VAX

DNS

JUNE ■ 1988 VOL. 7, NO. 6 ■ $4.00

DEC PROFESSIONAL

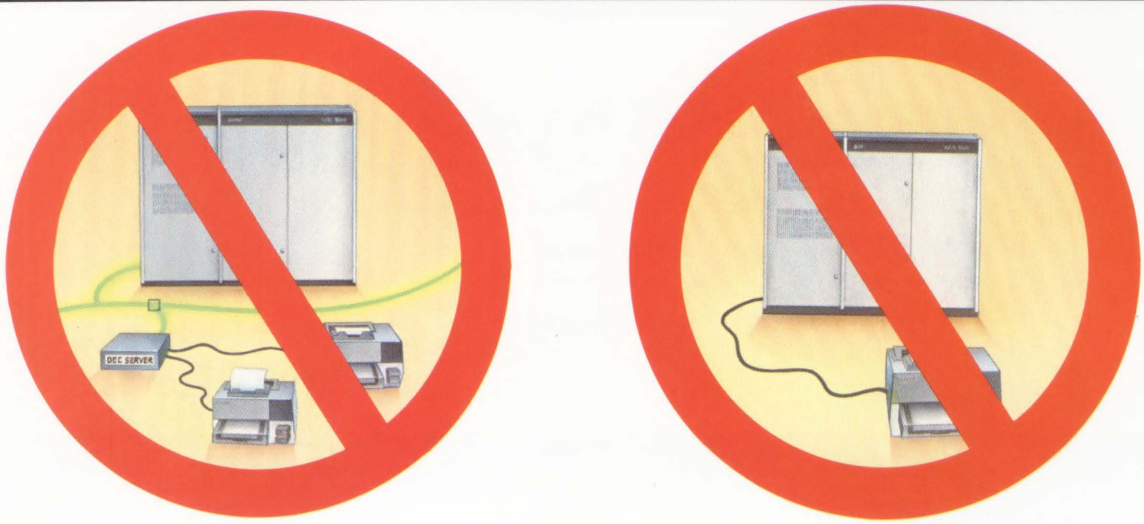
A PROFESSIONAL PRESS PUBLICATION

- A Guide To Power Problems
- Security For The New Manager
- Expanded Lab Section

Site Management

This magazine is not sponsored or approved by or connected in any way with Digital Equipment Corporation. "DEC" is a registered trademark of Digital Equipment Corporation. Digital Equipment Corporation is the owner of the trademark "DEC" and is the source of all "DEC" products.

RAF PRINT SERVER. 'THE ELIMINATOR.'



INTRODUCING THE MOST COST-EFFECTIVE, EFFICIENT WAY TO CONNECT PRINTERS TO YOUR VAX NETWORK.

Datability presents RAF Print Server—a technological breakthrough that enables standard, local PC printers to act and serve as VAX network printers.

RAF Print Server changes the way a normal, locally connected printer operates, transforming it from a single-user PC printer to a shared access network printer, exactly as if the printer was hung from a terminal server instead of the PC. Best of all, your PC can continue to function as a regular PC because RAF Print Server works invisibly in the background.

RAF PRINT SERVER ELIMINATES THE NEED FOR TERMINAL SERVERS.

No longer do you need to use a terminal server to put a printer on your network. In a matter of minutes, your local PC printer can be transformed into a shared network printer, available to all VAX and PC users.

RAF PRINT SERVER ELIMINATES WIRING.

No longer is it necessary to run separate printer wiring in addition to your Ethernet cabling. A printer merely connects to the closest PC without any office disruption.

RAF PRINT SERVER ELIMINATES COSTLY EXPENDITURE.

With RAF Print Server, the cost per printer connection drops more than 40% for most installations. And you're assured the flexibility to connect additional printers to your network with even greater savings.

Economy. Efficiency. Flexibility. They add up to make RAF Print Server a product that's simply unmatched in the marketplace.

DATABILITY

1-800-DIAL-DSS

In New York: (212) 807-7800
Datability Software Systems, Inc.
322 Eighth Avenue, New York, NY 10001

All product names are registered trademarks of their respective manufacturers.

CIRCLE 114 ON READER CARD

NOW INCLUDES
• Screen Painter • RMS Journaling
• Enhanced Rdb/VMS support

THE RELATIONAL PROBLEM JUST GOT SOLVED

PowerHouse® brings solutions to typical relational DBMS problems

Integrate new applications with existing data

New applications built in a third party relational DBMS won't necessarily integrate with your existing data. Because the PowerHouse development language supports both Digital's relational database and dominant file system, you're free to build new applications using Rdb/VMS® and integrate them with existing ones built on VAX RMS.® That means you're not locked-in to a proprietary relational DBMS and locked-out of your existing data.

PowerHouse provides compatibility and performance

Implementing relational technology can present compatibility and performance problems. Not with PowerHouse — it's tightly integrated with Digital's databases and operating system to guarantee you exceptional 4GL/DBMS performance. You can enjoy the combination of a fast-execution language and Digital-optimized databases, now and in the future. Your applications are completely compatible with all standard Digital software. And wherever Digital takes its hardware and software — your applications and data will go too.

Development power for 'production' applications

PowerHouse gives you total development capability in one language, not a collection of weak DBMS utilities and interfaces. Regardless of which Digital database you're using, PowerHouse gives you advanced, dictionary-driven development power. The power you need to prototype and build 'production' commercial applications, such as order entry, inventory tracking, and manufacturing — the backbone of your company.

Cognos has a full-service organization to back you up. Call any of our 38 offices around the world and find out why over 9,000 customer sites use PowerHouse.

1-800-4-COGNOS (U.S.)
1-800-267-2777 (Canada)
+44 344 486668 (Europe)

digital™ Cooperative Marketing Program

COGNOS

Cognos Corporation, 2 Corporate Place, 1-95, Peabody, Massachusetts 01960.
Cognos and PowerHouse are registered trademarks of Cognos Incorporated.
VAX and Rdb/VMS are registered trademarks of Digital Equipment Corporation.

CIRCLE 108 ON READER CARD

Here are a few plugs for our new software

Making Ends Meet
At Equinox we know how difficult it is to get all your PCs under control. We know you need a reliable, secure network that's easy to install and manage. One that lets PC users exchange information with your mainframe and each other, and allows printers and modems to be easily shared by everyone. A network that won't blow your budget sky-high.

Presenting SwitchLAN
SwitchLAN is an integrated pop-up PC communications program. It provides "hot-key" micro-to-mainframe access, PC-to-PC file transfers and printer management with Equinox Data PBXs. SwitchLAN was designed for organizations that don't require the multi-user features of PC LANs but do want the efficiency and cost savings offered by PC networking.

SwitchLAN's extensive help and pull-down menus guide even the most basic PC users through file transfer, host access and printer operations. People don't have to become network gurus to use it.

The "Switch" in SwitchLAN
An Equinox Data PBX is SwitchLAN's network hub. All connections are made using telephone type twisted-pair wiring and the serial "com" port already in your PCs. You don't need to buy network servers, install expensive network boards in every PC, or struggle with coax cable.

SwitchLAN and an Equinox Data PBX put an end to "Sneakernet", simply and at a fraction of the cost of other approaches, so you can afford to network all your PCs for what you might otherwise spend on just one department.

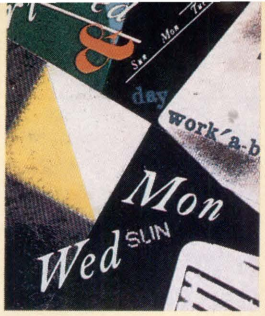
Don't take our word for it. Plug a free SwitchLAN demo disk in your PC and see for yourself how simple and capable it is.

Call 1-800-DATA PBX
In Florida: 305-255-3500
Equinox Systems Inc.
14260 S.W. 119 Avenue
Miami, FL. 33186

CIRCLE 122 ON READER CARD

EQUINOX

Simply Better Networks



DEC
PROFESSIONAL

CONTENTS

JUNE 1988 VOL. 7, NO. 6

SITE MANAGEMENT

38 **COPING WITH THE ELECTRONIC ACHILLES' HEEL**
by Dr. Alex Severinsky
A site manager's guide to power problems.

46 **CHECKING THE TEMPERATURE**
by Steve Rees
An inexpensive approach to environmental monitoring.

ARTICLES

50 **SECURITY: THE SCHEME OF THINGS**
by Betty Steele Adukoski
Understanding security in a non-privileged environment.

58 **SECURITY: SECURITY FOR THE NEW VAX MANAGER**
by Robert Hansen
An in-depth look at five key issues.

64 **CONNECTIVITY: PC INTEGRATION: A MIDTERM REPORT**
by Steven Salemi and Mark Maxson
An overview of the past, present and future of desktop connectivity.

72 **VAX: TO NAME ME IS TO KNOW ME**
by Philip A. Naecker
Distributed name service (DNS) simplifies the management of network resources.

78 **GRAPHICS: *GRAFKIT***
by David G. Goldstein
A powerful graphics interface from ICEX.

Continued on page 4.

LABORATORY DECPRO TESTING CENTER

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

ON THE COVER:
DEC PROFESSIONAL Laboratory and Testing Center, a working Local Area Cluster where we test software and hardware in real-world conditions. Photographer Steve Krouch, PhotoSep, Pennsauken, NJ.

CONTENTS

Continued from page 3.

DEPARTMENTS & COLUMNS

Publisher
by Carl B. Marbach
It's Not Funny Anymore 10

Editorial
by Dave Mallery
Calypso: Music Or Sinking Ship? 14

Cluster Chronicles
by Dave Mallery
Cluster Complexity 84

DCL Dialogue
by Kevin G. Barkes
The Five-Oh Defense 92

Field Service
by Ron Levine and Warren Haeberle
Self-Maintenance Requires A Partner 94

RSX Clinic
by James A. McGlinchey 100

From The Lab
by Dave Mallery
Break In! 102

From The Lab
by David B. Miller
PAKMANAGER 104

From The Lab
by David W. Bynon
Modular Office Wiring 110

From The Lab
by John F. McGlinchey
Digi-Data's Gigastore 116

From The Lab
by Howell D. Rasor
Magic Menu 120

Mac/VAX
by Al Cini
Helix Revisited 124

Back End
by John C. Dvorak
Nine Wacky Aspects Of 1988, Part 1 160

Letters 16

***ARIS*TALK** 18

Product Watch 22

Products 130

New Equipment 153

Used Equipment 154

Classified 155

Product Showcase 156

Advertisers Index 158

The ARIS symbol on an article indicates that the program segments are available electronically on our Automated Reader Information Service. Dial (215) 542-9458.

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. This magazine is not sponsored or approved by or connected in any way with Digital Equipment Corporation. "DEC" is a registered trademark of Digital Equipment Corporation. Digital Equipment Corporation is the owner of the trademark "DEC" and is the source of all "DEC" products. 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 by Professional Press, Inc., 921 Bethlehem Pike, Spring House, PA 19477. Printing and binding by R. R. Donnelley & Sons Company. Subscriptions are complimentary for qualifed U.S. and Canadian sites. Single copy price, including postage, $4. One year subscription rate $30 in the U.S. and Canada; and $60 foreign. All orders must be prepaid. Second Class postage paid at North Wales, PA, and additional mailing offices. POSTMASTER: Send all correspondence and address changes to: DEC PROFESSIONAL, P.O. Box 503, Spring House, PA 19477-0503. COPYRIGHT© 1988 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

Perfect matches to DEC user needs. Hip. Hip. And Hooray.

One-size-fits-all is an attribute best reserved for inexpensive socks. In the realm of PC-based emulation and communications software for DEC mainframe users, it's important to match specific user needs with specific product attributes. We have.

SmarTerm® 240 features exact four-color emulation of a DEC® VT241 terminal. Along with delivering full-screen ReGIS® and Tektronix® 4010/4014 graphics, SmarTerm 240 offers precise VT220, VT102, VT100, and VT52 text emulation.

For non-graphics applications, SmarTerm® 220 duplicates virtually every SmarTerm 240 text, communication, and ease-of-use feature. Three error-free file transfer protocols, including Kermit and Xmodem, are provided. Downloading minimizes on-line time requirements to boost overall system efficiency. And an optional network package allows direct LAN access to shared modems, printers, as well as host mainframes.

As SmarTerm 240 and 220 focus on graphics and text, new SmartMOVE® makes PC-to-the-rest-of-the-World communications sharper than ever. Speed connect, auto redial, and background file transfer features make this VT100 emulator a loud and clear choice for advanced communications requirements.

Graphics, text, and communications. If you're looking for a perfect fit, seek the software sized and priced to match your needs. Persoft has it. Period.

Visit your dealer or phone us at 608-273-6000.

© 1987 Persoft, Inc. All rights reserved. Persoft, SmarTerm, and SmartMOVE are registered trademarks of Persoft, Inc. DEC, VT, and ReGIS are trademarks of Digital Equipment Corporation. Tektronix is a registered trademark of Tektronix, Inc.

CIRCLE 175 ON READER CARD

persoft®

DEC UNIBUS* USER:
CONVERT YOUR OBSOLETE PDP-11* TO A POWERFUL '87 MODEL

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 CPUs — NO BACKPLANE CHANGE

FOR SPECIAL PRICING ON N1100, CALL OLIVIA AT (800) 233-1837 In Calif. (714) 261-8811

*UNIBUS *PDP *J-11 are registered trademarks of DIGITAL EQUIPMENT CORPORATION

NISSHO ELECTRONICS

17310 Red Hill Avenue, Suite 200, Irvine, California 92714 • FAX (714) 261-8819, TLX 181-308

CIRCLE 188 ON READER CARD

DEC PROFESSIONAL

Publisher: **Carl B. Marbach**
Editorial Director: **R. D. Mallery**

Editorial

MANAGING EDITOR Linda DiBiasio
ASSISTANT EDITORS Karen Detwiler, Pamela F. Fullerton
PRODUCTION EDITOR Suzanne Garr
SENIOR TECHNICAL EDITOR Al Cini
EAST COAST EDITOR Evan Birkhead
WEST COAST EDITOR Philip A. Naecker
TECHNICAL EDITORS Ron Levine, David B. Miller
BACK END EDITOR John C. Dvorak
C EDITOR Rex Jaeschke
DCL EDITOR Kevin G. Barkes
MICROVAX EDITOR David W. Bynon
NETWORKING EDITOR Bill Hancock
RSX EDITOR James A. McGlinchey
SPECIAL EDITOR Victor J. Chorney
UNIX EDITOR Lori A. Snyder
EDITORIAL ASSISTANT Anne Schrauger
CONTRIBUTORS Betty Steele Adukoski, David G. Goldstein, Warren Haeberle, Robert Hansen, Mark Maxson, Howell D. Rasor, Steve Rees, Steven Salemi, Dr. Alex Severinsky

Design

DESIGN/PRODUCTION DIRECTOR Leslie A. Caruso
DESIGN/PRODUCTION ASSOC. Ruth Ann Leiby
ART/PRODUCTION ASSOC. Timothy M. Kraft
ART ASSISTANT Sue Ann Rainey
PRODUCTION ARTIST Richard G. Kortz
TRAFFIC/PRODUCTION ASST. Joann Corvino
TYPESETTING MaryEllen Springer, Diana Yost

Circulation & Administration

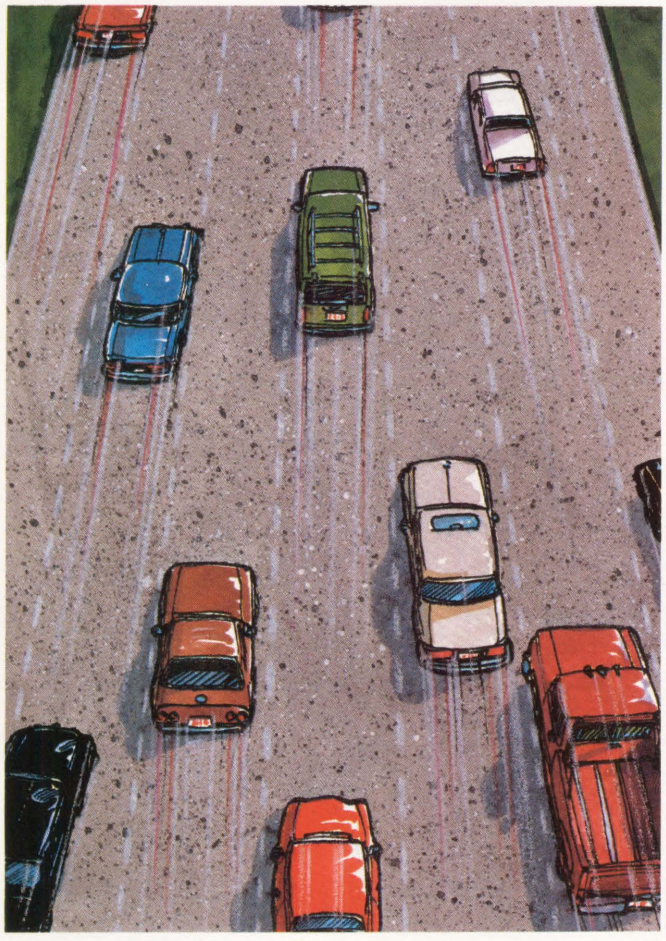
VICE PRESIDENT Peg Leiby
DIRECTOR OF MARKETING Mary Wardlaw
CIRCULATION MANAGER Betsy Ellis
FULFILLMENT MANAGER Margie F. Pitrone
CIRCULATION DBA Rebecca Schaeffer
CONTROLLER Andrea Beneke
MAILING LIST COORDINATOR Cathy Dodies
MARKETING SERVICES (215) 542-7008 Mary Ann Browarek
ASSISTANT TO THE PUBLISHER Jan Krusen

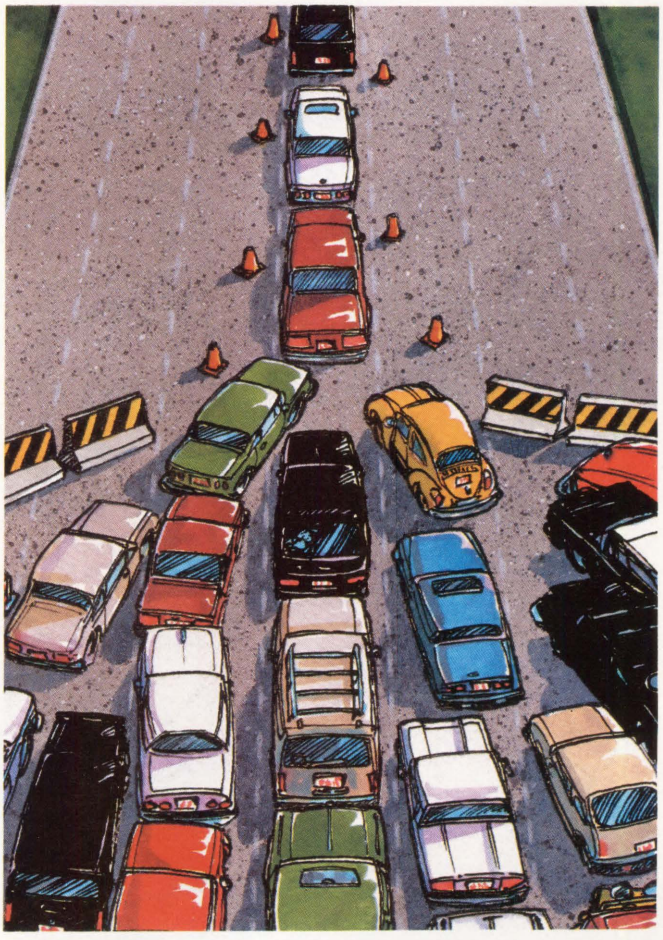
MIS

MANAGER John F. McGlinchey
ARIS MANAGER Bonnie Auclair
STAFF Kevin Kennelly, Ruth Mermelstein

PROFESSIONAL PRESS, INC.
For information on how to contact your sales representative, see page 158. Editorial, Advertising Sales, and Executive Offices at 921 Bethlehem Pike, Spring House, PA 19477. (215) 542-7008. TWX 910 333 9522. FAX (215) 628-2845. Easylink 62805174. ARIS (Automated Reader Information Service) (215) 542-9458. Additional Editorial Offices: East Coast Office at 238 Bedford St., Suite 3, Lexington, MA 02173. (617) 861-1994 West Coast Office at 1010 E. Union St., Suite 101, Pasadena, CA 91106. (818) 577-5970.

Here's the difference between I/O with TurboDisk and without.





It's time you unclogged your I/O traffic!

I/O buses are still back in the days of the Model T, while CPU and memory buses are speeding ahead. That means a continuous traffic jam.

TurboDisk™ is a RAM disk for the VAX/VMS® family that bypasses the I/O bus, and puts your most frequently accessed files in the high speed lanes.

TurboDisk customers realize 135% average improvement in performance with TurboDisk installed, the equivalent of having an additional system for the cost of a few terminals.

TurboDisk takes advantage of the improved memory architecture on the newest CPUs, and because it operates at memory speeds, it maximizes performance. (Watch for TurboDisk/SMP, for VMS V5.0 soon.)

A smart File I/O Recording facility pinpoints your hottest files, so you can move them right onto TurboDisk, and out of the traffic jam. An added plus, Shadow Recording, guarantees data integrity.

Get on the horn for a free demo package today!

EEC SYSTEMS INC.

EEC Systems, Inc., 327/E Boston Post Road, Sudbury, Massachusetts 01776
(617) 443-5106 FAX (617) 443-9997. (After July 16, the new Sudbury area code is (508).

Distributors:
Enhance Systems, Canada 403-245-4449
Salcom AG, Sweden 08-755-27-70
Nexcom Ltd., UK 06-02-390-656
Computer Dynamics Corp., Japan 81-3-366-9741
Computer Plus Marketing, Australia, 03-877-7711
Business Computers Ltd., New Zealand 03-50-534
ACU Systems, Switzerland, 041-404-505

VAX/VMS and VMS are registered trademarks of Digital Equipment Corporation.
TurboDisk is a registered trademark of EEC Systems, Inc.

CIRCLE 120 ON READER CARD

Introducing Reflection 4. VT241 emu

A well-balanced communications diet requires more than functional emulation and error-free file transfer. High-performance VT241 emulation and ReGIS graphics are just a beginning with Reflection 4.

Reflection uses less RAM than the competition. So there's more room for your other PC programs when Reflection is in background.

We think you'll find our hearty command language ideal for writing custom user interfaces, or for automating complex or frequently used routines.

With the PLUS option, you'll never fear a changing communications environment. PLUS supports popular LANs and LAT protocol

lation to satisfy your ReGIS appetite.

under DECNet DOS. You can even back up PC files onto any VAX, UNIX or ULTRIX system.

Trade up to Reflection 4 PLUS, the full-course ReGIS emulation software. Send us the original diskette to any VT240/241 emulator and $100, and we'll send you Reflection 4 PLUS. You can trade up to Reflection 4 PLUS for $200 with any other VT emulator.

Available April, 1988.
Offer good through June 30, 1988.

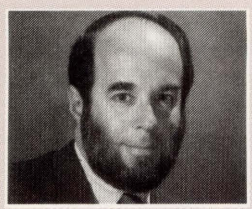
1-800-8PC-2VAX

REFLECTION™
SERIES
SOFTWARE

from Walker Richer & Quinn, Inc.

2825 Eastlake Ave. E. Seattle, WA 98102
U.S.A. (206) 324-0350 Telex 311743 WRQUR

CIRCLE 167 ON READER CARD



PUBLISHER

Carl B. Marbach

It's Not Funny Anymore

Hacking used to be fun. Finding ways to break into a computer system was a challenge that many high school and college students and most programmers couldn't resist. After all, if you could break in, then you really *knew* what you were talking about. You were a certified guru — a real wizard.

Years ago at DEXPO, we set up a PDP-11 and offered a prize to anyone who could crack our security system. While our backs were turned, someone pried open the back door, attached a console terminal, crashed the system and by interrupting the startup procedure was able to make himself a privileged account. We were angry that someone cheated, but we paid up.

Now a new security problem has appeared, the so-called viruses that are attacking computer systems. A virus is a program inserted into a computer system standalone or attached to another innocuous program that's activated at a later date and destroys data. These viruses are becoming widespread and are infiltrating sensitive computer systems and networks.

These insidious programs are simply vandals at work destroying what we do. It's been rumored that some viruses are attached to otherwise prestigious programs. We've been told that Aldus's *Freehand* program for the Macintosh contains a "benign" virus. If it's true, then some viruses can be attached to programs that come directly from manufacturers.

What does this mean?

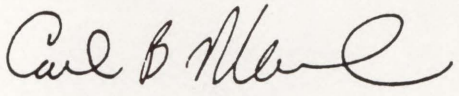
Remember that a virus attached to a priviliged program, like LOGINOUT, has the capability of compromising any and all data on your computer. This could render your computer system useless. Hundreds of thousands of dollars worth of computers, worthless; all because the data on them is insecure. It could be here today and gone tomorrow.

What's the answer? Do we return to the days of legions of green eyeshades and accountants/bookkeepers bent over 40-column ledger forms, because that data was secure?

Is this scenario farfetched? For $250,000 cash someone within DEC is reached and he attaches an innocuous patch to VMS V5.2, which inserts a virus onto several priviliged programs. This virus copies itself into many corners of every VAX when V5.2 is installed. These programs lie dormant for many months. Eventually, a person arises at DECUS and announces that it will cost $1,000 for every VAX installation to have the keys to unlock the virus and free themselves from certain destruction. The only other solution is to remove all your data and completely reload VMS (from a new distribution), then add only your source code, recompile and link them and hope that you found everything and that the new version of VMS doesn't have a similar virus.

Crazy? Yes. Impossible? No! Our businesses, our livelihoods and our computers are being threatened. These criminals must not be tolerated. We need laws, enforcement and a community awareness that this kind of behavior is unacceptable.

Let us know what you think, because we're planning several steps to help us move in the right direction.



MEMORY INNOVATIONS SHOWCASE-THREE

Highest Density, Lifetime Warranty, First to Market. . . . It must be Clearpoint.

The MV3000

From the largest manufacturer of workstation memory comes the MV3000, the best package of memory for the MicroVAX or VAXstation 3X00. Backed by a company committed to innovation, competitive pricing and unparalleled support, the MV3000 delivers:

- **Innovative Technology –** Using a custom gate array design, Clearpoint packs a full 32 or 16 megabytes of memory onto the MV3000 boards using state-of-the-art one megabit DRAMs.
- **Pricing Economy –** With either a cost-effective 8 MB design or the innovative 16 or 32 MB package, the MV3000 offers the best pricing for the best package.

Call Clearpoint for specifications on the MV3000.

CIRCLE 105 ON READER CARD

Clearpoint is a registered trademark of Clearpoint Research Corporation. DEC, VAX, MicroVAX 3000, VAXstation 3000, MicroVAX 2000, MicroVAX II are trademarks of Digital Equipment Corporation.

Unconditional Lifetime Warranty

Clearpoint delivers reliability. With the strictest testing and burn-in in the industry, Clearpoint confidently offers a lifetime warranty. Then backs it up with a 24-hour Repair/Replacement policy, 24-hour-a-day product support and an 800 service number that gives you a warranty with teeth.

Guaranteed Buyer Satisfaction

Need the best memory solution for all your in-house systems? Clearpoint works for long-term satisfied customers, not just short-term sales. With comprehensive, user-friendly documentation, trade-up credits and competitive pricing, Clearpoint guarantees buyer satisfaction.

CLEARPOINT

Get the DEC-Compatible Facts:

MV2RAM (for the MicroVAX II): Up to 16 MB on a board.

MV2000 (for the MicroVAX 2000): At 16 MB/board, you get MicroVAX II performance – at half the cost!

VXR8800 (for the VAX 88XX, 87XX and 85XX Series) Available in 64, 32 and 16 MB boards.

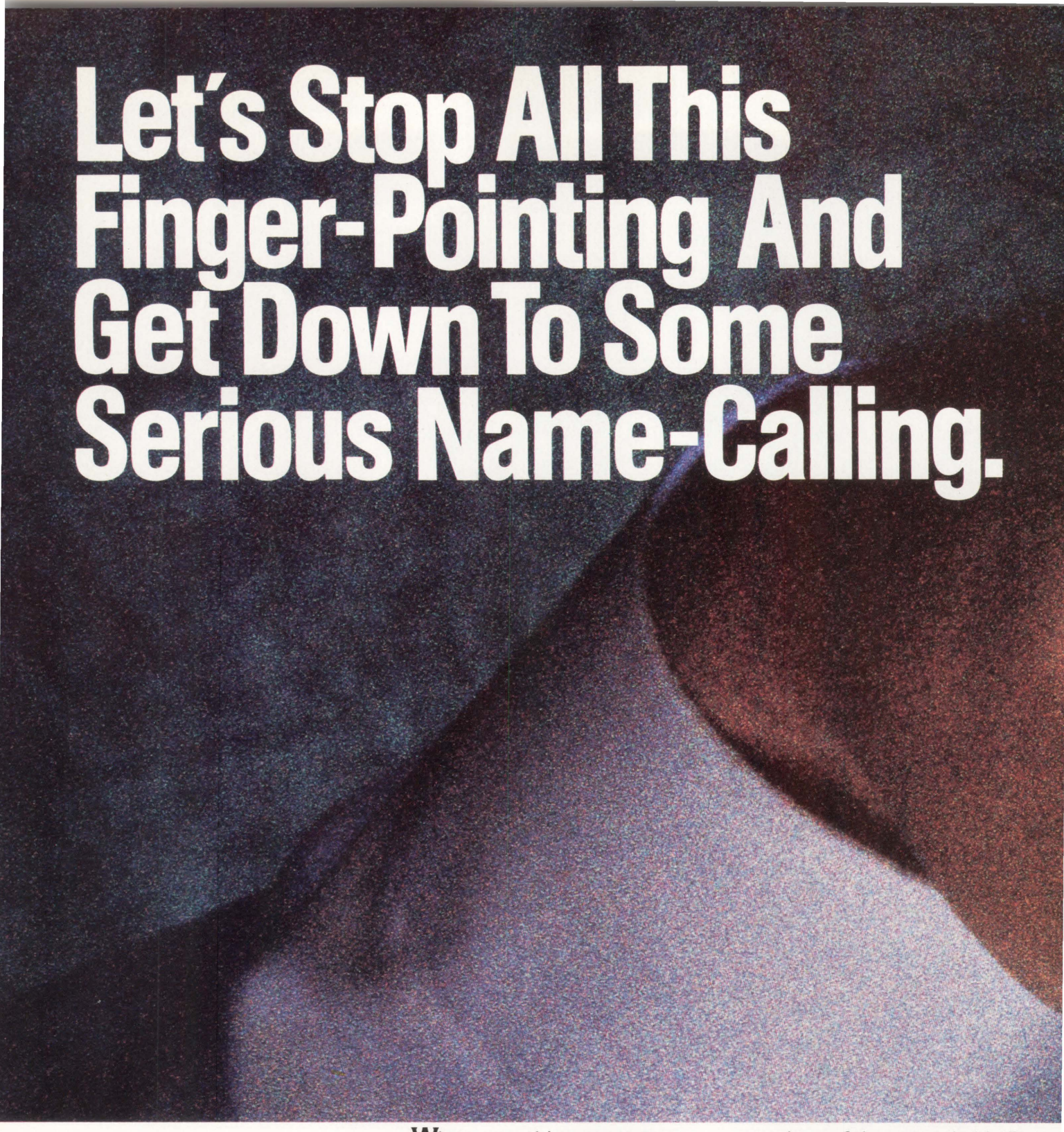
VXR8600 (for the VAX 86XX Series) Doubles the original slot capacity to 16 MB.

VBIRAM (for the VAX 83XX and 82XX Series) Offering up to 32 MB per slot, 128 MB per BI node!

Call or write for a product brochure, the '88 Product and Services Catalog, or the Designer's Guide to Add-in Memory.

Clearpoint Research Corp.
99 South Street Hopkinton, MA 01748
1-800-CLEARPT (617) 435-2000
Telex: 298281 CLEARPOINT UR
EUROPE *Clearpoint Europe B.V. Tel: 31-23-273744*
CANADA *Clearpoint Canada 416-620-7242*
JAPAN *Clearpoint Asia 03-221-9726*

If my memory serves me right . . . It must be Clearpoint!



Let's Stop All This Finger-Pointing And Get Down To Some Serious Name-Calling.

When something goes wrong with a computer system, everybody wants to know whose fault it is.

We have a better idea.

Solve the problem first. Point fingers later.

As the leading supplier of high performance peripheral subsystems for VAXs, we've seen our share of the unspeakable. But we've rarely seen the unsolvable.

We're not just talking about emergency service, either. Anyone can come in, smell smoke, and replace the offending device. We're also talking about things that are much more subtle. Like when your system is red-lined and it's still just too &@$%#! slow.

DEC is a registered trademark of Digital Equipment Corporation.

We can look at a whole system and figure out what went south and why. Sometimes better than the people who built it.

You see, what our subsystems and services do best is make Digital Equipment's processors perform better.

And except for those people whose checks are signed "Olsen," we have more trained bodies *in the field* to back us up than any other company selling in the DEC marketplace.

So you want to call somebody names?

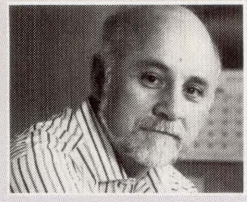
Call us. **800-333-2220.**

We'll solve your problems faster than you can say "System Industries."

SYSTEM INDUSTRIES

CIRCLE 243 ON READER CARD

© Copyright 1988 by System Industries, 560 Cottonwood Drive, Milpitas, CA 95035.



EDITORIAL

Dave Mallery

Calypso: Music Or Sinking Ship?

I attended the launch of the Calypso (VAX 62x0) line and viewed the proceedings with mixed emotions. I'd been hoping that the 62x0 series would obliterate the 82/83xx line from a price performance standpoint and that we'd be able to pick up a distressed 8250 on the surplus market at a favorable price. Too bad. The only machines affected by the announcement are the 8530, the 86xx and the 8550.

The Calypso has brought a measure of sanity to VAX pricing, however. It has removed a number of midrange models. And, it makes the growth path cheaper; it's easier to plug another CPU into your cabinet than to add another cabinet to the cluster, with all the attendant overhead of CI interfaces.

Certainly the Calypso has brought new luster to DEC's profit margins. It has implemented the 64-bit, 100-Mhz backplane using most of the BI mechanics. This has lowered the cost of the system backplane, perhaps more than any other economy in the line. Until a larger scale of integration permits multiple CPUs on a single card or carrier, this will represent the cheapest way to couple such busy devices.

I also attended the announcement of the new high- and low-end additions to Hewlett-Packard's Precision Architecture machines and saw some interesting parallels.

HP's high-end machine (95x) looks amazingly similar to both the Calypso and the 8800. There are slots in the 100-Mhz, 64-bit system backplane for up to four CPU cards. There are slots for massive amounts of memory. BI-like bus adaptors with slightly less bandwidth abound.

I've found that, in high-end electronics, things that look similar cost the same to make. When comparing HP and DEC, some are tempted to attribute a higher cost to the HP hardware, as it has a reputation of higher quality. But, HP machines cost about one-third of DEC machines for comparable horsepower. HP claims that, in its history, it never has had a product with as high a gross margin. It attributes those margins to the economies of manufacturing RISC processors.

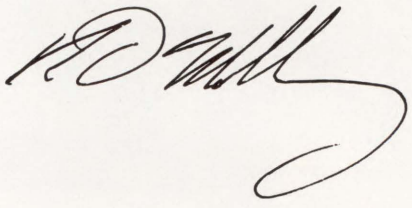
That's nonsense. If you count cards, the CPU accounts for only about 15 percent of the finished goods. In an 8800, the CPU might account for 20 percent.

My conclusion is that DEC is making hay while the sun shines. And well it might. The Goths aren't at the gate yet, but they're gathering their hoards somewhere in the provinces.

This has been a month of announcements. There are two new RISC chip sets, both of which start at 12 mips. When you hear about them, and the prediction of the downfall of the midframe, remember this axiom: "A workstation doesn't a mainframe make!"

Look inside a Calypso or an 8800 to see what a tiny part of the entire system the CPU is. Consider how difficult it is to keep a 12-mips CPU busy. If you want memory, consider the cost of the cache to keep 12 mips at full speed. As for I/O, the cost of gigabytes has plunged, but not nearly on the same exponential curve as the cost of mips. Getting those gigabytes off the disks and into the CPU remains as expensive as ever.

You want an operating system? Consider your choices. As UNIX standards drive off into the cosmos, consider what's left: a nasty squabble over who owns what and who's gonna take whose football and go home. Guess who gets left in the dust on the playing field?



DENSE

How dense? Try 2.3 gigabytes on a standard 8mm videocassette!

Think about it. . .With the CTS-8 8mm cartridge tape subsystem, you can store up to 2.3 gigabytes of data on a tape that's both inexpensive and reusable. That's enough capacity to handle four or five RA81 class disks. On a tape that fits in your shirt pocket.

Do your backups at night, when nobody's around. No operators. No tape swapping. When you arrive in the morning, your backup's done. Just take the tape out and put it in your desk. You don't even need a storage room.

And since the CTS-8 is completely VMS compatible, you can keep using the software and procedures you've always used. No hassles.

The CTS-8 is the breakthrough you've been waiting for. But you don't have to wait any longer. Because the CTS-8 is available *now* for DEC UNIBUS and Q-BUS VAX systems.

Let Transitional Technology show you what dense really means. Call TTI and ask for Sales.

"For large capacity back ups on a single, easy to purchase tape, the CTS-8 Subsystem wins hands down over any other tape subsystem that D.R. LABS have tested."

DIGITAL REVIEW/FEB. 22, 1988

1988 digital review TARGET AWARDS NOMINEE

Transitional Technology, Inc.

1401 N. Batavia, Suite 204 • Orange, California 92667

(714) 744-1030

CTS-8 is a registered T.M. of Transitional Technology, Inc. DEC. UNIBUS, Q-BUS, VMS and VAS are T.M. of Digital Equipment corporation.

CIRCLE 262 ON READER CARD

LETTERS

Address letters to the editor to *DEC PROFESSIONAL* magazine, P.O. Box 503, Spring House, PA 19477-0503. Letters should include the writer's full name, address and daytime telephone number. Letters may be edited for purposes of clarity or space.

CACHING CONTINUED

Having read two Letters To The Editor in response to my November 1987 article "Caching In On RSTS/E," I felt it important to respond. Both Mr. Smith's (February 1988) and Mr. Finneran's (March 1988) statements regarding all opened files being cached by RSTS/E when the SET CACHE/ALL command is in effect appear to be accurate, I admit, but this was not the main premise of the article.

Both letters point out the other important issues that were raised. First, not all systems have sufficient memory to take advantage of caching every file/program open performed by the SET CACHE/ALL command. In these cases, there isn't a simple way to enable sequential or random caching on groups or classes of files (perhaps only on specific disks) in their UFD entries — a solution provided in article.

In addition, some RSTS/E utilities do not preserve the UFD caching bits when used on flagged files; e.g., PIP. If system performance is dependent upon file-by-file caching, and files' caching attributes disappear through use of these utilities, they quickly can be restored on large groups of files.

I specifically stated in my article that it wasn't intended to address the effects on system performance of caching. Mr. Smith correctly asserts that SET CACHE/ALL is for those who want to randomly cache all read requests; however, $SET CACHE/ALL is all you need. On the surface, this is a correct statement, but can a system manager necessarily know that all that's needed for improved performance is to randomly cache all files? I do not feel that a single worst-case virtual array — perhaps on an unloaded system for timing comparisons — is in any way an accurate measure of the effects of randomly caching all files on a loaded system's overall performance.

I have been an avid reader and contributor to your magazines since they first appeared, as well as a long-time RSTS/E and VMS user. They continue to provide an important forum and significant practical contributions to the DEC community. I am especially glad to see that there still is an active group of RSTS/E users, with critical technical eyes, reading your magazine!

Laurence F. Koolkin
Montpelier, Vermont ■

Attention Oracle Users!

Report writing just got easier.

ORACLE*	DEC'S CDD*	XENTIS® DICTIONARY	NCA'S MAXCIM*
in Beta Test [For Applications created using the Oracle Database]	Argonaut, DBSI, MCBA, Transcomm/GSI, Diagonal Data, Ross Systems, Applications developed in-house		Manufacturing & Accounting Software

One XENTIS Report!

XENTIS—the premier report generator for DEC VAX/VMS computers—will soon be able to interface with the Oracle 4th GL. For programmers and nonprogrammers alike, XENTIS is fast and easy to use.

Proven in more than 500 installations, the Park Software report writer can combine information across several data bases . . . for example, your accounting staff can pull information from Ross Systems accounting software and combine it with data from Argonaut's Human Resources package in one report. And soon you'll be able to add data from applications created with the Oracle system.

To learn more about XENTIS and our fully functional evaluation kit, call (206) 343-0447 today!

CIRCLE 145 ON READER CARD

PARK SOFTWARE, INC.
P.O. Box 31529
Seattle, WA 98103-1529 (206) 343-0447

*Oracle is a registered trademark of the Oracle Corp. DEC and CDD are registered trademarks of Digital Equipment Corp. XENTIS and XENTIS/Dictionary are registered trademarks of Park Software, Inc. MAXCIM is a registered trademark of the NCA Corp. MCBA is a registered trademark of MCBA, Inc.

CORRECTION

The disk emulating version of EMC Corporation's Archeion optical storage subsystem will be compatible with VAX/VMS V4.6 and maintain compatibility with subsequent versions of VMS. The version cited in April's Product Watch was incorrect.

The Word At Microsoft Is SMARTSTAR Excels.

"For me, an outstanding feature of SMARTSTAR® is its ability to integrate with third party software as well as with applications developed in host languages. We use it as a transparent frontend facility to our MAXCIM (ASK) based manufacturing software," says Microsoft® Lead Development Analyst Greg Nelson. He also notes that the addition of scrolling regions (master/detail record processing) extends SMARTSTAR into the production applications development environment. In addition, Mr. Nelson states, "Signal Technology support is amazing. There is always a competent person available with a timely response."

SMARTSTAR is SQL-based 4GL application development and data management software designed exclusively for VAX/VMS. It is an ideal interface to Rdb and RMS, and it implements the Digital Standard Relational Interface. New features include functional menus, scrolling regions and windows. VAX/VMS users committed to Digital standards find that SMARTSTAR is a must.

As a leading VAX/VMS 3rd party application development system, SMARTSTAR is typical of the Signal Technology product line. PACS PLUS™ resource management software is installed at more VAX sites than all competitive products combined. ILS,® with more than 2,000 installations in 38 countries, is the world standard signal processing software. And no software developer is more committed to customer support and satisfaction than STI.

For details or a SMARTSTAR demonstration . . . or for information on any STI product, please write or call toll-free: 800-235-5787.

Signal Technology Inc

CIRCLE 275 ON READER CARD

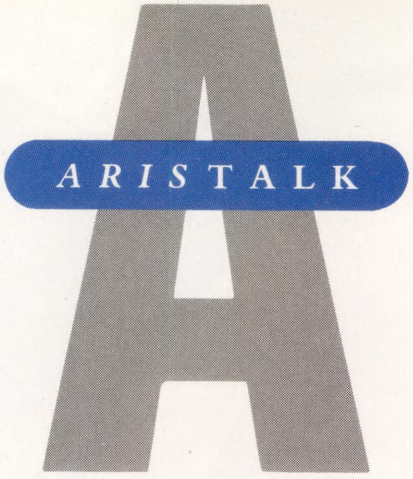
5951 Encina Road
Goleta, CA 93117 USA
(805) 683-3771
FAX (805) 967-0871
TWX/Telex 910-334-3471

VAX and VMS are trademarks of Digital Equipment Corporation.
MAXCIM is a trademark of NCA Corporation. Microsoft is a trademark of Microsoft Corporation.

Atlanta Boston Chicago Dallas Los Angeles New York San Francisco Washington, D.C.

digital™ Cooperative Marketing Program

KERMIT Protocol Now Available For Downloading



PRIORITIES

QUERY:

Richard Reeves *(SIG 13/MESS 73):* I have a problem with users hogging our MICROVAX II. The system increases the priority level depending on application. Does anyone know of a way to put a cap on the priority level (i.e., set a maximum level) for any given user?

REPLY:

Steve Thomas *(SIG 13/MESS 74):* The system will raise the priority of a process by some amount (I forgot the actual amounts) when it's doing disk and terminal I/O. Look at the base priority to see the level at which they are competing.

Concerning caps: Don't set your base priority any higher than that which some other user (e.g., SYSTEM) can log in as; if your high-priority process gets into a permanent loop, you'll have no more system until you reboot. Also, don't set your priority any higher than the Job Controller's priority; this generally is considered not nice. Don't set your priority any higher than 15; the SWAPPER runs at 16 and it's highly bogus to make the SWAPPER swap itself out; i.e., a BUGCHECK (machine crash) soon will follow.

WPS SPEED

QUERY:

Laura Gail Chase: *(SIG 12/MESS 181):* We currently have a 11/785 running WPS with approximately 23 WPS users. We are planning to purchase two MICROVAXs to run WPS and move our primary WPS users to those systems. We also want the users of the MICROVAX to have access to the 785, if needed.

We're planning to run Ethernet with terminal servers and DECNET to accomplish this task. However, we heard that DECNET will cause very poor response times for our WPS users. In a reply to SIG 12/MESS 188, one of your readers mentioned using DECSERVERS/Ethernet or DECSERVERS/muxes in a similar situation.

We also have been told that a product called a TERMINAL SWITCH might be a better and more affordable alternative to DECNET. If anybody has any information regarding any of these configurations, we'd be interested in hearing from you.

REPLY:

Kent Cearley *(SIG 12/MESS 181):* Laura, we're running WPS/PLUS under *ALL-IN-1* on MICROVAXs using DECSERVER 200s. Response time doesn't seem to be a problem, even with the port speeds set at 4800 baud. The server tends to optimize traffic on DECNET and send packets when a timer circuit expires, instead of with each keystroke. Some people seem to even get performance enhancements versus devices connected directly to controller cards. Anyway, I'd be interested to hear which way you go and what the results are.

CONVERSION DISK FAILURES

QUERY:

Martin A. Bluestein *(SIG 21/MESS 85):* I'm attempting to convert an 11/23+ system to 11/73, but I'm experiencing disk failures. Specifically, I purchased an 11/73 and a new backplane/box (because DEC stated that the 11/73 required it); I'm also attempting to upgrade to RSX11M+ V3.0, from V2.1.

The system runs well under 2.1

How To Use ARIS

If you're a subscriber to *DEC PROFESSIONAL*, you can call up our VAX and log into ARIS, our **A**utomated **R**eader **I**nformation **S**ervice. In ARIS, you can download programs from our publications, 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, access our cumulative index, take a peek at our editorial calendar for the year, and communicate with other DEC users.

To log in, you'll need your subscriber number (it's on your mailing label). Then, just set your terminal to seven data bits, one stop bit and space parity, or eight data bits, one stop bit and no parity, and dial (215) 542-9458. Baud rates: 300, 1200 or 2400.

SIG Identifications

Here are the SIG categories referenced in this month's *ARIS*talk:

12 .....Site management
13 .....System performance
21 .....Controllers/memory

MORE THAN A DATABASE FOR THE DEPARTMENT COMPUTER

Over the noise of corporate issues, your department's computing needs are not always heard. In the stack of things to do, they often wait at the bottom of the pile.

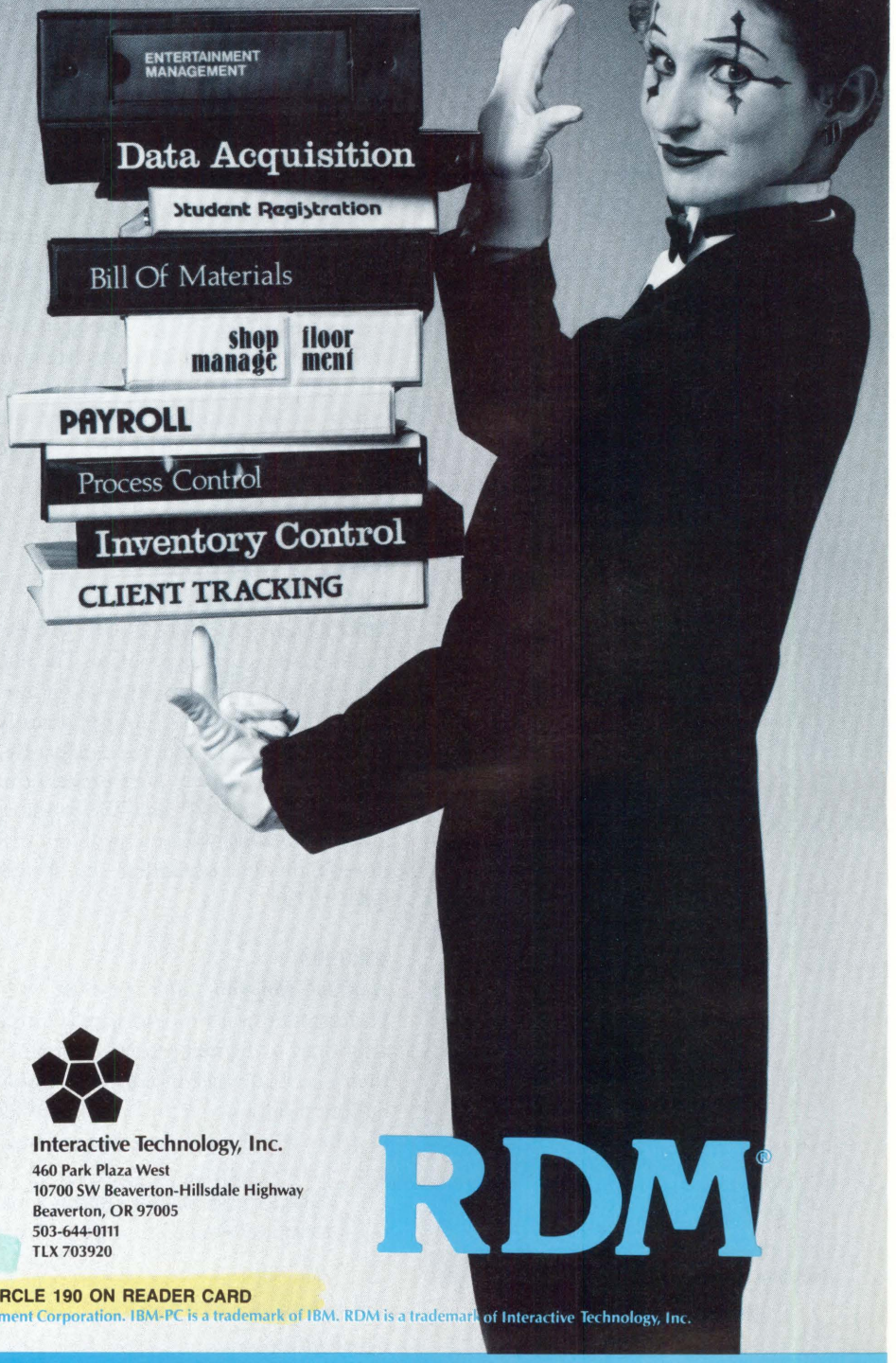
RDM is the ONLY application developer designed specifically to get department software development done. More than just a database, **RDM** is a complete application development system AND full relational database — integrated into one flexible, table-driven tool.

RDM's table-driven technology is a generation beyond conventional database development. **RDM** supplies all the parameters that shape standard application components. You add your own custom-designed specifics. **RDM** eliminates the need to code and recode routine application features.

RDM is nonlanguage, fill-in-the-form application development. With no programming code to analyze, the learning curve is short and productivity increases. With or without software development specialists, you create the entire application: data input forms, summaries and reports, command menus, on-line help files and processes to validate and manipulate data. You'll implement even the most procedural tasks — without procedural language syntax.

After initial software development — your department's needs will evolve. **RDM** makes system modification and maintenance easy. You add new forms and reports — when you need to. You create new files or change data relationships — quickly. And without any change or rewrite, **RDM** applications will transfer and share data across 10 different operating systems. You save time and money with one software product for your VAX, PDP-11 and IBM-PC.

Since 1980, **RDM** has been the choice of more than 2500 departmental application developers. For quick application development and easy maintenance, for increased productivity and extended portability, for stand-alone, integrated, distributed or networked systems . . . there's no better software solution than **RDM**.



Find out how your applications can rise to the top of the stack. Call today.

800-362-6203
In Canada, call 800-255-6378

Interactive Technology, Inc.
460 Park Plaza West
10700 SW Beaverton-Hillsdale Highway
Beaverton, OR 97005
503-644-0111
TLX 703920

RDM®

CIRCLE 190 ON READER CARD

VAX and PDP-11 are trademarks of Digital Equipment Corporation. IBM-PC is a trademark of IBM. RDM is a trademark of Interactive Technology, Inc.

CIRCLE 161 ON READER CARD

with 11/23+, but V3.0 with 11/73 generates disk failures (device timeouts) when testing two or more disks under IOX. I've patched DMDRV according to the Emulex patch sheet but to no avail. Emulex and DEC both scratch their heads; I'm scratching mine too, but if this isn't solved, mine will roll. Disks are Fuji 2322 and 2312. I'd appreciate your suggestions.

REPLY:

Wayne Steffen *(SIG 21/MESS 87):* I'm assuming that the 11/23+ is in a different backplane than the 11/73. Do you know if the disk controller needs NPR jumper removed? Find out if it's removed on the old backplane slots for the controller, and if so, it must be done for the new backplane.

Has your RSX-11M-PLUS V3.0 run on any system? If not, you're using a new system on new hardware, and the number of things to go wrong is increased. Try to use a known system or the hardware diagnostics to test the new system. If you can bring up 3.0 on the 11/23+, you can eliminate the software as a problem.

NULL PROCESS

QUERY:

Mike Cohen *(SIG 13/MESS 111):* I've experienced a recurring problem. The null process intermittently degrades system performance by consuming practically all the CPU. All other user processes slow to a crawl. How can I prevent this from happening? I'd also like to know a way of dealing with the problem that doesn't involve rebooting the system (VAX 11/730).

REPLIES:

Andrew Duggan *(SIG 13/MESS 112):* Unless your user processes are running at priority 0, the null process can't block their execution; even then, CPU would be split evenly between them. It sounds like they're waiting for another resource; e.g., memory, an I/O device, etc.

The null process only can run when the COMpute queue is empty. What kind of information can you get from:

$ Show System
$ Show Memory
$ Monitor Process/TOPCPU
$ Monitor Modes
$ Monitor States

These should give you some information about what's limiting the resources of your system.

Phil Anthony *(SIG 13/MESS 113):* The null process runs (i.e., shows CPU time; nothing's actually executing, and the null process is just a place holder) any time nothing else is running. In addition to Andrew's suggestions, though, I'd add the possibility that you have malfunctioning hardware, such as a terminal or tape drive or even the floating point accelerator, swamping the bus with stray interrupts. When VMS reboots, it sends a lot of hardware resets, terminating such an intermittent problem temporarily.

Richard B. Gilbert *(SIG 13/MESS 116):* How long has it been since you did a full image backup and restore of your system disk? A badly fragmented disk will bring VAX/VMS to its knees. Check the value for window turns using MONITOR I/O. If the value is greater than zero, you have a file fragmentation/disk fragmentation problem. There are several utilities around, most of them seem to be called FRAG, that will read BITMAP.SYS and report how free space on the disk is distributed.

The ideal situation, of course, is to have the free space in one large chunk. Typically, the free space is in several hundred separate chunks. This can cause the system to spend an inordinate amount of time looking for space, every time a file is created or extended. Worse, this ensures that your files will be fragmented. The simple, though time consuming, solution is to do an image backup and then restore the backup. This causes all files to be contiguous and all free space to be contiguous. There are several commercial software packages, and one from DECUS that will aid in curing/controlling the problem. ■

Introducing the Ditto 320XL...

With More Than 15 Major Improvements over The DEC VT320*... Perhaps DEC Should Be Emulating Us!

If you're looking to upgrade your DEC environment with a new terminal, don't settle for the limited features and functionality of the DEC VT320. The Ditto 320XL from Networx Data Products Co. has all the features of the VT320 plus over a dozen major improvements, including a 70Hz refresh cycle flicker-free screen, 2 standard and 6 optional pages of memory, an 80-132 column switchable "hot key", and 64K expandable firmware memory for custom OEM applications. And with our optional graphics upgrade (not available on the DEC VT320), you can create incredible graphs, charts, plots and drawings . . . without disturbing any of the 320XL's alpha-numeric features.

Even with all these extra features, the Ditto 320XL comes with a price tag that's hard to beat. And the Ditto 320XL is backed by a full, one-year nationwide service warranty. Another $49 buys you a 3-year extended warranty available directly from Networx.

Why settle for less. See why DEC users are calling the Ditto 320XL video display terminal the best value in today's market. For more information and spec sheets, write or call Networx today at 1-800-531-0019 or (516) 754-2798 within New York State. FAX 516-864-5875.

Networx™

DATA PRODUCTS COMPANY, Inc.

80 Modular Ave. Commack, New York 11725

CIRCLE 235 ON READER CARD

*DEC VT320 is a trademark of the Digital Equipment Corporation

PRODUCT WATCH

SYSTEM FINEX Is The First Network To Conform To The FDDI Standard

Fibronics Provides Hardware/Software Solutions With A High-Performance Communications Network

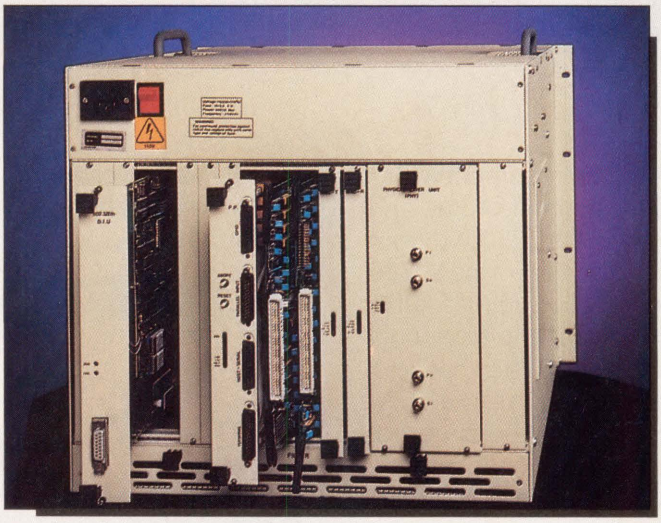
Fiber optic systems provide higher speed information transfer over longer distances with lower data error rates than conventional cable systems. Fibronics of Hyannis, Massachusetts, is a key player in developing products that can benefit from using the advantages of fiber optic technology.

SYSTEM FINEX, from Fibronics, is a new high-speed fiber optic LAN. It's the first network to conform to the Fiber Distributed Data Interface (FDDI) standard. The FDDI standard is defined under the auspices of the ANSI X3T9.5 working group.

Based on an open system architecture, the Fibronics network is a dual-fiber, high-bandwidth, 100 megabit-per-second, counter-rotating token-ring system. SYSTEM FINEX will connect heterogeneous mainframe computers, link together engineering workstations or link these engineering workstations with mainframe computers. The high-performance system also can interconnect existing Ethernet networks through bridges and gateways.

