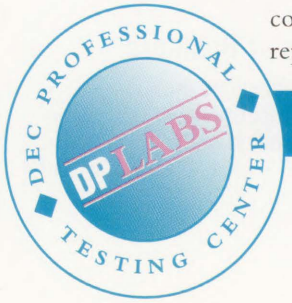
If dried plotter pens and time-consuming plots are slowing your engineering staff's efforts, consider the RasterPro 720 penless plotter from Da Vinci Graphics. The RasterPro 720 uses a 24-pin dot-matrix print/plot head to create plots and printed material. In plot mode it emulates the HP 7475A plotter and the special symbol set of the 7550A. In print mode it emulates a host of printers, including the IBM Graphics Printer and Proprinter XL and the Epson FX-80 and JX-80.

Rather than using ink pens as the recording media, the RasterPro 720 uses replaceable ribbon cassettes. The four-color fabric ribbon cassette (yellow, red, blue and black) can produce 14 colors. A black fabric ribbon cassette is available for monochrome plots.

The architecture of the RasterPro 720 enables it to perform as a high-resolution, archive-quality plotter, a check plotter for producing quick 180 or 360 degree monochrome or color drafts.

Tech Specs

The RasterPro 720 is 4.7 inches high, 22.8 inches wide and 13.6 inches deep. It uses Motorola's 68000 microprocessor as its CPU and comes standard with 1 MB of RAM upgradable to 2 MB for large



GEORGE T. FRUEH

Our VT240 terminal emulator has changed the meaning of portability.

What does VT240 portability mean to you?

- **Portable across operating systems!** Our ZSTEM 240 software runs under both MS-DOS and Unix 386 System V, making your PC look and act like a VT240/340 terminal on either operating system.
- **Portable across machines!** ZSTEM 240 runs on IBM PCs, XTs, ATs, PS/2s and compatibles, from AT&Ts to Zeniths!
- **Portable across portables!** ZSTEM 240 runs on portable PCs, letting you connect to your office systems when you're on the road.
- **Portable across video adapters!** ZSTEM 240 supports all standard video adapters: VGA, EGA, CGA, MCGA, AT&T, Hercules and many extended adapters. No matter what adapter/monitor combination you use, ZSTEM 240 displays double-high/double-wide characters, 132 columns, and VT340 ReGIS, sixel and Tektronix graphics.
- **Portable across networks!** ZSTEM 240 connects to your favorite networks, including Novell, 3COM, TCP/IP, Ungermann-Bass, Excelan, Wollongong, FTP, Sun and DEC's CTERM and LAT.

Of course, ZSTEM doesn't *really* come with a handle. What it does come with is our top-notch technical support and documentation, plus a solid warranty, so you can be assured of quality products backed by quality people. Call today about our complete line of VT emulation products.

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

Toll Free Order Desk
1-800-663-8702

KEA

ZSTEM and the KEA and ZSTEM logos are trademarks of KEA Systems Ltd. All other brand and product names are trademarks or registered trademarks of their respective holders.
©Copyright KEA Systems Ltd., 1989. All rights reserved.

CIRCLE 313 ON READER CARD

RasterPro 720

PLATFORMS: Emulates the HP 7475A plotter and supports HPGL

PRICE: $3,495

DA VINCI GRAPHICS INC.

HEADQUARTERS:
870 Hermosa Dr.
Sunnyvale, CA 94086
(408) 737-8800

PRODUCT LINE: Plotters

FOUNDED: 1987

OWNERSHIP: Private

BRANCHES: Boston

CIRCLE 538 ON READER CARD

plots. Communication with a host is through a Centronix parallel interface or an RS-232C serial interface.

In plot mode, the RasterPro 720 supports the Hewlett-Packard Graphics Language (HPGL) command set and A, B, A4 and A3 paper sizes. It plots unidirectionally and bidirectionally at 720 dots per inch (dpi) and has a draft mode selection for quick check plots. You can also plot in line widths of 0.25, 0.50, 0.75 and 1.30mm. A "long plot" capability allows plots of unlimited length to be plotted with no loss of accuracy between plot segments.

In print mode, print speeds range from 60 characters per second (cps) at 10 characters per inch (cpi) in letter quality to 240 cps at 10 cpi in high-speed draft. Character sets supported include IBM Graphics Printer with international characters and the IBM Proprinter character set.

Font types available include Courier, Prestige Elite, Draft, High-Speed Draft and Compressed. You can select from a variety of standard or proportional character spacings or program your own character spacing in 1/180-inch increments.

The Plot Thickens

The RasterPro 720 comes with a power cord, user's manual, paper guide panel and guide extenders, and color ribbon.

We configured our RasterPro 720 using the Quick Start section in the user's manual. We connected an RS-232C serial cable between the plotter and the COM1 port of our AST Premium 286 PC. The factory default settings are 9,600 baud, one start bit, 7 data bits, one stop bit and no parity.

Da Vinci Graphics supplied several demonstration plots on 5 1/4-inch floppy disks. The demonstration files were created with Autodesk's Autocad and Personal Cad Systems' Pcad to produce the necessary HPGL code for the RasterPro 720. To plot a file from disk, we issued the command:

```
COPY A:<filename> COM1 <CR>
```

The RasterPro 720 plots a drawing in two stages. First it reads the HPGL code from the PC and processes it by rasterizing the vector coordinates. During this time, no plotting takes place. Once the entire file is read and processed, the plotter plots the drawing.

We measured the processing and plotting time for the demonstration file SCHEM.HP. This file consisted of 161,838 bytes and produced a three-color detailed schematic of a single-board microprocessor. Processing took about three minutes, while plotting took about 11 minutes 45 seconds.

We also copied the PC demonstration files to our Lab's MicroVAX II using Walker Richer & Quinn's Reflection terminal emulator.

We connected the RasterPro 720 to the MicroVAX II via Datability Software Systems' Vista VCP-1000 communications server. We kept the same serial communication default parameters as with the PC and plotted the file SCHEM.HP by issuing the command:

```
PRINT/QUEUE=LTA1$PRINT SCHEM.HP
```

Processing again took about three minutes, and plotting again took 11 minutes 45 seconds.

THE RASTERPRO 720 comes with a user's guide divided into two main sections. The Quick Start section helps get your RasterPro 720 up and running immediately. The second section provides information on setting up your plotter, using the control panel, paper loading, plot mode and print mode setup, maintenance and troubleshooting. The user's guide also has an extensive appendix that describes plot and print mode specifications, interface considerations, HPGL plot commands, and plot mode and print mode fonts.

The RasterPro 720 penless plotter is ideal for electrical and electronic engineering, CAD, VLSI circuit design, construction engineering, architecture and geographic information systems. Its convenient desktop size and fast throughput make it a welcome addition to most engineering environments. ■

For More Information

AST Research Inc.
16215 Alton Pkwy.
Irvine, CA 92718
(714) 863-1333
CIRCLE 459 ON READER CARD

Autodesk Inc.
2320 Marinship Way
Sausalito, CA 94965
(415) 332-2344
CIRCLE 519 ON READER CARD

Datability Software Systems Inc.
322 8th Ave., 11th Fl.
New York, NY 10001
(212) 807-7800
CIRCLE 520 ON READER CARD

Epson America Inc.
23530 Hawthorne Blvd.
Torrance, CA 90505
(213) 373-9511
CIRCLE 521 ON READER CARD

Motorola Inc.
1301 E. Algonquin Rd.
Schaumburg, IL 60196
(708) 576-5518
CIRCLE 412 ON READER CARD

Personal Cad Systems Inc.
1290 Parkmoor Ave.
San Jose, CA 95126
(408) 971-1300
CIRCLE 522 ON READER CARD

Walker Richer & Quinn Inc.
2815 Eastlake Ave. E.
Seattle, WA 98102
(206) 324-0350
CIRCLE 422 ON READER CARD

DIVIDE AND MANAGE

Diagnostic LEDs show bridge activity for each segment or channel

Supports SNMP (Simple Network Management Protocol); Integrate with your own network management protocols

AUI drop cable connection

BNC connector for Thin Ethernet

ATI MAC layer self-learning bridges, available with SNMP support (Simple Network Management Protocol), let you divide your networks into more manageable segments. Two models include the AT-6870, a high performance learning bridge, and the AT-6875, similar to the 6870, but with the addition of SNMP support. They are designed to keep your data from traveling the backbone unnecessarily, and to help you expand your network by connecting segments or sub-networks together.

Network expansion. Connect any two segments together—thick or thin Ethernet—and transparently extend your network through ATI's bridges. All Ethernet high level protocols, such as TCP/IP, NetWare and DECnet are supported. Model AT-6875 also supports SNMP, so that it can be monitored and managed by any SNMP compatible network manager.

Better performance. Improve network performance by bridging workgroups to the backbone (partitioning), thus keeping local traffic from clogging the network. *Both bridges filter data at 25,000 pps, with a forwarding speed of 12,500 pps.* The self-improving look-up table, coupled with a spanning tree algorithm in the model AT-6875, further improves network operations.

- **SNMP management capability (AT-6875)**
- **Self improving look-up table, Spanning Tree Algorithm**
- **AUI, Thin Ethernet interfaces (IEEE 802.3, 10BASE5 and 10BASE2)**
- **25,000 pps data filter speed, 12,500 pps forwarding speed**

Special introductory offers*

AT-6870 **$1,795** (Retail $2,495) AT-6875 **$1,995** (Retail $2,995)

See us at Booth #439
INTEROP '90, San Jose, CA
October 8-12

ALLIED TELESIS INC.—*Excellence in Connectivity*
High Quality, Low Cost, Superb Service

Allied Telesis, Inc.

575 East Middlefield Road
Mountain View, CA 94043, U.S.A.
Phone (415) 964-2771 FAX (415) 964-0944

Phone us for the nearest U.S. or Canadian distributor offering volume pricing on nearly 100 ATI network building blocks.

*Introductory offer valid until 12/31/90

CIRCLE 103 ON READER CARD

Do people bet on Digital's Rdb?

"We knew we wanted a relational database. We looked at all the options and Digital's Rdb was clearly the best choice for us. It met all the criteria – performance, integrity, security and a wide variety of excellent software development tools. Rdb was a perfect match for our VAX® hardware architecture and for interoperability with other Digital layered software products. We felt Rdb was going to be a strategic product for Digital and they would dedicate the necessary resources for R&D to ensure it would continue to be the premiere relational database for VAX. We're firmly convinced this has been the case."

Al Pruden
Director of MIS
Crane Plastics
Columbus, Ohio

"Many of our customers process heavy volumes of information through our applications. Speed and efficiency are key for these systems so that our applications can provide timely information. After evaluating the performance of a number of relational databases, we found Rdb to be the most efficient production database."

Dennis Vohs
President
Ross Systems
Redwood Shores, California

"As the leading supplier of Laboratory Information Management Systems (LIMS) to the pharmaceutical industry worldwide, we are very concerned with integrating laboratory information into our clients' enterprise-wide networks. Rdb, in combination with other Digital documentation, validation and communication tools, simplifies the complex discovery process, new product development and quality assurance activities of many of our customers. Rdb is the right choice for our partners, and it's the right choice for us!"

Steven Herrick
Director, Laboratory Automation Operations
Beckman Instruments, Inc.
Allendale, New Jersey

digital™

their business You bet they do.

"Colonial's mutual fund managers use Rdb to support complex investment decisions. Since these decisions are key to our success, we need a relational database with a proven track record and very good performance. We plan to add SQL/Services and access UNIX® workstations. We're confident Rdb will be able to meet our demands."

Joseph Archer
Assistant Vice President
Colonial Management Associates, Inc.
Boston, Massachusetts

"John Deere Engine Works chose Rdb because of price, performance and integration. Rdb contributes directly to our bottom line allowing us to manage information efficiently and with less overhead. With the runtime license for Rdb included in the VMS® operating system, we can distribute applications economically throughout our organization. And Rdb has a seamless fit with Digital's CASE tools. This kind of database functionality allowed us to quickly develop a variety of shop floor applications."

Carlo Pensyl
Manager, Computer Systems
John Deere
Waterloo, Iowa

There are lots of reasons why Digital's Rdb/VMS™ database is the relational database of choice for companies with VAX systems.

On the left, you see some of those reasons. Clear examples of how our Rdb database is the perfect solution to a variety of customers' needs.

For more information on what Rdb can do for your business, call 1-800-343-4040, ext. 766.

We're sure you'll agree, too, that Rdb is the one for you.

Digital has it now.

© Digital Equipment Corporation 1990. The DIGITAL logo, Digital has it now and Rdb/VMS are trademarks and VMS and VAX are registered trademarks of Digital Equipment Corporation. UNIX is a registered trademark of American Telephone and Telegraph Company.

ULTRIX V4.0, Part 2

Philip E. Bourne, Ph.D.

Editor's note: This is the second of a two-part series on Digital 's release of version 4.0 of the ULTRIX operating system. This month we look at several features important in configuring your new operating system.

Once the ULTRIX V4.0 base system and appropriate software subsets are installed, a system administrator's thoughts must turn to customizing the system to meet site-specific needs. ULTRIX V4.0 provides a number of tools useful to the novice and experienced UNIX administrator. The command **man -k setup** introduces some of them (see Figure 1). Others may be present if a wider range of software subsets is installed.

We'll focus on four setup shell scripts: **lmfsetup**, **secsetup**, **snmpsetup** and **svcsetup**. These are new in ULTRIX V4.0 and lead us into a discussion of new features.

lmfsetup

The script **/etc/lmfsetup** can be used to register Product Authorization Keys (PAK). PAKs and the associated License Management Facility (LMF) software, a new feature of ULTRIX, aren't new to the VMS manager. They form part of the Digital Distributed Software Licensing Architecture (DDSLA), which has been part of VMS since V5.0. ULTRIX and VMS software PAKs come in two flavors: the capacity license and the per-user license. The first restricts usage based only on the CPU type and the latter only on the number of users who can simultaneously use a product.

All of DEC's ULTRIX layered products released with or subsequent to ULTRIX V4.0 must have a PAK and be registered. ULTRIX V4.0 itself requires a PAK if more than two users need to access it simultaneously. The program **/etc/lmf** (compare VMS SYS$UPDATE: VMSLICENSE.COM) is used to maintain PAKs.

Like VMS, once a PAK is registered it must be loaded into the kernel cache to be available. Each invocation of a software product checks the cache to determine whether use is authorized. There will be no surprises for the VMS system manager in maintaining and registering PAKs. However, the longstanding UNIX administrator may find it disconcerting that the early days of UNIX freeware have been replaced by a more structured and commercial approach. The ULTRIX *Guide to Software Licensing* provides information on DDSLA and the use of **/etc/lmf**.

secsetup

If the optional software subset ULTSEC040 is installed, the shell script **/etc/secsetup** can be used to establish the appropriate level of security for your ULTRIX V4.0 system. Levels BSD, UPGRADE and ENHANCED are supported. BSD maintains the standard BSD 4.2 level of security found in previous ULTRIX releases. UPGRADE offers a bridge between the original and ENHANCED levels of security. Existing users are handled in the traditional way; new users are subject to ENHANCED levels of security.

Existing users should be upgraded as soon as convenient if the highest levels of security are to be maintained. ENHANCED subjects all users to a new level of security. What does this imply? At the highest security level, the trusted path

FIGURE 1.

Name	Software/Files Configured
bindsetup (8)	Berkeley Internet Name Domain (BIND)/Hesiod service.
lmfsetup (8)	License Management Facility.
lprsetup (8)	Line printer spooler.
netsetup (8)	TCP/IP network.
nfssetup (8nfs)	Network File System (NFS).
secsetup (8)	Enhanced security features.
setupterm (3cur)	Low-level terminal setup.
snmpsetup (8n)	Simple Network Management Protocol (SNMP) Agent.
svcsetup (8)	The file **/etc/svc.conf**.
uucpsetup (8)	UNIX to UNIX Copy (UUCP).
ypsetup (8yp)	Yellow Pages (YP) .

ULTRIX V4.0 setup scripts.

FIGURE 2.

```
uid = 268
password = MXP3BnKLEWW960BEJc9DbHb6
passlifemin = 1 hour
passlifemax = 60 days
passmod = 12/20/89 - 10:24:38
authmask = login,change_password,enter_password
fail_count = 0
audit_id = 268
audit_control = or
audit_syscalls = creat,unlink
audit_tevents = login:0:1
```

***A typical temporary entry built with** /etc/edauth **before it's loaded into the file** /etc/auth.pag.*

Networkaholics

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

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

TALARIS SYSTEMS INC.®

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

Registered trademarks are proprietary to their respective manufacturers.

CIRCLE 165 ON READER CARD

feature, the audit subsystem and improved login security are enabled.

1. Trusted Path Feature — The trusted path feature is designed to prevent the capture of an unsuspecting user's password at login. For example, suppose you have a terminal in a public area. It's simple for a malicious user to write a program that appears to be the login program when executed on the public terminal when in fact it writes the user's or superuser's password to a file, simulates a login fail as if the password were mistyped, and exits. With trusted path access, the user first hits the secure attention key (Break key), whereupon all processes from that terminal, as determined by the device name, are terminated, and a clean login can be initiated.

This doesn't work for pseudo terminal connections, that is, remote logins via the network. Further, LAT users will recognize this as an inconvenience, because it interferes with the Break key function of the terminal server. The workaround for this is to redefine the terminal server attention key with the terminal server commands **set port <BREAK> remote** followed by, for example, **set port local <CTRL/A>** to reset the LAT Break key to <CTRL>/A.

2. Audit Subsystem — ULTRIX V4.0 includes an audit system that goes far beyond the standard Berkeley tools, such as the system accounting program, **/etc/sa** and the command **/usr/ucb/last**, in providing an audit trail. Audits can now be performed on specific commands and system calls. Moreover, each audit now can be for all users, a group of users or an individual. By default, the file **/etc/sec/audit_events** defines those events to be audited. This file is then used as input to the program **/etc/sec/auditmask** to define the systemwide audit mask.

Events can be audited when they fail, succeed, or both. Audit-logging is enabled for individuals with the utility **/etc/edauth**, which sets the user's audit mask in the authentification database file **/etc/auth.pag**. Figure 2 shows a typical temporary entry built with **/etc/edauth** before it's loaded into the file **/etc/auth.pag**.

Several of the fields shown in Figure 2 relate to the features of the password. Most of the other fields relate to what events are audited. The audit daemon, which must be running if auditing is to take place, is controlled by the program **/etc/sec/auditd**. Figure 3 illustrates the options that can be used with this command.

As you can see, the **auditd** program

FIGURES 3-5.

```
% auditd -h
```

-i:	host to receive audit data
-l:	local file to receive audit data
-c:	pathname (device or file) to receive auditd messages
-n:	# kbytes in auditd buffer
-a:	kerberos authentication (toggle)
-s:	network audit server status (toggle)
-d:	dump audit log buffer to file|dir|net
-k:	kill audit daemon
-p:	id # of daemon to receive command
-q:	query server for audit log pathname
-t:	timeout value for establishing remote connection
-f:	min percent free space before an overflow condition is triggered
-b:	local file to receive audit data on overflow condition
-o:	action to take on overflow condition 'a'- use alternate audit log specified via -b 'b'- shutdown system 'c'- use mounted filesystem with most free space 'd'- suspend auditing until space is available 'e'- overwrite current audit log
-?:	show status of audit daemon

Figure 3: The ULTRIX V4.0 auditd command.

```
% /usr/etc/sec/audit_tool /var/adm/auditlog.000 -B

AUID      RUID      R      E      PID
1123      0         0      0      1674:  login
```

Figure 4: A brief (-B option) summary of one audit trail record.

```
# @(#)svc.conf 2.5              (ULTRIX)              8/15/89
#
# File Format
# --------------
# database=service,service
#
aliases=local,bind              # aliases used by sendmail
auth=local,bind                 # repository of security related information
group=local,bind                # what users belong to what groups
hosts=local,bind                # list of hosts on the Internet
netgroup=local,bind             # like group but for a network of users
networks=local,bind             # types of networks on the Internet
passwd=local,bind               # user validation
protocols=local,bind            # known protocols on the Internet
rpc=local,bind                  # remote procedure calls
services=local,bind             # services available on the Internet

PASSLENMIN=6                    # minimum password length
PASSLENMAX=16                   # maximum password length
SOFTEXP=604800                  # 7 days in seconds - password expiration time
SECLEVEL=BSD                    # (BSD | UPGRADE | ENHANCED) - security level
```

Figure 5: A default /etc/svc.conf file. The file has been annotated to describe the various entries.

30 day Unconditional Return Guarantee.

No big box. No big price. Real big deal.

ETS-8
8-line Terminal Server
LAT-TCP

ETS-16
16-line Terminal Server
LAT-TCP

EPS-4
4-line Terminal Server
w/printer port
LAT-TCP

$1695 **$2495** **$1495**

Terminal servers that come in a big-big box at a big-big price can be a very big waste.

With Lantronix, you save a bundle by thinking small.

First, you save big bucks by not having to buy more lines than you really need. After all, why get a large, expensive box when a 4-, 8- or 16-line Lantronix terminal server is all you really need?

You save again with our low, low unit price. Lantronix offers quality-built concurrent LAT-TCP/IP terminal servers at the lowest cost to you.

You even can save on installation costs. Lantronix servers are so small they can be located close to your workgroups—minimizing the time, trouble and expense of cabling terminals to the server.

Think small, save big. Call to place your order today.

EPS-4 with parallel port supporting Centronics-Dataproducts interfaces.

1-800-422-7022

LANTRONIX

Call for educational, reseller and volume pricing!

Lantronix, 26072 Merit Circle, Suite 113, Laguna Hills, CA 92653, (714) 367-0050. Lantronix EPS-4, ETS-8 and ETS-16 are trademarks of Lantronix. All other brand or product names are trademarks or registered trademarks of their respective owners.

CIRCLE 140 ON READER CARD

VMS V5.4 UPDATE

In October 1989, DEC announced the Production Systems Program, a development program designed to extend the company's distributed production environments. The first result of this program is DECdtm, a set of transaction processing services bundled with VMS V5.4. The new operating system version is a critical enhancement for the VAX 9000 mainframe and VAXft 3000 fault-tolerant system.

The first feature provided by DECdtm is two-phase commit services for distributed databases and transaction processing. DEC enhanced its database products, DECtp monitors and RMS Journaling system to take advantage of the DECdtm features. The VMS MONITOR utility has also been updated to monitor DECdtm performance statistics.

Because DECdtm is part of VMS, it can coordinate actions across many heterogeneous resource managers. The coordination among resource managers can be likened to the way System Communication Services and the Connection Manager coordinate VAXcluster resources. According to DEC documentation, the resource manager approach gives users a high degree of flexibility in writing applications while ensuring that transactions are completed as an "all-or-nothing" unit of work.

According to DEC sources, DECdtm is the first set of transaction processing services to be included in a general-purpose operating system. Because VMS runs on the widest range of compatible processors, distributed database applications can now be run on the best processor for the job, from a desktop VAXstation to a VAX 9000 mainframe.

In future versions of DECdtm, DEC intends to make the DECdtm interface available for use by third-party developers. In addition, the DECdtm two-phase commit services will be extended to directly support distributed application programs, not just distributed database applications.

While DECdtm is the major enhancement to VMS V5.4, it isn't the only new feature. Two System Integrated Products — VMS Volume Shadowing and RMS Journaling — have also been enhanced. Volume Shadowing now provides fully distributed, clusterwide data availability and supports all DSA disks. RMS Journaling now supports distributed transactions through DECdtm.

In support of CI, NI and mixed-interconnect VAXcluster systems, VMS V5.4 improves I/O by supporting load balancing. CI load sharing provides the ability to share I/O traffic among multiple CI ports on the same system. Initial support for MSCP-level load balancing (static) allows I/O to be distributed in a mixed-interconnect environment.

Finally, as expected, DEC enhanced VMS security and system management features. A new definable password policy increases both control and system protection. The new password features uses a dictionary to prevent users from using words or the same password more than once. On the system management side, the SYSMAN utility can now execute command files. —*David W. Bynon, Workstations Editor.*

lets you protect against log file overflow — a likely event if using enhanced security features on a system with limited disk capacity. For example, log files can be directed to other filesystems on the local host or to remote hosts that are part of the same TCP/IP network. The latter permits you to define what DEC calls an audit hub — a single point of reference to the audit trail from multiple hosts. What do you do with this audit trail once it has been collected? The program **/usr/etc/sec/audit_tool** offers a way of summarizing audit information. Figure 4 illustrates a brief (-B option) summary of one record taken from the ULTRIX V4.0 *Security Guide for Administrators*.

The owner of the audit id (AUID) 1123 initiated a login event that was run by the real id (RUID) 0, that is, superuser. The error code associated with the event was 0, indicating that it completed successfully. Error codes are described in the man page errno(2), which proves useful when diagnosing why certain events failed — your first sign of someone attempting to misuse the system.

3. Login Security — A final note on security concerns better password control. As indicated above, ULTRIX V4.0 supports an authentification database, readable only by the superuser, in addition to the traditional **/etc/passwd** file, readable by all users. Features associated with this database, not available previously, include specifying a minimum length for a password; accepting passwords up to 16 characters long, compared with eight previously; password aging; specifying a minimum password lifetime; a password generator; and improved encryption. The **secsetup** script makes it easy for the system administrator to turn on these features.

snmpsetup

The script **snmpsetup** defines the environment for the Simple Network Management Protocol (SNMP). SNMP is used widely in the Internet community for network management. The protocol defines the role of a Network Management Station (NMS) and an SNMP Agent. The NMS exchanges messages with the SNMP Agent by means of the User Datagram Protocol (UDP) over the underlying Internet Protocols (IP). The SNMP Agent lets remote network managers on an NMS monitor and manage TCP/IP network entities specified in a Management Information Base (MIB).

With **snmpsetup**, you can configure the SNMP environment using the default MIB. Later you can modify this for site-specific needs, that is, write an Extended SNMP Agent for managing a private MIB. The ULTRIX V4.0 *Guide to Network Programming* contains information for those network administrators who need to monitor their TCP/IP-based networks closely.

svcsetup

The script **svcsetup** can be used to modify the file **/etc/svc.conf**, the database service selection and security configuration file. This file defines the type of access by services, for example Yellow Pages (YP) and BIND/Hesiod, to various database entries. Figure 5 shows a default **/etc/svc.conf** file. The file has been annotated to describe the various entries.

As you can see, by default the local host service and the BIND/Hesiod service (if enabled) have access to all database entries. As configured, the YP

The core of Mac-to-VAX connectivity.

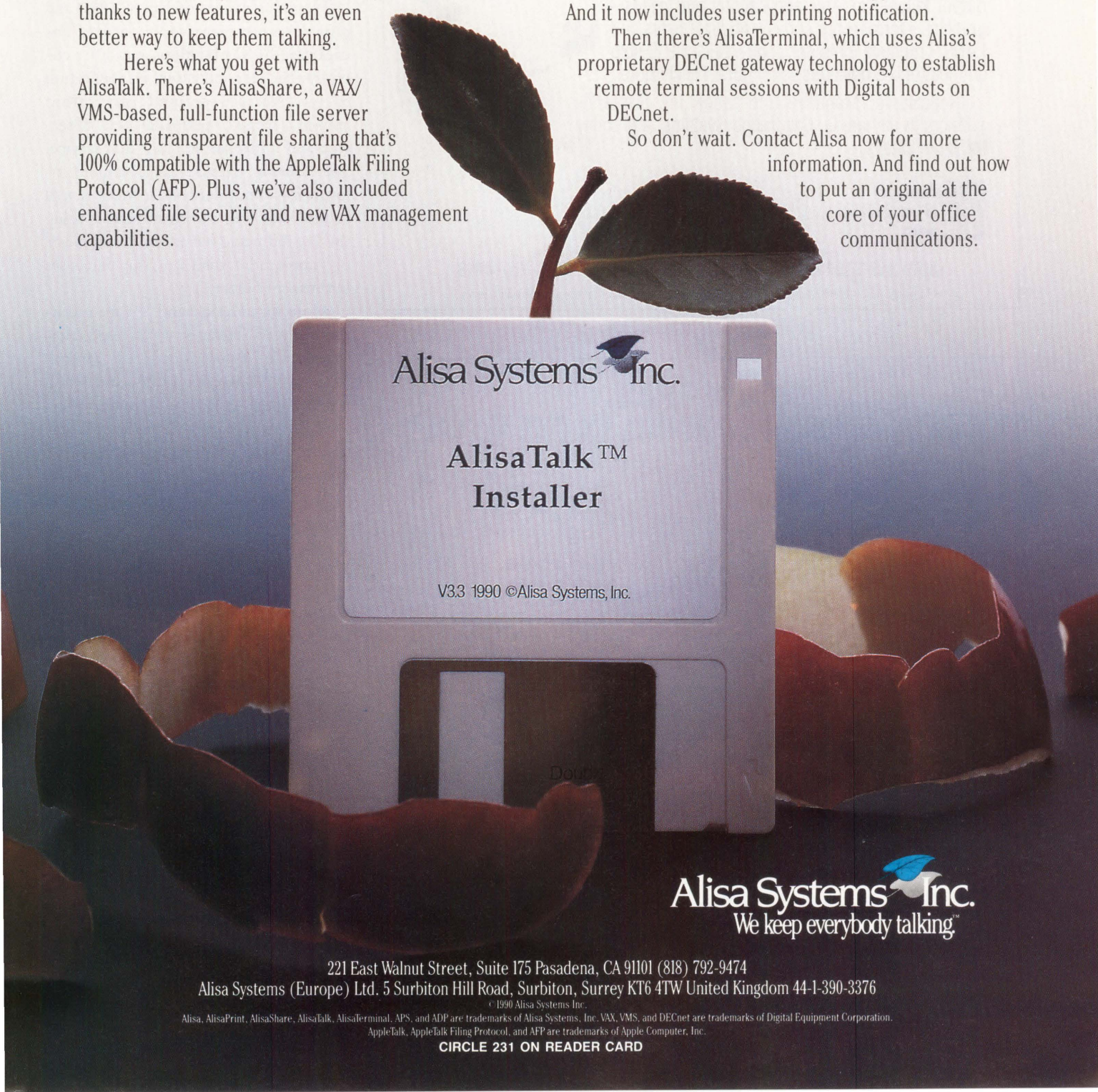
In a word, it's AlisaTalk. The software that puts AppleTalk on the VAX. It's the package that got Macs and VAXes on speaking terms in the first place. And now, thanks to new features, it's an even better way to keep them talking.

Here's what you get with AlisaTalk. There's AlisaShare, a VAX/VMS-based, full-function file server providing transparent file sharing that's 100% compatible with the AppleTalk Filing Protocol (AFP). Plus, we've also included enhanced file security and new VAX management capabilities.

Next comes the AlisaPrint System (APS), which makes it easy for both Mac and VAX users to print to PostScript devices connected to the AppleTalk network. And it now includes user printing notification.

Then there's AlisaTerminal, which uses Alisa's proprietary DECnet gateway technology to establish remote terminal sessions with Digital hosts on DECnet.

So don't wait. Contact Alisa now for more information. And find out how to put an original at the core of your office communications.



Alisa Systems Inc.
We keep everybody talking.™

221 East Walnut Street, Suite 175 Pasadena, CA 91101 (818) 792-9474
Alisa Systems (Europe) Ltd. 5 Surbiton Hill Road, Surbiton, Surrey KT6 4TW United Kingdom 44-1-390-3376

©1990 Alisa Systems Inc.
Alisa, AlisaPrint, AlisaShare, AlisaTalk, AlisaTerminal, APS, and ADP are trademarks of Alisa Systems, Inc. VAX, VMS, and DECnet are trademarks of Digital Equipment Corporation. AppleTalk, AppleTalk Filing Protocol, and AFP are trademarks of Apple Computer, Inc.

CIRCLE 231 ON READER CARD

PRINTUS MAXIMUS.

When your printing volume reaches gladiator proportions, you need the high duty cycles and low cost of ownership that are uniquely found in non-impact ion printers from Image Systems, Inc.

Print up to 250,000 pages per month with 300x300 dot-per-inch resolution, at less than 2 cents per page. Three models provide 30 and 45 page-per-minute output tailored to your applications and needs • graphics • forms • bar codes • multiple users and LANS • multiple fonts per page • DEC, HP, Diablo and Tektronix emulations • and much, much more.

MegaServe, MegaPro and MegaLine printers– winners in any arena. Call Image Systems, Inc. today for more details.

Image Systems, Inc.

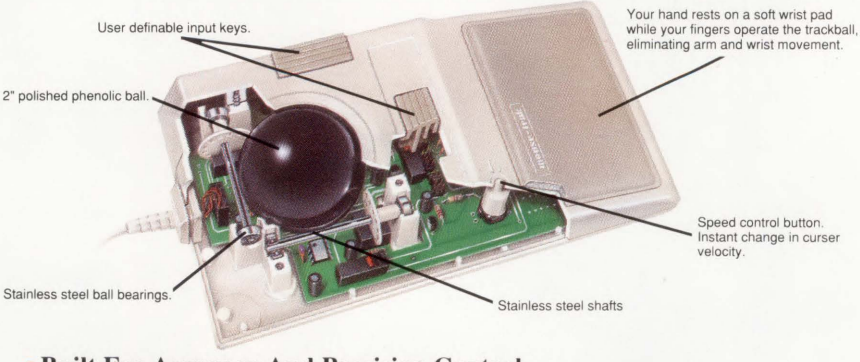
Image Systems, Inc.
2515 McCabe Way, P.O. Box 25139
Irvine, CA 92714

(800) 347-2484 Ext. 4480 • (714) 660-1421 • FAX (714) 757-4418

©Copyright 1990 Image Systems, Inc. All product names are trademarks of the respective manufacturers.

CIRCLE 305 ON READER CARD

MOUSE-TRAK. THE BEST CURSOR CONTROL IN THE WORLD



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

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

To Order or For More Information, Call Toll Free
1-800-533-4822

mouse-trak®

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

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

CIRCLE 138 ON READER CARD

service has no access to any database entries. We introduced the Hesiod name server and the Berkeley Internet Name Domain (BIND) service last month.

The BIND service is a host name and lookup service for the Internet network (configurable with the shell script **/etc/bindsetup**). It allows client systems to obtain current host names and addresses from BIND servers. There's no need for each client to maintain a current version of **/etc/hosts**.

Hesiod is layered on top of BIND and provides a name service for database entries used by workstations and other client systems. Hesiod allows an application to retrieve user-defined associations among a name, a particular type of service and information about that service. For example, Hesiod can distribute information about network services as well as host and user information. By using the Hesiod name server, you can replace or supplement many of the databases outlined in Figure 5.

Note that Hesiod and YP are mutually exclusive. That is, a password database can't be distributed by YP and Hesiod. BIND/Hesiod is the service used if the ENHANCED security option is installed. Hesiod can be thought of as extending the capabilities of YP to other types of databases, and it does so in a more secure fashion. The BIND/Hesiod service and its installation are discussed in the ULTRIX V4.0 *Guide to BIND/Hesiod Service*.

IN OUR DISCUSSION of several of the new scripts needed to configure the system, we have touched only the tip of the ULTRIX V4.0 iceberg. Once the system is correctly configured, you can begin to explore the majority of the improvements that await you below the surface.

Please send any thoughts on ULTRIX V4.0 via e-mail to SYSTEM@ CUMBG. BITNET or pbourne@cunixf.cc.columbia.edu. — *Philip E. Bourne, Ph.D., a senior associate of the Howard Hughes Medical Institute, is the author of* UNIX for VMS Users, *published by Digital Press.*

The GIANT KILLERS From SCO.

UNIX SYSTEM V AND
OPEN DESKTOP FOR
386/486 MICROCOMPUTERS.

No matter how you look at it, the SCO™ UNIX System V Operating System can be your GIANT KILLER when cost-effective workgroup solutions are required.

SCO UNIX System V allows simultaneous sharing of programs, resources and information. It turns your 386 and 486 microcomputer into a cheaper, yet powerful computing solution. A single PC doing everything a mainframe or minicomputer can do.

Over 2500 XENIX® and UNIX® Systems-based applications are available. And because SCO UNIX is non-proprietary and conforms to open system standards, it supports a full range of systems and peripherals. In fact, it supports more high performance devices than any other UNIX System. Up to 32 or more workstations with extremely quick performance.

Open Desktop™ lets you select standard, low-cost 386 and 486 PCs and turn them into instant graphical workstations. Based on SCO UNIX System V/386, it's an ideal platform for design engineering, electronic publishing applications and graphical business software.

Designed for the technical professional who demands excellent personal information management and distributed systems that integrate large, complex databases.

Thousands of DOS, XENIX and UNIX System applications are currently available and run without modification. Open Desktop includes a complete set of resources for operating system, graphical user interface, networking, database and DOS compatibility services.