SYSTEM FINEX is a hardware and software solution that addresses all seven layers of the ISO model. According to Dr. Joseph Garodnick, corporate vice president of marketing, "The adherence to the ISO model allows users to implement this new high-speed network without the fear of obsolescence as the ISO software develops."

With the high backbone speed of an FDDI network, transfer rates of 100 megabits per second are possible. For example, a SYSTEM FINEX network is able to transfer the text of the entire 48,000 pages of the *Encyclopedia Britannica* in 13 seconds.



The SYSTEM FINEX features network management capabilities and supports a network of 100 km with up to 500 connected stations.

SYSTEM FINEX features network management capabilities and supports a network of 100 km with up to 500 connected stations. Consequently, a SYSTEM FINEX Ethernet backbone overcomes the distance limitations associated with 802.3 networks. It provides a greater number of network connections over an extended distance, improves these network connections and network management.

SYSTEM FINEX can be used in any Ethernet environment. In addition, mainframes, minicomputers and workstations from multiple Ethernets can be connected through a single SYSTEM FINEX network, regardless of the protocols being used, such as TCP/IP, XNS, SNA and DECNET.

SYSTEM FINEX ranges in price from $20,000 to $30,000 depending on the configuration for each station.

For further information, contact Fibronics International Inc., Communications Way, Independence Park, Hyannis, MA 02601-1892; (617) 778-0700.

Circle 577 on reader card

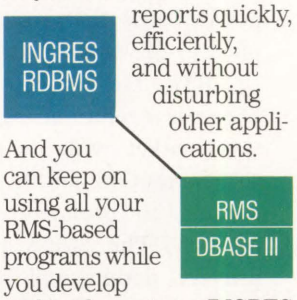
We've just cut five years off your relational DBMS conversion time.

To get the advanced capabilities of a relational database, you used to have to go through a lengthy, complicated, costly conversion.

Not anymore. Introducing the INGRES RMS Gateway—the first in a line of database links that let you apply relational DBMS power to older file management systems right now. Today. Without changing a thing.

The RMS Gateway makes RMS data appear as relational tables within an INGRES database. It lets you apply all the INGRES advantages—like easy user interfaces, industry-standard SQL, and powerful 4GL tools—while protecting your investment in data and applications.

Now you can generate all your decision-critical reports quickly, efficiently, and without disturbing other applications.



And you can keep on using all your RMS-based programs while you develop and implement new INGRES systems using the same data.

Best of all, the power of INGRES allows you to access RMS data across different hardware, networks, and operating systems—transparently—from anywhere in your organization. You can even combine INGRES and RMS data in any application.

What's more, an INGRES dBASE III Gateway is now available for data trapped in old PC files. And gateways to IBM's IMS, DB2 and SQL/DS are on the way.

No other relational database offers you these instant links to older data files—making INGRES the one relational DBMS you can put to work immediately. Which could help put you years ahead of the competition.

Get the INGRES advantage—call 1-800-4-INGRES for more information.

CIRCLE 155 ON READER CARD

INGRES

RELATIONAL TECHNOLOGY

1080 Marina Village Parkway, Alameda, CA 94501

ARMS803DP

© Relational Technology. Registered trademarks: DB2, IMS, and SQL/DS (International Business Machines), RMS (Digital Equipment Corporation), dBase III (Ashton-Tate).

RTE Deltec Revolutionizes The UPS Market

RTE Deltec's 8000 Series Online UPS Helps Electrically Safeguard VAXs

Uninterruptible Power Systems (UPSs) are used primarily to protect computer systems and other critical equipment from blackouts, brownouts, voltage fluctuations and electrical noise, which can damage them or the data they contain. By filtering and conditioning the available power, UPSs can regulate the power levels that are supplied to the equipment.

RTE Deltec of San Diego, is revolutionizing the UPS market with its new 8000 Series Online UPS. According to president Ray Meyer, "The 8000's proprietary design will soon replace conventional UPS systems." Virtually all existing medium- to high-power online UPSs use a non-utility interactive inverter design that was developed in the 1970s. In contrast, the RTE Deltec 8000 uses the technology of the 1980s, and according to the company that's what makes it a revolutionary new standard for the industry.

Meyer states that the new design eliminates the AC-to-DC-to-AC conversion problems that have been inherent in past UPS designs. The 8000's utility interactive, online design provides an efficient use of power, circuitry and space.

Operating at a 95 percent AC-to-AC efficiency results in low operating costs, quiet operation, less than 57 dB and less load on computer room air conditioning. But perhaps the most apparent is the size reduction; the 8000 Series is more than 50 percent smaller than most competitive inverter-based systems.

According to Meyer, "The 8000 Series uses a bidirectional utility-interactive, online converter that provides precise output regulation while supplying DC voltage to maintain battery charge. The design minimizes the conversion between AC and DC voltages."

The 8000's utility-interactive, online design provides an efficient use of power, circuitry and space.

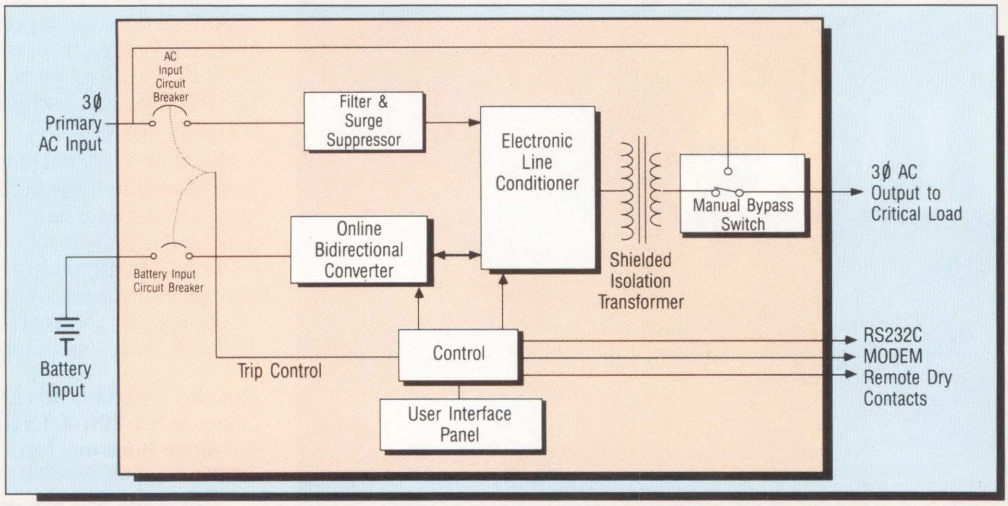
In addition to providing magnetic isolation, the 8000 features redundant sources of protected power that increase the system's reliability. The bidirectional converter eliminates the need for the separate rectifier/charger found in older systems. The converter acts as a charger and inverter, which provides total conditioning by adjusting the pulse widths and phase angle. Unlike offline designs, the 8000 also enables the early detection of an inverter failure before a crisis situation can occur.

A "make-before-break" manual bypass switch provides the ability to perform maintenance on the system without interruption or a phase shift. The 8000 UPS is available in models from 10 KVA to 25 KVA at prices ranging from $20,555 to $28,388.

For further information, contact RTE Deltec, 2727 Kurtz St., San Diego, CA 92110; (619) 291-4211.

Circle 580 on reader card

—Suzanne Garr



The 8000 Series UPS block diagram.

"I just recovered 20 percent of my disk space with PAKMANAGER"™

PAKMANAGER saves disk space by pinpointing space wastage. There's no VMS utility like it.
PAKMANAGER gives you an instant detailed report of disk space usage and identifies specific "space stealers" such as:

- unnecessary duplicate files
- aged files
- excessive multiversion files
- overallocated blocks
- expired files

PAKMANAGER gives you the vital information you need to zero in on disk space wastage and identifies performance problems such as wrong cluster factor, excessive directory nesting, or disk fragmentation.

Safe

PAKMANAGER is completely safe to use. No special privileges are required. In fact, no user files are ever accessed while PAKMANAGER'S reports are being generated. PAKMANAGER works in VAXclusters, shadowsets, and over networks.

Powerful

Reports that now take days to compile using standard VMS tools, will be generated in seconds. PAKMANAGER identifies culprit files, and gives you an efficient method to deal with those files, and recover valuable space immediately.

Cost Effective

PAKMANAGER, like other DEMAC software, is priced to allow you to recover the cost quickly. It enables you to postpone the acquisition of expensive hardware by allowing better use of existing resources. PAKMANAGER also saves money by increasing system efficiency and eliminating tedious hours of effort by system support staff.

Free Trial

Call us today, or use the coupon to find out more about the new way to manage your disk resources. We're so confident you'll realize the tremendous benefits that PAKMANAGER can bring to your site that we're offering you a FREE NO-HASSLE TRIAL! Call us, or write today, for more information.

DEMAC SOFTWARE LTD.

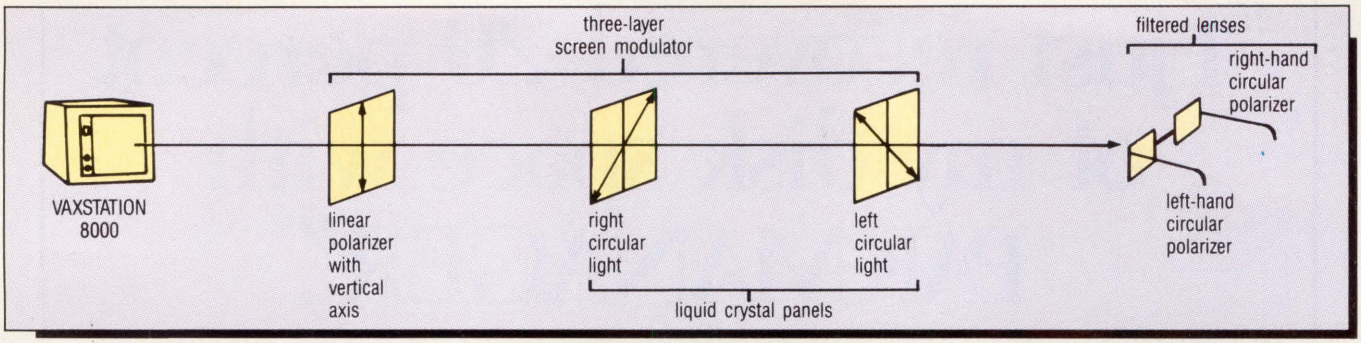
Name _____
Title _____
Organization _____
_____
Address _____
_____
City _____ State _____
Zip _____ Phone _____

VAX and VMS are trademarks of Digital Equipment Corporation
PAKMANAGER is a trademark of DEMAC Software Limited
SQUEEZPAK is a trademark of DEMAC Software Limited

CIRCLE 116 ON READER CARD

Call toll free
1-800-267-3862
In California
1-800-634-6552
Canada and international
613-748-0209

Mail to:
Demac Software Limited
Suite 103
Bridge Plaza
Ogdensburg, New York 13669



The combination of polarized glasses and the Z-Screen, which fits on the CRT, makes the image appear 3-D.

Evans & Sutherland Brings Stereo 3-D To Graphics Market

The VAXSTATION Becomes A High-Tech ViewMaster With ZScreen, *And Sunglasses*

A new state-of-the-art stereoscopic three-dimensional graphics system is available for advanced simulation and modeling applications, thanks to an OEM agreement between VAXSTATION 8000 developer Evans & Sutherland, of Salt Lake City, Utah, and StereoGraphics Corporation, of San Rafael, California, which perfected the stereo technology and will supply the essential hardware to Evans & Sutherland.

StereoGraphics' components include a display controller that converts workstation processor data from 60- to 120-fields per second and accommodates color or monochrome output; the *ZScreen* modulator, a set of liquid-crystal panels that fit the screen like a glare shield; and light-weight, polarized, dark glasses.

Shadowfax, Evans & Sutherland's workstation software with antialiasing and static shading capabilities, makes it possible for the stereo images to maintain straight lines with clean edges. In its stereo viewing option with the controller, *Shadowfax* alternately produces two slightly different angles of an image, each for 1/98th of a second. The first image is a right-eye view; the second is a left-eye view.

By doing this, the screen image is compensating for a shuttering effect carried out by the *ZScreen*, as well as the filtering effect of the glasses. When viewed through the *ZScreen* and the glasses, the image appears to have three dimensions.

The *ZScreen* shuttering is an optical illusion caused by three panels. The first is a polarizer. The other two are coated with electron alignment layers, one that circles to the left and one to the right. The light shot from the CRT follows these alignments.

The glasses are filters. The left lens only permits light from the left display angle to pass through and shields the light from the right image. Likewise, the right lens only lets the right eye see the right image. So, by capitalizing on the fact that each eye sends a separate image to the brain, the brain is tricked by the rapidly altering images into thinking it sees an object with depth and mass.

Additionally, the glasses allow you to move around without seeing the image duplicate or break up and allows onlookers several feet from the terminal also to get the full stereo effect.

Besides overcoming 3-D's poor historical reputation, the biggest problem facing Evans & Sutherland and StereoGraphics is public perception that standard, flat 3-D graphics is sufficient and that stereo 3-D is an unnecessary overkill.

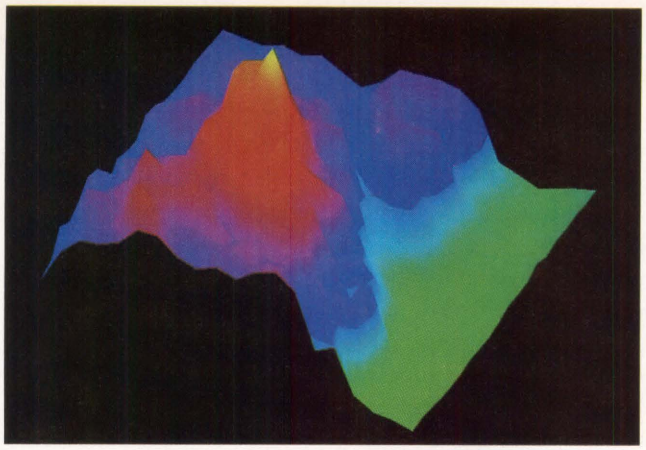
But stereo 3-D is a capability that's in high demand among technical workstation users with applications in molecular modeling and topographical mapping. In these industries, analysis and problem solving can be expedited by visualizing molecular modeling or terrain.

At the Scripps Clinic in San Diego, Dr. Chandra Singh is involved with molecular docking, a complex operation that involves connecting macromolecular structures. "With the stereo viewing option, the docking of an inhibitor into the active site of a protein can be achieved within an hour," explains Dr. Singh. "Without stereo, this docking procedure could take days to accomplish."

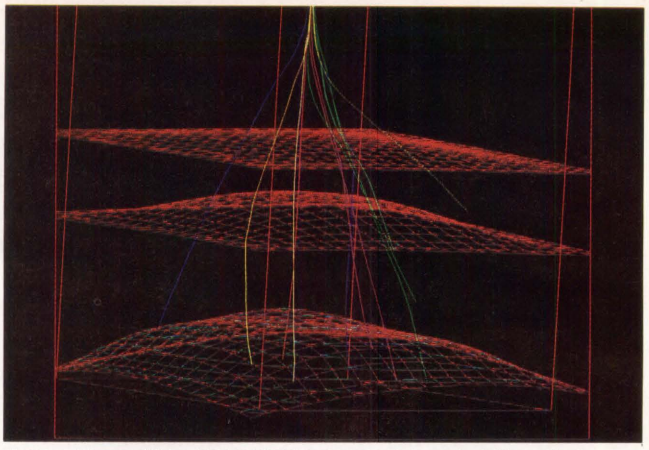
Screen simulation is the best way to determine if and how docking can proceed, which isn't possible with standard 3-D graphics programs. Stereo 3-D gives the receptor molecule depth and bulk, making it easier to dock the satellite substrate molecule, particularly when it must attach somewhere inside the receptor.

"I believe that stereo viewing is absolutely necessary to completely understand complex 3-D molecular structures," concludes Dr. Singh.

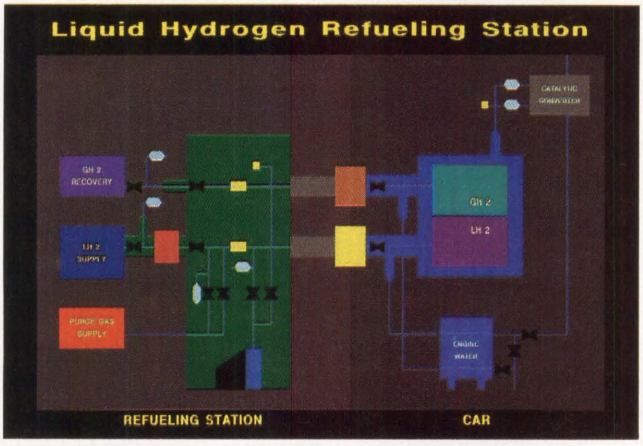
There are a few input options available from Evans & Sutherland. The first is the eight-dial manipulation device that is standard with the VAXSTATION. These dials can be programmed to ease movement and rotation along the x, y and z axes, or zooming and screen location. The other is the more nimble *Spaceball* trackball from SpaceWay Ltd., Australia,



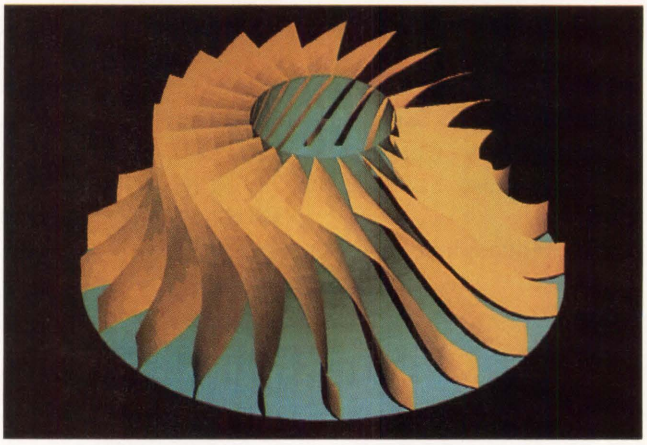
Local, interactive 3D manipulation of mapping data captured on a Tektronix 4129.



The 3D modeling capabilities of DI-3000 XPM are shown in this interactive drilling application.



The DI-3000 XPM graphics database excels at process modeling applications.



Using DI-3000 XPM, a turbine impeller is realistically rendered with local light source modeling.

Precision Visuals' DI-3000 XPM™

Graphics Modeling and Simulation Tools for Your VAX

The Product

DI-3000 XPM™ is Precision Visuals' flagship graphics tools product for creating 2D and 3D graphics application programs ranging from simple data display up to hierarchical graphics data management, and hidden line removal. DI-3000 XPM, which includes the powerful DI-3000® package proven by use at over 2000 sites, provides complete FORTRAN-callable subroutine tools for modeling and viewing. Industry-acclaimed documentation, product training, a HelpLine, and a team of Sales and Technical Support Engineers help speed your application development.

The User

DI-3000 and DI-3000 XPM are widely used subroutine libraries for developing engineering and scientific applications. DI-3000 XPM programmers have 2D or 3D applications that require: definition and repetitive use of graphics objects; updating of these objects and changing their relationships; changing spatial positioning, and manipulating selected subcomponents.

The Environment

DI-3000 XPM is machine and device independent, with initial support for the VAX/VMS environments. In the DEC environment, Precision Visuals' products install automatically as run-time shareable libraries, allowing run-time selection of device drivers and efficient use of machine resources. Over 100 graphics devices are supported, including graphics terminals and hardcopy devices from Tektronix, DEC, and HP, as well as PostScript-supported laser printers. Prices for DI-3000 XPM start at $5,500 on the DEC MicroVAX GPX; license fees scale up and down depending on CPU power.

The Features

DI-3000 XPM includes the entire DI-3000 2D/3D graphics subroutine library. For sophisticated development tasks, the XPM extension includes graphics data management based on the PHIGS output model, hidden line processing, and many extended primitives such as rectangles, ellipses, arcs, spheres, extruded polylines, extruded fill area sets, and solids of revolution. Graphics structures can be built, edited, and archived with or without images appearing on a graphics device. Output can also be displayed and rendered locally on Tektronix 41xx/42xx terminals by combining DI-3000 XPM with Precision Visuals' AddSys-3000™ software. DI-3000 XPM also supports a powerful name set filtering option for controlling the display and detectability of graphics picture components.

The Applications

DI-3000 XPM is a tool for programmers building design, simulation, process monitoring, and other applications including: ☐ Transportation or Communication Networks ☐ Simulation of Flow Phenomena ☐ Manufacturing Simulation ☐ Molecular Modeling ☐ 2D Layout ☐ Architectural Modeling ☐ Any Simulation Where 2D or 3D Objects Change Based on Events. Less complex applications can be fully addressed with the basic DI-3000 package.

The Story

To get the full story on DI-3000 XPM, including technical information and a complete list of supported systems and users,

Call Chris Logan at:
303/530-9000.

CIRCLE 148 ON READER CARD

DEC VAX, MicroVAX GPX, Tektronix, HP, PostScript, DI-3000 XPM, and DI-3000 are registered trademarks of Digital Equipment Corporation, Tektronix Incorporated, Hewlett-Packard Corporation, Adobe Systems Incorporated, and Precision Visuals Incorporated, respectively.

Precision Visuals®

Precision Visuals, Inc.
6260 Lookout Road
Boulder, Colorado 80301 USA
303/530-9000
Telex (RCA) 296428

Precision Visuals International
West Germany
Telephone: 49-69/6666 597 Telex: 17-6997150
United Kingdom
Telephone: 04427-76171 Telex: 826715

that provides rotations and linear movements, and responds to pushing and pulling along the depth axis.

Other industries where Evans & Sutherland expects stereo 3-D to attain strong followings are computational fluid dynamics, flight simulation and CAD/CAM. There's also some potential for financial analysis.

Evans & Sutherland provides service and support for the stereo equipment and plans to add a 3-D option to other products. Currently, the PS 390 also has stereo capabilities.

StereoGraphics maintains that the system will interface with any graphics-based computer or workstation with the proper 3-D software. The company also produces a stereoscopic projector and a complete stereo video system with stereoscopic cameras and a *ZScreen* monitor.

For further information, contact either Evans & Sutherland, 580 Arapeen Drive, Salt Lake City, UT 84108; (801) 582-5847; or StereoGraphics Corp., P.O. Box 2309, San Rafael, CA 94912; (415) 459-4500.

Circle 576 on reader card

—Evan Birkhead

The DoD Recruits Ruggedized MICROVAX II System

Rugged Digital Systems Receives Classification

Rugged Digital Systems Inc. of Mountain View, California, is shaping up and shipping out a new MICROVAX computer system with the Department of Defense (DoD) Classification, AN/UYK. According to the company, the type classification number will identify the MICROVAX II computer system AN/UYK-79 as standard military hardware.

Type classifications on U.S. military electronics describe the function and version of the equipment. For example, the *AN* is a standard designation for the armed forces, the *U* indicates that the equipment is designed for a general utility installation, the *Y* means that it's a data processing type of equipment and the *K* identifies its uses for computing applications.

The significance of the type classification is that the AN/UYK-79 is a fully-provisioned computer system with an Integrated Logistics Support (ILS) system. When the unit is deployed and maintenance is required, any DoD inventory can supply the necessary parts or service.

The AN/UYK-79 incorporates a MICROVAX II processor and 9 MB of MOS memory expandable to 16 MB. Measuring 12¼ inches high x 19 inches wide x 22 inches deep, the ruggedized MICROVAX II system has space for four 5¼-inch peripherals, including four fully removable Winchester disk drives that provide more than 1 GB of online mass storage.

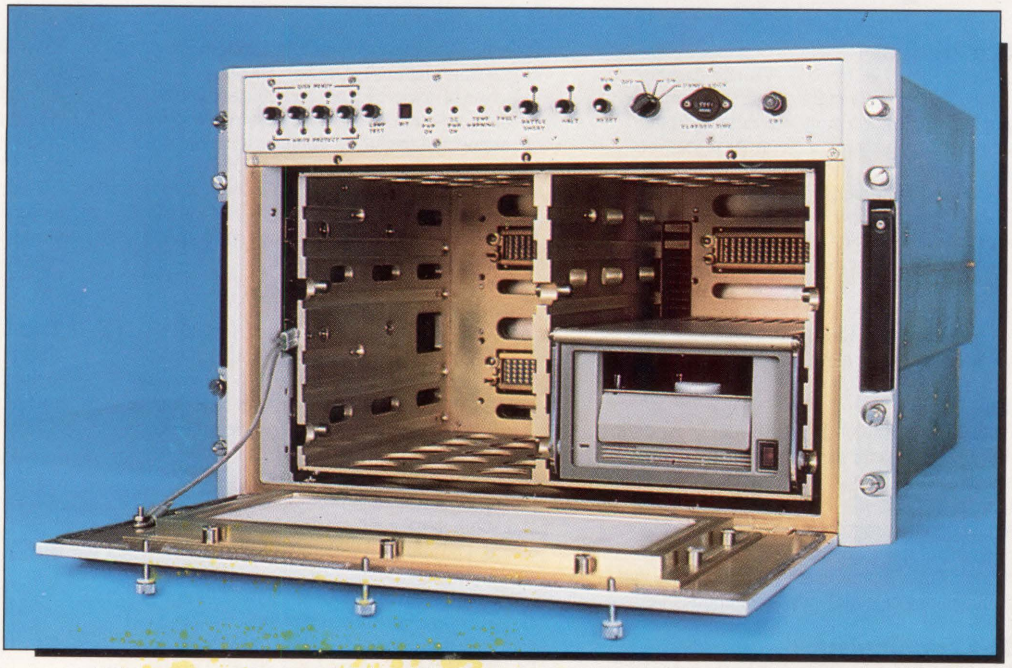
The system can be integrated with options, such as interfaces for the U.S. military's MIL-STD-1397 NTDS bus and MIL-STD-1553B avionics bus, controllers for Ethernet supporting either DECNET or TCP/IP protocols, and MIL-STD-188C serial lines, as well as most MICROVAX II-compatible options.

The system can withstand typical military tactical environments and meet the testing requirements of MIL-STD-810D. The AN/UYK-79 can be used in a wide range of tactical military C3I applications requiring high levels of computing power, such as image processing, signal intelligence, synthetic aperture radar, sonar, AI and other applications. It also can meet the stringent standards of MIL-E-16400, the Navy shipboard environmental specification for electronic equipment.

For more information, contact Rugged Digital Systems Inc., 665 Clyde Ave., Mountain View, CA 94043; (415) 966-1770.

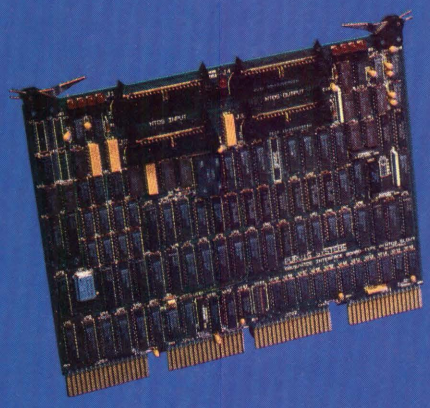
Circle 579 on reader card

—Suzanne Garr

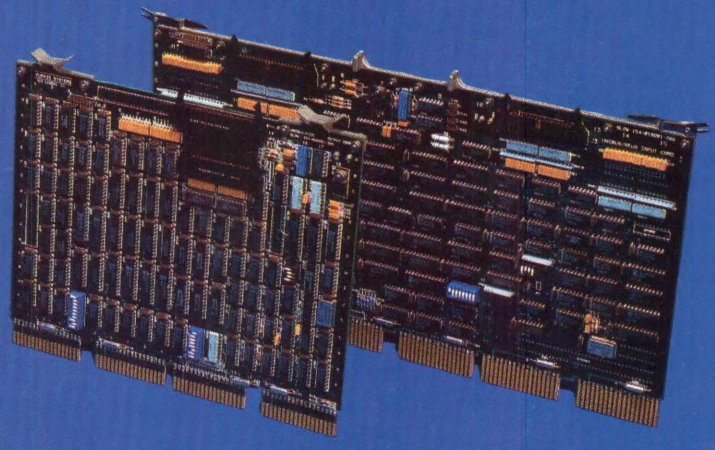


The AN/UYK-79 incorporates a MICROVAX II processor and 9 MB of MOS memory.

How do you connect your ruggedized or commercial DEC computer to Navy standard tactical computers?



QBUS



UNIBUS

MIL-STD-1397 Interfaces!!

Now your DEC computers can communicate directly with NTDS tactical computers and peripherals.

Designed to allow DEC computers meet the realtime requirements of NTDS tactical computers and peripherals, the PURVIS NTDS interfaces are fully compliant with MIL-STD-1397, making them ideal for ruggedized applications.

The PURVIS NTDS interfaces feature full duplex, 16 and 32 bit wide data transfers in all categories of operation. Available in three versions to support the data rates and characteristics for Type A (Slow), B (Fast) and C (ANEW).

PURVIS SYSTEMS ... The direct connect for MIL-STD-1397 (NTDS) Interfaces

CIRCLE 276 ON READER CARD

PURVIS SYSTEMS
INCORPORATED

1272 West Main Road • Middletown, Rhode Island 02840 • (401) 849-4750

© 1988 PURVIS SYSTEMS, Incorporated

DEC, QBUS and UNIBUS are registered trademarks of Digital Equipment Corporation

Third-Party Suppliers Boost Capabilities Of RCI's Precision-Intensive VisiNET

Numerix' NMX-4322 Processes Imaging Applications At 20 MB/Second

The number of products available for the VisiNET, an RS422-based image data bus that connects to VAXs via the Q-bus or UNIBUS, is increasing as new applications are materializing in scientific markets requiring high-speed image transfer. The VisiNET was developed by Recognition Concepts Inc. of Incline Village, Nevada. RCI augments the VisiNET with the Trapix 5500 image processor and Trapix Plus image acquisition and display workstation.

Trapix images, which can be 512 x 2048 pixels with 8-, 10- or 12-bit precision, can be acquired from a variety of devices, such as cameras, VCRs, infrared or radar. Trackball and joystick interfaces, and roaming and zooming images are available. The VisiNET supports up to 10 devices, including RCI's real-time VisiSTORE disk, which stores up to 20 GB with sustained transfers at 19.6 MB per second.

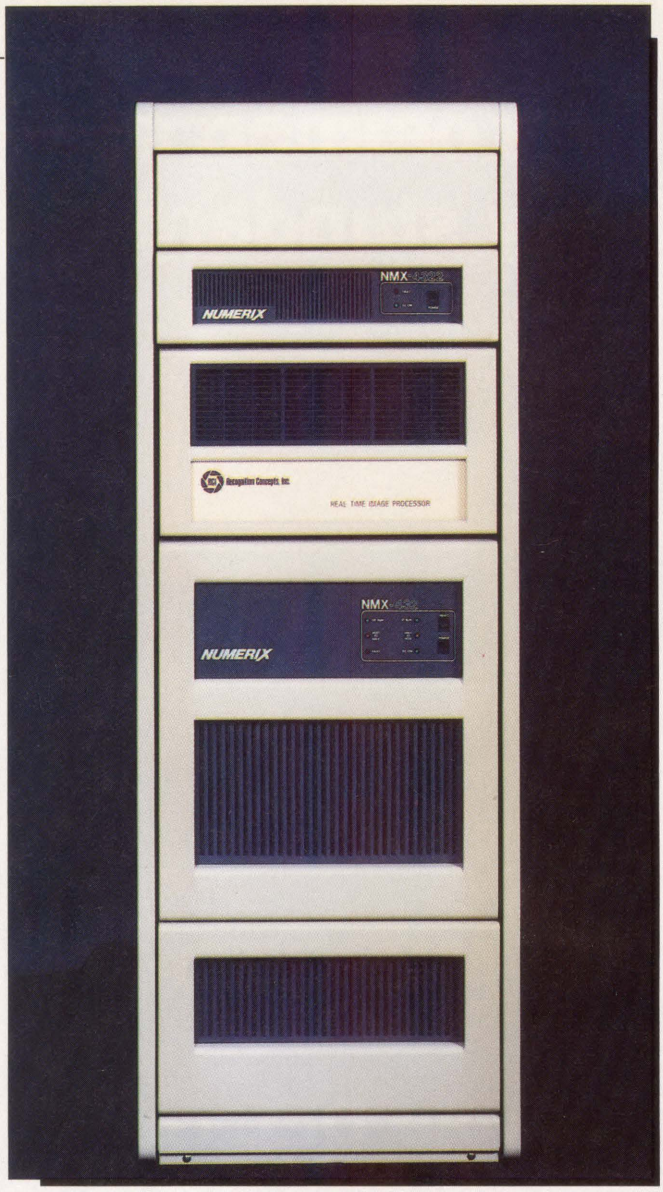
When combined with the NMX-432/E Attached Vector Processor (AVP), from Numerix Corporation of Newton, Massachusetts, Trapix benefits from a floating-point machine that can perform 2-D Fast Fourier Transforms, filtering, a FORTRAN optimizing compiler and warping functions on large images.

Other products using VisiNET interfaces are available from Tektronix Inc. of Beaverton, Oregon, and Jupiter Systems Inc. of Alameda, California. Tektronix' VisiTEK is a display workstation with 2040 x 1536 x 8 monochrome resolution and support for up to four display devices. The Jupiter imaging workstation has 1280 x 1024 x 28 color resolution.

In addition to its floating point capabilities, Numerix' NMX-432/E AVP also has a 64-MB memory that can execute image processing functions on a standard (1K x 1K) image at speeds up to the 20 MB per second capable on the VisiNET. The AVP attaches to the Trapix system with the NMX-4322, an interface that supports a low-speed control path and the VisiNET's high-speed data path.

System calls for the NMX-4322 consist of three FORTRAN routines:

1. CALL VPINI, which initializes the image processor within the AVP for data transfer over the VisiNET.
2. CALL TX2AP, which executes the data transfer from the image processor to the AVP.
3. CALL AP2TX, which starts data transfers from the AVP to the Trapix image processors.



The Numerix VisiNET interface and RCI's Trapix image processor sit atop the NMX-432 attached vector processor.

Numerix' director of marketing, Larry Zagorsky, says that the interface furthers the AVP's usefulness by uncovering new potential markets, and adds that with the new level of I/O performance, "We can now meet some of the critical needs of our image processing customers."

Numerix also provides a 5-foot tall, 19-inch wide cabinet that houses the Numerix AVP and NMX-4322 with the Trapix image processor.

For further information, contact: Numerix Corporation, 20 Ossipee Rd., Newton, MA 02164; (617) 964-2500.

Circle 571 on reader card

Recognition Concepts Inc., 341 Ski Way, P.O. Box 8510, Incline Village, NV 89450; (702) 831-0473.

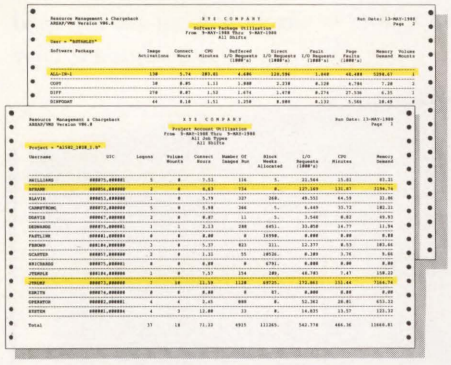
Circle 499 on reader card

—Evan Birkhead

ARSAP™

The system accounting product that stacks the DEC™ in your favor.

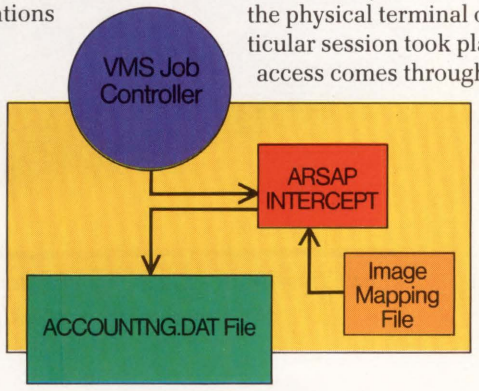
With ARSAP you can do it all. Everything from capacity planning to performance management to project accounting. ARSAP was designed to work with VMS, so you don't need to change your operating procedures to put this comprehensive system to work for you. And because of its exclusive options, ARSAP is the most efficient and powerful system accounting product available today.



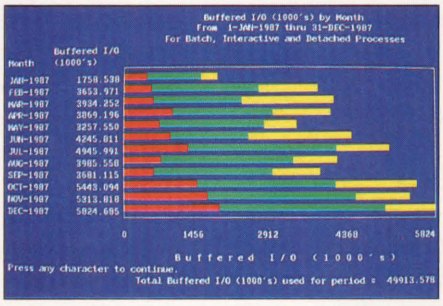
Manage users and control project costs using ARSAP reports.

Selective Image Accounting reduces accounting files by as much as 90%.

Only ARSAP allows you to select and report on the specific applications you choose, instead of the familiar "all or nothing" alternative offered by other systems. This valuable option saves thousands of I/O's to your system disk and reduces the space requirements of accounting files by as much as 90%!



Use "ARSAP Intercept" to automatically select image data for software reporting.



Analyze historical data to plan system resources required for future growth.

Disk Management and Global System Reporting aid long-term capacity planning.

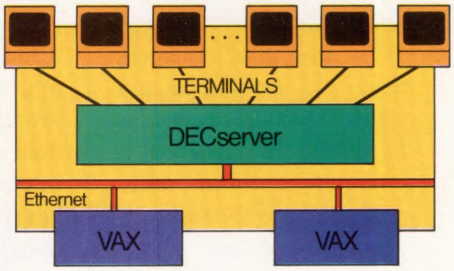
With ARSAP, you can generate easy-to-read bar chart capacity reports for any accounting statistic available from VMS, including CPU time, memory utilization, buffered I/O's, direct I/O's, connect time, and more. And our disk management reports identify amount of space allocated to each user and total amount of free space remaining.

Terminal Reporting tracks usage for control and troubleshooting.

ARSAP's exclusive terminal reporting feature lets you track usage and locate the physical terminal on which a particular session took place, even when access comes through virtual terminals, Intergraph™ workstations or DECservers (LATs).

Get the details on ARSAP today.

ARSAP (version 6.0) is the product of 11 years of system accounting design. No other software package is better suited to your DEC system or your system accounting needs. Only ARSAP offers you a *complete* solution. For more information about how ARSAP can meet *your* needs call GEJAC today.



ARSAP gives you the "evidence" to effectively allocate limited hardware among users.

1-800-43ARSAP

(1-800-432-7727)

GEJAC INCORPORATED

Mail the coupon below to GEJAC, INC.
8643 Cherry Lane, Laurel, MD. 20707

Name _____ Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____

Send information on:

- ☐ Chargeback
- ☐ Project Accounting
- ☐ Resource Management
- ☐ Printer Forms Tracking
- ☐ Performance Evaluation
- ☐ Capacity Planning
- ☐ Software Package Reporting
- ☐ Other

I have these VAX/VMS systems:

# of systems_____ Model #'s_____

ARSAP is a registered trademark of GEJAC, Inc. DEC is a registered trademark of Digital Equipment Corp. Intergraph is a registered trademark of Intergraph Corp.

CIRCLE 273 ON READER CARD

Pack Up And Go With Texas Instrument's TravelMate

The TravelMate LT220 Data Terminal Excels In Functionality And Portability

The TravelMate LT220 portable data terminal, from Texas Instruments of Austin, Texas, is a plug-compatible DEC VT220 terminal that allows you to tap the power of a VAX from remote locations. The LT220's five pounds, 8 1/6- x 11 1/2- x 3 1/6-inch packaging makes it well suited for applications, such as sales/service automation, electronic mail and database access, where portability and a small footprint are key requirements.

With an easy-to-read display, high-speed internal communications options, credit card-sized memory cards and several integral printer options or cradles, the LT220 is targeted at telecommunications, transportation, information services, financial and professional services and government markets.

"In designing the LT220, the first product in the TravelMate LT series, we have drawn on new technologies in displays, communications and storage media," says Jerry Rycaj, data terminal products' marketing manager. "The result is a laptop terminal with equivalent functionality to a desktop VT220, plus additional features."

The LT220 is designed for applications that require portability in VMS and UNIX operating environments. It can be customized for specific applications developed by VARs and end user organizations. No changes in host application attributes are required. The LT220 supports all VT220 character and screen attributes and has a familiar, full-function VT220 keyboard layout with embedded numeric keypad.

The LT220 has a 25-line x 80-column, Supertwist LCD with 640 x 200 resolution. This large, crisp display provides excellent screen readability. A backlit screen option is also available to provide readability in low-light environments. A built-in power-saver feature prolongs readability and optional battery life.

Two L-shaped printer cradle options, ink-jet or thermal, are available. The LT220 terminal plugs into either printer to form a complete, self-contained unit. Both printers provide draft mode at 160 cps; the ink-jet option also prints 80 cps in near letter-quality mode. Roll paper can be used with both printer options, however, the ink-jet printer also accepts fan-fold and letterhead paper.

Portability of a laptop is as important as how fast the user can communicate. RS232 and parallel interfaces are standard with the LT220. Communications options include an internal 300/1200 bps modem or 2400 bps modem. The 2400 bps modem is among the first to be integrated into a laptop terminal. This increases communication speed, thereby reducing costs. The non-volatile memory stores up to three host configurations. A credit card-sized MultiFile Cartridge option allows an LT220 user to create, edit and store multiple files of information. This option also includes forms generation, a run file capability that automates the data collection and communication processes with the host computer and an Auto Access feature for storage of phone numbers and automatic log on sequences.

The LT220 supports up to ½ MB of memory, which VARs can program in C for data collection, storage and retrieval. VARs can develop proprietary applications, thereby customizing the terminals to fit specific user needs. Built-in self-test capabilities to help you pinpoint problems are also available.

A battery option allows operation of the LT220 when an electrical outlet isn't available. An adaptor also lets you operate the laptop terminal from a car battery. With optional MNP protocol (up to Class 5), error-free data transmission with increased data throughput can be accomplished in a conventional or cellular phone network environment.

For more information, contact Texas Instruments Inc., Data Systems Group, P.O. Box 181153, DSG-196, Austin, TX 78718; (800) 527-3500.

Circle 550 on reader card

—Suzanne Garr

The TravelMate LT220 weighs less than five pounds combining portability with functionality.

The longer you wait, the deeper it gets.

When your computer's down, every minute counts. And costs.

That's why Sorbus,℠ the world's leading independent computer service company, *guarantees* four-hour response time on DEC equipment. (We're shooting for two hours, our average on all equipment.)

And our average repair time is only *one and one-half hours*.

In other words, we average about three and one-half hours from crashed to crunching.

We cover more than 3,000 different hardware products–mainframes, minis, micros, peripherals. Including DEC™ PDP-11XX, MicroVAX I and II, and VAX 11/7XX. And more IBM® equipment than anyone but IBM.

Altogether, we maintain more than 400,000 pieces of computer hardware at 60,000 sites nationwide. Chances are, we should be maintaining yours, too.

So call Sorbus today. While there's still time.

1-800-FOR-INFO.

Sorbus℠
A **Bell Atlantic**™ Company

50 E. Swedesford Road
Frazer, PA 19355

Sorbus is a service mark of Sorbus Inc.

IBM is a registered trademark of International Business Machines Corporation.

DEC is a trademark of Digital Equipment Corporation.

CIRCLE 158 ON READER CARD

64-Bit Architecture Is The Center Of PRISM's Workstation Series

Apollo Sets New Desktop Processing Marks With A Supercomputer Engine

With activity in the workstation marketplace heating to a boil, Apollo Computer's repositioning of its technical and business systems was expected. New competition from DEC, Hewlett-Packard, Sun and Silicon Graphics has furthered the state of the technology, and graphics offerings from startups Ardent and Stellar have spread out the field.

What wasn't anticipated was the extent to which Apollo would go to redesign its architecture. But Apollo's 64-bit Domain 10000 series, which is being promoted as a personal supercomputer, is capable of 15- to 30-VAX mips per processor and can be configured with up to four RISC processors. The new architecture is called Parallel Reduced Instruction Set Multiprocessing (PRISM), and the lower end 10010 systems (single processor) start at $69,900.

The personal supercomputer is available in two configurations: a server configuration with 8 MB of main memory and a 348-MB disk at the entry level and a computational graphics workstation configuration that adds eight planes of color and a 19-inch 1024 x 800 color display. The main memory uses 1-megabit DRAMs but will accept 4-megabit units. At the high-end 10040 (with four processors), the server prices start at $129,900 and the workstation prices start at $139,900. The synchronous system bus can attain 150 MB per second.

The 10000s are reportedly the first workstations to integrate a 64-bit format with RISC and parallel/multiprocessing capabilities. Apollo claimed that its breakthrough design technique was holistic engineering, which suggests that improvements in compiler technology were compensated for by improvements in the system architecture and operating system, etc. In particular, the RISC central processors have built-in independent processors for integer and floating point calculations that help the entire system handle number-crunching computations.

Each PRISM system comes with the Domain/OS operating environment that runs UNIX System V (Rel. 3), Berkeley 4.3, or both simultaneously.

Also included with an off-the-shelf 10000 is a new data flow compiler technology, a 128-KB instruction cache and a 64-KB data cache, PC/AT and VME buses, and up to 3 GB of local mass storage with four processors. The system can support up to four 5¼- inch drives, with a 15-megabit transfer rate per drive.

Thomas Vanderslice, Apollo's chief executive, said he expects the personal supercomputer to unearth new applications traditionally assigned to supercomputers, such as computational fluid dynamics, atmospheric simulation, molecular modeling and a new area that's penetrating the workstation market, financial modeling. It's also expected to bring new levels of performance to Apollo's current customers in mechanical CAD and CAE and electronic design automation.

"This is the first system of its class, one which I believe will set the pace for an entire new generation of workstations for many years to come," summed Vanderslice, hinting that further Domain series already are in the works.

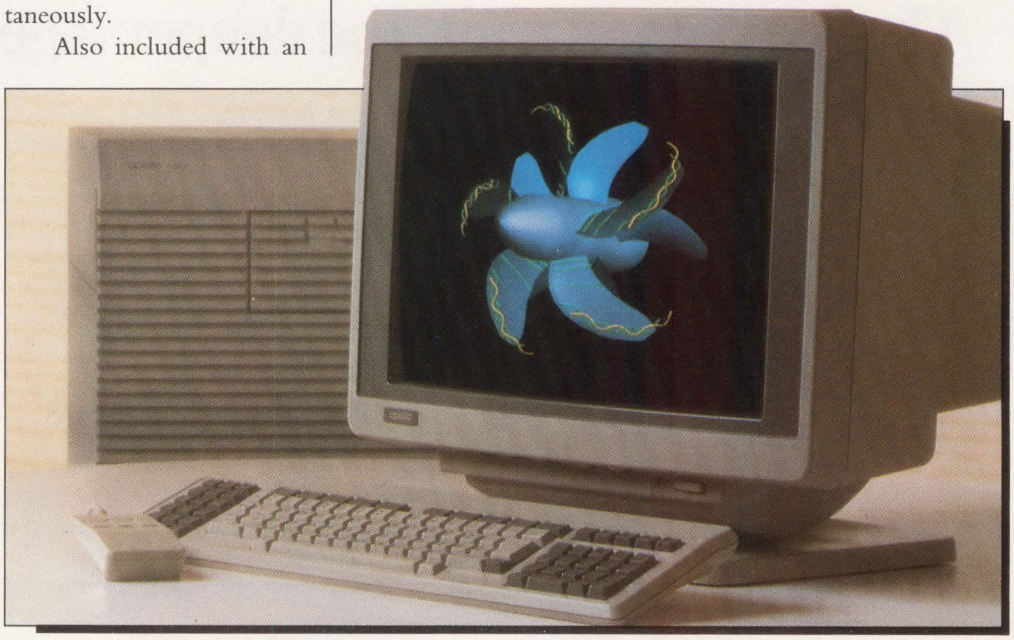
For DEC connectivity, Apollo supplies the Domain/Access gateway with the 10000s, which supports file transfer, file management and remote log in to data stored on VAX/VMS systems. A VT100 terminal emulator also is included and is supported through RS236 ports and the Domain Ethernet gateway.

The series rounds out a workstation family that includes the Domain 3000 entry-level personal workstation that starts at approximately $5,000, the Domain 4000 4-mips superworkstation for less than $14,000 and the DN580 and DN590 2-D and 3-D graphics workstations.

For further information, contact Apollo Computer Inc., 330 Billerica Rd., Chelmsford, MA 01824; (617) 256-6600.

Circle 572 on reader card

—Evan Birkhead



Each PRISM system comes with the Domain/OS operating environment.

FOR OVER 5 YEARS, WE'VE BEEN MAKING LIFE EASIER FOR COMPUTER SYSTEM MANAGERS.

IT HAD TO END SOMETIME.

CIRCLE 139 ON READER CARD

MegaTape Announ
Choice In The Ba

Sorry fellas.

We know how much you depend on us for disk backup systems that are idiot-simple and Old Faithful-reliable. For years, we've been making your life easy with "push the button and go home" backup of even the biggest disks.

But things have gotten more complicated. There are now major tradeoffs available between speed, capacity, and cost.

If your system is big, busy, and expensive, minimizing downtime is probably a major consideration. So you want the fastest backup possible.

On the other hand, smaller systems and networks may be able to get by nicely with a much less expensive but slower backup solution.

The point is that no single backup answer is right for everybody.

So now, MegaTape offers you a choice. The exceptional cost/capacity of 8mm. Or the "industrial-strength" performance of our proven cartridge technology—now dramatically upgraded.

You can still pick up the phone and order a MegaTape system for just about any minicomputer or workstation network.

But now you'll have to decide *which* MegaTape system to order.

NCES THE HARDEST CKUP BUSINESS.

NEW

MT-1500

CHOOSE BLINDING SPEED AND HIGH CAPACITY.

BI BUS Direct Attachment

When speed counts, nothing tops the new MT-1500. At maximum transfer rate, this rugged powerhouse backs up 1.2 gigabytes on a single cartridge in under 30 minutes. And it offers features you simply can't get anywhere else:

- ❑ Up to three plug-in interfaces: any combination of Pertec and SCSI. A front panel switch selects the CPU.
- ❑ Complete software compatibility. No need for special device drivers or backup utilities.
- ❑ Comprehensive local and remote diagnostics. A technician can easily troubleshoot the entire system from the front panel—or from across the continent, using a terminal and modem.

The MT-1500 comes in rackmount and tabletop configurations, and is designed for easy OEM customization. It's even read compatible with the previous generation of MegaTape systems.

NEW

GT-88

CHOOSE ROCK-BOTTOM COST AND EVEN HIGHER CAPACITY.

Even though the new 8mm data cartridges promise eye-popping capacity and unbeatable cost per megabyte, we saw a few problems. Unproven reliability, for one. Nonstandard interfaces, for another.

So our engineers made the problems go away. Presenting the remarkable new GT-88: the only 2 gigabyte, *Pertec-compatible* tape cartridge system you can buy. With an absolutely unique set of big-computer features:

- ❑ Works with existing software. No changes to device drivers or backup utilities are necessary.
- ❑ A full 1.25 MB of Cache, for burst-mode transfer rates up to 880K bytes per second.
- ❑ Optional switching between two different CPUs at the push of a button.

The GT-88—complete with AC power supply—is conveniently packaged as a tabletop unit or in 8″ form factor to fit standard enclosures. And it's format-compatible with other 8mm backup systems.

© 1988 MegaTape Corp.

THE EASIEST CHOICE OF ALL: MEGATAPE SUPPORT.

Although you might have to spend some time choosing between backup technologies, choosing a backup *company* shouldn't take you any time at all.

There simply isn't anybody else in the business that has the commitment, expertise, and track record that MegaTape does.

	GT-88	MT-1500
Capacity (formatted)	2.0 GB	1.2 GB
Transfer rate (burst)	880 KB/sec	3000 KB/sec
(sustained)	246 KB/sec	764 KB/sec
Interfaces	Pertec	Pertec, SCSI
I/O ports	1 or 2	up to 3
Dimensions (in.)	4.5H x 8.6W x 14.0D	8.75H x 19.0W x 24.0D

So while we may have complicated your choice a little bit, in the end the right decision is obvious.

MEGATAPE CORPORATION
1041 Hamilton Road
Duarte, CA 91010-0317
(818) 357-9921 • Telex: 510 600 7131
Telefax: (818) 357-2369

MegaTape

THE GREAT LEAP FORWARD IN BACKUP.

CIRCLE 139 ON READER CARD

COPING *with the* ELECTRONIC *Achilles' Heel*

A SITE MANAGER'S guide to power problems.

BY DR. ALEX SEVERINSKY

CONSIDER THE HYPOTHETICAL situation where a manager is using remote file access on a LAN with a DECNET-to-VAX connection to gather information for a monthly report. The system is working fine, but suddenly the keyboard locks and doesn't respond to input.

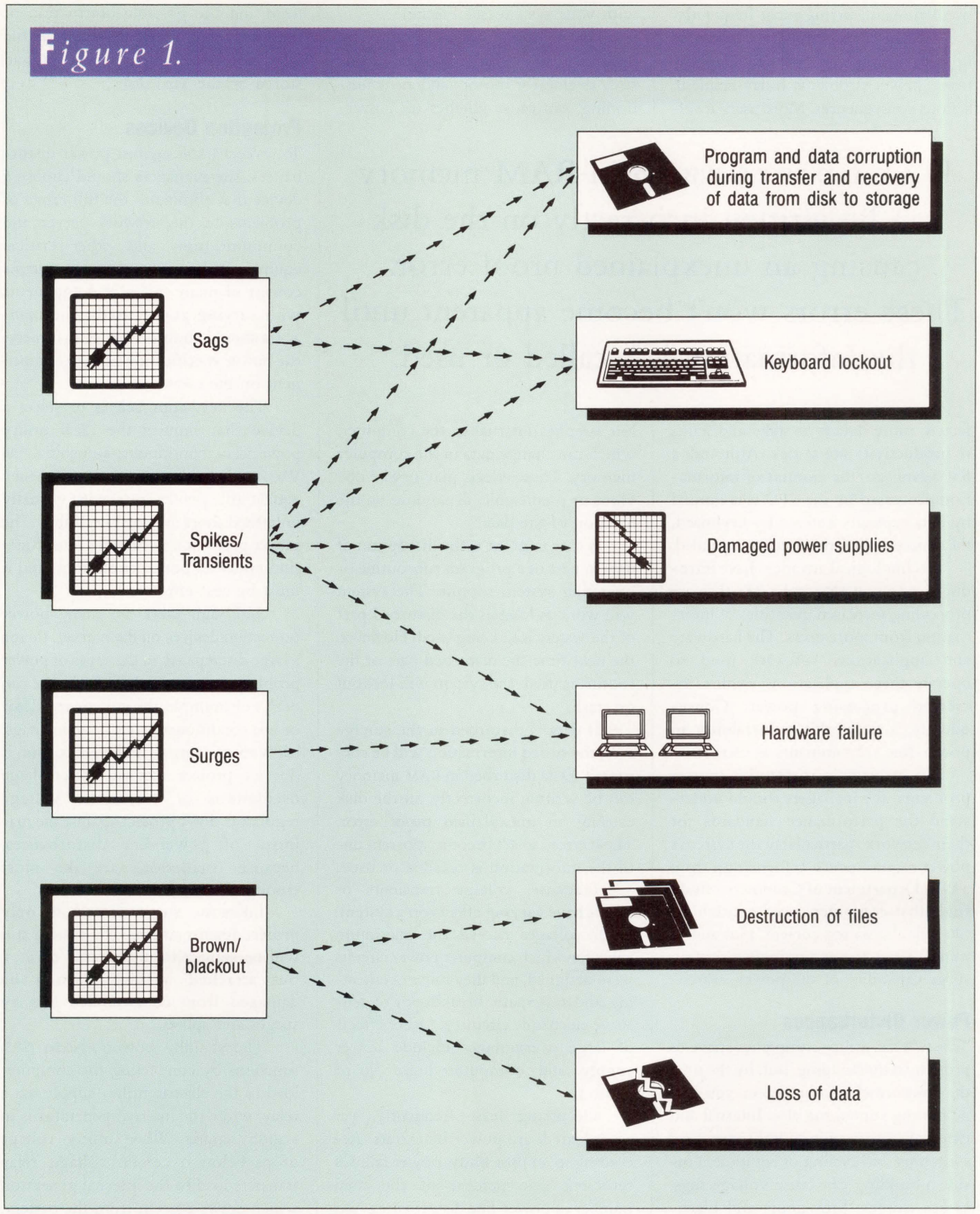
Another user on the network is baffled by corrupted data that he proofed a few days before. Meanwhile, complaints about unexplained board and power supply failure trickle in from other network users, who are tired of frequent system shutdowns and rebooting their systems.

To solve the problems, the site manager complains to the LAN vendor who installed the new network. Network connections and hardware and software components are examined, replaced and re-examined. But, network users still complain about the same problems, and frustration builds.

The unexpected has happened. The proven network coupled with the proven software and hardware is a problem. That unexplained problem requires examining the most crucial, yet most neglected, component of any network: electric power.

Since the dawn of the computer age, power has been a problem. Mainframes were pampered in a dust-free, climate-controlled environment. Dedicated power lines were installed to eliminate power problems. Today, as mini- and microcomputers have proliferated, that kid-glove treatment has changed. Now, computers are plugged into a wall socket and expected to work. Power is expected to be reliable, but often it's not.

Power-line disturbances are a common occurrence. According to an IBM study, power-line disturbances take place 57 times a month on average (two times per day for commercial sites), with undervoltages and high frequency



Effects of power problems on microcomputer systems.

oscillations occurring most frequently.

Because of technological advances in networking and software applications, power problems today result in serious consequences. More users are affected, more data is at stake and gains in productivity are at risk. Although a few years ago, the amount of information processed by the CPU was limited by data typically entered by keyboard, the concept of information has expanded.

Technological advances have introduced LANs, WANs and CAD that are processing increased quantities of information from more users. The hardware and applications software used to operate these applications require increased processing power. Consequently, a network's vulnerability to power-line contaminants is increased.

To manage a network's power problems, site managers should understand the performance standards for their network, particularly the system's power requirements. Information from a U.S. Department of Commerce study finds that computers need continuous 120-volt alternating current, plus and/or minus 10 percent and unlimited starting surge capability of the power source.

Power Disturbances

This is what utility companies strive to provide to the building, but, by the time the power reaches your system, you may be getting something else. Internal and external factors such as lightning, grid switching and cycling of equipment inside a building can cause voltage sags, spikes, surges, brownouts and blackouts. These disturbances can play havoc with your system (see Figure).

For example, power sags, caused by lightning, and normal business loads such as elevator motors and air conditioning, can cause glitches on power-line supplies internal to the computer, which can change data in the computer memory. These effects may not be obvious or predictable, depending on the location of the data.

DATA DISTURBED in RAM memory can be written incorrectly on the disk causing an unexplained proof error. These errors won't become apparent until the information is recalled or used.

A case in point is the disruption of data in part of a program subroutine or operating system routine. The system will work as long as the disturbed part of the system isn't being used. However, the next time the disturbed part of the routine is used, the system will lockout or crash.

If data is disturbed in the storage area, the stored information will be corrupted. Data disturbed in RAM memory can be written incorrectly on the disk causing an unexplained proof error. These errors won't become apparent until the information is recalled or used.

Likewise, voltage transients or spikes have varying effects on a system. High voltages exceed the maximum value for which computer power circuits were designed, and they cause overheating and systematic breakdown of sensitive electronic circuitry. Other effects of large overvoltages include power supply and computer logic board failures.

Occurring least frequently, yet most feared, are power blackouts. According to an IBM study, power failures represent one percent of the total number of power-line disturbances. Yet, they can cause the loss of all data in RAM and the possible destruction of files, if the failure occurs when the file allocation table is being rewritten and stored on the hard disk.

Protection Devices

To protect LANs against power disturbances, site managers should choose a device that eliminates the full range of problems to the network server and communications and other critical equipment. Because computer systems consist of many different components with varying power needs, site managers should choose a device that meets the power specification of each component on the LAN.

The best approach is to select a device that mimics the ideal utility power; i.e., continuous, sinusoidal 120 VAC voltage waveform at a frequency equal to the power line's, with virtually unlimited short overload capability. The power protection device also must function under all power conditions, and it must be cost effective.

Although there are many power protection devices on the market, there's a large discrepancy in the types of power problems with which each device can deal. For example, the voltage regulator or line conditioner protects against sags, brownouts, surges and spikes, but it doesn't protect against high-voltage oscillations or blackouts. Voltage regulators don't protect against the majority of power-line disturbances, because oscillations are the most common.

Likewise, surge protectors only protect against surges. The system still will be subject to unexpected crashes, but attached hardware won't be damaged from compounded hits by surges and spikes.

The standby power system (SPS) functions by connecting the computer load to the electric utility supply via a relay, while the internal generator is in standby mode. When utility voltage drops below a certain voltage, relay transfers load to the internal generator, which draws current from the battery.

But SPSs have drawbacks. Often,

Sources For SPS And UPS

Abacus Controls
P.O. Box 893
Somerville, NJ 08876
(201) 526-6010
CIRCLE 300 ON READER CARD

Advanced Conversion Devices
274 S. Salem St.
Randolph, NJ 07869
(201) 989-0095
CIRCLE 301 ON READER CARD

American Power Conversion
89 Cambridge St.
Burlington, MA 01803
(617) 273-1570
CIRCLE 302 ON READER CARD

Anasco Corp.
42A Cherry Hill Dr.
Danvers, MA 01923
(617) 777-8885
CIRCLE 303 ON READER CARD

Atlas Energy Systems Inc.
16872 Milliken Ave.
Irvine, CA 92713
(714) 863-0900
CIRCLE 304 ON READER CARD

ATR Electronics
P.O. Box 25010
St. Paul, MN 55125
(612) 738-3687
CIRCLE 305 ON READER CARD

Behlman Engineering
1142 Mark Ave.
Carpinteria, CA 93013
(805) 684-8311
CIRCLE 306 ON READER CARD

Best Power Technology
P.O. Box 280
Necedah, WI 54646
(800) 356-5794
CIRCLE 307 ON READER CARD

Black Box Corp.
P.O. Box 12800
Pittsburgh, PA 15241
(412) 746-5500
CIRCLE 308 ON READER CARD

Brooks Power Systems
1810 Byberry Rd., Ste. 3
Bensalem, PA 19020
(215) 244-0264
CIRCLE 309 ON READER CARD

Caltronix
2070 E. Henrietta Rd.
Rochester, NY 14623
(716) 359-3780
CIRCLE 310 ON READER CARD

Clary Corp.
320 W. Clary Ave.
San Gabriel, CA 91776
(818) 287-6111
CIRCLE 311 ON READER CARD

Com-Protect Inc.
4129 Lowerline St.
Slidell, LA 70461
(504) 641-1316
CIRCLE 312 ON READER CARD

Computer Power Inc.
124 W. Main St.
High Bridge, NJ 08829
(201) 638-8000
CIRCLE 313 ON READER CARD

Computer Power Products
227 E. Compton Blvd.
Gardena, CA 90248
(213) 277-6937
CIRCLE 314 ON READER

Controlled Power
1955 Stephanson Hwy.
Troy, MI 48083
(313) 528-3700
CIRCLE 315 ON READER CARD

Converter Concepts
P.O. Box 35
Pardeeville, WI 53954
(800) 253-5227
CIRCLE 316 ON READER CARD

CPS Electronics Inc.
4151 112th Terrace N.
Clearwater, FL 34622
(800) 237-6010
CIRCLE 317 ON READER CARD

Craig Data Products
652 Glenbrook Rd.
Stamford, CT 06906
(800) 243-5760
CIRCLE 318 ON READER CARD

Cyberex Inc.
7171 Industrial Pk. Blvd.
Mentor, OH 44060
(216) 946-1783
CIRCLE 319 ON READER CARD

Data Spec
20120 Plummer St.
Chatsworth, CA 91313
(818) 993-1202
CIRCLE 320 ON READER CARD

Displex Inc.
1 Alexander Pl.
Glen Cove, NY 11542
(516) 671-4400
CIRCLE 321 ON READER CARD

EFI Corp.
350 W. 2700 S.
Salt Lake City, UT 84115
(801) 486-5871
CIRCLE 322 ON READER CARD

EIL Instruments Inc.
10 Loveton Circle
Sparks, MD 21152
(301) 771-4800
CIRCLE 323 ON READER CARD

Electronic Specialists
171 S. Main St.
Natick, MA 01760
(617) 655-1532
CIRCLE 324 ON READER CARD

Elgar Corp.
9250 Brown Deer Rd.
San Diego, CA 92121
(619) 450-0085
CIRCLE 325 ON READER CARD

Emergency Power Engineering
1660 Scenic Ave.
Costa Mesa, CA 92626
(714) 557-1636
CIRCLE 326 ON READER CARD

Emerson Electric Co.
3300 S. Standard St.
Santa Ana, CA 92702
(714) 545-5581
CIRCLE 327 ON READER CARD

Energy Electronic Systems
9486-8 Deerco Rd.
Timonium, MD 21093
(301) 561-5430
CIRCLE 328 ON READER CARD

Exide Electronics
P.O. Box 58189
Raleigh, NC 27658
(919) 872-3020
CIRCLE 329 ON READER CARD

Fedco
P.O. Box 1403
Fondulac, WI 54936
(414) 922-6490
CIRCLE 330 ON READER CARD

Fiskars Electronics Corp.
10362 Miller Rd.
Dallas, TX 75238
(214) 341-8700
CIRCLE 331 ON READER CARD

General Power Systems
1045 S. East St.
Anaheim, CA 92805-8508
(714) 956-9321
CIRCLE 332 ON READER CARD

HDR Power Systems Inc.
600 Oakland Park Ave.
Columbus, OH 43214
(614) 262-6832
CIRCLE 333 ON READER CARD

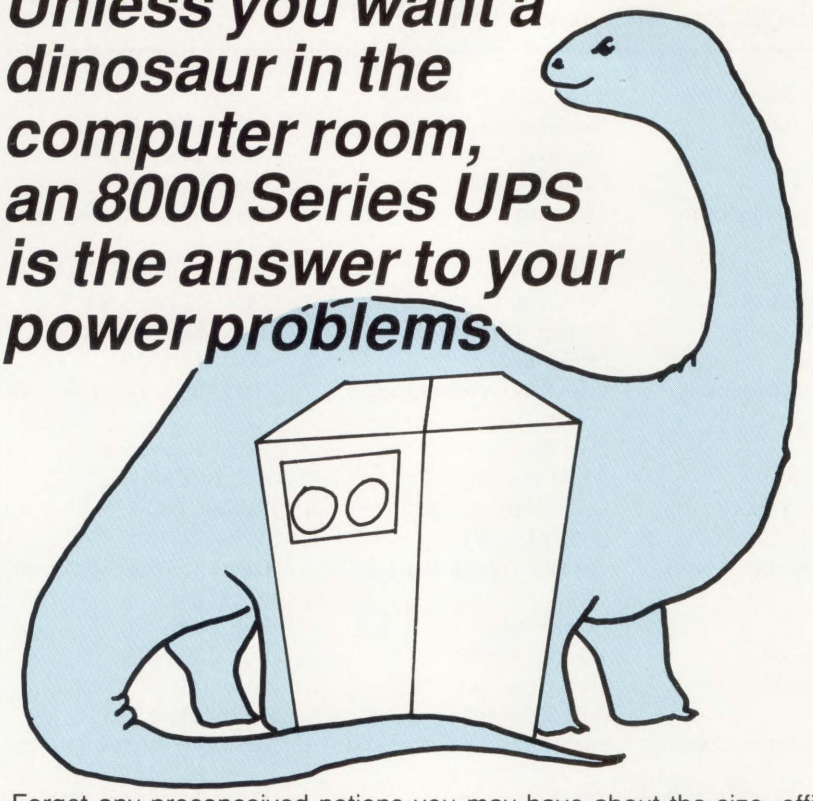
High Technology Software
P.O. Box 60406
Oklahoma City, OK 73146
(405) 848-0480
CIRCLE 334 ON READER CARD

Hitran Corp.
362 Highway 31
Flemington, NJ 08822
(201) 782-5525
CIRCLE 335 ON READER CARD

Continued on page 43.

Three-Phase Uninterruptible Power for Your VAX

Unless you want a dinosaur in the computer room, an 8000 Series UPS is the answer to your power problems



Forget any preconceived notions you may have about the size, efficiency, or cost of providing on-line, uninterruptible power to your computer system. RTE Deltec has made a technological breakthrough that brings you the most advanced, reliable power protection available at prices you won't believe:

Introducing the 8000 Series UPS

- 10KVA to 25KVA three-phase power ratings
- Smallest footprint available at this power range
- An astonishing 95% typical efficiency
- Complete microprocessor monitoring & control

Call or write for our free Product Guide

RTE DELTEC

2727 Kurtz Street • San Diego, CA 92110
(800) 854-2658 • (619) 291-4211 (in California)

CIRCLE 284 ON READER CARD

The following are trademarks of Digital Equipment Corporation:

A-to-Z, ALL-IN-1, CDD, DATATRIEVE, DDCMP, DEC, DECalc, DECconnect, DECgraph, DECmail, DECmate, DECnet, DECsystem-10, DECSYSTEM-20, DEC/Test, DECUS, DELNI, DIBOL, DNA, Eve, FMS, GIGI, IAS, IVIS, LAN Bridge, LA50, LA100, LQP02, LSI-11, MASSBUS, MicroPDP-11, MicroPower/Pascal, MicroVAX, PDP, PDT, P/OS, Q-bus, Rainbow, RALLY, Rdb/VMS, RSTS/E, RSX, RT-11, TEAMDATA, TOPS, ULTRIX, UNIBUS, VAX, VAXBI, VAXcluster, VAX DIBOL, VAXELN, VAXFMS, VAXlab, VAX LISP, VAX SCAN, VAXstation, VMS, VT, Work Processor, WPS

UNIX is a trademark of Bell Laboratories.
MS-DOS is a trademark of Microsoft.
CP/M is a trademark of Digital Research, Inc.
Macintosh is a trademark of Apple Computer, Inc.
X Window System is a trademark of MIT.

the computer system won't ride through the time it takes the SPS to initiate operation after sensing that the voltage has dropped, and the system will crash anyway. Also, SPS equipment doesn't protect against spikes and high-frequency oscillations, and it has limited function during brownout.

Although a SPS is limited in its power protection capabilities, an online uninterruptible power supply (UPS) eliminates all types of power problems. It continuously operates from battery power and doesn't switch, using line voltage only to keep its batteries charged. In effect, the online UPS isolates the computer system and peripherals from the utility line. It's an ultimate computer power source.

Evaluation Criteria

Unfortunately, there are no available standards for specifications and performance of UPS devices. To evaluate online units, there are two different criteria that need to be assessed to determine each product's capabilities: inrush capability and output waveform.

Inrush capability is the capacity required for the power source to start up all connected loads at any time. When electronic equipment is turned on, the power draw surges temporarily to exceed the operating power requirement for the attached equipment. If this happens when the demand for power from the UPS is already high, a short-lived overload occurs. Consequently, online devices may require inrush or surge capacity as high as 2,000 percent.

Without this capacity, users starting their computers at the beginning of each day would overload the UPS; systems wouldn't turn on, or other devices on the line would shut down. Online devices with insufficient inrush capacity can't be used to power equipment to the rated output of the UPS.

A second key issue is the quality of the waveform produced by the UPS. A sine waveform is characteristic of ideal utility power and will power any type of load. This waveform must be a pure alternating-current (AC) type. Even the

Sources For SPS And UPS (Continued)

ICS-Electro-Pac Div.
520 Interstate Rd.
Addison, IL 60101
(312) 543-6200
CIRCLE 336 ON READER CARD

INMAC
2350 Zanker Rd.
San Jose, CA 95131
(800) 547-5444
CIRCLE 337 ON READER CARD

Jefferson Electric Co.
1400 Center Circle Dr.
Downers Grove, IL 60515
(312) 691-2400
CIRCLE 338 ON READER CARD

LaMarche Mfg.
106 Bradrock Dr.
Des Plaines, IL 60018
(312) 299-1188
CIRCLE 339 ON READER CARD

Liebert Inst. Group
48133 Warm Springs Blvd.
Fremont, CA 94539
(800) 538-1770
CIRCLE 340 ON READER CARD

Lortec Power Systems
145 Keep Ct.
Elyria, OH 44035
(216) 327-5050
CIRCLE 341 ON READER CARD

Panamax
150 Mitchell Blvd.
San Rafael, CA 94903
(800) 472-5555
CIRCLE 342 ON READER CARD

Perma Power Electronics
5601 W. Howard
Chicago, IL 60648
(312) 647-9414
CIRCLE 343 ON READER CARD

Power Systems & Control
P.O. Box 27306
Richmond, VA 23261
(804) 355-2803
CIRCLE 344 ON READER CARD

Precise Power Corp.
P.O. Box 9547
Bradenton, FL 34206
(813) 746-3515
CIRCLE 345 ON READER CARD

Rapid Power Tech.
Grays Bridge Rd.
Brookfield, CT 06804
(203) 775-0411
CIRCLE 346 ON READER CARD

Ratelco
1260 Mercer St.
Seattle, WA 98109
(206) 624-7770
CIRCLE 347 ON READER CARD

Safe Power Systems Inc.
528 W. 21st St.
Tempe, AZ 85282
(602) 894-6864
CIRCLE 349 ON READER CARD

Sola Electric
1717 Busse Rd.
Elk Grove Village, IL 60007
(312) 439-2800
CIRCLE 350 ON READER CARD

Staco Energy Products
301 Gaddis Blvd.
Dayton, OH 45403
(513) 253-1191
CIRCLE 351 ON READER CARD

Sun Research
P.O. Box 210, Old Bay Rd.
New Durham, NH 03855
(603) 859-7110
CIRCLE 352 ON READER CARD

Superior Electric Inc.
383 Middle St.
Bristol, CT 06010
(203) 582-9561
CIRCLE 353 ON READER CARD

Sutton Designs Inc.
300 N. Tioga
Ithaca, NY 14850
(607) 277-4301
CIRCLE 354 ON READER CARD

Teledyne Inet
2750 W. Lomita Blvd.
Torrance, CA 90505
(213) 325-5040
CIRCLE 355 ON READER CARD

Toshiba
13131 W. Little York Rd.
Houston, TX 77041
(713) 466-0277
CIRCLE 356 ON READER CARD

Universal Power Systems
800 Charcot Ave., Unit 111
San Jose, CA 95131
(408) 435-5050
CIRCLE 357 ON READER CARD

UPSystems Inc.
7801 E. Somerset Blvd.
Paramount, CA 90723
(213) 634-0621
CIRCLE 358 ON READER CARD

Wilmore Electronics Co. Inc.
P.O. Box 1329
Hillsborough, NC 27278
(919) 732-9351
CIRCLE 359 ON READER CARD

smallest percentage of direct current (DC) on the output can saturate numerous magnetic loads, such as fans and transformers, thereby making them inoperative.

An online UPS with similarity and performance to ideal utility power is the best solution to power problems. It offers the following features:

1. Sine waveform with no DC on the output.
2. Frequency similar to that in the power line.
3. Virtually unlimited short overload capacity.

This type of UPS eliminates all utility power disturbances and doesn't create any of its own. Therefore, no costly engineering investigation of the site power is necessary. *—Born and educated in the Soviet Union, Dr. Alex Severinsky is president and founder of Viteq Corporation in Lanham, Maryland.*

ARTICLE INTEREST QUOTIENT
Circle On Reader Card
High 528 Medium 529 Low 530

Introducing a new line of disk drives that hits them all. The new DS-Series from Century Data, with storage capacities from 450 MB to more than 1 GB. If compatibility is what you respond to, you'll feel comfortable knowing the new DS-Series drives are the first DEC® plug compatible replacement drives for the RA81 and 82 Series that don't require extra cabling or external boxes. If size is the big issue with you, look at how our drives measure up to theirs. Ours are half the size, and half the weight, which makes it very easy to fit twice the storage capacity in the same rack you're using now. Looking for low power consumption? Our drives draw less than 1/3 the power of a DEC unit at start-up, and use

Compatibility

Size

Power

What's your

© 1988 Century Data Incorporated. DEC is a registered trademark of Digital Equipment Corporation.

just 1/2 the power to run. They can save enough in power costs to pay for themselves in less than 4 years. Does speed catch your attention? The DS-Series boosts system performance with average seek times of just 15 to 18 milliseconds. Or do you look at the bottom line first? Good, because the new DS-Series drives will cost you less there. Which is pretty impressive when you consider they give you so much more. And if you're the type to put an emphasis on reliability, you should know we've been building extraordinarily reliable disk drives for more than 20 years. For more information on the new disk drives that push all the right buttons, call us or write Century Data Incorporated.

Speed

Cost

Reliability

hot button?

CENTURY DATA

2055 Gateway Place, San Jose, CA 95110.
Outside California call 1-800-325-5756.
Inside California call (408) 298-5756.

CIRCLE 279 ON READER CARD

CHECKING THE TEMPERATURE

AN INEXPENSIVE approach to environmental monitoring.

BY STEVE REES

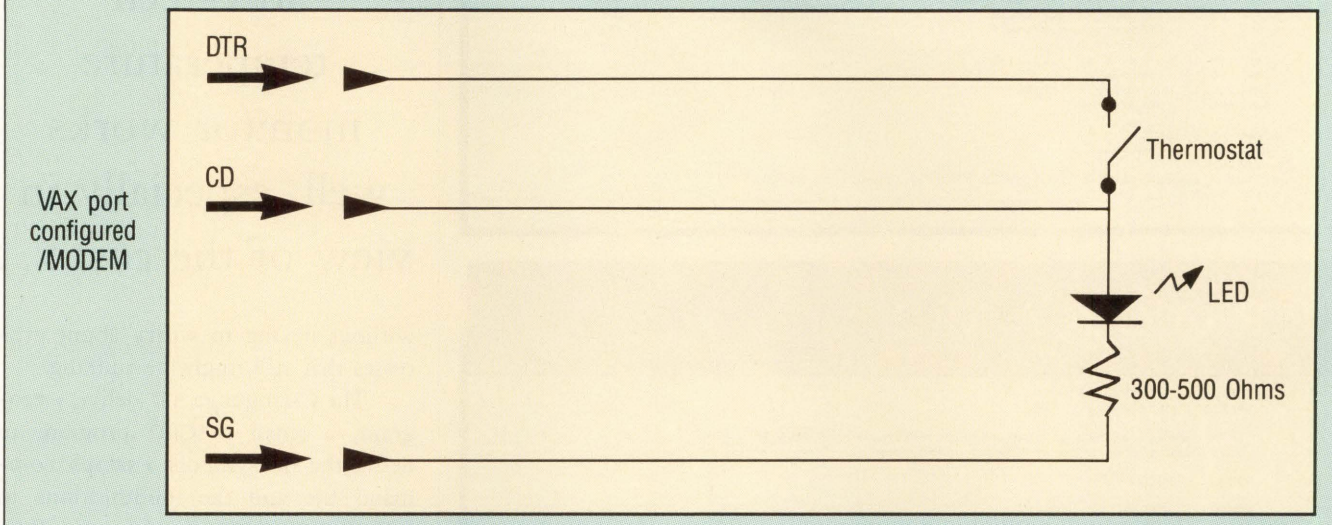
THERE ARE MANY computer room environment monitoring systems on the market and most are expensive. There is an alternative to this problem, however, that you won't need to negotiate with your finance department; in fact, you probably can implement it out of petty cash.

This technique involves using an ordinary household thermostat to signal the VAX that the temperature has risen above a preset threshold (the jargon-minded reader could call it a passive, one-bit analogue-to-digital converter). A thermostat usually operates by way of a bimetallic strip that tilts a mercury switch as the temperature changes. Models designed to control furnaces usually close the contacts as the temperature falls and opens them as it rises. This type is used here.

First, an unoccupied terminal port on the VAX is selected and set up /MODEM/PERMANENT. This tells the machine to listen to, among others, the RS-232 Carrier Detect (CD) signal on the port. It also makes the port's Data Terminal Ready (DTR) signal go positive, providing the power needed to signal high temperature. Next, CD and DTR (pins 8 and 20, respectively) on the VAX port are wired to the thermostat. Testing with an ohmmeter will show which of the thermostat connections are the right ones to use.

The thermostat then is set to three or four degrees above the room's ambient temperature; this closes the circuit through the mercury switch, connecting DTR to CD. Since DTR is high, CD is pulled high, indicating to the VAX that a connection has been established through the port. Although not necessary, Signal Ground (pin 1) also can be wired to the thermostat so that

Figure 1.



Schematic of low-tech computer room temperature monitor.

a light-emitting diode can indicate when CD is high; i.e., when the temperature is below the threshold (see Figure 1).

Whenever the machine is booted, a detached process queues a CTRL-Y AST to the thermostat port and then hibernates. If CD drops on a port configured /MODEM, all such ASTs are delivered to the initiating process. Thus, when the temperature rises, the thermostat breaks the connection between DTR and CD, causing CD to drop. The VAX then delivers the AST, awakening the process. The AST-handling routine submits to batch a command file that, in our case, sends REPLYs and mail messages to any technical staff who may be logged into the local system, and mail messages via DECNET to the staff at the main operations center.

If no response to these messages occurs within 10 minutes, a version of SHUTDOWN.COM, which doesn't stop the queue manager, is executed in batch on all three of the VAXs in the room. This allows at least a graceful dismount of disks. Bringing the systems down in this fashion won't reduce the heat appreciably, but it will allow whoever comes to the rescue to cut the power

PROGRAM 1.

```
/*****************************************************************************
******                                                                  ******
******  Program: THERMOSTAT.C                                           ******
******  Author:  Steve Rees, 1987                                       ******
******                                                                  ******
******  This program queues an AST to a port indicated by the logical ******
******  THERMOSTAT_PORT and then hibernates.  When the process          ******
******  is awakened by the AST, it submits the command file             ******
******  THERM:THERMOSTAT.COM to SYS$BATCH and exits.                    ******
******                                                                  ******
*****************************************************************************/

#include <stdio.h>
#include <ssdef.h>
#include <iodef.h>
#include <descrip.h>

long    status;
short   channel;
$DESCRIPTOR( devDesc, "THERMOSTAT_PORT" );

globalvalue SJC$_QUEUE;
globalvalue SJC$_FILE_SPECIFICATION;
globalvalue SJC$_ENTER_FILE;

main()
    {
        void thermostatRoutine();

        status = sys$assign( &devDesc, &channel, 0, 0 );
        if ( !(status & 1) )
            exit( status );

        status = sys$qio( 0, channel, IO$_SETMODE | IO$M_CTRLYAST, 0, 0, 0,
                  &thermostatRoutine, 0, 0, 0, 0, 0 );
        if ( !(status & 1) )
            exit( status );

        status = sys$hiber();
        if ( !(status & 1) )
            exit( status );
    }

/******
****    AST-handling routine for the thermostat.
******/
void thermostatRoutine()
    {
        struct {
            short bufLen, itemCode;
            long  bufAddr, retAddr;
        } itemList[3];
        char queueName[] = "SYS$BATCH";
        char fileName[] = "THERM:THERMOSTAT.COM";
```

Continued.

PROGRAM 1. . . . continued

```
    itemList[0].bufLen = strlen(queueName);
    itemList[0].itemCode = SJC$_QUEUE;
    itemList[0].bufAddr = queueName;
    itemList[0].retAddr = 0;
    itemList[1].bufLen = strlen(fileName);
    itemList[1].itemCode = SJC$_FILE_SPECIFICATION;
    itemList[1].bufAddr = fileName;
    itemList[1].retAddr = 0;

    itemList[2].bufLen = 0;
    itemList[2].itemCode = 0;

    status = sys$sndjbc( 0, SJC$_ENTER_FILE, 0, itemList, 0, 0, 0 );
    exit( status );
}
```

PROGRAM 2.

```
$ !     Program:  THERMOSTAT.COM
$ !     Author:   Steve Rees, 1987
$ !
$ !     This command stream is submitted to batch to indicate an over-
$ !     temperature condition in the computer room.
$ !
$       SET     NOON
$ !
$       REPLY   /TERM=OPA0: /BELL -
"%THERMOSTAT-F-TOASTY, high temperature in corporate computer room."
$       REPLY   /TERM=OPA0: /BELL -
"-THERMOSTAT-F-TOASTY, system shutting down in 10 minutes."
$ !
$       REPLY   /USER=(SYSTEM,TECHNICAL,OPERATOR) /BELL -
"%THERMOSTAT-F-TOASTY, high temperature in corporate computer room."
$       REPLY   /USER=(SYSTEM,TECHNICAL,OPERATOR) /BELL -
"-THERMOSTAT-F-TOASTY, system shutting down in 10 minutes."
$ !
$       MAIL    SYS$INPUT /SUBJ = "Overheating in corporate computer room" -
                CENTRL::SYSTEM,CENTRL::TECHNICAL,CENTRL::OPERATOR -

                                *** WARNING ***

        The temperature in the Corporate computer room has risen above an
        acceptable level.  The systems will be shut down in 10  minutes.
        Please contact someone to check into the situation, either to
        restore air conditioning or to power off the equipment, as soon
        as possible!

$       WAIT    0:10:00.00
$       SUBMIT  /REMOTE VAX2"THERM password"::THERMOSTAT
$       SUBMIT  /REMOTE VAX3"THERM password"::THERMOSTAT
$       @       THERM:THERMAL_SHUTDOWN 0 SHUTDOWN YES NO LATER NO NONE
$       LOGOUT
```

PROGRAM 3.

```
.title          SJC macro definitions
;               To be linked with thermostat.c

$SJCDEF         GLOBAL

.end
```

PROGRAM 4.

```
Excerpt from THERMAL_SHUTDOWN.COM, the version of SHUTDOWN.COM used here.

================================================================================
.
.
.
$stand_alone = 1
$33:
$if remaining .gt. 1 .or. queues_stopped then goto 36
$!say "%SHUTDOWN-I-STOPQUEMAN, The queue manager will now be stopped."
$!set noon
$!if f$search("SYS$SYSTEM:QUEMAN.EXE") .nes. "" then stop/queue/manager
$!set on
$queues_stopped = 1
.
.
.
```

THIS profoundly low-tech temperature monitor works well, especially in view of the cost . . .

without having to worry about processes that still might be running.

The C-language AST delivery program, a small MACRO program to define the SJC symbols, a sample command file and the modifications to SHUTDOWN.COM are shown in Programs 1-4 respectively.

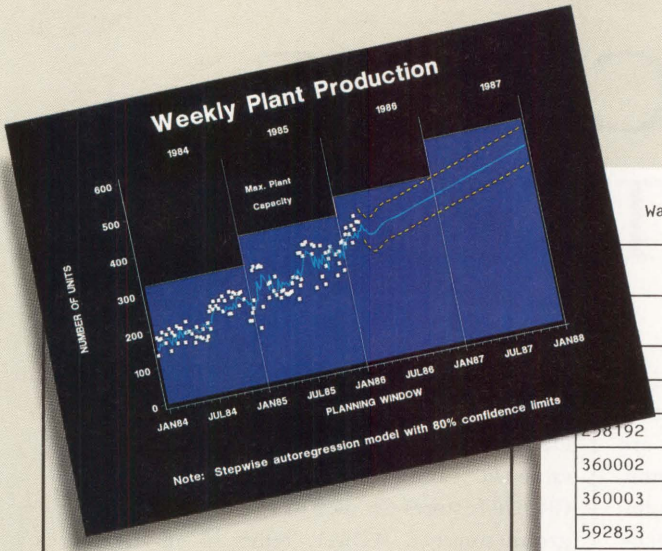
In tests conducted here at Ault Foods Limited, Etobicoke, Ontario, the thermostat reacted to the temperature rise within 10 minutes of the air conditioner shutting down and had all three VAXs down 11 minutes after that. Note that the time to activation depends on the amount of computer equipment, the size of the room and the thermostat setting, etc. This profoundly low-tech temperature monitor works well, especially in view of the cost, about $15 in parts, two hours of labor, plus a small ongoing quantity of VAX resources.

This project suggests obvious extensions. Simple circuits to detect low or excess humidity, water on the floor or even unauthorized entry into the room are available in hobbyist electronics books. One or more of these could be built and connected to your VAX using the same method. This approach to environmental monitoring might seem unorthodox, but think of the fun you can have bragging about your homemade VAX peripherals. — *Steve Rees is a technical analyst for Ault Foods Limited, Etobicoke, Ontario.*

ARTICLE INTEREST QUOTIENT
Circle On Reader Card
High 520 Medium 521 Low 522

The SAS® System

The Data Analysis Tool You Won't Outgrow.



Warehouse Inventory Report - 16JAN87

	Quantity on Hand	Quantity on Order	Projected Reorder Date
	123980	10000	THU, FEB 12, 87
	89450	5000	FRI, FEB 20, 87
298192	20110	1000	MON, MAR 30, 87
360002	8585	0	TUE, FEB 10, 87
360003	15985	500	TUE, FEB 10, 87
592853	469120	20000	WED, FEB 18, 87

If your job demands a powerful data analysis tool, the SAS® System is your solution. The SAS System gives you ready-to-use procedures for performing every kind of analysis—from simple descriptive statistics to advanced regression, analysis of variance, discriminant analysis, clustering, scoring, and more.

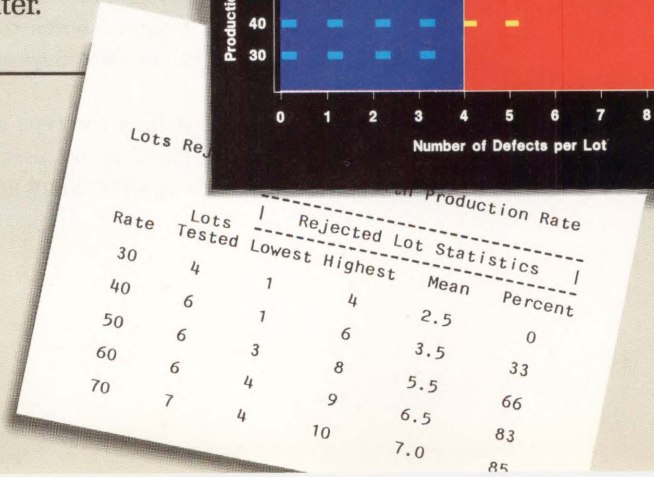
The SAS System reads data in any structure from any kind of file. You can create new variables, modify old ones, combine files, detect errors, and accumulate totals. Once your analysis is complete, you can report your results in lists, tables, charts, or plots.

And as your needs grow, the SAS System grows with you. All the tools you need for color graphics, forecasting, modeling, "what if" analysis, project management, optimization, and quality control are available in the SAS System. You choose the products you need, and enjoy the same easy-to-use language and syntax in each. Plus, you can use the same software on your personal computer.

For details, send us your name and address. Or call a Software Sales Representative today.

The SAS System. It's the most widely installed tool for data analysis among VMS users*... And more.

SAS Institute Inc.
SAS Circle □ Box 8000
Cary, NC 27512-8000
(919) 467-8000
Fax (919) 469-3737

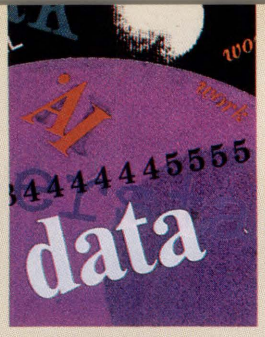


* Computer Intelligence, January 1986.

The SAS System runs on Digital Equipment Corp.'s VAX™ series minicomputers and workstations under VMS,™ as well as other mainframes, minicomputers, and personal computers.

SAS is the registered trademark of SAS Institute Inc., Cary, NC, USA. Copyright © 1987 by SAS Institute Inc. Printed in the USA.

digital™ Cooperative Marketing Program



SECURITY

THE SCHEME OF THINGS

Understanding Security In A Non-Privileged Environment.

By Betty Steele Adukoski

User identification codes (UICs), protections and access control lists (ACLs) are mechanisms in the VMS security scheme. When maintaining several non-privileged environments on the same system, these mechanisms are useful tools and offer sophisticated and complex options for enhancing system security. But, complexity can lead to confusion.

To avoid unruly mishaps and problems in these non-privileged areas, it's important to understand what these mechanisms do, where they obtain their default values and how they can be controlled.

UIC-Based Protection

UIC-based protection consists of a UIC and a protection code. They work together to control access according to the user UIC. The UIC specification can be either numeric or alphanumeric and is [group,member]. When a user tries to access a file, the system compares his UIC to the file's UIC. Based on the file's associated protection code, the system determines if access should be allowed. The user's UIC is stored in the system authorization file (SYSUAF) and is assigned when the username is created. $SHOW PROCESS displays the user's UIC.

The protection code defines the type of access allowed to the file, based on the user's UIC. The protection code is SYSTEM:RWED, OWNER:RWED, GROUP:RWED, WORLD:RWED. SYSTEM protection refers to privileged users. OWNER means that the user must have the same UIC, both group and member, as the file. GROUP requires the user to have the same UIC group number. WORLD refers to all users. (R)ead, (W)rite, (E)xecute and (D)elete describe the type of access allowed for that type of user, for example:

```
$DIR/OWNER/PROTECTION
Directory of DUA1:[PROD.DATA]
FILE.DAT;1    [110,2]    (RWED,RWED,RWE,)
```

A user with a UIC of [110,150] would have group read, write and execute access but not delete access. World users, any user that doesn't have the same group UIC [110,*], would have no access.

Each directory file also has a protection code and UIC. If a user needs access to a file, all the directories for that file also must allow the access. The top-level, or root, directory and all subdirectories in the path to that file need the proper protection set to allow the user to get through them to the file, for example:

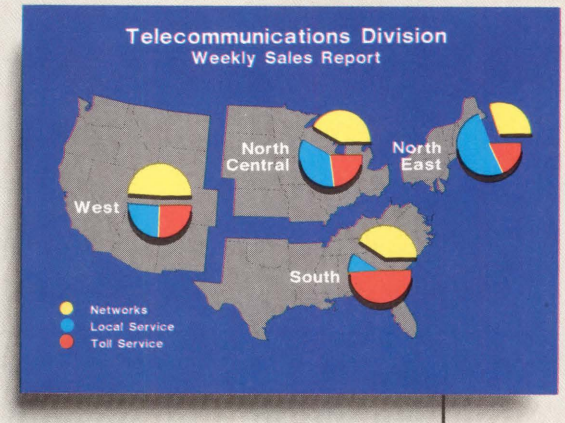
```
Directory of DUA1: [PROD]
DATA.DIR;1    [200,2]     (RWED,RWED,RWE,)
```

The same [110,150] user wouldn't be able to access FILE.DAT. Even though FILE.DAT allows GROUP:RWE, the directory DATA.DIR is a different UIC and doesn't allow world access of any type. Therefore, the user would be blocked by the directory and denied access. In this example, the root directory PROD.DIR also would need to be checked to ensure that it

The SAS® System

The Graphics Tool You Won't Outgrow.

When you've got to turn those numbers into a presentation, turn to the SAS® System. The SAS System includes easy-to-use procedures for charts, plots, maps, and three-dimensional displays. At a glance, you can grasp detailed statistics, spot relationships among items, and trace emerging trends. And when your manager wants more, the SAS System lets you customize your graphs and present multiple displays on the same page for easy comparison. You can produce your graphs on terminals, plotters, transparencies, or slides.



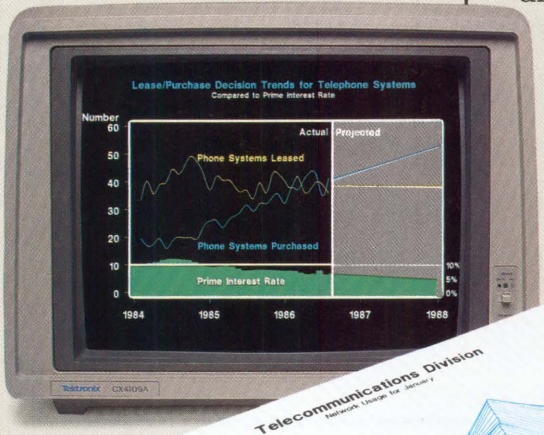
You can even use the SAS System to analyze your data before you present them. We've got tools for every kind of analysis—from simple descriptive statistics to advanced regression, analysis of variance, discriminant analysis, clustering, scoring, and more.

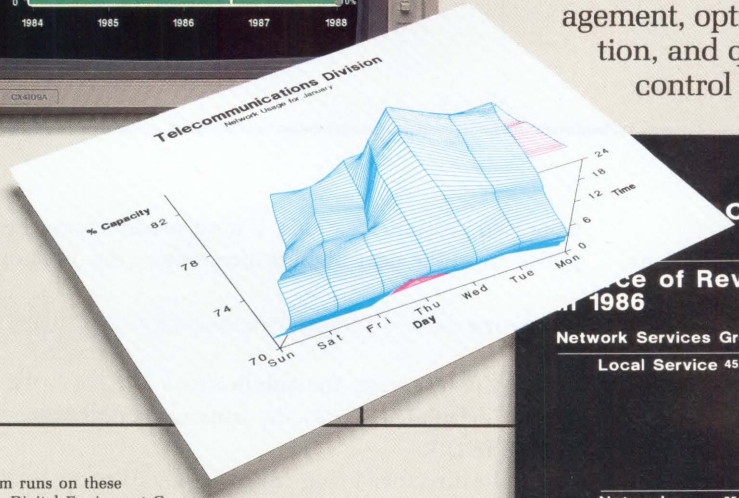
And as your needs grow, the SAS System grows with you. All the tools you need for full screen data entry, modeling, forecasting, "what if" analysis, project management, optimization, and quality control are available in the SAS System. You choose the products you need, and enjoy the same easy-to-use language and syntax in each. Whether you license one product or several, you'll enjoy the same high-quality software, training, documentation, and support we've offered for more than ten years.

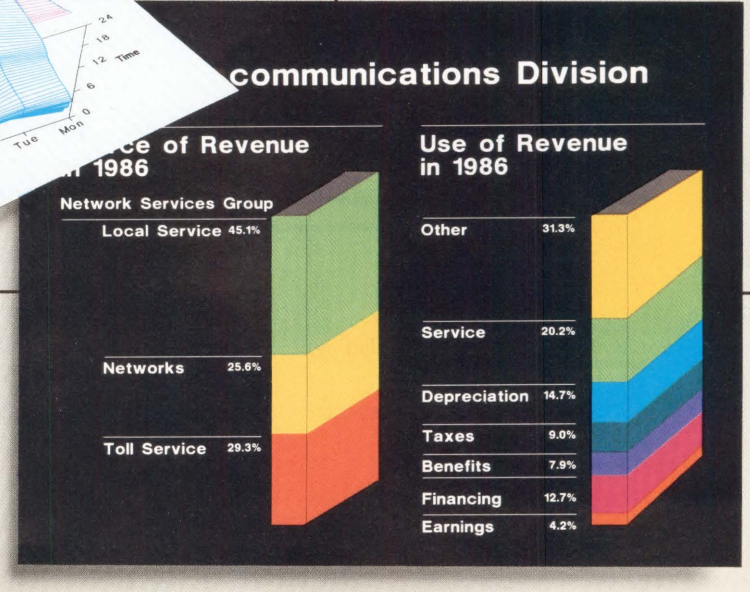
For details, send us your name and address. Or call a Software Sales Representative today.

The SAS System. It's for those who need a graphics package today, and for those who have an eye on tomorrow.

SAS Institute Inc.
Box 8000 ☐ SAS Circle
Cary, NC 27511-8000
(919) 467-8000
Fax (919) 469-3737







The SAS System runs on these minicomputers: Digital Equipment Corp. VAX™ 8xxx and 11/7xx series under VMS,™ and MicroVAX II™ under MicroVMS™; Prime Computer, Inc. Prime 50 series under PRIMOS®; and Data General Corp. ECLIPSE® MV series under AOS/VS. The SAS System also runs on IBM 370/30xx/43xx and compatible machines under OS, CMS, DOS/VSE, SSX, and ICCF; IBM XT/370 and AT/370 under VM/PC; and IBM PC XT and PC AT under PC DOS. Not all products are available for all systems.

SAS is the registered trademark of SAS Institute Inc., Cary, NC, USA.
Copyright © 1986 by SAS Institute Inc. Printed in the USA.

TABLE 1.

Summary Of Commands

Security Defaults	UIC	Protection
File:		
new file	directory	default process protection (RMS_FILEPROT)
previous version exists	previous file	previous file
Subdirectory	next highest directory	next highest directory less delete
Root directory	disk volume	MFD less delete
Security Show Commands	**File/Directory**	**Process**
UIC	DIR/OWNER	SHOW PROCESS
Protection	DIR/PROTECTION	SHOW PROTECTION
ACL	DIR/ACL	
All securities	DIR/SECURITY	
Security Change Commands	**Existing**	**New**
File UIC	SET FILE/OWNER	COPY/OWNER
Directory UIC	SET FILE/OWNER	CREATE/DIRECTORY/OWNER
File Protection	SET FILE/PROTECTION	COPY/PROTECTION
Directory Protection	SET FILE/PROTECTION	CREATE/DIRECTORY/PROTECTION
Process-created files		SET PROTECTION/DEFAULT
File ACL	SET FILE/ACL	
Directory ACL	SET FILE/ACL	

allows the access needed by the user.

A file's default UIC is assigned from the directory in which it resides, for example:

```
$COPY
From:    DUA2: [TEST.DATA]FILE2.DAT
To:      DUA1: [PROD.DATA]*.*
```

Because DATA.DIR has an owner UIC [200,2], the FILE2.DAT that was copied into that directory also will have the UIC [200,2].

The default UIC for a newly created directory is derived from two possible locations. If it's a subdirectory, the UIC is pulled from the next highest directory in the directory tree:

```
$CR/DIR DUA1: [PROD.DATA.SOURCE]
```

In this example, the subdirectory SOURCE.DIR would reflect a default UIC [200,2], the same as the next highest directory DATA.DIR.

If the directory being created contains a top-level directory, the default UIC comes from the disk volume. $SHOW DEVICE/FULL shows the owner UIC for the disk volume.

Our front end helps protect your back end.

Today's users require sophisticated interfaces for their applications. Yet complex front ends are a real pain to create, especially when the specs change and your deadlines don't.

But now JYACC introduces JAM™, a powerful user interface development tool that makes it easier than ever to design and revise your complex applications.

Use windows and colors freely with JAM.

JAM is the first tool that does it all, from prototyping to implementation. With JAM, you start by creating screens and linking them together to develop an application shell. You can experiment with the look of the interface, and even explore "what if" scenarios on the application flow. Then you attach processing routines, and your application is complete.

JAM works under the following operating systems:

- UNIX®
- MS-DOS®
- VMS®
- XENIX®
- RMX™
- VOS™

You'll be amazed at how quickly your applications spring to life with JAM's interactive screen management utility. You can use features like context-sensitive help, shifting and scrolling fields, a variety of visual attributes and extensive data validations to create exciting screens, windows and menus—all without writing a single line of code. JAM also lets you test your prototypes at any time.

JAM lets you draw from its extensive subroutine library to help you write processing routines faster. And revisions to your applications are easier, because your subroutines are insulated from the data entry and presentation details of the interface.

JAM is extremely portable. It runs on almost every computer, from PCs to superminis, and works under 6 operating systems. This allows you to develop consistent interfaces throughout your company—a significant asset to the Fortune 500 companies that have been using JAM for more than a year.

Enhance applications with context-sensitive help.

JAM from JYACC. It gets your front ends—and back ends—in great shape. Call for more information about JAM and our demo diskette. 800-458-3313

JYACC FORMAKER™, JAM's screen manager, is also available separately.

JYACC, Inc., 116 John Street
New York, NY 10038 212-267-7722

Introducing
JAM

JYACC Application Manager. *The Composer for Sophisticated Applications.*

CIRCLE 131 ON READER CARD

JYACC

Excellence in Systems & Application Design

MS-DOS, XENIX: Microsoft Corp.; UNIX: AT&T Bell Labs; RMX: Intel Corp.; VMS: Digital Equipment Corp.; VOS: Stratus Corp.

The default protection for a file is assigned from the default process protection. The SYSGEN parameter RMS_FILEPROT is used to establish this user protection during login. $SHOW PROTECTION displays the default process protection.

If a previous version of the file being copied already exists in the destination directory, both the UIC and the protection code are inherited from the previous file:

```
$COPY
From:    DUA2:[TEST.DATA FILE.DAT]
To:      DUA1:[PROD.DATA]*.*
$DIR/OWNER/PROT
Directory of DUA1:[PROD.DATA]
FILE.DAT;2      [110,2]    (RWED,RWED,RWE,)
FILE.DAT;1      [110,2]    (RWED,RWED,RWE,)
FILE2.DAT;1     [200,2]    (RWE,RWE,RE,)
```

As shown in this example, no previous version of FILE2.DAT existed. Therefore, the UIC was assigned from DATA.DIR directory, and the protection came from the default process protection. The second version of FILE.DAT, however, inherited its UIC and protection from the previously existing version.

Subdirectory default protections are pulled from the next highest directory. The default protection of a top-level directory comes from the volume master file directory (MFD). $DIR/PROT [000000] 000000.DIR displays the default MFD protection.

When either a root directory or subdirectory is created, all protections are inherited except delete. By default, no delete access is allowed. For example, the newly created SOURCE.DIR directory inherits the protection of DATA.DIR minus the delete protections. This means that SOURCE.DIR has the default protection SYSTEM:RWE, OWNER:RWE, GROUP:RE, WORLD:NO ACCESS.

Changing Defaults

Typically, files are moved between captive non-privileged areas by privileged users in a controlled procedure. Non-privileged users who aren't captive are capable of getting to DCL ($). These users can copy their own files within their non-privileged area.

The procedure for any of these file manipulations can include guidelines for overriding the default UICs and protections for files and directories.

If a file's UIC needs to be changed, the following DCL command would be used:

```
$SET FILE/OWNER=[110,150] FILE.DAT
```

The UIC also can be assigned at the time the file is copied by using $COPY/OWNER=[110,150].

An existing directory's UIC can be reassigned by using $SET FILE/OWNER or $SET DIRECTORY/OWNER. For a new directory, the UIC can be appended to the CREATE command: $CR/DIR/OWNER.

File protection can be changed during the file copy or after

When either a root directory or subdirectory is created, all protections are inherited except delete.

the file has been moved:

```
$COPY/PROTECTION=(O:RWED,G:RWE,W:R)
$SET FILE/PROTECTION=(O:RWED,G:RWED,W:R)
```

The first example assigns the specified protection to the file at the time it's copied. The second example changes the protection for a file that's not being moved but simply modified.

An existing directory's protection can be reset by using $SET FILE/PROT. When changing a root directory, remember to preface it with the MFD:

```
$SET FILE/PROT=G:R DUA1:[000000]PROD.DIR
```

For a new directory, the protection can be appended when the directory is created: $CR/DIR/PROT.

New files created by captive non-privileged users default to the process protection. The default process protection can be changed for these captive users in their LOGIN.COM:

```
$SET PROTECTION=G:RWED/DEFAULT
```

Including this DCL command in the user login resets the user's default group protection. System, owner and world protections remain unchanged.

If the non-privileged user isn't captive and is capable of getting to DCL ($), the user can issue the same DCL command to change his process protection.

It's important to remember two points regarding default process protection:

1. If a previous version of a file being created exists, the protection is picked up from that previous version and not from the process default.
2. When the user logs off, the default protection returns to its original value. If the different default protection is needed, non-captive users or the captive user's LOGIN must reset the protection every time he logs in.

ACLs

The ACL is used with the UIC-based protection to enhance security in areas where specific protection is needed. The ACLs are stored in the rights database, which is created through AUTHORIZE.

"I need unattended back-ups now...

Jerry Gulden
President
Real-Share, Inc.

*...I was desperate for a high-density back-up system. I've got daily back-ups requiring 30 GCR tapes. They are critical to me and my clients. So, I researched various vendors, and SUMMUS provided the complete solution. The **GigaTape** drive fits my needs — and the comprehensive support has been as impressive as the performance of the drive."*

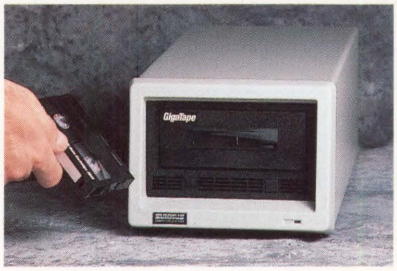
At SUMMUS, we know that you can't afford to take corporate computing decisions lightly. Years of experience in customer system integration for special applications end users, OEMs and VARs have taught us that delivering the most value in an integrated product means more than just bolting iron together.

It's easy for us to talk about the SUMMUS commitment to quality, technology, and value. It's easy to say that we provide the right solutions for your high-performance computing needs. It's easy because it's true. That's why Real-Share, Lockheed, Kraft, General Electric, NASA and others have come to SUMMUS for solutions.

2.33 Gigabyte Unattended Back-up

GigaTape™

Our newest product can put this commitment and expertise to work for you, saving you hundreds of hours and thousands of dollars in annual operator and media costs with its high-capacity performance.



Featuring advanced 8mm helical-scan technology, the ***GigaTape*** is fast, accurate, and reliable. TMSCP compatible with DEC systems, the ***GigaTape*** will soon be available for IBM, Apple, Sun and other systems.

Ready for delivery with One-Year Warranty — and 30-day return privilege. A full range of maintenance support options is available through our award-winning National Support Group.

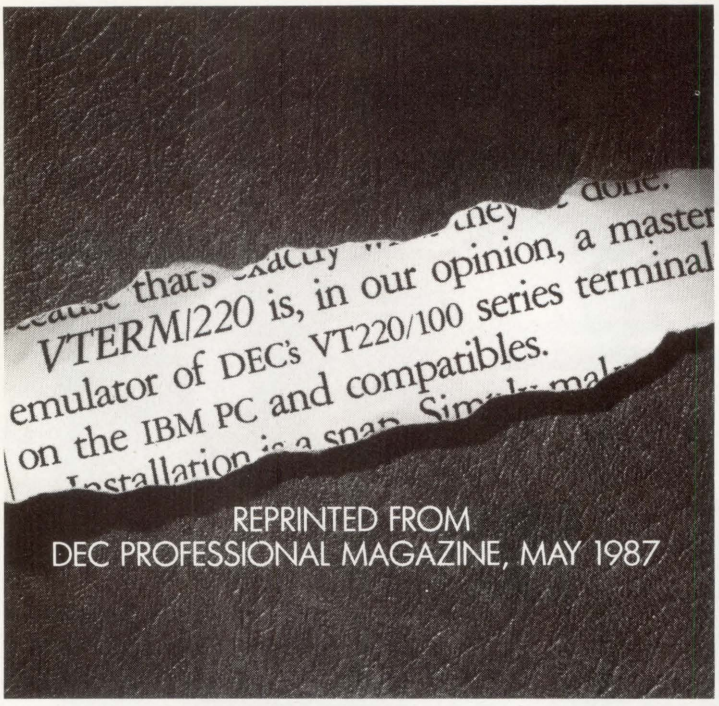
For more information call us today at 1-800-255-9638.

CIRCLE 160 ON READER CARD

SUMMUS™
COMPUTER SYSTEMS

SUMMUS COMPUTER SYSTEMS
P.O. BOX 820549 • HOUSTON, TEXAS 77282-0549
713-589-9772 • TELEX 62045352 Answer back SCSSUM • FAX 713-496-1681
Call for our representatives in Canada, France, W. Germany, and the U.K.

© SUMMUS COMPUTER SYSTEMS, 1988
SUMMUS, GIGATAPE, and GIGABOX are TradeMarks of Summus Computer Systems
DEC TM Digital Equipment Corp., IBM TM International Business Machines Corp., Apple TM Apple Computer, Inc., Sun TM Sun Microsystems



(WITH REVIEWS LIKE THESE, WHO NEEDS CLEVER HEADLINES?)

Find out why magazines like DEC Professional and PC Week and over 60,000 PC users appreciate the convenient yet powerful features of VTERM/220, VTERM III and VTERM/4010.

Send in this coupon to see for yourself the most functionally complete emulation of DEC VT220, VT100, VT52 or Tektronix 4010 terminals. **VTERM***

I would like to find out why magazines like DEC Professional, PC Week and others rate VTERM/220 so highly.

☐ Please send me the DEC Professional and PC Week reviews.

☐ Please send me information on your free 30-day evaluation of VTERM/220, VTERM III and VTERM/4010.

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

PHONE NUMBER _____

Write: Coefficient Systems Corporation
611 Broadway, New York, N.Y. 10012

DP688

or call **(212) 777-6707** ext **606**
FAX: (212) 228-3137 TELEX: 6503156498
*VTERM refers to VTERM/220, VTERM III and VTERM 4010 from Coefficient Systems Corporation.

CIRCLE 107 ON READER CARD

A file can have an ACL that specifies access to that particular file for a certain user or group of users:

```
$SET FILE/ACL=(IDENTIFIER=[110,22],ACCESS=READ)
File:   FILE.DAT
```

Even though FILE.DAT has a GROUP:RWED protection for [110,*] users, user [110,22] is allowed read access only.

If the same $SET FILE/ACL command is assigned to a directory, it also will prevent the user from accessing the file, even if no ACL is set on the file itself.

Any subdirectories created inherit the ACL from its next highest directory, if an ACL exists:

```
$DIR/ACL
Directory of DUA: PROD
DATA.DIR    (IDENTIFIER=[200,*],ACCESS=NONE)
```

When SOURCE.DIR was created, it defaulted to the same ACL as DATA.DIR. $DIR/ACL displays any ACL that's set for a file. Check all directories for that file for any possible ACLs affecting access to the file.

ACLs can be beneficial tools in a non-privileged environment when more specific access segregation is needed. But don't assign so many ACLs that your system becomes burdened and unmanageable. It's important to read, in greater detail, all the ACL options available and plan their uses before actually implementing them. If you take this precaution, you'll decrease the chances of accidentally overriding an assigned ACL with an established higher level ACL structure.

Security Maintenance

To maintain non-privileged segregation security properly, UIC-based protections and ACLs should be monitored frequently to detect and correct unauthorized changes or access errors to these areas. $DIR/SECURITY displays the UIC, protection and ACL for a file.

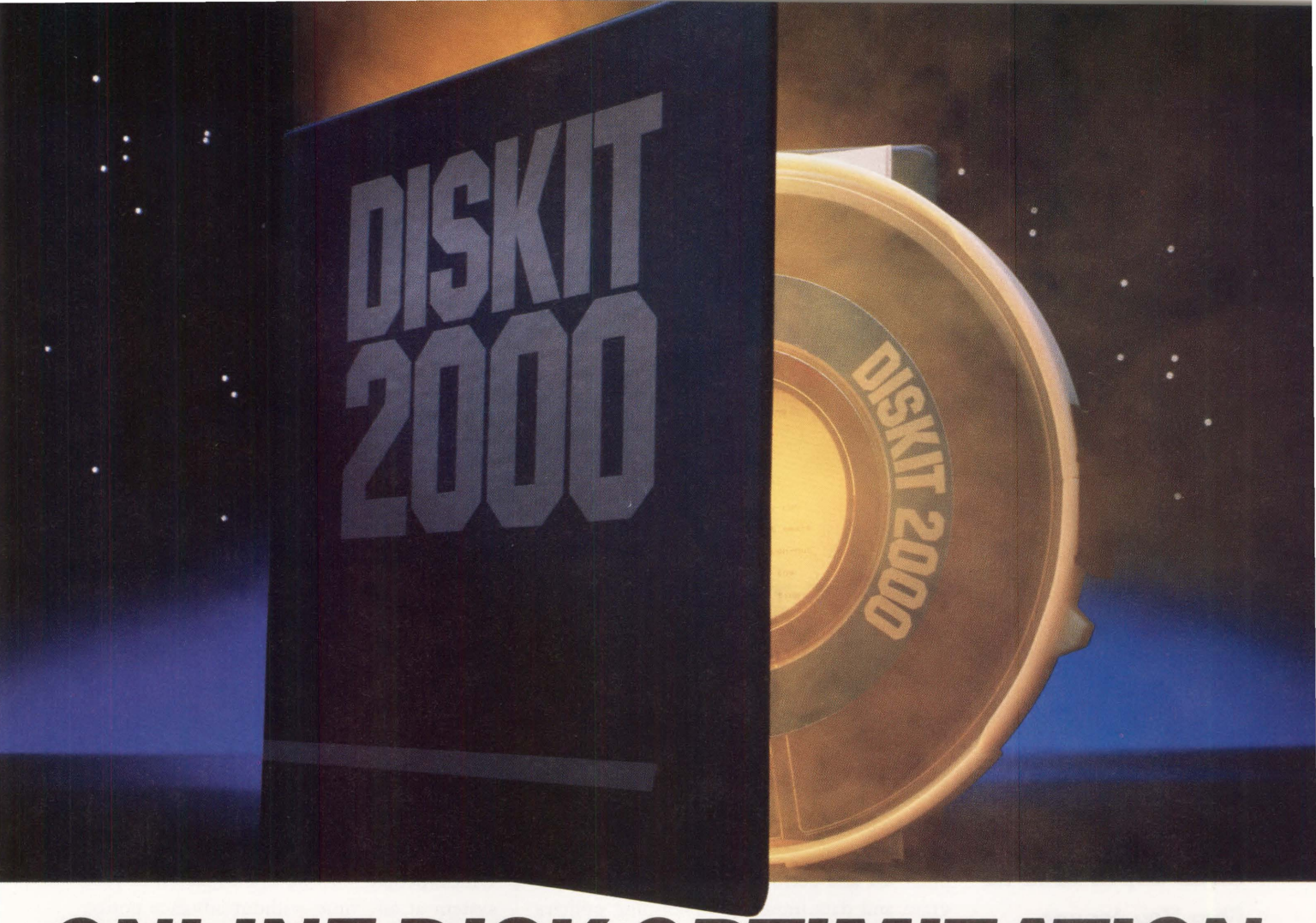
Regular review of your security scheme can alert you to possible protection bottlenecks. You also can catch implementation errors that may cause unnecessary privilege violations for your non-privileged users.