Discover the multiuser and workstation solutions from SCO that companies around the world are using. Learn how your company can be a GIANT KILLER for the nineties by contacting TriLogic today.

SCO™
AUTHORIZED
RESELLER

TriLogic
R.D. #2 • Box 203A • Old Route 519
Canonsburg, PA 15317
412-745-0200
800-346-2933
FAX 412-745-5950

UNIX is a registered trademark of AT&T. SCO and the SCO logo are trademarks of the Santa Cruz Operation, Inc. XENIX is a registered trademark of Microsoft Corporation. Open Desktop is a trademark of the Santa Cruz Operation, Inc.

CIRCLE 251 ON READER CARD

DIGITAL WATCH

Brian O'Connell

A Server By Any Other Name

When is a minicomputer not a minicomputer? When it's a revolutionary server built from scratch by DEC, capable of I/O firepower double that of comparable offerings from Hewlett-Packard and IBM and available in server, timesharing, real-time and dual-host configurations. The VAX 4000, released at Boston's DECWORLD in July, promises to shake things up in the server marketplace and clarifies DEC's client/server philosophy for the '90s.

Olsen said as much prior to the announcement, scolding the media for its "premature" assessment of the demise of minicomputers. "You in the media said that minis were dead," Olsen noted. "They're not dead, they're just servers, and they both do the same thing. The VAX 4000 is the first server designed to be optimized as a server."

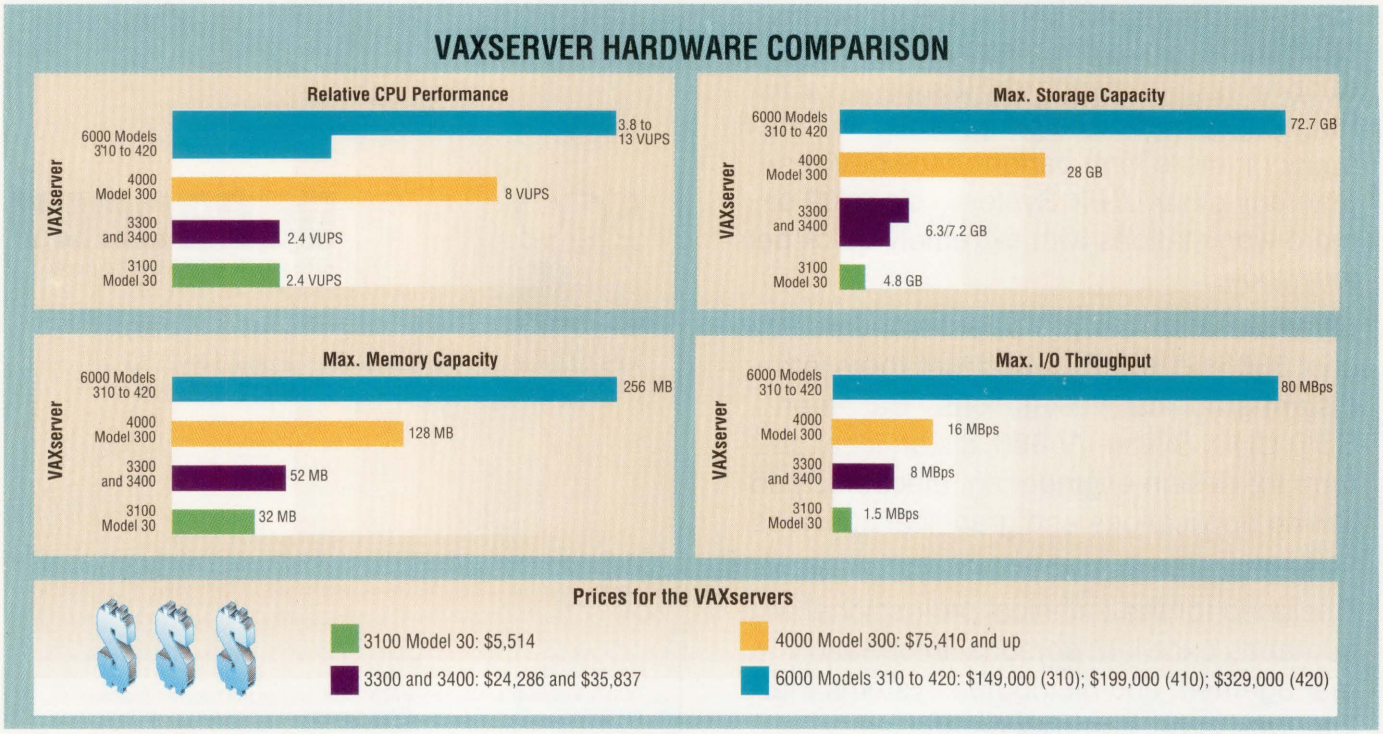
DEC is counting heavily on the 4000's success. While industry analysts concede that DEC's fourth-quarter loss of $257 million, or $2.11 per share, qualifies as a nightmare, most believe that DEC is rolling headlong into a product cycle that should boost earnings. The success of this cycle depends heavily on whether or not the early history of such products as the VAX 4000 and 9000 is written in black or red ink.

The VAX 4000 Model 300, the first in what DEC promises to be a long line of network servers that spans the VAX product line, is a deskside computer based on an 8-VUP VAX processor. The 4000 boasts three dedicated 10-mip RISC processors.

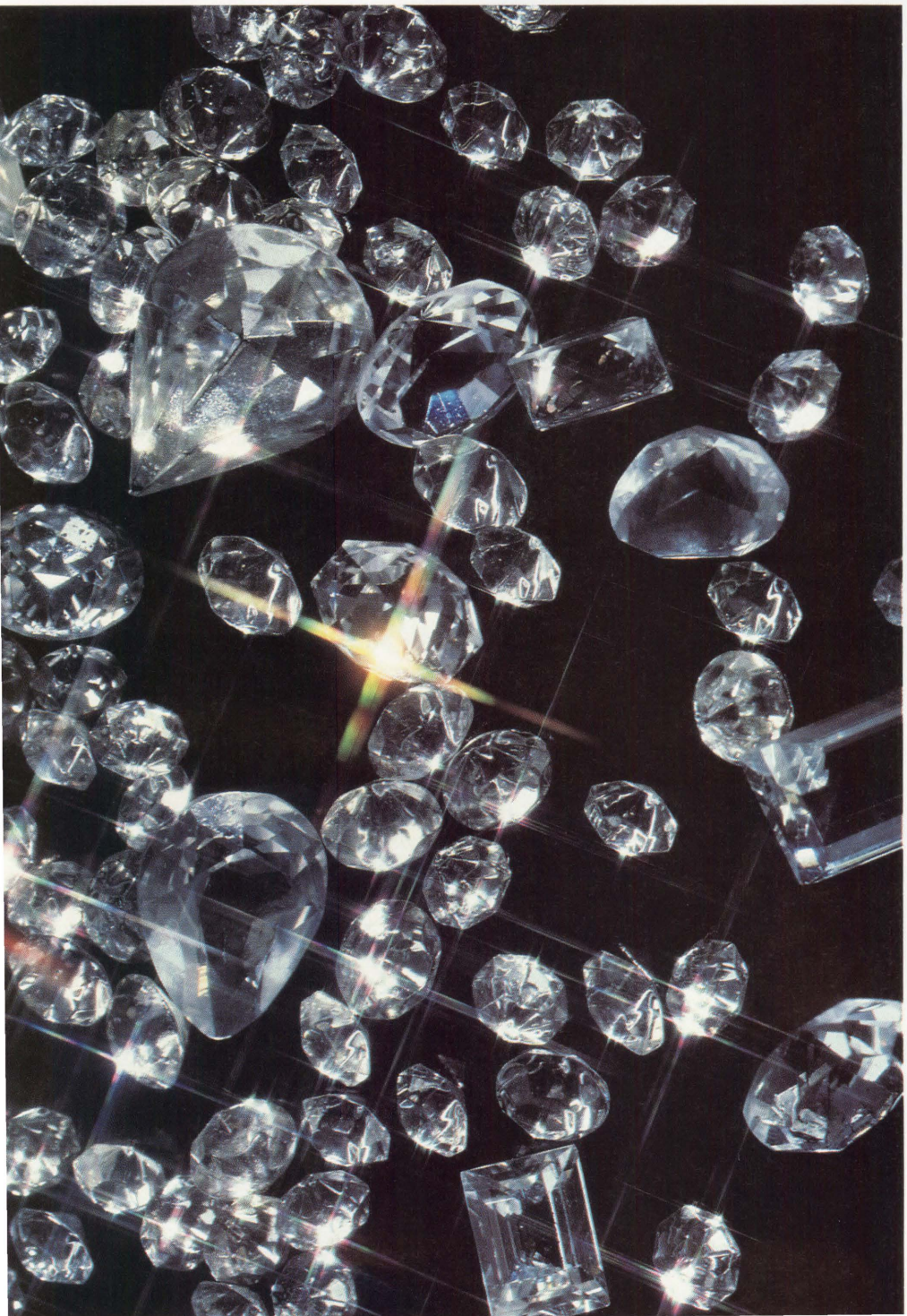
According to Lucien Philippon, manager of entry systems business product management, the VAX 4000 Model 300 can support up to 124 simultaneous ALL-IN-1 users (roughly 50 more than the MicroVAX 3900), more than 240 diskless PC clients, and 60 to 90 diskless workstations in an I/O-intensive environment.

Two embedded DSSI adapters and an embedded Ethernet interface channel managed by RISC-based processors are linked to the CPU via a dedicated internal I/O bus. The I/O adapters provide a throughput wallop of 800 I/Os per second, double that of previous VAXserver 3100s. According to DEC, the VAX 4000 boasts a 22-transactions-per-second performance, compared to the eight-transactions-per-second rate clocked in by the MicroVAX 3900.

VAX 4000 ECC memory is expandable from 32 MB to 128 MB in increments of 32 MB, twice that of the MicroVAX 3900. Disk storage is expandable to 28 GB, 7 GB for each of four DSSI adapters. Currently, the only DSSI disk drive that DEC offers is the 381-MB



When It Comes To Digital, Nobody Offers You More Software Solutions Than We Do.



The average Digital software vendor offers 4 products.

We offer 44.

44 comprehensive, integrated Digital software solutions that cover all of your needs from Information Management to Systems Management to Business Applications.

digital™ Cooperative Marketing Program

Each and every solution is engineered specifically to exploit your VAX/VMS environment to the fullest—and it shows. Our VAX database solution for example, is the industry's best. It beats the competition in terms of reliability, performance, and manageability.

Of course, other environments and distributed processing are important to you too and we deliver more here as well. With our Computing Architecture For The 90s (CA90s), you can run on Digital—and across other major hardware platforms to get the freedom and flexibility you need. CA90s also enables you to migrate to new technologies without abandoning the proven technology you rely on today.

CA90s

So no matter what kind of software you need: Information Management, Systems Management, or Business Applications, find out what the world's leading independent Digital software vendor has to offer you.

Call 1-800-645-3003 and find out why CA's Digital software solutions are a cut above the rest.

COMPUTER ASSOCIATES
Software superior by design.

© 1990 Computer Associates International, Inc.
711 Stewart Avenue, Garden City, NY 11530-4787
VAX and VAX/VMS are registered trademarks of the Digital Equipment Corporation.

CIRCLE 110 ON READER CARD

Hewlett-Packard Cries Foul

It looks as if DEC and Hewlett-Packard won't be exchanging Christmas cards again this year. HP is steaming over the figures released by DEC at the VAX 4000 announcement, figures HP argues rely on inaccurate information that shows price and performance superiority of the VAX 4000 Model 300 over the HP 3000 Series 922, 932 and 949.

Specifically, HP is accusing DEC of misrepresenting the price of its 3000 Series systems and botching HP's track record on estimated mips ratings, number of active users supported, maximum memory and dual-host availability.

According to HP marketing manager Jon Goulden, DEC's VAX 4000 comparison research was an uninspired effort. "Digital has a responsibility to publish correct numbers," says Goulden. "Had they attempted to call us, we would have been more than happy to comply and verify their numbers before they went to press. They were really stretching."

Lucien Philippon, DEC's manager of entry systems business product management, disagrees. "HP was aware of what we were doing," he explains. "We conducted extensive studies on the material we published and checked every reference. We based our information on data that HP had published to the world [through TPC-A benchmark results], and we believe we are accurate on all accounts. There was nothing malicious on our part."

The Transaction Processing Performance Council (TPC) of Fremont, California, founded in 1988 by industry analyst Omri Serlin, comprises 34 members from leading computer companies. TPC-A is the new industry-standard benchmark for OLTP performance.

DEC is at least guilty of supplying customers with dated prices on the HP 3000 Series 922, 932 and 949 computers. In its VAX 4000 release, DEC listed a price of $93,000 for the 922, $130,000 for the 932 and $245,000 for the 949 (with a standard 32 MB of memory) based on February 1990 numbers, according to Philippon. As of July 1, HP had revised its pricing structure for these products to $70,000 for the 922, $89,500 for the 932 and $266,000 (with a standard 64 MB of memory) for the 949.

Philippon argues that it's HP's responsibility to notify the TPC of price changes, something HP failed to do. But Goulden disagrees, claiming that with new benchmarking procedures price changes on products can be made without notifying the TPC.

HP is also crying foul over DEC's interpretation of HP's mips ratings on the HP 3000 product line. Instead of an estimated rating for the 922 of 3.8 mips, HP claims that a figure of 10 mips is closer to the truth. DEC also claimed a rating of 6 mips for the 932 and 12 mips for the 949. HP claims the correct calculations are 15 and 28 mips, respectively. As for users, DEC claims 50 for the 922, 75 for the 932 and 100 for the 949, as opposed to 124 for the VAX 4000. Not so, says HP: try 152, 240 and 400, respectively. As for maximum memory, DEC states that the 922 (64 MB), 932 (64 MB) and 949 (96 MB) fail to stack up against the VAX 4000 and its 128 MB of memory. Try again, says HP, which claims that actual memory figures for the 922, 932 and 949 are 128 MB, 128 MB and 192 MB, respectively.

In addition, DEC's claim that HP has yet to release a true fault-tolerant product is in question. HP claims that its SPU Switchover/XL hardware failure detector and its Mirrored Disk/XL application downtime eliminator were available at the time of the VAX 4000 announcement.

HP also claims that it hasn't heard from DEC since mid-July, when DEC called requesting more information on HP 3000 products. DEC feels that the matter is closed.

Meanwhile, the giggling you hear from the vicinity of Armonk, New York, is only beginning to subside. —*B.O.*

half-height RF31, which sells for $8,800. According to Philippon, DEC has developed a 1.2-GB 4mm DAT drive that offers speedy high-capacity backup. "We wanted to get at programs and applications and not be bogged down by the CPU," he said.

"The evolution of the VAX 4000 is made up of many things," explained Philippon. "We recognized up front that the server environment was in need of a disk and communications I/O. We placed higher-speed DSSI microprocessors instead of separate cards on the Q-bus, using 10-mip RISC chips yielding 800 I/Os per second each. To achieve performance like this, you need as many open channels as possible."

But what of the MicroVAX 3800 and 3900, the VAX 4000's first cousins and predecessors? Thanks for the memories, says Philippon. "You can't call an 8-VUP system that handles hundreds of users a 'micro.'"

According to William R. Demmer, DEC vice president of VAX/VMS systems and servers, the VAX 4000 "virtually renders the MicroVAX 3900 obsolete" with major I/O performance improvements, double the CPU performance, and little or no change in system pricing.

"When you look at the VAX 4000 and the power it packs, you may be surprised at its size," said Demmer. "It takes up less than 15 percent of the floor space of a comparable IBM AS/400. And it uses less power than your average toaster. But making toast is about the only thing it doesn't do."

Historically, MicroVAX users have sidestepped the ULTRIX bandwagon. DEC isn't planning an ULTRIX version of the 4000, according to Philippon. "In light of RISC/ULTRIX research funding, we feel that the customer needs faster processors on a RISC architecture. ULTRIX users are more interested in fast mips processing performance per dollar."

If DEC's last financial statement is any indication, the company could use some good news in a hurry. But DEC is sensitive to charges that products such as the VAX 4000 represent a "high-noon" scenario in which sales of one or two products are used as a barometer for the company as a whole.

"Yes, we are betting on the success of the 4000," said Philippon, "but not more than any other product." According to Demmer, DEC had already received 1,000 orders for the VAX 4000 before the announcement date and had shipped 500 systems. DEC also announced the VAXserver 6000, a lower-priced server configuration of the VAX 6000.

LAN Marketplace

Also present amid the VAX 4000 hoopla at DECWORLD was DEC's unveiling of a family of Fiber Distributed Data Interface (FDDI) products and its Digital Management Control Center (DECmcc) program. In FDDI, DEC introduced an intelligent network concentrator, a translating bridge, a LAN adapter and FDDI management software. All releases adhere to the technology underlying DEC's proprietary FDDI chip, which will be manufactured by Motorola and Advanced Micro Devices as part of a joint licensing agreement among the three outfits.

"Any client system can access any server system via FDDI," said William R.

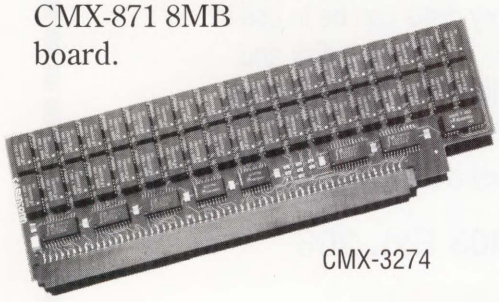
AVAILABLE NOW

First 32MB memory for DECstation 5000.

Only Camintonn can boost system memory to 480MB.

Camintonn's new CMX-3274 is the first 32MB ECC memory expansion board available for the DECstation/DECsystem 5000. And it's available now.

If your power needs are a bit more modest try Camintonn's CMX-871 8MB board.



CMX-3274

Workstation	Max. System Memory	Camintonn Memory
DECstation 5000 DECsystem 5000	480MB	32Mbyte 8Mbyte
DECstation 3100 DECstation 2100	24MB	4Mbyte
VAXstation 3100 VAXserver 3100 MicroVAX 3100	32MB	24Mbyte 16Mbyte 12Mbyte 8Mbyte 4Mbyte
SUN SPARCstation	64MB	4Mbyte 1Mbyte

The CMX-3274 and CMX-871 are 100% DEC compatible. And like all Camintonn memory boards, they come with a lifetime warranty and a 24-hour replacement policy.

Check the chart. Camintonn offers a wide range of DEC and Sun workstation memory products. We also offer memory and communications products for MicroVAX II, III and MicroPDP systems.

Call, write or FAX Camintonn for our free product guide.

CAMINTONN
CORPORATION

Leveraging your computing investment.

(800) 843-8836

22 Morgan, Irvine, CA 92718-2022
(714) 454-6500, FAX (714) 454-6599

All trademarks acknowledged. ©1990 Camintonn Corporation.

CIRCLE 242 ON READER CARD

For More Information

Access Technology Inc.
2 Natick Executive Park
Natick, MA 01760
(508) 655-9191
CIRCLE 461 ON READER CARD

Advanced Micro Devices
P.O. Box 3453
Sunnyvale, CA 94088
(408) 970-9700
CIRCLE 514 ON READER CARD

Ingres Corp.
1080 Marina Village Pkwy.
Alameda, CA 94501
(415) 769-1400
CIRCLE 515 ON READER CARD

Motorola Inc.
1301 E. Algonquin Rd.
Schaumburg, IL 60196
(708) 576-5518
CIRCLE 412 ON READER CARD

Oracle Corp.
20 Davis Dr.
Belmont, CA 94002
(415) 598-8000
CIRCLE 462 ON READER CARD

Raxco Software Inc.
2440 Research Blvd., Ste. 200
Rockville, MD 20850
(301) 258-2620
CIRCLE 463 ON READER CARD

Ross Systems
555 Twin Dolphin Dr.
Redwood City, CA 94065
(415) 593-2500
CIRCLE 464 ON READER CARD

Verity Inc.
1550 Plymouth Ave.
Mountain View, CA 94043
(415) 960-7600
CIRCLE 492 ON READER CARD

Vitalink Communications Corp.
6607 Kaiser Dr.
Fremont, CA 94555
(415) 794-1100
CIRCLE 420 ON READER CARD

Johnson, vice president of telecommunications and networks. "Sixty percent of our existing customer base relies on the client/server architecture. We have chosen FDDI as our next-generation LAN technology to accommodate the growing population of systems and networks in client/server computing."

FDDI is the international standard for high-speed LANs. It boasts a bandwidth of 100 Mbps, 10 times the speed of Ethernet. A link can be established between existing Ethernet LANs by using FDDI as the backbone network. FDDI can link computer networks over 100 kilometers, according to Carl Piper, DEC FDDI marketing manager.

DEC's FDDI releases include the DECconcentrator 500, its FDDI cornerstone. It attaches devices such as workstations and bridges to a 100-Mbps dual-ring FDDI backbone. The DECconcentrator 500 accommodates up to 12 single attachment station (SAS) interconnections.

The DECbridge 500 provides the interconnection between a 10-Mbps IEEE 802.3 Ethernet LAN and a 100-Mbps FDDI backbone via the DECconcentrator 500. It filters traffic at a rate of 461,309 packets per seconds (446,429 FDDI and 14,880 802.3 Ethernet).

The FDDIcontroller 700 links the DECstation 5000 to high-performance FDDI LANs, offering up to a 100-Mbps bandwidth to allow customers to build tightly coupled FDDI workgroups of workstations and servers.

The DECelms FDDI management software, available on VMS V5.2 and later, manages 802.3 Ethernet and 100-Mbps LAN devices from a single management site in the network. DECelms software allows network managers to configure and manage a DECconcentrator 500 and any LAN bridge in an ex-

MEMORIES ARE MADE OF THIS!

VIRTUAL DISK from **Bear Computer Systems** is a virtual miracle -- two products in one. A combined memory disk and virtual disk driver, it diagnoses and treats a variety of VAX/VMS* user problems, such as file access and disk space limitation. The memory disk greatly accelerates I/O-bound applications without program modifications, and increases read/write operations at memory transfer rates up to 800%. Multiple memory disks can be in use in memory simultaneously, requiring no souce code modification. Both virtual disk and memory disk appear as an "extra disk drive," but actually use either the virtual memory or space on an existing disk drive. **VIRTUAL DISK** -- a virtual necessity!

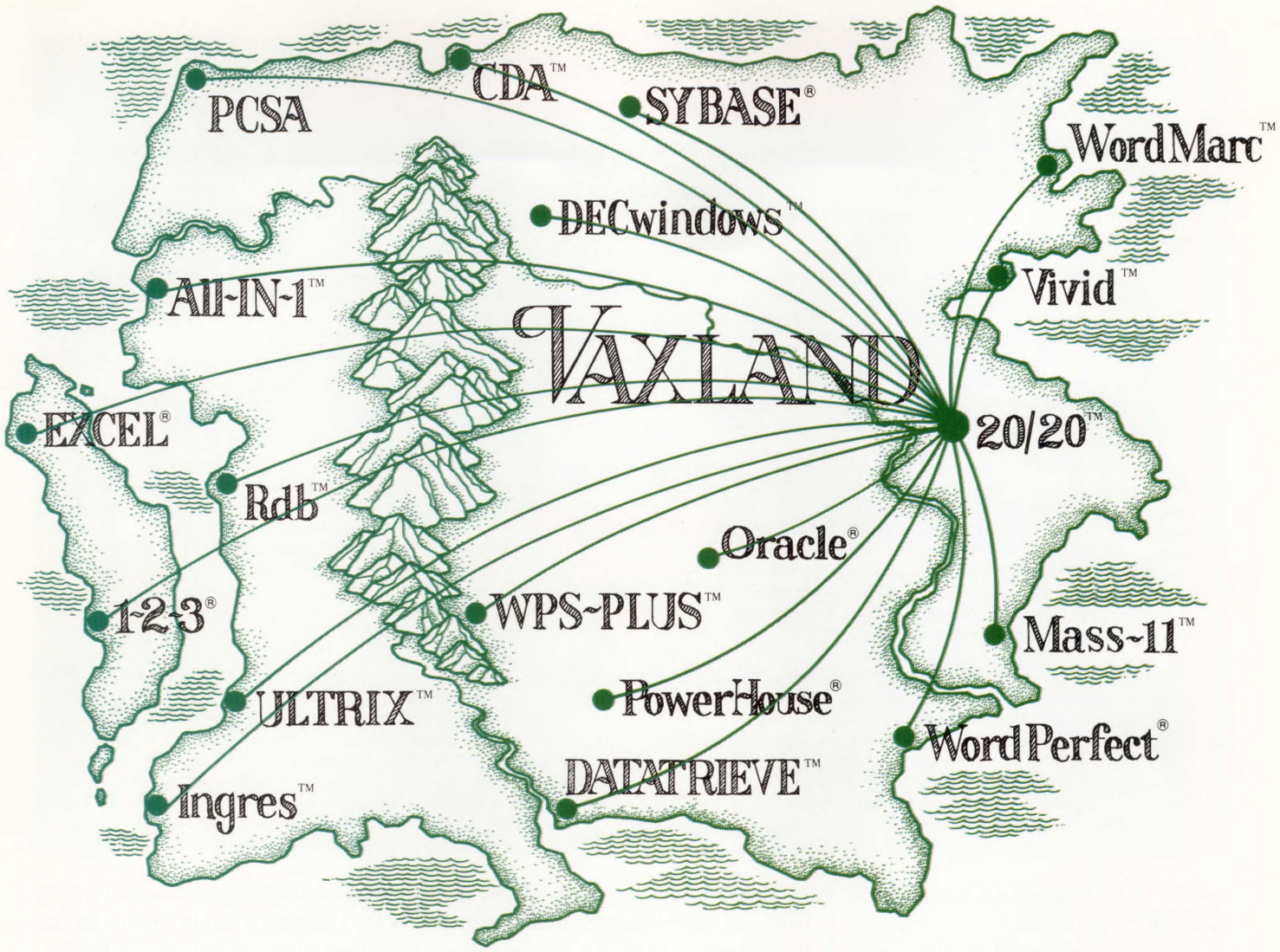
Call today for information about your free product demo package!

800•255•0662 Ext. 208 OR 818•341•0403 Ext. 208

Bear Computer Systems, Inc., 9346 De Soto Avenue, Chatsworth, CA 91311

*VAX/VMS is a registered trademark of Digital Equipment Corporation.

CIRCLE 272 ON READER CARD



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

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

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

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

Using simple menus and prompts, you'll bring data from any number of databases directly into your spreadsheets—perfectly formatted, ready for analysis. Likewise, 20/20 makes it easy to incorporate spreadsheet data into your word processing documents, and vice versa. Not to mention the fact that 20/20's consolidation capabilities let you perform spreadsheet roll-ups incorporating 20/20, Lotus 1-2-3® and Excel models.

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

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

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

Access Technology
A CompuServe Company
20/20™

Trademarks are the property of their respective holders.

CIRCLE 178 ON READER CARD

Disaster Tolerance Technology

Disaster Relief — VAXcluster managers who lie awake at night worrying about earthquakes, hurricanes, terrorist attacks and other disasters that result in system failures can now rest easier — for a price. DEC has developed a technology that virtually ensures zero response time to VAXclusters affected by an unforeseen event such as a blackout or a flood. DEC's "disaster tolerance" computing technology integrates advances in VAXcluster technology with the FDDI networking standard.

As FDDI possesses a greater bandwidth than Ethernet, businesses can now spread a single VAXcluster system over a greater distance than is possible with the Network Interconnect. DEC's initial implementation of FDDI will support distances of up to 2km between stations and a maximum ring circumference of 100km. If you're willing to invest in another data center within 100km of your current one, a VAXcluster spread across two data centers is guaranteed by DEC to remain up and running if either data center is knocked out during a disaster.

Virtual Terminal Xing— Five months after the VT1000 began shipping, DEC has expanded the features of its first X terminal with the introduction of the VT1200. New features include a customize security window that lets you secure that window as well as all terminal manager customize windows. In addition, the Video Terminal Emulation (VTE) customize windows have the ability to be read-only, allowing the customize screen to be viewable while the OK and APPLY buttons remain inactive. A pause feature lets you blank the screen and resume sessions by entering a password.

The VT1200 is designed to be connected directly to an Ethernet LAN, eliminating the need for a dedicated serial interface or terminal server. It comes standard with 2 MB of memory expandable to 4 MB.

The VT1200 offers a choice of a 15-inch monochrome monitor (1,024 x 864) quantity-priced at $2,695 and a 19-inch monochrome monitor (1,280 x 1,024) quantity-priced at $3,395. It's also available with a 19-inch exclusive electroluminescent flat-panel monitor for $13,995. Upgrades from the VT1000 are available at no cost.

Access And DEC Spread The Wealth — Eight years after a lucrative agreement was inked allowing DEC to market Access Technology's popular 20/20 spreadsheet, both companies have decided to go to the well once again in another distribution agreement. This time, Access has agreed to let DEC distribute its 20/20 Database Connection and 20/20 Word Processing Connection. DEC also holds the full licensing, support and servicing rights for all Access products to which it has distribution rights.

Vitalink Hooks Up With DECnet — Vitalink Communications has announced it will add DECnet Phase IV support to its Transpath family of bridges and routers. DEC will provide Vitalink with Phase IV routing code and documentation as well as network management code and technical support to assist in the development of a Phase IV router. DEC and Vitalink spent six years co-researching development technology for remote bridging, Spanning Tree Protocol, DEC's EMA program and the DECnet Phase IV implementation.

Ross Links With Digital And Raxco — Ross Systems announced that DEC has agreed to a marketing alliance allowing the two firms to comarket Ross accounting application software products. Ross will integrate key DEC products within its product line. Ross will also implement Network Application Support (NAS) software, which includes DECforms, DECwindows and DEC/EDI.

In a related development, Ross has announced a distribution agreement with Raxco Software that grants Ross the right to market Raxco's Raxmaster and Raxmanager software products.

Verity-Oracle Agreement — Verity and Oracle have embarked on an agreement that will install Verity as an Independent Software Vendor (ISV) for Oracle's Desktop Products Division. As an Oracle ISV, Verity will continue the development and maintenance of the Topic SQL-Bridge interface to Oracle RDBMS desktop platforms, including DOS, OS/2 and the Mac operating system. Verity's Topic SQL-Bridge enables Oracle users to access unstructured text and image data not linked with Oracle. B.O

—Eric Schoeniger, Assistant Editor/Articles, contributed to this report.

tended 802.3 Ethernet LAN and FDDI network environment.

DECelms is expected to play a significant role in the DECmcc management station product line, also announced at DECWORLD. DECmcc is DEC's architecture that allows multivendor networks to be managed as a single computer center. DECmcc is based on the Enterprise Management Architecture (EMA), DEC's blueprint for managing all elements of a distributed information environment.

DEC released the DECmcc Director for VMS, its first implementation of an EMA-compliant management system designed for DEC and non-DEC networks, systems and databases. The DECmcc Director software package, integrated with each DECnet-VAX license, is made to order for companies seeking to clamp down on costs, because users need to be trained only once on the program.

The software package includes the Executive, the Management Information Repository and the Applications Programming Interface, which are layered on top of an RMS database. They combine to manage DEC and non-DEC entities, such as the DECnet/OSI Phase V Access Module (AM), DECnet Phase IV AM and Registration Functional Module (FM), and segregate them into manageable domains.

DEC also offers the DECmcc Management Station ULTRIX software package, which enables network managers to remotely manage network devices on either a TCP/IP or a DECnet Phase IV network. It provides a DECwindows graphical map user interface based on the X Window System and includes an Ingres SQL relational configuration database for storage and retrieval of data.

DEC consolidated its current suite of network management products into a single software package called the DECmcc Management Station for VMS V2.0. Version 2.0 will be offered for two configurations: the DECmcc Site Management Station (SMS) for LAN management and the DECmcc Enterprise Management Station (EMS) for enterprise environment management. DECmcc software will eventually segue to full EMA compliance, with V2.0 now including the DECmcc Basic Management System and the optional DECmcc DECnet Diagnosis FM and replacing the Remote Bridge Management Software (RBMS) with DECelms LAN software.

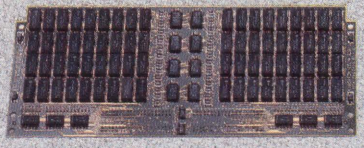
DEC'S FIRST ATTEMPT to shed its minicomputer image is found in the VAX 4000. Never one to shy from a fight, Olsen apparently has decided to plunge headlong into the '90s with a full slate of client/server products that will change the face of DEC — but with one eye on the bottom line, so as not to lose face with shareholders. ■

EXPAND
Your Memory

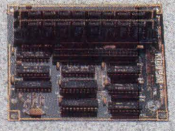
Let Kingston Blow Your Mind with our quality memory upgrades... fully compatible, guaranteed for life and cost-effective. What else could you ask for your growing DEC VAXstation or DECstation?

For a system expanding experience, call us at (714) 545-6887.

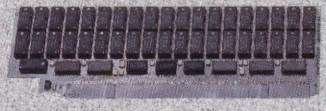
DECstation 5000 Expansion Boards!



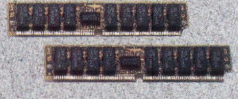
VAXstation 3100
8, 12, 16 MB Memory Expansion Boards



VT1000/1200 Terminals
1 MB Memory Upgrade



DECstation 5000
8, 32 MB Memory Expansion Boards



DECstation 3100
4 MB Memory Upgrade

Kingston
TECHNOLOGY CORPORATION

Manufacturers of a full line of memory products for:
Apple • AST • AT&T • Compaq • Epson • HP • IBM • NEC • Silicon Graphics • Sun • Toshiba • Zenith
Brand names mentioned are trademarked by their respective holders.

3023 South Harbor Boulevard • Santa Ana, California 92704 • (714) 545-6887 FAX (714) 545-2176

CIRCLE 269 ON READER CARD

Genuine 486™ System... Amazing 386™ PRICE!

Yes, full powered 80486 computer systems with all the traditional Northgate features and performance.

And a price that says "BUY NOW!"

$6,199.00

Delivered to Your Home or Office

YOU CAN'T IMAGINE WHAT SPEED REALLY IS until you have Northgate's new Elegance 486 under your fingertips. Feel the power! It delivers everything a 486 should do ... **AND MORE!** Applications—even CAD—appear on the screen almost before you release the keys. Gone is the aggravation of waiting!

Sizzling performance requires the hottest components ... and that's what Northgate delivers.

486 processor combines the capabilities of an enhanced 386, fast 387 math coprocessor, an advanced cache controller and 8K of supporting static cache memory. Result? Incredible processing speed!

Now add in Northgate's new proprietary motherboard. Unique design maximizes the power and features of the 486 processor.

And look at this! A Maxtor 200Mb hard drive. Breaks performance barriers with 15MS speed ... yet doesn't make a peep.

Impressed? There's more. 4Mb of RAM (expandable to 16Mb). And 64K of 25NS read/write-back cache (expandable to 256K). Of course, it comes with a Northgate *OmniKey*™ keyboard—your choice of PLUS or ULTRA models.

PLUS, Northgate has a full range of expansion options! Monitors, hard drives, tape backups, memory cards, printers, modems, and more. Custom configure the system that's right for you.

Use a Northgate 486/25 for 30 days. If it fails to do everything we say, just return it.

Special 486/33 Upgrade Offer

Buy your Elegance 486/25 now. And when you need more processing power, we'll upgrade it to a 486/33MHz for just **$1500.00!**

ORDER TODAY! Be sure to ask about custom configurations, leasing and financing programs.