When a captive user questioned me about an access violation that she received, I reassured her I could fix it and that she hadn't been violated.

Do your homework before you set up these security features. If you have a full understanding of UIC-based protection and ACLs before you begin, you'll find it will be a smoother implementation. Your system will thank you in better performance and less maintenance. Your non-privileged users will thank you by not asking embarrassing questions.

—Betty Steele Adukoski is a Florida-based free-lance writer.

ARTICLE INTEREST QUOTIENT
Circle On Reader Card
High 505 Medium 506 Low 507



ONLINE DISK OPTIMIZATION FOR VMS PROFESSIONALS

Diskit 2000 is engineered for discriminating VMS professionals, the pros who demand perfection.

Why Settle for Just Online

Sure, Diskit 2000 delivers convenient, transparent online operation. Sometimes, that's just not enough. So, Diskit 2000 also includes a specially designed offline program to restructure system files and create perfect disks.

Fully Automatic or Absolute Control

The option is yours. Of course Diskit 2000 provides automatic optimization. It'll consolidate free space for faster file creation, automatically place directories to minimize head movement, and multi-stream data for faster operation. More important, Diskit 2000 provides an interactive graphic display to monitor disk optimization and all the options you need to maximize disk performance.

Designed to Meet Tomorrow's Needs

Diskit 2000's power is impressive and obvious. A VMS professional will really appreciate its sophistication and depth. Diskit 2000 will impress you today, but you'll really appreciate our careful engineering tomorrow — like our ability to safely handle hidden file accesses or to erase free space for complete security.

Get the Complete Story

DEC customers can count on Software Techniques for quality system software and solid advice. Call on us now for complete information on Diskit 2000.

(800) 332-8650

We'll rush you detailed information on Diskit 2000 and our other VAX/VMS system management software. From Software Techniques — where being first is a tradition.

Software Techniques Inc.,
6600 Katella Avenue,
Cypress,
California 90630 USA
Telephone (714) 895 1633
Telex 701331

Distributors of UIS Software in the USA.

VAX, VMS, and Cluster are trademarks of Digital Equipment Corporation. Diskit is a trademark of Software Techniques, Inc.

Full Featured Dual Mode:
- Online Restructuring Transparent to All Users
- Offline Restructuring for Perfect Disks including System Files

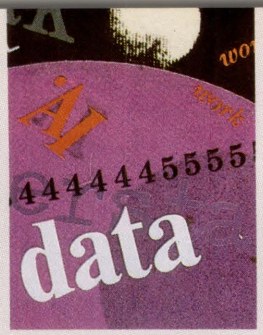
Maximum Compression
- Restructures All Files — even Multi-Header
- Consolidates Free Space
- Multiple Disk Operation

Absolute Data Integrity
- Detects Bad Disk Structures and Shuts down Automatically
- Full Automatic Recovery from System Interruptions
- Data Maintained on Disk at All Times
- Checks All File Accesses — Even NOLOCK
- Safe on Clusters
- Label Check to Intercept Operator Error

Maximum Flexibility
- Automatic or User Defined Directory Placement
- Optional User Defined File Placement For Faster Access
- Automatic or User Defined Free Space Placement
- Adapts to Your Site Environment

Easy Operation
- Doesn't Lock Out Users
- Suspends and Restarts to Work Within System Load
- Built in Scheduler
- Instant Reports

CIRCLE 269 ON READER CARD



SECURITY

SECURITY FOR THE NEW VAX MANAGER

By Robert Hansen

An In-depth Look At Five Key Issues.

In any shop, there are five security issues that need to be addressed. These include the control of access to system facilities, logging computer use and performance, maintaining program and data integrity, developing policies and procedures to deal with security related issues, and the housing and location of computer facilities.

Controlling Access

Regarding access, one consideration is the need to control physical access to your computer room. Only people who need access to the computer room should have it, but many unauthorized people manage to acquire keys or combinations. There's a wide variety of locks available, with methods of restricting access ranging from handprint recognition to the conventional key; the best method for you depends on the level of security needed at your site.

A popular and practical option is the combination bolt on the computer room door. This option is attractive, because the combination can be changed as often as necessary, and it's relatively cheap. The reason for restricting access to the room is to keep people from having access to information; i.e., the system console, modem telephone numbers, backup tapes, etc. So change the combination regularly.

There's also the issue of controlling access to the system, both local and dialup access. Unless people must be able to dial in to your system at any time without advance notice, disconnect your modem from the system when it's not in use. No hacker can get through a disconnected modem. Require modem users to request that the modem be hooked up for a specific time period. If they need it after hours (and you don't have someone on duty at the time), hook it up before you leave at night and disconnect it again in the morning. It may seem like a lot of trouble, but you'll feel better the next time you hear about the guy whose system got trashed by someone fooling around over the modem.

A person dialing in to your system should not be provided with any information about your system until he has logged in successfully, and he should be required to enter a system password before the username prompt. This will thwart the casual hacker and the uninformed disgruntled employee. You can accomplish this with the following commands:

```
$ SET PASSWORD/SYSTEM
$ SET TERM/SYSPASSWORD/PERMANENT term-id
```

where term-id is the device name of the dialup terminal.

digital™ Cooperative Marketing Program

digital review TARGET AWARDS WINNER

LOGICRAFT'S 386ware

#1 in DEC/MS-DOS Integration.

For five years in a row, Logicraft has set the standards in PC emulation. **386Ware**, the industry's most powerful DOS network server, is one reason.

With an 80386 microprocessor, **386Ware** runs IBM PC programs on any VT terminal. *DR Labs* says "**386Ware** is blindingly fast... more than five times faster than an IBM PC AT". At a fraction of the cost of a PC.

386Ware makes it easy to share data with other network users; easy to switch back and forth from PC to VAX programs.

Digital Review readers voted **386Ware** a 1988 Target Awards winner. They think it's the year's best hardware communications product. And so will you.

To give your VAX PC capabilities, call Logicraft today for more information or a free demonstration.

LOGICRAFT

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

CIRCLE 134 ON READER CARD

PROGRAM 1.

```
$ SET ACL SECRET.DAT/ACL=(IDENTIFIER=[15,*],ACCESS=READ+WRITE+DELETE)
$ SET ACL SECRET.DAT/ACL=(ALARM_JOURNAL=SECURITY, ACCESS=READ+
  WRITE+DELETE+FAIL)
$ SET ACL SYS$SYSTEM:SYS.EXE/ACL=(ALARM_JOURNAL=SECURITY, ACCESS=WRITE+DELETE+
  SUCCESS+FAIL)
$ SET AUDIT/ALARM/ENABLE=( LOGFAIL=ALL, BREAKIN=ALL, LOGIN=(DIALUP,REMOTE),
  LOGOUT=(DIALUP,REMOTE), ACL )
$ DEFINE/USER SYS$COMMAND TTBO:
$ REPLY/ENABLE=SECURITY
$ DEASSIGN/USER SYS$COMMAND
```

To suppress the system announcement message on all terminals, enter:

```
$ DEASSIGN/SYSTEM SYS$ANNOUNCE
```

At the same time, update your SYSTARTUP.COM file to reflect the changes, or the changes will disappear the next time the system is rebooted.

You also may wish to control the times during which users can log in to the system, and means by which they can do so (local, remote, dialup, etc). This can be accomplished by running the AUTHORIZE utility and modifying each username. The following example shows how to make sure that a user with the username Razor can log in only on Monday through Friday, from 8 a.m. to 6 p.m., and never can dial in to the system:

```
UAF> modify/noaccess=(primary,19-7,
  secondary,0-23)/nodialup RAZOR
```

You can do a lot with AUTHORIZE, so think about what your users need to be able to do, and read about AUTHORIZE in the manuals.

You may want to consider running a watchdog-style program on your system, which automatically will log out users who are inactive for a specified period of time. Using programs that monitor user activity ensures that terminals don't remain logged in and vulnerable for an excessive amount of time. There are a number of such programs available from third-party developers, as well as some unsupported ones available through DECUS.

Logging Computer Use And Performance

VAX/VMS provides several methods by which a system manager can monitor his system. Each method has distinct advantages and should be considered with the specific needs of your environment in mind. As time goes by, you will develop an innate sense for how your system normally feels. Here, I'll focus on the VMS Accounting Utility, Security Auditing, and the use of access control lists (ACLs) to restrict access and sound security alarms. These surveillance utilities have a generic appeal to the security conscious VAX manager and provide a simple means of logging potentially subversive or compromising activity.

When trying to document or detect a security breach, the VMS Accounting utility is a useful tool. When studied regularly, the Accounting log can help you spot suspicious events or unfamiliar patterns of system use. For instance, you might see that someone logged in at 3 a.m. one weekend morning, perhaps with an unauthorized username. Or, you may notice that someone has been logging into your system via a remote network node which normally is inactive during the time the events were logged.

If proper attention isn't paid to the log, however, you won't be aware of some of the strange activity that could be taking place on your system. If you don't know what is being logged, $ SHOW ACCOUNTING from DCL will tell you. If Accounting isn't enabled on your system, and you want to enable it, the *VMS DCL Dictionary* provides a complete list of events that can be logged. A common command to enable basic accounting might be:

```
$ SET ACCOUNTING/ENABLE=(PROCESS,
  INTERACTIVE, LOGIN_FAILURE,
  SUBPROCESS, DETACHED, BATCH,
  NETWORK, PRINT, MESSAGE)
```

Of course, each system has a unique environment with a unique set of requirements that need to be assessed to determine exactly which events should be logged.

With Accounting enabled, you have a variety of reporting options available to you. For instance, you can scan the log each morning, looking for unusual activity. One way to do this is with the command:

```
$ ACCOUNT/SINCE:2-JUN-1988/TYPE="-"PRINT
```

to list all events for which Accounting is enabled, except PRINT type events.

The DCL command SET AUDIT allows you to enable a number of security alarms that can alert you to possible attempts to compromise your system. When an event occurs for which a security alarm is enabled, a message is sent to all users who are enabled as security operators. The message indicates the type of event and provides relevant details concerning the perpetrating process (PID, username, image, privileges used, etc.).

To conform to some basic security principles, I recommend enabling security alarms for log in failures, break in attempts, and successful log ins from remote and dialup terminals. A successfully sounded alarm is the most reliable in-

dication of a security breach available, because the alarm sounds before a privileged user can alter any log files or change his identity.

If there are files on your system that are sensitive, you can set alarms on them. Alarms can be set to indicate file access (or attempted access) for READ, WRITE, EXECUTE, DELETE and/or CONTROL. To set an alarm on a file, place an entry in the target file's ACL defining what types of access should sound an alarm. For the alarm to sound after the ACL entry has been made, ACL auditing must be enabled.

You must have at least one terminal enabled as a security operator's terminal for the message to be displayed.

The Program shows:

1. How to set an alarm on a file called SECRET.DAT that will sound when any user other than [15,*] tries (and fails) to access it.
2. How to set an alarm that will sound anytime the file SYS.EXE is written to.
3. How to enable security auditing for the ACL-based alarms as well as for log in failures, break in attempts, and dialup and remote log ins and log outs.
4. How to enable a security operator's terminal.

For more security-conscious sites, audit the use of privilege to access files, which wouldn't be available otherwise to a user. This can be accomplished with the command:

```
$ SET AUDIT/ENABLE = FILE_ACCESS =
  (SYSPRV,BYPASS,READALL,GRPPRV)
```

As you can imagine, though, this type of auditing can create huge amounts of data that must be sifted.

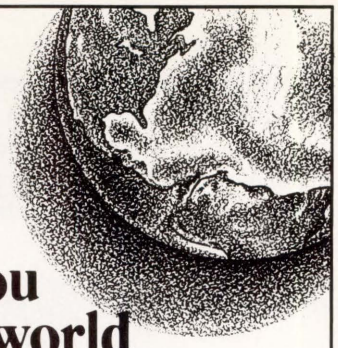
Maintaining Data Integrity

There's an undocumented CHECKSUM command that provides an excellent means of verifying the integrity of a file. To use it, type:

```
$ CHECKSUM FILENAME.DAT<CR>
```

Nothing will be displayed, but a nine- or 10-digit checksum value will be computed and stored in the symbol CHECKSUM$CHECKSUM. The slightest change in the file (such as using the PATCH utility to change a single byte) changes the checksum value. By periodically recording the checksum values for important files on your system and comparing them to the previously recorded values, you can discover if one of the files has been changed.

Don't record the checksum values on the system. That would create two problems: the perpetrator can alter the recorded values, and the existence of the values can alert the intruder that you're aware of his activities, so he can take evasive action. Write a short command procedure that performs a CHECKSUM on a list of files, printing the result and erasing the evidence from the disk.



GURU®:
When you expect the world from your expert system.

Tired of being limited? It's time to discover GURU—an expert system environment with comprehensive inference engine and rule management controls.

Incredible flexibility.

GURU lets you design an expert system that runs exactly the way you want. By using fuzzy variables, certainty factors, reasoning rigor, rule selection order, and numerous environmental and utility variables, you have virtually unlimited control over the consultation environment.

Unprecedented development efficiency.

Using GURU's case saving and replay, you can track the effects that rule changes have on system behavior. You can also use meta rules to examine or alter other rules during a consultation. And using GURU's knowledge tree, you can display the relationships and dependencies between an application's rules, variables, and goals.

Quick and thorough.

By mixing forward and backward chaining, goal search time can be shortened dramatically. And, using GURU's multiple rule firing capability you can re-fire rules as values change. GURU also comes equipped with seamlessly integrated 4th generation decision support capabilities such as data base, spreadsheet, and report generator.

GURU runs on PCs, LANs, and VAXs.

To find out how GURU can exceed your expectations, call 1-800/344-5832 or 317/463-2581.

Explore the world of expert systems with GURU Tutor!

This full-featured development environment allows you to prototype GURU applications using rule sets, data bases, spreadsheets, and more for only $75. To order, call us at 1-800/344-5832 or write. VISA, MasterCard, and American Express accepted.

mdbs®
P.O. Box 248
Lafayette, IN 47902
1-800/344-5832
317/463-2581

GURU is a registered trademark of mdbs, Inc.
VAX of Digital Equipment Corp.

CIRCLE 137 ON READER CARD

You also can set write-access alarms on important system files so that if a user writes to one, you know immediately of the violation. Some files for which you can save checksum data and/or ACL based file-access auditing are listed below (these are files that DEC lists as having particularly high security significance):

```
SYS$SYSTEM:        SYS.EXE
                   F11BXQP.EXE
                   LOGINOUT.EXE
                   DCL.EXE
                   JOBCTL.EXE
                   JBCSYSQUE.DAT
                   SYSUAF.DAT
                   NETUAF.DAT
                   RIGHTSLIST.DAT
                   STARTUP.COM
SYS$LIBRARY:       SECURESHR.EEXE
SYS$MANAGER:       SYSTARTUP.COM
                   VMSIMAGES.DAT
SYS$SYSROOT:       [000000]SYSEXE.DIR
                   [000000]SYSLIB.DIR
                   [000000]SYSMGR.DIR
```

Often neglected is data stored offline (i.e., BACKUP tapes). Tapes containing sensitive or confidential data must be kept locked up. Tapes (especially TK50s) are easy to hide and can often be carried out without arousing any suspicion. I know of a financial institution where employees took summer heat breaks in the computer room, where backup tapes were stored. With all the people coming and going, it would have been easy for one of the employees to walk off with a tape or two each day, making a competitor very happy. If you can't lock the door to the room where the tapes are stored, use a locking cabinet.

Storing data off-site is an excellent way to keep your tapes out of danger. If you have a current system backup stored in a secure off-site location, you're protected against the destruction of your data, either by malicious or natural means. A common practice is to rotate weekly or monthly full system backup tapes to an off-site location. This allows the convenience of having on-site backups easily accessible while providing the security of a current off-site backup.

If your site is a high-security environment, or if you feel your confidential data is vulnerable, consider employing a data encryption utility. Encrypting your data is a good way to ensure that only authorized users can see sensitive information, but this benefit needs to be weighed against the cost of the time spent encoding or decoding the data and the hassle of generating and remembering encryption keys.

Some sites might be interested in the VAX/VMS Encryption Facility (DEC SPD 2674). It uses the National Bureau of Standards approved Data Encryption Standard (DES) algorithm to encrypt your files. An advantage to using this product is that it's designed to work with VMS Backup, using the undocumented /ENCRYPT qualifier. That means you can make sure your backup tapes are unintelligible to would-be data thieves.

Implement A Set Of Security Policies

It's important for each site to develop and implement good security policies. The *Guide to VAX/VMS System Security* is full of facts, examples and good suggestions that will help you develop a set of policies suited to your environment.

There are certain standard common-sense policies applicable to every site. One such policy concerns password expiration. When you initially add a user to the user authorization file (UAF), set his password as expired. This ensures that the password will be changed on the first log in.

Think about the length of time that passwords should remain valid. If you conclude that passwords should be changed more or less frequently than the default of six months, specify a password lifetime. Expire all passwords if, at any time, an unauthorized person might have password knowledge. This will force a password change upon each user when he logs in next:

```
$ MCR AUTHORIZE
UAF> ADD RAZOR /PASSWORD=PDX287OSU
        /PWDEXPIRED /PWDLIFETIME=60-0
UAF> MODIFY/SYSTEM_PASSWORD=KGMS89
```

Naturally, the standards applicable to user passwords also apply to the system password. But, system passwords don't have a lifetime (they don't expire), and a minimum length isn't enforced. You must choose an appropriate system password and change it periodically.

Another good security practice is the implementation of a procedure for dealing with the termination of personnel who use the system. When you learn of an employee's plans to resign (or of his impending termination), perform a full system backup. When the employee leaves, mark his account as expired immediately. Although most employees aren't likely to behave maliciously, don't guess at which ones will.

Add a page to your Policies and Procedures (P&P) manual describing the steps to be taken when an employee leaves. Take into account the nature of your site and the environment in which the employee has worked, and make sure the employee's account is expired, the system password has been changed, his keys have been returned, and any combinations he might have possessed (i.e., to the computer room) have been changed. Further consider whether you should force other users to change their passwords (by setting them as expired with AUTHORIZE).

Another page of your P&P manual should be devoted to

emergency situations; i.e., ones that inhibit or prevent the normal operations of the system, including such natural disasters as fire, flood, earthquake, power failures and gas leaks.

What takes place at your site depends on the structure of the building and the location of the computer room, but be conscious of any potential security problems the situation might create. For instance, if the power goes out, does the door to your computer room automatically unlock? Power failures have been staged to facilitate access or to cover up covert system activity. Anticipate potential security holes that might be created at your site by such situations, and either make them impossible or have a procedure for dealing with them during the crisis.

Vital to any system security management technique is forethought. By considering security issues, you are preparing to take action. By developing a set of policies and procedures, you're ensuring that your ideas are used and perpetuated.

Secure Housing And Location

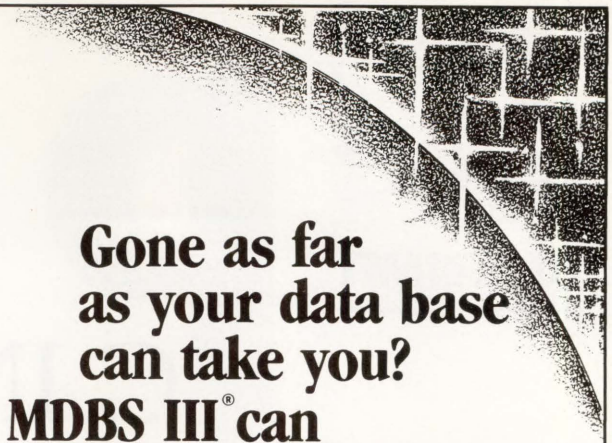
Although you probably aren't in a position to affect the structure and location of your computer room, secure housing is an important and overlooked security issue. Many computer culprits have gained access to the computer room by taking advantage of poor structure in the building. Examples include people lifting up ceiling tiles and climbing in through the ceiling, cutting holes in the roof, breaking windows, picking locks, etc. At one California college, disgruntled professors climbed over a wall separating a public area from the system console, removed a doorknob, took it to a locksmith and returned undetected in less than four hours. They had all the privileges they wanted and a key.

The importance of each of these issues varies, depending on the specific needs of your company. But, ignoring even one area could lead to disaster. We've all heard horror stories about hackers getting into a system and deleting files or maliciously altering data. But, we usually think the other guy will be the target.

Clients (or others that rely on your company) may have grounds to file negligence suits against you and your company in some cases. If an unauthorized person gets confidential information (such as personnel data), you can be sued by one of your own employees. What would happen to profits, if your competitors had access to information sensitive to your company? What would happen to your job?

Questions like these make it worth considering the consequences of ignoring security. It will take a little effort, some research and thought, but by addressing these issues and planning your strategy, you can minimize your risk. —*Robert Hansen is senior software engineer at Software Techniques Inc. in Cypress, California.*

ARTICLE INTEREST QUOTIENT
Circle On Reader Card
High 517 Medium 518 Low 519

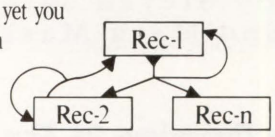


Gone as far as your data base can take you? MDBS III® can take you further.

You know the situation. You need to develop a system that will handle massive amounts of data and involves complex data relationships. And not only do you need it in an unreasonable time, it has to run on a PC or a mini. And on top of that, your current dbms simply can't handle the job.

Design real world schemas.

MDBS III supports data bases into the hundreds of megabytes and beyond, yet you can still retrieve data in split-seconds.



You can design a data base to represent structures as they are in the real world, capturing many-to-many, one-to-many, many-to-one, one-to-one, forked and recursive relationships. There's no time-wasting, space-hungry dummy records or extra coding. Every time you modify your data structure, MDBS III modifies your data base automatically.

Develop more efficient applications.

MDBS III offers high performance with flexible data-structures, airtight data integrity, automatic recovery, password, encryption and read/write protection, transaction logging, spur-of-the-moment query, report generation, easy schema restructuring, and much, much more.

From PCs to LANs to VAXs, see how far MDBS III can take you. Call 1-800/344-5832 or 317/463-2581.

mdbs®

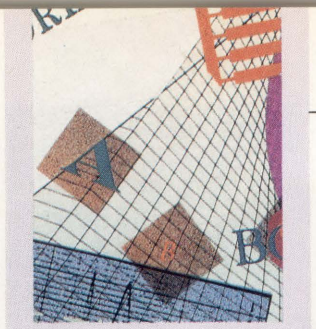
P.O. Box 248
Lafayette, IN 47902
1-800/344-5832
317/463-2581

Technical specifications

• records/data base—unlimited • fields/record—32,767 • max db size—4GB • records/set (file)—unlimited • fields/index—32, 767 • indexes/record—2,500 • access codes—65,535 • plus performance tuning, significantly reduced storage requirements, clustering, multi user, multiple language I/Fs

MDBS III is a registered trademark of mdbs, Inc. VAX of Digital Equipment Corp.

CIRCLE 138 ON READER CARD



CONNECTIVITY

PC INTEGRATION: A MIDTERM REPORT

By Steven Salemi and Mark Maxson

An Overview Of The Past, Present And Future Of Desktop Connectivity.

Personal computers in the workplace changed the way people do their jobs, but not always in ways that industry observers expected.

The continuing decline in the cost and size of processors and memory made the personal computer possible. Information systems architects responded by moving the computing resource closer to the demand. The result, a self-contained compute engine on the desktop, led to the development of spreadsheets, desktop publishing, windowing and other software considered too compute-intensive for shared systems.

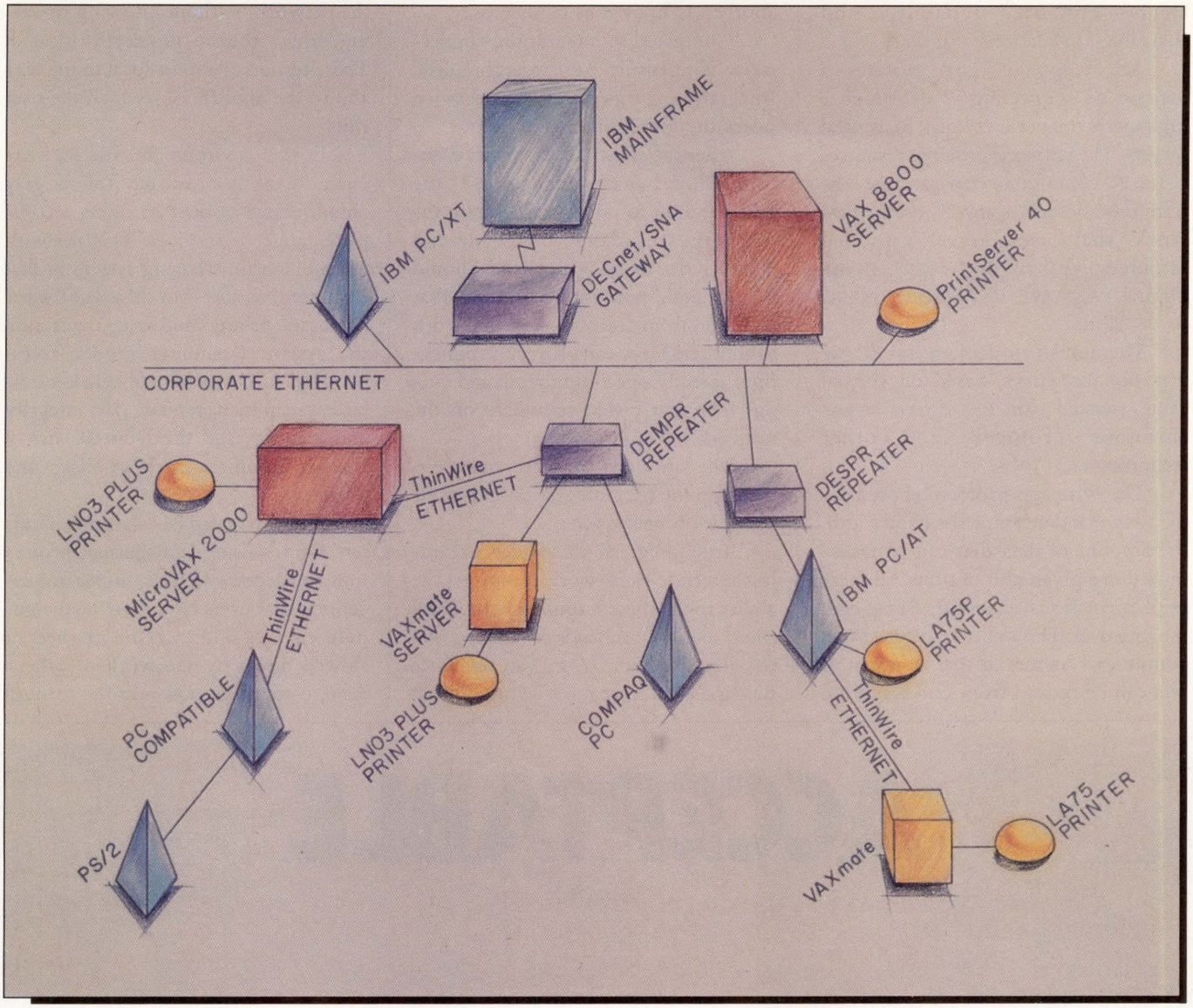
With the freedom to implement this new breed of applications came a number of drawbacks. Personal computers are personal; i.e., one human, one machine. But one-on-one doesn't represent the way most people work. Companies and other organizations, the primary buyers of PCs, succeed through shared efforts and teamwork. A primary activity of people working in organizations is information sharing in meetings, presentations, conferences, committees, reports and memoranda.

The advances in personal productivity enabled by the personal computer were a giant step backward in terms of information sharing. Because much of the organization's data is now contained on PC floppy disks, Winchester drives and hardcopy scattered from office to office, the ability to share information among all users is a distant dream. The reality scenario is a 1.2 MB floppy containing a word-processed memorandum, a database on a Winchester, a spreadsheet with one user's macros stored on a 360 KB diskette and a printout of a report with a 3½-inch microfloppy taped to the front page.

To address the difficulty of information-sharing in this environment, myriad conversion utilities, document importers and exporters, and rudimentary attempts at point-to-point file transfer networks have been devised. But, these spot solutions to individual problems lack consistency and system-wide efficacy. They have proven very difficult to implement and manage. PC users feel victimized by their own tools.

Another problem created by PCs in the organization is information security. More than ever, information is regarded as a valuable corporate asset to be guarded and preserved against loss or corruption. With this asset now buried among hundreds or thousands of personal computers, it's impossible to ensure that all data is regularly backed.

Compared to traditional large disk and tape storage systems, the low cost of the



An enterprise-wide network topology with PCs acting as peers in the network.

devices used to store PC data implies a greater risk to data. The hazards of the typical office environment (coffee, cigarette smoke, vacuum cleaners, filing cabinet magnets, and so on) could cause a systems architect to tremble in fear of imminent loss.

The absence of centrality in this distributed working environment makes management of the overall computing resource difficult, if not impossible. When a new version of an application or operating system arrives, it can take months or years before each user obtains the updated copy and is brought "up to rev." In the meantime, there's a mixed-mode environment with the strong possibility of data incompatibility and other headaches.

This article explores network integration as a solution to these and other computing problems, contrasts connectivity and integration, compares several architectures and explores one architecture in depth: Digital's Personal Computer Systems Architecture (PCSA).

PC Network Integration

The goal of PC integration is to provide a shared network environment for each PC, with access to common disk storage, printers and other devices. The compute engine lives on the desktop, with centralized disk storage for ease of management, backup, cost effi-

ciency, enhanced reliability and shareable applications and data.

Achieving this goal requires a method of connecting PCs through a high-performance network to central servers. The network provides resources to the PC community transparently. The term *client* describes any PC on the network that uses server-provided resources; i.e., an IBM PC/XT, PC/AT, Digital VAXMATE, COMPAQ DESKPRO or PC clone.

The industry offers several PC integration networks, based on coaxial cable, twisted pair, RS232 serial asynchronous protocols and other technologies.

The wire and protocol chosen for the network determine the bandwidth, the amount of data that can be transmitted in a given unit of time. All these implementations achieve the same end, moving data. The ability to connect two computer systems, so that a stream of bits can be moved from one system to another, is known as connectivity.

Compared to integration, connectivity is relatively easy to accomplish. Integration, a superset of connectivity, poses the more difficult questions.

After the ability to move bits is accomplished, what comes next? Is the user required to write programs to interpret the stream of incoming bits and decide what to do with them? Should PCs be equipped with programs that copy files from one point in the network to another? How can users run applications directly, specifying input and output files that reside anywhere on the network?

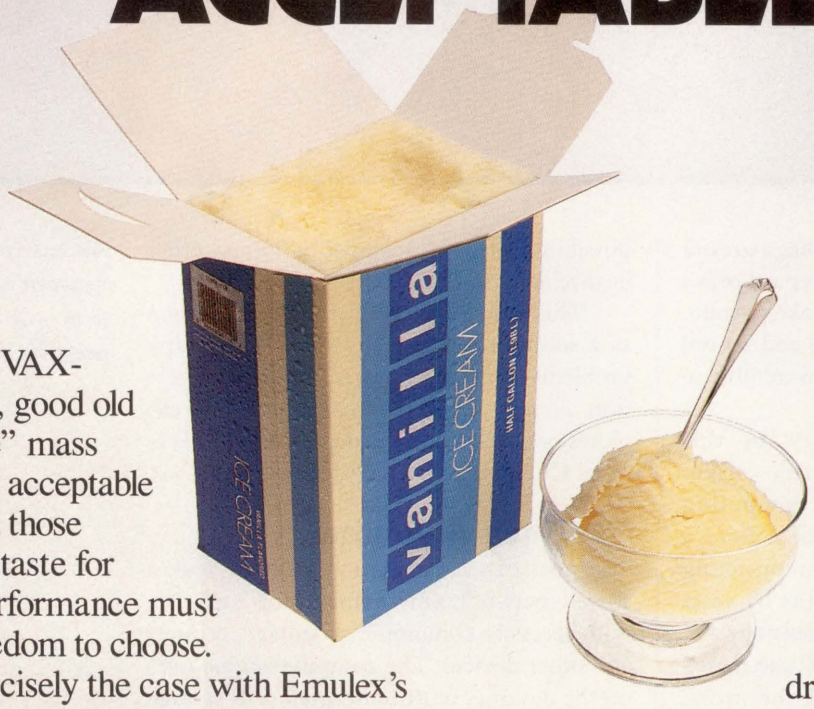
The answers to these questions point up the true integration of any PC integration network.

True integration provides a seamless interface to network resources; the ability to use these resources without issuing special commands or copying files to a local system. Users can reference files and printers that reside throughout the network, without knowing or caring where they're physically located. These resources appear local to the user and to the applications which the user runs.

In this environment, the PC wire connects the user to an amorphous gray cloud, or network, that offers a complete range of services. This network resembles a timesharing system in that each user has access to shared software, databases, printers and other devices on the system (assuming proper access privileges). Other benefits are centralized system management, data integrity and security, and the reduced cost of sharing resources such as disks and printers.

This integrated PC environment offers the requisite data sharing, protection and access, with the important exception that users have their own compute engines and can't be crashed or slowed down by the work of others. Also, computing power in the form of

ACCEPTABLE



For some VAXcluster users, good old "vanilla-like" mass storage is an acceptable solution. But those users with a taste for optimum performance must have the freedom to choose. Which is precisely the case with Emulex's SMDI (SMD-Interconnect) subsystems. SMDI lets you expand storage capacity for all your VAXes...even VAXcluster. SMDI works with the HSC50/70 so that fast, high-capacity industry standard SMD-E drives appear as RA drives to the host. It's multiple gigabytes of storage in space-saving packaging.

additional PCs is expandable linearly in a PC network; in a timesharing system, it must be enhanced in large, discrete, host processor-sized steps.

The Scope Of Integration

One popular class of PC integration products, PC LAN servers, shares disks and printers from one central MS-DOS system among a small number (typically four to 20) of MS-DOS workstations. These first-generation PC integration products from IBM, Banyan, Novell, Micom-Interlan and other firms provide horizontal integration. Such architectures support resource sharing among the members of a small department or workgroup, but provide limited and usually non-transparent mechanisms for communication or integration beyond the workgroup level.

Another class of PC integration products provides vertical integration up the organizational ladder to corporate mainframes and superminis. Such packages generally are limited to task-to-task or file-transfer functionality, due to conversion requirements when talking to foreign (non-MS-DOS) architectures. Examples include SNA gateway products and 3270 emulators.

A third class of PC integration products includes DEC's PCSA and offerings forthcoming from other manufacturers. These products are capable of wide area network (WAN) access in addition to PC local area network (LAN) access, providing seamless two-dimensional (vertical and horizontal) integration among like machines in the workgroup, and among mainframes and superminis on the departmental, divisional and corporate levels.

Seamless Integration

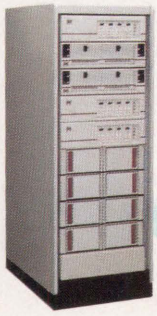
Let's examine the technical aspects of achieving seamless integration, using DEC's PCSA products — VAX/VMS Services for MS-DOS server software and DECNET/PCSA Client software — as an example. Note that PCSA is a phased implementation, integrating mainstream MS-DOS products with larger systems. Its long-range goal, stated in DEC's recent network application support announcement, is to extend seamless integration to as many different types of client systems as possible.

On a non-networked MS-DOS system, the user is presented with mnemonically labeled disks and printers. Floppy disks are A: and B:, the hard drive is C:, and printers are LPT1: through LPT4:. When an MS-DOS application or user wishes to use one of these devices, the utility or application performs an Interrupt 21 hexadecimal system call to the MS-DOS operating system for service.

PCSA begins its work here, with Microsoft's *MS-Net*. A piece of code known as REDIR, the DOS Redirector, captures control before MS-DOS, examining the parameters in the system call for the drive letter. If the request is

EXCEPTIONAL

You can still choose plain vanilla... if that's all you want. But you do have a choice of much more variety with Emulex's SMDI.



Call (800) EMULEX 3 or (714) 662-5600 in California.

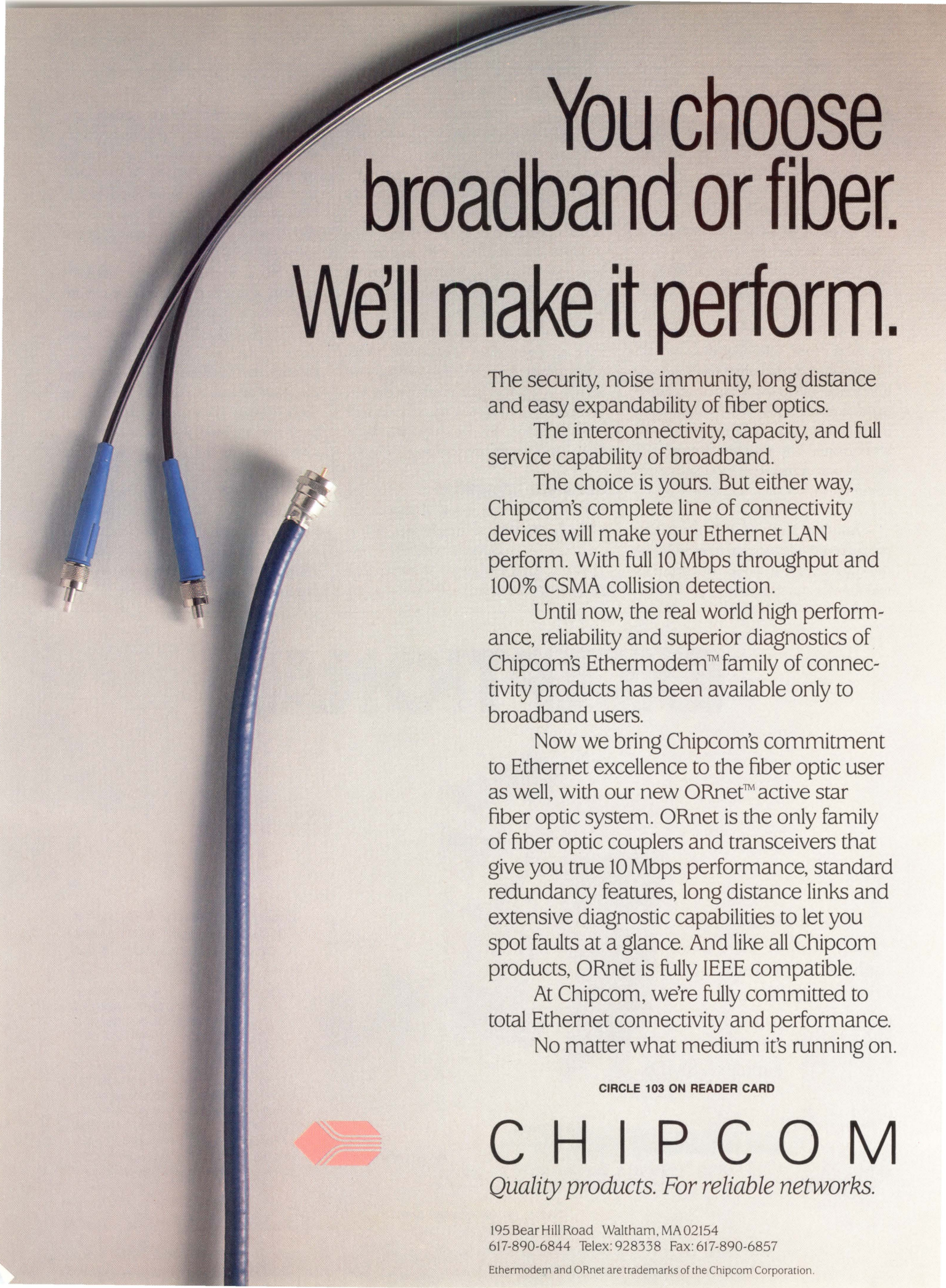
Emulex Corporation
3545 Harbor Blvd.
Costa Mesa, CA.
92626

EMULEX

Regional Offices:
Anaheim, CA (714) 385-1685
Atlanta, GA (404) 587-3610
Burlington, MA (617) 229-8880
Chicago, IL (312) 490-0050
Dublin, CA (415) 829-1170
Teaneck, NJ (201) 836-3717
Washington, DC (703) 264-0670
International Offices: Bracknell 344-484234
Munich 89-3608020 North Sydney 2-957-1669
Paris 134-65-9191 Tokyo 3-234-8951 Toronto (416) 673-1211

VAX and VAXcluster are registered trademarks of Digital Equipment Corp.
©1988, Emulex Corporation, Inc.

CIRCLE 264 ON READER CARD



You choose broadband or fiber. We'll make it perform.

The security, noise immunity, long distance and easy expandability of fiber optics.

The interconnectivity, capacity, and full service capability of broadband.

The choice is yours. But either way, Chipcom's complete line of connectivity devices will make your Ethernet LAN perform. With full 10 Mbps throughput and 100% CSMA collision detection.

Until now, the real world high performance, reliability and superior diagnostics of Chipcom's Ethermodem™ family of connectivity products has been available only to broadband users.

Now we bring Chipcom's commitment to Ethernet excellence to the fiber optic user as well, with our new ORnet™ active star fiber optic system. ORnet is the only family of fiber optic couplers and transceivers that give you true 10 Mbps performance, standard redundancy features, long distance links and extensive diagnostic capabilities to let you spot faults at a glance. And like all Chipcom products, ORnet is fully IEEE compatible.

At Chipcom, we're fully committed to total Ethernet connectivity and performance.

No matter what medium it's running on.

CIRCLE 103 ON READER CARD

CHIPCOM

Quality products. For reliable networks.

195 Bear Hill Road Waltham, MA 02154
617-890-6844 Telex: 928338 Fax: 617-890-6857

Ethermodem and ORnet are trademarks of the Chipcom Corporation.

to a local drive (A:, B: or C:) or printer, REDIR releases control to MS-DOS and allows the request to execute normally.

However, if the reference is to a virtual drive letter (e.g., drive N:) or remote printer, REDIR assumes this is a network reference. It examines a data structure to determine which network node (server system) is associated with drive letter N:. The I/O request is inspected for type (OPEN, CLOSE, READ, WRITE, DIRECTORY, etc.), and a message packet is formulated containing these parameters. The packet, called a Server Message Block (SMB), is passed to PC-resident DECNET code, which transports the message across the local or wide area network to the destination server system.

The server system, either a VAX-MATE or VAX/VMS, receives the SMB packet via DECNET, which identifies the packet type and passes it to object 64, the Personal Computer File Server (PCFS)_SERVER process. This image interprets the request type and examines the data structures to identify the corresponding directory on the VMS file system (or printer attached to the server) that services the client. PCFS has the intelligence to do on-the-fly conversion of the data stream from MS-DOS to VMS format, converting a variable length sequential access text file to MS-DOS STREAM format, for example.

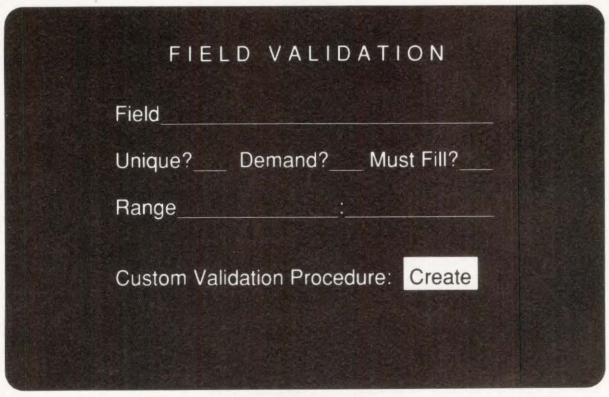
PCFS also maintains file locking information and won't allow simultaneous write/read requests to collide within the same file. This becomes interesting when one file is to be opened by two or more file servers, each running on a different member node of a VAX-CLUSTER. The solution is a carefully designed system of locks and signals to preserve data integrity.

After the requested operation is performed, the result is placed in the SMB packet, and the response is sent to the client, where the I/O request completes transparently. The user might never know the PC went onto the network for data.

In this implementation, a file on the server can be accessed simultaneously by a number of MS-DOS clients and by applications running on the VAX. PCFS masks any differences in file structure or access, enabling MS-DOS and VMS applications to cooperatively access a common database. This approach is suitable for transaction processing applications, where PCs serve as point of entry stations, validating and preprocessing records, which then are posted to a common database resident on large VAX disk farms. It also overcomes the 32-MB MS-DOS limit on file size, because the file structure storing the data is the more robust VMS ODS-II file system.

An interesting side effect of bridging the DOS and VMS worlds is the mapping of MS-DOS file names to VMS file names. MS-DOS allows file names of up to eight letters with three-letter ex-

Unlock Programmer Productivity



With System 1032 Application Facility

System 1032/AF automatically generates most of your application code from menu selections. Yet you can add custom procedures wherever you need something special.

CompuServe®
Data Technologies
Tel: (617) 661-9440

CIRCLE 111 ON READER CARD

tensions (e.g., MSDOSFIL.TXT), but VMS allows longer file names. However, VMS file names may contain only A-Z, 0-9, $, _ (underscore) and - (hyphen) characters; MS-DOS allows almost any character in a filename specification, including some that aren't printable.

The resolution of this problem may be inelegant, but it works: MS-DOS clients aren't shown filenames that are too long for MS-DOS to accept, and MS-DOS filenames containing illegal-for-VMS characters automatically are converted. The illegal character is represented as its hexadecimal value, prefixed by a flag sequence of double underscores. Thus, JOE&BOB.TXT becomes JOE__BOB.TXT, a legal VMS filename. When a client requests a directory, all filenames are scanned for __xx and backtranslated accordingly. Thus, the MS-DOS user sees the file as it originally was named, oblivious to DEC's mirror tricks.

This is only one of a number of areas where differences between the different file systems required smoothing over.

Performance Issues

With this conversion taking place in real time, you might expect performance to suffer. However, the latest release, version 2, of DEC's VAX/VMS Services for MS-DOS delivers throughput roughly equivalent to a local hard disk, owing to a virtual memory cache and multithreaded processing.

Also found in V2 is a new component, Local Area Disk (LAD) services, also called the Disk Server. LAD provides a vast enhancement in performance at the sacrifice of some functionality.

Not all applications require file sharing, but a large amount of file services overhead is spent in tracking the shareablity context of files. Not all applications require WAN access, but overhead is expended in gaining access to it. Not all DOS files need to be readable by VAX/VMS systems, although CPU cycles are required to map one file system to the other.

Companies Mentioned In This Article

Banyan Systems Inc.
115 Flanders Rd.
Westboro, MA 01581
(617) 898-1000
CIRCLE 534 ON READER CARD

Compaq Computer Corp.
20555 FM 149
Houston, TX 77070
(713) 370-0670
CIRCLE 498 ON READER CARD

Digital Equipment Corp.
146 Main St.
Maynard, MA 01754
(617) 897-5111
CIRCLE 535 ON READER CARD

IBM
Old Orchard Rd.
Armonk, NY 10504
(914) 765-1900
CIRCLE 536 ON READER CARD

Micom/Interlan Inc.
155 Swanson Rd.
Boxboro, MA 01719
(617) 263-9929
CIRCLE 537 ON READER CARD

Microsoft Corp.
16011 Northeast 36th Way
P.O. Box 97017
Redmond, WA 98073-9717
(206) 882-8080
CIRCLE 538 ON READER CARD

Novell Inc.
122 East 1700 South
Provo, UT 84601
(801) 379-5900
CIRCLE 539 ON READER CARD

LAD represents a trade-off of these features. It works by intercepting the flow of control farther down the stream on the MS-DOS client side, letting MS-DOS take control and assert DOS file system mapping. When DOS attempts to perform its I/O to a non-existent local disk, LAD (implemented as both MS-DOS and VMSM device drivers) takes control and notes the I/O request parameters in a Direct Access to Disk (DAD) packet. The packet contains the logical block number to be read from the disk, except there's no physical disk, only the network virtual disk.

LAD checks the table of drive associations and determines the service name for which this packet is destined. Instead of DECNET, the packet is handed to Local Area Systems Transport (LAST), a highly-optimized message protocol specifically engineered for high-throughput transaction processing on local area networks.

LAST delivers the request to the server node, where it's received by a VMS-resident LASTDRIVER. LASTDRIVER removes the network protocol and passes the DAD message to LAD$KERNEL. LAD$KERNEL looks up the association between the requested service name and a container file on the VMS disk system. A container file is a large, virtual disk image that contains an MS-DOS file structure and concomitant retrieval information.

Thus, LAD files aren't visible to VMS applications; only the container file is. LAD$KERNEL reads the desired block from the container file and returns it as the response message, via LASTDRIVER and the network. The client receives the block and returns it to MS-DOS; the network access is completed invisibly as if the I/O had been local.

The LAD/DAD/LAST mechanism for serving virtual disks is significantly faster than local hard disk performance. File system and RMS overhead is eliminated; DEC moves blocks of information over the Ethernet wire. The overhead from file sharing also is eliminated; LAD disks aren't write-shareable. A system cache on the server

compresses multiple requests into single I/O operations, a feature MS-DOS can't match locally. LAST eliminates some of the network overhead required by DECNET.

In practice, LAD services are useful for storing files that typically don't need to be written to, such as operating system, applications and other utility files, as well as personal files that users don't wish to share with other users on the network. Because the LAD container file is compatible with the DECNET-DOS Network Virtual Disk (NVD), the LAD file is accessible through the DECNET-DOS Network Device Utility (NDU) in a WAN.

The LAD is also a good choice for workstation-specific startup information, including networking code that allows PCs equipped with intelligent Ethernet controller cards to be booted remotely over the network. Remote boot capabilities provide a high level of security, enable true diskless PC workstation operation and make it easy for system administrators to distribute system startup and configuration files over the network to users.

File server access and disk server access can be coresident on one client; i.e., a client can use drive letters E:, F:, G: and H: to map network LAD disks and use drive letters I: through Z: for file server connections to various servers throughout the local and corporate networks.

The Future

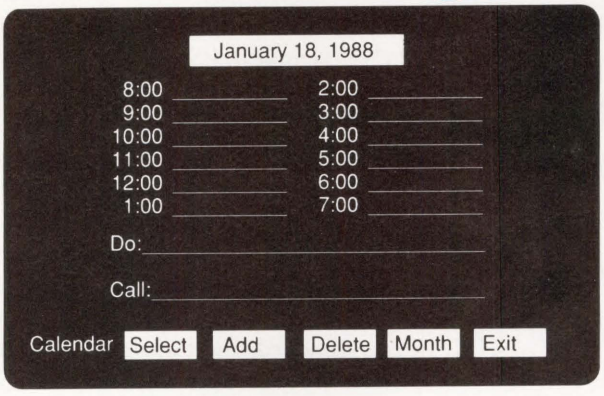
PCs still look like PCs, but network integration has transformed local systems into windows that let users access the computing resources of the entire organization, from the printer in the next office to a database on disks halfway around the world.

Much work remains, however. Now that the bridges are built, common data formats must be provided, so that applications can access different files and programs regardless of underlying hardware and software architectures. As new types of client systems become popular, and new industry standards evolve, these must be integrated into existing systems and networks.

Although the target keeps moving, the bull's-eye remains a transparent system that enables users to make use of disk, file, print and compute resources from their desktops, and permits systems architects to distribute those resources as required to any part of the organization. *—Steven Salemi is president of Bottom Line Communications in Concord, Massachusetts, and Mark Maxson is supervisor of software development for DEC's Personal Computing Systems Group in Littleton, Massachusetts.*

ARTICLE INTEREST QUOTIENT
Circle On Reader Card
High 531 Medium 532 Low 533

Unlock M.I.S. Backlogs

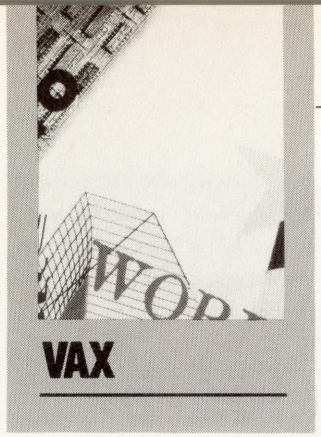


With System 1032 Application Facility

One keystroke builds a standard application from any System 1032 database you indicate. You then extend this prototype into a full-fledged system by filling in specification menus.

CompuServe®
Data Technologies
Tel: (617) 661-9440

CIRCLE 112 ON READER CARD



VAX

TO NAME ME IS TO KNOW ME

By Philip A. Naecker

Distributed Name Service (DNS) Simplifies The Management Of Network Resources.

Editor's note: This is the second in a series on DECNET Distributed Services (DSS). (See Jeffrey Schriesheim's article "Netting DECNET System Services" [April 1988]). These layered products from DEC are intended to combine multiple VAX computer systems into a highly integrated, distributed computing environment.

If you work in a large organization that uses DEC computers, you know that computer systems are becoming increasingly unstable. Disks are added, directories are moved around, printers are moved from one node to another, and new nodes constantly are being added to the network. If you've been following DEC's marketing activity, you also may have surmised that Digital intends to proliferate new machines throughout the client's company rather than just add bigger machines in the computer center. Therefore, keeping track of resources and making use of the resources as they move from location to location are becoming major headaches.

At one time, logical names might have been a technical solution for keeping track of the location of resources. A programmer would use a logical name, like APPLICATION_DISK, to point to the resource, and the translation of the logical name would result in the actual resource, such as "DUA4:". By using the logical name rather than the actual name of the resource, the program is insulated from change, when the system manager decides to move the application to a new disk; e.g., when he changes the translation of APPLICATION_DISK from DUA4 to DUA5..

But today computer systems are distributed across networks and, for a number of reasons, logical names don't extend into the distributed environment. Yet to be able to access a resource that may move around the network is essential, if software maintenance costs are going to be controlled and resource use maximized.

THERE ARE TWO PARTS to solving the problem of location resources around the network. The first is to devise a logical naming scheme that will be both stable and meaningful. The second is to be able to distribute those names and their associated attributes around the network, so that they're available to every application that needs them.

The VAX Distributed Name Service (DNS), from Digital, is a DECNET layered product that provides a network-wide means of assigning unique, location-independent names to network resources. The named resources, called objects in DNS parlance, can be disks, printer queues, nodes and anything else you want to name. But, DNS provides

more than a naming mechanism; it distributes the names across the network automatically, so that all applications and users can access an object using the same name. If an object is moved, an application that uses DNS won't have to be changed. DNS will make sure that the new location of the object is provided to all the applications that use it.

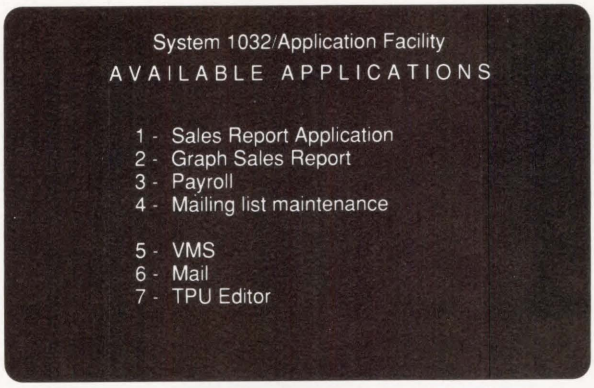
> An interesting feature of DNS is that it provides a time service.

DNS is based on a server-client model. DNS server software is installed on a DNS Server Node and maintains a database of DNS object names on that node. The DNS server software also communicates via DECNET with all other DNS Server Nodes in the network, propagating information from the database to application in the network that needs to know it. The applications that use DNS information are called clients. At present, there are two DNS client software products: VAX Remote System Manager V2.0 and VAX Distributed File Services. In the future, there will be many more DNS client products. In fact, in Phase V of DECNET, all DECNET nodes will be DNS clients, because all DECNET node names will be DNS objects.

To make use of a DNS server, a DNS client sends the server a resource name and requests information (attributes) about that resource (see Figure 1). There are many attributes that can be requested, but the most frequent one is the node name where the resource resides. The client then uses the attribute, such as the node name to perform useful work. In the case of Distributed File Service (DFS), for example, DFS would use the node name returned by the DNS server to find out where a group of files resides at the moment.

DNS uses a hierarchical model of the network namespace, in which related objects can be grouped (see Figure 2). For example, a network namespace might group names by department, such as PERSONNEL, MARKETING, SALES, etc., or by some larger organizational boundary, such as AUTOMOBILES, AEROSPACE and CONSUMER_PRODUCTS. Names are fully qualified by the hierarchy, like file names under VMS that are qualified by the device and directory name. Thus .PERSONNEL.DEVELOPMENT.SOURCE_DISK is different from .MARKETING.DEVELOPMENT.SOURCE_DISK. (In

Unlock VAX Resources

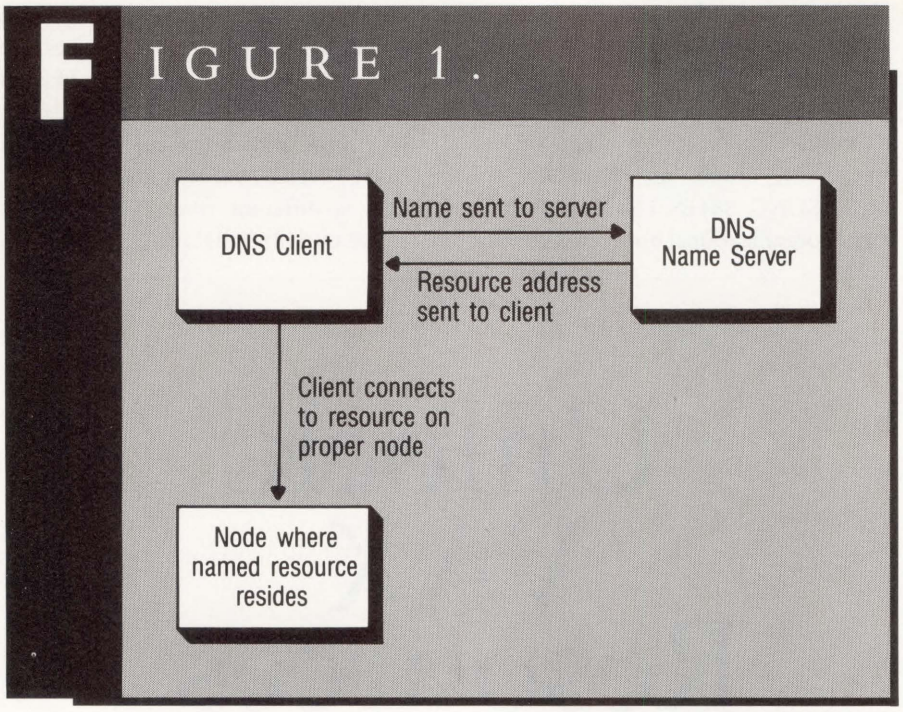


With System 1032 Application Facility

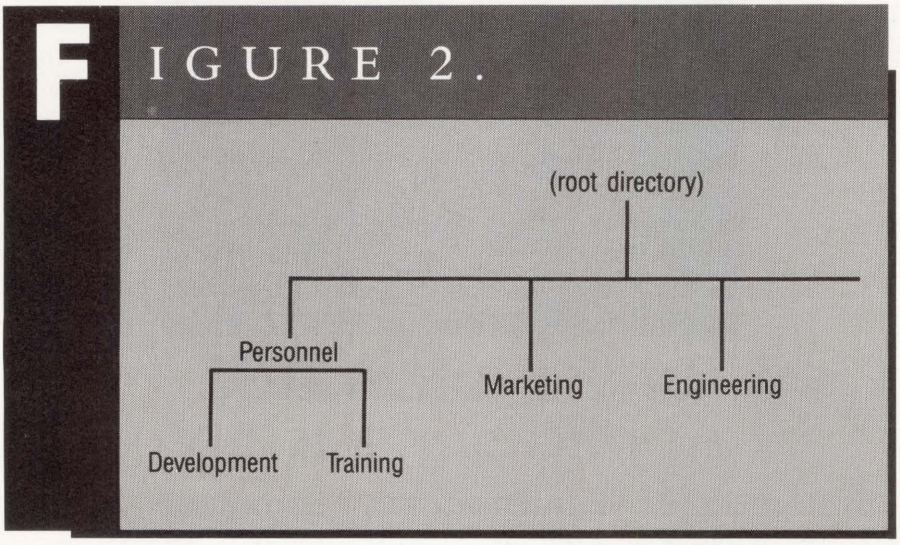
System 1032/AF integrates everything on your VAX: VMS services, 4GL, existing 3GL modules. Integrate at the menu level or invisibly weave everything together inside an application.