CALL TOLL-FREE 24 HOURS A DAY

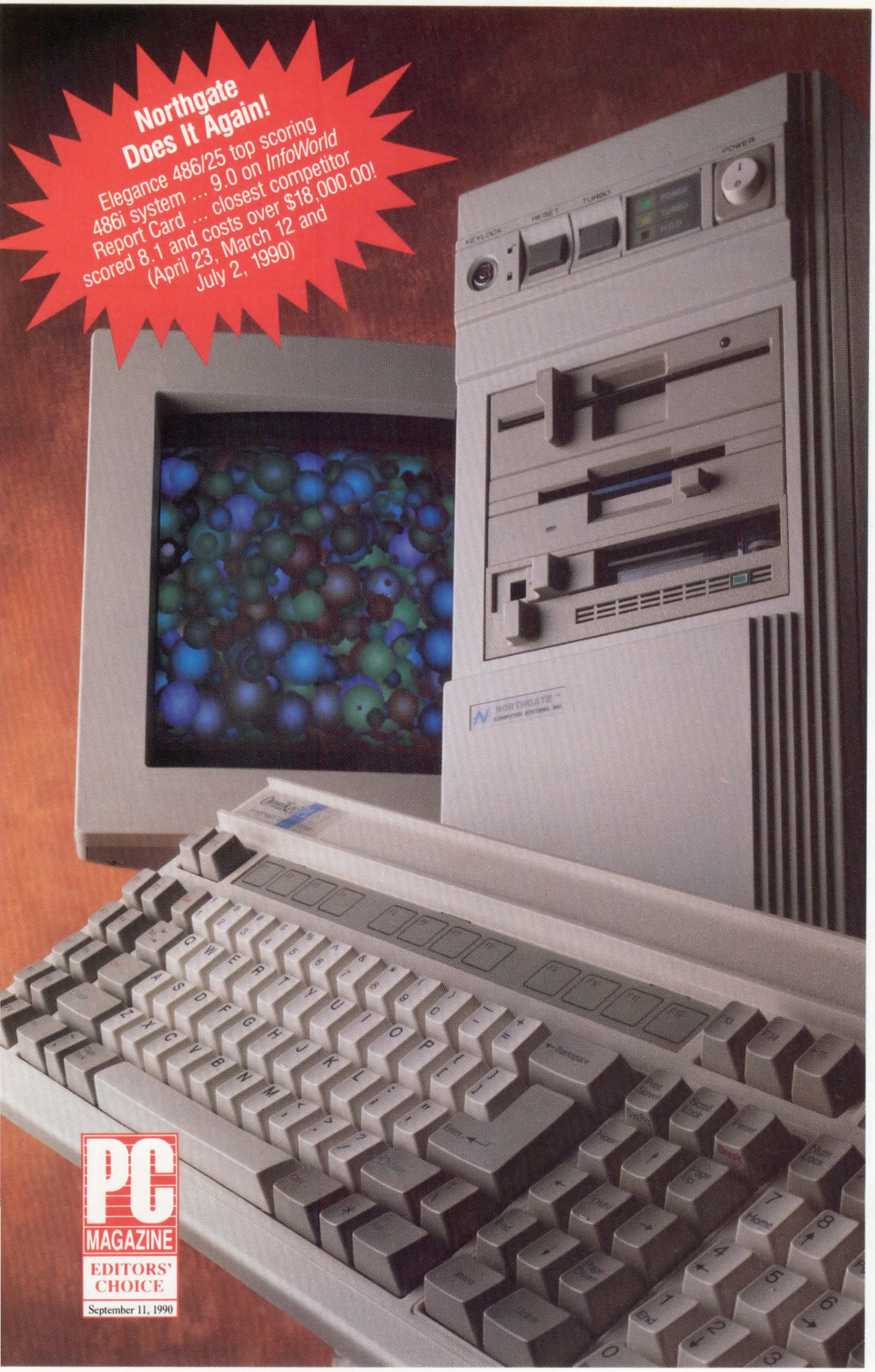
800-548-1993

Notice to the Hearing Impaired: Northgate now has TDD capability. Dial 800-535-0602.

NORTHGATE COMPUTER SYSTEMS™ *"We hear you!"*

7075 Flying Cloud Drive, Eden Prairie, MN 55344

Financing: Use your Northgate Big 'N' revolving credit card. We have millions in financing available. We accept Visa and MasterCard, too. Lease it with Northgate, up to five-year terms available.



Elegance™ 486/25 system configuration

- 25 MHz Intel 80486™ processor with 80387-compatible floating point coprocessor
- Industry Standard Architecture (ISA) bus
- 4Mb of 32-bit DRAM (expandable to 8Mb on the motherboard; total system RAM expandable to 16Mb with an optional memory card)
- Proprietary, U.S.-made motherboard
- 200Mb Maxtor hard drive with 15 MS access time
- 64K SRAM read/write-back cache (optional 256K cache available)
- High density 1.2Mb-5.25″ and 1.44Mb-3.5″ floppy drives; also reads, writes and formats low density disks
- Eight expansion card slots; one 32-bit, six 16-bit and one 8-bit
- Weitek numeric co-processor support
- Two serial and one parallel ports
- 14″ monochrome monitor
- Hercules compatible video controller
- MS-DOS 4.01 and GW-BASIC software; Smart Drive disk caching software
- On-line users guide to system and MS-DOS 4.01
- 220 watt power supply
- Elegance 7 drive-bay custom tower cabinet pictured (desktop style available)
- Clock/calendar with 5 year battery backup
- Your choice of exclusive award-winning *OmniKey*/PLUS or ULTRA keyboard
- Park utility
- Front mounted controls for high/low speed operation, system reset, and keyboard lockout
- Total compatibility with all of your existing AT peripherals and I/O boards
- FCC Class B Certified

Superior Northgate Support

Famous 30-Day Performance Guarantee. Northgate backs every system with our famous no-risk policy. If you aren't 100% satisfied, return it—no questions asked.

Warranties. Your system is covered by a 1-year limited warranty (5 years on keyboard). If a part fails, we'll ship a new one overnight at our expense—before we receive your troubled part.

Industry's Best Unlimited Toll-Free Technical Support. February 7, 1990, *BYTE* Magazine, Dr. Jerry Pournelle,* on Northgate technical support ... "has become the standard that other mail order computer companies must match."

Our system consultants are on duty 24 hours a day, 7 days a week to answer your questions. **On-site service** is available to most locations if we can't solve your problems over the phone.

Prices and specifications subject to change without notice. Northgate reserves the right to substitute components of equal or greater quality or performance. All items subject to availability.

©Copyright Northgate Computer Systems, Inc., 1990. All rights reserved. Northgate, *OmniKey* and the Northgate 'N' logo are registered trademarks of Northgate Computer Systems. 80386 and 80486 are trademarks of Intel. All other products and brand names are trademarks and registered trademarks of their respective companies.

CIRCLE 278 ON READER CARD

COCT90.DOC

VAX C And Program Sections, Part 1

LET'S C NOW

Rex Jaeschke

Editor's note: Programs running under VAX/VMS involve program sections, and while you can program successfully without knowing anything about them, some knowledge can help you exploit VAX C. In this two-part series, C Editor Rex Jaeschke explains how.

When a compiler generates an object file, it partitions the instructions and data into sections. In the VAX/VMS environment and the RSX-11M system from which VMS was "derived," these sections are called Program Sections, or psects.

In a simple situation, all instructions might be combined into the same code psect and all data into one data psect. Psects have attributes assigned to them by the compiler. When the linker processes all the object modules making up a program, it looks at each psect contained therein and deals with it according to its attributes.

Code psects, for example, usually must be concatenated so that each function is assigned its own unique code address space. This task is more complicated for programs that contain disk or memory-resident overlays, since such programs may use the same address space for different functions or data from different overlays.

Some data psects also will be concatenated, while others, such as those declaring a particular global variable, will be overlayable. The task of organizing psects is one of the main jobs of the VAX/VMS Linker and the RSX TaskBuilder.

I'll discuss psects as they apply to DEC's VAX C compiler. However, the principles are the same for most systems.

Analyzing Psect Generation

The compiler is responsible for creating psect records in the object file and for providing the linker with sufficient information to know in which psects the code and data should finally be placed. Consider the following program, which contains objects with various storage classes and some code. It also contains some VAX C-specific keywords. The example is the .LIS file produced from the compilation, and it contains the VAX intructions generated by the /LIST /MACHINE options:

```
/* test1.c */

char c;
short s;
int i;
const double cd;
readonly double rd;
noshare double nd;
noshare readonly double nrd;
noshare const double ncd;
volatile int vi;
volatile const int vci;
volatile noshare int vni;
volatile readonly int vri;
volatile const noshare int vcni;
static int si;

main()
{
                        0010 main:
                  0000  0010          .entry   main,^m<>
            5E 04 C2    0012          subl2    #4,sp
        00000000* EF 16     0015          jsb      C$MAIN

        globaldef float gf;
        globaldef {"xyz"} double gd;
        const globaldef double ge;

        static double sd;
        const static double csd;
        char *pc = "text";
}
            50 01 D0    001B          movl     #1,r0
                  04    001E          ret
```

When you compile using /LIST /SHOW=ALL, the listing file contains a list of the psects generated and the psects' attributes. For example, the above program produced the following list:

```
Psect Name              Allocation              Attributes
----------              ----------              ----------
$CODE                     31 bytes    PIC,      REL, SHR, EXE, RD
$DATA                     16 bytes    PIC,      REL,           RD, WRT
C                         1 byte      PIC, OVR, REL, GBL, SHR, RD, WRT
S                         2 bytes     PIC, OVR, REL, GBL, SHR, RD, WRT
I                         4 bytes     PIC, OVR, REL, GBL, SHR, RD, WRT
CD                        8 bytes     PIC, OVR, REL, GBL, SHR, RD
RD                        8 bytes     PIC, OVR, REL, GBL, SHR, RD
ND                        8 bytes     PIC, OVR, REL, GBL,      RD, WRT
NRD                       8 bytes     PIC, OVR, REL, GBL,      RD
NCD                       8 bytes     PIC, OVR, REL, GBL,      RD
VI                        4 bytes     PIC, OVR, REL, GBL, SHR, RD, WRT
VCI                       4 bytes     PIC, OVR, REL, GBL, SHR, RD
VNI                       4 bytes     PIC, OVR, REL, GBL,      RD, WRT
VRI                       4 bytes     PIC, OVR, REL, GBL, SHR, RD
VCNI                      4 bytes     PIC, OVR, REL, GBL,      RD
XYZ                       8 bytes     PIC,      REL, GBL, SHR, RD, WRT
$CHAR_STRING_CONSTANTS 5 bytes        PIC,      REL,           RD, WRT
```

The attributes are abbreviated here. Their meanings are:

- PIC — position independent.
- OVR — overlay (versus nothing, which means concatenate).
- REL — relocatable (versus nothing, which means absolute).
- GBL — global (versus nothing, which means local).
- SHR — shareable (versus nothing, which means not shareable).
- EXE — executable (versus nothing, which means not executable).
- RD — read access (versus nothing or NORD, which mean not readable).

Gandalf Hybrid Networks Make DEC LAT® Connectivity a Reality.

Trial and error is a costly way to discover what you need in a LAT Hybrid Network system. You need a system that meets today's requirements, with open access to the future. You need a Gandalf STARMASTER® Hybrid Network system.

A STARMASTER system with Netserver LAT software provides cost effective DEC LAT compatibility and terminal server functionality, without limiting your communication options.

STARMASTER connects your LAT LAN to a variety of environments, creating a compatible Hybrid Network system. Netserver with LAT software gives your LAT users access to PC-based applications, shared printers, Local and Wide Area Networks, and computer systems such as UNIX and IBM. STARMASTER also provides TCP/IP, X.25, 3270/SNA, and many other interconnectivity solutions.

Find out how Gandalf can bring compatibility to your growing LAT network requirements. Call Gandalf, first in Hybrid Networks: ***1-800-GANDALF (US), 613-723-6500 (Canada).***

gandalf

Bridging Islands Of Excellence

STARMASTER is a registered trademark of Gandalf Technologies Inc. DEC and LAT are registered trademarks of Digital Equipment Corporation. UNIX is a registered trademark of American Telephone and Telegraph Company. IBM is a registered trademark of International Business Machines Corporation.

Gandalf uses LAT technology licensed from DEC.

CIRCLE 254 ON READER CARD

© 1990 Gandalf Technologies Inc.

■ WRT — write access (versus nothing or NOWRT, which mean not writeable).

Each of the 13 global variables occupies its own psect by the same name. Since VMS' object language isn't case-sensitive, all names in object modules are in uppercase. One consequence of this is that if you have three globals spelled **ABC**, **Abc** and **abc**, all will generate psects of exactly the same name, ABC, which results in something other than what you probably intended. Let's see how the attributes of each psect are affected based on the keywords used in their declarations.

All global variables generate a psect of the same name, converted to uppercase. They also all have the OVR attribute.

All global variables generate a psect of the same name, converted to uppercase. They also all have the OVR attribute. The linker gathers all psects of the same name having the OVR attribute overlaying them into the one memory location. That is, it makes sure that all references to that global variable from all modules actually are referring to the same object. That's what global means.

The allocation size of a psect corresponds to the size of the object that caused its creation. For example, a **char** is 1 byte, therefore C is 1 byte. The same is true for **s** and S and **i** and I.

Global variables are writeable by default. Therefore, their psects have the WRT attribute. However, this can be overridden via the **const** type qualifier. Note that **cd** is a **const double**. As such, psect CD is 8 bytes but doesn't have the WRT attribute. That is, VAX C actually stores a **const** global in a write-protected location in memory. Any attempt to modify **cd** at run time will generate a memory-access violation. On the other hand, PDP-11 C and DOS-based C compilers can't write-protect memory the way VMS can. Therefore, **const** is only a compile-time protection in these environments.

The global variable **rd** has the **readonly** keyword. This VAX C extension is superseded by **const**. Like **const**, **readonly** forces the psect to have the NOWRT attribute. Not only can **const** be used to do the same thing as **readonly**, but it also can do far more. I advise you to use **const**.

The VAX extension keyword **noshare** can be used to disable the SHR attribute. This is useful when tasks linking against a shareable image need to get their own impure copy of a data psect. Examples of this are **errno** and **vaxc$errno** — two globals that create NOSHR psects of the same names.

The **volatile** type qualifier has no effect on psect attributes. It's used by the compiler when generating code that accesses such a qualified variable for either read or write.

The rest of the source code/psect mapping isn't as obvious. Let's begin with the psect $CHAR_STRING_CONSTANTS, since that's the simplest. The compiler places each string literal in the same psect, and this is it. Since the string **"text"** is 5 bytes long (don't forget the trailing null character), that's the size of this psect.

The **globaldef** keyword is a VAX C extension. And while I won't discuss it in detail, suffice it to say that it allows the programmer some control of psect placement. For example, I've specifically requested that the **double** variable **gd** be placed in psect XYZ. Since that's all we place there, XYZ is 8 bytes. The psect also is read/write by default. The variable **gf** is also declared using **globaldef**. But since no psect was specified, it goes in the special psect $DATA, which is also read/write by default. However, **ge** has the **const** type qualifier as well as **globaldef**, so rather than being stored in the read/write $DATA psect, it's placed in the read-only $CODE psect. That is, **const globaldef** objects are actually write-protected at run time.

The file scope static variable **si** and block scope static variable **sd** are stored in $DATA along with **gf**, making a total size of 16 bytes. The static **csd**, on the other hand, has the **const** qualifier, so it's stored in $CODE and is write-protected. $CODE then contains **csd**, **ge** and the 15 bytes of instructions, including the entry mask longword, generated as shown in the listing with relative addresses of 0010 through 001E, making the psect 31 bytes long.

The psects $CODE, $DATA, XYZ and $CHAR_STRING_CONSTANTS don't have the OVR attribute. This means that at link time the linker will concatenate all psect contributions of this name in other object modules. That is, when the linker is done, $CODE will contain all the instructions from all the object modules. Since a function must be completely contained within an object module, its instructions will be grouped as they were written. However, the order in which functions' instructions are grouped in $CODE depends on the order in which you specify the object modules to the linker. This is the same for $DATA and friends.

Looking At The Link Map

The previous example produced a file called TEST1.OBJ, and it was the only user-written object module involved in linking. All others came from the VAX C or VMS libraries. The following is an extract of the resulting link map. The executable was produced without using the shareable image version of vaxcrtl:

```
Psect Name      Module    Base      End     Length   Align
----------      ------    ----      ---     ------   -----
C$$TRNS_VALUES            00000200 00000373 (372.)   LONG

CD                        00000378 0000037F (8.)     QUAD
NCD                       000003B8 000003BF (8.)     QUAD
NRD                       000003C0 000003C7 (8.)     QUAD
RD                        000003C8 000003CF (8.)     QUAD
VCI                       000003D0 000003D3 (4.)     LONG
VCNI                      000003D4 000003D7 (4.)     LONG
VRI                       000003D8 000003DB (4.)     LONG
```

```
$CHAR_STRING_CONSTANTS 00000400 0000098D (1422.)  LONG
                TEST1  00000400 00000404 (5.)     LONG
$DATA                  00000990 000013A7 (2584.)  QUAD
                TEST1  00000990 0000099F (16.)    QUAD
C                      000013A8 000013AB (1.)     LONG
I                      000014CC 000014CF (4.)     LONG
ND                     000014D0 000014D7 (8.)     QUAD
S                      000014DC 000014DD (2.)     LONG
VI                     00001584 00001587 (4.)     LONG
VNI                    00001588 0000158B (4.)     LONG
XYZ                    00001590 00001597 (8.)     QUAD
$CODE                  00001600 00007B46 (25927.) QUAD
                TEST1  00001600 0000161E (31.)    QUAD
```

The linker organizes the psects in memory according to rules, e.g., data psects come first and, within that, read-only comes before read-write. It's important to note that the first psect, C$$TRNS_VALUES, (contributed from somewhere in the VAX C RTL) has a base address of 00000200, or 512 in decimal. The reason is that the first page of virtual address space (addresses 0 to 511) in a VMS image is protected from read and write from within a user program. In fact, trying to access this page is a common cause of access violations in VAX C programs. For example:

```
#include <string.h>

main()
{
        char c[20];
        char *pc = &c[0];

        strcpy(*pc, "abcd");
}
```

The problem is that the first argument to **strcpy** is a **char** — *not* a pointer to **char** — and its value is some arbitrary number between 0 and 255. This **char** is widened to an **int** when **strcpy** is called, and **strcpy** interprets it as an address in the first page of address space. So when **strcpy** tries to access it for write, an access violation occurs. The same results if you try to read ***pc**.

If a prototype is in scope of the call to **strcpy**, an error or a warning should be produced, because a **char** isn't assignment-compatible with a **char** pointer. This happens with more recent versions of VAX C. The compiler can't detect the problem if we're using **printf** instead. For example:

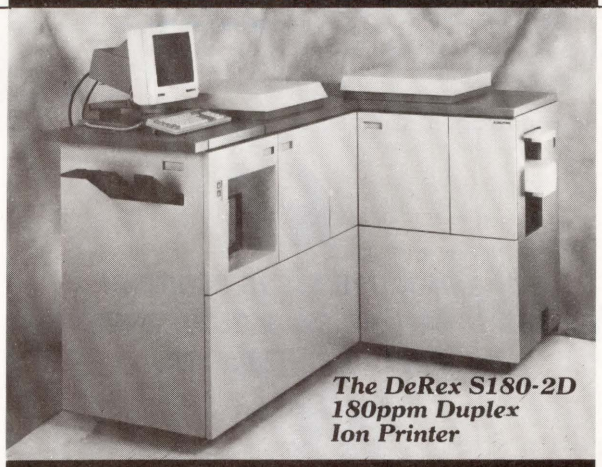
```
#include <stdio.h>

main()
{
        char c[] = "abcdef";
        char *pc = &c[0];

        printf("%s", *pc);
}
```

If a **char** is passed, which **printf** interprets as an address, no checking is possible at compile time.

In any event, each psect has an alignment. Note that psects containing the global **double** variables are aligned on quadword boundaries. This makes sense, because the VAX performs quadword operations more efficiently on quadword boundaries. For all other data types, the resultant psect is aligned on a longword.

DEREX INC.

THE NAME TO KNOW IN PRINTER SYSTEMS



The DeRex S180-2D
180ppm Duplex
Ion Printer

THE ION FAMILY

- ☑ 30, 45, 75, 180 (90 duplex) PPM performance
- ☑ Duty Cycles up to 2,000,000 pages per month
- ☑ Lowest cost/high volume non-impact printers available today
- ☑ Compatible with DEC (attaches to all VAX systems, local or network—LAT or TCP/IP, LN03+, LaserJet & Line Printer emulation)
- ☑ Superb Print Quality
- ☑ Universal Forms Development Software
- ☑ Field proven in hundreds of major corporate data centers
- ☑ Nationwide quality installation, training, support, service

DEREX INC. 3650 Coral Ridge Drive Coral Springs, FL 33065 (305) 753-0840 • (800) 245-7282

I want DeRex Inc. working for me.
Please send me information on:

☐ The Ion Printer Family
☐ The Midrange Non-Impact Printer Family
☐ The Impact Printer Family
My computer is _____
☐ Local ☐ Remote
My needs are: ☐ Immediate
☐ 30-90 Days ☐ Information Only
Name _____
Company _____
Title _____
Telephone (_____) _____
Address _____
City _____ State _____ Zip _____

CIRCLE 282 ON READER CARD

Each object module's contributions to a psect are shown after the total size of that psect as follows:

```
$CHAR_STRING_CONSTANTS 00000400 0000098D (1422.)  LONG
                TEST1  00000400 00000404 (5.)     LONG
$DATA                  00000990 000013A7 (2584.)  QUAD
                TEST1  00000990 0000099F (16.)    QUAD
$CODE                  00001600 00007B46 (25927.) QUAD
                TEST1  00001600 0000161E (31.)    QUAD
```

The contribution made by the run-time library functions

> ***If a prototype is in scope of the call to strcpy, an error or a warning should be produced.***

have been omitted here. As you can see, it was very significant and accounted for almost all of these three psects.

String Literal Storage

Consider the following program, which attempts to modify a string literal. It tries to change the "I" in the string pointed to by **pc1** to a "?" and the RING in the string pointed to by **pc2** to "xyz:"

```
/* psstring.c - see if like strings are shared in memory
and if strings are read-write or read-only. */

#include <stdio.h>
#include <string.h>

main()
{
        char *pc1 = "STRING";
        char *pc2 = "STRING";

        printf("pc1 = %p, pc2 = %p\n", pc1, pc2);

        pc1[3] = '?';
        strcpy(pc2 + 2, "xyz");

        printf("pc1 -> %s, pc2 -> %s\n", pc1, pc2);
}

pc1 = 400, pc2 = 407
pc1 -> STR?NG, pc2 -> STxyz
```

As you can see by the output, VAX C permits string literals to be modified. It also stores the identical strings separately as two distinct strings, starting at locations 400 and 407. This behavior is permitted by the ANSI C standard. Whether strings are stored in a read-write location or whether identical strings are treated separately is up to the implementation.

The relevant instructions generated, as taken from the listing file, are:

```
        movab     $CHAR_STRING_CONSTANTS,r2
char *pc1 = "STRING";
        moval     (r2),r3
char *pc2 = "STRING";
        moval     7(r2),r4
```

The address of the string literal psect is loaded into r2 and offset 0 and 7 are used as the addresses of the two strings.

The psect information from the compilation listing and linker map follows:

```
Psect Name             Allocation     Attributes
----------             ----------     ----------
$CHAR_STRING_CONSTANTS  60 bytes   PIC, REL, RD, WRT

Psect Name               Base     End    Length    Attributes
----------               ----     ---    ------    ----------
$CHAR_STRING_CONSTANTS 00000400 000009C0 (1473.) ..., CON, WRT, ...
         PSSTRING      00000400 0000043B (60.)
```

The psect has the WRT attribute. Note that the psect begins at address 400, and since the first string is at offset 0 within the psect, its address is also 400, which is what we see from the output shown earlier.

Most programmers, using any language, think of string literals as being constants. After all, doesn't literal imply that what you see is what you get? I suggest you try to write-protect string literals. This can be done in VAX C by disabling the WRT attribute of the psect as follows. If string literals weren't stored in their own psect, this wouldn't be possible, since WRT/NOWRT protection is only specifiable at the psect level.

To change the attributes of a psect, you must link using an

ISO C Standard Status Report

On June 18 and 19, I attended an ISO C meeting at the British Standards Institute in London. It was the first time I acted officially as the U.S. International Representative. My predecessor, P.J. Plauger, remains the convenor.

We recently completed a letter ballot on the proposed ISO standard, and no countries objected except for the fact that it was based on an earlier ANSI C draft. I expect that the ISO C standard initially will be identical to the ANSI standard. However, within a few years as many as three formal addenda will be published that will have the weight of a standard. These probably will be based on the three outstanding work items remaining:

1. The U.K.'s request for clarification on undefined behavior.
2. Denmark's alternate trigraph proposal.
3. Japan's request for extra multibyte library functions.

This was the first time that Japan was represented, and their presentations were well-received.

The ISO C group has been inactive in recent years because of the delays in the ANSI standard. However, now that that standard is final and new work items have been received, a more rigorous schedule has been established. The next meeting will be in Copenhagen on November 26 and 27, and another is tentatively scheduled for Tokyo on May 13 and 14, 1991.—*R.J.*

ALL THIS AND A WHOLE LAT™ MORE.

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

That's a lot without mentioning LAT.™ But we must. SmarTerm 340 and SmarTerm 340 for File Servers include an implementation of LAT™ Protocol Technology fully licensed from Digital® Equipment Corporation.

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

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

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

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

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

persoft®

ACCESS THE POWER YOU NEED.™

© 1990 Persoft, Inc. All Rights Reserved. Specifications subject to change without notice. Persoft and SmarTerm are registered trademarks of Persoft, Inc., 465 Science Drive, Madison, WI 53711. Digital, VT, LAT, and ReGIS are trademarks of Digital Equipment Corporation. Novell is a trademark of Novell, Inc.

CIRCLE 152 ON READER CARD

> ***Most programmers think of string literals as being constants. After all, doesn't literal imply that what you see is what you get?***

options file, for example:

```
LINK PSSTRING,PSSTRING/OPT
```

where PSSTRING.OPT contains:

```
PSECT_ATTR=$CHAR_STRING_CONSTANTS,NOWRT
```

By disabling writes to this psect, we can detect any attempt, presumably a bug, to modify string literals. The output from the test program now is:

```
pc1 = 200, pc2 = 207
%SYSTEM-F-ACCVIO, access violation, reason mask=04,
 virtual address=00000203, PC=00001627, PSL=03C00000
%TRACE-F-TRACEBACK, symbolic stack dump follows

module name routine name  line       rel PC    abs PC
PSSTRING      main         302      00000027  00001627
```

where the list file line 302 contains:

```
302     pc1[3] = '?';
```

Now the link map shows the psect to have the NOWRT attribute:

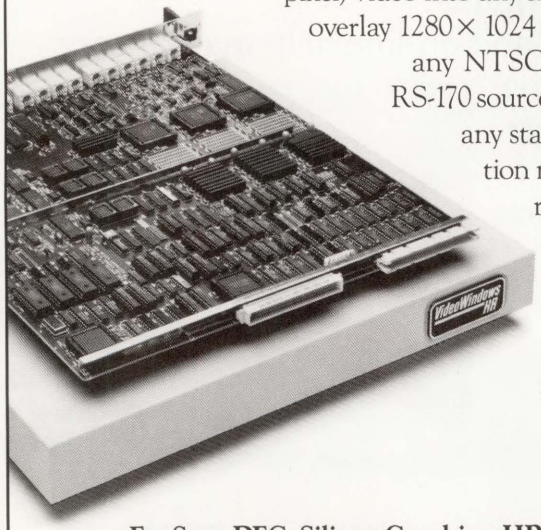
```
Psect Name                Base     End      Length    Attributes
----------                ----     ---      ------    ----------
$CHAR_STRING_CONSTANTS 00000200 000007C0 (1473.) ..., CON, NOWRT, ...
          PSSTRING     00000200 0000023B (60.)
```

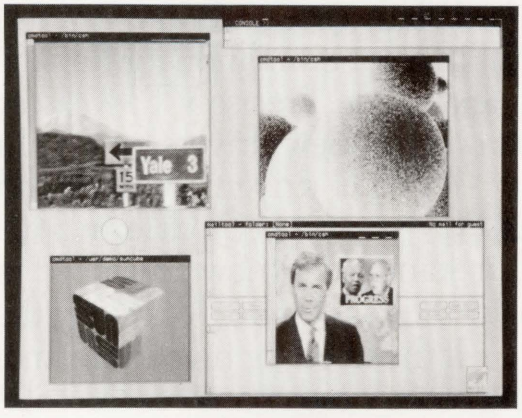
READERS ARE ENCOURAGED to submit C-related comments and suggestions to Rex Jaeschke, 2051 Swans Neck Way, Reston, Virginia 22091 or via e-mail to uunet!aussie!rex. —*Rex Jaeschke is an independent consultant, author and lecturer. He's* DEC PROFESSIONAL*'s representative on the ANSI C Standards Committee 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, *is available from Professional Press. For more information, call Trish Dunkerley at (215) 957-4265.*

VideoWindows® for Workstations

FULL MOTION VIDEO AND SOUND ON YOUR WORKSTATION

Add multimedia to your workstation. Full motion, digitized video under existing software environment. Scale true 16.7 million color (24 bits/pixel) video into any size window and overlay 1280 × 1024 graphics. Input any NTSC, PAL or RGB RS-170 source and output on any standard workstation monitor. Zoom, reposition, fade, pan, freeze, and image capture. On-board audio amplifier.





VideoWindows® HR

For Sun, DEC, Silicon Graphics, HP/Apollo, MacIntosh, HiRes PC's, and more...

New Media Graphics Corporation
780 Boston Road
Billerica, MA 01821
TEL: (508) 663-0666
FAX: (508) 663-6678

CIRCLE 148 ON READER CARD

Memory and power now available in a small package.

INTRODUCING VERSION 4.0

Check out our newest version of Reflection® and discover the best way to link your PCs to your host.

Version 4.0 of Reflection 2 and Reflection 4 lets you make the most of powerful software applications on your PC while still providing versatile Digital VT terminal emulation and fast, dependable file transfer to the host.

Reflection's memory requirements have been scaled down so you have more space for your favorite spreadsheet, database, and word processing applications. Speaking of memory, a new feature called State Save lets you remove Reflection completely from memory to run a large application and then return to the host session right where you left off.

File transfers are even faster and easier with Reflection 4.0. Wildcard transfers make it easier to select and transfer groups of files. When you use Reflection with TelnetManager™ over a TCP/IP-linked PC, Reflection will implement the FTP file transfer protocol so you can take full advantage of the speed of the network.

And there's lots more. Rotate graphics to print sideways for larger formats that are easier to read. Users of EGAs and VGAs can display a full 132 columns of text on-screen without using a special video adapter card.

It's a big act in a small package. Step right up. See for yourself.

Upgrade for Peanuts

Try the new Reflection 2 or Reflection 4. Send us the title page from your current emulator manual (VT220 or higher) along with your check or purchase order for:

Reflection 2PLUS	$125
Reflection 4PLUS	$200

Current Reflection users can update to the new Reflection 4.0 for just $100.*
Call us toll free today.

1-800-872-2829

Hurry, offer expires 12-31-90.

Walker Richer & Quinn, Inc.

2815 Eastlake Avenue E., Seattle, WA 98102 / 206.324.0407, FAX 206.322.8151 / Zeestraat 55, 2518 AA Den Haag, The Netherlands / + 31. (0)70.356.09.63, + 31. (0)70.356.12.44 FAX

*Prices do not include shipping or tax. Reflection is a trademark of Walker Richer & Quinn. All other trademarks are property of their respective holders.

CIRCLE 173 ON READER CARD

FIELD SERVICE

Ron Levine

Service Search

MIS and DP managers sometimes find that locating the right service vendor can be difficult. Despite the many DEC system service providers, it can be hard to find one that supports older machines or a peripheral made by a little-known vendor. And if you aren't in or near a big city, it can be hard to find nonmanufacturer service.

Sometimes those responsible for purchasing service may have to make a vendor change or addition even though their current service organization is 100 percent satisfactory. For instance, if you're relocating to a different geographical area, expanding into a new region or opening a site in an out-of-the-way place, your current service provider may not be able to handle the new location. If you're adding sites, what do you do — change vendors just to find one who can include the new sites? This could entail switching from a vendor with a satisfactory record to one with an unknown record — probably not the best decision.

Finding a local company in the new area while continuing a relationship with your current service company is a more viable alternative. And your current maintenance contractor may be willing to subcontract and administrate service at the new site so that you can continue to deal with only one vendor.

On an international level, suppose your U.S. office gets a trouble call from an overseas branch. The used optical disk jukebox you shipped them is down, and the problem requires a specialist. Where do you find one quickly?

And there are many other reasons a user, even one located in a major metropolitan area, sometimes needs the services of a small, hard-to-find local service company instead of a large, easily accessible national or international service vendor. For example:

- Your systems are maintained in-house but on occasion may require backup support on a specific unit. Smaller companies may be more receptive to a permanent working relationship for this type of support.
- Your regular service vendor doesn't supply the one-time value-added service you need.
- Service is required on a little-known, outdated unit that isn't supported by your service vendor or in-house staff.

When it comes to obtaining service for DEC-based sites, there are three main options from which to choose:

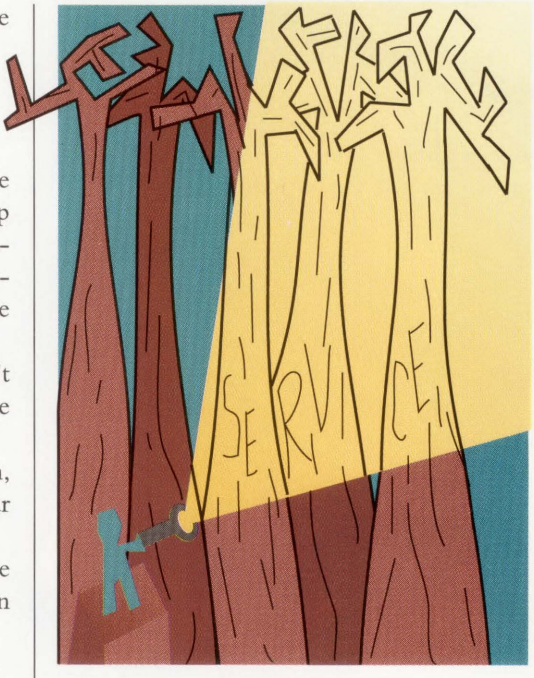
1. Manufacturer's service (from DEC).
2. Independent or third-party maintenance (TPM).
3. Self-maintenance.

Further, maintenance can be divided into three main categories: preventive, corrective and predictive. Value-added services can be contracted on an as-needed basis.

However, while it's fairly straightforward to characterize the types of service, it isn't nearly as simple to ascertain who maintains what type of equipment, which hours and days coverage is provided, what response time can be expected, and how vendors charge for their service.

Service Sourcery, Too

One way to find the service you need is an up-to-the-minute computerized listing of all known service and maintenance companies in the computer industry. The listing, called the Service Sourcery, Too, is an online database of more than 4,000 service firms both large and small. It's



published by Coordinated Service. Bill Herbert, president of Coordinated Service, says that it's the only computerized listing of all third- and fourth-party maintenance offerings.

You can use the service to search for specific technical capabilities, coverage of geographical area and other pertinent information about service providers. The list is produced at the time of order, ensuring access to the latest information available. The companies are listed by product, geographical area and 14 other parameters.

The listing provides information on local, national and international independent service organizations. Data provided includes types, brands and models of equipment serviced, service offerings, geographical coverage, time-and-material rates, response time, branch locations and specialties. Other pertinent information,

WHERE DO YOU GO WHEN YOUR PRODUCTS ARE NO LONGER ON DECK?

THE SERVICE PROFESSIONALS...MAINTECH.

With so many products coming onboard, and many not-so-old products going overboard, you could be a castaway before you know it.

Don't be caught adrift in a costly and turbulent sea. Let Maintech offer you the security of 18 years of quality, resource and commitment.

With a Maintech service agreement you enjoy:

- Guaranteed 4-hour response
- A 12-hr. service window, 8 a.m. - 8 p.m.
- Complete FCO management
- MEMO Error Log Monitoring
- MC-220 Console Management
- Complete Diagnostic Software Support

If you have less critical maintenance requirements, or wish to migrate to self-maintenance, ask us about our Guardian Maintenance and Transition Maintenance programs.

1 800-426-TECH

212 827-2603 FAX 212 869-2876

MAINTECH

A DIVISION OF VOLT DELTA RESOURCES INC.

1133 Avenue of the Americas
New York, NY 10036

CIRCLE 142 ON READER CARD

such as company address and phone number, how long the company has been in business, revenues, number of service employees and whom to contact, is also part of the report.

Service Sourcery, Too, is available by:

- Subscription — For an annual fee, you receive the complete database on disks for use on your IBM PC, compatible or Mac. The information is updated quarterly, and you can copy the data for use throughout your organization.
- Preferred Service — For an initial fee plus a per-record charge, you have unlimited access to the database for searches as needed. Reports are mailed within 24 hours of request.
- One-Time Inquiry — For a one-time fee and a per-record charge, you can perform an individual search based on a specific parameter. Additional charges are incurred for extra parameters.

> ***A self-maintainer can use Service Sourcery, Too, and Insta-Facts to quickly locate technical support or service for products he can't handle in-house.***

Service Profiles

A subset of Service Sourcery, Too, is Insta-Facts. It's a computerized report in a three-ring binder that provides company profiles on third- and fourth-party maintainers throughout the world. It's printed the day you request it.