CompuServe
Data Technologies
Tel: (617) 661-9440

CIRCLE 113 ON READER CARD



Server-Client structure of DNS.



Hierarchical name space.

DNS, the leading dot character is used to denote the root of the namespace, so every DNS name starts with a dot.)

Why It's Better

In contrast to traditional naming practices, the use of DNS is consistent with a dynamic network environment. For starters, there's a single namespace throughout the network; i.e., the translation of a particular name is the same for every node in the network. In contrast, if an application uses logical names to locate a file in the network, it would be possible for two nodes to have different translations for the same logical name. Furthermore, to move the object (resource) to which those logicals are pointing, a resource manager has to locate all the logical names in the network and change them simultaneously, while moving the actual application to the new location.

Moving a resource is simple with DNS. The object location and the DNS name are changed, and the next time a client application requests the location of the object, it will receive the new location. Furthermore, DNS automatically will propagate the new location to all the other name servers on the network that need to know about the location of the object.

DNS also provides a single point of control for managing access to an object. Each time a client requests information about a DNS object, the client's access rights are checked against the current access database for that object. If the client doesn't have access, the information isn't returned, and the client is prevented from gaining access to the object. Like other attributes of a name, access rights are consistent throughout the network. The rights are based on the concept of a network user identifier, nodename::username, and thus are superior to access control based upon DECNET access control information or proxy logins.

DNS also provides a means of defining network-wide groups of users. A DNS manager can assign individuals to groups, or groups to other groups simplifying access control. For example, you might create a group called PERSONNEL.OFFICE_MANAGERS and assign to it the users using nodename::username who are office managers. Another group might be called PERSONNEL.VICE_PRESIDENTS, and both groups could be assigned to a third group called PERSONNEL.SIGN_PURCHASE_ORDERS.

How Do I Get There From Here?

DNS information is provided to the network by DNS servers. There is at least

one DNS server in a network, but there can be more, if necessary. You want to make sure a DNS client can locate at least one active DNS server in the network at any time. If a DNS client can't find a DNS server, it can't obtain information about DNS names. Typically, a network will have at least one server node on each Ethernet, plus enough redundant servers to guarantee that an active server is available to all DNS clients. A server and client can run on the same node, too.

> DNS doesn't distribute the information about every object to every server.

Why not put the DNS service on every node? Well, the short answer is that the service function consumes valuable computer resources. The long answer is it involves a greater understanding of how DNS partitions the namespace among servers.

Although DNS names are fully qualified hierarchical objects, like Common Data Dictionary pathnames or VMS directory/filenames, there's a single namespace on an entire network, so there can be only one object with any particular name. But DNS distributes names across the network, so all servers have a common view of the namespace. The tricky part is that DNS doesn't necessarily distribute the information about every object to every server.

The smallest clump of information distributed is a DNS directory. A directory is any of the higher parts of a DNS pathname, such as .PERSONNEL.DEVELOPMENT. Inside of the .PERSONNEL.DEVELOPMENT directory, there may be a number of DNS objects, such as SOURCE_DISK, TEST_DATABASE, etc. The entire .PERSONNEL.DEVELOPMENT directory (or, for that matter, the entire .PERSONNEL directory) could be distributed to one or more nodes in the network.

There always would be one master copy of the directory that could be changed, and the other read-only copies on other DNS server nodes would be updated whenever an object in the master directory is modified. For example, if software development for the personnel department is taking place in Los Angeles and New York, a copy of the .PERSONNEL.DEVELOPMENT directory may be placed in servers in both locations. That way, a request for information from that directory wouldn't have

Application Development Seminars

June 1 Stamford, CT
June 3 Worcester, MA
June 8 Columbus, OH
June 10 Detroit, MI
June 15 Albuquerque, NM
June 17 San Diego, CA

9 a.m. to Noon

See our 4GL-based application development environment in action at a free morning seminar. Call our Seminar Coordinator to reserve your spot.

CompuServe

Data Technologies
Tel: (617) 661-9440

CIRCLE 286 ON READER CARD

There are performance and reliability advantages to having a local copy of the directory, so directories generally are propogated to be close to the places where they're likely to be used.

to travel across country to be satisfied.

In contrast, the .PERSONNEL.INSURANCE directory may only exist in the home office, because rarely does anyone access the names in this directory from anywhere else. On the other hand, .PERSONNEL.NEW_EMPLOYEE might exist on the LAN in every city in which a new employee could join the company, because the new employee applications run in each of those cities.

Note that a copy of a directory doesn't have to exist on a local node in order to be accessible. The namespace is identical across the network, so a software engineer in Houston could access a name in .PERSONNEL.DEVELOPMENT even though a copy of the .PERSONNEL.DEVELOPMENT directory isn't available locally. However, there are performance and reliability advantages to having a local copy of the directory, so directories generally are propagated to be close to the places where they're likely to be used.

Physically, DNS objects are stored in an RMS ISAM file called a clearinghouse. Because only entire DNS directories can be distributed (it's not possible to distribute a single name such as .PERSONNEL.DEVELOPMENT.SOURCE_DISK; you must distribute the entire directory), a clearinghouse is a collection of DNS directories. A DNS server deals with clearinghouses; i.e., with collections of directories. Often there's only one clearinghouse per DNS server node, but it's sometimes useful to separate directories into different clearinghouses, even on the same node. For example, you might want to remove some directories from service on this node but leave other directories operating. You can do this by grouping the directories into separate clearinghouses.

An interesting feature of DNS is that it provides a time service. Because DNS object updates propagate through the network in a rather complicated fashion, dependent on update frequencies (called the convergence) and factors such as server node availability, it's possible that two updates for the same DNS object may reach a server out of sequence. Therefore, DNS puts a time stamp on every activity. The time stamp is based on Greenwich mean time, which is calculated from local system time plus a time zone offset defined in the DNS database.

Using DNS

Using DNS has two components: the system management component and the client component. The client component is easy, because at this time it's limited to Digital layered products. There's no documented user interface for DNS at this time, although it will be in Digital's interest to add one in the future.

A system manager or DNS server manager accesses DNS using a program called DNS$CONTROL. This program is similar to the Network Control Program of DECNET. Learning to use DNS$CONTROL is straightforward, if you understand DNS concepts and are comfortable with NCP.

There are two kinds of system management tasks you can do under DNS: namespace management and server management. Namespace management must be done in cooperation with other DNS managers in the network, because the namespace must be defined consistently. By using DNS commands you can create new DNS directories, but there's no DNS command to create a DNS object. Objects are created only by DNS clients.

You also can use DNS$CONTROL to create an alias for an object, thus preserving an old name while applications convert to a new name. For example, the .PURCHASING.COMPANY_CARS directory might be moved to .PERSONNEL.COMPANY_CARS. In this case, an alias, called a LINK in DNS, would be created to reflect the old name without requiring that duplicate information be maintained.

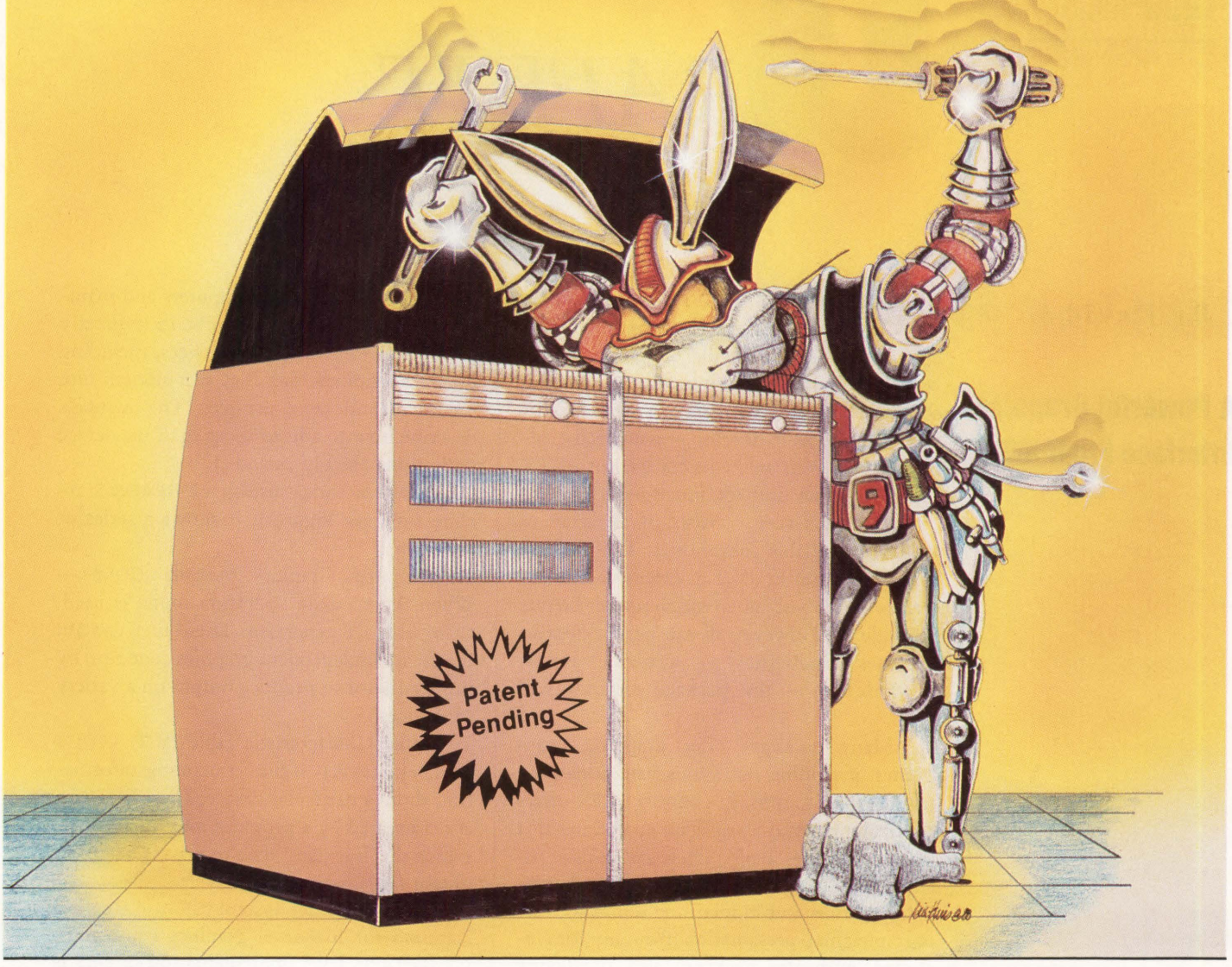
Managing the server involves monitoring server performance and possibly tuning the DNS parameters that affect performance. For example, if you have an active server you might want to increase the RMS buffering in certain clearinghouses or periodically reclaim unused clearinghouse space. If a disk crashes, you may have to obtain a backup copy of a clearinghouse from a tape or establish a read-only copy of a clearinghouse as the new master copy.

DNS is a strategic product for Digital. It will be a key component of Phase V DECNET networks and will be used by more products in the future. Digital is counting on DNS to simplify the management of network resources: without DNS, difficulty of access to network resources may well become a barrier to Digital's goal of putting a Phase V Node on every desk. At *DEC PROFESSIONAL*, we're currently using DNS with Remote System Manager V2.0 and Distributed File Services V1.0. As this series continues, we'll report on our experiences with DNS.

ARTICLE INTEREST QUOTIENT
Circler On Reader Card
High 555 Medium 556 Low 557

VAX ACCELERATION SOFTWARE TECHNOLOGY

RAXCO's Continuous, Interactive Dynamic VAX/VMS System Tuning & Acceleration



- ***Speeds*** Throughput
- ***Slashes*** Response Time
- ***Improves*** Available Memory Use
- ***Quickens*** Image Activations
- ***Tunes*** Individual Processes for Optimal Performance
- ***Uses*** Little CPU
- ***Runs*** Detached
- ***Starts/Stops*** with a Simple One-Line Command
- ***Shows*** Tuning & Acceleration Via Onscreen System Monitor
- ***Employs*** Macro-32 Coding for Matchless Efficiency
- ***Installs*** Easily

SEE and FEEL your VAX/VMS soar via a revolutionary breakthrough—**RABBIT-9 V.A.S.T.** (VAX Acceleration Software Technology). V.A.S.T. uniquely combines heuristic programming, artificial intelligence and classic feedback loops for interactive, continuous dynamic tuning and system acceleration. YOUR SYSTEM FEELS BETTER THAN EVER BEFORE!

EXPERIENCE HARDWARE IMPROVEMENTS AT SOFTWARE PRICES!

Call "The VAX/VMS Peformance Experts" for a FREE DEMO:

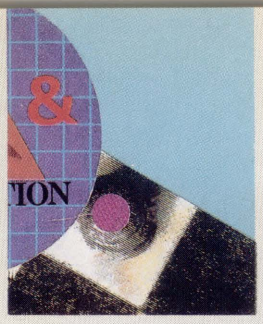
RAXCO USA
2440 Research Blvd.
Rockville, MD, USA
20850
(301) 258-2620

RAXCO CANADA
1173 2nd Avenue East
Owen Sound
Ontario N4K 2J1
(519) 371-5020

RAXCO
RABBIT
SOFTWARE

VAX/VMS are registered trademarks of Digital Equipment Corporation

CIRCLE 249 ON READER CARD



GRAPHICS

GRAFKIT

By David G. Goldstein

A Powerful Graphics Interface From ICEX.

GRAFkit, by International Computer Exchange (ICEX) of Louisville, Colorado, is a recent entry in the race to win your production software budget. It consists of a series of programming tools to develop presentation quality graphics. Yet, unlike its competitors, ICEX sacrifices some fluff for functionality.

GRAFkit's core consists of an array of FORTRAN callable subroutines. The package makes no claim to offer an extensive user interface and is best suited for computer literate individuals. However, if you need extensive graphics capabilities — available almost nowhere else — this package certainly will help.

Many packages offer graphing capabilities, providing numerous variations on a few types of graphs. In contrast, ICEX offers a few, algorithmically difficult procedures that most companies avoid. These capabilities include 3-D graphs and objects (including manipulation and hidden line removal), cartographic map presentation (from libraries included with the package) and overlaying graphs.

In addition, *GRAFkit* features device-independent capabilities and various modes of operation. It works in two modes: interactive where the user sees the graphics screen with each graphics call; and metafiles to create fast, embedded graphics for use as a part of larger applications.

By incorporating a sophisticated, device-independent architecture, versions are available that run on both microcomputers and mainframes. Also, output can be obtained directly or spooled to a variety of devices, including graphics terminals, disk files, pen plotters, film recorders and laser printers. The manuals describe how to add to more than 100 device definitions already included.

For a pictorial display of *GRAFkit*'s architecture, see Figure 1. It shows a series of acronyms:

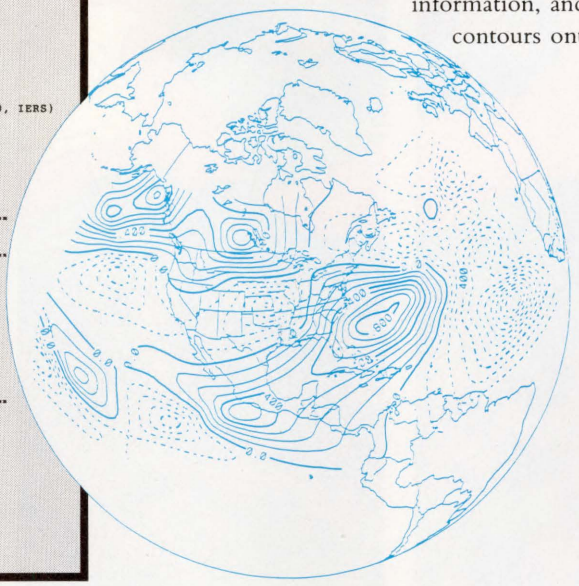
1. Computer Graphics Metafile (CGM) — When the metafile operation mode is used, CGM files are generated. These files contain the device-independent graphics code read by the Translator to produce output on a variety of devices.
2. Device Characteristic Table (DCT) — DCT files begin as ASCII files containing information about a particular device. These files then are converted by a program into binary files, which the Translator uses to drive a device to obtain fast graphical display.
3. Graphics Kernel System (GKS) — GKS is a standard for low-level graphics commands. *GRAFkit*'s 0A level implementation of GKS is used to provide such primitive graphics functions as drawing lines, marking text, drawing filled polygons and defining coordinate systems. These commands are accessed by all levels of *GRAFkit*'s drawing functions and provide the actual device-independent commands used by the CGM and Translator programs. The GKS standard implemented is designed around the International Standards Organization and American National Standards Institute for the graphic's creation in standard FORTRAN-77.
4. System Plot Package Subroutines (SPPS) —

LABORATORY DECPRO TESTING CENTER

PROGRAM 1.

```
C
      REAL A(55,45), LONMIN, LONMAX, LATMIN, LATMAX
      COMMON /TRANS/ IDIM, JDIM, LONMIN, LONMAX, LATMIN, LATMAX
      COMMON /CONRE4/ ISIZEL, ISIZEM, ISIZEP, NREP, NCRT, ILAB, NULBLL,
     1                IOFFD, EXT, IOFFM, ISOLID, NLA, NLM, XLT, YBT,
     2                SIDE
      DATA IDIM, JDIM / 55, 45 /
      DATA LONMIN, LONMAX, LATMIN, LATMAX / -160., -20., 0., 60. /
C
C INPUT ARRAY OF VALUES FOR CONTOUR MAP.
C
      OPEN (UNIT=1, FILE='SAMPLE12.BIN', STATUS='OLD', FORM='UNFORMATTED')
      READ (1) A
      CLOSE (1)
C
C OPEN GKS, OPEN AND ACTIVATE THE WORKSTATION, GENERATE TITLE.
C
      CALL OPNGKS
      CALL PWRITY (.5, .975, 'SAMPLE 12', 9, 1, 0, 0)
C
C CHANGE DASH-LINE PATTERN, THEN DRAW SATELLITE VIEW OF GLOBE.
C
      CALL MAPSTI ('DA', '010421'O)
      CALL SUPMAP (2, 40.0, -90.0, 0., 0., 0., 0., 0., 1, -1000, 4, 0, IERS)
C
C OVERLAY CONTOUR MAP, CLOSE FRAME, CLOSE GKS.
C
      IOFFM = 1
      CALL CONREC (A, IDIM, IDIM, JDIM, 0., 0., 0., 1, -1, -585)
      CALL FRAME
      CALL CLSGKS
      END
C=====================================================================
C THE FOLLOWING TWO ROUTINES PERFORM THE MAPPING OF THE CONTOURS ONTO
C THE SATELLITE VIEW OF THE GLOBE.
C=====================================================================
      FUNCTION FX (X,Y)
C
      COMMON /TRANS/ IDIM, JDIM, LONMIN, LONMAX, LATMIN, LATMAX
      REAL LONMIN, LONMAX, LATMIN, LATMAX
C
      XLON = LONMIN + (X-1.0) * (LONMAX-LONMIN) / (FLOAT(IDIM)-1.0)
      YLAT = LATMIN + (Y-1.0) * (LATMAX-LATMIN) / (FLOAT(JDIM)-1.0)
      CALL MAPTRN (YLAT, XLON, FXLON, YDUMMY)
      FX = FXLON
      RETURN
      END
C=====================================================================
      FUNCTION FY (X,Y)
C
      COMMON /TRANS/ IDIM, JDIM, LONMIN, LONMAX, LATMIN, LATMAX
      REAL LONMIN, LONMAX, LATMIN, LATMAX
C
      XLON = LONMIN + (X-1.0) * (LONMAX-LONMIN) / (FLOAT(IDIM)-1.0)
      YLAT = LATMIN + (Y-1.0) * (LATMAX-LATMIN) / (FLOAT(JDIM)-1.0)
      CALL MAPTRN (YLAT, XLON, XDUMMY, FYLAT)
      FY = FYLAT
      RETURN
      END
```

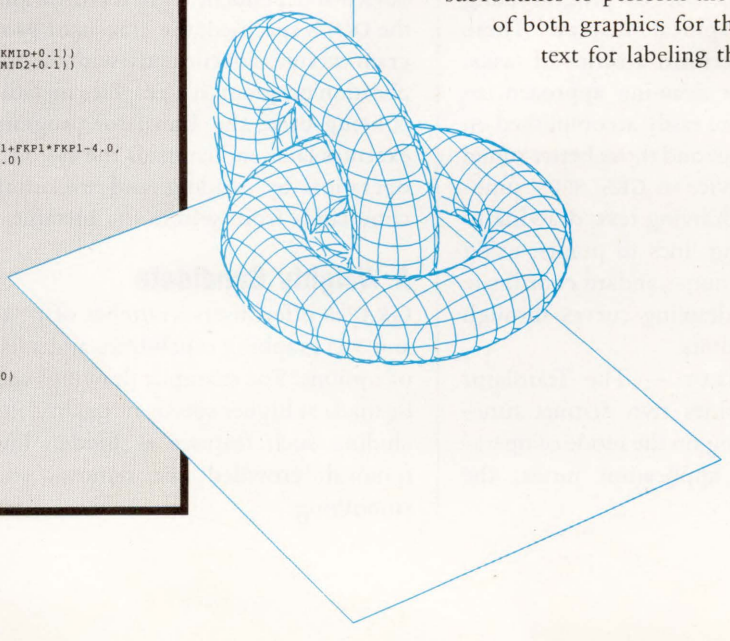
Example 1: This is an elementary example of *GRAFkit's* capabilities to work with and overlay maps. The program reads in a satellite view of the globe and some weather information, and superimposes the contours onto the globe.

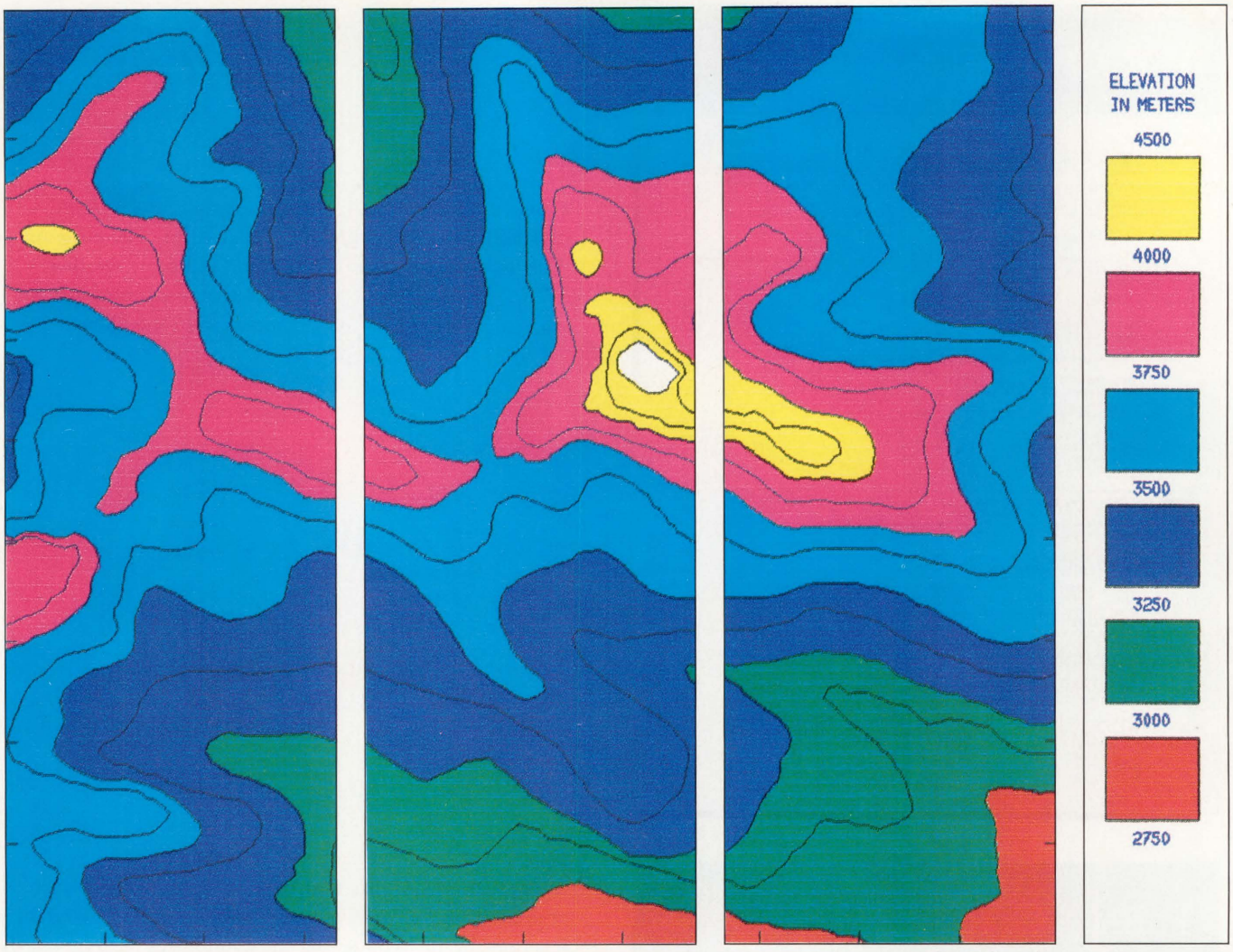


PROGRAM 2.

```
C
      DIMENSION T(21,31,19), SLAB(33,33), EYE(3)
      DATA NU, NV, NW / 21, 31, 19 /
C
C CONSTRUCT THREE DIMENSIONAL ARRAY TO BE PLOTTED
C
      JCENT1 = FLOAT(NV)*0.5 - 3.0
      JCENT2 = FLOAT(NV)*0.5 + 3.0
      DO 300 I=1,NU
          FIMID = I-NU/2
          DO 200 J=1,NV
              FJMID1 = J-JCENT1
              FJMID2 = J-JCENT2
              DO 100 K=1,NW
                  FKMID = K-NW/2
                  F1 = SQRT(36.0/(FJMID1*FJMID1+FKMID*FKMID+0.1))
                  F2 = SQRT(36.0/(FIMID*FIMID+FJMID2*FJMID2+0.1))
                  FIP1 = (1.0-F1)*FIMID
                  FIP2 = (1.0-F2)*FIMID
                  FJP1 = (1.0-F1)*FJMID1
                  FJP2 = (1.0-F2)*FJMID2
                  FKP1 = (1.0-F1)*FKMID
                  FKP2 = (1.0-F2)*FKMID
                  T(I,J,K) = AMIN1(FIMID*FIMID+FJP1*FJP1+FKP1*FKP1-4.0,
     1                FKMID*FKMID+FIP2*FIP2+FJP2*FJP2-4.0)
100           CONTINUE
200       CONTINUE
300   CONTINUE
C
C DEFINE EYE POSITION
C
      EYE(1) = 100.0
      EYE(2) = 150.0
      EYE(3) = 125.0
C
C OPEN GKS, OPEN AND ACTIVATE WORKSTATION.
C
      CALL OPNGKS
C
C LABEL THE PLOT.
C
      CALL PWRITY (0.3, 0.97, 'SAMPLE 9', 8, 1, 0, 0)
      CALL PWRITX (0.3, 0.93, '3-D DONUTS', 10, 22, 0, 0)
C
C DRAW THE THREE DIMENSIONAL ARRAY.
C
      CALL EZISOS (T, NU, NV, NW, EYE, SLAB, 0.0)
C
C DEACTIVATE AND CLOSE WORKSTATION, CLOSE GKS.
C
      CALL CLSGKS
      END
```

Example 2: *GRAFkit* has the capability to draw perspective projections in 3-D with hidden line removal. The program functions by first computing the coordinates of points in the intersecting donuts and specifying the points to be displayed in the intersecting donuts. It then computes the display, specifying how these points should be seen from a particular perspective (eye positioning) and calls subroutines to perform the actual drawing of both graphics for the donuts and text for labeling the scene.





Longs Peak, Colorado.

SPPS provides a plotting interface between the utility programs and GKS to ensure efficient use of programming time and graphical display. These subroutines perform a series of tasks, using a vector drawing approach, to speed tasks more easily accomplished on a plotting device and those better suited for a raster device to GKS. SPPS' functions include drawing text, drawing to points, drawing lines to points, using fractional and non-standard coordinate systems, and drawing curves through sets of data points.

5. The Translator — The Translator program provides two distinct functions, depending on the mode of operation. In the application mode, the Translator provides device-dependent commands to the terminal, based on the device-independent requests made and the DCT's specified; the Translator program executes concurrently with the application program. If a graphics metafile is being used, the Translator program executes later and controls the system's operation by reading and executing commands from within the metafile.

A Weighty Candidate

GRAFkit offers users a number of 1-, 2- and 3-D graphing capabilities and a list of options. For example, drawings can be made at higher speeds or quality, including such features as hidden line removal, crowded line removal and smoothing.

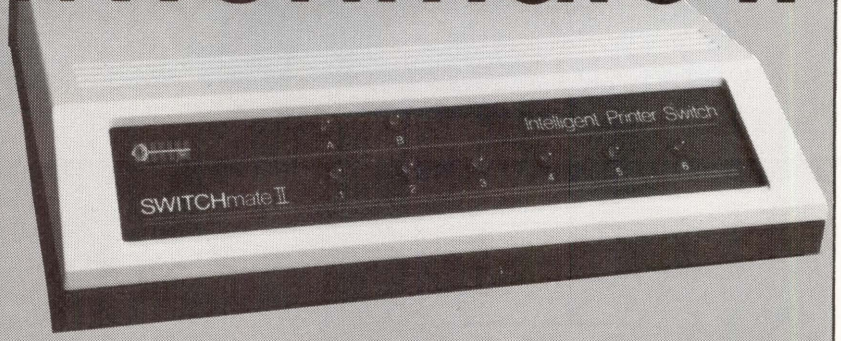
The types of graphs and pictures that can be generated include:

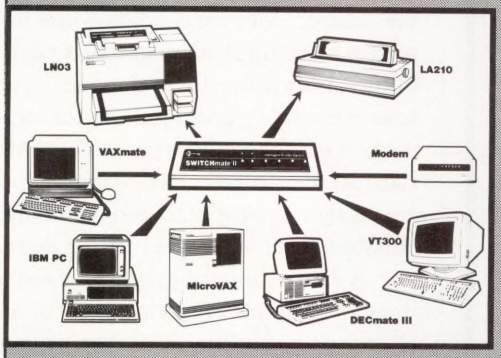
1. Histograms — bar charts.
2. Scattergrams — for displaying experimental data.
3. Contour maps — functions of the type f(x,y) with differing grades of contour, drawing speed and image quality.
4. Both normal and logarithmic scales — for display.
5. Cartographic maps — including the capability to graphically manipulate, overlay and display entries from an included library of maps.
6. Vector drawings and streamlines — to display such things as effects of magnetic fields.
7. 2-D pictures with gray-scales.

Share printers automatically and save big on printers and printer maintenance!

SWITCHmate II

The only electronic printer switch designed to work with Digital printers and systems allows up to six systems to share the use of one or even two printers.





The SWITCHmate II provides completely automatic sharing of one or two printers by up to six systems, including IBM PC's, Digital DECmates and VAXes, and most other systems. Accessing two printers via a single connection to your system, you can economically take advantage of the latest in high speed laser printing and keep the impact printer you still need for multi-part forms, addressing envelopes, etc.
The SWITCHmate II is user installed in minutes, and requires no change to your system or printing procedures.
Call today and start sharing, *and saving*, tomorrow!

90-Day Total Satisfaction Guarantee
1-Year Next-Day Air Replacement Warranty

Gold Key ELECTRONICS, INC.

Call 603-625-8518 • P.O. Box 186, Goffstown, NH 03045

SWITCHmate is a trademark of Gold Key Electronics, Inc. IBM-PC is a trademark of International Business Machines Corp. Digital, DEC, LN03, LA210, MicroVAX, DECmate, VAXmate, and VT300 are trademarks of Digital Equipment Corp.

CIRCLE 194 ON READER CARD

Learn more about VAX/VMS

Send for Introduction to VAX/VMS, 2nd Edition . . .

A self-teaching guide that explains and illustrates how to use VAX/VMS systems — from basics to systems and programming.

A handbook for beginners and a reference for experienced users.

Updated, revised and improved, the 2nd Edition's 10 Chapters and 8 Appendices give you overviews, explanations, and the "how to's" of . . .

- The VAX computer family
- DCL command language
- User accounts & environments
- Command procedures, mail, backup & help features
- DEC terminals
- Advanced features, Special function keys
- VAX/VMS file systems
- Defining symbols
- Lexical functions
- VMS device types & corresponding codes
- VMS error message facility
- Pictures, examples, programs & glossary

. . . and more.

For Fast Service
Call (215) 542-7008
with credit card information.

Or complete
the order form below.

▶ Clip and Send ◀

Introduction to VAX/VMS, 2nd Edition Order Form

Please send _____ copy(ies) of *Introduction to VAX/VMS* at $29.95 each plus shipping/handling. (Shipping and handling for U.S. $1.50, Canada $3.00, All other foreign $7.00).
PLEASE MAKE PAYMENTS IN U.S. DOLLARS AND DRAWN ON A U.S. BANK.

☐ Payment enclosed for $_____. Charge to: ☐ VISA ☐ MasterCard

Account No. |_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_| Expires _____

Signature _____ Date _____

Name _____
(PLEASE PRINT)

Address _____

City _____ State _____ Zip _____

Country _____ Telephone ( ) _____

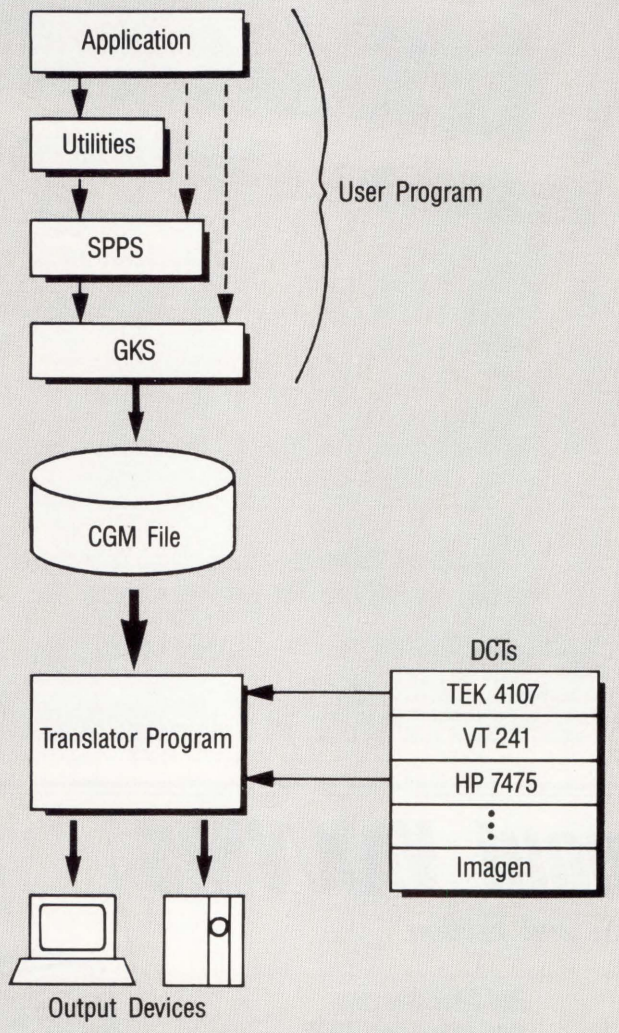
Make checks payable and send order to:
PROFESSIONAL PRESS, INC., P.O. Box 503, Spring House, PA 19477-0503

☐ Contact me with information on quantity discounts.

ORDER NOW – $29.95 – NEW REVISED & ENHANCED EDITION
SATISFACTION GUARANTEED.

DP688

FIGURE 1.



The **GRAFkit** *architecture.*

8. 3-D function drawing — incorporating 3-D axis labeling, with the text being displayed in three dimensions.

9. 3-D surfaces — with hidden lines removed.

10. 3-D solids — generated from data arrays.

GRAFkit also has text incorporation capability; text can be aligned, sized, spaced, subscripted, superscripted, rotated, colored and chosen from a variety of fonts. These capabilities are algorithms built on lower level graphic primitives for such functions as line and region drawing, fills and windowing.

To illustrate *GRAFkit*'s capabilities, see Examples 1 and 2, created by Programs 1 and 2, respectively.

Uses

GRAFkit can be used for presentation and scientific graphics, and mappings for topographical and cartographical displays. ICEX's software can be used by mathematicians, physical scientists and business people, and it provides the sophisticated 3-D modeling required by engineers and computer scientists.

However, *GRAFkit* isn't for the uninitiated. Not a hand-holding user interface covering shallow graphics capabilities, it's a powerful tool requiring at least elementary programming experience. The subroutines are FORTRAN callable; all examples and documentation are written for FORTRAN programming, although other languages may use them.

A kit to produce graphs, it's not a draw or paint package, CAD/CAM or an electronic publishing tool. Yet, if you can program, have access to someone who can, or can have a user interface tailored to your needs, *GRAFkit* provides graphics power you might not find elsewhere.

GRAFkit
SCO Inc., a wholly owned subsidiary of International Computer Exchange Inc.
740C S. Pierce Ave.
Louisville, CO 80027
(800) 222-4239
Price: $2,995 — $25,995, depending on CPU and number of users.
CIRCLE 458 ON READER CARD

A Wish List

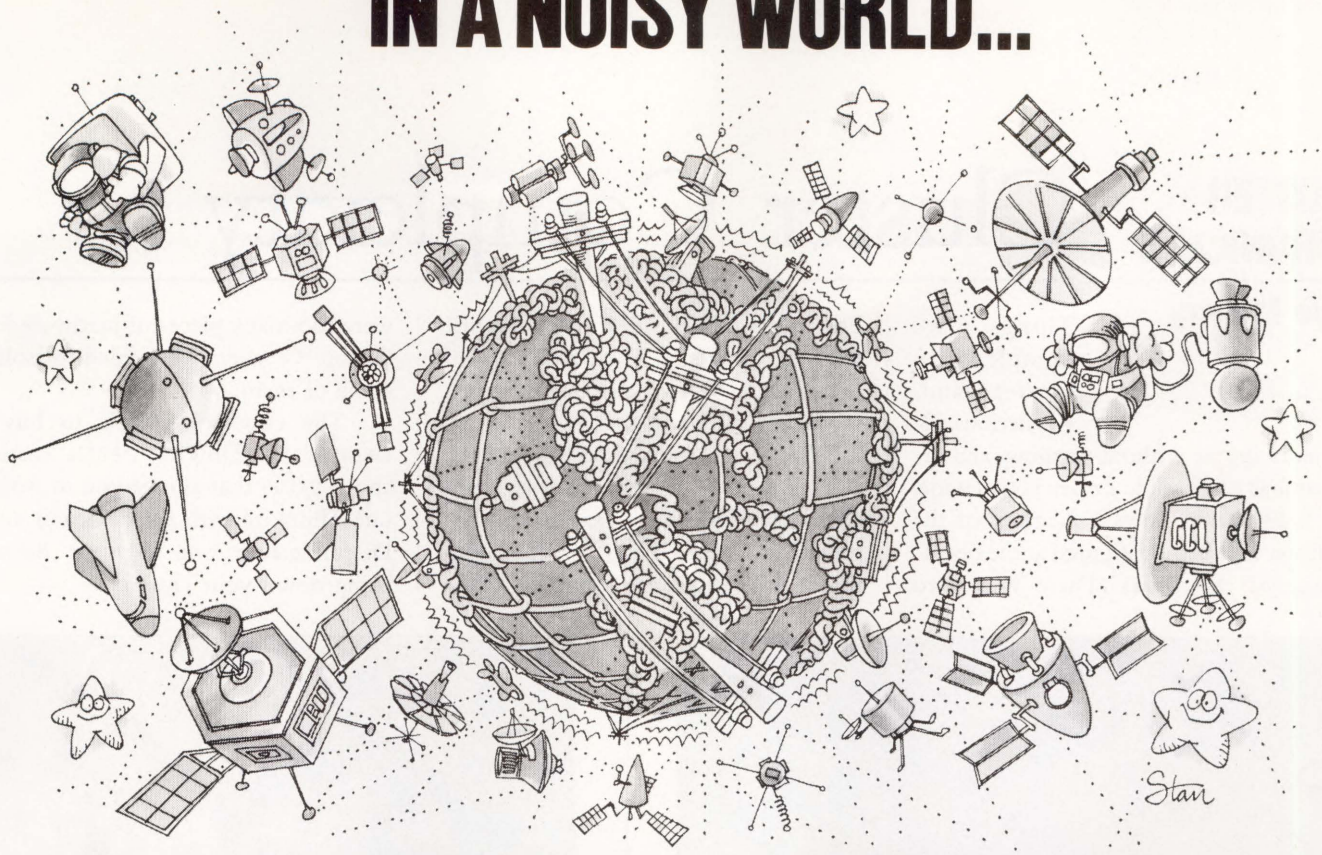
GRAFkit could benefit from an interface for non-programmers, smoother curves and a few more type fonts. Also for programmers, some interactive help and debugging would be nice.

Its documentation is plentiful, consisting of a binder of instructions and another of examples. ICEX's material is organized, including installation instructions, specific and general graphics information, indices and appendices. The description of each routine offers guidelines on use and parameters, and the general methodologies used for implementation.

If you have a variety of equipment to interface, such as microcomputers and VAXs, *GRAFkit* might be not only your best choice, but your only one. *—David G. Goldstein is a Philadelphia-based freelance writer.*

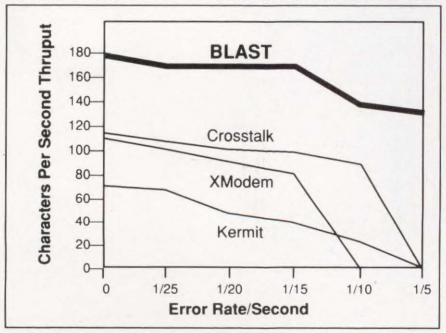
ARTICLE INTEREST QUOTIENT
Circle On Reader Card
High 459 Medium 460 Low 461

IN A NOISY WORLD...



BLAST IS THE UNCHALLENGED LEADER IN COMMUNICATIONS SOFTWARE

PERFORMANCE LOSS WITH INCREASING NOISE



Noise simulation tests run with a 30K binary spreadsheet file at 1200 baud between IBM-PC's, using BLAST II, rev. 8.1. Comparable or better results on VAX and other environments.

Most communications software performs well under ideal conditions. But in the *real* world of noisy communications circuits and satellite-routed phone calls, there's only one consistent performance leader—BLAST.

The secret is **BL**ocked **AS**ynchronous **T**ransmission, BLAST's protected-pipelining protocol that won't slow down to a snail's pace, drop data or disconnect in adverse conditions. Noisy phone lines . . . satellites . . . PBX switches . . . X.25 packet network delays—your valuable data BLASTs through it all.

Link PCs, Macs, Minis & Mainframes

Only BLAST guarantees you fast, 100% error-free file transfer among micros, minis and mainframes running under 30 different operating systems. No matter *what* systems you need to connect, BLAST software links them all. Connect hundreds of sites at down-to-earth prices—and let BLAST's speed cut your phone charges, too.

And the new BLAST II expands upon this rugged power with a streamlined user interface, VT-100/220 emulation, superior data compression, auto-dialing and all the other "state-of-the-art" features you'd expect. Plus, you get **BlastScript**, a powerful English-like programming language that lets you quickly create custom menu-driven applications on multiple systems. Easily set up remote polling, data collection, order entry and other powerful applications.

The choice of the FORTUNE 500

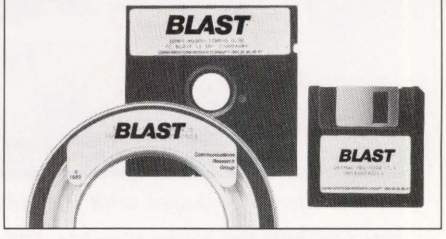
When Bankers' Trust, Blue Cross, Exxon, Nabisco and many other FORTUNE 500 companies chose communications software for their financial data transfer operations, they chose BLAST to cut through the noise. Shouldn't *you* choose BLAST too? Give us a call today.

1-800-24-BLAST

Any computer with BLAST can talk to any other computer with BLAST:

IBM	VM/CMS or MVS/TSO
DEC	VAX/VMS; PDP/RSX; RT-11
DATA GENERAL	RDOS; AOS; AOS/VS
WANG	VS
PRIME	PRIMOS
HEWLETT-PACKARD	3000/MPE; 1000/RTE
HARRIS	VOS
UNISYS	BTOS, CTOS, UNIX
IBM-PC & PS/2	MS-DOS
APPLE	Macintosh
UNIX/XENIX	AT&T; Altos; NCR; Sun; Tandem; HP; VAX & mVAX; SCO Xenix; etc.

Many others available; please inquire.



BLAST®

Communications Research Group

5615 Corporate Boulevard • Baton Rouge, LA 70808 • (504) 923-0888

©Copyright 1988, Communications Research Group, Inc.
Crosstalk is a registered trademark of Digital Communications Associates, Inc.

CIRCLE 180 ON READER CARD

CLUSTER CHRONICLES

Dave Mallery

Cluster Complexity

Things are complex in cluster land. Mysterious ailments appear without warning, and the number of possible causes is too wide.

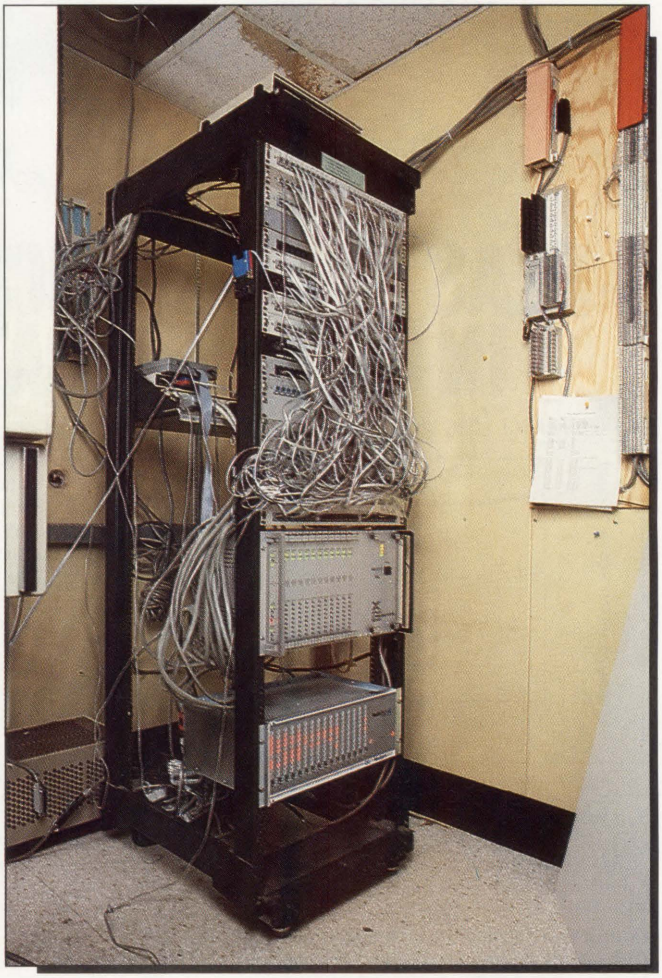
Figure 1 shows a diagram of the cluster as it was configured at the beginning of this series. There were two Ethernets: one for the Xyplex and one for everything else. There were several protocols active on the second Ethernet: LAVC, DECNET and XNS.

We were too vulnerable in the Ethernet; everything was strung on a single ThinWire circuit, leaving us at the mercy of people on another floor who might decide to move a printer. There were too many pieces of hardware living on the wire. We needed to isolate some of them.

The easy solution is to buy a DEMPR, a ThinWire DELNI costing about $3,000 that allows you to isolate one ThinWire path per device or area. Disconnecting one segment doesn't bring down your cluster.

Here are the 10 cluster controllers, extra DELNI and only one of the 10 sets of cables and connectors that we eliminated.

The Sniffer is packaged with a Compaq AT. If you wish, you can buy the software alone and run it on your own properly configured machine.



The Maxserver sits below the MOD-TAP patch panels and above the modem rack. The single DELNI and 3Com ThinWire tap sit on a shelf in the back. All cluster controller cards are connected directly to patch panel groups via single 25-pair cables.

The Sniffer
Network General
1945A Charleston Rd.
Mountain View, CA 94043
(415) 965-1800
CIRCLE 467 ON READER CARD

Maxserver
Xyplex Inc.
100 Domino Dr.
Concord, MA 01742
(800) 338-5316
CIRCLE 468 ON READER CARD

An alternate and more flexible solution, particularly if you own a DELNI and the one we used, involved taking the MESTAs off the 750 and the MICROVAX II. We then cabled them to a DELNI in the traditional manner. This ensures that the basic backbone of the cluster will stay up, even if someone mucks up the ThinWire. Next, we used a 3Com device to convert another DELNI port to ThinWire. We then connected GOLLUM:: (MICROVAX 2000), the other printers and the Logicraft 386ware to it. Ideally, we'd have several of these transition devices and use the multiple ThinWire segments to isolate PCs from Logicraft from MICROVAX 2000s, etc.

A few vendors now are offering a device that will simplify this problem. It's a rack mount frame into which you can plug combinations of traditional (DB15), ThinWire and optical Ethernet boards, forming a customized hybrid DEMPR/DELNI combination. Allied Telesis had a prototype at DEXPO East, and we're trying to get one to test and review.

When we went through the above transition, we ended up with our Ethernet going through one DELNI. We were confident that we could get away with it because of actual traffic measurements we were making with The Sniffer from Network General of Mountain View, California.

Maxserver

Our Maxserver arrived from Xyplex of Concord, Massachusetts. Before MAX, we had a stack of 10 Xyplex cluster con-

Number 9 FEL Computing

THE MÖBIUS STRIP ENQUIRER

The Newsletter of Micro and Host Computing

Möbius Is Micro/Mini Matchmaker!

PC/VAX Romance...
"We met through RS-232. Möbius introduced us."

Fast-Talking PC Grabs Heart Of VAX Over Ethernet.
"Your files and my files are our files now."
"We even share printers," purrs satisfied PC.

Close Coupling Of PC And VAX Blamed On Möbius

LAPTOPS CARRY ON WITH VAX FROM MOTEL PHONES
Möbius Let It Happen!

Möbius Enhances VAX Security Over PCs.
Relieved VAX Able To Limit Involvement With Over-Eager PCs.

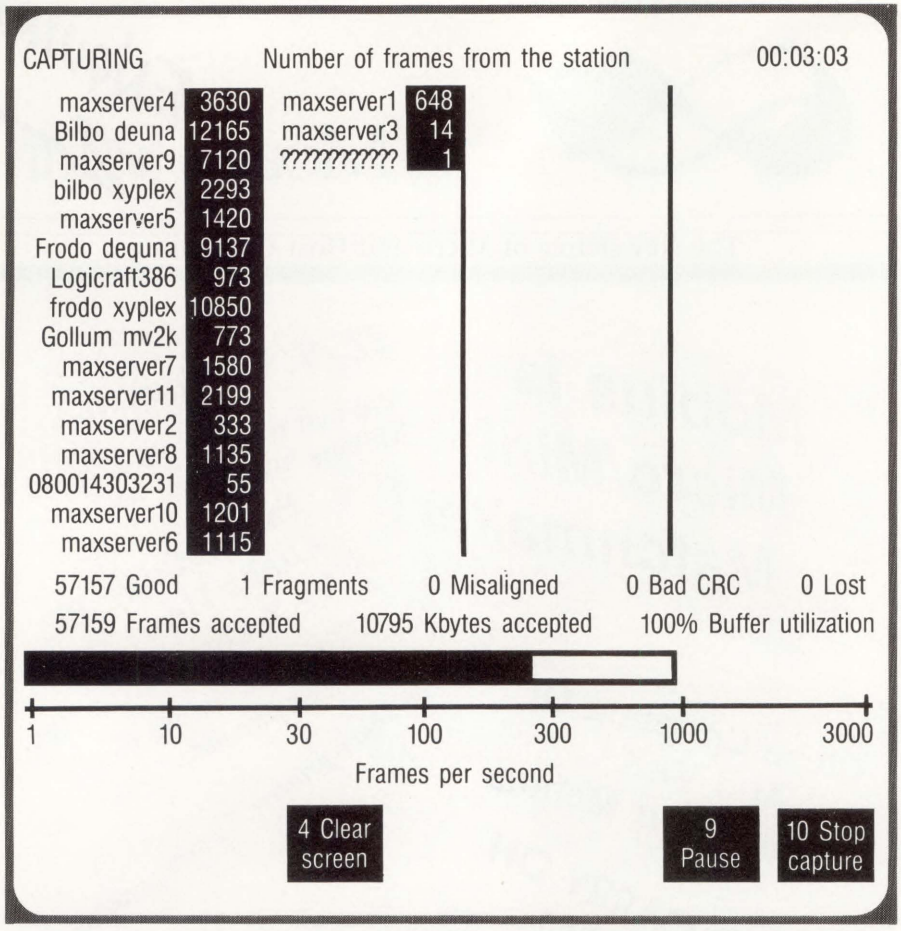
PC with Micro Möbius seeks VAX with Host Möbius for open sharing of data, leading to possible permanent integration.
(802) 348-7171

Hey PCs! For a good time with the VAX of your dreams, call FEL Computing
(802) 348-7171
or write
10 Main Street, PO Box 72
Williamsville, VT 05362
Telex: 9102409365

Möbius Promotes Micro/Mini Intimacy
Whirlwind Courtship Over Ethernet -- Fast As A 10 MB Channel Can Go!

CIRCLE 123 ON READER CARD

Möbius is a registered trademark and TaskForce is a trademark of FEL Computing.



Screen 1: Display of The Sniffer during frame capture.

trollers, cabled to two DELNIs. Each cluster controller had eight MOD-TAP connectors on the back, feeding through an eight-way octopus into a 25-pair cable that ended up on the back of one of our patch panels. That's a lot of cable, expense and extra connections where something could go wrong. Plus, there's the added cost of more than $2,000, considering the connectors and DELNI. The Maxserver offers design features that reduce the cabling. The Ethernet is carried in the unit's backplane, eliminating the DELNIs and all associated cabling. It enters the backplane via an Ethernet half-repeater board. You can add a second unit to use either as a redundant entry point or as the other half of a repeater, bridging the network to another segment. We're using it to bridge to the ThinWire portion of our network.

This eliminates the mess of RS232 connectors and MOD-TAP octopi. There's a single Amphenol 25-pair connector on the back of each cluster controller board that connects directly to the back of our MOD-TAP patch panels; no special cross-wye wiring is needed.

Maxserver reduces the hardware to a single power supply. Power supplies for data communications gear measure times between failure in decades. This kind of rack mount, OEMed power is preferable to the smaller, less rigorous units found in the standalone units. The change eliminated nine power supplies in the cluster controllers and a 10th in the second DELNI.

There's another major simplification concerning system management. The configuration file needs the serial number of each discrete controller. Previously, whenever we had to replace a broken one, we had to edit the configuration file before restarting it with the new serial number. Now, the Maxserver box has a single serial number with the slot number appended. You can change cards on the fly while it's still running without changing the configuration file. The unit has a convenient connector on the front panel for an antistatic cuff (supplied) for board changes.

Performance of the unit is about the same as the previous unit's (see "The Trials and Tribulations of ThinWire," May, 1988, p. 152). After all, the configuration is the same, and the cluster controller hasn't changed.

There are several software enhancements concurrent with this hardware release. TCP/IP support is now available, allowing you to use Xyplex to access other UNIX-based machines on your network. This also permits you to skip the Xyplex-supplied Ethernet boards (HIUs) and use other TCP/IP boards (such as Excelan) that you already own. But, if you do that, you're paying a performance penalty, as you are opting not to use Xyplex's customized terminal driver.

Our unit was delivered with a total of 11 cluster controller boards; i.e., 88 terminals. We have a 12th on order and have room for two more boards before we have to buy another box.

In addition to serving the two major VAXs on the cluster, some of the ports are connected to our old RSTS system on an 11/73. In this mode, the Maxserver simply serves as a data PBX. There's no Ethernet connection on the RSTS machine.

Installation went smoothly. There were no hardware glitches. It took about a day to rearrange cables.