Created from the Service Sourcery, Too, database, Insta-Facts comprises the results of the most commonly requested searches, standardized into preselected titles. These reports are offered by the suggested title for a fixed fee. For example, a request for DEC equipment service companies yields a standard list of about 125 vendors. Full profiles on each are printed at the time of request and mailed.

Other preselected titles include:

- IBM midrange service companies.
- Wang service companies.
- Canadian service companies (listed by location).
- International service companies (listed by location and product).

A SELF-MAINTAINER CAN USE Service Sourcery, Too, and Insta-Facts to quickly locate technical support or service for products he can't handle in-house. A company with more than one location can find service to provide maintenance or repair at a remote site. And a large TPM can locate small, independent service companies in remote locations to fill gaps in its coverage. ■

Optical Update

The world's first one-terabyte optical tape recorder was undergoing beta testing at the Canadian government's Canada Center for Remote Sensing (CCRS) this summer. Optical tape unit and media development, a joint project between Creo Products and ICI Imagedata, is nearing completion.

The delivery of the first of five units to the CCRS (a division of Canada's Department of Energy, Mines and Resources) and the purchase of two units by the Canadian Department of National Defense introduces ground-breaking technology into the mass storage market. This is the first installed optical storage device to read, as well as write, multiple tracks simultaneously. The tape units use Creo's new error-correction technology and a patented linear scanner.

The Creo drive employs lasers to record data on optical tape at extremely high density. One 12-inch reel of optical tape holds one terabyte (1,000 GB) of data, the equivalent of 5,000 conventional magnetic tapes, 2,000 5 1/4-inch optical disks or 500 million typed sheets of standard paper. The ICI tape media has a shelf life of more than 15 years.

In a related development, ICI completed the first phase of its flexible optical disk drive and media program. For the past two years, ICI and Iomega subsidiary Bernoulli Optical Systems Company (BOSCO) have been involved in a joint development project to design an optical unit based on ICI's Digital Paper media and Iomega's proprietary Bernoulli drive technology. With initial development of the project completed and major technical goals for the first phase achieved, ICI will enter the second phase: licensing of the technology and completion of drive development.

However, following a strategic reappraisal of its business for the 1990s, Iomega has decided not to proceed to the final phase of the program, which would lead to commercialization of the drive. Its involvement will cease with the completion of the current phase, but BOSCO will continue to support ICI as agreed. ICI is now looking for a strong partner to complete development of the drive. —*R.L.*

For More Information

Bernoulli Optical Systems Co.
5700 Flatiron Pkwy.
Boulder, CO 80301
(303) 939-8611
CIRCLE 537 ON READER CARD

Coordinated Service Inc.
P.O. Box 1260
Littleton, MA 01460
(508) 486-0388
CIRCLE 451 ON READER CARD

Creo Products Inc.
110-3700 Gilmore Way
Burnaby, BC V5G 4M1
(604) 437-6879
CIRCLE 534 ON READER CARD

ICI Imagedata
P.O. Box 751
Wilmington, DE 19897
(800) 456-3669
CIRCLE 535 ON READER CARD

Iomega Corp.
1821 W. 4000 S.
Roy, UT 84067
(801) 778-3000
CIRCLE 536 ON READER CARD

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®
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 248 ON READER CARD

DCL DIALOGUE

Kevin G. Barkes

DSNlink: On-Demand Software Support

You're working on a complex DCL command procedure and you're having problems. Some of your code isn't behaving properly. Despite repeated searches through the *DCL Dictionary*, you just can't seem to locate the cause of the glitch.

What do you do? You send a VMSmail message containing the irksome command file fragment to the magical address DSN%VMS-DCL. The odds are pretty good that by the end of the day you'll have the answer.

The rapid response is possible because of DSNlink, DEC's "on-demand" network linking its Customer Support Centers (CSC) with participating customer sites. DSNlink is free to sites having at least a Basic VMS Support license.Your support request is linked to the Colorado CSC and is transferred to DEC's other U.S.CSCs if appropriate.

Essentially, it's an automated version of the Digital Software Information Network (DSIN). But calling DSNlink an automated DSIN is like calling a VAX 9000 a big calculator. Having DSNlink is like having a resident VMS wizard lurking in the bowels of your VAX.

On-demand networks are common. For example, my computer bulletin board system (BBS), SYS$OUTPUT, is part of the international FidoNet amateur network, which has more than 7,000 member nodes worldwide. FidoNet is a prototypical on-demand network.

Unlike DECnet networks, which are in constant communication, FidoNet nodes call each other over regular phone lines only when they have electronic mail or files to exchange. DSNlink works the same way.

The DSNlink software goes in easily with VMSINSTAL and requires a minimum of fiddling to configure. It requires a dedicated serial port and modem.

DSNlink is completely managed by a single detached process named DSN$NETWORK. When a user issues DSN commands, the commands are piped into DSN$NETWORK, which controls the modem and all communications operations. Up to 32 users on your system can be connected through a single DSNlink channel to DEC, although the practical considerations of 2,400-bps throughput limits things.

> ***"Having DSNlink is like having a resident VMS wizard lurking in the bowels of your VAX."***

DSNlink offers four major functions: Mail, File Copy, Flash Mail and Interactive Text Search. DSNlink Mail permits the transmission of service requests to DEC using the regular VMSmail utility. Mail sent to DSN%-nnnn (nnnn is the software product name) "wakes up" DSN$NETWORK, which then dials DEC and passes the message on. An acknowledgement is e-mailed back to you via DSNlink and, depending on the nature of the request, a response from CSC personnel follows shortly. I've never had to wait more than two hours for a response, but then I have a tendency to make requests in the wee hours of the morning and on weekends. Your mileage may vary.

DSNlink Mail can only handle ASCII files up to 30 blocks in length. For large text files or binary files such as images, DSNlink File Copy can be used.

A close relative to DSNlink Mail is Flash Mail, which enables DEC to send important product notices and image patches. From my standpoint, the only downside to Flash Mail is that it eliminates my major source of free TK50 cartridges. Such is progress.

Mail, Flash Mail and File Copy run in batch mode. However, DSNlink permits interactive access to the DSNlink host and its impressive collection of databases. This final DSNlink application, appropriately named Interactive Text Search (ITS), is similar to the DSIN interface but is easier to use and far more versatile.

Which databases you can access depends on the software support licenses you have from DEC. But even with VMS-only access, you can get to nearly a dozen databases covering just about everything in VMS — 20,000 articles in all. With a simple SEARCH command you can reduce hours of searching through "the big gray wall" to a few minutes. Articles can be printed to your system printer, extracted to a file on your local system and otherwise manipulated.

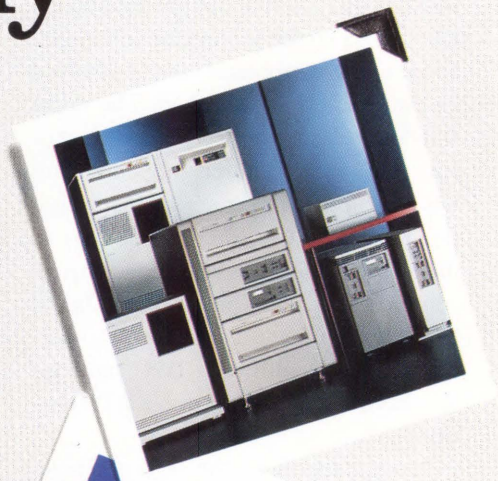
The DSNlink software buffers its I/O quite well. While you're reading a screen, DSNlink keeps transmitting in the background. If you decide to extract a file you've read, the process is practically instantaneous. It's much easier than using DSIN, on which you have to capture

Meet the #1 Software for a Growing Family

The more you rely on the expanding family of VAX™ computers, the more you need the SAS® System—the leading data analysis and graphics software in the VAX market. No other software has the power and flexibility to handle *all* your data management, analysis, and presentation needs. Across the entire range of VAX systems.

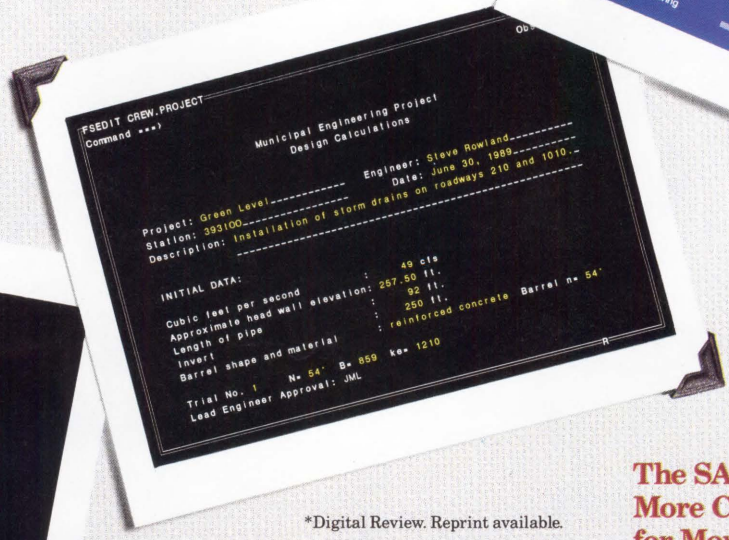
The SAS System brings you more choices for data entry, retrieval, and management. . . report writing and graphics. . . statistical and mathematical analysis (including quality control). . . business planning, forecasting, and decision support. . . operations research and project management. . . and applications development. All fully integrated. All backed by VMS–specific technical support, training, and documentation.

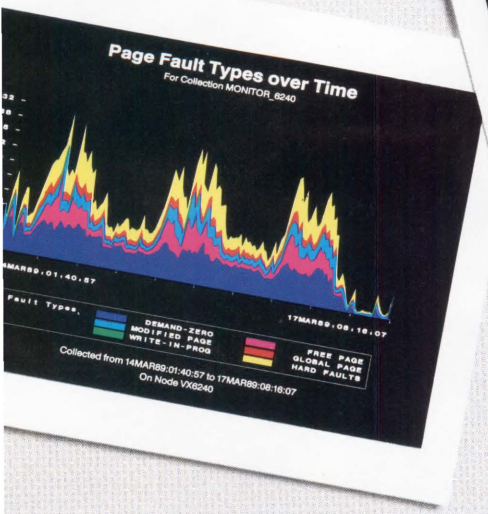
And now we've extended the family with specialized tools for evaluating VAX computer performance, as well as interfaces to popular data bases such as ORACLE® and Rdb.™ No wonder experts call the SAS System ". . . perhaps the most sophisticated and versatile family of products on the market."*



Yours for 30 days. . . FREE

Find out why the SAS System is the software you won't outgrow. Ask for our free 12-page executive summary and details about a free 30-day software evaluation. Call us today at (919) 677-8200. In Canada, call (416) 443-9811.





*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

The SAS® System. More Choices for More Applications than Any Other Software.

SAS®

SAS Institute Inc.
SAS Circle □ Box 8000
Cary, NC 27512-8000
Phone (919) 677-8200
Fax (919) 677-8123

your online session to a file and later edit out the extraneous information.

Nothing's Perfect

Despite its marvelous capabilities, DSNlink has a few shortcomings, which DEC, to its credit, is working to correct. Some of these problems may be resolved by the time this is published. The initial DSNlink release worked only with specific DEC-manufactured modems. This was a major inconvenience. Many sites don't purchase DEC modems because of their cost, which is several times that of generic units. The proprietary Digital Modem Command Language is a roadblock as well, although DEC modems also have a Hayes-compatible AT command set.

User reaction to the lack of Hayes compatibility was so strong that DEC developed a special script file that permitted DSNlink to work with "regular" modems. At the May DECUS Symposium in New Orleans, the DSNlink folks spent most of their time telling users about the availability of the script file and their intention to bundle a Hayes compatibility option into a future release of the software. Some DEC folks appear to have been left out of the loop, so if you're told that a Hayes script isn't available, be insistent and don't take no for an answer.

DSNlink currently supports only 2,400 bps. Support for faster modems would be nice, especially when more than one user is connected to the network. Despite built-in data compression, it takes time to scroll through a large listing of database entries or to copy a large file.

DSNlink supposedly requires a port with full modem control capability. I say supposedly because I was able to get DSNlink to run off a DEC Scholar Plus modem on one of the serial ports of my VAXstation 3100, which doesn't have modem flow control. However, my permanent DSNlink connection will be off a terminal server.

Another drawback is the need to dedicate a port and a telephone line to DSNlink. DEC says it needs a constant dial-in line to deliver Flash messages. Since I've had DSNlink connected, the only unsolicited mail I've received was a note advising me that a telephone problem at the support center had been corrected. I hadn't even been aware of one.

Since DEC is paying for the phone calls (DSNlink uses toll-free 800 numbers), its request for a port and dedicated phone line isn't that unreasonable. If you're really tight on serial ports, it's a simple operation to create a command file that can stop and start the DSNlink software automatically to provide others with access to the line.

Security Issues

Sites with a paranoid bent may feel uneasy about giving an outsider access to their system, despite DEC's assurances that DSNlink is secure and can't be used

for any scurrilous activity. A proprietary communications protocol is used by the software. It can talk only with DEC's CSC.

When DSNlink is running, it will talk only with the CSC. And when the DSN$NETWORK process is idle, the port is set to NOTYPE_AHEAD, which prevents unsolicited input from initiating a login sequence. If you're using a DEC modem, DSNlink exploits its built-in passwording capabilities for even greater security.

Nonetheless, a system manager I know was put off by the DSNlink startup command file, which creates the startup process by using $RUN LOGINOUT with /PRIVILEGES=ALL.

Temporal Displacement

Another major problem deals with DSNlink's ITS facility. With thousands of entries in several databases, it isn't unusual for a SEARCH command to produce hundreds of hits. This is especially true when your query covers a broad topic such as BACKUP utility problems.

The /SINCE qualifier ostensibly serves as a filter to block database entries created prior to a specified date. Unfortunately, it doesn't work properly. DEC's database software detects the date the entry was last modified, not the original date of the actual entry. CSC routinely goes through its databases, correcting typographical errors and performing minor updates. These are detected by the ITS software as new entries.

For example, when I searched for the word VMS and used the /SINCE qualifier to restrict the search to entries created in the past week, I received a listing of more than 240 titles. There weren't 240 new bugs reported in VMS in seven days, thank goodness. Rather, CSC had been busy cleaning up typos and modifying the release numbers of VMS. ITS picked up each change as a new entry.

This problem will take time to correct. DEC is planning to revamp its database software, but it's a long-term effort. Meanwhile, one workaround is to issue searches one day at a time, starting at the current date and working backward. Since ITS has command buffer recall, this isn't as onerous as it sounds.

Despite these hitches, DSNlink is a winner. I used to complain about the monthly support costs for VMS. DSNlink makes it worth every penny.

FOR AN "I LOVE DCL" sticker and/or a listing of all FidoNet BBSs in the U.S. featuring message areas with DEC-related topics, send a self-addressed, stamped #10 business envelope to KGB Consulting, 4107 Overlook St., Library, PA 15129. The list is also available online from the SYS$OUTPUT BBS: (412) 854-0511, 1,200/2,400 baud. If you have FidoNet access, ask your local sysop to file request DECBBS.LST from 1:129/38. *—Kevin G. Barkes is an independent consultant and publisher of the monthly* KGB Report *newsletter.* ■

crystal clear.

Perceptics' Optical Storage Subsystems provide the transparent solution to your mass storage problems.

Now you can have on-line optical storage as readily as magnetic disk storage.

At the heart of every Perceptics optical storage subsystem is LaserWare, providing transparent magnetic disk emulation on VAX/VMS (including BI Bus) and Sun/Unix host systems. There is no need to modify your existing software or hardware.

You choose storage capacities from 690 MB to 6.8 GB on single drives or up to one Terabyte on a variety of jukeboxes. And our new multifunction drive systems give you the flexibility of interchanging nonerasable (write once) and rewritable (M-O) media in the same drive.

Perceptics, the full service source of optical storage subsystems, has a crystal clear solution to your mass storage problems.

perceptics
A Westinghouse Company

P.O. Box 22991 · 725 Pellissippi Parkway
Knoxville, Tennessee 37933-0991
(615) 966-9200 (800) 448-8544
FAX (615) 966-9330

CIRCLE 355 ON READER CARD

All logos and company names are TM, © and/or ® their respective owners.

WORKSTATIONS

David W. Bynon

Workstations A La Carte

From the beginning, DEC has been a supplier of modules and components for system integrators. DEC's first products, which were sold in 1958, weren't computers — they were modules used to build computers. Although a lot has changed since 1958, DEC continues to build modules and components for system integrators who must assemble a system to strict specifications or within a budget. The VAXstation and DECstation lines of workstations are examples of the modular approach to building systems. In this article, we'll explore building DEC workstations a la carte.

As with any system integration exercise, you must be familiar with what's feasible and what's available. This is a formidable task, because DEC and third-party products are continuously changing. For example, there are more than 100 VAXstation 3100 model numbers. The DECstation lineup is a mere 18 models, excluding the DECstation 5000 series. DEC's video, disk, tape, network and memory options list for pages. Third-party products for DEC workstations include memory, disks, tape, networks and video graphics. There are more third-party memory, storage and peripheral manufacturers for DEC workstations than I could possibly list here.

Recently, DEC announced an aggressive price reduction for its VAXstation and DECstation workstation family. The new low-end price for a diskless VAXstation 3100 or DECstation 2100 is $5,950, a $560 reduction in price.

Although DEC's price reduction on base workstations is considerable, the real news is the price reduction on workstation memory upgrades and storage devices. In some cases, DEC cut memory prices by more than 50 percent. DEC's new 3100/2100 workstation memory price standard is $250 per megabyte. DECstation 5000 memory prices were reduced to $550 per megabyte. This is highly competitive with third-party offerings. The reduction in prices is good news for consumers, but it isn't an auspicious prospect for third-party memory and storage vendors. Price reductions from the third parties will have to follow.

The Lineup

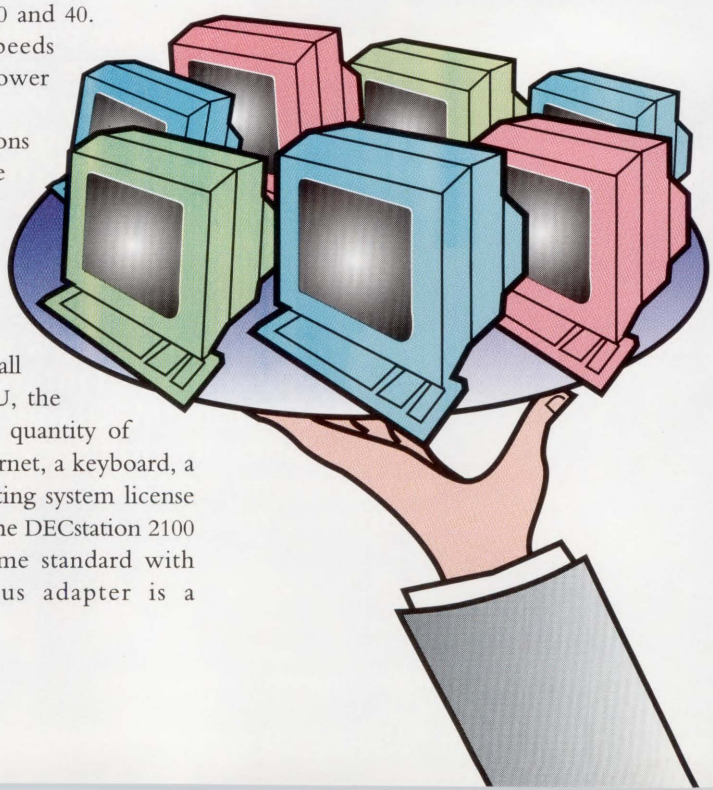
There are four basic DEC workstations, excluding the Q-bus models. These are the VAXstation 3100 Model 30, the VAXstation 3100 Model 38, the DECstation 2100 and the DECstation 3100. There are two derivatives of the VAXstation 3100 Models 30 and 38 that facilitate additional internal storage devices: the Models 40 and 48. The VAXstation Models 38 and 48 are higher-clock-speed versions of the VAXstation Models 30 and 40. The higher clock speeds increase processing power by 40 percent.

All DEC workstations are available as base systems that can be used as building blocks for integrators or do-it-yourselfers. The base system configurations vary, but all include the basic CPU, the lowest recommended quantity of memory (8 MB), Ethernet, a keyboard, a mouse and the operating system license (ULTRIX or VMS). The DECstation 2100 and 3100 models come standard with SCSI. The SCSI bus adapter is a VAXstation 3100 option. To make a robust system, you must integrate memory, storage devices and graphics.

Integrating Memory

VAXstation 3100 memory is expandable from 8 to 32 MB. DEC designed the VAXstation 3100 memory as a daughterboard that interfaces with the motherboard via a pair of pin connectors. The daughterboards are designed in such a way that two memory boards can be stacked to facilitate expansion. The printed circuit board standoffs are in place for the first memory board. Additional standoffs and mounting hardware are provided with DEC and third-party expansion memory.

The VAXstation 3100 memory expansion method presents a possible problem for some integrators and cost-conscious individuals. Because only two memory boards can be stacked, the memory board provided with base systems will often be thrown out in favor of two higher capacity memory boards. With DEC's new memory prices, it isn't



as easy to throw away the DEC 8-MB boards. Compare VAXstation 3100 part number PV01A-BJ (8-MB VMS base system) at $5,950 and VAXstation 3100 part number PV01A-CA (16-MB VMS base system) at $7,090. For the cost difference ($1,140), you can't buy a 16-MB board. So if you need a workstation with 16 MB or more, the base system to buy is the PV01A-CA.

At least two third-party memory manufacturers have solved the memory throw-away problem. By building 24-MB expansion boards, third-party memories can be used with the existing 8-MB to achieve a full 32-MB system.

One last note about the 8-MB base system memory board. Don't buy two 8-MB base systems and one 16-MB memory upgrade with the intention of building two 16-MB workstations. The 8-MB boards don't have a second connector to permit stacking. They were designed to be the first or second memory board but not both.

DECstation 2100/3100 memory upgrades are less troublesome. DECstations use 2-MB single inline memory module (SIMM) strips. You must upgrade in 4-MB increments. The DECstations' total memory capacity is 24 MB. I recently saw DECstation 4-MB memory kits for as low as $795. DEC's new list price for the MS01-AA 4-MB upgrade kit is $1,000.

DEC workstation memory installation is a simple matter of loosening two Phillips screws to remove the cover, removing the mass storage mounting tray (leaving the drives intact) and snapping in the module(s). A memory upgrade for a VAXstation or DECstation is literally a 15-minute job. As a precautionary note, for static protection of the new memory and the system board, use a grounding wrist strap. Some third-party memories come with a disposable grounding strap. If your add-on memory doesn't, be sure to get one.

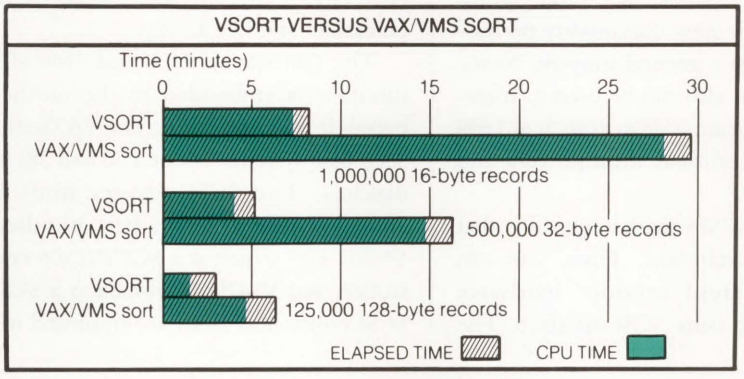
Integrating Storage

At a recent convention I listened to a DEC spokesperson say, "Digital wants to be your open systems vendor." After

VSORT AND VSELECT

The fastest way to sort and extract records on a VAX.

If you spend too much time sorting with the VAX/VMS sort utility, spend less — up to 75% less — with VSORT from Evans Griffiths & Hart, Inc. Compare the following elapsed and CPU times for VSORT (V03.07) and the VAX/VMS (V4.2) sort utility running on a VAX 11/780.



VSELECT, the fast sequential record extractor.
VSELECT is also fast and efficient. Running stand-alone on a VAX 11/780, VSELECT often exceeds scan rates of 1,000 blocks per second. It can select and reformat records from an indexed file much faster than the VAX/VMS CONVERT utility can unload the same file — often three or four times faster.

For RSTS/E, use FSORT3 and SELECT.
If you run RSTS/E on the PDP-11, we invite you to join the hundreds of users and OEMs who, for the past ten years, have relied on FSORT3 and SELECT for the fastest possible record processing.

Other software products for VAX/VMS and RSTS/E

- *ROSS/V* a RSTS/E operating system simulator under VAX/VMS.
- *KDSS* a multi-terminal key-to-disk data entry system.
- *TAM* an efficient screen formatter for transaction processing applications.
- *DIALUP* a data communications package that links VAX/VMS and RSTS/E systems to remote computers.
- *BSC/DV* a device driver for DEC's DV11.

For more information, call
(617)861-0670 or write:
Evans Griffiths & Hart, Inc.
55 Waltham Street
Lexington, MA 02173
TWX: 710-326-0103

Evans Griffiths & Hart, Inc.

EG&H

DEC, VAX, VMS, RSTS and PDP are trademarks of Digital Equipment Corporation.

CIRCLE 194 ON READER CARD

several years of building proprietary, DEC-will-provide-everything systems (remember the VAXstation 2000?), DEC seems to be heading in the right direction. All DEC workstations, including the VAXstation 3520/3540 and DECstation 5000 Model 200, support standard SCSI devices via a single- or dual-channel SCSI controller.

Long regarded as a low-performance and uncertain storage device interface, SCSI has grown to be the most widely used general-purpose workstation interface. Because of its rising popularity, SCSI devices such as disks, tapes and optical drives form the new commodity peripheral market. As a general-purpose device interface, SCSI also can be used to interface communication devices such as LAN controllers, terminal multiplexers and co-processors.

Much of SCSI's market appeal is that it's an open standard. Thus, you can connect different vendors' hardware devices to the same SCSI interface. The relatively minor snag with SCSI is software drivers, which must be written for each device. Recognizing this, DEC provides VMS systems (as of V5.3) with an example SCSI class driver (SKDRIVER.MAR) that can be modified to support non-DEC devices. The *VMS Version 5.3 Small Computer System Interface (SCSI) Device Support Manual* provides adequate documentation for system programmers. ULTRIX users now have the same support with the release of ULTRIX V4.0. Another resource for device drivers is Professional Press' *VMS Advanced Device Driver Techniques* by Jamie E. Hanrahan and Lee Leahy.

The DECstation 2100 and 3100 SCSI interface is embedded in the motherboard. It isn't an option. The VAXstation 3100 base systems (Models 30 and 38) are diskless. The SCSI adapter must be added. There are two part numbers: VS42D-HF, which is a SCSI/ST506 controller, and VS42D-JF, which is a SCSI/SCSI controller. Both are mounted to a peripheral mounting plate that integrates into the system box with several captive screws. The SCSI controller connects to the motherboard via a ribbon cable. DEC workstation packaging is first-rate. I can't overemphasize the ease with which you can install memory and storage devices.

Non-DEC storage devices that exactly or closely emulate DEC's can be used as substitutes for the real McCoy. I regularly use off-the-shelf 760-MB SCSI disk drives instead of DEC's RZ56 665-MB disk drive. Drive formatting is accomplished through the workstation's diag-

For More Information

Motorola Inc.
1301 E. Algonquin Rd.
Schaumburg, IL 60196
(708) 576-5518
CIRCLE 412 ON READER CARD

Peritek Corp.
5550 Redwood Rd.
Oakland, CA 94619
(415) 531-6500
CIRCLE 413 ON READER CARD

Your Connection to Productivity

XESS™ The X Windows Engineering & Scientific Spreadsheet provides real-time data connectivity on DEC and other popular workstations.

BURCOM™ The communications gateway for connecting DEC VAX processors to Unisys A/V/B computers.

Ulysses™ The communications gateway connecting DEC VAX computers with Unisys 1100/2200 computers.

EasyEntry™ The data entry and data management system on DEC VAX and personal computers.

For more informqtion on these software programs CALL (800) 334-5510

applied information systems

500 Eastowne • Chapel Hill, NC 27514 • (919) 942-7801

Xess, Burcom, Ulysses, and EasyEntry are trademarks, and AIS is a registered trademark of Applied Information Systems, Inc. All other trademarks belong to their respective holders.

CIRCLE 105 ON READER CARD

"Best network training course I've ever attended!"
"Complete, concise, and entertaining -Thanks !"
"Really prepared me to build my network!"

Register today for

THE MACINTOSH-VAX/VMS NETWORKING LAB™

And Learn :

★ ***To install, use and manage AlisaTalk™, PacerLink™, TSSnet™, and other Mac-VAX products!***

★ ***To connect your Mac and IBM PC workstations through a VAX host!***

★ ***How AppleTalk works, and How a VAX/VMS system works within an AppleTalk network!***

★ ***To develop VAX-based Macintosh database applications!***

NOW COVERS DEC LAN WORKS FOR MACINTOSH

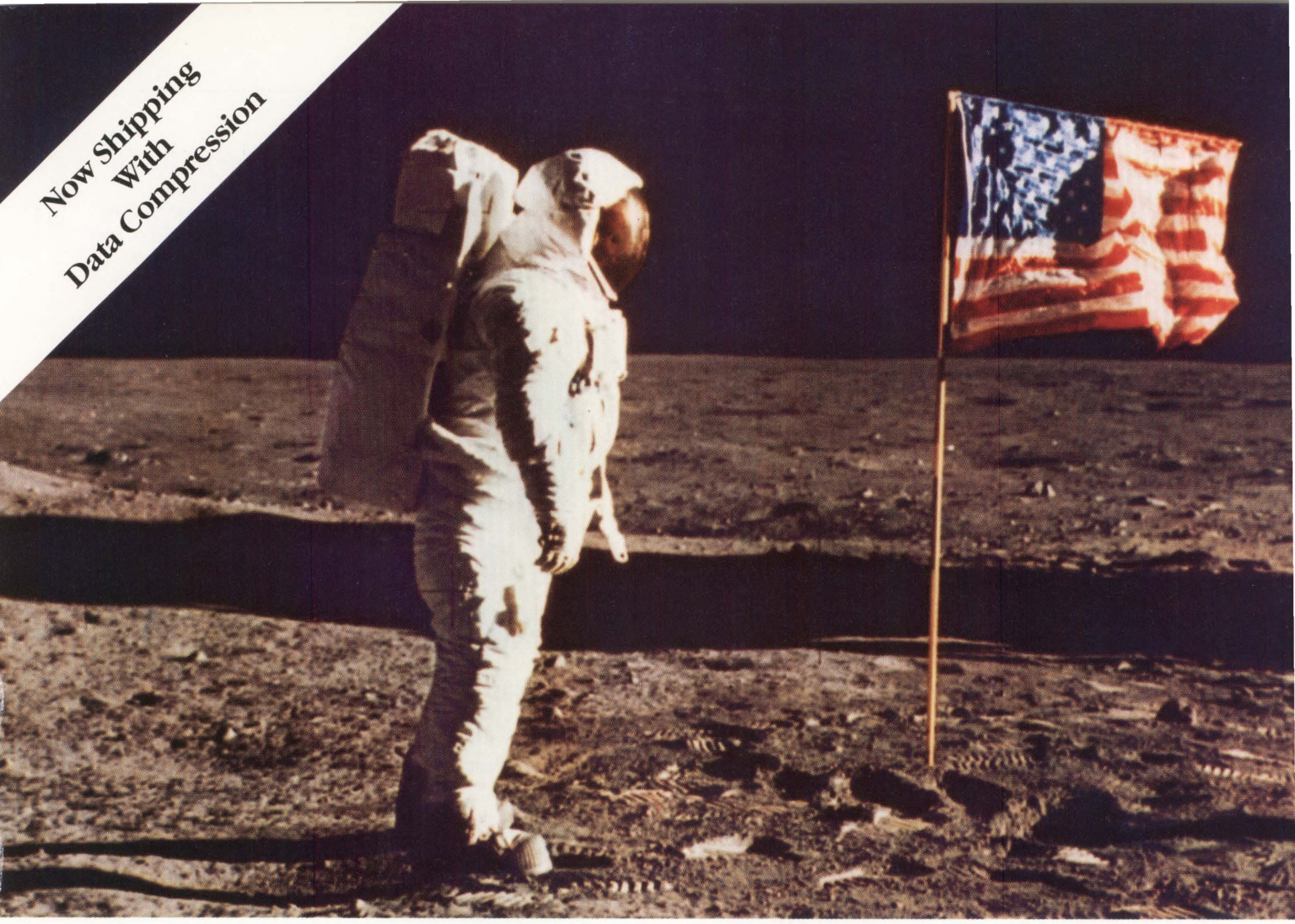
Offered monthly in our fully equipped lab facility - $995 tuition per student includes lecture, materials, lab access - even continental breakfast and lunch! Call for 1990 class dates! Ask about our custom, on-site training program!

Register RIGHT NOW, with your Visa or MasterCard!

800-969-4360

COMPUTER METHODS CORPORATION
525 Rt 73 South • Suite 300 • Marlton, NJ 08053

CIRCLE 277 ON READER CARD

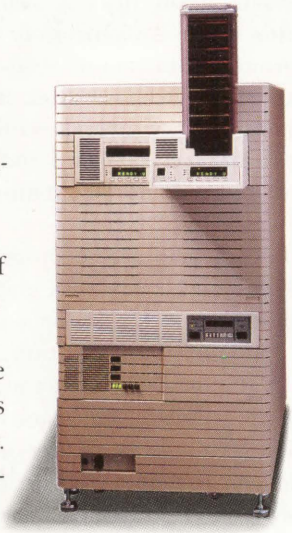


Introducing Our SI2480 Tape Drive. Because Leading Edge Has Always Meant Having All The Right Stuff.

At last, a cost-effective tape subsystem that has everything going for it. The new SI2480 is indeed leading edge technology for today's demanding VAXcluster backup. Now, you can get high performance, reliability, and unattended backup in one rackmountable 3480-compatible tape solution.

With the SI2480, the right stuff means the kind of performance that can put your operation in orbit. With a 3MB per second transfer rate, this HSC-compatible system lets you handle backup or restore assignments in a flash. While high-speed search lets you locate files in an average of less than 20 seconds.

Capacity takes off too, with the SI2480. Dependable ½-inch 3480-compatible cartridges hold 200 MB each. A 10-cartridge stacker/loader brings capacity to 2 GB. Plus you can put up to four SI2480s in a cabinet for unattended backup of up to 8 GB.



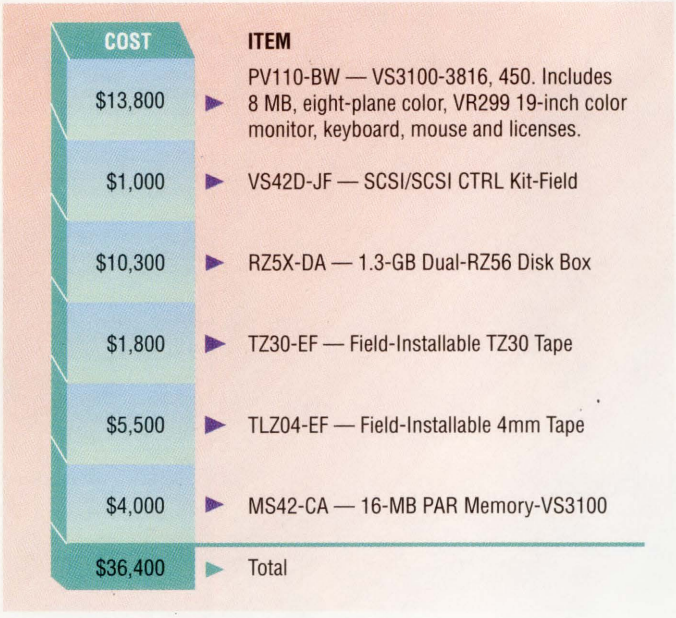
And when it comes to reliability, we don't promise you the moon. We just give you a system you can count on thanks to extensive diagnostics, MTBF ratings over 15,000 hrs., as well as worldwide field service.

So, if you're looking for a backup system that will blast you into the future, look no further than the SI2480. Just call **800-333-2220**. And we'll help you land one safely.

SYSTEM INDUSTRIES

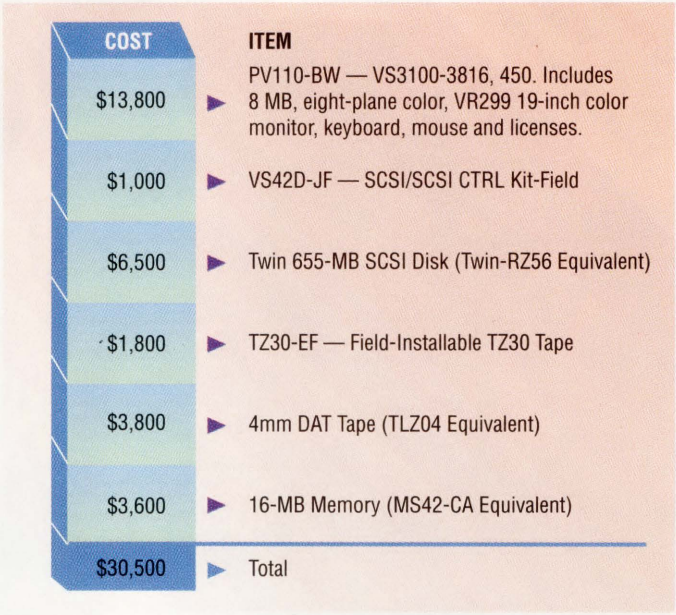
HSC and VAXcluster are trademarks of Digital Equipment Corporation. Photo: NASA.

CIRCLE 164 ON READER CARD



COST	ITEM
$13,800	PV110-BW — VS3100-3816, 450. Includes 8 MB, eight-plane color, VR299 19-inch color monitor, keyboard, mouse and licenses.
$1,000	VS42D-JF — SCSI/SCSI CTRL Kit-Field
$10,300	RZ5X-DA — 1.3-GB Dual-RZ56 Disk Box
$1,800	TZ30-EF — Field-Installable TZ30 Tape
$5,500	TLZ04-EF — Field-Installable 4mm Tape
$4,000	MS42-CA — 16-MB PAR Memory-VS3100
$36,400	Total

Figure 1: VAXstation 3100 cost analysis.



COST	ITEM
$13,800	PV110-BW — VS3100-3816, 450. Includes 8 MB, eight-plane color, VR299 19-inch color monitor, keyboard, mouse and licenses.
$1,000	VS42D-JF — SCSI/SCSI CTRL Kit-Field
$6,500	Twin 655-MB SCSI Disk (Twin-RZ56 Equivalent)
$1,800	TZ30-EF — Field-Installable TZ30 Tape
$3,800	4mm DAT Tape (TLZ04 Equivalent)
$3,600	16-MB Memory (MS42-CA Equivalent)
$30,500	Total

Figure 2: DEC/third-party VAXstation 3100 cost analysis.

nostic firmware.

The average discount price for a raw 760-MB drive is $2,500. An additional $500 will buy a drive box with power supply, fan and cables. Several third-party storage vendors are currently integrating their own boxes with drives. List prices for 1.2-GB drive subsystems ready to connect to your workstation start at $7,000. The new list price for the DEC RZ56 665-MB drive is $4,900 (the original fare was $8,500).

Other SCSI devices readily available for the VAXstation and DECstation include 4mm tape, 8mm tape and optical disks. The 4mm and 8mm tape drives that I've seen emulate or appear to the system as a TK50/TZ30 tape drive. These devices provide the ideal backup solution for high-capacity disk drives, because the TK50's 95-MB storage capacity is inadequate.

Installing SCSI disks and tapes is simple. Each SCSI device must have a unique channel node number. In most cases, the node number is set via dual inline package (DIP) switches or jumpers. Once set, the SCSI channel cable can be connected to the device or to the device cabinet. The last device on the SCSI cable must be terminated with a DIP or single inline package (SIP) resister network.

Integrating Co-Processors

As of this writing, the workstation co-processor industry hasn't announced a deliverable product. But the products are coming. Co-processors will be available for such tasks as vector/array processing, software cross-development and high-end graphics.

One company, Peritek, is developing high-performance graphics co-processors based on the Motorola 68030 CPU and ACRTC graphics controller. The co-processors run an X Window System server, which offloads this task from the workstation CPU. Co-processors such as this promise DECstation 5000-class performance at a much lower cost. It will also be possible to put multiple workstation heads (display, keyboard and co-processor) on a single DECstation or VAXstation CPU.

The Peritek graphics co-processors compete with DEC's new SPX graphics co-processor. The SPX is an eight-plane graphics option for the VAXstation 3100. It provides 10 times the graphics performance of the standard eight-plane color VAXstation 3100 and can support one or two Trinitron monitors. SPX graphics resolution is 1,280 x 1,024, an improvement over the standard 1,024 x 864. The SPX graphics co-processor is available as an upgrade or as an integrated package.

I HAVE LONG BEEN a fan of system integration, because it boosts the computer industry through fair competition. When an OEM giant such as DEC produces an open systems platform, it promotes the industry's add-on market growth and the development of new and innovative products. The workstation add-on market is ripe with products and savings. With DEC's recent price cuts, the savings are even greater. Unfortunately, too few companies take advantage of integration. Not enough buyers are aware of the ease with which most third-party devices can be integrated with the base system.

Figures 1 and 2 display a simple cost comparison of an off-the-shelf VAXstation 3100 and a VAXstation 3100 built a la carte. For comparison purposes all prices are list. Most common third-party workstation add-ons, such as memory, disks and tapes, are competitively priced. Notable discounts are available from many reputable distributors.

System integration is good for the consumer and for the industry. Try your next workstation a la carte and feel the difference where it counts: in your budget. ■

Nothing Is Faster Than A Great Team.

In sailing, great teamwork wins races. The combination of a powerful sailboat and a skilled crew can't be beat. For high performance computing, there's another team that can't be beat; your workstations and our memory.

You see, Dataram memory is the perfect teammate for your workstation. No other memory gives you more speed and high performance than our technically superior boards.

But we give you more than speed. We assure our memory's quality and reliability with a Lifetime Guarantee and The Express Spares Program. We price our memory quite competitively. And we support it with an expert technical staff. In fact, since 1967, we've offered a full line of high performance memory products — with speeds up to 250 MHz.

For the ultimate in high performance computing, team your workstation with our memory. It's an unbeatable combination.

DEC	SUN	HP/Apollo	DG
VAXstation 3100	3/260 3/280	DN2500	AViiON
VAXstation 3200-3900	3/470 3/480	9000/340 DN3000	MV series
VAXstation 2000	4/260 4/280	9000/360 DN3500	
DECstation 2100/3100	SPARC 330 SPARC 370	9000/350 DN4000	**IBM**
MicroVAX II/III/IV	SPARC 490	9000/370 DN4500	RISCSys 6000
VAX 6000 Systems	1MB/4MB SIMMs		

DATARAM

Your workstations, our memory. A powerful team.

The Dataram Corporation, P.O. Box 7528, Princeton, NJ, 08543
1(800)822-0071 In NJ, 1(609)799-0071

DEC • SUN • HP/Apollo • IBM • Mac • MIPS • SGI

All brands and/or product names mentioned are trademarks or registered trademarks of their respective manufacturers.

CIRCLE 245 ON READER CARD

THE MAC CONNECTION

Al Cini

Mirror For The Mac

Already well-known for its MS-DOS-based Reflection terminal emulation software, Walker Richer & Quinn is now shipping Reflection 2 Plus for the Macintosh. In the highly competitive field of Mac terminal emulators, this Mac-based VT320 terminal emulator stands out by combining a number of human interface innovations with a powerful command language and several handy behind-the-scenes features.

With more than 800 pages of thorough documentation, technically oriented users will find a lot of power to explore in Reflection 2 Plus. And users who just want to log on to a VAX and run host programs can simply double-click Reflection on the Mac to be on their way — perhaps with a little help from the *Quick Start* guide.

Reflection 2 Plus cleverly exploits advanced Mac human interface capabilities in many ways. The Reflection Mac display window provides a vertical scroll feature that can be used to recall captured host text from the top of the screen and a horizontal scroll feature for wide displays. In addition, when the product's terminal display window is resized, its displayed contents can be cropped or scaled to the new window size. This unique feature makes it easier to recognize a familiar host display among a crowd of reduced windows on the Mac's screen.

Reflection is fully compatible with Multifinder under the Mac OS and will function in Multifinder background mode. This feature enables Reflection to continue to capture host input or to upload/download a file while another Mac application is active.

Reflection supports Copy and Copy Table under its Edit menu. Copy Table is useful for moving column-formatted information from the terminal emulator to a Mac spreadsheet package. Holding down the Mac's Command key while selecting column-formatted text from the display lets you pluck a table from within a rectangle in the middle of the screen.

To simplify navigation of its many menus and options, Reflection offers an onscreen help facility. Like the hlp facility found in Microsoft's Excel spreadsheet package, a special menu selection converts the Mac's onscreen cursor to a question mark. You simply browse Reflection's menus and features with the question mark to learn more about them.

Faithful Emulation

Often missing from the Mac's keyboard, several useful control keys, such as Backspace, NUL and Break, are implemented as readily accessible pull-down menus in Reflection. These important keys are usually absent from or hard to find on other emulator packages.

When running host applications that use the special function keys found on DEC keyboards, Reflection converts the Mac's extended keyboard function keys to the necessary keystrokes. Mac users who lack an extended Mac keyboard can generate these keystrokes by using Reflection's Fkeys and Keypad menus (see Figure 1).

Faithful emulation of VT320 terminal characteristics is one of Reflection's principal assets. Covered thoroughly in the *Technical Reference Manual*, Reflection carefully implements every VT320 terminal escape and control sequence, including character set display and slave printer functions as well as cursor movement and display control operations. Reflection even supports blinking character fields, a feature absent from most terminal emulators.

Reflection's fidelity to these standards makes it suitable for use in front of ter-

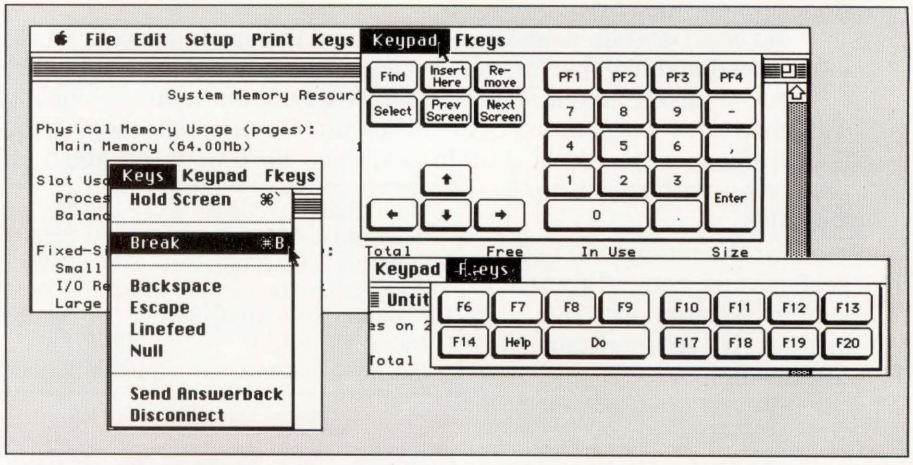


Figure 1: Key menus in Reflection 2 Plus. A VT320's function keys are presented to the Reflection user under the product's Keypad and Fkeys menus. Mac users with an Apple extended keyboard also will find these functions mapped onto their Keypads and Function keys. Commonly used communication control keys, such as Break, are found under the Keys menu.

It's Time You Started Using Our Mail Slot.

It's the one labeled AlisaMail.™

The corporate E-mail solution for Microsoft Mail users.

AlisaMail is a powerful, cost-effective combination of mail servers and gateways on the VAX that connects Macs and PCs running Microsoft Mail with DEC, IBM, and public E-mail systems.

Now Microsoft Mail users can plug into the corporate VAX mail system and network, using Microsoft Mail to send and receive mail messages on the network.

There's no training needed for existing Microsoft Mail users, either. You use the same Mac mail interface you always have. To easily send mail to DEC VMS users, DEC All-in-1 users, IBM Profs users, and X.400 addresses.

And adding new gateways and servers to increase your mail connectivity is simple. Because our Information Switch,™ the heart of AlisaMail, provides a common set of message services for mail gateways and servers.

AlisaMail by Alisa. Another special delivery from the originators of Mac-to-VAX connectivity software.

Alisa Systems Inc.
We keep everybody talking.™

221 East Walnut Street, Suite 175 Pasadena, CA 91101 (818) 792-9474
Alisa Systems (Europe) Ltd. 5 Surbiton Hill Road, Surbiton, Surrey KT6 4TW United Kingdom 44-1-390-3376

Information Switch and AlisaMail are trademarks of Alisa Systems Inc. VAX, DEC, VMS, and All-in-1 are trademarks of Digital Equipment Corporation.
IBM is a trademark of International Business Machines. Microsoft Mail is a trade-mark of Microsoft Corporation.

CIRCLE 222 ON READER CARD

minal feature-packed host applications, such as ALL-IN-1, which may not work properly behind other emulators.

Reading The Script

Another Reflection asset is its command language capability. Described in the *Command Language Manual*, the Reflection Command Language (RCL) includes constructs that can control every Reflection feature, with language syntax for defining variables and conditional branching. The average Mac user may find RCL a bit daunting, but it can be used by MIS personnel to create standard connection or file transfer procedures to automate such multistep functions for the average Mac user. While the language includes a few Mac- and MS-DOS-specific commands, most scripts can be used interchangeably between these environments.

Reflection command files can be created using a Mac text editor and saving the file as text only. For simple edits to command files smaller than 32 KB, Reflection includes a command language window that can be used for this purpose (see Figure 2).

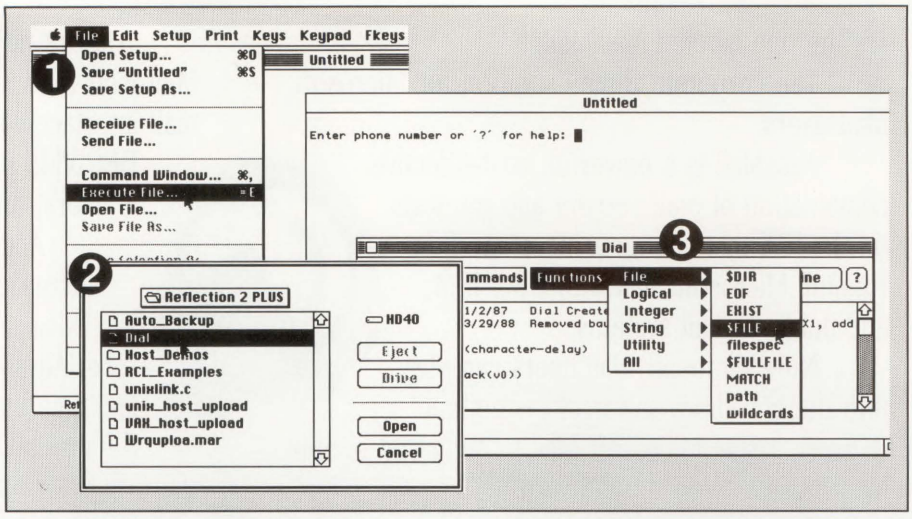
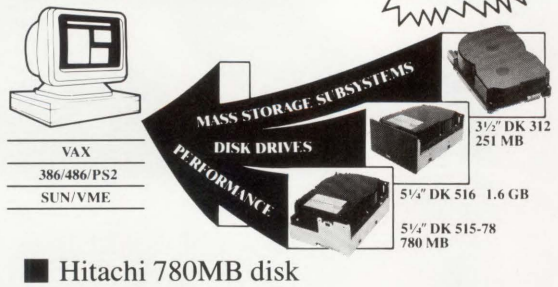


Figure 2: The Reflection Command Language (RCL). With Reflection's Execute File menu (1), a user selects an RCL script for execution — in this case, the Hayes modem dialer procedure included with the package (2). The procedure can be edited or a new procedure can be developed using Reflection's Command Window (3). Pull-down hierarchical menus in the Command Window are used to suggest RCL syntax elements.

The package includes a complete library of example RCL scripts. In many cases, site-tailored RCL procedures can be written quickly using these examples as templates.

HITACHI

Call for FREE Product Catalog



- Hitachi 780MB disk subsystem.....$2,695
- Archive 1.3GB 4mm tape backup.....$2,350
- Exabyte 2.34GB 8mm tape backup.....$3,450
- Pinnacle 650MB rewritable optical.....$4,395
- Kingston PC Memory–FREE Catalog–Best Pricing

5 Year Warranty on disks
Proven 150,000 hr. MTBF
We sell quality, price, performance

SPECIALIZED SYSTEMS TECHNOLOGY
We Integrate Solutions

1-800-688-8993 • FAX (713) 781-8996 • (713) 781-8993

CIRCLE 263 ON READER CARD

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.

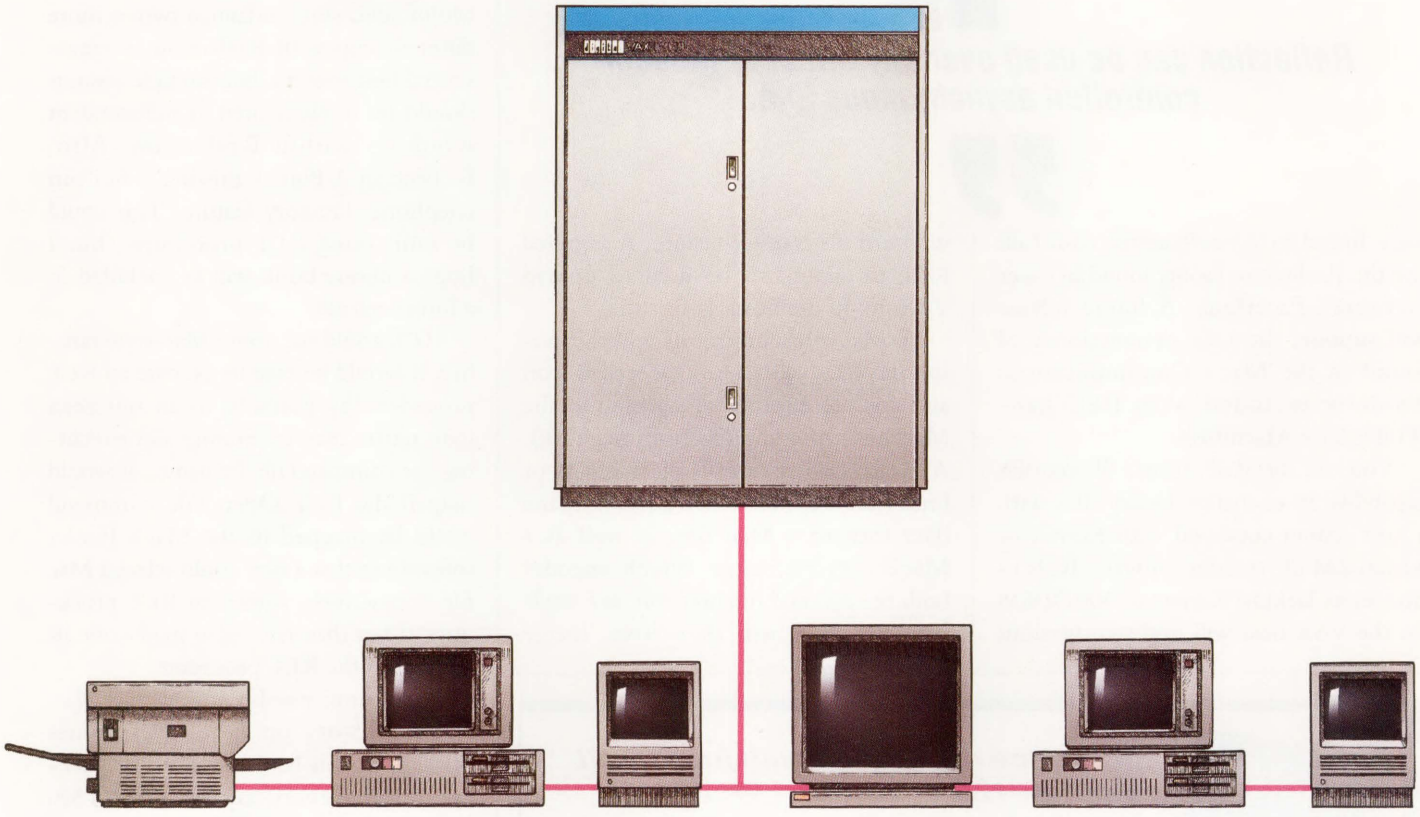
It also helps somebody else important: you. Because the more a publication and its advertisers know about you, the better they can provide you with articles and advertisements that meet your information needs.

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

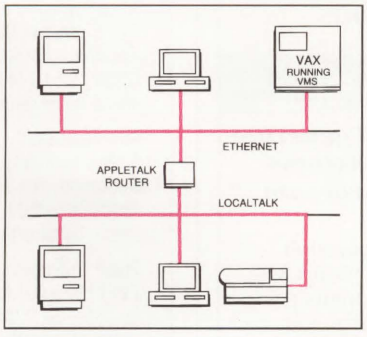
NOW SHIPPING

Pacer's on TOPS!



If you've never seen a VAX on a TOPS® LAN, feast your eyes! With PacerTOPS™ connectivity software, micro users throughout your organization can now take full advantage of a major corporate computing resource.

PacerTOPS puts VAX file-serving at everybody's fingertips – for greatly expanded storage capacity, back-up routines, and the superior security of VMS.



Now, many of the 500,000 users of installed TOPS nodes (Macs and PCs alike) can retrieve files from an attached VAX, share them with other users and return them to the VAX for back-up and storage. Yet each interface stays the same – regardless of whether you're working on a VAX terminal, Mac or PC.

With PacerTOPS, a Mac user could create a spreadsheet using Excel and save the file on the VAX via TOPS. The spreadsheet could then be accessed by VAX users with Access Technology's 20/20. Or by PC users with PC-Excel or Lotus 1-2-3, again via TOPS.

For enhanced integration, PacerTOPS works with PacerShare, Pacer's AppleShare-compatible file server. Thus, a TOPS user who has a PacerShare volume mounted on the VAX can publish it to the TOPS LAN, making it available to all other MACs and PCs on the network.

If you think it's time your TOPS users started enjoying the convenience, security, back-up and storage of the corporate VAX that everybody else in the organization is getting, call our West Coast office at (619) 454-0565 or our East Coast office at (508) 898-3300.

Pacer SOFTWARE

PACER SOFTWARE, INC., 7911 Herschel Ave., Suite 402, La Jolla, CA 92037 (619) 454-0565; 1900 West Park Drive, Suite 280, Westborough, MA 01581 (508) 898-3300
Pacer Europe S.A., Valbonne, France, (33) 93 653 008, FAX: (33) 93 653 100. All product names subject to trademark claims.

CIRCLE 150 ON READER CARD

Reflection can be used over any direct or modem-controlled asynchronous line. To establish a session with the host over a LAN, Reflection supports the AlisaTerminal network connection software found in Alisa Systems' AlisaTalk and the Redirector facility found in Pacer Software's PacerLink. A future release will support the LAT connection tool found in the Mac's Communications Toolbox included with DEC LanWORKS for Macintosh.

> ***"Reflection can be used over any direct or modem-controlled asynchronous line."***

You can use Reflection's file transfer capability to exchange binary files with a host system equipped with Kermit or XMODEM file transfer software. Reflection users lacking Kermit or XMODEM on the VAX host will find two versions of the vendor's proprietary VAXlink utility included — one for VMS and one for ULTRIX. The VAXlink host software offers some advantages over Kermit and XMODEM, including a handy wildcard file transfer feature. A supplied RCL program can be used to upload VAXlink to the host.

A Mac file consists of application-specific data (its data fork) as well as icon and control information specific to the Mac environment (its resource fork). A Reflection user can select ASCII or binary file transfer, which affect only the data fork of a Mac file, as well as a MacBinary exchange, which encodes both the data and resource fork as a single host file. A fourth alternative, Image transfer, can be used to exchange RMS files between two VMS hosts, preserving the files' RMS record characteristics.

Suggestions

The Reflection package supports only one interactive session at a time. Under Multifinder, you can launch two or more different copies of Reflection to create several host sessions, but multiple sessions should be implemented as independent windows within Reflection. Also, Reflection 2 Plus is missing a built-in telephone directory feature. This could be built using RCL procedures, but I hope a phone book will be included in a future release.

RCL could use some Mac-style taming. It would be nice to execute an RCL procedure by pointing to an onscreen icon rather than by finding and executing the command file by name. It would help if the RCL Open File command could be mapped to the Mac's Finder software so that a user could select a Mac file interactively within an RCL procedure rather than having to hard-code its name into the RCL procedure.

Reflection may be new to the Mac, but its history on other PCs comes through in this Mac release. The package mimics every aspect of a VT320 terminal and sports an impressive array of behind-the-scenes scripting and file transfer features. ■

For More Information

Alisa Systems Inc.
221 E. Walnut St., Ste. 175
Pasadena, CA 91101
(818) 792-9474
CIRCLE 421 ON READER CARD

Microsoft Corp.
1 Microsoft Way
Redmond, WA 98052
(206) 882-8080
CIRCLE 423 ON READER CARD

Pacer Software Inc.
7911 Herschel Ave., Ste. 402
La Jolla, CA 92037
(619) 454-0565
CIRCLE 424 ON READER CARD

Walker Richer & Quinn Inc.
2815 Eastlake Ave. E.
Seattle, WA 98102
(206) 324-0350
CIRCLE 422 ON READER CARD

$295

VersaTerm-PRO

emulation/communications application

MACWORLD Magazine 1989 World Class Award Winner

Access text and graphics mainframe applications from one easy-to-use program

■ *EMULATE* industry standard text and graphics terminals, including the DEC VT100, DEC VT200, DG D200, Tektronix 4014, and Tektronix 4105 ■ *COMMUNICATE* with a wide variety of mainframe computers or information services ■ *TRANSFER* files using popular protocols, including XModem, YModem and Kermit ■ *BACKGROUND* operation is supported under MultiFinder ■ *SUPPORTS* Apple CommToolbox.

developed by Abelbeck Software

$249

KaleidaGraph

data analysis/graphics application

CORPORATE TOP RATED PCWEEK 1989 SATISFACTION POLL

for the Macintosh series of P

Import data, analyse the data, and generate high resolution scientific and business graphics from one easy-to-use program

■ *FLEXIBLE* data import facilities ■ *FAST* operation (5 to 20 times faster than CricketGraph™ version 1.3) ■ *LARGE* data sets supported (32,000 data points per variable) ■ *PROGRAMMABLE* RPN Calculator and Algebraic Formula entry ■ *FEATURES* including: curve fitting; 15 plot types; log & linear scaling, zoom, and pan; automatic plot generation; hot links to data.

SYNERGY SOFTWARE

2457 Perkiomen Ave., Reading, PA 19606, 215-779-0522

CIRCLE 163 ON READER CARD

DATABASE WORLD*
Conference & Exposition
December 11-13, 1990 · Boston, MA

The Most Comprehensive Database Conference Covering the Technologies of the '90s

The Conference:

Featuring over forty technical presentations in nine tracks including:

- SQL Servers/Distributed Database
- Object-Oriented Database
- OLTP & High Performance
- AD/Cycle—Repository
- Systems Management
- Connectivity
- Expert Systems
- NEW PCs and Downsizing
- NEW Imaging

The Exposition:

Featuring over 60 companies demonstrating the latest in database technology

Participating companies include:

AGS Management Systems, Inc. • AI Association • AICorp • Bachman Information Systems • Borland International • Boston Computer Society • Businessland • Cognos Corporation • Computer Associates International, Inc. • Compuware Corporation • DBMS Magazine • Digital Equipment Corporation • Encore Computer Corporation • Fox Software • Gupta Technologies • Information Builders, Inc. • Information Dimensions, Inc. • InfoTel Corporation • Ingres Corporation • Intelligence Ware • Intelligent Business Systems • JYACC • LEGENT Corporation/BST Division • MASS HIGH TECH • MAXWEST, Inc. • Micro Decisionware • MicroTimes • Microrim • Morgan Kaufmann Publishers • MPI Technologies • MUST Software • Nucleus International • On-Line Software International • Oracle Corporation • Revelation Technologies • Sequent Computer Systems, Inc. • Software AG • Software Magazine • Software Products International • Sun Microsystems • Systems Center, Inc. • The Indus Group • The Programmer's Shop • Unisys Corporation • Vitronix • XDB Systems • *... plus many more*

A10DJ

Call 508-470-3880 Today!
For complete information on:

*DATABASE WORLD is a Service Mark of Digital Consulting, Inc.

- ★ DATABASE WORLD Conference Program
- ★ FREE DATABASE WORLD Newsletter Subscription
- ★ DCI Catalog of Events
- ★ Exhibiting at DATABASE WORLD

Digital Consulting,® Inc.

CIRCLE 247 ON READER CARD

PRODUCTS

NCD X Terminals Gain Increased DEC Connectivity

Network Computing Devices Inc. announced three features for its family of X terminals that enhance DEC and ULTRIX connectivity. The company's color and monochrome X terminals now access and display non-X applications via DEC's LAT protocol. They also emulate the VT220 and access ULTRIX and VMS via high-speed serial communication in addition to Ethernet.

NCD X terminals can use LAT protocol to access existing terminal applications on VMS-based hosts. Up to four DECwindows-managed LAT windows can be displayed simultaneously on the terminal screen. The LAT implementation, compatible with NCD's standard software, lets you intermix LAT, TCP/IP TELNET and standard X windows, as well as windows accessible through the X terminal's local serial port. The product's XRemote transport protocol operates on ULTRIX- and VMS-based hosts. It performs multilevel data compression in X environments, making NCD terminals usable across telephone lines or RS-232 links.

NCD X terminals support the LAT protocol and VT220 emulation as standard features in NCD's $50 software license fee. XRemote capability is available in a PROM set that costs $300 for each NCD unit. XRemote operation also requires one host-side cartridge tape that costs $500.

For more information, contact Judy Estrin, Network Computing Devices Inc., 350 N. Bernardo Ave., Mountain View, CA 94043; (415) 694-0650.

Circle 482 on reader card

BASISplus Offers Multiformat Document Management

Information Dimensions Inc. announced document format management capabilities for BASISplus, a text information management system. BASISplus' multiformat capabilities preserve documents in their original format for storage, retrieval and display. The product eliminates the need to force information into a predetermined format because it accommodates conventional, continuous and sectioned database record structures.

Applications for the multiple format information storage and retrieval capabilities of BASISplus include records management, research information archives, customer service, litigation support and competitive intelligence. The product runs on all major platforms including VAX/VMS and ULTRIX.

BASISplus costs from $5,000 to $179,000. For more information, contact Ed Loss, Information Dimensions Inc., 655 Metro Place S., Dublin, OH 43017; (614) 761-8083.

Circle 470 on reader card

Microtronix Datacom Offers Increased WAN Efficiency

Microtronix Datacom Ltd. announced the Packet Miser, a communications system designed to increase efficiency of applications over WANs. The product minimizes the cost of transferring packet-switched data over X.25 or PSDN networks.

The Packet Miser lets you communicate with VAX/VMS host processors without experiencing delays often associated with transferring packet-switched data. Because users communicating with host computers in a VMS environment must rely on echoing performed by a host rather than their own terminals, network costs and data-transfer delays are increased. The product ends network echoing by implementing standard VAX/VMS terminal functions at users' sites. This lets hosts forward all I/O requests to remote sites for processing. The company's LSI-X.25 and KXJ-X.25 front-end processors serve as packet-switching interfaces for DEC processors.

The Packet Miser costs from $4,500, depending on existing hardware configuration.

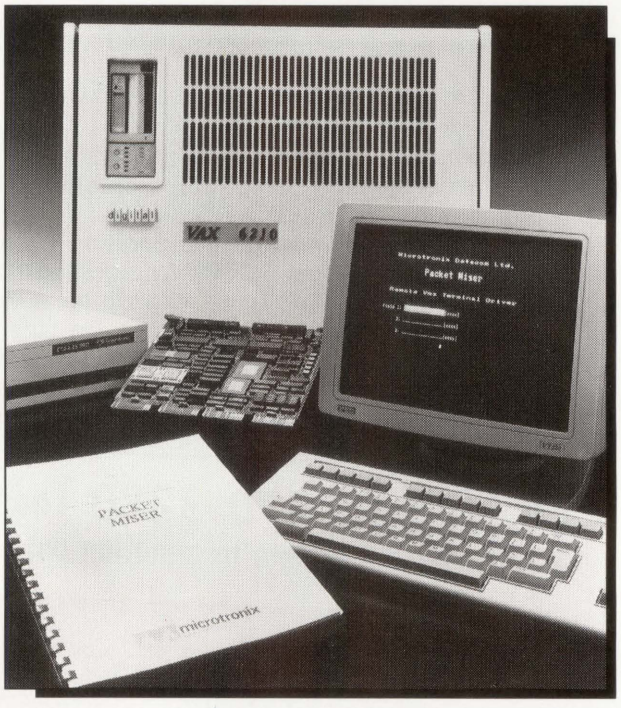
For more information, contact Erin Pease, Microtronix Datacom Ltd., 125 Bessemer Rd., London, ON N6E 1P9; (519) 681-3430.

Circle 468 on reader card

Performance 8000 Server Supports 128 Ports

Emulex Corporation announced the Performance 8000, a rack-mount communications server that supports up to 128 asynchronous ports in a 5 1/4-inch-high chassis. The Performance 8000 is compatible with LAT and TCP/IP.

The Performance 8000 provides maximum uptime by offering optional redundancy on power supplies, network interface boards and fans. It has a "hot swap" capability that lets qualified service personnel replace defective boards or power supplies without shutting down the server. Its basic chassis supports up to four 32-port plug-in terminal controller boards, each of which has a 16-MHz 80286 CPU and a 25-MHz I/O processor.



Microtronix Datacom's Packet Miser increases efficiency of applications over WANs.

Other features include multiple-host printer queuing, voltage and temperature readouts at the system console, extended security features and compatibility with major cable management systems.

The Performance 8000 costs $11,500 for the basic chassis with one power supply and one network interface board. Each 32-port terminal controller board costs $3,795.
For more information, contact Dan Reese, Emulex Corp., 3545 Harbor Blvd., Costa Mesa, CA 92626; (714) 662-5600.

Circle 469 on reader card

Servio Releases First Of Gemstone Tools

Servio Corporation announced Gemstone V2.0, an ODBMS that supports C++. The company also announced the first of the Gemstone Tools, the Gemstone Visual Schema Designer.

Gemstone, written in C, is based on a multithreaded client/server architecture and can be configured with clients and servers running on the same or heterogeneous machines, depending on the type of application. It supports workstations and servers from DEC, IBM and Sun as well as TCP/IP and DECnet protocols. V2.0 enhances performance through improved caching, optimized algorithms and greater flexibility in retrieving complex objects. It offers a C++ interface that provides persistent storage to C++ applications.

The Gemstone Visual Schema Designer is a graphical tool for creating class definitions. It lets you define classes and their instance variables, create and manipulate the class hierarchy and define sets to hold collections of objects.

Gemstone V2.0 costs from $12,000 for a four-user license on entry-level workstations.
For more information, contact Carole Rutter, Servio Corp., 1420 Harbor Bay Pkwy., Ste. 100, Alameda, CA 94501; (415) 748-6200.

Circle 473 on reader card

Vermont Research Announces Pennine/Vsdi and DRAMfile

Vermont Research Corporation announced the Pennine/Vsdi solid-state disk drive. The company also announced DRAMfile, a 5 1/4-inch solid-state memory device.

The Pennine/Vsdi can be expanded in steps of 8 MB up to 128 MB in a single chassis and up to 2 GB using an extension chassis. It's supported by integral, rechargeable battery backup and a high-speed cartridge tape or disk drive and performs a maximum of 300 I/O data requests per second. It operates on systems with VAXBI, Q-Bus or UNIBUS bus-level interfaces via any appropriate DEC controller. DRAMfile transfers data at rates of 5 MBps in synchronous mode and 2.8 MBps in asyncronous mode. By eliminating the seek and latency time associated with mechanical devices, it achieves virtually zero access time in less than half a millisecond for SCSI overhead.

The Pennine/Vsdi costs $338 per MB. DRAMfile costs from $4,100 for 8 MB to $23,000 for 80 MB.
For more information, contact John Dimitruk, Vermont Research Corp., Precision Pk., N. Springfield, VT 05150; (802) 886-2256.

Circle 471 on reader card

Ten-Port Terminal Server Supports LAT, TCP/IP And SNMP

Cisco Systems Inc. announced the STS-10x, a 10-port multiprotocol Ethernet terminal server that supports TCP/IP and LAT protocols and industry-standard SNMP-based network management and remote software loading.