We're pleased with the Maxserver as a logistical improvement to our operation. We've reduced the number of discrete components and increased system reliability. We benefit from the reduced system overhead of the Xyplex servers, because the cluster controllers

When Used Isn't Good Enough

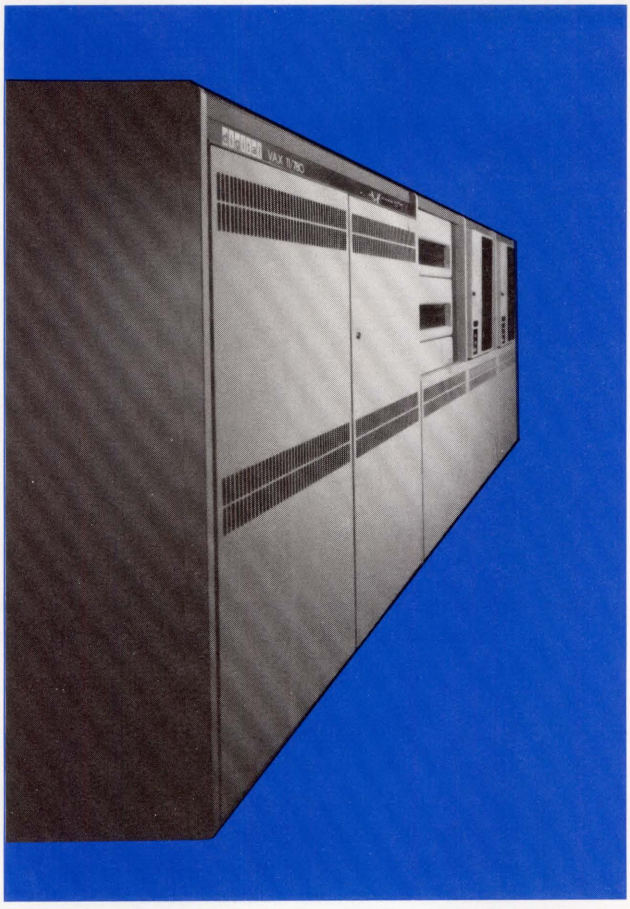
Quality Equipment at Reasonable Prices

Call toll-free ***1-800-722-4777*** *today and cash in with savings on quality equipment*

Specialists in Depot Repair of Circuit Boards

Twelve-month on site GE maintenance option available

Complete network installation and maintenance services available



Sometimes NEW is too much and USED isn't good enough. Our REMANUFACTURED computer equipment fills this void and offers the best of both worlds. All system components are dynamically tested and inspected for wear before shipping. Included is a six-month warranty.

RA 81-AA-DISK DRIVE

- Remanufacured DEC* RA 81-AA DISK DRIVE (456MB, 16B)
- Rackmount
- SDI Interface, 120V - 60HZ
- $9,875

VAX 11/780XA-AE

- Remanufactured DEC* VAX 11/780XA-AE
- VMS license optional
- $19,000

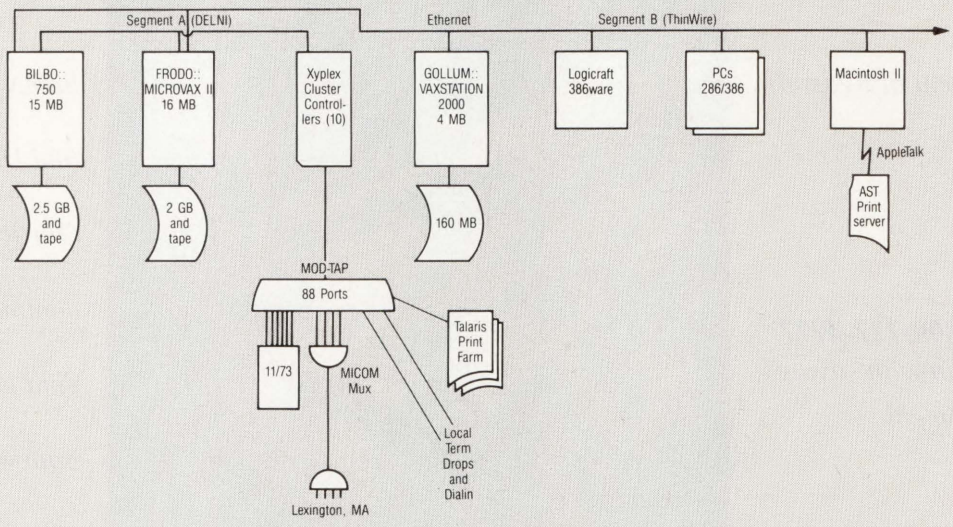
*Registered trademark Digital Equipment Corp.

RESTOR
a Cincinnati Bell company
7880 Foundation Drive
Florence, KY 41042

606-342-5800

CIRCLE 156 ON READER CARD

FIGURE 1.



The cluster as it was configured at the beginning of the Cluster Chronicles series.

handle much of the character overhead. The measured Ethernet overhead of the 88 ports going full speed clocks in at 200-300 frames per second.

The Sniffer

I've been running The Sniffer on our Ethernet for about three weeks, trying to get a feel for the amounts of traffic and cable loading. The Sniffer is a Compaq portable AT with the high-bandwidth Ethernet board plus software from 3Com in Santa Clara, California.

Because the Ethernet is a bus, every station on a segment sees every frame transmitted by any station. If an Ethernet board enters the "promiscuous" mode, it simply can look at everything that goes by without making its presence known to the network. That's what The Sniffer does. It's equipped with programs that can decipher many of the standard Ethernet protocols. Unfortunately, the LAVC protocol isn't among them.

Even lacking the detail presentation (which is a sure thing for a future release), The Sniffer can tell you vast amounts about your cluster. In its capture mode, it gives you a real-time display and an auditory geiger counter indication of the traffic on your network. Figure 2 shows our current Ethernet configuration.

We're using DECNET, LAVC, XNS (both for Logicraft 386 and Xyplex) and TCP/IP (for a printer we're reviewing for publication). The DELNI is the hub. The Xyplex Maxserver has two halves of a repeater formed from its redundant Ethernet cards. This repeater isolates the ThinWire segment of the network from any fragments in the DELNI half.

The Sniffer can be configured to observe either ThinWire or traditional Ethernet. This is a matter of changing a large dip switch on the Ethernet board. Getting inside the Compaq requires a set of Torx screwdrivers, but that's the only complexity. I changed our unit to ThinWire when it arrived.

The Sniffer captures Ethernet frames into a buffer (size depends on available memory in the PC). These frames are available for inspection both in summary and full detail. After the buffer is full, the contents flush continually, being replaced by fresh frames. The Sniffer can filter frames, keeping only those that interest you. That can be by type or by some data content. Sets of captured frames can be stored on disk and replayed later for detail inspection.

The Sniffer has a menu system that's a horizontal tree structure. The screen is divided into three regions. You traverse option branches by moving to the right with the arrow, going deeper into the root system while retaining two higher menu levels to your right on the screen.

When you first activate The Sniffer, you're faced with an undecipherable array of Ethernet addresses. Your first task is to assign device names to these addresses. The Sniffer stores these in a file and uses them (unless instructed otherwise) on subsequent captures.

It's a useful device, even if you're not a network diagnostician. It sits on my desk and gives me a constant audible

(but not intrusive) background noise that measures the use of the network and the condition of the cluster. The purring noise of the network on The Sniffer is very comforting and not intrusive. When trouble does occur (like a cluster transition), the silence immediately is deafening.

The capture display gives you a bar graph at the bottom of the screen that gives you instantaneous traffic (either in packets or in network utilization percent) with a high water mark. Our network with full traffic will average 300-500 packets per second and peak at 1000 several times a minute (see Screen 1).

On a busy morning, we'll pass 1 million frames that contain a total of 200 MB in 100 minutes. It really increases your respect for RG/58 coax. After a few hours of capturing, it became obvious to me why DEC now is supporting multiple Ethernets on the larger machines.

When I first started using The Sniffer, I had the LAVC ThinWire separate from the Xyplex terminal server and Logicraft box. The traffic generated by the LAVC was running at about 200 frames per second with an average frame size of 340 bytes. Peak frame size on the LAVC seems to be around 1,500 bytes. After we combined the networks, the average frame size dropped to about 150 bytes, because the Xyplex frames are mostly about 80 bytes each. Even with our full load of about 50 users on three systems, the network seldom hits 25 percent of full capacity.

Companies Mentioned In This Article

Allied Telesis
2685 Marine Way, Ste. 1220
Mountain View, CA 94043
(415) 964-2771
CIRCLE 463 ON READER CARD

Excelan Inc.
2180 Fortune Dr.
San Jose, CA 95131
(408) 434-2300
CIRCLE 469 ON READER CARD

Logicraft Inc.
22 Cotton Rd.
Nashua, NH 03063
(603) 880-0300
CIRCLE 464 ON READER CARD

MOD-TAP System
P.O. Box 706
Harvard, MA 01451
(617) 456-3500
CIRCLE 465 ON READER CARD

3 Com Corporation
3165 Kifer Rd.
Santa Clara, CA 95052
(408) 562-6400
CIRCLE 466 ON READER CARD

2.5 Gigabytes VAX Backup

Gigastore works with the standard VMS, DCL Backup Command and all Qualifiers or standard Unix Dump/Restore Command and all Arguments. It also provides DEC tape emulation for general purpose use.

Utilizing true read-after-write coupled with very powerful error correction, GIGASTORE™ gives you an unsurpassed error rate of 1 in 10^{23} bits. In addition, you get a high speed search capability not available in most 9-track drives and the convenience of a T-120 VHS cartridge. An IBM PC interface is also available.

Call Digi-Data, an organization with a 25 year history of manufacturing quality tape drives, at (301) 498-0200.

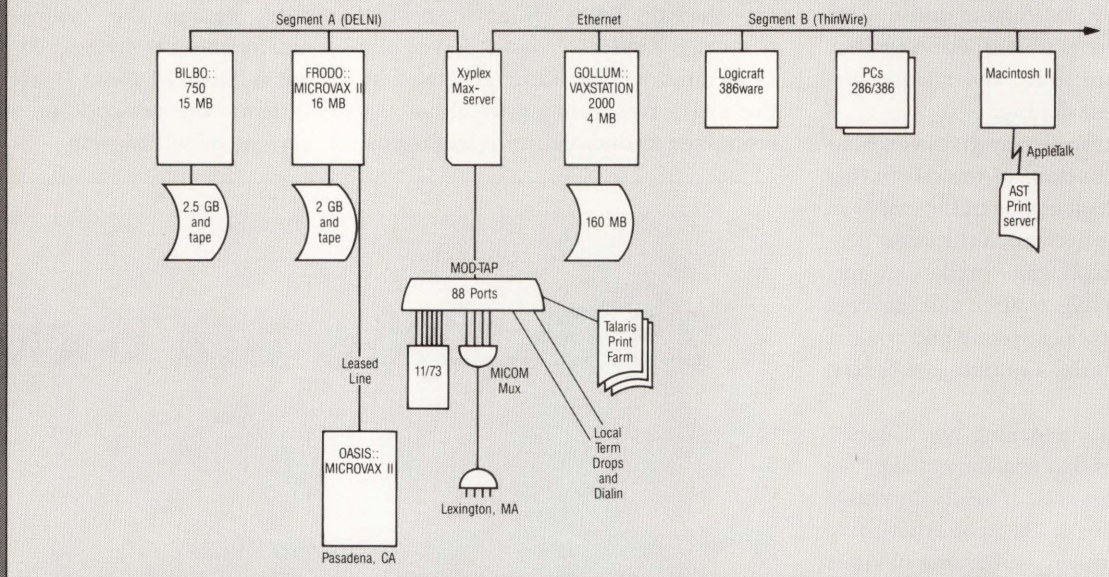
™GIGASTORE is a trademark of Digi-Data Corporation.

DIGI-DATA CORPORATION
8580 Dorsey Run Road
Jessup, MD 20794-9990
(301) 498-0200
Telex 87-580
... First In Value

In Europe contact: Digi-Data Ltd. • Unit 4 • Kings Grove • Maidenhead, Berkshire England SL6 4DP • Telephone No. 0628 29555/6 • Telex 847720

CIRCLE 184 ON READER CARD

FIGURE 2.



The* DEC PROFESSIONAL *Laboratory and Testing Center.

As I'm writing this at 7:00 a.m., there are two batch jobs running on FRODO::, getting all their I/O from BILBO:: over the network. The cable is passing about 10 MB per minute or about 15 percent of capacity. That translates to a data rate of about 250 LAVC (big) frames per second. I made all these measurements from the capture screen, switching options to change between percent net utilization to packets per second.

A security note: Because The Sniffer is a tapping device and Ethernet frames aren't encrypted, you could gather enough data from the traffic to acquire a system password. It would take persistence, but it's possible. This unit should live in a secure area.

The Sniffer has two diagnostic functions. It's capable of generating a known load on the network by sending repetitive messages to itself or another node. This will allow the expert to load a network on demand for capacity testing.

The other feature is Time Domain Reflectometer (TDR), which often is provided by another piece of hardware. In TDR mode, The Sniffer sends out a pulse and looks for echos, like radar. By timing the return reflections, it can tell you how far down the coax the problem (unterminated or shorted cable) lies. If you buy The Sniffer, it's a good idea to calibrate on an off day by unterminating the cable at known points and comparing the distances to those measured by The Sniffer. That will save you when problems arise.

The Sniffer is a tool that deserves a wider audience than network diagnosticians and network software developers. It's a window onto the network with enough information to deserve a place on the desk of any serious system manager.

Cluster Progress Report

We've ordered a leased line from our offices in Spring House, Pennsylvania, to our Pasadena, California, office. We will do DDCMP DECNET with the MICROVAX out there via DMV-11s. That makes our network coast-to-coast.

With the advent of third-party BI hardware, we feel it's imperative to have a test bed. (We're seriously looking for an 82xx as this is written.) Then we'll have every bus structure served by the third party here in our Spring House Lab. Our processing load has grown in the last few months and that extra 1.6 mips will be consumed on arrival.

Our lab philosophy is to test equipment in a real environment; i.e., one in which real data is processed. We're building this network and cluster, because that's what most of you are doing out there in your shops. We believe that the testing environment is as important as the test. How a unit integrates into the real world counts. Our employees bear the brunt of occasional foul ups, but we feel that real environment testing is worth the cost.

Incidentally, if you have a new product, hardware or software, that you would like us to test and report on, please contact David Miller in our Editorial Department. ■

VAX 11/780 Users:

When it comes to innovations in special performance upgrades, Nemonix always comes in first.

Announcing the Nemonix 780-SPU.

Interested in increasing your system's throughput up to 45%? If the answer is yes... Nemonix, the leader in Special Performance Upgrades has the solution — The Nemonix 780-SPU, the only cost alternative to VAX 11/785!

Don't buy a new system. You don't have to. For a lot less money, a multi-board CPU upgrade enhances your machine's performance up to 45%; your own VAX 780 quickly graduates, doing the work of a larger, more costly system.

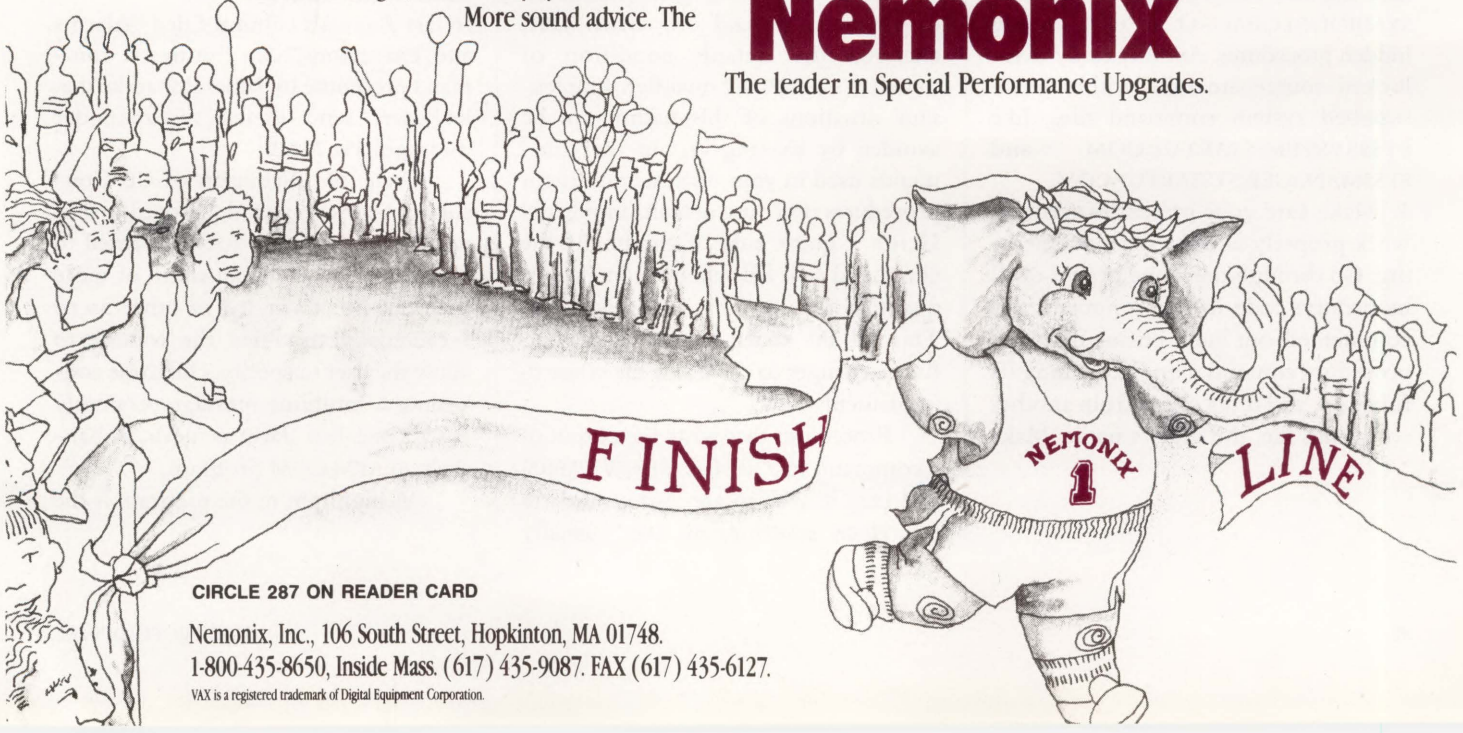
More sound advice. The Nemonix 780-SPU protects the investment you've made in your machine. For added insurance: the SPU includes our Exclusive Customer Protection Package.

So raise your system to a higher standard of living. Call us today at 1-800-435-8650. In Massachusetts call (617) 435-9087.

Remember... with Nemonix you'll always come out ahead.

Nemonix™

The leader in Special Performance Upgrades.



CIRCLE 287 ON READER CARD

Nemonix, Inc., 106 South Street, Hopkinton, MA 01748.
1-800-435-8650, Inside Mass. (617) 435-9087. FAX (617) 435-6127.

VAX is a registered trademark of Digital Equipment Corporation.

DCL DIALOGUE

Kevin G. Barkes

The Five-Oh Defense

There's nothing that makes a DCL hacker quiver like the anticipation of "a future major release of VMS."

With the impending introduction of 5.0, a lot of people are shaking like parts of California during an earthquake. Some can't wait for the rumored enhancements to DCL; others, remembering some of the conversion problems from 3.7 to 4.0, simply are quaking in fear.

Depending on the approach taken, converting your DCL code to run properly under 5.0 can be a dream or a nightmare. If you observe the following recommendations, the chore will be less onerous.

1. Get a hard copy of all your DCL command files.
2. Produce a listing of all the files, along with their purpose and where they're invoked. This can be tougher than it seems. At many sites, symbols used for activation of .COM files have been around for so long that the procedures they call may be forgotten. Do a SHOW SYMBOL/GLOBAL/ALL to pick up any hidden procedures. Another easily overlooked source are calls within DEC-supplied system command files, like SYS$SYSTEM:STARTUP.COM and SYS$MANAGER:SYSTARTUP.COM.
3. Make sure your present procedures work properly and are self-documenting. Go through them and get rid of all inoperative code, invalid comments and commented-out lines. Ensure that each procedure contains a line explaining its function, and if it's called from another command file, the caller's name. Make certain they work as intended. When you're finished, print them out again.
4. Classify the procedures as critical (needed for system startup and configuration), urgent (needed for proper application operation), non-critical (nice to have, but you can live for a while without them) and trash. Trash procedures (i.e., ones not used for ages, that never did work or are of unknown purpose) should be written off to tape for just-in-case safekeeping and deleted; you probably will need the extra space for 5.0.

Of course, only blow away files in any SYS$ directories when you're sure they're not DEC-supplied, and therefore non-essential. Now is a good time to move command files that aren't specifically system-related to site-specific directories, and remember, the $ is a DEC-reserved character.

5. Study the release notes, making sure that you understand all the changes in DCL command syntax. Command qualifier default changes and alterations in command display output are the two most common sources of problems.

For instance, much grief was caused in versions 3.4 and 3.5, when DEC changed the default condition of BACKUP's /REWIND qualifier. Unpleasant situations of this nature can be avoided by making certain the commands used in your critical and urgent procedures don't use defaults implicitly. Here's a quick rule of thumb: If the command will fail when a non-default qualifier is used, include the qualifier. This has the added benefit of making future changes to the .COM file easier to implement.

Procedures that write the output of a command to a file (i.e., SHOW USERS) and read it back in are also candidates for close scrutiny, as DEC usually enhances command displays with each new release. The F$EXTRACT call that presently pulls out a user name might return nothing but spaces, under 5.0.

You can expect procedures using MONITOR and SHOW to require modification; it's likely that queue management commands also will need tweaking.

6. Avoid temptation. Don't try initially to implement the marvelous enhancements to DCL. Your first job is to get your system up and running and your applications humming along. Make as few changes as necessary; after everything's operating reliably, you can start adding your improvements.

Major operating system upgrades are painful in any environment, but fortunately DEC goes to great pains to automate the process and provide the system manager with all information required to effect a smooth transition. The installation procedures and documentation will contain detailed instructions and explicit directions; follow them carefully.

Mail Reminders

In last August's column titled "Alarms and Excursions," we featured a command procedure by James Robanske that let users send themselves reminder messages via MAIL.

Craig W. Dickinson of GE Consulting Services liked the procedure but wrote to me saying that he wanted to be able to " . . . send an alarm of more than one line to myself or other users. I eventually modified the routine to allow the user to specify a filename containing a multiline message or simply enter a one-line alarm as in Mr. Robanske's ALARM.COM program.

"A highlight in the program is the

fact that the INQUIRE statement was not used while prompting the user for message input. By using the READ statement, blank lines could be entered easily, and the user could exit simply by entering CTRL-Z. . . . "

I hope Craig doesn't mind, but I also added a few bells and whistles of my own to MESSAGE.COM, mainly support for MAIL distribution lists. This little procedure now can send a message to users in a .DIS file at a scheduled time in the future.

Have a handy procedure you'd like to share with our readers? Send it to my office at the address below.

BBS Copies

A reminder to electronic bulletin board users who'd like a copy of all the DEC-related FidoNet BBSs in the United States: Send a self-addressed, stamped envelope to BBS List, Kevin G. Barkes Consulting Services, 4107 Overlook Street, Library, PA 15129.

Or, you can obtain the information you need online by calling my BBS, SYS$OUTPUT, at (412) 854-0511. Look for DECBBS.LST in the VAX or Rainbow file areas. Other recent additions to the board include VAX, PDP-11 and MS-DOS versions of KERMIT and some nifty VAX-related utilities and editors. First-time callers now have download capability. Check in and check it out!

—Kevin G. Barkes is a Pittsburgh-based independent consultant, specializing in VAX/VMS training, tuning, configuration and facilities management services.

PROGRAM.

```
$! See description at end of file.
$!
$! Set error handling:
$       SET NOON
$!
$! If in batch mode, go directly to the mailer:
$       IF F$MODE() .EQS. "BATCH" THEN GOTO DOIT
$!
$! Set control_y interrupt:
$       ON CONTROL_Y THEN GOTO ERR_HANDLER
$!
$! Check command line for parameters 1, 2 & 3
$       IF P1 .NES. "" THEN GOTO GOT_P1
$!
$ GET_P1:
$! Get the mail delivery time:
$       INQUIRE P1 "When"
$       IF P1 .EQS. "" THEN GOTO GET_P1
$!
$ GOT_P1:
$       CHECKTIME = F$CVTIME(P1)
$       IF .NOT. $STATUS THEN GOTO GET_P1
$       ON WARNING THEN GOTO ERR_HANDLER
$!
$ GET_P2:
$! Determine the recipient:
$       IF P2 .NES. "" THEN GOTO GOT_P2
$       INQUIRE P2 "Who (<cr>=self)"
$!
$ GOT_P2:
$! If P2 is a mail distribution file, check for its existence
$! and construct a legal MAIL recipient-name string.
$       IF F$EXTRACT(0,1,P2) .NES. "@" THEN GOTO CHECK_P3
$       DN = P2 - "@"
$       DN = F$PARSE(DN,".DIS")
$       IF F$SEARCH(DN) .NES. "" THEN GOTO BUILD_DIS
$       WSO "Distribution file ",DN," does not exist."
$       P2 = ""
$       GOTO GET_P2
$ BUILD_DIS:
$       QU = """
$       P2 = QU+"@"+DN+QU
$!
$ CHECK_P3:
$! Will a message be entered on-line or a file used?
$       IF P3 .NES. "" THEN GOTO GOT_P3
$!
$! Build the name of the file in which the message will be stored.
$!
$ GET_P3:
$       FILETEST = "F"
$       TMPDIR = F$TRNLNM("SYS$SCRATCH") + F$GETJPI("","PID")
$       RAWFN  = F$ELEMENT(1," ",F$TIME()) - ":" - ":"
$       FN = TMPDIR + RAWFN
$       OPEN/WRITE MFILE 'FN'
$       IF P3 .EQS. "" THEN GOTO GET_MESSAGE
$       WRITE MFILE P3
$       GOTO END_MESSAGE
$!
$ GET_MESSAGE:
$       LINE_CNT = 1
$       WRITE SYS$OUTPUT "Enter message (up to 15 lines)"
$       WRITE SYS$OUTPUT "Enter control-z when completed."
$!
$! Write message to file:
$!
$ MESSAGE_LOOP:
$       READ/PROMPT="Line ''LINE_CNT': " /END=END_MESSAGE SYS$COMMAND MESSAGE
$       WRITE MFILE MESSAGE
$       IF LINE_CNT .EQ. 15 THEN GOTO END_MESSAGE
$       LINE_CNT = LINE_CNT + 1
$       GOTO MESSAGE_LOOP
$!
$ GOT_P3:
$! Exit if the message file does not exist...
$       ETEST = F$SEARCH(F$PARSE(P3))
$       IF ETEST .EQS. "" THEN -
$        WRITE SYS$OUTPUT P3," does not exist."
$       IF ETEST .EQS. "" THEN EXIT
$       FN = F$PARSE(P3)  ! otherwise, use P3 for the message
$       FILETEST = "T"
$!
$ END_MESSAGE:
$       CLOSE MFILE
$!
$! Queue message request:
$!
$       IF P2 .EQS. "" THEN P2 = F$EDIT(F$GETJPI("","USERNAME"),"TRIM")
$       SUBMIT/NOPRINT/NOLOG/PAR=('FN','P2','FILETEST') -
        /AFTER="''P1'" 'F$ENVIRONMENT("PROCEDURE")
$       EXIT
$!
$ ERR_HANDLER:
$       WRITE SYS$OUTPUT "Unable to queue message request..."
$       SAVE_MESSAGE = F$ENVIRONMENT("MESSAGE")
$       SET MESSAGE/NOF/NOI/NOS/NOT
$       CLOSE MFILE
$       SET MESSAGE 'SAVE_MESSAGE'
$!
$! Delete the file FN created by this routine only; don't delete
$! any existing files if P3 was a file specification.
$!
$       IF FN .NES. "" .AND. P3 .EQS. "" THEN DELETE/NOCONFIRM 'F$PARSE(FN)'0
$       EXIT
$!
$! Process message request
$!
$ DOIT:
$       MAIL/SUBJECT="AutoMessage" 'P1' "''P2'"
$       IF P3 THEN EXIT
$       DELETE/NOCONFIRM 'F$PARSE(P1)'*
$       EXIT
$!
$! Procedure info:
$!
$! message.com
$!
$! Original procedure (alarm.com) by H. Robanske (11/15/86)
$! U.S. West Network Systems, Inc., Bellevue, Washington
$!
$! Modified by C.W. Dickinson (11/19/87)
$! GE Consulting Services, Syracuse, New York
$!
$! MAIL distribution file support and minor changes
$! by Kevin G. Barkes (2/13/88)
$!
$! synopsis: send a message (up to 15 lines) or a file to
$!           any user or legal mail distribution list (@MAIL.DIS)
$!           (defaulted to user invoking the procedure), scheduled
$!           for delivery at a specific time.  The message, if
$!           entered online, is ended by typing CTRL-Z.
$!
$! syntax: @message [<time>] [<username>] [message_filename/1-line message]
$!
$! parameters:
$!
$! TIME - may be expressed in absolute or combination time.
$!
$! Absolute time:   dd-mmm-yyyy:hh:mm:ss.ss
$!                  TODAY
$!                  YESTERDAY
$!                  TOMORROW
$!
$! Combination time: An absolute time + or - a delta time (dd-hh:mm:ss.ss)
$!
$! USERNAME - any valid username, may be used with VAX networks.
$!
$! MESSAGE_FILENAME - any standard VAX file, which may contain more than
$!                    the 15-line message maximum for interactive message
$!                    generation.
$!
$! 1-LINE MESSAGE   - The user may optionally enter a 1-line message that
$!                    must be contained in quotes (""), replacing the
$!                    message_filename. NOTE: The omission of quotes will
$!                    result in only the first word of the message being
$!                    sent via mail.
```

FIELD SERVICE

Ron Levine and Warren Haeberle

Self-Maintenance Requires A Partner

More reliability is being engineered into data processing systems. System downtime is declining, but there always will be a need for maintenance. To meet this need, some companies have chosen to handle their own computer repairs, becoming self-maintainers.

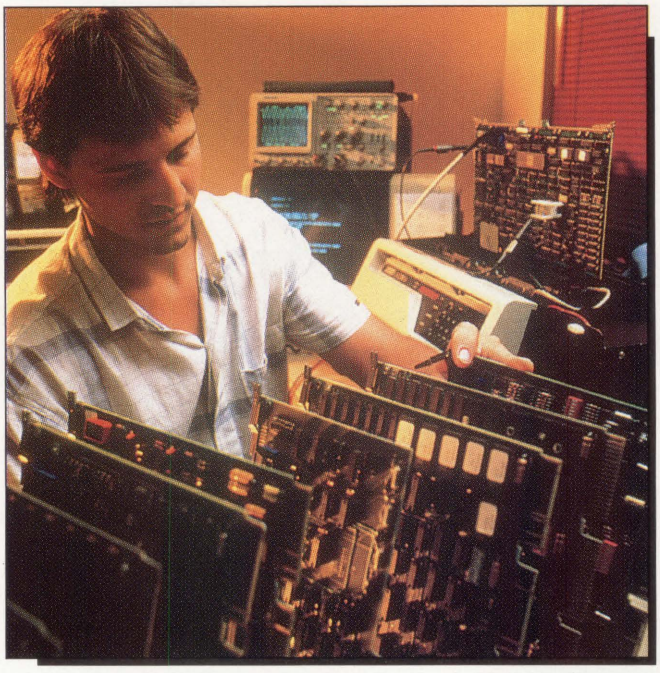
Self-maintenance doesn't mean self-sufficiency. Self-maintainers need a partner in pursuit of computer repair independence. For example, many computer equipment problems can be corrected by replacing one of the unit's circuit boards. Few self-maintenance companies, however, have the expertise, documentation or equipment to continue to the next step — isolating the problem on the board. That type of capability generally isn't viewed as cost effective.

It's less expensive to repair a board than to buy a new one. But, where do you have this service performed? The OEM may be one source. Another might be the independent depot repair facility.

Send It In

Depot repair, or fourth-party maintenance as it has come to be called, has existed since computers began breaking down. Depot repair companies don't send service representatives to a site. Instead, customers send their defective parts or equipment to the repair facility by mail, parcel post or other means of commercial shipping. Although self-maintenance companies historically have been the primary customers for this type of service, OEMs use independent depot repair to handle work overloads.

Because OEMs offer depot repair services, why would you consider an independent repair service? The answer is the same reason for becoming a self-maintainer in the first place — price. Independent depot repair prices are approximately 20 to 25 percent lower than those of the OEM. Turnaround time usually is faster too; for example, circuit boards are returned in a few days, not weeks.



In addition to repairing boards and other items, many fourth-party maintenance vendors provide board swapping and/or immediate replacement of parts.

In certain situations, you can't choose the OEM for depot repair. Sometimes, the OEM doesn't offer service on less popular models or has discontinued service on equipment no longer in production. With self-maintenance on the rise, depot repair has become an important factor in this maintenance market.

Importance Of Parts And Service

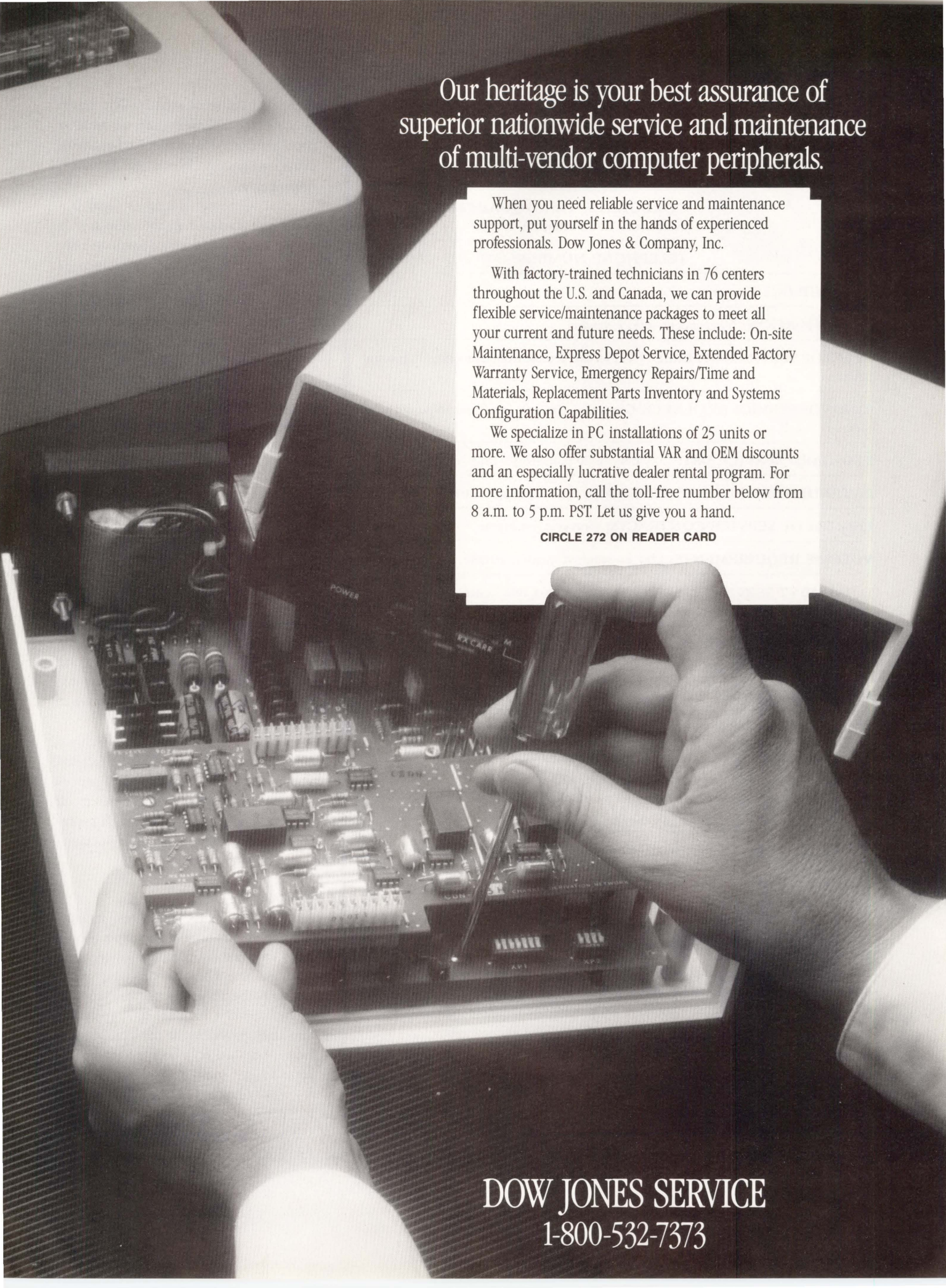
To repair computer equipment, a repair depot must have access to parts. Obtaining the parts necessary to keep a system online sounds simple but it's not. Certain OEMs maintain close control over parts distribution.

Therefore, before you select a depot repair service, take a close look at its inventory, making sure it has the right parts for your system. The depot repair company not only should be willing to disclose inventory levels but also encourage physical inspection. By visiting the facility, you'll be able to see which quality control measures are in effect.

Quality Control

Another area of concern is how the parts and your original equipment are handled by the repair depot.

Static electricity, for example, if uncontrolled, can ruin delicate components



Our heritage is your best assurance of superior nationwide service and maintenance of multi-vendor computer peripherals.

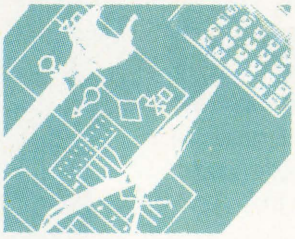
When you need reliable service and maintenance support, put yourself in the hands of experienced professionals. Dow Jones & Company, Inc.

With factory-trained technicians in 76 centers throughout the U.S. and Canada, we can provide flexible service/maintenance packages to meet all your current and future needs. These include: On-site Maintenance, Express Depot Service, Extended Factory Warranty Service, Emergency Repairs/Time and Materials, Replacement Parts Inventory and Systems Configuration Capabilities.

We specialize in PC installations of 25 units or more. We also offer substantial VAR and OEM discounts and an especially lucrative dealer rental program. For more information, call the toll-free number below from 8 a.m. to 5 p.m. PST. Let us give you a hand.

CIRCLE 272 ON READER CARD

DOW JONES SERVICE
1-800-532-7373



SERVICE PROFILE: SORBUS CORPORATION

CORPORATE HEADQUARTERS: 50 East Swedesford Rd., Frazer, PA 19355

TELEPHONE NUMBER: (800) FOR-INFO

CONTACT: Dick Cooper

CLASSIFICATION: Independent service vendor

TYPES OF SERVICES OFFERED: Field service, remote troubleshooting/diagnostics assistance

KINDS OF SERVICE AVAILABLE: Contract — on-site, four-hour response; non-contract — call

STANDARD SERVICE DAY: 7:00 a.m.—6:00 p.m. (Mon.-Fri.)

EXTENDED SERVICE DAY AVAILABLE: Yes — per agreement

LENGTH OF SERVICE CONTRACTS: One year, multiyear

VOLUME REQUIREMENTS: May be required in some remote areas

EQUIPMENT SERVICED: Most DEC computers; IBM, IBM clones, Amdahl, HP and AT&T computers; most peripherals, modems, and add-on PCBs

MARKETS SERVED: Customers — OEMs, VARs, dealers, end-users, most verticals; geography — national

IN BUSINESS SINCE: 1971 (Sorbus was created as a division of MAI)

PRICING: Fixed on contracts; time and materials on others. Note: Sorbus isn't a discount vendor, but prices are usually lower than manufacturer's service.

REMARKS: Number one TPM company in the U.S., providing service for more than 400 brands. DEC maintenance may be price guaranteed on a multiyear basis when included in an equipment leasing agreement.

Sorbus is the number one third-party maintenance vendor in the United States. DEC-based systems service was added to the product lines maintained in November 1987. More than 400 brands of computer-related equipment are serviced, making Sorbus an excellent choice for single-source field maintenance.

Sorbus is a Bell Atlantic Company, employing more than 200 FEs out of 200 nationwide offices. More than 60,000 sites, for approximately 45,000 customers, currently are maintained.

Sorbus maintains a complete parts inventory of more than 230,000 different items (more than 6,000,000 parts total) for all products serviced. Diagnostics used by field service are both system and component level. Parts replacement may be new, refurbished or on an exchange basis. Average repair turnaround time is five days.

CIRCLE 514 ON READER CARD

or negate complex repairs. The result may not be apparent but, in time, a problem caused by static discharge can cause a circuit board to function improperly.

3M antistatic measures have become the standard in the industry. A depot service concerned with quality control will incorporate these standards in its operation, including:

1. Grounding employees who handle circuit boards or components.
2. Keeping circuit boards in antistatic bags when not being repaired and when being returned to the customer.
3. Storing spare parts and components in specially designed antistatic bins.
4. Using specially laminated tabletops at workstations to minimize static electricity.
5. Using environmental safeguards, including temperature and humidity controls.

Automatic Upgrades

Data processing systems don't remain constant. Through engineering change orders (ECO) or field change orders (FCO), the OEM can alter the function of the circuit board. The OEM automatically makes these revisions when servicing the circuit boards.

This service can be obtained through a quality depot repair facility, provided the company has an engineering department and access to the circuit board schematics. Although such a service isn't universally available, it's becoming more prevalent.

Response Time

A company that becomes a self-maintainer must have the expertise on site for both daily computer upkeep and emergencies. For the company technician to perform his duties correctly and efficiently, he must have the parts and tools available. If the computer is down because of a bad circuit board, replacement must be at hand.

The ideal solution is a spare parts kit, easily obtained through a qualified independent depot repair company. The kit comes with a complete line of

MAINTECH.

DEC is a registered trademark of Digital Equipment Corporation.

KEEPING THE SMARTEST COMPANIES IN AMERICA OPERATING AT PEAK PERFORMANCE.

Maintech is a performance-driven computer maintenance company that has a history of success in critical applications with Fortune 500 companies, dating back to 1971. Our portfolio includes such demanding applications as E911, 411 Directory Assistance and Electronic Funds Transfer. We offer a combination of experience, depth, range and operational support not available from other independent service companies.

Maintech Customer Engineers are trained to recognize the subtle interaction of hardware, firmware, operating systems and application code on a wide range of DEC and DEC-compatible products. And to optimize performance, Maintech utilizes a number of support programs, including:

- **Remote Diagnostic Analysis Centers**
- **National Logistics Management System**
- **Twenty-four hour Technical Support Hotline**
- **Automated Dispatch System**

As a division of Volt Delta Resources, Maintech is more than just a hardware maintenance company. We have ready access to operations, application, system, and engineering support—capabilities which allow us to provide complete system services. Maintech maintains systems to your high standards of performance, not simply to hardware specifications.

Most importantly, Maintech is a company that responds swiftly and goes the distance for our clients. This ability to act decisively has earned Maintech a reputation for quality and performance that's unequaled.

Maintech. For proven performance in critical applications.

MAINTECH
GUARDIAN MAINTENANCE SERVICES
A DIVISION OF VOLT DELTA RESOURCES INC.

1 800-426-TECH

1133 Avenue of the Americas
New York NY 10036
212 827-2600

A VOLT INFORMATION SCIENCES COMPANY

CIRCLE 135 ON READER CARD

Troubleshooting Tip

Before lugging out the Oscope on a disk drive problem, check to ensure that the drive has been set up properly, that cables are connected correctly and that the drive's unit address is selected properly. Most disk drive trouble calls are due to improper setup of the disk drive subsystem.

If additional drives are available on site, switch drives using the same controller. If the new drive works, the problem has been isolated to the original drive. Using diagnostics, run the faulty drive on one head at a time; this will locate any bad head(s). Likewise, use only half of the cylinders (tracks) during a test to pinpoint possible media or positioning faults.

Most disk drive problems are simple and can be identified quickly at this level. *—Ron Levine*

statically protected and tested circuit boards, specifically designed for your particular system. You can purchase, rent or lease the kits.

When the technicians use the replacement boards, the defective boards can be shipped back to the depot service company for repairs.

Another depot repair service that's becoming more common is card or board swapping. If a company needs a replacement card and can't wait for repairs, it can trade or swap that card with one from the depot repair facility, saving the expense of finding and buying a new board.

Parts And Service

Training your system's maintenance force can be another area where a depot repair company can assist. Training from the original equipment manufacturer is expensive and frequently unavailable when needed. Additionally, in many cases, the courses are fixed and can't be modified to meet your needs.

Some depot repair companies provide regularly scheduled instruction on a broad spectrum of equipment. Others tailor courses to match customer requirements. Some repair schools provide assistance after completion of the course. If your technician becomes stumped on a problem, he can call the school for advice or to repair parts.

To be a successful self-maintainer, a company must be able to secure both parts and outside repair assistance quickly. A reliable depot repair facility supplies occasional, but necessary, assistance. *—Warren Haeberle is president of Electronic Service Specialists Ltd., a Bell Atlantic company, Menomonee Falls, Wisconsin.*

UNIX Training

For the '80s, '90s & Beyond!

UniForum/DC ■ August 2-4, 1988
Washington Hilton & Towers
Washington, D.C.

■ 9 in-depth tutorial sessions presenting essential UNIX information.
■ 18 condensed symposia exploring additional UNIX features.
■ An exhibit floor packed with the latest UNIX hardware & software.

Get the UNIX Answers You Need!

Call 800-323-5155 for your FREE brochure.

UniForum/DC
2400 East Devon Avenue
Suite 205
Des Plaines, Illinois 60018

CIRCLE 285 ON READER CARD

C++

FULL COMPILER – not a preprocessor

- Complete software-development system
- Selectable AT&T C++, ANSI C, K&R C
- Based on proven Oregon Software technology
- Generates extremely fast, compact code
- Comprehensive error checking
- Backed by responsive support engineers
- Strongly typed language

DATA ABSTRACTION FACILITY (classes)

- Operator overloading
- Information hiding/sharing
- Constructors/destructors

✓YES! I want top performance at an affordable price

To order, or for more information, call 1-800-874-8501
6915 SW MACADAM, SUITE 200, PORTLAND, OR 97219

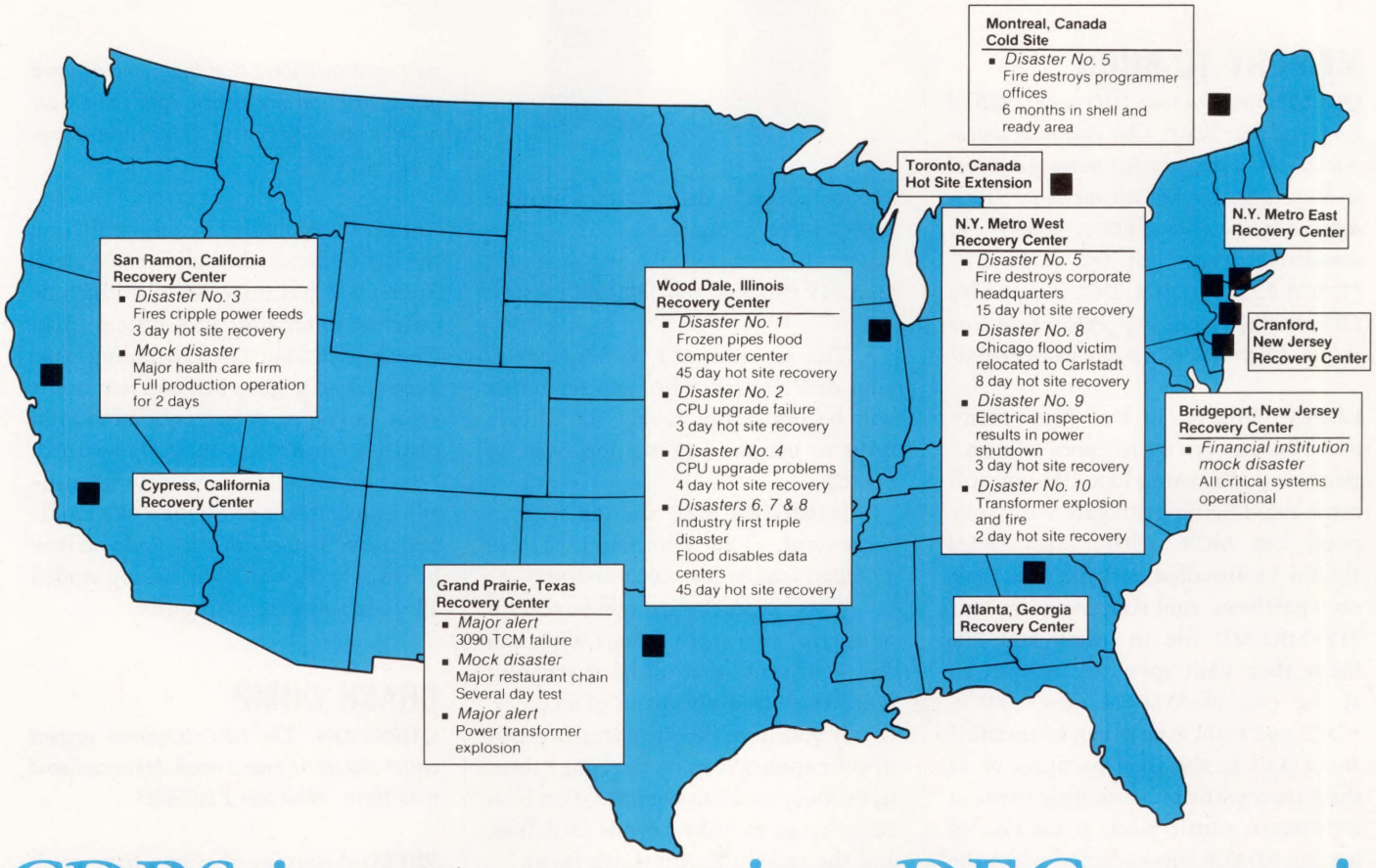
OREGON SOFTWARE

Professional Products for Software Development

CIRCLE 288 ON READER CARD

In Disaster Recovery, It's Experience That Counts . . .

To date, CDRS has helped 10 companies survive computer disasters.



CDRS is now serving DEC users!

Comdisco Disaster Recovery Services Inc. (CDRS) is the world's largest disaster recovery resource. We have supported more customers in disaster situations than any other company.

Now, we're offering our unmatched capabilities to users of Digital Equipment Corporation systems. Our facility in Cranford, New Jersey, is totally dedicated to the DEC world. It is a fully configured facility, and offers DEC equipment up to and including the VAX 8700, plus telecommunications capabilities ready to use. If, for any reason, your DEC equipment becomes unavailable, you can occupy the site and continue your vital data processing functions, virtually without interruption. You can also have remote access to our facility through our Mobile Cluster capability.

Besides providing equipment, we can consult you on everything from contingency plan development to data center design and reconstruction.

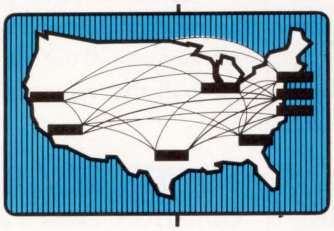
COMDISCO®

Comdisco Disaster Recovery Services, Inc.

6400 Shafer Court, Rosemont, Illinois 60018

CIRCLE 109 ON READER CARD

Experience proves you can count on Comdisco.



Yes, CDRS! I'm concerned about a DEC computer disaster.

☐ Send me more information.
☐ Have your representative phone for an appointment.

Name

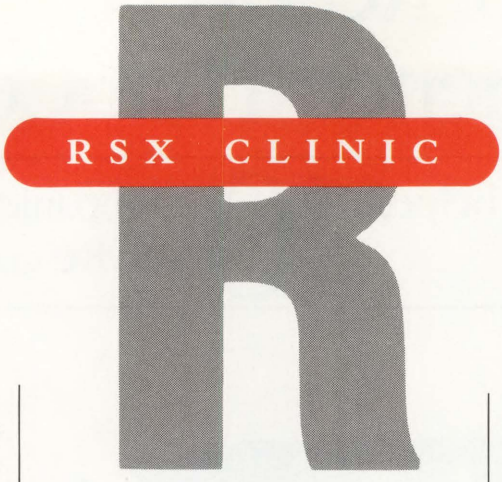
Company Title

Address Phone

City State Zip

Clip and return to: Charles Gladfelter, Director of Marketing, CDRS Inc., 6400 Shafer Court, Rosemont, IL 60018.

Or call 312/698-3000.



MEMORY TO BURN

QUESTION: *I run an 11/73 with 2 MB of RAM and four RL02s. Our operating system is RSX-11M. The system has memory and pool to burn. Can anyone tell me what DEC-supplied tasks are safe to FIX in memory? I'm considering fixing PIP, INS, TKB, F77, F11ACP, MCR..., ...MCR, DCL and possibly LBR. Will this cause any problems, because they no longer will be reloaded when needed?*

REPLY: You're lucky. Not many RSX-11M sites can claim "pool to burn." Because you're using RSX-11M you still must avoid being profligate with your pool, but MCR..., SHF... and TKTN should be installed and fixed in their own partition. Add commands in your SYSVMR.CMD file to install and FIX them, then VMR your exec as you did at the end of SYSGEN. The ...MCR, ...DCL and F11ACP tasks can be installed and FIXed in the GEN partition or in their own partition. Installing them in GEN saves a little pool, at the risk of getting F11ACP checkpointed when the GEN partition becomes full.

The language processors and utilities (F4P, TKB, LBR, F77, MAC, PIP) are best just installed. I don't see where FIX-ing them will pay back much, except a little time on the initial task load, not much to be saved in light of all the overlay loads these tasks do as they run. Some even may have a problem if you FIX them. They may assume that they always are reloaded from disk and, therefore, may make corresponding assumptions about their internal data areas.

Other things you might do with your luxurious memory come to mind. Mount all your disks with a private F11ACP. The command is:

```
MOUNT DLxx:/ACP=UNIQUE
```

The separate ACP will speed up your disk accesses a bit, and file opens will be noticeably faster. You always want to use the largest, non-overlaid F11ACP.

Install TKB, MAC and PIP with an increment. The command is INS TKB/INC=20000 (or 40000 or 60000...)

These utilities then will have a lot of internal data space to start with, and they will avoid that initial checkpoint when they need to expand in memory.

If you have disk-resident overlays in your applications code, change them to memory-resident overlays. This is an easy change to make to your .ODL files, and the tasks will run much faster.

Last, add a RAM disk. Use the FXDRV from DECUS or any one of the commercially available products. Put your TKB, F77 and PIP task images on the RAM disk and INStall them from the RAM disk. Reassign the work files for TKB (LUN 8), F77 (LUNs 6,7) to the RAM disk.

Keep an eye on pool while you're doing all this. It will be the first critical resource you'll use up, even though you have all that memory.

TUNING ORDERS

QUESTION: *I want to do some system tuning to my system, including a new SYSGEN to change a few things in the exec. When I start up SYSGEN, I find that some required pieces aren't on my system disk. Do I have to order them separately? Our system is supplied by an OEM.*

REPLY: I was puzzled by this until I saw the last sentence, then all became clear. Your OEM has done the old "Include only the minimum" RSX system trick. Check with your OEM regarding your licensing arrangements, and determine whether you're, in fact, entitled to a full distribution kit for RSX. Be warned: "the minimum" RSX system trick usually is accompanied by the, "We modified the system code" trick and you may be entirely on your own, having voided all your software warranties.

CRASH DUMP

QUESTION: *The DEC telephone support center told me to take a crash dump and send it to them. How can I do that?*

REPLY: Assuming that you have crash dump support included in your SYSGEN, do the following:

1. Halt your machine. How you do this will vary with the model of PDP-11 you're using, but you'll usually find a button or switch labeled HALT on the panel. If not, try hitting CTRL-P on your console terminal.
2. Once the system is halted, change the contents of the Program Counter (PC) to an octal 40 and the contents of the Processor Status Word (PSW) to an octal 30340.
3. Hit the switch or command your processor to CONTINUE.

The operating system will jump

into the system crash code and prompt you to insert a scratch disk or tape into the crash dump drive, and then it will halt. When you again proceed, the machine's memory will be dumped onto the crash dump drive. Send this, along with machine-readable copies of your LB:[1,54]RSX11M.STB and LB:[11,10]RSXMC.MAC files to Digital. And include a completed SPR form.

This is the simplest, most graceful and, therefore, most boring way to crash a system. My list of all-time favorite system crashes has at least 12 other ways to cause system crashes, but these are best left out of print.

BRU ERRORS

QUESTION: *HELP! Our Virtual Disk driver (VE:) from DECUS causes us problems. We're trying to BRU files from the virtual disk onto a tape and keep getting errors from BRU.*

REPLY: A modification to BRU in the RSX-11M-PLUS 4.0 and and RSX-11M 4.2 release is causing this. It's a fairly simple problem to fix. You want to edit the database file for the virtual disk driver and then rebuild the driver. Edit the file VETAB.MAC (it may be called VETBL.MAC). Find the line that says:

```
.WORD DV.MNT!DV.F11 ; U.CW1
```

add the attribute bit DV.MSD to this list, so that it now reads:

```
.WORD DV.MSD!DV.MNT!DV.F11 ; U.CW1
```

Then rebuild the virtual disk package. The virtual disk driver package you mention contains a command file to rebuild the package. Just invoke it, then reinstall the virtual disk driver. Your existing virtual disk container files won't be affected.

Please mail your questions to RSX Clinic, DEC PROFESSIONAL, *Professional Press, Box 503, Spring House, PA 19477-0503. Questions also can be submitted through ARIS.*

The Detectives

TRW's family of diagnostic packages: your private investigators of system troubles. Designed to aid in the maintenance of DEC systems, they're easy to learn and use.

Solve hardware mysteries fast with:

- **TRW 700 Series stand alone and on-line diagnostics for VMS-based systems**
- **TRW 86SDP stand alone and on-line diagnostics for DEC 8600/8650 systems**
- **TRW M.T.P. on-line system exerciser for MicroVAX II**
- **TRW U.S.E. on-line system exerciser for UNIX-based VAX systems.**

All are menu-driven and user-friendly. All are affordably-priced, warranted and supported. Volume discounts are available, too.

To interrogate us about diagnostics or other TRW support services, call (703) 898-4127, or write TRW Technical Training Center, 420 Hudgins Roads, Fredericksburg, Virginia, 22401. Put TRW on the case for fast, efficient system diagnostics.

DEC, VMS, VAX and MicroVAX II are trademarks of Digital Equipment Corporation. UNIX is a trademark of American Telephone and Telegraph. These trademarks are used solely for identification purposes.

TRW

CIRCLE 165 ON READER CARD

© 1988 TRW Inc. TRW is the name and mark of TRW Inc.

ATTENTION VENDORS

The *DEC PROFESSIONAL* magazine will consider DEC-specific hardware and software products for review. We do not endorse or guarantee any products reviewed or discussed.

For further information contact:

The Editorial Department, Professional Press,
921 Bethlehem Pike, Spring House, PA 19477.

FROM THE LAB

Dave Mallery

Break In!

There's an old saying that goes, "If you wait around long enough, everything will happen." Recently, the adage came to pass at a colleague's installation.

At about 1:00 p.m., a heart-stopping message appeared on every terminal in his building:

> IT WAS A VERY BAD IDEA TO LEAVE THE PASSWORD ON THE FIELD SERVICE ACCOUNT

Down went his system, and we got a plea for help.

This is really about what we did to fix it, rather than how he got there. He arrived there because no one reset his password after his last Field Service call a month earlier. DEC was on the machine from Colorado, looking at the configuration. He hadn't cleaned up. Years of vigilance negated by a moment's distraction.

What follows is the sequence of events we followed as an emergency drill immediately after the event.

First, we powered down all modems in the computer room. A sober look at the broadcast message revealed that the intruder had been on a local dialin line.

We then did a full dump of the UAF file to the printer. We divided the listing, and everyone got to look at all of it over the next hour. We found a single account that the artist had created that had SETPRV.

We checked the modification date of all the system files for stability. The local lines remained pulled, pending changing all their numbers. Fortunately, we live in a world of computerized phone exchanges and wholesale number changes only cost money. They can be done in hours.