In the STS-10x, an enhanced version of the STS-10, ROM memory is doubled to 256 KB. The product optionally supports DEC's LAT protocol in addition to its standard TCP/IP. Cisco licenses the LAT technology directly from DEC so that current and future compatibility is guaranteed. STS-10x users can use rlogin, TELNET or serial line Internet protocol for communication with UNIX- or ULTRIX-based hosts. The product features a remote booting capability that lets you load, centrally store and update system software from a remote host over the network.

The STS-10x terminal server costs $2,995. The LAT option costs $250.
For more information, contact Jeff Paine, Cisco Systems Inc., 1525 O'Brien Dr., Menlo Park, CA 94025; (415) 326-1941.

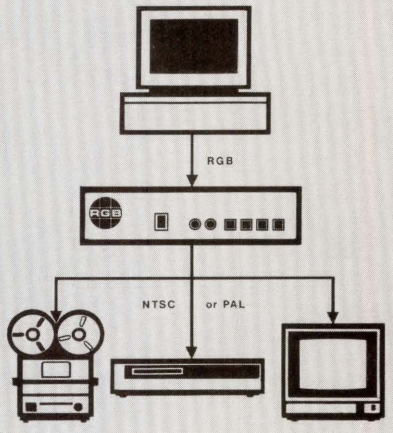
Circle 467 on reader card

Camintonn Provides DECstation 5000 Memory

Camintonn Corporation announced the CMX-871 and the CMX-3274 8- and 32-MB ECC memory boards for the DECstation 5000 and the DECsystem 5000.

The CMX-871 8-MB board with 1-Mbit DRAM allows 120 MB of memory. The CMX-3274 32-MB board with 4-Mbit DRAM allows 480 MB of memory. Both boards are 100 percent DEC-compatible and

Convert Computer Graphics to Video



RGB/Videolink™
Scan Converters
with Autosync

The Link Between Computer Graphics and Television Video for Video Taping, Video Transmission and Video Teleconferencing

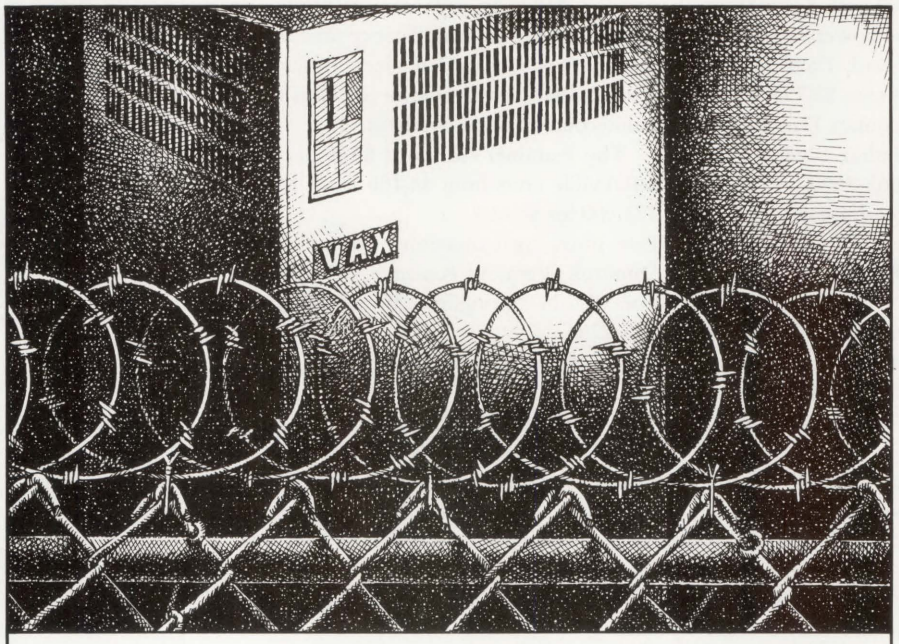
- Adjustment free auto-locking
- Full broadcast quality encoder and sync generator
- Flicker elimination
- Anti-aliasing
- Genlock
- Video overlays with linear keyer
- Full 24 bit color processing
- Composite (NTSC or PAL), S-Video, Y, R-Y, B-Y and RGB video outputs
- Made in the USA

Model 1400AX
autosyncs to workstation displays (45–80 kHz)

Model 600AX
autosyncs to EGA, VGA, and Mac II displays (21.5–35.0 kHz)

RGB SPECTRUM
2550 Ninth Street, Berkeley, CA 94710
TEL: (415) 848-0180 FAX: (415) 848-0971

CIRCLE 357 ON READER CARD



Now you can AUTOMATICALLY identify and correct existing and potential VAX security loopholes — with AUDITOR.

This Is The Only Security Management System Easier To Use Than the VAX* AUDITOR.

AUDITOR secures all VAX systems on your network or cluster with ONE single utility.

AUDITOR determines and (optionally) corrects deviation from your Security Baseline.

AUDITOR easily produces security reports with concise explanatory text.

AUDITOR is the ideal tool for Systems Managers or EDP Auditors.

Call 1-800-232-5215 for more information or a free trial.

BRAINTREE
Technology Inc.

SIMPLIFYING SYSTEM MANAGEMENT.

600 Cordwainer Drive
Norwell, MA 02061

Within Massachusetts or outside the USA, call 1-617-982-0200.

*VAX is a trademark of Digital Equipment Corporation.

CIRCLE 316 ON READER CARD

come with lifetime warranties.

The CMX-871 is priced ar $3,200. The CMX-3274 is priced at $15,800.

For more information, contact Geneve Zagarnaga, Camintonn Corp., 2332 McGaw Ave., Irvine, CA 92714; (714) 553-0247.

Circle 474 on reader card

Ingres Ships Database Software For OS/2 And DOS

Ingres Corporation announced the Ingres Server for OS/2 and Ingres Tools for DOS, PC software products that connect industry-standard PCs to the Ingres RDBMS.

The Ingres RDBMS provides large corporations with enterprisewide computing applications. The Ingres Server for OS/2 lets users on PC LANs run Ingres database applications, giving workshop users immediate access to data on their LANs. Simultaneously, MIS maintains control over data integrity usually available only with larger hardware. The Ingres Tools for DOS give programmers the flexibility and speed of an integrated 4GL for SQL database development. It lets programmers develop the application-client component of a distributed client/server network. The data can be stored locally on a PC or on a network server, mini or mainframe.

The Ingres Server for OS/2 costs $1,995. The Ingres Tools for DOS cost $495. The Ingres Tools For DOS ABF/4GL programming kit costs $295. The Ingres Tools For DOS embedded SQL for C costs $250.

For more information, contact Mark Lewis, Ingres Corp., 1080 Marina Village Pkwy., Alameda, CA 94501; (415) 769-1400.

Circle 465 on reader card

Integrated Systems Updates Topaz Software Series

Integrated Systems Inc. announced an updated version of the Topaz software series. Designed for use in organizations requiring distributed solutions for administrative functions, it includes integrated modules for electronic requisitioning, purchasing with EDI option, stocked material requisitioning and inventory control, request for quotation and accounts payable.

Topaz features pop-up windows, free-form text editing, turbo keys for multilevel screen access, a virtual menu rapid function access system, a consistent user interface, extensive analysis/auditability and user/function security. Its architecture uses standard DEC development software.

Topaz costs from $10,000 to $45,000. A staff of management consultants and VAX specialists are available for all phases of implementation and support.

For more information, contact Integrated Systems Inc., 170 Algonquin Pkwy., Whippany, NJ 07981; (201) 884-0892.

Circle 466 on reader card

Netron/Cap V2.5 Adds IMS Test Facility

Netron Inc. announced Netron/Cap V2.5, a CASE system for development and maintenance of COBOL applications on VAXs. V2.5 adds several enhancements for VAX-based development, including the IMS Test Facility (IMSTF) for testing IBM IMS mainframe applications built on VAXs.

Netron/Cap consists of a software toolset of screen, report and system designers, processors and utilities, and a library of read-only reusable components called frames that are adaptable to any programming usage. With V2.5, users of Netron/Cap developing a sophisticated IMS application on a VAX platform can test program structure and logic

capture
prioritize
lookup
route
track
respond
mail
report
analyze
solve

THE BEST SYSTEM MANAGERS ORGANIZE THEIR PROBLEMS

At busy VAX sites, responding to user problems requires an organized solution. That's why these system managers use Target->Hotline, a central problem database.

Here's how it works. The help desk or user logs in a problem. Target->Hotline notifies the support staff of a new problem, then prioritizes and routes the problem to a support representative. Historical data can be reviewed, the solution entered, and the user notified. Reports capture problems, bottlenecks, and performance for all DECnet nodes. And no problem is ever overlooked.

To qualify for a free evaluation copy, call us toll free.
1-800-233-3493.
The best solution for your problems is Target->Hotline.

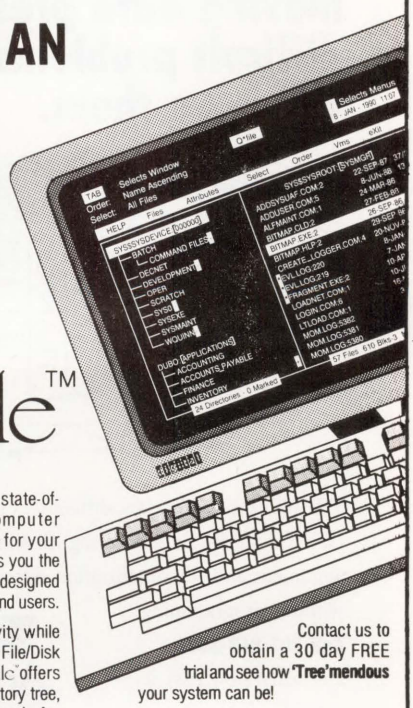
TARGET SYSTEMS CORPORATION

33 BOSTON POST ROAD MARLBORO, MA 01752 USA (508) 460-9206 FAX (508) 481-9187

CIRCLE 166 ON READER CARD

"FINALLY, AN X-TREE™ FOR THE VAX"

Q★file™



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

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

X-Tree™ is a registered Trademark of X-Tree Company.

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

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

CIRCLE 340 ON READER CARD

and data communication before moving it into production usage on a mainframe. Other features include the Netron/Cap Listing Annotator for use in debugging and impact analysis, enhancements to the Capframe library, and refinements to the field-at-a-time processing capabilities.

For more information, contact Bill Daverne, Netron Inc., 99 St. Regis Crescent N., Toronto, ON M3J 1Y9; (416) 636-8333.

Circle 472 on reader card

Ace Microsystems Adds Features To LEX-WP

Ace Microsystems Ltd. announced LEX-WP V9C, a word processor and database package. It's available for VAX/VMS and PCs running PC/MS-DOS and XENIX.

LEX-WP includes a built-in multiuser database and a programming language. Its editing facilities include multiple-columns handling, macros for recalling text and a spell checker with a 174,000-word dictionary. It also contains a four-function calculator facility and multilingual facilities that let you work in a number of languages. V9C features a thesaurus, improved help screens, redlining and box-drawing facilities, and a built-in multiuser database that includes processing and mailslot facilities. It's supplied with four database systems: a mailslot/card index system, a personal system, and bibliography and sales leads tracking. An SQL interface is used to communicate with Oracle, which enables migration to other proprietary database systems with an SQL interface. The product also supports the RMS file structure and can run under ALL-IN-1.

For more information, contact John Irwin, Ace Microsystems Ltd., Kew Bridge House, Kew Bridge, Brentford, Middlesex TW8 0EJ (081) 847-4673.

Circle 475 on reader card

Industrial Mouse-Trak Is For Harsh Environments

Itac Systems Inc. announced the Model M5-IND industrial-version Mouse-trak for harsh environments that require rugged, compact systems.

The Model M5-IND provides ruggedized stationary input and is constructed of 5 percent glass-filled Lexan 500 (the material used to make bulletproof glass). It has the same design and features as the commercial-version Mouse-trak: user-definable input keys, speed control and single connection to the host. In addition to the case design, a mylar ring has been added around the ball opening for added protection from dust and debris. The PCB. has a conformal coating for water-resistant electronics in high-moisture areas. The shielded cable offers strength and reduced EMI. The Model M5-IND can interface directly with a single connection to such computer systems as Apple, DEC, IBM and Sun.

The Model M5-IND costs $295.

For more information, contact Peter Whitney, Itac Systems Inc., 3121 Benton St., Garland, TX 75042; (214) 494-3073.

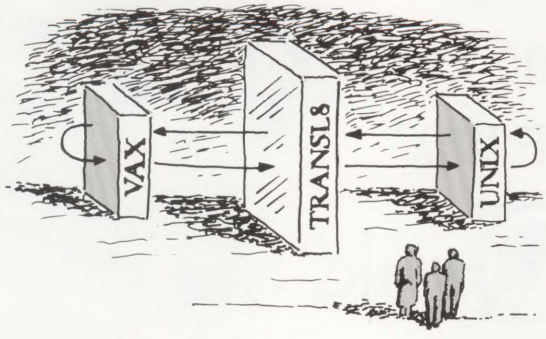
Circle 477 on reader card

SAS Institute Enhances SAS/CPE And ALL-IN-1 Link

SAS Institute Inc. announced V2.0 of its SAS/CPE computer performance evaluation software. It lets system analysts collect, analyze and report current usage and anticipate changing requirements to help fine-tune VAXs. The company also announced an enhanced link to ALL-IN-1 that lets ALL-IN-1 users take advantage of capabilities in the SAS Applications System.

SAS/CPE features a variety of functions

Moving data presents difficult problems . . . we solve them.



TRANSL8 resolves data differences between VAX and UNIX systems. Byte ordering, floating point, data alignment and file organization differences are solved without programming.

Call 303 863-8088
and learn how easy it is to share data now.

Accelr8® Technology Corporation
303 East 17th Avenue Suite 108
Denver, Colorado 80203

Dealer inquiries invited.

TRANSL8 is a trademark of Accelr8 Technology Corporation.
VAX is a trademark of Digital Equipment Corporation. UNIX is a trademark of AT&T.

CIRCLE 360 ON READER CARD

* * * ATTENTION * * *
AlisaTalk™, PacerLink™, Helix VMX, and SequeLink™ Customers!

NOW, You Can Dial Into Your VAX and Use These Products, with

ASYNCSERVER™

★ *Software-only dial-up solution! Works with the modems, asynch lines, and terminal servers you already own!*

★ *Totally AppleTalk™ compatible - use your Chooser to select file, print, and database servers!*

★ *Works through your VAX to connect you with LaserWriters™, AppleShare™ servers, and other AppleTalk devices!*

★ *Fully LAT-transparent Can be used through a DECserver port!*

HyperCard Tour and 30-day evaluation available! Priced between $750 and $2500 per VAX CPU - unrestricted user count!

Order RIGHT NOW, with your Visa or MasterCard!

800-969-4360

COMPUTER METHODS CORPORATION
525 Rt 73 South • Suite 300 • Marlton, NJ 08053

CIRCLE 188 ON READER CARD

to simplify the collection, management and reporting of system performance and resource-usage data. V2.0 includes support for Ethernet monitoring, enhanced billing and rate definition tools, full support for MONITOR and SPM data collection and many new reports. The enhanced ALL-IN-1 connection lets you run V6.0-based SAS software applications under VMS without leaving the ALL-IN-1 (V2.3) environment.

SAS/CPE V2.0 costs from $575 to $4,100.

For more information, contact Mike Truell, SAS Institute Inc., SAS Circle, Box 8000, Cary, NC 27512; (919) 677-8000.

Circle 479 on reader card

Vitalink's Bridge Products Meet DoD TEMPEST Standards

Vitalink Communications Corporation announced that its Ethernet and Token Ring bridges and bridge/routers are available in versions that meet the Department of Defense's (DoD) TEMPEST standards (NACSIM 5100A). TEMPEST-compliant products are used on secure or classified networks to prevent compromising data-related or intelligence-bearing signals from appearing external to the equipment.

Products available in the TEMPEST-compliant versions include Vitalink's TransPATH 350 and TransPATH 550 bridge/routers and TransLAN 350 and TransRING 550 bridges. Vitalink's bridge and bridge/router products have RS-422/449 interfaces that support resynchronization of link-encryption devices such as KG84 and KG94. The TEMPEST bridge/router product uses the DoD's IP security options and revisions (RFC1038).

For more information, contact Marilyn Callaghan, Vitalink Communications Corp., 6607 Kaiser Dr., Fremont, CA 94555; (415) 794-1100.

Circle 480 on reader card

V-Scan Consolidates Monitoring Of Multiple Network Segments

Virtual Microsystems Inc. announced the V-Scan Network Monitoring System. It lets network managers consolidate the monitoring of multiple network segments and standalone PC LANs for a single VAX/VMS-based product.

V-Scan lets network managers perform monitoring functions, including alarm notification of potential problems and recording of important statistics, on a range of network-resident devices, independent of vendor or protocol. It can monitor a variety of devices resident on a VAX network, including minis, workstations, PCs, terminal and file servers, bridges, routers and gateways, from such vendors as DEC, HP and Sun. Information about these devices can be provided regardless of the protocol they use. V-Scan is available for VAX/VMS and DECnet V4.7 or later.

V-Scan costs from $7,500 for a single segment.

For more information, contact Bill Thomasmeyer, Virtual Microsystems Inc., 1825 S. Grant St., Ste. 700, San Mateo, CA 94402; (415) 573-9596.

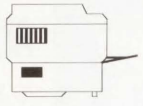
Circle 481 on reader card

Bell Atlantic Establishes DEXtra Support Program

Bell Atlantic Business Systems Services announced the DEXtra Support Program, a series of software and system support services for VAX/VMS users.

The DEXtra Support Program includes five support areas: Integrated System Support,

Hassle Free PostScript Printing? It's easy . . . using ScriptServer for VMS



- ✔ Provides a seamless software interface for local or LAT attachment of PostScript printers to VAX systems
- ✔ Translates ASCII and HP-GL files to PostScript output . . including support for color printers
- ✔ Invokes software switchable emulations available on most PostScript printers
- ✔ Downloads and manages PostScript fonts on a permanent or job-specific basis
- ✔ Includes a PostScript formatting facility for defining options such as typefaces, paper sizes, orientation, two-up, margins and form setup modules

See for yourself how ScriptServer can work for you!

GrayMatter
Software Corporation
1300 Dexter Avenue North Suite 550
Seattle, Washington 98109
206-281-8800

Call Today for a 30 day free trial
800-477-0348

CIRCLE 132 ON READER CARD

Oregon C++

TRUE OPTIMIZING COMPILER
not a translator

SOURCE-LEVEL DEBUGGER
window interface available

LIBRARY SUPPORT
C/C++ Libraries

2.0 COMPATIBLE
Multiple Inheritance & Pure Virtual Functions

• VAX/VMS	• VAX/ULTRIX
• NCR Tower 32	• Hewlett-Packard 9000/300
• Sun 386i	• MOTOROLA Delta Series 680X0
• Sun-3	• Interactive UNIX/386
• SCO Xenix/386, SCO UNIX/386, & AT&T UNIX/386	
• Soon to be joined be DECstation and Sun SPARCstation	

Also available from Oregon Software: Pascal-2 and Oregon Modula-2 development systems, Source-Tools management system, & C++ training seminars

Software leasing program available!

Call 1-800-874-8501

OREGON SOFTWARE
6915 S.W. Macadam Ave. Portland, Oregon 97219
TEL: 503-245-2202 FAX: 503-245-8449

CIRCLE 149 ON READER CARD

System Upgrade Support, Performance Enhancement Services, Coldsite Disaster Recovery and Site Relocation Services. Highlighting the program is Integrated System Support, which features technical support via telephone for software and onsite remedial and preventative system maintenance.

For more information, contact Mary Keifer, Bell Atlantic Business Systems Services, 50 E. Swedesford Rd., Frazer, PA 19355; (215) 296-6000.

Circle 483 on reader card

ezBridge Assists In Building LU6.2 Applications

System Strategies Inc. announced ezBridge Peer-to-Peer Productivity Tools for simplifying multivendor application-to-application development over LU6.2. Two initial productivity tools are being offered: ezTransaction Server and ezCommon Interface.

ezBridge Peer-To-Peer Productivity Tools are software modules that provide communications services to developers building multivendor LU6.2 applications. They're designed for online transaction environments and other environments requiring real-time movement and delivery of information. The productivity tools are currently available for IBM's LU6.2 on the AS/400 and System Strategies' ezBridge Peer-to-Peer on VAX/VMS systems. The ezTransaction Server is a software module that's layered on top of LU6.2. It provides guaranteed end-to-end data integrity over VAX/VMS. The ezCommon Interface also is layered on top of LU6.2 and lets you develop LU6.2 applications without having extensive knowledge of LU6.2

The ezBridge Peer-to-Peer Development Tools cost from $15,000 to $30,000, depending on the type and size of the processor. For more information, contact Lynn Tusa, System Strategies Inc., 225 W. 34th St., New York, NY 10001; (212) 279-8400.

Circle 484 on reader card

Oracle Announces Oracle For 1-2-3 DataLens

Oracle Corporation announced Oracle for 1-2-3 DataLens, a read/write DBMS interface to Lotus 1-2-3 for VAX/VMS. The company also announced that Lotus Development Corporation joined the Oracle Solutions Vendor (OSV) Program.

Oracle for 1-2-3 DataLens gives Lotus 1-2-3 for VAX/VMS users full read/write access to Oracle data. You now can leverage your existing knowledge of Lotus 1-2-3 to query and modify Oracle data and perform complex SQL operations from within its 1-2-3 applications. Because Oracle runs on more than 80 operating systems, Lotus 1-2-3 users can access data stored in any system within the network. Oracle is currently developing DataLens drivers for other platforms including UNIX, OS/2 and MS-DOS.

ORACLE 1-2-3 for VAX/VMS costs from $500 to $30,000.

For more information, contact Oracle Corp., 500 Oracle Pkwy., Redwood Shores, CA 94065; (415) 506-7000.

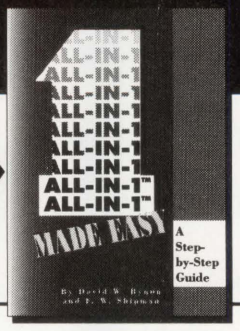
Circle 485 on reader card

Data Processing Design's Gold-Mail Enhances VMSmail

Data Processing Design Inc. announced Gold-Mail V1.1, a VMS electronic messaging package. Gold-Mail is VMSmail-compatible, offering such features as registered mail, batch mode send, pull-down menus, multiple editor choices, spelling correction, visual drawers and folders, and re-editable message and header.

Everything You Always Wanted to Know About ALL-IN-1

All In 1... New Book!



ALL-IN-1 Made Easy

by David W. Bynon and F.W. Shipman
Softcover, 160 pages, $24.95

Master the techniques of . . .

- *Creating, editing and printing documents*
- *Using the ALL-IN-1 desk calendar*
- *Electronic mail*
- *Creating form letters and distribution lists*
- *Importing one document into another*
- *The WPS-PLUS editor*

. . . and more. A book that belongs on every ALL-IN-1 user's desk.

*ALL-IN-1 is a registered trademark of Digital Equipment Corporation.

Cut Here

ALL-IN-1 Made Easy Order Form

☐ **Yes,** send me _____ copies of ALL-IN-1 Made Easy @ $24.95 per copy. (Add $3 shipping and handling for the 1st copy and $1 for each additional copy. Outside the US, please call 10-1-215-957- 4265 for shipping charges.)

☐ Check enclosed for $_____

Charge to:

☐ VISA ☐ MasterCard ☐ American Express

Acct. No_____Exp. Date_____

Signature_____Date_____

Ship to:

Name_____

Title_____

Company_____

Address_____

City_____

State/Zip_____

Telephone( ) _____ Fax( ) _____

THANK YOU for your order. ***Quantity discounts available.***

Complete, detach and mail your order form to:

Professional Press Books
101 Witmer Road, P.O. Box 446, Horsham, PA 19044

To order by credit card, FAX completed form to **(215) 957-1050** or call Trish at **(215) 957-4265** 9am - 4pm eastern time.

DPHH1090

Gold-Mail V1.1 lets WordPerfect users create messages within Gold-Mail using a WordPerfect message editor. You can send mail without loosing document attributes. It also includes access to personal distribution lists with list creation and editing capabilities, access to user directory services and the ability to send and read files in nontext format.

For more information, contact Collette Kimmich, Data Processing Design Inc., 1400 N. Brasher St., Anaheim, CA 92807; (714) 970-1515.

Circle 486 on reader card

DLM 200 Evaluates Data Transmission

Benedict Computer announced the DLM 200, a hand-held data communications troubleshooting tool for evaluating and monitoring data transmissions between any two devices on an RS-232C-type interface. The unit features remote operations capability and can evaluate sync and async devices.

The DLM 200 lets you capture and display the flow of data in both directions, examine the data in various formats, generate programmable transmission tests, and gather statistics on system and operator performance. It can perform bit error rate testing and examine devices, line continuity and basic communications activity over sync or async lines during installation and troubleshooting of communications networks. The unit features a 40-hour nine-volt battery, weighs 19 ounces and measures about 8 x 5 x 2 inches.

The DLM 200 costs $2,295.

For more information, contact Benedict Computer, 220 Felton Dr., Menlo Park, CA 94025; (415) 323-0148.

Circle 497 on reader card

Dilog Controllers Multiplex Async Lines To DEC Systems

Dilog announced two high-performance communications controllers. The CQ3032 and CQ3016 allow Q-bus users to multiplex 16 or 32 async lines to the MicroVAX 3000, DECstation 5400 and DECserver 500 and 550 terminal servers.

The CQ3032 provides 32 async DMA lines on a standard quad height Q-bus card for connection of such devices as terminals, modems and other controllers. The CQ3016 provides a lower cost alternative for 16 async devices. Both boards are compatible with DEC's DHV11 and CXY08 controllers. They require no additional software or modifications and are fully compatible with VMS and ULTRIX. They also provide DMA output on each line, a transmit silo for each line and support for programmable data ranges from 50 to 38.4 Kbps. User access to communications ports is located on a remote panel assembly that can be mounted inside a RETMA cabinet, under a computer room floor or on a wall.

The CQ3032 costs $3,700; the CQ3016 costs $2,700.

For more information, contact Judie Dutton, Dilog, 1555 Sinclair St., Anaheim, CA 92806; (714) 937-5700.

Circle 499 on reader card

RdbServer Lets Sybase Applications Access Rdb

Analytical Technologies Inc. and Sybase announced the RdbServer, a connectivity server for Rdb. It provides transparent read and write access to Rdb from Sybase-based applications.

The RdbServer was developed using the Sybase Open Server, an API that provides

Bring Project Management Down to Earth

With C-PLAN, it's easy to plan, monitor, and track projects of any size. You'll provide the right information to the right people . . . on time.

Now C-PLAN makes it easy.

DSD CORPORATION
18912 North Creek Parkway, #105
Bothell, WA 98011

1-800-767-7564
Call (206) 485-7564
Fax (206) 485-3993

C-Plan is a registered trademark of DSD Corporation.

CIRCLE 198 ON READER CARD

Error Detection on DEC* Systems Is Easier Than Ever With

Pro-Cure™

Stand-Alone Hardware Diagnostics

From Electronic Service Specialists

- Comprehensive Testing of CPU and Peripherals
- Accurate Failure Detection
- Starts Testing Even When System Is Down
- Auto Configuring
- Easy To Use
- Flexible Licensing Plans

We invite you to give Pro-Cure diagnostics a try today! We're sure you will agree that it is one of the most effective, yet economically priced diagnostic software tools on the market. Until December 31, 1990, ESS is making this low introductory offer —

UPGRADE your present diagnostic package and get Pro-Cure for the price of its yearly update fee.**

Call ESS today for further details and get Pro-Cure software working for you!

DEPOT REPAIR • SALES • TRAINING • DATA RECOVERY • TECHNICAL SUPPORT SERVICES
Sales representatives available 7:00 a.m. to 7:00 p.m. (CST)

Bell Atlantic
Computer Technology Services
ESS Division
N92 W14612 Anthony Ave.
Menomonee Falls, WI 53051
(414) 255-4634 FAX: (414) 253-3262
International FAX: (414) 253-3300

Pro-Cure is a trademark of Bell Atlantic Corporation.
*DEC and VAX are registered trademarks of Digital Equipment Corporation.
**DEC diagnostics do not apply to this offer.

CIRCLE 204 ON READER CARD

access to non-Sybase data sources and applications. As a migration tool, the product eases the transition from Rdb to Sybase. As a data server, it lets you use third-party front-end tools to access Rdb tables. It provides user-transparent access to Rdb tables in the DEC environment. It lets you perform select, insert, delete and update functions on Rdb tables with Sybase and third-party front-end tools. It also makes Rdb tables accessible through the Sybase Open Client Interface, which allows non-Sybase programming tools and 3GL applications to be used.

RdbServer costs from $10,000 to $60,000, depending on configuration and number of users.

For more information, contact Jim Barbour, Analytical Technologies Inc., 30300 Telegraph Rd., Ste. 200, Birmingham, MI 48010; (313) 540-4440.

Circle 496 on reader card

VAX Fieldsystem Offers Ethernet Networking Options

Fornax Computer Corporation announced DEC's LanWORKS (formally PCSA) support for VAX-based Fieldsystem portable computers. VAX Fieldsystems now offer two Ethernet networking options for linking the integrated laptop to the internal VAX: LanWORKS or Datability's RAF.

The VAX Fieldsystem is a complete turnkey system that integrates a laptop computer with a MicroVAX. The MicroVAX power supply can adapt to either 50- or 60-Hz power, letting VMS applications be moved to almost any area of the world. The product ships with a Xircom Pocket LAN Adapter, which offers flexibility in configuring the entire Fieldsystem solution, and either PCSA or RAF drivers. It can be configured with 200 or 400 MB of internal storage. A SCSI connector is available for attaching external SCSI devices. Two RS-423 MMJ and one fully pinned RS-232 communication port are available for attaching additional asyncronous communication options.

For more information, contact Fornax Computer Corp., 17 Doren Dr., Somerville, NJ 08876; (201) 874-7122.

Circle 510 on reader card

Hardware Design System Accounts For Numerical Precision

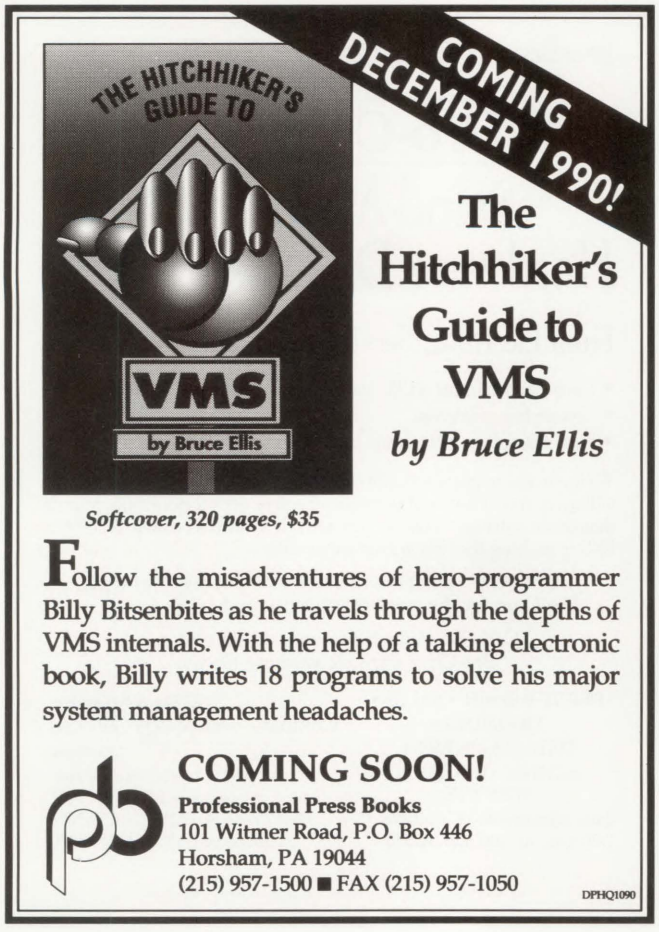
Comdisco Systems Inc. announced the Hardware Design System option for the Signal Processing WorkSystem. This graphical design and simulation package lets engineers account for the numerical precision of real-world hardware when designing digital signal processing systems. It can perform a bit-true simulation of the design and automatically translate a block-level design diagram to a hardware specification.

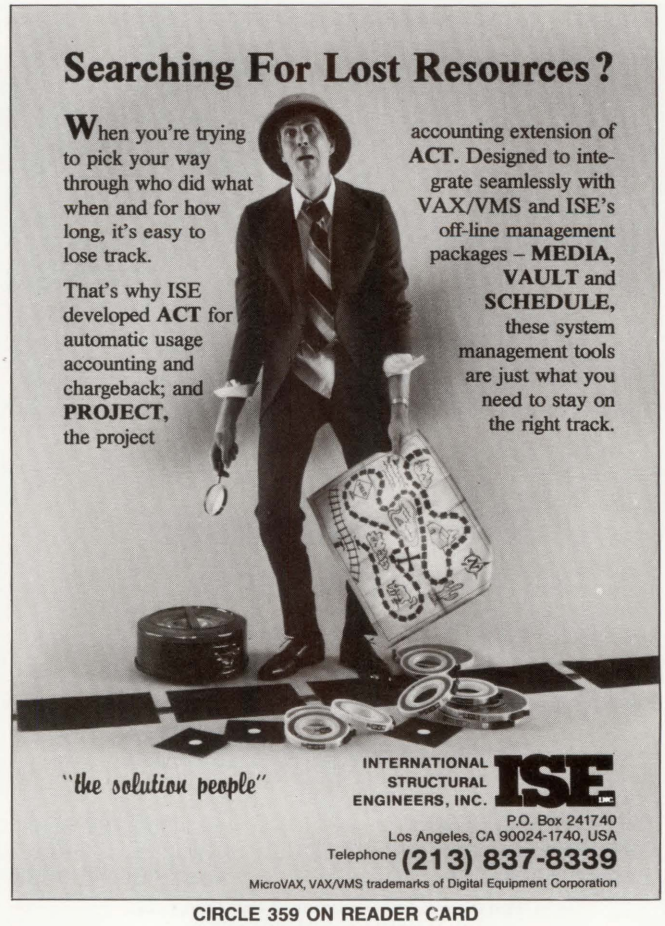
The Hardware Design System incorporates software models, subroutines and libraries that let you create a high-level block diagram specifying the precision of the target hardware. When the high-level system design is complete, you can run a bit-accurate simulation. If the hardware is inadequate, word parameters controlling precision can be changed. The effects of overflow and loss of precision are also simulated. The product runs on such platforms as the DECstation 2100 and 3100 series, HP-Apollo DN3000 and DN4000 series, and Sun3 and Sun4.

The Hardware Design System costs $10,000.

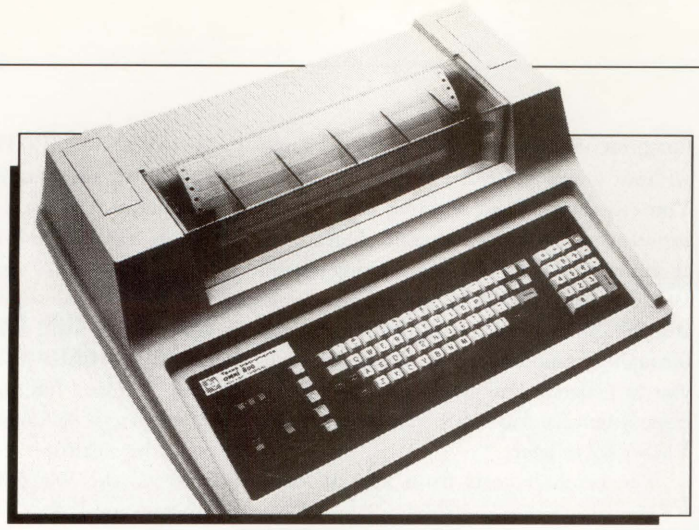
For more information, contact Michael Walsh, Comdisco Systems Inc., 919 E. Hillsdale Blvd., Foster City, CA 94404; (415) 574-5800.

Circle 498 on reader card





CIRCLE 359 ON READER CARD



Ideal Technologies' 820 KSR functions as an interactive telecommunications terminal, a remote I/O unit or a send/receive device.

Ideal Announces Data Terminal And Printers

Ideal Technologies announced a customized version of Texas Instruments' 820 Keyboard Send Receive (KSR) Data Terminal with DEC LA120 emulation. The company also announced the Model 885 Demand Document Printer.

The 820 KSR functions as an interactive telecommunications terminal, as a remote I/O unit in a DEC timeshare environment, or as a send/receive device in other data entry/retrieval applications. Features include a reset key, line feed, line control options, vertical or horizontal tabbing and forms advance.

The Model 885 Printer includes zero-forms waste capability. This feature eliminates the waste of multipart business forms such as tickets or invoices.