Because the system seemed stable, work continued. The next step was to do a $BACKUP/COMPARE on the disks using the last full system backup. This will find any modifications or patches made to VMS or any component. Anything found by this method should be replaced from a distribution tape. The single account in the UAF could just be a decoy and the real damage could be elsewhere in the system.

Fortunately, the comparisons were equal, so we had confidence that we were hit by a rather benevolent ego tripper. The worst thing is that you can never be totally sure.

The morals of the story:

1. Change your dialin numbers every few months. When you change them, request non-sequential numbers.

If you have to give the numbers to people, changing them and only revealing on a need-to-know basis is the best technique.

Use AUTHORIZE to flag both SYSTEST and FIELD for audit. Remember to unflag them before authorizing and reflag afterward.

2. Use a program that runs automatically and scans a UAF dump looking at the privilege settings. The program has to be automatic and has to scream bloody murder when it finds accounts with priv that are enabled and aren't in a list. It also should scream about any new accounts it finds. Screaming can be accomplished by sending mail to a distribution list that includes management.

3. Use SET/AUDIT/ALARM/ENABLE=(ACL,INSTALL,MOUNT,AUTHORIZATION,BREAKIN=ALL) in your SYSTARTUP to enable alarm messages.

> ***"Years of vigilance negated by a moment's distraction."***

Also add SET ACL SYS$SYSROOT:[000000]SYSTEST.DIR/ACL=(SECURITY,ACCESS=READ+WRITE+DELETE+CONTROL+FAIL+SUCCESS) along with a clone for SYSMAINT.DIR to SYSTARTUP. This enables alarms on the field and test accounts.

Use REPLY/ENABLE=SECURITY (with OPER and SECURITY priv) in your LOGIN.COM to get the alarms.

After a few hours of constant interruption on your terminal, you will decide that a permanently logged in hardcopy terminal is a better receptacle for these messages. The problem is that you actually have to look at it several times an hour.

Another consideration is a system password. If you choose one, the dialin user must give the password (with no prompt) on connect before the username prompt is given. If you change this monthly and tell only your current authorized dialin folks, you probably could change phone numbers less often.

Editor's note: A break in like this can happen to the most knowledgeable system manager. All it takes is a moment's distraction. There are a number of articles in this issue that can help you tighten your security. See Betty Steele Adukoski's "The Scheme Of Things" on page 50." New VAX managers will find Robert Hansen's "Security For The New VAX Manager"on page 58 helpful.■

Most purchasing software systems promise great performance.

As long as they call the tune.

Adapting software to your unique purchasing requirements can cost a fortune. Unless you buy Cardinal.

With Cardinal, you get the fit and functionality of custom software at a fraction of the cost. This means you can specify as many unique order types as you need. You can specify how each will be processed. And you can do all of this quickly and easily — without programming.

No other approach to purchase order management gives you anywhere near this much flexibility. Cardinal's unique architecture lets you define and process requisitions, blanket contracts, standing orders, import orders — any kind of order — any way you like. And as your order processing requirements change, your systems can change with them — without reprogramming.

So why settle for an inflexible order management system? Or spend a fortune on custom software development? Call Cardinal. And get to call your own tune.

cardinal data corp

75 Second Avenue, Needham, MA 02194 • (617) 449-0066
Distributors: Los Angeles (714-554-1551) • Sydney (2-436-4022)

INTEGRATED SOFTWARE FOR: **ORDER MANAGEMENT • PURCHASING • INVENTORY • RECEIVABLES • PAYABLES • GENERAL LEDGER**

CIRCLE 195 ON READER CARD

FROM THE LAB

David B. Miller

PAKMANAGER

As a VAX system manager, you may face frustrations regarding sorting and managing your disks. A disk-wide directory can show junk all over the place: duplicate files in at least 15 different directories, 25 versions of a COBOL billing program replete with smaller test data files; files so old that their names are written in Latin; lots of files with nothing in them; and subdirectories so deep that you need oxygen to get to the bottom.

This could take hours or even days to clean up. Besides, what's important and not important? You needed an additional disk drive anyway.

Before you do anything rash, check out *PAKMANAGER* from DEMAC Software Ltd. of Ottawa, Ontario. It's designed to help system managers clean up and manage their disks as well as to keep them clean forever. We tested *PAKMANAGER* version 1.1 to see if it could help us.

Installation

Installing the software involved using VMSINSTALL and calling DEMAC for our personal software key numbers. A nice feature about the key numbers is that extending your license after an initial demo period simply requires another phone call to DEMAC for new numbers. No new installation step is required. If *PAKMANAGER* is installed on a CPU in a cluster, any disk in the cluster can be monitored. If you wish to run *PAKMANAGER* from multiple CPUs in the cluster, you need to obtain a separate installation key for each CPU on which you wish to run the program. There is no additional charge for this service.

PAKMANAGER can be run interactively or from the DCL command line. Command line report qualifiers exist for each of the individual reports on the interactive main menu. In command line mode, you also may direct output to specified files and devices, rather than view them on the screen.

It may take a while for *PAKMANAGER* to come up, because it must analyze the disk first. It does this by examining the device's INDEXF.SYS file. If a /VMS qualifier is added when *PAKMANAGER* is invoked, it searches the device for information based on directories, instead of the INDEXF.SYS

FIGURE 1.

FRAGMENTED FILES ON "USER3:" (AT LEAST 2 FRAGMENTS)
PAKMANAGER Version 1.1x
Copyright (c) Demac Software Ltd. — 1987,1988
Mon, April 18, 1988. 2:57 pm

SIZE	EXTENTS	FILE NAME	
300000	46	[CIRC.DECOLD]	PROSUB.DAT;1
30003	37	[CIRC.DECSUB]	HPSUB.DAT;1
80001	35	[CIRC.HPSUB]	PROSUB.DAT;1
17190	29	[CIRC.HPSUB]	MARTIN.DAT;1
15888	12	[CIRC.HPSUB]	OCS.DAT;1
19104	6	[ZIP9]	F1000.DAT;2
2067	6	[000000]	INDEXF.SYS;1
1890	4	[CIRC.HPSUB.BPA]	HP__V16__NOV87__RRN.SLC;1
303	4	[CIRC.HPSUB]	PDPVAX.DAT;1
16773	4	[CIRC.HPSUB]	PROSUB.ALF;1
72	3	[000000]	BADBLK.SYS;1
1905	3	[CIRC.DECOLD]	BPAF1000B.SLC;1
21	3	[CIRC.HPSUB.BPAWORK]	HP__V2__QUALITY.LOG;4
27	3	[CIRC.HPSUB]	V24QDTZIP.LST;1
6	2	[CIRC.DECNEW]	CONVERT.LOG;2
6	2	[CIRC.HPSUB]	CONVERT__MARTIN.LOG;1
3006	2	[CIRC.HPSUB]	ELSUB.DAT;1
6	2	[CIRC.HPSUB]	FIXCOD11THRU3.LOG;1
3984	2	[CIRC.DECSUB]	HPSUB.ALF;1
12	2	[CIRC.HPSUB.BPAWORK]	HP__V16__BPA__QUALITY__TEST.LOG;1
1926	2	[CIRC.HPSUB.BPA]	HP__V21__JAN88__RRN.SLC;1
18	2	[CIRC.HPSUB.BPAWORK]	HP__V23__MAR__ADDZIP.ACC;1
6	2	[CIRC.HPSUB]	LOGIN.COM;24
78	2	[CIRC.DECNEW]	PROCODE.DAT;1
6	2	[CIRC.DECNEW]	SELECT__ALL.LOG;2
21	2	[CIRC.HPSUB]	V24CODB.LOG;1
6	2	[CIRC.HPSUB]	VNEWQDT.COM;4
426	2	[ZIP9]	XXX.DAT;1

Report Summary

File ownership mask	:	[*,*]
Number of files	:	28
Total blocks allocated	:	494751
Largest size	:	300000
Average size	:	17669
% of disk used	:	45.88

Fragmented Files report.

PAKMANAGER Version 1.1x
Copyright (c) Demac Software Ltd. - 1987, 1988
Fri. April 15, 1988. 4:35 pm
Device is 'User3:'

KEY	MERGEABLE REPORTS	FILES
A	Aged Files	0
B	Files needing Backup	11
D	Duplicate Files	0
E	Expired Files	407
F	Fragmented Files	31
L	Large Files	28
O	Over Allocated Files	1
P	Placed Files	3
V	MultiVersion Files	9
Z	Zero Length Files	19

KEY	OTHER REPORTS/OPTIONS	FILES
S	Summary	407
T	Directory Tree	17
R	ACL Restricted Files	3
I	Interesting Files	0
C	Cluster Factor Analysis	-
U	Space Usage by Owner	-
/	Setup Menu	-
H	Help	-
X	Exit PakManager	-

Enter any KEY to select a report or option.
Enter several KEYs to combine MERGEABLE reports
Enter '*' KEY(s) to alter report parameters.

Select a report or option key :

Screen 1:* PAKMANAGER's *Main Menu.

file. The /VMS start up is slower but is required if interesting files are to be reported.

The main menu screen of *PAKMANAGER* (see Screen 1) tells the story. Each choice except Help and Exit produces a report. Figures 1 through 4 show four of these reports to give you an idea of the kinds of things *PAKMANAGER* will do.

The main menu screen contains:

1. Aged Files (A) — Based on a file's last revision date, this choice displays the oldest files on the disk in terms of lifespan in days.
2. Files Needing Backup (B) — As the system manager, you decide what files are to be backed up regularly. *PAKMANAGER* allows you to do this based on file size. All files meeting the requirements you specify will be reported here. The Backup report can help a system manager gauge how much disk or tape space may be required to do the backup.
3. Duplicate Files (D) — This reports all files with duplicate names in all directories. Care is needed here, because files such as LOGIN.COM probably aren't duplicates; they simply have the same name.
4. Expired Files (E) — If a volume's retention period has been set, this report will point out all files violating their expiration date and could be potential candidates for archive.
5. Fragmented Files (F) — This report points out which files are fragmented and the number of fragments used by those files (see Figure 1).
6. Large Files (L) — Figure 2 illustrates how *PAKMANAGER* reports those files meeting and exceeding a specified file size as well as the number of extents used for those files. The specific file size to be met or exceeded is determined by the system manager.
7. Over-allocated Files (O) — Files that have more space allocated to them than they're currently using are reported.
8. Placed Files (P) — This points out all files with placement control on them. Too many placed files could cause problems with fragmentation for other files.
9. Multiversion Files (V) — It reports all files with multiple versions and the size of the oldest version of each file.
10. Zero Length Files (Z) — This lists files with allocated space but none of that space is used.
11. Summary (S) — This summarizes all *PAKMANAGER* reports (see Figure 3).
12. Directory Tree (T) — It provides a directory-by-directory report of all files on the disk and how space is being used. Directory nesting also is indicated, giving you an idea of where directory nesting may cause a slowdown in performance because of degraded access time.
13. Files with ACLs (R) — This displays all files with Access Control Lists (ACLs). ACLs have their security uses, but they should be reviewed from time to time to see if they're justified. ACLs degrade file access times.
14. Interesting Files (I) — Reported here are all files that meet at least one of the following: they contain bad blocks; are multiheader or multivolume files; they take more space than allocated; new files or directory/header name mismatch;

they're alias files or they're lost, locked or privileged.

15. Cluster Factor Analysis (C) — This report provides information concerning different cluster sizes and what kinds of tradeoffs would be required if the disk's cluster size were changed (see Figure 4). It reports the number of wasted blocks, the number of files that fit into the reported cluster size and the size of the BITMAP.SYS file for each reported cluster size. You then can examine this report to make decisions about whether a disk's cluster size should be changed.

16. Space Usage By Owner (U) — File information such as number of blocks, percentage of disk space consumed and number of files and directories are displayed along with the owner UIC and name.

17. Setup Menu (/) — The setup menu allows you to alter parameters, such as output to the screen or a disk file, naming a DCL command file to be created and report sorting options.

Features

PAKMANAGER sports a few other conveniences worth mentioning. Any of the available reports can be combined by selecting them as mergeable. Merged reports display all information that meets the criteria of all specified reports. Simply enter all of the letters corresponding to the desired reports. For example, entering LF generates a merged report showing all fragmented files that also meet the large file criterion.

> ***Any of the available reports can be combined by selecting them as mergeable.***

Report criteria is controlled by the system manager, who can change any of *PAKMANAGER*'s default settings. You as the manager determine what is a large file for your site, what you consider to be the degree of fragmentation necessary to warrant a report, etc. Report criteria can be changed interactively from the main menu or from the DCL command line.

Whether you use the DCL command line format or run *PAKMANAGER* interactively, you can specify parameters for maximums and minimums for reports that need them. Sets of parameters then can be saved to files and loaded when necessary. This allows you to create custom parameter files for different disks and CPUs and will save you the bother of having to re-enter the desired maximums and minimums every time *PAKMANAGER* is run.

Also available is a time-saving feature that creates DCL batch files containing a separate DCL line for each file that meets the report specifications. For example, a command line to create a DCL command file to delete all zero length files on DISK0: would be:

```
$pakman disk0:/ZERO = (COMMAND =
  "Delete",SWITCH = "/log")'/DCL =
  DeleteZero.COM/OUT = Zero.Out
```

where:

1. ZERO is the *PAKMANAGER* report to be produced (zero length files).
2. COMMAND = "Delete" is the DCL

FIGURE 2.

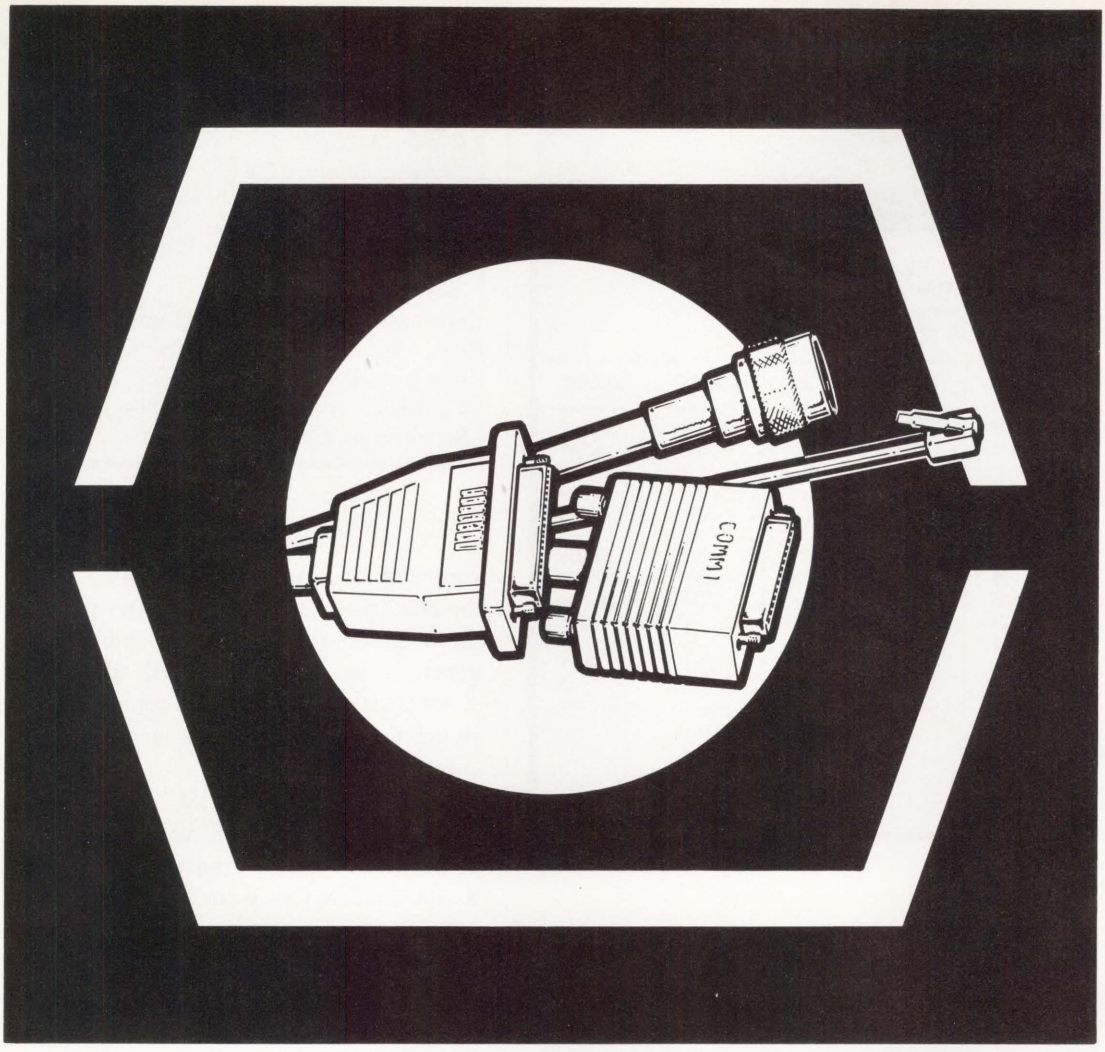
LARGE FILES ON "USER3:" (AT LEAST 1000 BLOCKS)
PAKMANAGER Version 1.1x
Copyright (c) Demac Software Ltd. — 1987,1988
Mon, April 18, 1988. 2:57 pm

SIZE	EXTENTS	FILE NAME	
300000	46	[CIRC.DECOLD]	PROSUB.DAT;1
80001	35	[CIRC.HPSUB]	PROSUB.DAT;1
32772	1	[CRASHDUMP]	GOLLUM.DMP;1
32772	1	[CRASHDUMP]	GOLLUM.DMP;2
30003	37	[CIRC.DECSUB]	HPSUB.DAT;1
21648	1	[ZIP9]	ALL__COMPANIES__ZIP9.DAT;1
19104	6	[ZIP9]	F1000.DAT;2
17190	29	[CIRC.HPSUB]	MARTIN.DAT;1
16773	4	[CIRC.HPSUB]	PROSUB.ALF;1
15888	12	[CIRC.HPSUB]	OCS.DAT;1
5637	1	[ADFIX]	NOTES.JSR;1
3984	2	[CIRC.DECSUB]	HPSUB.ALF;1
3006	2	[CIRC.HPSUB]	ELSUB.DAT;1
2382	1	[CIRC.HPSUB]	MANAUTO.DAT;1
2067	6	[000000]	INDEXF.SYS;1
1950	1	[CIRC.HPSUB.BPA]	HP__V23__MAR88__RRN.SLC;2
1950	1	[CIRC.HPSUB.BPA]	V23QDT.SLC;1
1947	1	[CIRC.HPSUB.BPA]	HP__V24__APR88__RRN.SLC;3
1947	1	[CIRC.HPSUB.BPA]	V24QDT.SLC;1
1926	1	[CIRC.HPSUB]	HPCLEANUP2.SLC;2
1926	2	[CIRC.HPSUB.BPA]	HP__V21__JAN88__RRN.SLC;1
1926	1	[CIRC.HPSUB.BPA]	HP__V22__FEB88__RRN.SLC;2
1926	1	[CIRC.HPSUB.BPA]	V22QDT.SLC;1
1905	3	[CIRC.DECOLD]	BPAF1000B.SLC;1
1890	4	[CIRC.HPSUB.BPA]	HP__V16__NOV87__RRN.SLC;1
1890	1	[CIRC.HPSUB.BPA]	HP__V17__DEC87__RRN.SLC;1
1488	1	[CIRC.HPSUB]	INREX__VEGAS.DAT;1
1440	1	[CIRC.HPSUB.BPA]	V21REN.SLC;1

Report Summary

File ownership mask	:	[*,*]
Number of files	:	28
Total blocks allocated	:	607338
Largest size	:	300000
Average size	:	21690
% of disk used	:	56.33

Large Files report.



DECUS

Your best connection for training

Training for the future through DECUS Seminars...

Join thousands of other computer users who have benefited from participating in a DECUS sponsored training seminar. The information provided by each seminar will increase your knowledge and productivity and also help you keep pace with changing computer technologies.

Introduction to VAX/VMS Performance Management	July 11	Denver, CO
VAX/VMS and Clusters Software Configuration Management	July 12	Denver, CO
TeX Made Easy–Using TeX With the Plain Macro Package	July 25	Westford, MA
Introduction to Artificial Intelligence	July 26	Westford, MA
Introduction to DECnet-VAX Security	August 5	Cleveland, OH
VAX Notes–From Concepts to Customization–How to Become a Notes Wizard and Addict	August 5	Cleveland, OH
VMS Tuning "Rules of Thumb"	August 8	Cleveland, OH
Network Performance on DECnet-VAX Based Networks	August 21	Tysons Corner, VA
TeX Made Easy–Using TeX with the Plain Macro Package	August 22	Tysons Corner, VA
Organizing Software Maintenance via Software Tools–How to Plan, Develop, and Control Software Maintenance	August 29	Research Triangle Park, NC
Optimizing and Tuning VMS Systems for Large Applications	August 30	Research Triangle Park, NC
Introduction to Artificial Intelligence	September 7	Minneapolis, MI
MIS Planning–Conception, Implementation and Operation	September 7	Minneapolis, MI

Send today for complete seminar and registration information or call 617-480-3307.
Mail to DECUS, Seminar Information, 219 Boston Post Road, Marlboro, MA 01752.

CIRCLE 277 ON READER CARD

☐ Please send me the detailed seminar catalog including registration information
☐ I am not a DECUS member, please send me a Membership application

Name_____

Title_____

Company_____

Address_____

City_____

State_____ Zip_____

Digital Equipment Computer Users Society

FIGURE 3.

FILE AND FREE SPACE SUMMARY ON "USER3:"
PAKMANAGER Version 1.1x
Copyright (c) Demac Software Ltd. — 1987,1988
Mon, April 18, 1988. 2:57 pm

REPORT TYPE	MIN	COUNT	BLOCKS	% DISK	AVERAGE	LARGEST
Files	-	397	615768	57.11	1551	300000
Free Space	-	179	462423	42.89	2583	47106
Directories	-	17	81	0.01	4	24
Aged files	365	0	0	0.00	0	0
Backup Needed	0	22	85299	7.91	3877	80001
Duplicates	3	0	0	0.00	0	0
Expired files	- *	397	615768	57.11	1551	300000
Fragmented	2	28	494751	45.88	17669	300000
Large files	1000	28	607338	56.33	21690	300000
MultiVersions	3	9	618	0.06	68	240
OverAllocated	5	1	53	0.00	53	53
Placed files	0	3	21060	1.95	7020	16773
Zero Length	0	17	18	0.00	1	6

Cluster Factor : 3
Total Blocks : 1078272
Bad Blocks : 72
Owner : [*,*]

PAKMANAGER ***Summary.***

FIGURE 4.

CLUSTER FACTOR ANALYSIS ON "USER3:"
PAKMANAGER Version 1.1x
Copyright (c) Demac Software Ltd. — 1987,1988
Mon, April 18, 1988. 2:57 pm

CLUSTER FACTOR	WASTED BLOCKS	HIT RATE	BITMAP SIZE
1	0	100.00	264
2	202	49.12	132
3	425	28.21	88
4	516	24.94	66
5	705	18.39	53
6	884	15.11	44
7	1022	9.57	38
8	1024	11.34	33
9	1178	9.32	30
10	1210	8.82	27
11	1394	7.81	24
12	1400	8.31	22
13	1507	7.05	21
14	1638	6.80	19
15	1625	6.05	18

Cluster Factor Analysis report.

PAKMANAGER
DEMAC Software Ltd.
1260 Old Innes Rd.
Ottawa, ON K1B 3V3
(800) 267-3862
(800) 634-6552 (CA)
Price: $495 for VAXSTATIONs to $2,995 for VAX 8800s. Pricing is available for the new 8974s and 8978s
Hardware: VAX/VMS CPUs
CIRCLE 513 ON READER CARD

command to be executed on every file the ZERO report finds. A DCL command line beginning with $ Delete will be generated for every zero length file.

3. SWITCH = "/log" is a DCL command switch to be applied to each line of the command file.

4. /DCL = DeleteZero.COM specifies that DeleteZero.Com will be the name of the created DCL command file.

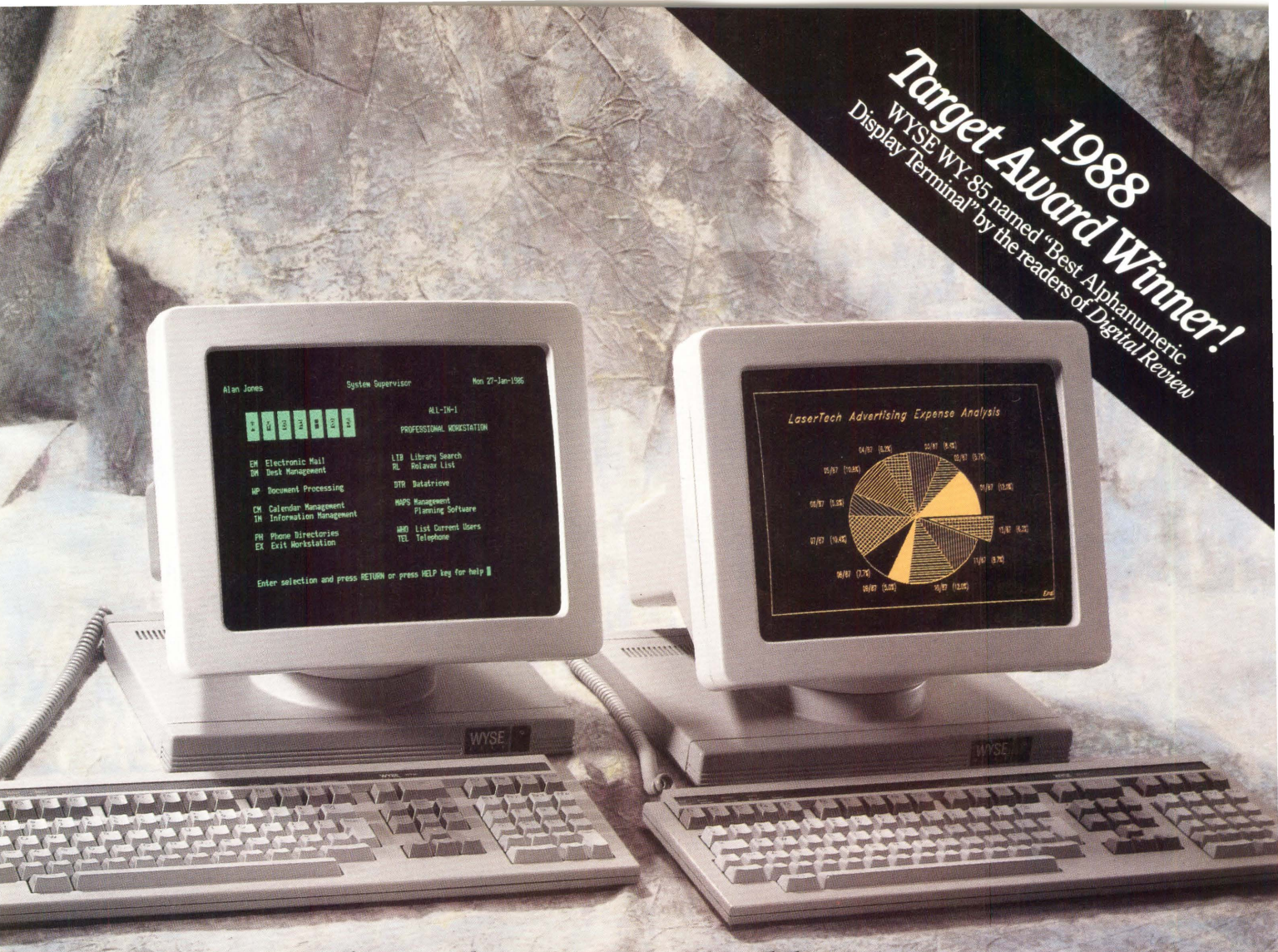
5. /OUT = Zero.Out is the name of the output file containing the report generated by the /ZERO report qualifier.

Documentation

PAKMANAGER is simple to use and contains a good online help facility. Its documentation is concise and helpful in explaining each report and the information it contains, although the program is so self-explanatory that you won't need the documentation very long.

The technical support personnel at DEMAC informed me that user response to *PAKMANAGER* has been overwhelming and many suggestions for additional features are being implemented. Therefore, when you obtain a demo or purchase the product, don't be surprised to see some extras not mentioned in this review. DEMAC is open to user feedback and takes it seriously.

PAKMANAGER provides a flexible, easy-to-use and powerful system to help you manage VAX disks effectively. If teamed with a disk compression and defragmenting utility such as DEMAC's *SQUEEZPAK*, the two tools will provide a solid one-two combination to fight against disk clutter. ■



Now the best seller comes in an illustrated edition.

With the WY-85 at left, Wyse authored the best selling alternative to DEC's VT-220. It's fully compatible with the VT-220, but loaded with features that make it even more compatible with the people who use it.

Like a larger 14" screen. Tilt and swivel base. An easier set-up mode.

And while our keyboard is identical to DEC's in layout, they can't touch our touch.

Our new WY-99GT at right further illustrates Wyse's continuing drive to improve on a standard. It features the same advantages as the WY-85. Plus graphics, with full Tektronix 4010/4014 compatibility, and high resolution characters.

Our dual resolution mode lets you retain full VT-220 compatibility and shift from DEC resolution to hi res.

And there's a happy ending. The WY-85 is just $599, the WY-99GT $649. Both are made, serviced, and supported by the company that ships more terminals than anyone but IBM.*

Wyse. When it comes to quality and value in terminals, we wrote the book. For more information, call 1-800-GET-WYSE.

WYSE

We make it better, or we just don't make it.

CIRCLE 258 ON READER CARD

Trademarks/Owners: Wyse, WY-85, WY-99GT/Wyse Technology; DEC, VT-220/Digital Equipment Corporation; Tektronix, 4010, 4014/Tektronix. Screen image on WY-99GT created using Cognos Power House.
*IDC 1986 U.S. Terminal Census.

FROM THE LAB

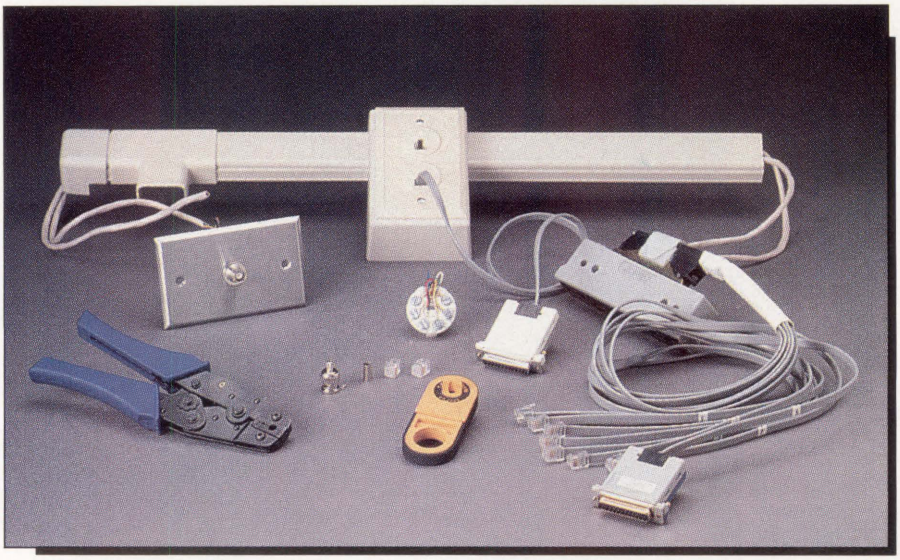
David W. Bynon

Modular Office Wiring

Wiring an office for connecting computers and their peripheral equipment used to be a complicated task. Although most offices using DEC equipment only require two types of connectivity, RS-232 and Ethernet, the traditional installation of these conductors wasn't simple. To implement the two wiring standards, you needed tools such as a transceiver tap, drill, TDR, soldering iron, multimeter, screwdriver, wire cutters, pin insertion tools and much more. The job required a communication electrician's tool kit and the knowledge to use it; wiring an office meant pulling wire through the walls, ceiling and floor.

> ***". . . the typical average office can be wired professionally in three or four hours."***

No more. The job now is so simple your average Lego-maniac can do it. By using modular office wiring, the typical average office can be wired professionally in three or four hours. The primary components of modular office wiring are six conductor telephone cord (also known as Telco wire and zip cord), RJ11 connectors and receptacles, RG58 shielded coaxial cable (basic ThinWire Ethernet hose), crimp-on BNC connectors and the plastic wire track of your choice. For more than eight connections in a single office, a closet patch panel or distribution panel also is needed. These components, together with five hand tools (wire cutters, RJ11 crimp tool, BNC crimp tool, hacksaw, screwdriver and tape measure), are all you need.



The primary components of modular office wiring are six conductor telephone cord, RJ11 connectors and receptacles, RG58 shielded coaxial cable, crimp-on BNC connectors and the plastic wire track of your choice.

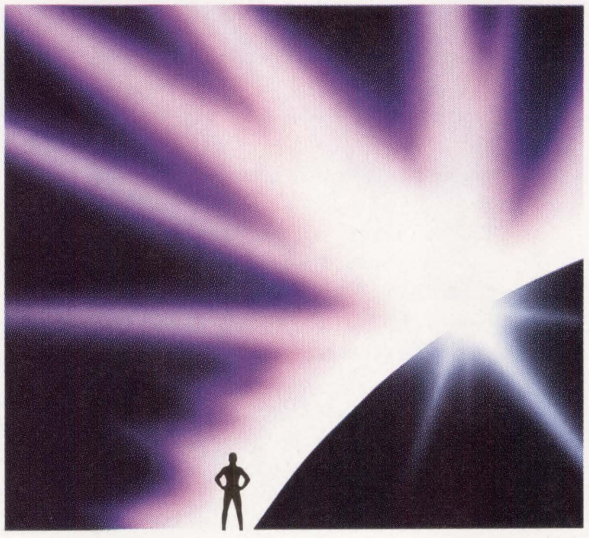
DEC made offices easier to wire by developing terminal servers and MICROVAXs. DEC terminal servers and MICROVAX systems allow the installer to localize most of the wiring effort. By installing either a terminal server or MICROVAX in or near the office it serves, the wiring mass (distribution to terminals and printers) can be contained in a small area, simplifying the wiring and future maintenance.

Let's examine the wiring task for the average office area. Most wiring areas are clustered. This simplifies the task, as you usually can install your distribution frame in a central location, such as a phone or utility closet, and string the wires from there. A distribution frame is a floor-standing or wall-mounted rack on which to mount patch panels, terminal servers and other communications equipment. If a wiring closet isn't available, you can use an enclosed 30-inch equipment rack, mount your terminal servers and patch panels inside, and use the top as a laser printer stand.

To disperse lines from the distribution frame to each office or area that requires terminals and printers, you lay plastic wire track and install receptacle boxes. The track is available in several sizes and colors to meet most requirements (always buy the track in a size larger than you currently need, as you never know when you'll have to run more wires). Numerous track fittings are available to join sections of track,

Empress

The High Tech RDBMS



The World's Most Advanced.

Standards

SQL Compatibility
UNIX, VMS and DOS plus a complete 4GL application development system.

Guaranteed Integrity
Referential integrity and warm restart on distributed databases.

Adaptability

Nested Transactions
Savepoints, full DDL support in nested transactions of unlimited size.

Kernel Level Access
Only EMPRESS provides a fully relational direct kernel interface.

Leading-Edge

Fully Distributed
DECNET, NFS, Apollo Ring with two phase commit on any number of databases.

User Defined Functions
No other DBMS allows the user to create their own datatypes.

Contact us today for more information.

Empress
The High Tech RDBMS

TEL (416) 922-1743 FAX 922-0162

CIRCLE 255 ON READER CARD

Distributors Of Modular Office Wiring Products:

Allied Telesis
2685 Marine Way, Ste. 1220
Mountain View, CA 94043
(415) 964-2771
CIRCLE 566 ON READER CARD

ANIXTER
4711 Golf Rd.
Skokie, IL 60076
(312) 677-2600
CIRCLE 558 ON READER CARD

Belden Wire & Cable
P.O. Box 1980
Richmond, IN 47374
(800) 235-3364
CIRCLE 559 ON READER CARD

Black Box Corp.
P.O. Box 12800
Pittsburgh, PA 15241
(412) 746-5500
CIRCLE 568 ON READER CARD

Cable Management Systems
17955 Skypark Circle, Ste. F
Irvine, CA 92714
(714) 261-2622
CIRCLE 560 ON READER CARD

Cabletron Systems
10 Main St., Box 6257
E. Rochester, NY 03867
(603) 332-9400
CIRCLE 567 ON READER CARD

Capitol Radio Wholesalers Inc.
12270 Wilkins Ave.
Rockville, MD 20852
(301) 881-2270
CIRCLE 561 ON READER CARD

Control Cable Inc.
Data Systems Division
7261 Ambassador Rd.
Baltimore, MD 21207
(301) 298-4411
CIRCLE 570 ON READER CARD

General Instrument
Network Cable Division
P.O. Box 1729
Hickory, NC 28603
(800) 982-1708
CIRCLE 562 ON READER CARD

Glasgal Communications Inc.
151 Veterans Dr.
Northvale, NJ 07647
(201) 768-8082
CIRCLE 563 ON READER CARD

INMAC Corp.
2465 Augustine Dr.
Santa Clara, CA 95054
(408) 727-1970
CIRCLE 569 ON READER CARD

Illinois Computer Cable
5207 Walnut Ave.
Downers Grove, IL 60515
(800) 323-2612
CIRCLE 564 ON READER CARD

MISCO INC.
One Misco Plaza
Holmdel, NJ 07733
(800) 631-2227
CIRCLE 554 ON READER CARD

MOD-TAP System
P.O. Box 706
Harvard, MA 01451
(617) 456-3500
CIRCLE 565 ON READER CARD

Nevada Western
615 N. Tasman Dr.
Sunnyvale, CA 94089
(408) 734-2700
CIRCLE 553 ON READER CARD

TW COMCORP
81 Executive Blvd.
Farmingdale, NY 11735
(516) 753-0900
CIRCLE 552 ON READER CARD

make corners, tee off and reduce the track size.

The plastic track is installed using the adhesive strip on the back. Cut the track to length, peel the tape off the adhesive strip and stick it into place (the baseboard is the safest place to apply it).

> ***"DEC made offices easier to wire by developing terminal servers and MICROVAXs."***

Use a hacksaw to cut the plastic. When all the wires are laid in the track, snap it closed.

Typically, you install receptacles close to where a terminal or printer is to be placed, or at evenly spaced intervals, such as every eight feet. There are dozens of modular receptacles available with your choice of 66-clip or screw-down terminations.

Standard three pair (six conductor) telephone wire or Telco cord runs inside the track between your distribution frame and receptacle boxes. Distances (between distribution frame and receptacle) of several hundred feet are possible; however, for the best performance, runs under 250 feet are suggested.

To couple the terminals and printers to their receptacles, use short lengths (six to 10 feet) of Telco wire. Telco wire uses modular plugs that crimp on, in two easy steps, with a small hand tool. Several modular plug types are available. The most popular are the standard RJ11 type (like your telephone uses) and the new Modified Modular Jack (MMJ), which is compatible with the DECCONNECT system. I promote the use of the MMJ, as it prevents someone from plugging its terminal into a telephone jack (detrimental to your office phone system).

When crimping modular plugs onto the Telco wire, make sure the wire

Accurate, Timely Information For Management Decisions

You can get it with MCBA business software. Because to succeed, management needs accurate, timely reporting of information. To increase efficiency. To control costs. To make effective decisions.

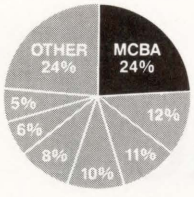
MCBA has been providing flexible, cost-effective business software for Digital Equipment Corporation computers since 1974. Today, our integrated accounting, distribution and manufacturing software system is available in COBOL for the entire range of Digital VAXs™. And our DIBOL® software runs on both the VAX and the PDP™-11.

Flexibility by Design

MCBA software is flexible, so you don't have to change your business procedures to use it. MCBA provides a wide range of report formatting and printing options, so you can get your data the way you want it. And even though MCBA software is loaded with powerful features, tens of thousands of users worldwide enjoy its user-friendliness.

MCBA—The Market Leader

A recent independent survey shows MCBA to be the leader in accounting software for the VAX, with the largest market share (see chart).



Digital VAX
Accounting Software
Market Share
MCBA 24%
Source: *Computer Intelligence*

Find Out More About MCBA

MCBA software can help you relieve manual tasks and increase efficiency—saving you time, effort and money. All of which makes MCBA software an effective management tool.

Find out more about MCBA. Complete and mail the coupon below today. Or call the MCBA office nearest you.* (Reseller inquiries are also welcome.)

Complete this coupon and mail to:

MCBA, Dept. A, 425 W. Broadway, Glendale, California 91204-1269.

☐ Please have an MCBA reseller contact me.
☐ Send me more information about MCBA business software in ☐ VAX COBOL; ☐ DIBOL for ☐ Accounting; ☐ Distribution; ☐ Manufacturing.

Name _____

Title _____

Company name _____

Address _____

City _____ State _____ ZIP _____

Phone (_____) _____ Best time to call: _____

I am an: ☐ End user; ☐ Software reseller; ☐ OEM; ☐ Consultant; ☐ Digital employee.

DP688

Software Solutions that Mean Business™

MCBA®

*__Headquarters:__ 425 W. Broadway, Glendale, CA 91204-1269. **(818) 242-9600**

*__Branch Office:__ 120 Wood Ave. S., Suite 300, Iselin, NJ 08830-2709. **(201) 548-6600**
(Serving AL, CT, DC, DE, FL, GA, MA, MD, ME, MS, NC, NH, NJ, NY, PA, RI, SC, TN, VA, VT, South America, West Indies, and Europe)

MCBA's COBOL Software for the Digital VAX: Accounting: Accounts Payable, Accounts Receivable, General Ledger, Fixed Assets and Depreciation, Payroll. **Distribution:** Purchase Order and Receiving, Customer Order Processing, Inventory Management, Sales History. **Manufacturing:** Bill of Material Processor, Job Costing, Labor Performance, Master Scheduling, Material Requirements Planning, Shop Floor Control, Standard Product Costing, Standard Product Routing, Capacity Requirements Planning. **DIBOL software for the PDP-11 and VAX is also available.**

Copyright ©1988 by MCBA, Inc. All rights reserved. MCBA is a registered trademark and Software Solutions that Mean Business is a trademark of MCBA, Inc. DIBOL is a registered trademark and VAX and PDP are trademarks of Digital Equipment Corporation.

CIRCLE 237 ON READER CARD

is well seated into the plug, and don't reverse the wires between the two ends. The best way to keep yourself from reversing the wires is to use a system. WHITE IS NOT RIGHT works for me; that is, the white wire always faces to my left as I crimp. If you follow this method, you can use the standard color code as your guide.

To adapt your terminal equipment to the modular wiring system, you use a DB25 (25-pin oval connector) to modular jack adapter. The adapters screw onto the equipment's RS-232 jack and, presto, you've been converted. If you already have equipment with modular jacks, such as the VT320 or VT340, an adapter isn't required. If you have terminal servers with DB25 connectors or if you're connecting directly to a VAX/MICROVAX with DB25 connectors, you'll need to install modular jack adapters here, too.

The adapters are available with standard RJ11 or MMJ connections and in different wiring configurations. Adapters for the computer side of the equipment are called Data Terminal Equipment (DTE) System and those for the terminals are called DTE Drop. For modems, a Data Communications Equipment (DCE) Drop adapter is used. When purchasing equipment, be aware that terminal servers and DH/DZ/DMF cabinet kits are available with modular jacks. Purchasing these models will save you the expense and trouble of adapters.

"When purchasing equipment, be aware that terminal servers and DH/DZ/DMF cabinet kits are available with modular jacks. Purchasing these models will save you the expense and trouble of adapters."

For offices to be wired with Thin-Wire Ethernet, the RG58 coaxial cable can be run inside the plastic track, beside the RS-232 cables. If you're not using Ethernet (Thin- or ThickWire), but you think you might someday, install it up front while you're running other wires.

There are many receptacle face plates available that support various combinations of modular jack, BNC,

What you don't need is a lecture on the advantages of a spreadsheet designed for VAX™ computers.

fiber couplings and other connections. My personal favorite is the Mod Barrel Plate by MOD-TAP Systems of Harvard, Massachusetts. On a single Mod Barrel Plate, I can install phone, RS-232, ThinWire Ethernet and video connections for about $22 (versus DEC's DECCONNECT faceplate at $42).

To connect the RG58 (ThinWire Ethernet) to each receptacle, you must splice a tee connector into the cable. This isn't as complicated as it sounds. For each splice, you cut the RG58 cable and install two BNC connectors. A BNC is a half-twist, quick connect/disconnect connector.

BNC connectors have three parts: the connector body, a sleeve and a tiny signal probe. They're installed in seven steps:

1. Slide the sleeve over the RG58.
2. Strip off ½-inch of outer insulation from the end (don't cut through the braided ground).
3. Strip off ¼-inch of the braided ground and inner nylon insulation (be careful not to cut or nick the center conductor).
4. Using a BNC crimp tool, crimp the signal probe onto the exposed RG58 center conductor.
5. Spread back the braided ground wire, and slip the BNC body over the signal probe. The center nylon insulation should be ¼-inch into the neck of the BNC, and the signal probe must be flush with the top.
6. Push the braided ground wire over the neck of the BNC; then slide the sleeve up to the BNC body as far as it will go.
7. Use the BNC crimp tool to crimp the sleeve onto the neck of the BNC.

After you've put a BNC on each end of the RG58, which you have cut, you can put a BNC tee connector between them. The tee then is connected to the receptacle plate. There's nothing to it.

At the wire closet or distribution frame, you have several options for termination. The most popular is to use a modular jack patch panel. The individual terminal lines are wired directly to the back of the patch panel. Short patch cords, with modular plugs, make the connection to your terminal servers or other data lines. In this way, you're free to change connections, if problems arise or your configuration changes.

If you have only a few connections, and your wiring is being run through a phone closet, you can make use of individual jack boxes. If none of these situations suits you, MOD-TAP has two quick-and-dirty adapters: the octopus and the harmonica. The octopus concentrates eight modular connectors into a single 50-pin connector. The harmonica distributes signals to eight modular jacks from a single 50-pin connector.

Modular office wiring is quick, easy, flexible and less expensive than fixed wiring methods. ■

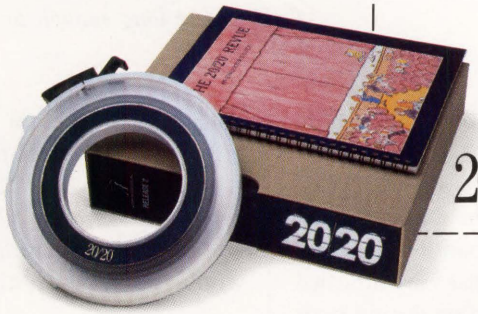
What you do need is proof.

Order a 20/20 Evaluation Kit and you'll get a full working program, documentation and Evaluator's Guide. 20/20 is the leading integrated spreadsheet for VAX™ computers. 75% of everyone who tries 20/20, buys 20/20. Once you see what it can do for you, we think you will, too.

Attached is my business card or letterhead. Please send:

☐ Information on ordering a 20/20 Evaluation Kit.
☐ Information on 20/20.
☐ Information on your reseller program.
Computer Model _____

Access Technology, 6 Pleasant Street, South Natick, MA 01760/617-655-9191. In Europe: 66-68 Chapel Street, Marlow, Bucks SL7 1DE, England (0628)890345 Telex: 848138 DPA688



20/20™ by Access Technology

CIRCLE 196 ON READER CARD

FROM THE LAB

John F. McGlinchey

Digi-Data's Gigastore

I was dreaming the other night that I could back up all 2+ GB of my disk storage without having a computer operator to attend to reels of nine-track tape. It was wonderful to put a small cartridge into a rack-mounted tape device at the end of the day and know that, while I slept, the system would back itself up without any intervention. I awoke with a sigh and came to work only to have Dave Mallery drop off a Gigastore VHS backup system from Digi-Data Corporation of Jessup, Maryland, in my office for review.

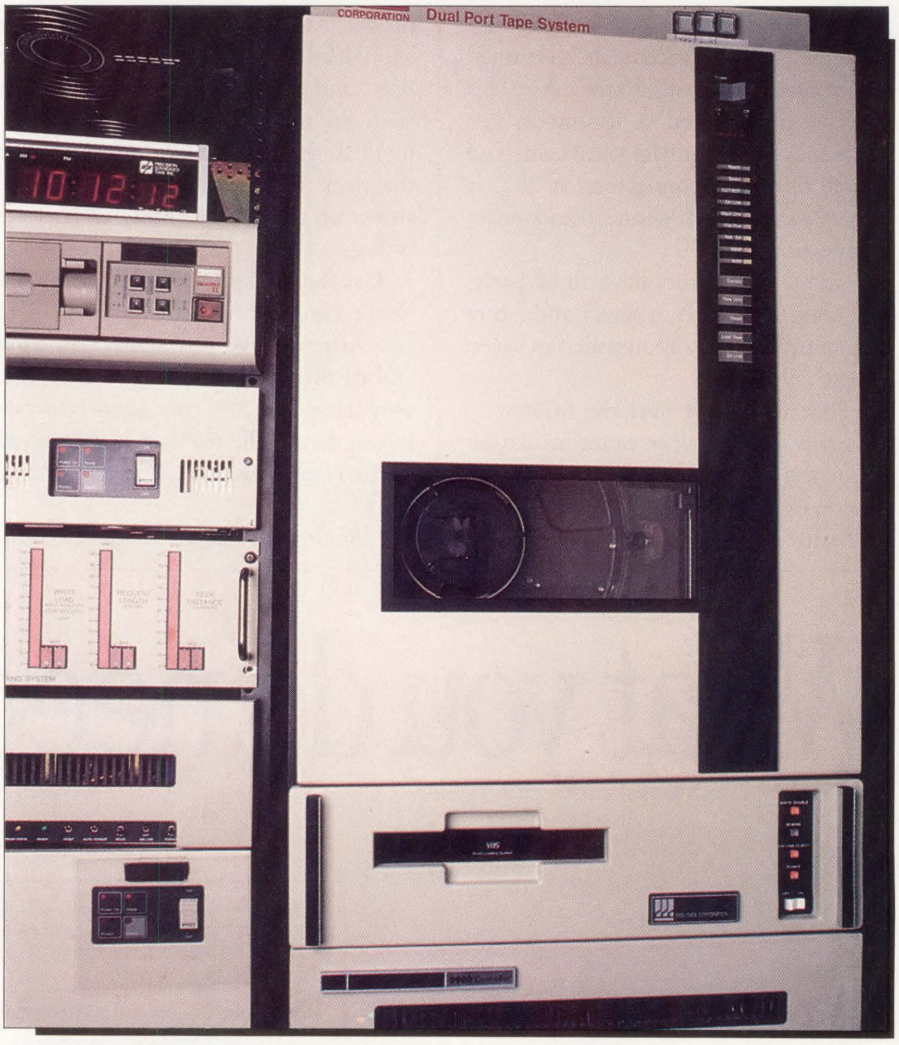
I installed it on a Q-bus MICROVAX II and then on a UNIBUS VAX 11/750 with relatively no problems. It uses a standard DILOG tape controller, so it looks like a TS11, device MSA0:. If you already have an MSA0: device, Gigastore can be modified so it won't conflict. For instance, if you already have an MSA controller, changing the device address will cause VMS to recognize the controller as MSB, etc.

The real configuration problem is that the drive must reside on the same machine with the data. It's not possible to drive the Gigastore to full throughput using data transfers over the LAVC coax. When we installed it on FRODO:: (our MICROVAX II), we had no difficulty backing up the 300 or so megabytes on its system disk, because that was local. BILBO::, our 750 cum disk farm, has about 2.2 GB on board and thus is an ideal test bed for capacity testing.

It's a true tape streamer. It starts moving tape on the first write operation and doesn't stop between files. It will run the tape for the length of the tape, which is six hours on a VHS T-120 cassette. It's up to you to enable your system to put the 2.5 GB of disk storage on that tape within the allotted time.

If you're in a situation where the CPU to which your disks are attached has an intensive schedule during your backup period, you might not be able to put all the data on the tape in six hours. This is true of any of the new drives that use a video tape as their base.

Here's the rub. The machine will need six hours from the first write. If you start the operation at 3 a.m., you won't be done until 9 a.m. Our



Gigastore fits in with our other devices. We installed it into a 19-inch H960 rack. Cables were long enough to reach anywhere.

DEMAND MORE

...FROM YOUR VAX.

When VAX users demand the latest, most productive data analysis tools, they get them with SPSS software. SPSS offers the only family of analytical software that's created specifically for the VAX/VMS environment. Enabling everyone to get more work done while conserving system resources.

SPSS products let you do it all, from data management and statistics to producing professional reports, charts and maps. Ready to run on everything from VAXclusters™ to VAXmates,™ they streamline every task.

Our SPSS-X™ mainframe system gives users the power to reduce mountains of data into meaningful information.

What's more, it comes with very special VAX options. Like SPSS-X Track,™ a versatile system management tool that lets you perform complete performance monitoring, capacity planning and chargeback reporting. And SPSS-X Capture,™ the data base interface that combines the data management capabilities of Datatrieve™ with the power of SPSS-X.

At SPSS, we've been producing software for the DEC community for over fifteen years! Now contact our Marketing Department to see what our products can do for you.

CALL 1/312/329-3304

SPSS inc. SPSS Inc. • 444 North Michigan Avenue, Suite 3000 • Chicago, Illinois 60611
In Europe: SPSS Europe B.V. • P.O. Box 115 • 4200 AC Gorinchem, The Netherlands • Telephone: +31183036711 • TWX: 21019

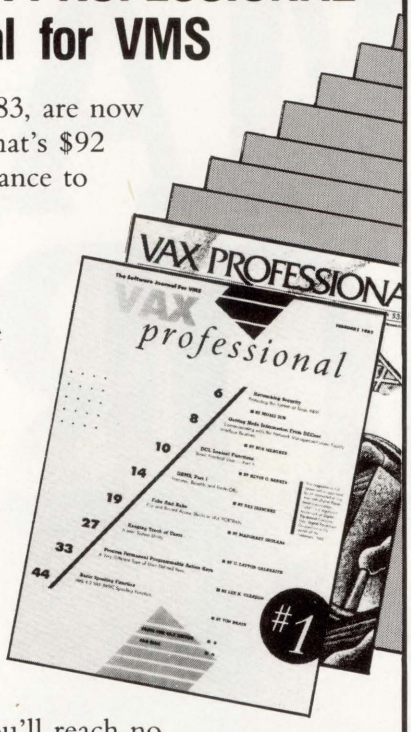
VAX, VMS, VAXcluster, VAXmate and Datatrieve are trademarks of Digital Equipment Corporation. SPSS-X, SPSS-X Capture and SPSS-X Track are trademarks of SPSS Inc. for its proprietary computer software.

© 1987, SPSS Inc.

CIRCLE 159 ON READER CARD

NOW AVAILABLE!
BACK ISSUES OF VAX PROFESSIONAL
The Software Journal for VMS

Issues dating back to August 1983, are now available at only $4 an issue. That's $92 for a 23 issue set. This is your chance to replace your worn-out copies and missing issues.



Over the years, VAX PROFESSIONAL has covered the important topics on VAX/VMS systems. Six issues a year, filled with articles by hands-on experts like Bill Hancock, Al Cini, Dave Mallery, Carl Marbach, Rex Jaeschke, Kevin Barkes and many more.

Complete your computer library, order a set of 23 back issues. Then, when you need technical software information, you'll reach no farther than your book shelf.

ORDER YOUR SET OF AVAILABLE BACK ISSUES NOW!

FOR FAST SERVICE CALL (215) 542-7008 with credit card information or complete and mail the form below.

▼ Clip and Send ▼

VAX PROFESSIONAL BACK ISSUE ORDER FORM

YES, I want _____ back issue set(s) at $92 per 23 issue set.

Payment enclosed for $_____

Charge to ☐ VISA ☐ MasterCard

(Canadian orders add $10 shipping for each set.)

Account #|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_| Expires _____

Signature _____ Date _____

Name (Please print) _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone (_____)_____

ALL ORDERS MUST BE PREPAID

Make checks payable and send to:

VAX PROFESSIONAL, P.O. Box 504, Spring House, PA 19477

DP688

Gigastore
Digi-Data Corporation
8580 Dorsey Run Rd.
Jessup, MD 20794
(301) 498-0200
Price: $6,275 to $6,675, depending on CPU.
CIRCLE 457 ON READER CARD

machines, like most real-life operations, run heavy batch schedules at night. These are not optional. I doubt that there are six contiguous hours in 24 available for dedicated backup service.

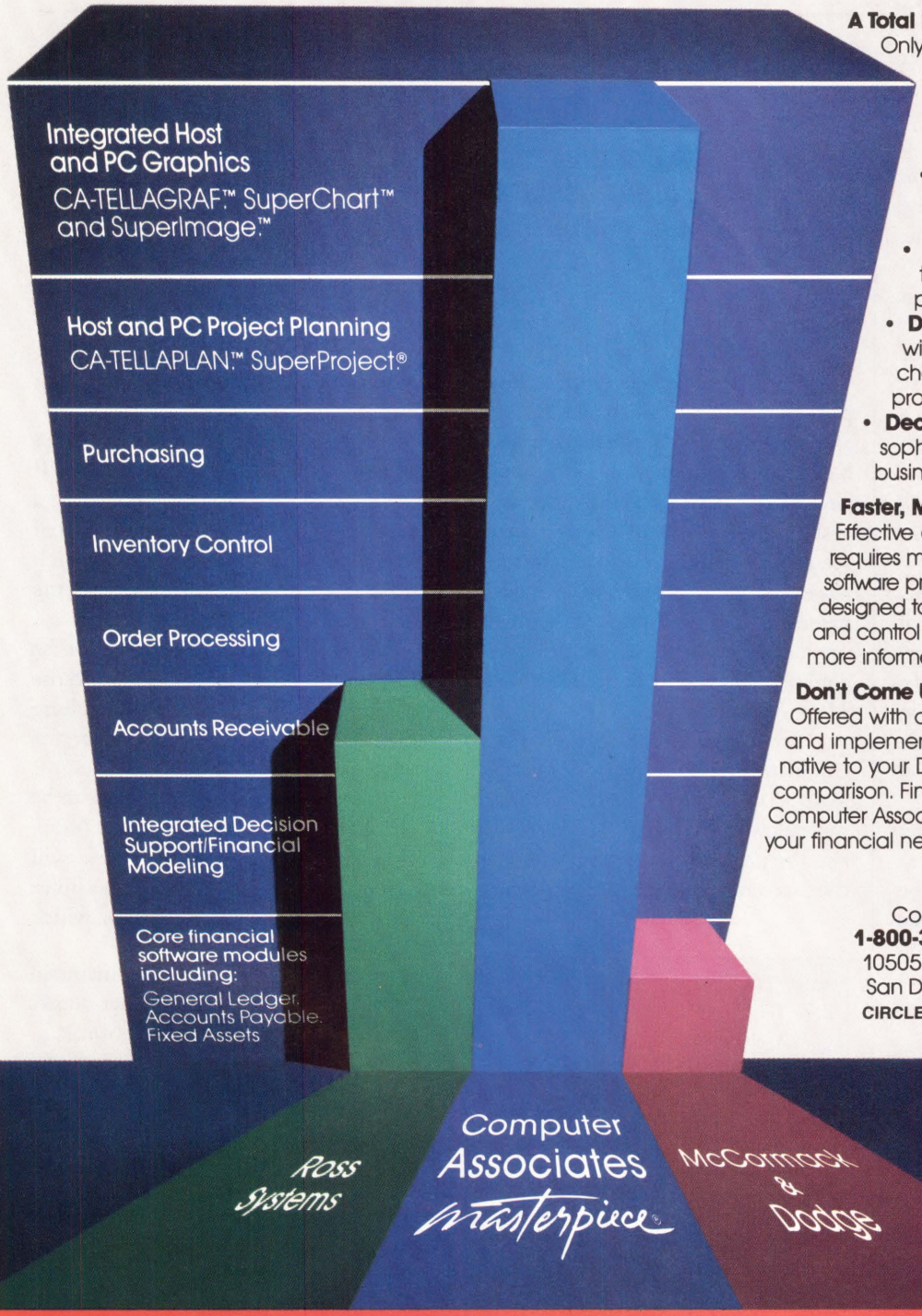
So, the ideal of a full image backup every night, devoid of operator attendance, is an illusion on our system. Daily image backups of subsets of the entire data farm are possible. The problem is that the concurrent batch load is a heavy determinant of the amount of data that actually will end up on the VHS tape during the available six hours.