For more information, contact Mike Moretti, Ideal Technologies, 13101 Washington Blvd., Ste. 247, Los Angeles, CA 90066; (213) 827-9023.

Circle 476 on reader card

Nemonix Expands VAX 8800-Series Processing Power

Nemonix Inc. announced a series of CPU upgrades for the VAX 8810 through 8840 series. The upgrades add to the processing power of existing systems at a cost much lower than new systems.

The NX8XX-XL series provides an alternative to DEC upgrades, which cost more and require CPU board additions. The Nemonix upgrades are fully transparent to existing hardware and software. The add-on modules can be disabled with a switch, returning the system to its original configuration.

The upgrades provide 7.5 VUPS for the VAX 8810 at $14,995; 14.3 VUPS for the VAX 8820 at $19,995; 21 VUPS for the VAX 8830 at $24,995; and 27.8 VUPS for the VAX 8840 at $29,995.

For more information, contact Peter Cholakis, Nemonix Inc., 106 South St., Hopkinton, MA 01748; (508) 435-9087.

Circle 505 on reader card

Sherwood 785ST Emulates VT-Series Terminals

Sherwood announced the 785ST, an ANSI terminal designed to emulate the VT52/100/220/320. Three communication ports allow it to be connected to multiple computers simultaneously.

The 785ST is designed to be configured in DEC or DEC-compatible environments in which full ANSI compatibility is required. Compatibility with the DEC feature set is ensured by a built-in VT320 character set and compatible keyboard. The terminal features a universal auto-sensing power supply that automatically adapts to available voltage. It has a 14-inch flat CRT display system and a refresh rate of 60 or 78 Hz.

The product costs $479.

For more information, contact Phil Graham, Sherwood, 4181 Business Center Dr., Fremont, CA 94538; (415) 623-8900.

Circle 506 on reader card

SuperLAT/DOS Implements Full LAT Protocol

Meridian Technology Corporation announced SuperLAT/DOS, a toolkit aimed at easing the task of implementing LAT communication services within MS-DOS applications. With SuperLAT/DOS, developers can add LAT protocol support to existing and new products.

SuperLAT/DOS is an MS-DOS version of Meridian's portable SuperLAT software. It implements the full LAT protocol, enabling any MS-DOS application to function in DEC networks as a host, as a single-port terminal server, or both. As a host, applications advertise and deliver services to other LAT-capable systems connected to the Ethernet. As a terminal server, applications can initiate connections to services offered by LAT host systems.

A license for the software and documentation with a block of 50 run-time licenses costs $2,500. Single run-time licenses cost $150.

For more information, contact Donald Hirsh, Meridian Technology Corp., P.O. Box 2006, St. Louis, MO 63011; (314) 394-1600.

Circle 502 on reader card

MCBA Targets DEC Open Systems Products

MCBA announced the MCBA Classic accounting, distribution and manufacturing software for DEC's open systems products, including the DECsystem 316+, DECsystem 325 and DECsystem 333 running SCO/UNIX System V/386.

MCBA Classic software for UNIX systems is an integrated closed-loop MRP II system comprising 19 independently functioning modules. With MCBA software, you can select the packages that fit your current needs and expand the system as your requirements change.

MCBA's software for UNIX-based systems is priced from $2,500 to $6,000 per module. The company licenses its software primarily through a network of authorized resellers.

For more information, contact Bob St. Amand, MCBA, 425 W. Broadway, Glendale, CA 91204; (818) 242-9600.

Circle 501 on reader card

DEC LaserTwin Lets DEClaser Emulate HP LaserJet

Metro Software Inc. announced the DEC LaserTwin V2.0. It lets the DEClaser 2000 family of laser printers emulate the HP LaserJet Series II in an MS-DOS environment.

DEC LaserTwin supports DEClaser 2100 simplex and DEClaser 2200 duplex with dual paper cassettes. It provides upgraded support for the installed base of LN03 laser printers, which the DEClaser 2000 family replaces. Emulation lets the DEC printers operate with the PC software written for the LaserJet. DEC LaserTwin V2.0 is memory-resident, using 28 KB of RAM.

The product costs $295.

For more information, contact Joe Gold, Metro Software Inc., 1870 W. Prince Rd., Ste. 70, Tucson AZ 85705; (602) 292-0313.

Circle 503 on reader card

UIS Enhances V-X Manager Management And Reporting Tool

UIS Inc. announced security and graphics enhancements to V-X Manager, its VMS operations management and reporting tool.

V-X Manager V2.0 provides screen-based facilities for standardizing system operations, a menu-building system for creating operator interfaces and user menus, and a set of standard and customizable system management reports. With V2.0, system managers can allow access to system management functions and site-written DCL procedures without granting VMS privileges to users. You can then offload selective tasks to less experienced operators and nontechnical staff at remote sites without compromising system security. An optional audit trail feature is available. V2.0 also offers graphic capabilities through its reporting components, allowing you to generate line graphs and histograms from system file data. V-X Manager supports VMS V4.7 or later.

The product costs from $2,650 for a MicroVAX to $21,000 for a VAX 9000.

For more information, contact Nancy Langmeyer, UIS Inc., 420 Bedford St., Lexington, MA 02173; (617) 861-6262.

Circle 507 on reader card

WordMarc-Rdb Connection Links WordMarc And Rdb

Marc Software International announced the WordMarc-Rdb Connection, a program that provides seamless two-way integration between the WordMarc word processing program and Rdb.

The WordMarc-Rdb Connection lets Rdb users incorporate information from Rdb in a WordMarc document by making menu selections. You can incorporate snapshot reports that don't change as Rdb data is modified or live-linked reports that are updated automatically to reflect changes in Rdb. Live links are preserved across network nodes. Rdb data can be merged directly with WordMarc mail-merge documents to produce letters and reports. You can create a WordMarc mail-merge database from Rdb data or send entries from the WordMarc database to Rdb.

The product costs from $395 on a workstation to $11,500 on a large VAX.

For more information, contact Wendy Wytyshyn, Marc Software Int'l, 260 Sheridan Ave., Ste. 309, Palo Alto, CA 94306; (415) 326-7511.

Circle 500 on reader card

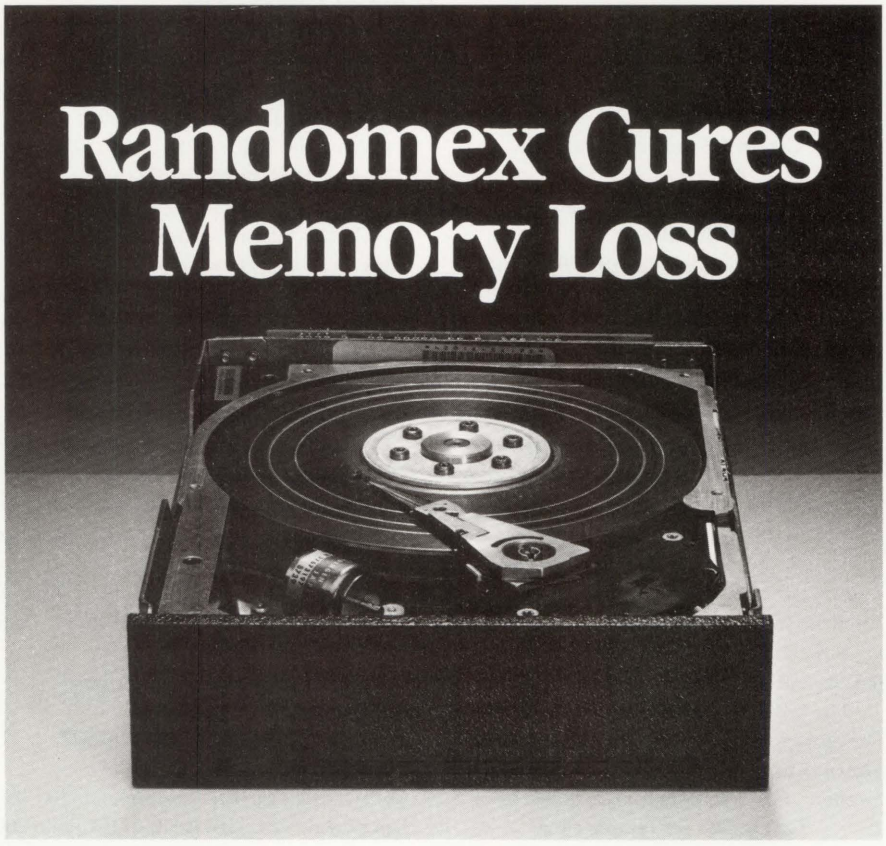
Samsung's SGS-19 Terminal Incorporates RISC Technology

Samsung Software America Inc. announced the Samsung Graphics Station 19 (SGS-19), an X display terminal.

Based on the AM29000 RISC microprocessor from Advanced Micro Devices, the SGS-19 achieves a benchmark rating of more than 60,000 Xstones. Local processing functions are performed by the AM29000 coupled with 256 KB of VRAM and 2 MB Instruction/Data DRAM memory. The SGS-19 offers a 13- x 15-inch footprint, a 19-inch monochrome monitor, an enhanced 101-key keyboard and a three-button mouse. Network connection and communications support includes thick and thin Ethernet cable for TCP/IP and a serial line connector for SLIP, TFTP and TELNET terminal session capabilities.

For more information, contact Steven Salemi, Samsung Software America Inc., One Corporate Dr., Andover, MA 01810; (508) 685-7200.

Circle 487 on reader card



Head crashes don't have to be fatal.

Randomex has been successfully retrieving lost data from all kinds of media for more than 10 years. The fact is, we have been able to retrieve data in over 98% of the more than 1,400 cases we have handled. We have recovered data lost from all kinds of natural disasters, hardware failures and operator errors.

Utilizing innovative methods with custom-designed hardware and software, our uniquely qualified staff of specialists provides the most accurate, reliable and comprehensive data retrieval in the industry.

In most cases, we can evaluate and recover the data from your media and deliver it back to you within 3 days, we guarantee our work in writing.

So the next time you lose your memory, don't forget Randomex — the first name in data retrieval.

Call 1-800-RANDOM-X. We are ready to back you up 24 hours a day.

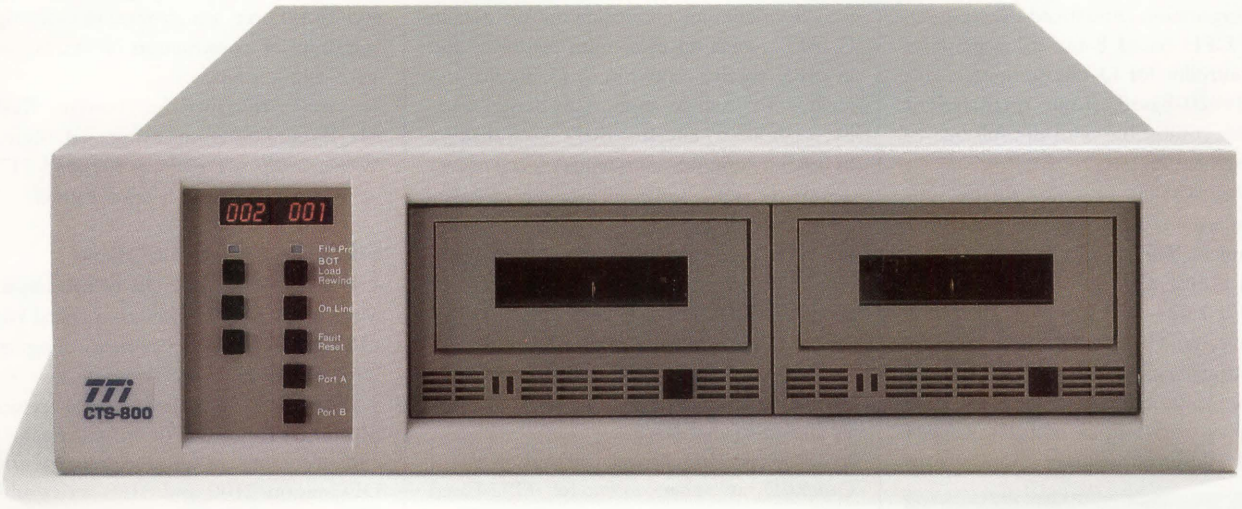
RANDOMEX, INC.

1100 E. Willow Street, Signal Hill, CA 90806
1-800-RANDOM-X (213) 595-8301 FAX: (213) 427-3420

CIRCLE 337 ON READER CARD

Backing up a VAXcluster can be reel slow.

Or real fast.



You decide.

You can stick with your TA-79 and back up at a snail's pace.

Or you can switch to TTI's CTS-800 Series and accelerate the entire backup process.

You can stand around all day (or night) loading reels—15 reels in all—to back up 2.2GB on your VAXcluster.

Or you can insert just one 8mm cartridge in a CTS-800 Series drive and let it back up those 2.2GB of data completely unattended.

Need really high capacity? Up to four tape drives can be connected to a single port on your HSC40/50/70 controller. So with a fully loaded HSC5X-CA card, you can back up 32GB overnight... completely unattended. That's real efficiency.

And upgrading to a high performance TTI backup subsystem is really easy. The CTS-800 is a plug and play swap with TA drives and 100% HSC compatible too.

TTI's CTS-800 Series Tape Subsystems. It's the VAXcluster backup subsystem with un-reel performance.

For more information, call the leader in unattended backup systems, TTI, at (714) 693-1133.

Or write: Transitional Technology, Inc., 5401 E. La Palma Ave., Anaheim, CA 92807. FAX: (714) 693-0225.

TTi
TRANSITIONAL TECHNOLOGY, INC.

European Sales Office. Transitional Technology, Suite A, Regal Court, 112 London Road, Headington, Oxford OX3 9AU. Phone: 0865 742266.

VAXcluster, HSC and TA79 are trademarks of Digital Equipment Corporation.

CIRCLE 169 ON READER CARD

CBIquick Creates UNIX And VAX Online Application Training

AMT Corporation announced the CBIquick computer-based instruction generator. It creates realistic product demonstrations and interactive online user training for UNIX and VAX applications.

CBIquick provides fast development, exact simulation of the real application and portability across platforms. The product's lessons and demos may include custom diagrams and graphics added by the developer. Demos and CBI lessons run on UNIX and VAXs, as well as IBM-compatible MS-DOS PCs. An optional feature is the ability to synchronize the CBI presentation to a voice recording using a special audio/sync cassette player connected to the terminal or PC. With this option, a human voice guides the user step by step.

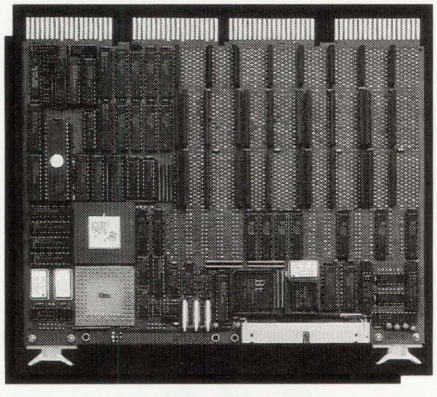
For more information, contact AMT Corp., 183 Guggins St., Boxboro, MA 01719; (508) 263-3030.

Circle 508 on reader card

Peritek Brings Color Graphics To Q-Bus Computers

Peritek Corporation announced the VCF-Q, a 32-bit, CPU-based 8-bit color graphics display controller for Q-bus computers. It's a TMS 34020-based, single quad-height board that's compatible with the full line of Q-bus-based computers.

The VCF-Q's 24-bit color palette supports 256 active colors selected from 16.7 million choices. The product supports a 1,024 x 1,024 x 8 bits/pixel primary graphics display with a 1,024- x 1,024- x 4-bits/pixel graphics overlay. The board's display memory can be optionally expanded to 2,048 x 1,024 addressable pixels, resulting in a 1,280 x 1,024 actual display or two pages of 1,024 x 1,024 for double-buffered displays. Applications include CAD/CAM/CAE, medical imaging, terrain mapping, image processing, simulation, process control, and animation and special effects. For more sophisticated applications a VAX-based C compiler and cross assembler are available.



Peritek's VCF-Q 8-bit color graphics display controller for Q-bus computers.

The VCF-Q costs from $2,500. Pricing for a complete system including a 19-inch monitor, cables, keyboard and software begins at $5,595.

For more information, contact John Wranovics, Peritek Corp., 5550 Redwood Rd., Oakland, CA 94619; (415) 531-6500.

Circle 478 on reader card

Tom Software's APPX Speeds Application Development

Tom Software Inc. announced Application Xcellence (APPX) 4GL business application software. It combines portability, CASE and a broad core of financial- and vertical-market applications in one environment.

APPX is a complete business application environment that speeds up the development, operation, maintenance and management of applications. It builds on and enhances the company's Speed II product, a 4GL application development environment. Written in C, APPX runs on most mini platforms and in many database environments. Its features include a complete application design facility, a consistent interface that's controlled by its process compiler, an integrated, active data dictionary and a series of database management tools.

For more information, contact Louis Kern, Tom Software Inc., 127 S.W. 156th St., Seattle, WA 98166; (206) 246-7022.

Circle 509 on reader card

QuickED Enhances TPU-Based Editors

MVP Systems Inc. announced version 1.0 of QuickED, an enhancement for TPU-based editors that use the DECwindows interface.

QuickED speeds the editing cycle and provides easier access to the editor by separating the tasks of starting an editor and editing a file. The QuickED edit command locates an editor that's already running and tells it to read in the file to be edited. Normal editor start-up time is eliminated. When you finish editing a file, the QuickED interface writes the file and shrinks the editor to an icon to wait for another edit command. QuickED is compatible with VMS V5.3 or later. Support is provided for VAX LSE V3.0 or later.

The product costs from $395 to $995, depending on the number of users.

For more information, contact MVP Systems Inc., 2700 E. Main St., Ste. 108, Columbus, OH 43209; (614) 265-3572.

Circle 504 on reader card

Mobius Connects Varied PC LANs To VAX Systems

Fel Computing announced an enhanced version of Mobius that integrates entire LANs into the VAX. PCs that reside on various LANs, such as Token Ring or Ethernet can have access to full VAX/VMS capability via the enhanced Mobius products.

Mobius operates with enterprisewide networks to let a company's PCs access its VAX/VMS systems. It has small memory requirements (64 KB), which can be loaded into high memory. The product provides such services to PCs on LANs as VAX file service, print service, file transfer and terminal emulation. More features can be added with Mobius Plus including virtual processes, PC control, task-to-task communication and an advanced programmer's interface (API). Other modules are Access, for automatic login to the VAX upon login to the network, and Task-Force, a high-level task-description language for construction of PC/Network/VAX applications.

For more information, contact Kathryn Merriam, Fel Computing, 10 Main St., Williamsville, VT 05362; (802) 348-7171.

Circle 511 on reader card

FileSafe 2100 D Supplies 2.2 GB Of Storage On 8mm Tape

Mountain Computer Inc. announced FileSafe 2100 D, an 8mm tape system designed for DEC workstations and servers.

FileSafe 2100 D is a custom version of Mountain's existing 8mm subsystem with enhancements specifically designed for the DECstation 2100 and 3100 series and the DECsystem 3100 server running ULTRIX. The drive provides 2.2 GB of storage on a single 8mm tape, an asyncronous SCSI interface with a maximum burst-data transfer rate of 1.5 MBps and a sustained-data transfer rate of 246 KBps in streaming mode. The FileSafe 2100 D kit includes an auto-sensing power supply, a 2.2-GB tape cassette, a SCSI interconnect cable, power cord, a SCSI terminator and a cleaning kit.

FileSafe 2100 D costs $6,795.

For more information, contact Jay Baker, Mountain Computer Inc., 240 Hacienda Ave., Campbell, CA 95008; (408) 379-4300.

Circle 512 on reader card

FUSION® For DEC

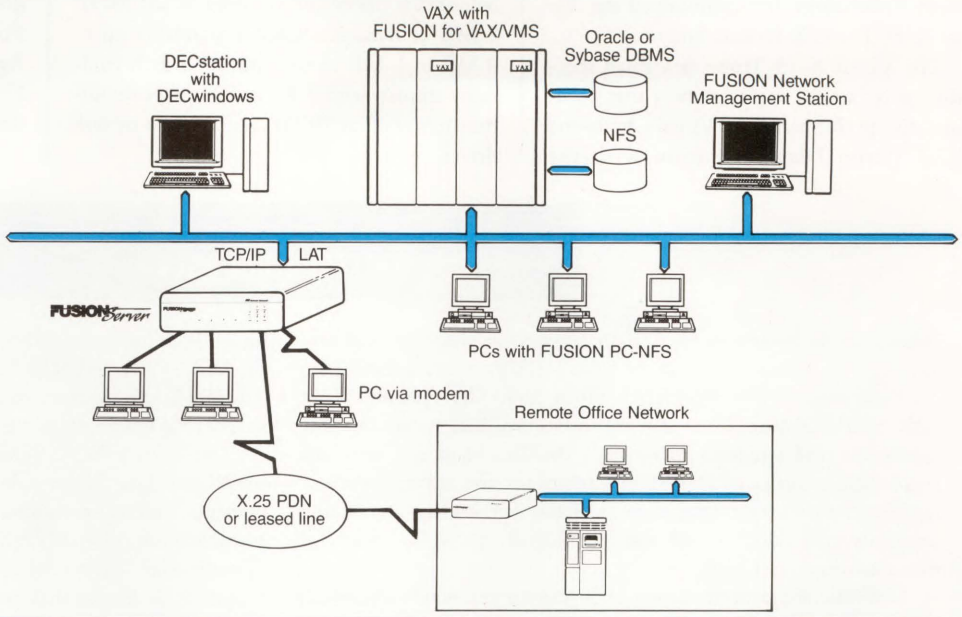
Now Network Research offers a more complete version of DEC connectivity.

- *FUSION TCP/IP for VAX/VMS version 3.4 provides support for Oracle and Sybase data bases, DECwindows, Network File System (NFS), high performance, and more*
- *FUSIONserver connects LAT-based terminals to VAX and TCP/IP hosts concurrently*
- *FUSIONserver gateway allows remote PC dial-in, remote office connection over leased line, and X.25 access*
- *FUSION PC-NFS provides VAX file and disk services to your PCs via NFS*
- *FUSION Network Manager controls all FUSION TCP/IP nodes and any node using the SNMP protocol from a single station*

To find out how FUSION network solutions can perform for you, call now.

1-800-541-9508

Fusion is a licensed trademark. All other product names are trademarks of their respective manufacturers.



Network Research

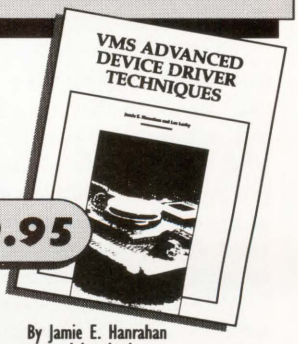
When high energy solutions for DEC connect, it's Fusion®

Network Research Corporation
2380 North Rose Ave., Oxnard, CA 93030
805-485-2700 Fax 805-485-8204

CIRCLE 147 ON READER CARD

Become A Device Driver Expert

VMS Advanced Device Driver Techniques guides you through basic techniques for writing device drivers for the VMS Version 5 operating system.



By Jamie E. Hanrahan and Lee Leahy

Order VMS Advanced Device Driver Techniques Today!

To order by credit card call Trish at (215) 957-4265 (9am – 4pm eastern time)
Have charge card information ready. **Quantity discounts available!**

Complete & return this form with your payment.

VMS ADVANCED DEVICE DRIVER TECHNIQUES ORDER FORM

To order your copy, send $59.95 plus shipping and handling charges of $3.00 for the first copy and $1.00 for each additional copy. PA residents add 6% sales tax.

Please call for information on shipping and handling outside the US.

Mail your order to:
Professional Press Books
101 Witmer Road
P.O. Box 446
Horsham, PA 19044

❑ Send _____ Copy(ies) ❑ Check enclosed for $ _____

Charge to: ❑ VISA ❑ MasterCard ❑ American Express

Account #_____ Exp. Date _____

Signature_____ Date _____

Name_____ Title_____

Address_____

City_____ State_____ Zip_____

Country_____ Phone(_____) _____

Mail, Phone or FAX Your Order Today – (215) 957-4265, FAX (215) 957-1050

DPHH1090

Visual Technology Announces X-15 Turbo X Display Station

Visual Technology Inc. announced the Visual X-15 Turbo X Display Station.

The Visual X-15 Turbo is a small footprint, grayscale X display station that combines the performance of Visual's high-end X-19 Turbo Display Station with the compact size of its standard X-15 Display Station. The product features a Motorola MC68020 processor running at 20 MHz, 2 MB of dynamic RAM expandable up to 8 MB in 1-MB increments, a 15-inch landscape display with 1,152 x 900 pixel resolution refreshed at 70 Hz, and no fans or disk drives.

The Visual X-15 Turbo X Display Station costs from $2,975 for 2 MB of RAM and grayscale.

For more information, contact Susan Agranoff, Visual Technology Inc., 120 Flanders Rd., Westboro, MA 01581; (508) 836-4400.

Circle 513 on reader card ■

Digital Products

BASEstar Software — DEC demonstrated its BASEstar software product as a key element in a live discrete manufacturing demonstration at DECWORLD '90 in July. The Flexible Work Cell exhibit featured the integration of robots, programmable controllers and applications through BASEstar and the Network Application Support (NAS) environment for manufacturing. BASEstar provides integration facilities for highly automated assembly, fabrication and material-handling applications for manufacturing operations.

DEC also announced support for BASEstar as a standard product. BASEstar is designed to facilitate the integration of manufacturing equipment and applications, accelerate the development of integrated manufacturing systems and provide a platform for the consistent development of manufacturing applications. It's designed for use in a distributed VAX processing environment.

VAX DSM V6.0 — DEC's new version of its MUMPS software implementation features new transaction processing capabilities, failover recovery in a VAXcluster environment, enhanced security and portable run-time software for integration of applications with other MUMPS systems. VAX DSM V6.0, DEC's superset of ANSI MUMPS, is a high-level interpretive programming language and a multiuser data management system that lets many users share a common database. VAX DSM runs under VMS.

The new version lets you organize database accesses into transaction recovery units. Another enhancement provides high database availability in a VAXcluster environment. If a node malfunctions, operations on other nodes that share the common VAX DSM database are suspended while automatic routines are executed. A new callable software interface enables routines written in any programming language to read from and write to a VAX DSM database directly. Database security has been enhanced by a connection control function.

VAX DSM V6.0 costs from $1,991.

DEComni/VMS Network Interface — The new DEComni/VMS network interface is DEC's implementation of the Manufacturing Message Specification (MMS) standard of the ISO specification. It lets VMS-based applications communicate directly with plant floor devices such as PLCs and robots from multiple vendors. The applications don't need to be rewritten, thus reducing the need for custom communications software. DEComni/VMS supports DECwindows and the full line of VAX processors. The interface costs $530.

ULTRIX Database Agreement — DEC and Sybase announced an agreement to provide secure DBMSs for ULTRIX on VAXs. DEC will market Sybase's Secure SQL Server and Secure SQL Toolset to provide database security for VAX/ULTRIX systems and future RISC systems. Sybase will engineer the products to operate on DEC VAX and RISC systems that run ULTRIX. DEC and Sybase will also share technology to achieve higher levels of database security for government customers.

The Secure SQL Server is a DBMS designed to manage multilevel data. It provides discretionary and mandatory access control, auditing of security-relevant events, and separate user and administrator roles. It's built on a client/server architecture that provides high application availability for online environments. The Secure SQL Toolset lets you build applications that access data in the Secure SQL Server in accordance with security requirements.

The Secure SQL Server costs from $42,000 to $252,000. The Secure SQL Toolset costs from $2,400 to $155,200.

Demand Printing Solution — DEC's Demand Printing Solution lets you print documentation retrieved from an electronic database at high speeds in a production environment. The solution integrates VAXs, optical storage, and scanning and printing technologies with flexible local area networking. With the Demand Printing Solution, the traditional printing production and delivery process is replaced by printing on demand. The solution comprises four subsystems:

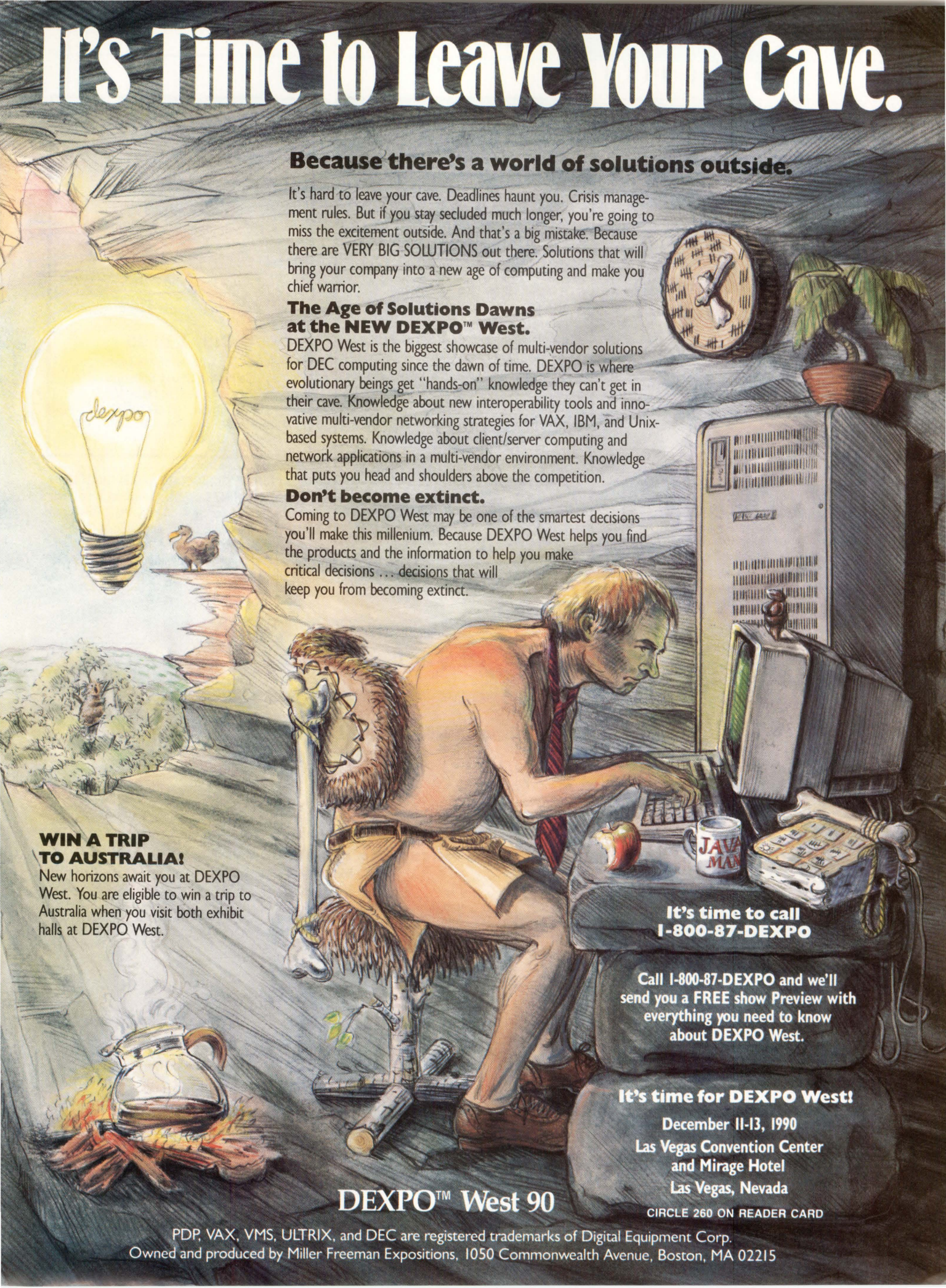
- The Scanning Subsystem creates electronic files through a duplex scanner that can scan up to 22 dual-sided page impressions per minute at 300 dpi. It's controlled by a MicroVAX 3400.
- The Processing and Storage Subsystem lets scanned, compressed documentation be stored on optical WORM memories and magnetic disks. It's driven by a VAX 6000 Model 410 and stores image files using VAX Rdb/VMS.
- The Re-Engineering Subsystem allows manipulation and editing of page images retrieved from the Scanning or Processing and Storage Subsystems. A VAXstation 3100, a 19-inch monitor and ABB's RE:Vision software are included.
- The Printing Subsystem uses a VAX-based print controller to decompress page image files and drive a Kodak Ektaprint 1392 printer at up to 92 ppm.

The Demand Printing Solution, including training, customization and services, is priced at less than $2 million.

Process/Lab Integration Set — DEC announced the Process/Lab Integration Set, which includes integrated software applications and related services that link the production process and the quality control laboratory. It integrates third-party applications for supervisory process control with laboratory information management systems. Online integration between the quality control laboratory and the production area allows for adjustments to be made during the process. Targeted markets include chemical, pharmaceutical, oil and gas, pulp and paper, and food and beverages industries. Pricing depends on customer need for integration services.

For more information, contact your local DEC sales office or call (800) DIGITAL.

It's Time to Leave Your Cave.



Because there's a world of solutions outside.

It's hard to leave your cave. Deadlines haunt you. Crisis management rules. But if you stay secluded much longer, you're going to miss the excitement outside. And that's a big mistake. Because there are VERY BIG SOLUTIONS out there. Solutions that will bring your company into a new age of computing and make you chief warrior.

The Age of Solutions Dawns at the NEW DEXPO™ West.

DEXPO West is the biggest showcase of multi-vendor solutions for DEC computing since the dawn of time. DEXPO is where evolutionary beings get "hands-on" knowledge they can't get in their cave. Knowledge about new interoperability tools and innovative multi-vendor networking strategies for VAX, IBM, and Unix-based systems. Knowledge about client/server computing and network applications in a multi-vendor environment. Knowledge that puts you head and shoulders above the competition.

Don't become extinct.

Coming to DEXPO West may be one of the smartest decisions you'll make this millenium. Because DEXPO West helps you find the products and the information to help you make critical decisions . . . decisions that will keep you from becoming extinct.

WIN A TRIP TO AUSTRALIA!

New horizons await you at DEXPO West. You are eligible to win a trip to Australia when you visit both exhibit halls at DEXPO West.

It's time to call 1-800-87-DEXPO

Call 1-800-87-DEXPO and we'll send you a FREE show Preview with everything you need to know about DEXPO West.

It's time for DEXPO West!

December 11-13, 1990
Las Vegas Convention Center and Mirage Hotel
Las Vegas, Nevada

DEXPO™ West 90

CIRCLE 260 ON READER CARD

PDP, VAX, VMS, ULTRIX, and DEC are registered trademarks of Digital Equipment Corp.
Owned and produced by Miller Freeman Expositions, 1050 Commonwealth Avenue, Boston, MA 02215

CLASSIFIED

Custom Hardware Design

VAXBI, Q-BUS & UNIBUS DESIGN CAPABILITIES INCLUDING DEVICE DRIVERS

Services from consultation to production

SOFTWARE RESULTS CORPORATION
COLUMBUS, OH 43229

15 Years Experience

CALL (800)772-3282 or (614)785-0282

Cost Effective Service.

MODE VI is a company specializing in the repair and maintenance of PRINTRONIX, GENICOM, DATA PRODUCTS, AND C. ITOH matrix printers.

A MODE VI Service Agreement eliminates the high cost of "pay-as-you-need" repair service. A standard maintenance fee effectively stabilizes the cost of service. MODE VI Service Agreement rates are reasonable and predictable, making service an easy item for the customer to plan for.

To learn more about us, call today.
(617) 932-5265
Serving New England, New Jersey, and New York City.

MODE VI TECHNOLOGY CORPORATION

Tired of retyping MS-DOS commands on your IBM PC?

The **VKEYS**tm DOS shell emulates the **VAX/VMS** Command Line Editor!!!

Features: Remembers the last 20 commands typed
Use Arrow keys and CTRL keys to RECALL and edit
Define foreign commands and more!!!

Only $39.95

Send check or purchase order to:
California Street Software
P.O. Box 19225, Dept. V-1
Washington, DC 20036-9998
Please specify number of copies and 3.5 or 5.25 disk size.

PDP11?

Replace your "Boat Anchor" Disk Drives with our High-Performance Winchester Subsystems. No more head-ache, no more head-crash!

- Old O.S.'s Supported
- 8" Floppies Supported
- MSCP Driver not required
- High Capacity
- High Reliability
- Competitive Pricing

Comware TECHNICAL SERVICES

1571 Parkway Loop, Suite D
Tustin, CA 92680
Phone (714) 258-2800
FAX (714) 258-3412

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.

USED EQUIPMENT

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

* Registered trademark of Digital Equipment Corporation

WE BUY, SELL, LEASE & TRADE

WE WILL PAY

$$ CASH $$

for your surplus DEC and DEC compatible Hardware

MICRO VAX II and MICRO VAX III SYSTEMS IN STOCK

CXY08-AF	$ 1,000	MS630-BB	$ 400
DESPR-AA (new)	550	MS630-CA	1,500
DEREP-AA (new)	1,000	RA60-AA	1,600
DSRVB-BA (new)	1,600	RA60-P (new)	650
DV31ATB-AA (new) 3100 Model 10	6,800	RA60-P	400
DV360S1-AA	34,000	RA82-CA (new)	8,500
Fujitsu 2322	800	SC008-AC	4,950
H4000 (new)	125	TK50	1,500
KA630-AA	1,500	TSV05 w/Qbus Controller for 3500, 3600	1,800
KDA50-QA	1,800	TU79-AF	11,000
LG01-EA (new)	6,500	UDA50-A	250
LN03A-AA	2,200	VT241	700
Maxtor XT4380E	1,200		

*Cables *Make Offer**

BNE3L-10	BNE3L-20	BNE2A-MA	BNE3D-10
BNE3M-10,20	BNE3K-05	BNE4D-05	BNE3L-05
BNE3K-20	BNE3H-05	BNE4E-02	BC22D-80
BNE30-10	BNE2A-MB	BNE4C-05	BC22D-50

(612) 884-6601
FAX (612) 884-6652

Minnēcomputers, Inc.

dda DIGITAL DEALERS ASSOCIATION

9555 James Avenue South • Minneapolis, MN 55431

CALL (215) 957-1500 NOW TO PLACE YOUR AD.

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 MVIII Inventory!!

Boston Boards & Systems

'90 PRICE REDUCTION!!!

READY TO SHIP!!

Boston Boards & Systems

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!!

SPECIAL:
8000 SPARES

WE ALSO BUY NEW & USED EXCESS *DEC INVENTORY

CALL OR FAX YOUR EXCESS HARDWARE LIST
FOR PROMPT CASH OFFER!!!

EMC² cipher CONTROL DATA EMULEX KENNEDY FUJITSU T.M. National Semiconductor

FAX: 617-585-6211
TELEX: #920-038BBS *Digital is a registered trademark of Digital Equipment Corporation

digital digital

CIRCLE 220 ON READER CARD

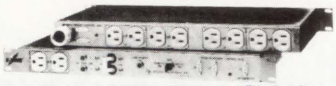
PRODUCT SHOWCASE

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 — — —

Z-LINE®



Our proprietary **Multiple Time Delay™ circuitry sequences** your power-up to **protect** your systems from the spikes and surges, EMI & RFI, 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.**
PRICES FROM $453 TO $317

DON'T WAIT UNTIL IT HAPPENS, CALL TODAY!
PULIZZI ENGINEERING INC.
3260 S. Susan Street, Santa Ana, CA 92704-6865
(714) 540-4229 FAX (714) 641-9062

CIRCLE 209 ON READER CARD

Software Developers

Dynamic code documentation for your software development environment

DOCZ™

- Streamlines development and support
- Promotes code sharing
- Reduces development costs
- Works with all computer languages
- Provides both printed and on-line docs
- Works with your version control software
- 30-day money-back guarantee, VISA/MC
- Single-user MSDOS, VMS, Unix - $195

Software Toolz, Inc.
8030 Pooles Mill Drive
Ball Ground, GA 30107-9610
(404) 889-8264 Orders, V-mail (800) 869-3878

CIRCLE 351 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
CDLR dda

EAST COAST (516) 273-7777
WEST COAST (206) 392-9878

CIRCLE 201 ON READER CARD

MOVE DR11-W SOFTWARE TO VAXBI IN ONE EASY STEP

Simpact's new PDI16 parallel data interface plugs into a single slot in the VAXBI and delivers the functionality of two DR11-W interfaces *plus* full DR11-W software compatibility.

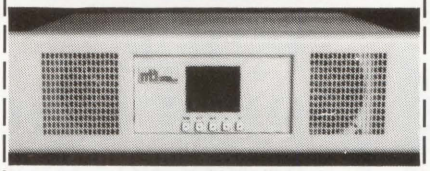
Features include:

- Two complete DR11-W channels on a single card
- 1.3 MB aggregate bandwidth
- True DR11-W compatibility
- Licensed, native VAXBI option

Simpact Associates, Inc.
9210 Sky Park Court, San Diego, CA 92123
800-488-4188

CIRCLE 352 ON READER CARD

BEST SELLING DEC RA90 DISK DRIVE*



NOW $9,999.
·DEC MAINTENANCE
·48 HOUR DELIVERY

Call for more information and demo!
1•800•783•RACE (7223)
614•888•0100

mb SYSTEMS AUTOMATION

4795 EVANSWOOD DRIVE, SUITE 200, COLOMBUS, OHIO 43229

*Equivalent DEC, RA90 are trademarks of Digital Equipment Corp.

CIRCLE 205 ON READER CARD

VAX CAREERS

Winning combinations of these skills can propel **YOU** into some of the best companies on the East Coast!!!!

DATA PROCESSING / ENGINEERING

— FORTRAN, COBOL, C, MACRO
— RDB, ORACLE, INGRES
— VMS, ULTRIX, NETWORKING
— FACTORY AUTOMATION, PROCESS CONTROL, PLC'S
— MANUFACTURING, CIM, MRP
— PHARMACEUTICALS

BRENDA CAREY, C.P.C.
Digital Recruiter

Amos & Associates

633-B Chapel Hill Road
Burlington, NC 27215
(919) 222-0231
FAX (919) 222-1214

CIRCLE 200 ON READER CARD

DEC

BUY & SELL
RENT & REPAIR
EMERGENCY EXCHANGES

TRADITIONAL PRODUCTS
INCLUDING PDP-8

SALES:
408-270-1100 800-726-0726
FAX:
408-270-1183
2298 QUIMBY ROAD
SAN JOSE, CALIFORNIA 95122-1356

CRISIS COMPUTER CORPORATION

CIRCLE 202 ON READER CARD

WE RENT VAX

MV 3600/3900
VAXstation 3100/3200/3500
VAX 8000/6000

3 to 12 month term
Immediate delivery
Purchase accruals

"Since 1966"

ACS Equipment Corporation
26319 I-45 North
The Woodlands, TX 77380
Fax: 713-292-1474

1-800-288-1846

We buy surplus DEC/VAX

CIRCLE 213 ON READER CARD

PROGRAMMERS SYSTEMS & APPLICATIONS

1 SYSTEMS PROG MVS JES 3	70K
VAX VMS ORACLE, SYBASE	50K
STRATUS PL1	50K+
IMS DB/DC COBOL CICS	40-50K
2 PROGRAMMERS BANYAN	$ FLEX
2 P/A WANG BASIC, COBOL	$ FLEX
2 P/A COBOL CICS VSAM	50K+
3 P/A AS-600 & PC's	50K+
2 MVS MSA AND/OR MCDODGE	55K
3 SPOTS TPF PROGRAMMER, EXP IN MAINTENANCE OR INSTALLATION	70-85K
1 IEW CASE TOOL TECHNOLOGY	60K
1 PRJ/MGR, KNOWLEDGE OF OPTICAL STORAGE	65-75K
1 IMS-DBA	50K
1 SPOT IDMS-DBA	55K

Call Bob
EXEC-COMPUTER
1440 Broadway - Suite 1652, NYC 10018
(212) 944-9250
(212) 869-2846 fax
Serving New York Metro Area Since 1977
Sorry No Entry Level or Sponsorships

CIRCLE 224 ON READER CARD

PLACEMENT EXECUTIVE
RECRUITMENT/SALES

We are a full service computer firm expanding our executive search division, which specializes in EDP & Finance. We are looking for individuals who are highly motivated with an entrepreneurial spirit & previous sales/placement experience. Earn high commissions from our various divisions: executive placement and special commission from Hardware & Software sales & consulting assignments. Candidates must have superior interpersonal skills & be able to motivate others in order to match the right person with the right job. We are seeking individuals with high income expectations, draw/commission/incentives.

Call Joseph (212) 944-9269
or send resume to :
EXEC-COMPUTER
1440 Broadway - Suite 1652, NYC 10018
or fax resume (212) 869-2846

CIRCLE 222 ON READER CARD

WTW
SOFTWARE CONSULTING SERVICES®

WESSON, TAYLOR, WELLS Software Consulting Services was recently named by INC. MAGAZINE as #130 of America's 500 fastest-growing companies. To keep pace with our growth, we are inviting qualified **PROGRAMMER ANALYSTS** to join us in state-of-the-art projects nationwide.

1 (800) 833-2891

CIRCLE 208 ON READER CARD

Wesson, Taylor, Wells needs **Programmer/Analysts** with 2+ years experience in one or more of the following disciplines:

UNIX UNIX UNIX UNIX UNIX

- Rdb
- INGRES
- CORVISION
- FORTRAN
- ALL-IN-1
- ORACLE
- DBMS
- SMARTSTAR
- DECNET
- UNIX

Benefit from one of the finest compensation programs in the industry; relocation assistance also available. For more information, call **Tom Hesson** at **1 (800) 833-2895** or **Carol English** at **1 (800) 833-2894.**
WESSON, TAYLOR, WELLS, Dept. DP-10, P.O. Box 1587, Camden, SC 29020.

WTW SOFTWARE CONSULTING SERVICES®

Equal Opportunity Employer

CIRCLE 208 ON READER CARD

MEDIA DAMAGE NEED NOT PROVE FATAL

DATA RETRIEVAL SERVICES, INC.

Leaders in data retrieval from

- **Head-crashed disk packs**
- **Damaged disk drives**
- **Damaged floppies and tapes**

Los Angeles, CA **(213) 398-2764**
Clearwater, FL **(813) 461-5900**

CIRCLE 217 ON READER CARD

Why take chances?

Buy used equipment you can trust . . . from a dealer you can trust.

Buy, sell, or service, our members have been working since 1982 to promote ethical standards in the secondary market. So look for the DDA logo – you'll find quality, value, and peace of mind.

dda DIGITAL DEALERS ASSOCIATION

(313) 475-8333 ■ 107 S. MAIN STREET, SUITE 202
CHELSEA, MICHIGAN 48118

CIRCLE 214 ON READER CARD

Maintaining Old Fortran? Try FOR_STRUCT™

- ***An invaluable tool for transforming unstructured FORTRAN into clean, maintainable code.*** Control constructs are fully restructured to standard FORTRAN-77, VAX FORTRAN or FORTRAN-90, while preserving code logic. A choice of style options is also available. Now includes a FORTRAN-90 preprocessor!
- ***Call now for more information.***

COBALT BLUE™
2940 Union Avenue, Suite C
San Jose, CA 95124, USA
TEL(408) 723-0474, FAX(408) 377-7648

CIRCLE 184 ON READER CARD

The following are trademarks of Digital Equipment Corporation:

A-to-Z	DNA	RSTS/E
ALL-IN-1	Eve	RSX
CDD	FMS	RT-11
DATATRIEVE	HSC	ThinWire
DEC	LAN Bridge	ULTRIX
DECalc	LAT	UNIBUS
DECconnect	LA50	VAX
DECgraph	LA100	VAXBI
DECmail	MASSBUS	VAXcluster
DECmate	MicroPDP-11	VAXELN
DECnet	MicroVAX	VAX LISP
DECstation	NAS	VAX SCAN
DECsystem	PDP	VAXserver
DECUS	Q-bus	VAXstation
DECwindows	Rainbow	VMS
DELNI	RdbExpert	VMSmail
DEQNA	Rdb/VMS	VT
DIBOL	ReGIS	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.
•Macintosh is a trademark of Apple Computer, Inc.
•X Window System is a trademark of MIT.
•NFS is a trademark of Sun Microsystems Inc.

VAX TRAINING

Using BUILD-A-COURSE™

Half the cost of Digital!
Design your own Course
Tailored for your Site

(404)392-1488

Bernstein & Associates, Inc.
3 Dunwoody Park Suite 103
Atlanta, Ga 30338 USA

VAX is a registered trademark of Digital Equipment Corporation.

CIRCLE 210 ON READER CARD

SYSTEMS PROFESSIONALS FULL TIME POSITIONS

ON LINE/REALTIME "C" PASCAL ..... NJ 30-85K
R & D Environment UNIX/VMS/MSDOS
Transaction Processing

VAX, VMS, UNIX, SYBASE ..... NY 30-60K
Fin, Info., Workstation Dev.

IBM MAINFRAME COBOL ..... NY 30-80K
CICS and Database, New Dev. F/X sys.

TANDEM TAL ..... NY 40-60K
Heavy Dev., Market Data

IMS DB ..... NY 40-45K
Train CICS

"C" New Dev. ..... NJ 50-65K
MS/DOS, OS/2, Novell

Call Dave
EXEC-COMPUTER
1440 Broadway - Suite 1652, NYC 10018
(212) 944-9250
(212) 869-2846 fax
Serving New York Metro Area Since 1977
Sorry No Entry Level or Sponsorships

CIRCLE 223 ON READER CARD

ADVERTISERS INDEX

Reader Service Number		Page
360	Accler8	142
183	Access Technology	25
178	Access Technology	105
363	Advanced Systems Concepts	67
231	Alisa Systems	97
222	Alisa Systems	133
103	Allied Telesis	89
323	Applied Digital Systems, Inc.	65
105	Applied Information Systems	128
326	Archive Corporation	1
358	Bancomm	72
350	BDT Products, Inc.	85
272	Bear Computer Systems	104
275	Beckman Instruments	27
242	Camintonn Corporation	103
181	Clearpoint, Inc.	7
240	CMD Technology Inc.	79
108	Cognos Corporation	63
248	CompuServe Data Technologies	121
110	Computer Associates	101
277	Computer Methods Corp.	128
188	Computer Methods Corp.	142
112	Contemporary Cybernetics Group	17
114	Data Processing Design	21
115	Datability Software Systems	14-15
245	Dataram Corporation	131
282	De Rex, Inc.	113
247	Digital Consulting	137
	Digital Equipment Corporation	90-91
120	Diversified Computer Systems	33
349	Diversified Computer Systems	33
198	DSD Corporation	145
122	Emulex Corporation	36-37
125	Equinox Systems, Inc.	2
204	ESS	145
194	Evans, Griffiths & Hart	127
246	Executive Software	83
254	Gandalf Technologies Inc.	111
131	Gold Key Electronics	65
132	GrayMatter Software	143
305	Image Systems Inc.	98
328	Ingres Corporation	8-9
133	Interactive Software Systems	66
135	Interconnections	60
359	International Structural Engineers	146
137	Invitational Computer Conference	159
138	ITAC Systems, Inc.	98
313	KEA Systems Ltd.	87
269	Kingston Technology	107
368	KOM, Inc.	51
140	Lantronix	95
141	Logicraft, Inc.	13
319	Lotus Development Corp.	53

Reader Service Number		Page
142	Maintech	119
182	Meridian Technology Corporation	75
143	Micro Technology, Inc.	11
144	Micro Technology, Inc.	B.Cover
260	Miller Freeman Expositions	153
302	National Instruments	45
147	Network Research Corp.	151
148	New Media Graphics	116
238	Nissho Electronics	6
278	Northgate Computer Systems	108-109
244	O'Reilly & Associates Inc.	50
	Oracle Corporation	I.B.Cover
149	Oregon Software	143
150	Pacer Software	135
304	Park Software	62
355	Perceptics Corporation	124-125
185	Peritek Corporation	71
153	Persoft, Inc.	5
152	Persoft, Inc.	115
241	Polestar Corporation	81
295	Precision Visuals, Inc.	64
155	Printronix	43
156	Printronix	43
157	Process Software Corporation	78
236	Progress Software	29
337	Randomex, Inc.	148
231	Recital Corporation	59
357	RGB Spectrum	139
347	Russell Information Sciences, Inc.	I.F.Cover
364	Saiga Systems, Inc.	69
	SAS Institute, Inc.	123
233	Softool Corporation	49
263	Specialized Systems Technology	134
160	SPSS	61
162	Synctronics	18
163	Synergy Software	136
211	System Industries	19
164	System Industries	129
165	Talaris Systems, Inc.	93
166	Target Systems	141
367	TGV	35
169	Transitional Technology, Inc.	149
251	TriLogic Corp.	99
258	Unbound, Inc.	41
340	W. Quinn Associates, Inc.	141
172	Walker Richer & Quinn	55
173	Walker Richer & Quinn	117
174	Wilco Communications, Inc.	23
345	Winchester Systems	77
298	Windjammer	140
317	WordPerfect Corporation	73
226	Wyse Technology	56-57
175	Xyplex, Inc.	31

More information about these advertisers is available electronically on our Automated Reader Information Service Bulletin Board (ARIS/BB). Dial (215) 957-1000; Southern California (818) 577-9100; Northern California (415) 873-2135; Massachusetts (617) 863-5010.

ADVERTISING SALES OFFICES

Jeffrey S. Berman, Associate Publisher
(215) 957-1500

Mark Durrick, Eastern Regional Manager
David Beardslee, Western Regional Manager

MID-ATLANTIC
(215) 957-1500
Mark Durrick, Eastern Regional Manager
(215) 957-4213
Connie Mahon, Account Executive
(215) 957-4216
101 Witmer Road, Horsham, PA 19044
FAX (215) 957-1050

SOUTH-ATLANTIC
(215) 957-1500
Mark Durrick, Eastern Regional Manager
(215) 957-4213
Connie Mahon, Account Executive
(215) 957-4216
101 Witmer Road, Horsham, PA 19044
FAX (215) 957-1050

NEW ENGLAND
(617) 861-1994
Alonna Doucette, Regional Sales Manager
Marissa Scibelli, Account Executive
238 Bedford St., Ste. 3
Lexington, MA 02173
FAX (617) 861-7707

MIDWEST & SOUTH
(708) 747-0600
Richard E. Julius, Regional Sales Manager
Kristi Wesslen, Account Executive
20180 Governors Hwy., Suite 101
Olympia Fields, IL 60461
FAX (708) 747-0707

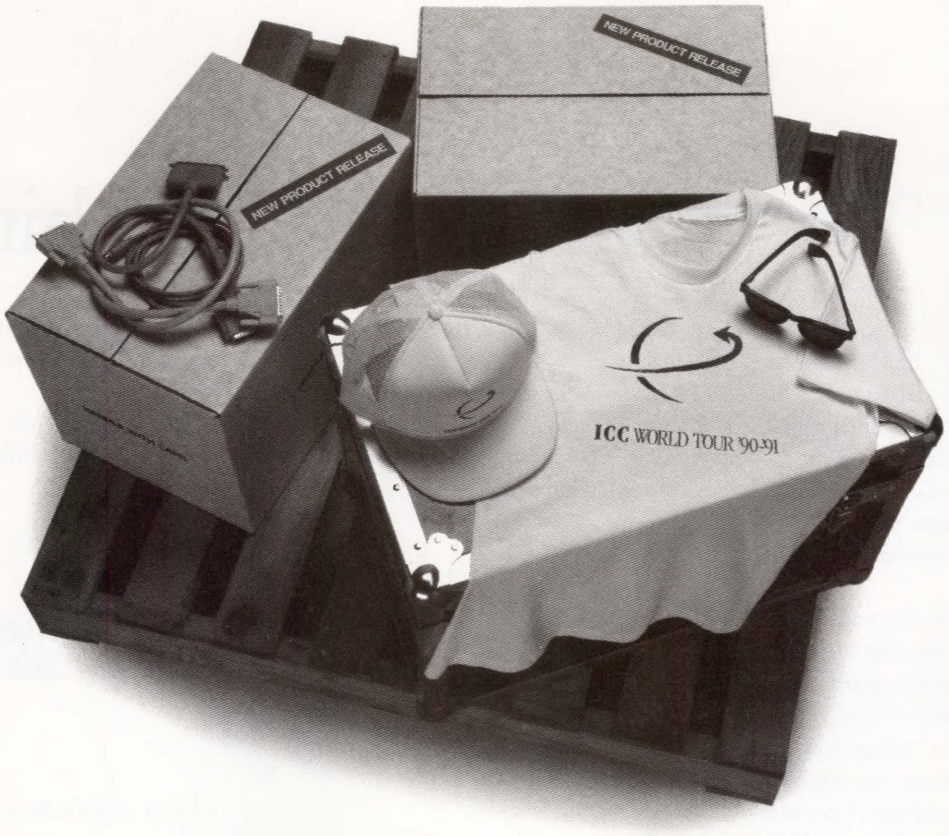
NORTHERN CALIFORNIA & NORTHWEST
(415) 873-3368
Lee D. Salem, Regional Sales Manager
Judy Courtney, Account Executive
903 Sneath Ln., Ste. 220
San Bruno, CA 94066
FAX (415) 873-6608

SOUTHERN CALIFORNIA & SOUTHWEST
(818) 577-5970
David Beardslee, Western Regional Manager
Karin Altonaga, Regional Sales Manager
Mary Marbach, Account Executive
1010 E. Union St., Ste. 101
Pasadena, CA 91106
FAX (818) 577-0073

CANADA/INTERNATIONAL
(215) 957-1500
Helen B. Marbach, Regional Sales Manager
(215) 957-4202
101 Witmer Road, Horsham, PA 19044
FAX (215) 957-1050

(215) 957-1500
Beth Zanine, Advertising Administrator
Mary Browarek, Classified Ad Manager
Cathy Dodies, List Rental Manager
Jane L. Hope, List Rental Sales

DEC Professional



The ICC World Tour is Pleased to Bring a New Collection of Computer Products to Asia

The Invitational Computer Conferences (ICC) are collecting worldwide suppliers for an exclusive computer industry event.

You will have an opportunity to see what today's products offer through hands-on demonstrations and to learn what tomorrow's products will be. Attending the technology seminars will provide expert answers to your questions. Featured products will include disk drives, tape drives, controllers, test equipment, LAN products, terminals, printers, modems and related products.

If you are corporate management, or integrally involved in your company's design, engineering, government applications or purchasing efforts for computer products, you will qualify as a guest to the Asia/Pacific ICCs.

We cordially invite you to an ICC near you. Please watch for your invitation, or call/fax (with English translation) for additional details on how you can receive an invitation.

The ICCs specialize in bringing the latest computer technologies to you, for your evaluation. With the research expertise from our parent company, Dataquest, we have the support of the world's leading computer analysts at each stop on the ICC tour throughout Asia, Europe and North America.

Tokyo, Japan	*November 27, 1990*
Seoul, South Korea	*November 30, 1990*
Kowloon, Hong Kong	*December 04, 1990*
Taipei, Taiwan	*December 07, 1990*
Singapore, Malaysia	*December 12, 1990*

Call for your Asia/Pacific invitation,
Dataquest/ICC
U.S. TEL: (714)957-0171
FAX: (714)957-0903
EUROPE/UK TEL: (0895)835050
FAX: (0895)835260/1/2

CIRCLE 137 ON READER CARD

BACK END

John C. Dvorak

The Man In The Machine

Marci Peoples Halio, assistant director of the writing program at the University of Delaware, has discovered a peculiar phenomenon. Freshmen taking her writing course who use Macs produce worse compositions than those who use IBM PCs.

Based on experience and a computer-aided analysis, she claims that Mac users make more spelling and punctuation mistakes and write at an eighth-grade level. The PC users write at a college level.

If this isn't bad enough, the Mac students write on vapid subjects. They concentrate on issues such as dating and television. The IBMers write about teen pregnancy, war and stuff like that. My conclusion: The computer makes the man (or woman, as the case may be).

I thought it might be worthwhile to take the concept a step further and compare writing on a Mac, a PC clone, an Atari Mega, an Amiga 2000, a VT100 hooked to a VAX and an IBM 3270 hooked to a 3090.

Unable to do this scientifically, I took a different tack. I was hypnotized and made to believe that whatever computer I used was my favorite. I was encouraged to express my thoughts about the machine and use it to list five topics about which I'd like to write.

While these unscientific results don't completely confirm the unscientific conclusions of Halio, they show a definite pattern and indicate that "you are what you write on." Here are the results, computer by computer:

Macintosh

Thoughts:

This is a neat machine. I love the mouse and feel superior to the poor saps who use anything else.

Topics:

1. New ice cream flavors.
2. Bruce Willis: actor, singer and Renaissance man.
3. Do those cleaners/waxes advertised on TV really work?
4. Was Rob Lowe unfairly treated after those incriminating video tapes were released?
5. Where's Brazil, anyway?

PC Clone

Thoughts:

This is a very functional machine. I like it and feel superior to the poor saps who use anything else.

Topics:

1. Phenomenology in an age of bleached blondes and the implications of such a culture and its effects on Eastern Europe.
2. Tissue culture fraud at laboratories.
3. Mating habits of native tree frogs.
4. Use of the word *indeed* in 18th century literature.
5. Is "form versus function" a dead issue in modern architectural theory?

Atari Mega

Thoughts:

This machine is a bargain, and I can even make it run Mac software! I feel superior to people who paid more than I did.

Topics:

1. Atari compared to the Mac.
2. Mac software on the Atari.
3. What's wrong with the Mac?
4. Why the Atari is the best deal.
5. The decline of bowling in America.

Amiga 2000

Thoughts:

This machine is fabulous, but nobody wants to talk about it. It's a cover-up. I love this machine but feel sorry for myself.

Topics:

1. Why the Amiga is never discussed.
2. Fancy video techniques done easily on the Amiga.
3. How commodore is blowing Amiga's marketing.
4. How good is the true stereo on the Amiga?
5. New uses for the Amiga.

> ***"Mac users make more spelling and punctuation mistakes and write at an eighth-grade level."***

VT100 hooked to a VAX

Thoughts:

This is a real computer. I like it and feel superior to the poor saps who use anything else.

Topics:

1. Button collecting.
2. I wish I had invented C.
3. How to borrow money.
4. Is the sponge bath making a comeback?
5. Efficiency in rebooting a VAX.

IBM 3270 hooked to a 3090

Thoughts:

This is a real computer. I like it and feel superior to the poor saps who use anything else.

Topics:

1. VM is the best thing ever!
2. Is RPG-II a victim of bad press?
3. How to make a bureaucracy work.
4. The history of corporate dress codes and their importance.
5. Alternate realities.

When the exercise was over, I looked at the results, went home and wrote this column — in longhand. ■

Harder Working Hardware

ORACLE provides linear performance increases for VAX 6000 and 9000 SMP systems.

Businesses are making significant investments in Digital's VAX SMP systems, largely on assurances that these systems can be expanded as needed. But scalable hardware doesn't mean much without scalable software.

On VAX SMP systems, ORACLE delivers linear increases in performance as additional processors are added to the system.

This is because ORACLE takes full advantage of DEC's symmetric multiprocessor (SMP) architecture. So performance benchmarks rise linearly to an impressive 66.0 TPS on a six processor VAX 6360 system.*

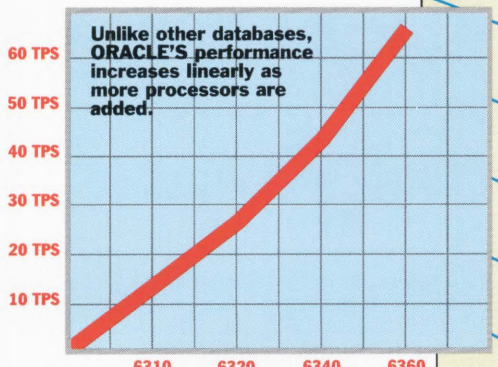
And the better the performance, the lower the cost per transaction. Which means customers making a major hardware investment don't have to settle for a minor performance return.

But more than just linear performance gains, ORACLE offers an unequalled OLTP solution for virtually any computer system. VAX/VMS, VAX/ULTRIX, RISC/ULTRIX, even IBM mainframes.

Not to mention all the PCs, Macs and workstations found in most companies. Which may be why 41% of all VAX 6000 database customers are running ORACLE.**

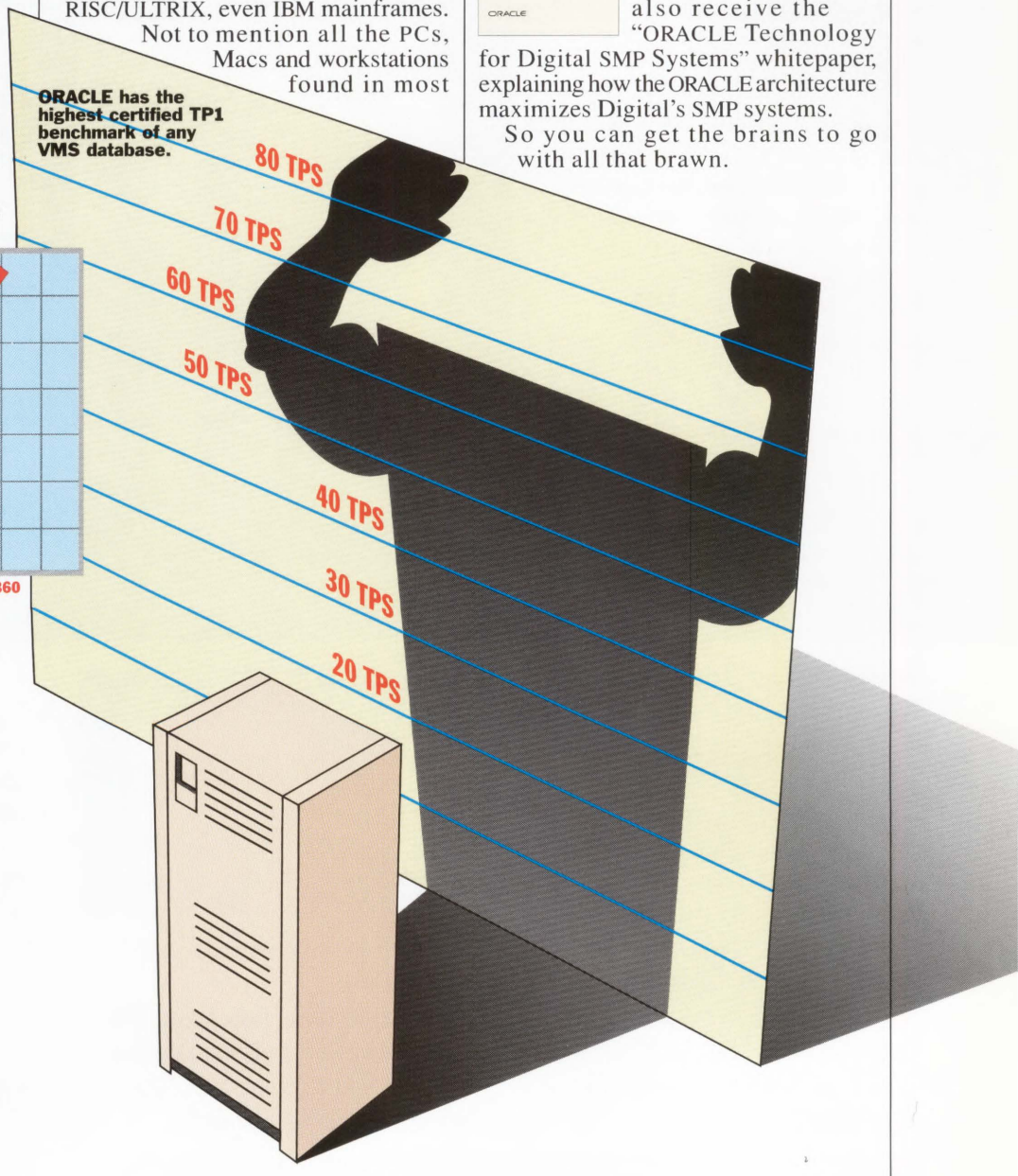
Call 1-800-633-0527 extention 1609 to sign up for a free Oracle Data Management Conference. You will also receive the "ORACLE Technology for Digital SMP Systems" whitepaper, explaining how the ORACLE architecture maximizes Digital's SMP systems.

So you can get the brains to go with all that brawn.



* According to Codd and Date's audited TP1 performance benchmarks

** According to Sentry Market Research, 1990.

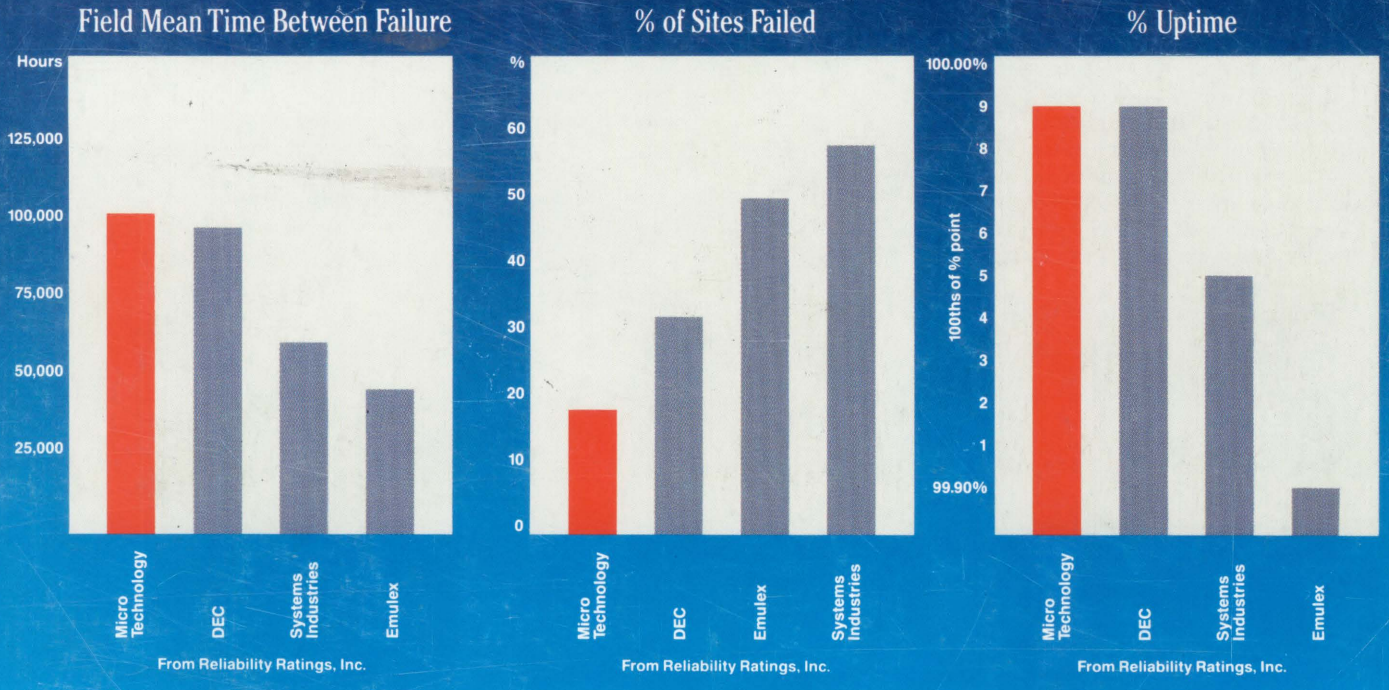


ORACLE®

Compatibility • Portability • Connectability

©1990 Oracle Corporation. ORACLE is a registered trademark of Oracle Corporation. All trade names referenced are the service mark, trademark, or registered trademark of the respective manufacturer. Call 1-800-ORACLE1 for hardware and software requirements.

And you thought DEC was the safest choice for hard disks!



Reliability Ratings,* an independent research firm, will make you think again.

It proves that while the RA 90 is a good disk drive, the MDI-276 from Micro Technology is even better.

For example, the research showed our MDI-276 had the best MTBF: 101,235 hours. DEC finished a distant second at 97,082 hours. Systems Industries and Emulex trailed far behind.

The MDI-276 also had the fewest failed sites, beating DEC by 13%, Emulex by 32% and Systems Industries by a whopping 40%.

Our uptime was unsurpassed at 99.99%.

And our drive failure rate was 7%—nobody was lower. Compare that with reported failure rates of 15% for Systems Industries and 19% for Emulex!

So you can see, when it comes to hard disks, you only have two real choices. The company with a reputation for reliability, DEC. And the company proven to be more reliable, Micro Technology.

For more information about the RA 90 compatible drive that's even more reliable than the RA 90 itself, call Micro Technology today at (800) 999-9MTI.

Micro Technology

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

*Results of an independent survey conducted by Reliability Ratings, an organization that specializes in providing unbiased reliability and service data to managers of DEC sites. Partial reprints available on request. Reliability Ratings' research department has no affiliation with Micro Technology Inc. Reliability Ratings is a registered trademark of Reliability Ratings, Inc. Per cent of sites failed is a function of both reliability and the average number of drives installed at end-user sites.

DEC and RA 90 are registered trademarks of Digital Equipment Corp. Emulex is a registered trademark of Emulex. Systems Industries is a registered trademark of Systems Industries.

CIRCLE 144 ON READER CARD