Because we have no way of guaranteeing that the load will be low enough to attain the necessary data rate to the drive, we are limited to perhaps 1 GB or less of guaranteed capacity. If you can either guarantee full processor power for six hours, or have considerably less than the 2.5 GB as a backup requirement, then you seriously should consider VHS as a backup medium. The labor savings alone will buy the unit for you in six months.

A replacement TSDRIVER is included with Gigastore, which enables you to perform fast searching of files during restore operations. Without this Fast Search capability, restoring a file at the end of the tape would take six hours; i.e., the amount of time it takes to get to the end of a VHS tape in Play mode. With the driver, it takes less than 10 minutes. We did this by getting the very last file on a fully loaded tape. The driver takes advantage of the tape-drive's ability to Fast Forward.

All in all, this could eliminate the need for anyone to do daily backups. Insert a VHS tape before going home at night, and let a batch job do a full backup while you're dreaming. ■

Measured Against Masterpiece, All Other Financial Software Comes Up Short.



A Total Financial System.
Only Computer Associates' Masterpiece® offers a complete financial software system, with add-on capabilities beyond the reach of any competitor:

- **Graphics** that generate persuasive, executive-quality presentations and reports.
- **Host and PC Project Management** to provide versatile and advanced project management.
- **Distribution Management System** with fully integrated, realtime purchasing, inventory control and order processing.
- **Decision Support System** for more sophisticated financial analysis and business decision making.

Faster, More Informed Decision Making.
Effective corporate financial management requires more than just the basic accounting software products. Masterpiece's total solution is designed to improve your ability to manage and control your financial information for faster, more informed decision making.

Don't Come Up Short—Evaluate Masterpiece!
Offered with an unmatched on-site installation and implementation program, Masterpiece is native to your Digital VAX. We invite your comparison. Find out how Masterpiece and Computer Associates offer the best solution for all your financial needs. Call Chris Andrews today:

Computer Associates
1-800-343-4133 (Ext. 1906)
10505 Sorrento Valley Road
San Diego, CA 92121-1698
CIRCLE 193 ON READER CARD

COMPUTER ASSOCIATES™
Software superior by design.

- **World's leading independent software company.**
- **Broad range of integrated business and data processing software for mainframe, mid-range and micro computers.**
- **Worldwide service and support network of more than 70 offices.**

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

FROM THE LAB

Howell D. Rasor

Magic Menu

Have you ever come across a utility program that you couldn't live without? *SideKick*, from Borland International, Scotts Valley, Arizona, for example, is a classic. *SideKick* found its way into my PC about three years ago, and I've used it religiously ever since.

Magic Menu by EMETEK of Los Angeles, California, is also one of these useful little utilities. Only this time it's for VAX/VMS users. *Magic Menu* is an interrupt key menu system that works like, well, magic. It turns even the most average VAX/VMS user into a SPAWN-O-MATIC professional.

I like productivity from a VAX system. Lately, with the mounds of work I've had to do, a single terminal session simply wasn't making the grade. Once I installed *Magic Menu*, however, I was instantly converted into a multiprocessor; I can perform several tasks at once.

Being an avid interactive computer user, I was skeptical about a menu system, especially one that claims to be magic. I've seen menu systems before and they weren't very impressive. You always had to finish with one menu choice before running another. *Magic Menu* breaks the mold.

Magic Menu employs what EMETEK calls the "magic key" (CTRL-]). The magic key lets you return to the menu without having to finish what you're working on. As long as the program you're leaving doesn't request user input, it will continue processing while you go on to other work. If the program you left does require input, it will wait for you to return.

> ***The system manager can maintain* Magic Menu *or grant other users maintenance access using the MAGIC_MENU identifier in the SYSUAF.***

Magic Menu comes with a three-page installation guide, which is simple and informative. The first page and a half describes installation for most sites and the rest has special instructions for systems running DIBOL programs. It seems that DIBOL translates terminal names into numbers via a table of device names. So, in order to deal with this unique situation, EMETEK provides a command procedure to build a table for *Magic Menu* users.

After installing the product, two command procedures must be modified: SYSTARTUP and SYLOGIN. The changes will allow those using *Magic Menu* to run the program by typing MM. Captive accounts can use *Magic Menu* by putting the MM command in their log in procedures.

All menus are stored in SYS$COMMON:[SYSLIB]MMINFO.DAT. If this is unacceptable for your site, a system-wide logical name called MMINFO may be defined which translates into the full path name for the new location.

When the program is started for the first time, it prompts the user for license validation. This is done by calling EMETEK to get a special number for your installation.

Certain parameters may have to be changed for users running *Magic Menu*. If this is the case, *Magic Menu* will prompt the user when a menu choice fails to start and also tells him which parameter caused the failure.

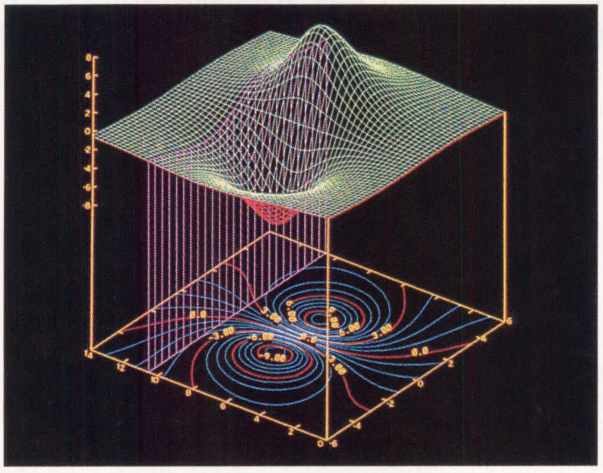
The system manager can maintain *Magic Menu* or grant other users maintenance access using the MAGIC_MENU identifier in the SYSUAF. Users with the MAGIC_MENU identifier have complete control over all menus.

Defining a menu within *Magic Menu* is, of course, menu driven. Simply choose the Maintain function from the Main Menu and the Menu Maintenance Menu appears. This allows you to edit your menu, or, if you're the

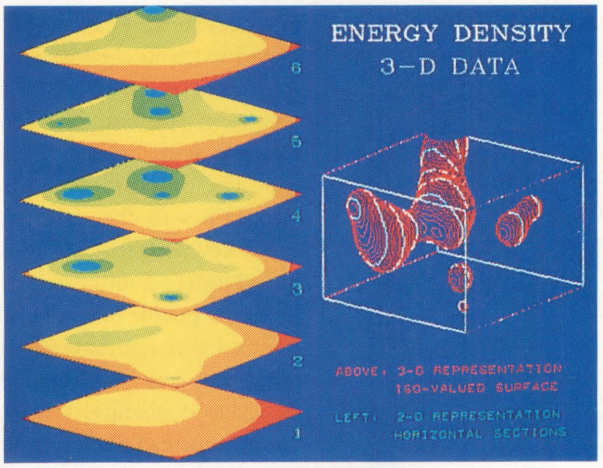
Magic Menu
EMETEK
9136 Gibson St.
Los Angeles, CA 90034-1925
(213) 836-2784
Price: $100 per concurrent user up to 70 users. Then $20 per user thereafter.
CIRCLE 504 ON READER CARD

SideKick
Borland International Inc.
4585 Scotts Valley Dr.
Scotts Valley, CA 95066
(408) 438-8400
CIRCLE 548 ON READER CARD

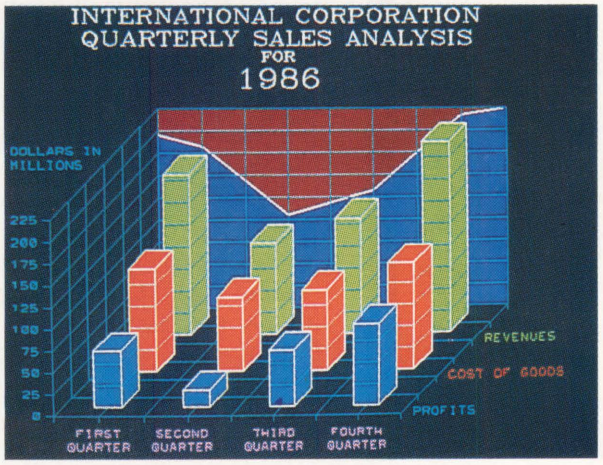
GRAFKIT™



3D Surface Over a Contour
Quantitative results displayed through contours can be combined with qualitative presentations of the same data using a surfacing routine. Contours can be used for displaying scientific distributions or representing geophysical data.



3D Solids and Contours
Presentation flexibility of 3D data is greatly enhanced by offering variable perspectives on 3D surfaces and solids. Contours and halftones may be added to clarify results.



Histograms and Graphs
2D and 3D histograms are available with color fill or shading capabilities. Choose from a complete set of characters and multiple fonts to enhance your graphs. A wide range of 2D and 3D graphs are also available.

A COMPLETE TECHNICAL GRAPHICS PACKAGE

TO EXPAND: PERFORMANCE

GRAFkit™ provides serious technical graphics capability for VAX computers in a VMS or ULTRIX environment. It allows the user to organize, store and output complex graphs on a wide range of devices by using simple calls to the GRAFkit™ library of routines.

VERSATILITY

GRAFkit™ is based on and includes a Graphical Kernel System (GKS) foundation which organizes graphic data in an ANSI/ISO approved format. It offers better integration with other software programs by using the national and international standards for graphic data. GRAFkit™ also includes an ANSI/ISO approved Computer Graphics Metafile (CGM) which allows data to be stored device independently. Over 100 popular devices are currently supported including: DEC, HP, Tektronix, Calcomp, Apple, Graphon, NDS, Versatec, IBM, BBC, etc.

TO SAVE: TIME

GRAFkit™ allows the user to concentrate on the application programs and pass the results through GRAFkit™ routines to automatically organize, interpolate, smooth, label, color/shade, translate, and produce a finished visual presentation.

EFFORT

In most cases, only a single call is used to access the GRAFkit™ library of routines, and all remaining functions are automatic. GRAFkit™ routines can be accessed from application programs written in C, Pascal, BASIC, COBOL, FORTRAN, PL/I, and ADA.

EXPENSE

Although GRAFkit™ is a complete technical graphics package, the initial cost is usually the same or less than the price of a GKS package alone from another vendor. At $3,995, GRAFkit™ is an ideal graphics solution for a work station. It can also be purchased for a variety of departmental VAX computers for under $10,000.

Our commitment to continuous support of the package at a nominal fee makes GRAFkit™ a fine investment for years of high quality service.

Call Today: 1-800-222-4239 ext. 714

SCO INC

740C South Pierce Avenue
Louisville, CO 80027-9989
303/666-5400
Telex:292682
FAX:666 7054

SCO, Inc. is a wholly owned subsidiary of International Computer Exchange, Inc.

CIRCLE 253 ON READER CARD

menu manager, define special menus, add users or modify existing menus. It's also possible to set up group menus for users who perform the same functions.

To change an existing menu or create a new one, you enter the number from the menu where you want the new choice to appear. Next, you enter the menu title, then enter the command that will be executed by that menu choice. When entering the command, you have some options to consider:

1. P — To pause after the program exits and before it returns to the menu.
2. Y — To enable CTRL—Y during program execution.
3. T — To enable CTRL—T during program execution.
4. I — To enable an interactive DCL session after executing the DCL command specified.
5. * — To prompt you for information.

For example, if you decide to have menu option 1 give you a directory listing of the default directory, you would enter DIRECTORY for the description of option 1 and DIR *(/P) to pause after the directory. To return to the menu you would press RETURN.

All of the switches (P,Y,T and I) must be enclosed within parentheses and the parentheses must be preceded by an asterisk. Switches may be mixed to suit your needs.

The most recent release of *Magic Menu* incorporates a print function on all user menus. This function lets the user print a full screen of information from any of the active menu choices. When choosing this function it prints the screen of the menu choice last active to the printer of your choice. This is a useful function for many types of applications.

> ***"The only problem I had with the program was the magic key; it's the same key used for exiting a connection in KERMIT."***

Magic Menu does nothing more than create a subprocess (SPAWN) for every menu choice you have active. Because of this, *Magic Menu* can be a memory hog. I ran eight of the nine possible menu choices, effectively nine processes, and used a total of 2.4 MB of memory. This could be a sore point for systems with limited resources.

The only problem I had with the program was the magic key; it's the same key used for exiting a connection in KERMIT. I discussed the problem with the people from EMETEK and they suggested an amicable solution: Change the exit key within KERMIT (SET ESCAPE 33 changes it to open square bracket instead of close square bracket).

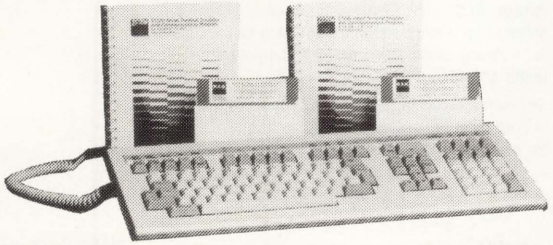
There are two terminal situations under which *Magic Menu* failed to operate: remote terminal (SET HOST) and VAXSTATION VT100/220 emulation windows. The terminal types WT and RT aren't recognized.

If you run into problems, telephone support is available from EMETEK. They also are open to suggestions for product improvement. For the money, it's well worth the capability it provides.

Editor's note: EMETEK has recently added *Magic Menu* to VMS V5.0. It works with VT100/200/240/320/340 and compatibles, in ANSI alphanumeric or line drawing mode. *—Howell D. Rasor is a senior personal computer consultant at Bynon & Associates, Silver Spring, Maryland.*

PowerStation™

A Complete VT220 / VT241 Work Station Upgrade for the IBM PC/XT/AT and PS/2



"Now true 800 pixel wide VT241 display and support for VMS Services for MS-DOS."

PowerStation™ 240 $435
VT240 style keyboard and ZSTEM VT240 Emulation Software. Optional WPS labelled keys (GOLD KEY MODEL) add $30.

ZSTEM pc™ - VT240 Emulator Emulation Software only. $295
VT240/241 Emulation Software with all the features of ZSTEM VT220 plus ZSTEM 4014, sixel and ReGIS graphics.

PowerStation™ 220 $289
VT220 style keyboard and ZSTEM VT220 Emulation Software. Optional WPS labelled keys (GOLD KEY MODEL) add $30.

ZSTEMpc™-VT220 Emulator Emulation Software only. $150
All the features of ZSTEM VT100 plus 8-bit mode, downloadable fonts, user defined keys, full national/multi-national modes. Extended macros-/script language. True 132 columns on Hercules, VGAs, Super EGAs, and standard EGAs using the EGAmate option. 128 columns on CGAs. 43 line support on EGAs. Enhanced keyboard support. Ungermann Bass Net/One and VMS Services for MS-DOS support.

EGAmate™ $39
Daughterboard option for 132 columns and true 800 pixel wide ReGIS display on standard EGA adapters.

PS220/2 $19
Keyboard adapter cable for PS200 on PS/2 systems.

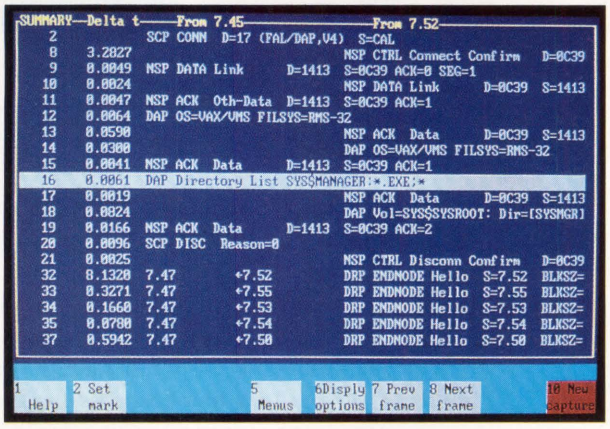
ZSTEMpc™-4014 Emulator $99
Use with ZSTEM VT100, VT220, or stand-alone. Interactive zoom and pan. Save/recall images from disk. Keypad, mouse, digitizer, printer, plotter, and TIFF support. 4100 color and line style color mapping. 640 x 400 and 640 x 480 on some adapter/monitors.

ZSTEMpc™-VT100 Emulator $99
High performance COLOR VT100. True double high/wide, smooth scrolling. ISO and attribute mapped color. XMODEM and KERMIT, softkey/MACROS, DOS access.

KEA Systems Ltd.
#412 - 2150 West Broadway, Vancouver, B.C. Canada V6K 4L9
Telephone (604) 732-7411 **Telex** 04-352848 VCR **Fax** (604) 732-0715
Order Toll Free (800) 663-8702
30 day money back guarantee AMEX/MC/VISA

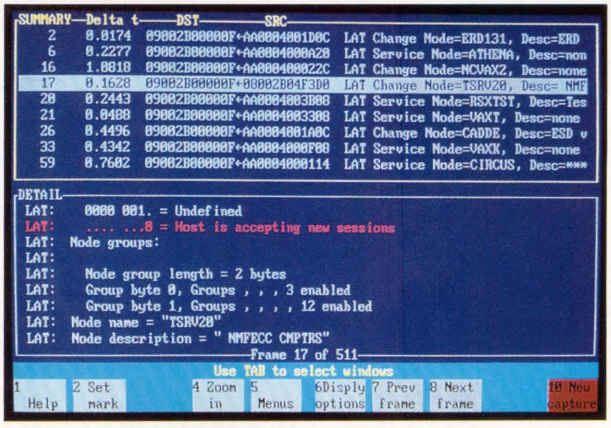
CIRCLE 132 ON READER CARD

Your network's darkest secrets exposed.



Unveil what protocols hide!

The Sniffer's DECnet protocol interpreter handles key protocols, including SCP, NSP, and DRP, as shown in this SUMMARY analysis of Ethernet frames. You can CAPTURE information based on lower level protocol content, node addresses, pattern matching, and/or frame error conditions, then instantly DISPLAY information in the format you prefer for analysis and understanding.



Peer into network activity at will!

Go below the SUMMARY view to see the DETAIL behind all network packets. The Sniffer sheds light where darkness reigned. Even LAT is fully decoded. Now you can tune and adjust your network configuration to meet your requirements. Get the most out of your network investment by seeing what's actually happening . . . before you invest more in your network.

Yes, your DECnet™ has secrets. Secrets like excessive retransmissions, or unexplained timeouts.

And you're paying for them. With lower network performance, high network maintenance costs, inefficient network planning and expansion, or even network downtime.

The Sniffer:

A complete system for network analysis that delivers big benefits: Better LAN performance, maintenance, and planning. Payback is often a matter of weeks.

Enter The Sniffer. Exit network secrets.

Attach the Sniffer™ to your LAN, and turn it on. You'll feel at home with the Sniffer's intuitive menu structure after just a few minutes.

Capture all the information on the network.

Or, using the menus, select various triggering and filtering combinations, to home in on areas you want to analyze closely.

And in moments, you'll see your LAN's protocol and traffic information laid out in the display format you choose for analysis and action.

The Sniffer takes you inside the critical networking protocols.

All the key DECnet protocols: LAT, MOP, DRP, SCP, NSP, DAP, and NICE. And there are software modules for TCP/IP, Sun protocols (including NFS), ISO/MS-Net, XNS/MS-Net, and Novell NetWare,® with more on the way.

Do you have multiple LANs? The Sniffer can have multiple personalities. So you don't need to buy a different system for each LAN.

What made The Sniffer the industry leader in only 2 years?

Network complexity. The bigger the network, the greater the consequences of network secrets.

The Sniffer's protocol capabilities, intuitive menu, display/reporting features, and multiple LAN personalities are unmatched by any other network instrument.

That's why our customer list includes virtually *every* significant network vendor. Including Digital.

Get this free information:

Includes a hands-on demo disk that runs on your PC- or AT-compatible, simulating the instrument. Plus literature, and a DECnet case history.

Toll-free 1-800-952-6300.
Ask for Dept. G93

In California, 1-800-423-4440.
Ask for Dept. G93

Please specify Ethernet,® Token Ring® ARCNET® or StarLAN version.

Network General

1945A Charleston Road
Mountain View, California 94043

© Copyright 1988 Network General Corporation
Trademarks: The Sniffer: Network General Corporation. DECnet: Digital Equipment Corporation. Registered Trademarks: ARCNET: Datapoint Corporation. Ethernet: Xerox Corporation. Netware: Novell, Inc.

Helix Revisited

A look at two new data reduction tools from Odesta.

BY AL CINI

WORKING TOGETHER, a Macintosh and a VAX are a great team; VAX capacity and power controlled through Macintosh graphics. Driven by the right software, VAX information viewed through the uniquely seductive Macintosh user interface makes for a powerful and flexible decision support system.

In "The Networked Mac/VAX" (December 1987), we saw how Odesta Corporation of Northbrook, Illinois, combined the graphics front end of its *Double Helix* relational database product (see Screen 1) for the Macintosh with a VAX-based back end database record server, introducing this combo as *Helix VMX* and hinting of advanced data analysis and reduction tools to come (see Editor's Note).

MAPPING YOUR DATA

ODESTA'S *GEOQUERY* IS best described as a map-based spreadsheet package. Once data records containing five-digit ZIP Code fields are loaded into *GeoQuery*, the package can answer complex geographic questions about them.

GeoQuery accepts data records in standard Macintosh row-column format: input data records consisting of their component fields, separated by tab characters, each record ending with a carriage return character. Data in this format naturally is produced by most VAX terminal emulators' COPY TABLE option, as well as by the data dump/export facilities provided by *Helix* and other Macintosh database applications. Thus, information can be extracted easily from any Macintosh or VAX data source for use with *GeoQuery*.

Initially, *GeoQuery* displays a complete map of the United States, partitioned into regions by state boundaries. The *GeoQuery* view of the U.S. can be reduced to a particular area of interest by selecting and cutting unwanted states, and by slicing states into smaller regions (see Screen 2). *GeoQuery* includes atlas files describing the continental United States, Alaska and Hawaii. Optional atlases available from Odesta include regional and county U.S. maps, partitioned into smaller areas by several popular criteria; e.g., Areas of Dominant Influence.

GeoQuery refers to input data records, located by their component ZIP Codes, as pushpins. *GeoQuery*'s Load pushpin function asks for the name of the input file containing the data records, reads the first record in the file and displays its fields through three vertical scrolling areas. A *GeoQuery* user specifies the record location of the ZIP Code by scrolling through and selecting these input fields. Record identification and classification fields, which assist in subsequent analysis, also can be selected. The *GeoQuery* package includes pushpin records for U.S. cities.

With pushpins loaded and geography narrowed, the *GeoQuery* user can add landmarks interactively; e.g., towns, buildings, etc., by specifying their names and ZIP Codes. The distances between landmarks and pushpins can be measured by *GeoQuery*'s ruler mapping tool, and the records found within a given distance from a landmark or within a defined region can be found. Simple summary reports of located records can be obtained within *GeoQuery*; for more complex analyses, records can be copied through the Mac's Clipboard into other applications (see Screen 3). *GeoQuery* maps also can be copied into drawing packages, such as *MacDraw,* for manual enhancement.

While the product works well in the sometimes restrictive environment of a Macintosh Plus or SE, *GeoQuery*

Confused?

No wonder.

Macintosh®-VAX/VMS™ Networking means a dizzying array of connectivity products, network architectures, and hardware options.

Why not join us at our office in Marlton, NJ (20 minutes from Philly, two hours from New York) to get your hands dirty and your head straight:

June 13-15, 1988 •
July 6-8, 1988 •
August 1-3, 1988 •
September 7-9, 1988 •

The Macintosh/VAX Networking Lab

Course length - 3 days

Tuition - $950

Training Objectives:

- Find out how to connect your Macintosh and IBM PC-compatible workstations through a VAX
- Understand AppleTalk and DECnet network architectures.
- Learn how to install and use various AppleTalk network hardware products.
- Learn how to install and manage various DECnet and AppleTalk based Mac/VAX networking products.
- Learn how to use and evaluate Macintosh terminal emulators.
- Learn how to develop VAX-based Macintosh database applications.

Topics Covered:

Network Architectures •
DECnet, AppleTalk

Network Hardware •
Ethernet
LocalTalk
Bridges
Gateways

Network Management •

Terminal Emulators •
VT100, VT220,VT240
Tektronix

VAX/VMS File Servers •
AlisaTalk, PacerShare

Networked Databases •

Network Management •

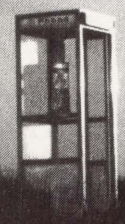
COMPUTER METHODS CORPORATION
525 ROUTE 73 SOUTH • SUITE 300 • MARLTON, NJ 08053
CONSULTING • TRAINING • SOFTWARE ENGINEERING

PHONE (609) 596-4360 ***FAX (609) 596-4362***

Macintosh and AppleTalk are registered trademarks of Apple Computer, Inc.
VAX and VT are registered trademarks of Digital Equipment Corporation.
IBM and IBM PC are registered trademarks of International Business Machines, Inc.

CIRCLE 179 ON READER CARD

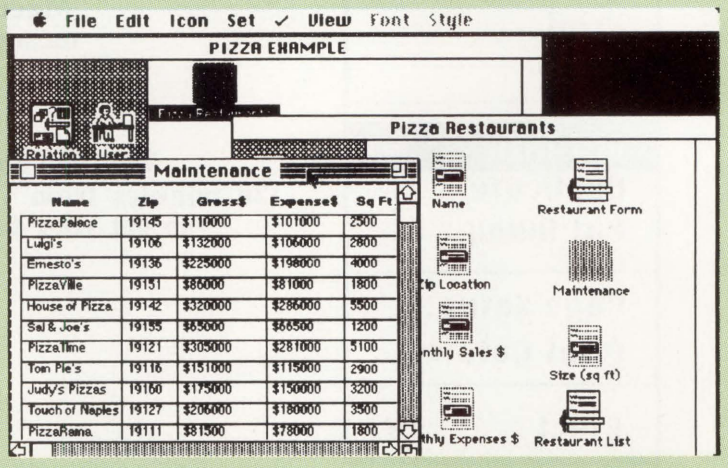
If you're worried about cancer, remember this. Wherever you are, if you want to talk to us about cancer, call us. We're here to help you.



AMERICAN CANCER SOCIETY

2,500,000 people fighting cancer.

SCREEN 1.



Pizza restaurant example *Double Helix II* database definition.

really can use a Macintosh II's greater speed, larger monitor and color display capabilities, especially for big analysis jobs. On both large and small screens, though, demographic information comes alive through *GeoQuery*. Geographic trends in data such as sales information and subscription lists, which might be impossible to discern with traditional reporting tools, become apparent immediately through *GeoQuery*.

THE STATISTICS CONNECTION

AS *GEOQUERY* IS to geographic data, *Data Desk* is to observational data. *Data Desk* is a fairly complete statistical analysis and graphics package whose features are especially powerful in exploratory statistical analysis.

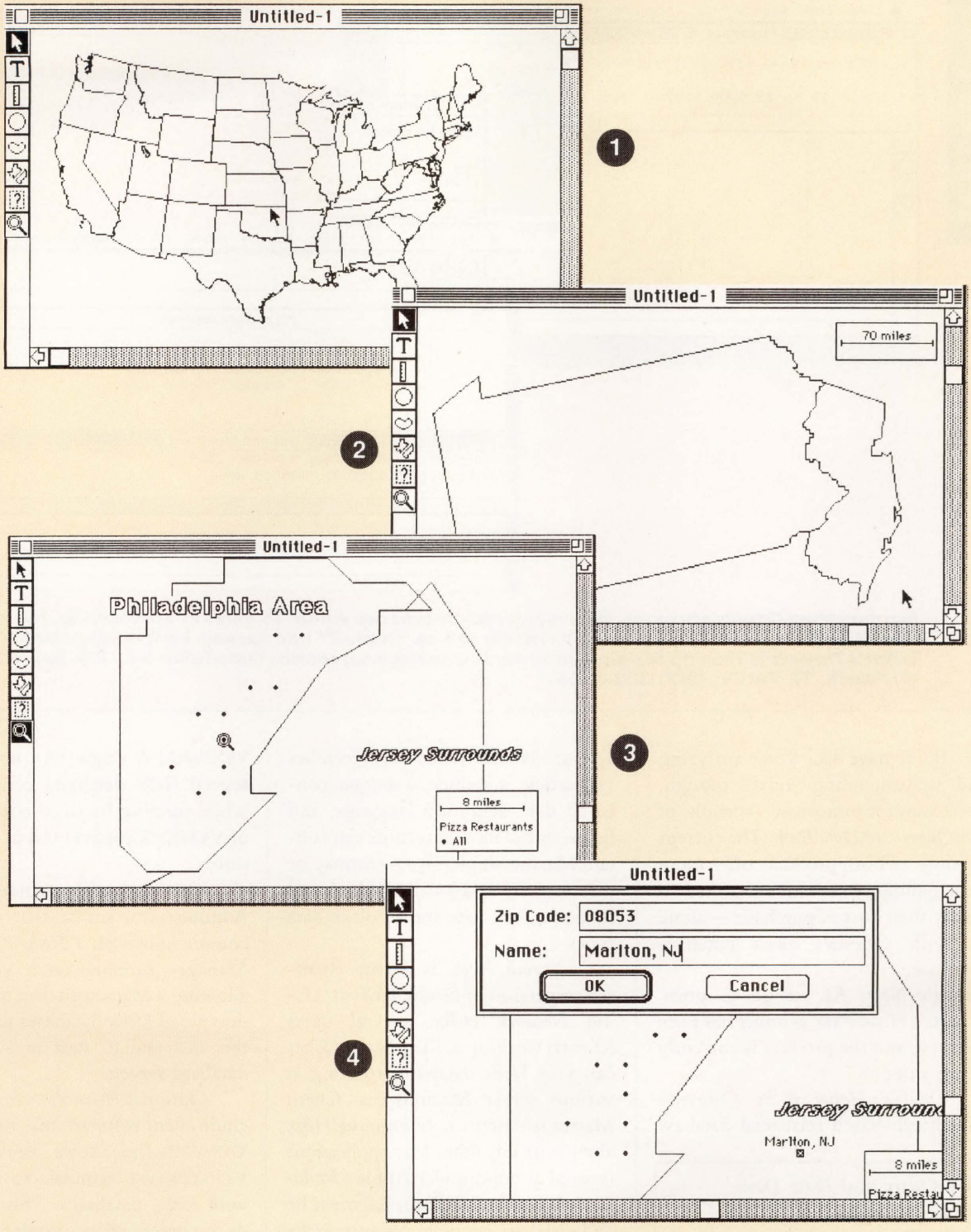
Like *GeoQuery*, *Data Desk* can accept data records in row-column format. Unlike *GeoQuery*, however, *Data Desk* also can import its data (*Data Desk* refers to them as variables that correspond to a record's fields) directly from a *Double Helix* database (see Screen 4).

Built-in *Data Desk* graphics capabilities include the usual two-variable scatterplots, as well as a very sophisticated multivariate 3-D plot. *Data Desk*'s 3-D plots can be viewed from different angles by rotating them on the screen using one of several *Data Desk* plot tools. With a mousestroke, a *Data Desk* user can get these plots spinning and lean back and watch their data points revolve in orbit around the center of the graph. Think you see something in the data? Ask *Data Desk* for a correlation, regression or analysis of variance report and view the numbers through separate windows alongside your spinning graph (see Screen 5).

WHAT'S MISSING?

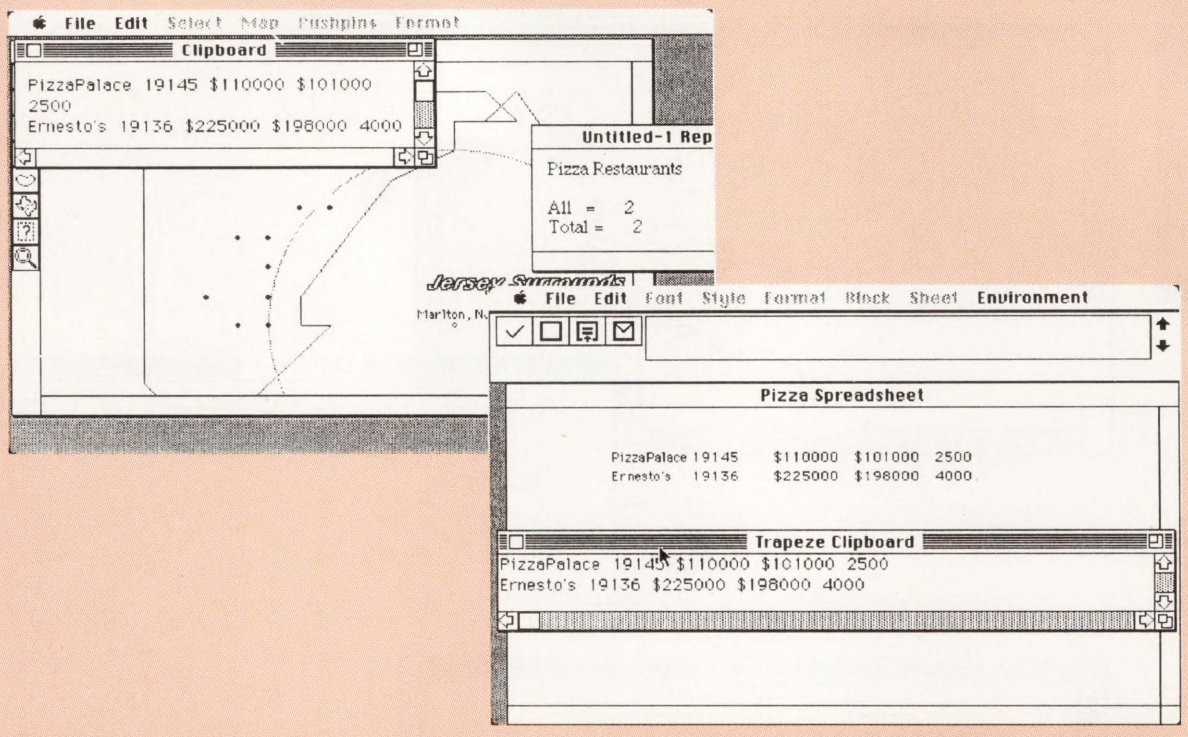
GEOQUERY COULD USE some sort of map exaggeration feature to raise states or regions in proportional relief to the percentage of data records contained within them. Also, *Data Desk* should be able to import variables from a networked *Helix* database, such as *Helix VMX*, and *Helix* variables should be accessible from *GeoQuery* directly, without an intermediate dump-load operation. Odesta claims it's working on a closer integration with all versions of *Helix* for both products.

SCREEN 2.



***GeoDesk* map query features. 1. Initially, a U.S. map is displayed. 2. States can be selected and "cut" from the map, leaving PA and NJ area of interest. 3. PA and NJ can be "sliced" into parts; example data points appear as "pushpins" on the new map. 4. "Landmark" reference points can be added interactively, located on the map by ZIP Code.**

SCREEN 3.



Manipulating *GeoQuery* maps. How many restaurants are within 16 miles of our Marlton, NJ, landmark? Data records selected by such criteria can be "copied" into spreadsheet applications (Data Tailor's *Trapeze* is shown). For more information on *Trapeze*, contact Data Tailor Inc., P.O. Box 11530, Ft. Worth, TX 76109; (817) 332-6836.

If you have data worth analyzing and understanding today, though, don't wait for tomorrow's versions of *GeoQuery* and *Data Desk*. The current versions of both products offer more than enough innovative features to justify their cost of purchase — alone or with Odesta's *Helix* database software.

Editor's Note: As we go to press, Odesta's *Helix VMX* product has been released, and the product is currently being shipped.

Double Helix II is Odesta's Macintosh-based relational database system. As reviewed in the December 1987 article, it includes a unique icon-based data definition language, and fields within its data records can contain Macintosh pictures — bitmap or pict format — as well as the usual numeric, text, date and Boolean data types.

Network Helix is a true client-server version of *Double Helix II*. Using *Network Helix*, several users (clients) working at their Macintoshes can visit *Helix* databases running at various server Macintoshes. Client Macintosh users can be running *Helix* along with any other Mac applications (several at once, under Apple's *MultiFinder*). Server Macintoshes must be dedicated to running *Network Helix* server software.

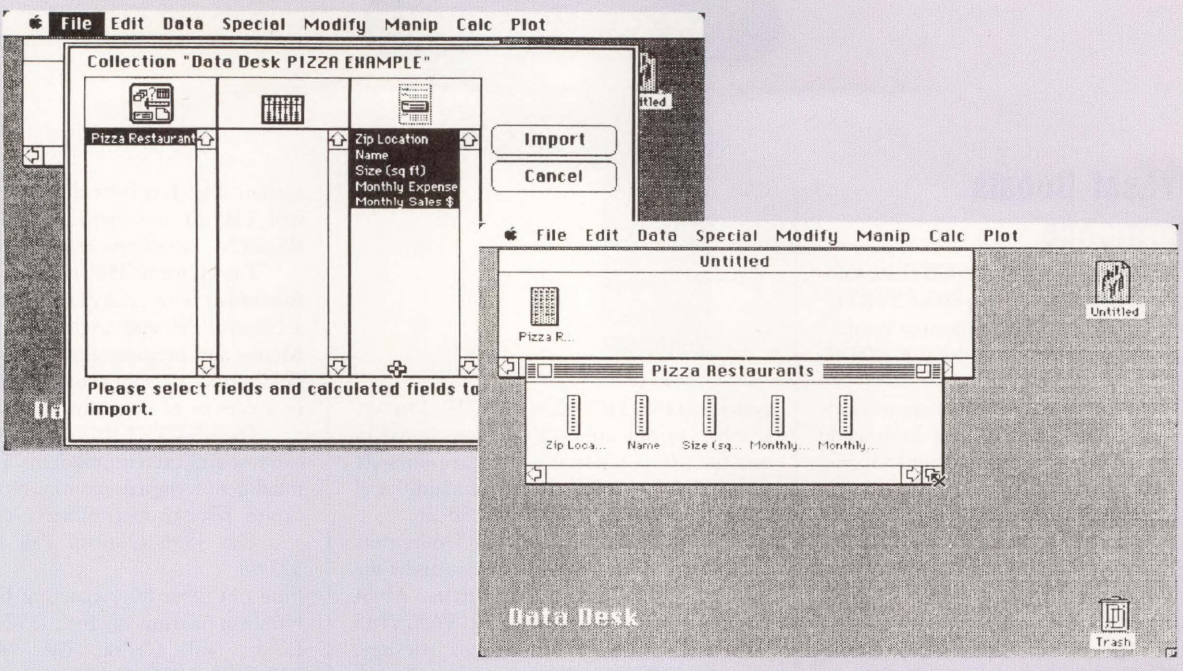
In operation, *Helix VMX* replaces the dedicated Macintosh database server with processing running under VAX/VMS. A single VAX could offer several *Helix* databases concurrently while running its usual complement of VAX/VMS applications at the same time.

Helix VMX also includes a *Helix* Administrator utility that works in conjunction with a *Helix* Collection Manager running on a VAX host, allowing a Macintosh user to up- and download *Helix* databases to or from the VAX and to start or stop *Helix* database servers.

Optional *Helix VMX* features include client software that runs under VAX/VMS and allows users at DEC VT100/200/300 terminals to visit *Network Helix* databases. This interface does a heroic job of simulating Mac's windows and pull-down menus on the character-cell-oriented VT screen — ignoring Macintosh-only pictures and fonts, of course.

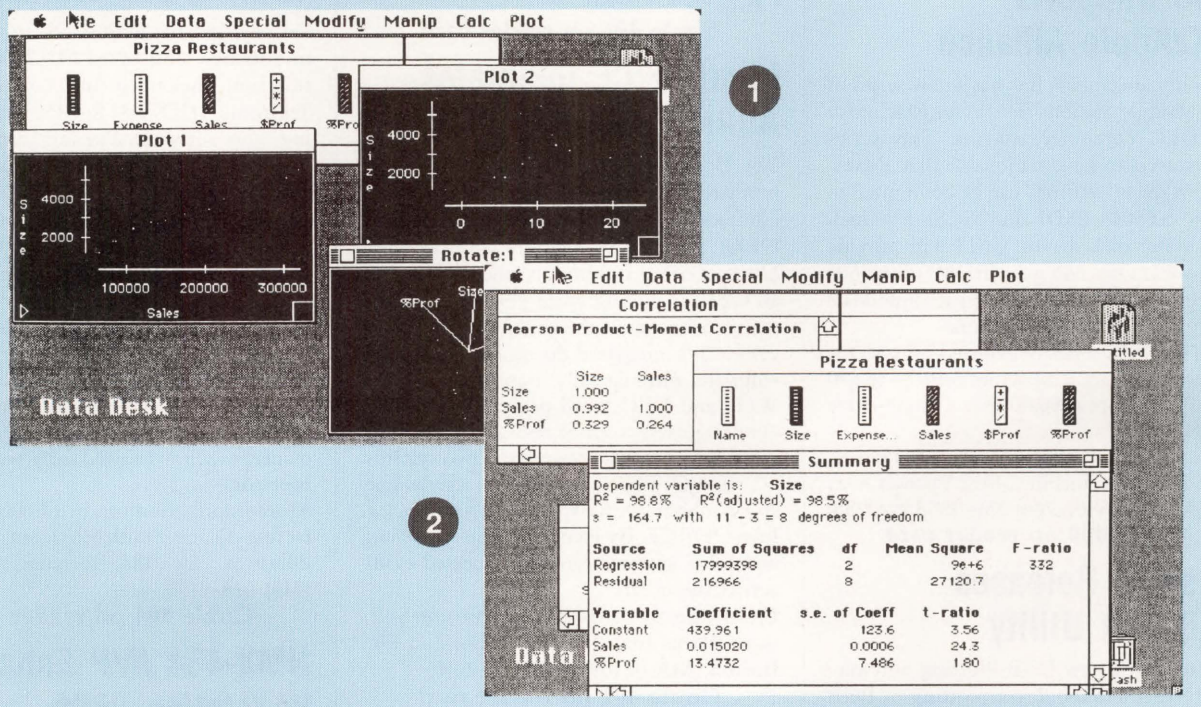
GeoQuery* and *Data Desk
Odesta Corporation
4084 Commercial Ave.
Northbrook, IL 60062
(312) 498-5615
CIRCLE 547 ON READER CARD

SCREEN 4.

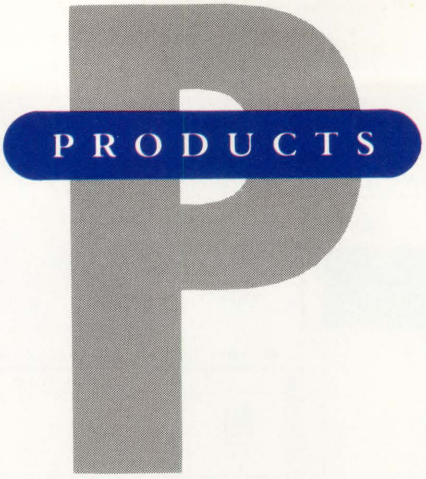


Data from *Helix* collections can be "imported" directly into the *Data Desk* for statistical analysis.

SCREEN 5.



Once imported, database variables: 1. Can be studied through numerous *Data Desk* plotting features, including "3-D" plots for multivariate analysis. 2. Can be reduced using statistical procedures, including regression and variance analysis. ■



SYBYLset Boosts Performance

Tripos Associates announced SYBYLset software on the new VAXstation 8000. SYBYLset, an integrated suite of molecular modeling software modules, includes the SYBYL and MENDYL packages.

SYBYLset provides full-menu interaction (pop-up, pull-down, and look-aside menus are all options) and flexible iconic mouse-driven modeling tools. These features offer an intuitive, easy-to-use system for researchers in molecular modeling. User interfaces also can be customized for individual needs, allowing the researcher to assemble a personalized toolkit.

Find out more by contacting Mary Woodward, Tripos Associates Inc., 6548 Clayton Rd., St. Louis, MO 63117; (314) 647-1099; (800) 323-2960.

Circle 409 on reader card

DMS Supports DEC/Apple Alliance

CMS Enhancements Inc. has a new series of Data Module Stations (DMS) for Macintosh and DEC computer systems. This series allows users to have removable disk drives. The 5¼-inch "Station" can be configured to accept ST506, ESDI and SCSI 5¼-inch Winchester disk drives. CMS will provide Removable Data Modules (RDM) of various capacities and disk interfaces to accommodate a variety of data requirements.

The DMS series of external subsystems ranges in formatted capacities from 71 to 670 MB. Prices start at $6,000 for a single-drive subsystem.

For further information, contact Ted James, CMS Enhancements Inc., 1372 Valencia Ave., Tustin, CA 92680; (714) 259-9555 ext. 258.

Circle 400 on reader card

Versatec Releases RGB Plot Utility

Versatec has a new RGB Plotting Software Utility that lets the direct plotting of RGB (red, green and blue) data on Versatec plotters. It supports all Versatec electrostatic and thermal transfer color plotters.

The RGB Plotting Software Utility supports user customization in the following ways: to be used with these additional color systems (HLS, HSV, CMYK: CIE, L*u*v*, L*a*b*); to operate on RGB data stored in one file (RGB triplets) or in three separate files (red, green, blue); to support additional plotters for producing gray scale; etc.

The RGB Plotting Software Utility runs on VAX and MicroVAX computers under the VMS operating system. It's written in ANSI FORTRAN 77 and distributed in VAX/VMS format. The utility is a standalone package.

The RGB Plotting Software Utility costs $500.

Obtain more information by contacting Versatec, a Xerox company, 2710 Walsh Ave., Santa Clara, CA 95051; (800) 538-6477; in CA (800) 341-6060.

Circle 401 on reader card

InterOFFICE Integrates All-IN-1 And OFFICE

The Boston Software Works Inc. has announced InterOFFICE, which provides complete and seamless integration of the OFFICE and ALL-IN-1 messaging systems. Users of either system can send messages of all types, including word processing documents, to users of the other system. InterOFFICE's integrated document conversion software automatically translates between Wang and DEC word processing formats, allowing users to share revisable word processing documents between the two systems.

InterOFFICE operates over a serial line, so any system with a spare serial line can run InterOFFICE. By using modems, the Wang and DEC systems can be connected easily across the ocean.

Learn more by contacting The Boston Software Works Inc., 120 Fulton St., 2nd Flr., Boston, MA 02109; (617) 367-6846.

Circle 402 on reader card

Test Paks Added To The Huntron 4500

Huntron Instruments has added two Test Paks to its Huntron 4500 universal diagnostic system. The Test Paks allow the 4500 Control Pak to test hard disk systems and RS-232-C asynchronous equipment.

The Huntron 4500 is a simulation-based functional tester and exerciser consisting of a Control Pak and a selection of Test Paks. Menus and preprogrammed tests allow for field service personnel to isolate board faults in a variety of electronic hardware.

The RS-232IT (Interface Tester) Test Pak can test and exercise modems, multiplexers, intelligent terminals, communications ports, cables, laser printer, plotters, etc.

The 4500 Control Pak is priced at $2,995.

Find out more by contacting Jim Crosson, Huntron Instruments Inc., 15720 Mill Creek Blvd., Mill Creek, WA 98012; (206) 743-3171; (800) 426-9265.

Circle 403 on reader card

Tek, ReGIS Built Into 16 MHz 386 Workstation

Pericom Inc. has built on-board emulations into its new 386-based MX7000 Workstation unit, making it fully compatible with Tektronix 41XX and ReGIS, without needing more software. The full complement of emulations include VT220, Retrographics VT640 and Westward 3220.

The workstation gives you access to host-based applications with no degradation of performance over a conventional graphics terminal. It also gives extra speed and power to users running standalone applications, including those using its enhanced EGA mode. In this mode, the MX Workstation simulates an EGA resolution close to the display's normal viewable resolution of 1K x 780 and dispenses with the need for a separate EGA monitor.

More information can be obtained by contacting Diane Smith, Pericom Inc., 2219, 205th St., Ste. 103, Torrance, CA 90501; (213) 618-9190.

Circle 404 on reader card

NMX-464 AVP Enhances VAXstation 8000

Numerix Corporation has announced the availability of the NMX-464 Attached Vector Processor (AVP) for the VAXstation 8000. The dual precision hardware capabilities of the NMX-464 allow the compiler

to select the correct precision for each segment of code based on the required precision of the user-declared valuables. The NMX-464 is fully supported with a FORTRAN integrated vector processing (IVP) software system, a traditional attached processor FORTRAN development system, more than 400 Math Library functions and diagnostic software support. Both FORTRAN environments include an optimizing compiler that supports many of the VAX FORTRAN extensions and a screen-oriented debugger.

The NMX-464 supports DEC's entire family of workstation systems, including the Q-bus and UNIBUS interfaces.

Find out more by contacting Jeanne McColl, Numerix Corp., 20 Ossipee Rd., Newton, MA 02164; (617) 964-2500.

Circle 405 on reader card

New VAX/VMS System Management Tools

EVA-TUNER and EVA-BACKUP are the latest products of EVA Systems Software BV. EVA-TUNER gives VAX system managers exact data about the performance status of their VAXs and tells them how to tune their systems for optimal performance. It starts by loading and analyzing the nominated VMS monitor file automatically before entering in an interactive dialog with the user. Once the user has answered some questions, EVA-TUNER writes a VAX/VMS performance assessment report and advises the user how to tune his VAX for maximum performance.

EVA-BACKUP is fully automatic. The system manager can set a time during off-peak hours for the backup. At the preset time and day, EVA-BACKUP will wake up automatically and perform all aspects of its job. Get more information, by contacting Christian Rothemeyer, EVA Systems Software BV, Amsterdamsestraatweg 23, NL-1411 AW Naarden, The Netherlands; +31-2159-43304; FAX: +31-2159-45714.

Circle 406 on reader card

ASCII Terminal Aimed At DEC Market

Memorex Telex announced a new ASCII display terminal. The Memorex Telex 0220 ANSI Display Station is a plug-compatible alternative to the VT220, VT100 and VT52 display terminals and can be used in the DEC and IBM environments.

The 0220 displays the full DEC supplemental and special graphics character sets and any VT220-compatible, downline-loadable character sets. It also supports 15 different international character sets.

The Memorex 0220 can connect directly to a DEC CPU or any other system that supports the ANSI X3.64 communications standard.

The Memorex 0220 ANSI Display Station costs $545.

Find out more by contacting Tom Lustenader, Memorex Corp., 611 South Milpitas, CA 95035-5473; (408) 957-1000.

Circle 415 on reader card

Diskeeper Introduced For VAX 8840

Executive Software Inc. has a Diskeeper for the VAX 8840. It's modified to operate on VMS 5.0 to accommodate the new 8840. Diskeeper for the 8840 prevents the 8840's disks from becoming fragmented and impacting the processing capabilities of DEC's most powerful VAX. Diskeeper will manage these disks, eliminating the fragmentation of files to allow data to be read at maximum speed while also grouping free space at the front of the disk for efficient and contiguous creation of new files.

Diskeeper prices start at $249 for VAXstations including the 8000, to $4,500 for the VAX 8840.

To obtain more information, contact Leland Thoburn, Executive Software Inc., 3131 Foothill Blvd., Ste. F, La Crescenta, CA 91214-2699; (818) 249-4707.

Circle 407 on reader card

BIOSYM Ports Software To VAXstation 8000

BIOSYM Technologies Inc. is porting two of its products to operate on the VAXstation 8000 workstation. The two software packages are Insight and Discover. Both products now are used in protein engineering, drug design and chemical research applications in the U.S., Europe and Japan. Insight is a powerful 3-D real-time, computer graphics program. Discover is a rigorous program for molecular dynamics and simulation for small and macromolecular systems. Used to analyze the interactions of proteins, nucleic acids and organic molecules and polymers, Discover also is used in protein engineering and drug design.

Learn more by contacting Christine Sheppard, BIOSYM Technologies Inc., 10065 Barnes Canyon Rd., Ste. A, San Diego, CA 92121; (619) 458-9990.

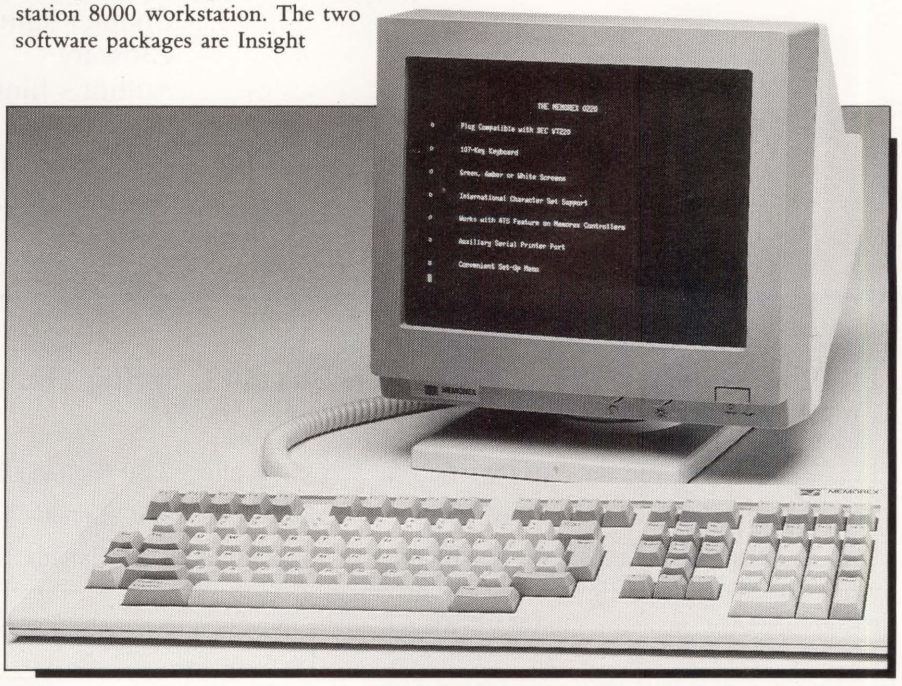
Circle 408 on reader card

Cameo Systems Announces CAMSTAT

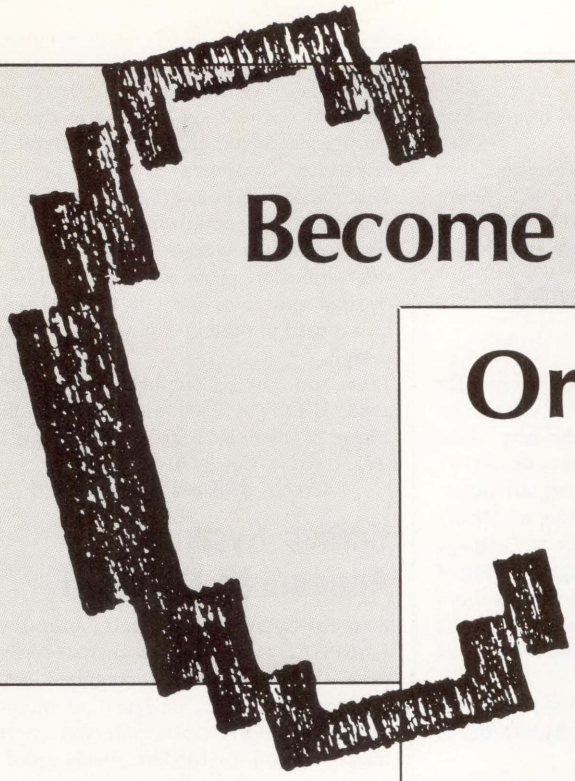
Cameo Systems Inc. has announced CAMSTAT, a powerful data analysis software tool. CAMSTAT is an integrated set of statistical functions, designed to monitor, detect, help correct processes and improve quality control. CAMSTAT was designed for use by operators, technicians and engineers responsible for the daily problems encountered in a modern manufacturing facility.

The menu structure ensures that a user is productive immediately. The use of color and graphics, together with visual displays, make interpretation of the results fast and simple.

CAMSTAT simultaneously supports parametric, attribute, character and data



Memorex Corporation's ASCII display terminal.



Become a 'C' Expert...

Order *Let's C Now*

by Rex Jaeschke

A Self-Teaching Guide to C Language in Two Volumes

Volume 1: Introductory material
13 User-friendly chapters
A guide to learning C

Volume 2: Advanced instruction
13 self-teaching chapters
All you need to know to use C

26 lessons from *DEC PROFESSIONAL* magazine's "Let's C Now" column, updated and compiled by author Rex Jaeschke. Written for any operating system using DEC hardware, primarily for VAX and PDP.

Plus: Tested examples
Chapter summaries
Glossary
Author's hints and suggestions
Workbook format

For fast service call (215) 542-7008 with credit card information, or clip and send the attached order form.

Please complete and return with payment to:

PROFESSIONAL PRESS, INC., P.O. Box 503, Spring House, PA 19477-0503

Payment must be made in US dollars and drawn on a US bank.

Please send me:

_____ **two-volume set(s)** of *Let's C Now* at **$42.95** plus $3.00 (Canada $6.00) for postage and handling per set.

_____ copy(ies) of *Let's C Now, Volume 1* at $22.95 plus $1.50 (Canada $3.00) for postage and handling per copy.

_____ copy(ies) of *Let's C Now, Volume 2* at $22.95 plus $1.50 (Canada $3.00) for postage and handling per copy.

Please charge my credit card: ☐ VISA ☐ MasterCard

Account # _____

Expiration Date _____/_____

Signature_____ Date_____

Name/Title _____

Company_____

Address _____

City _____ State_____ Zip_____

Country _____ Telephone ( )_____

DP688

variables. It also has full-screen data entry and editing.

For further information, contact the Product Marketing Department, CAMEO Systems Inc., 2880 San Tomas Expwy., Santa Clara, CA 95051; (408) 986-9200.

Circle 410 on reader card

VAX/VMS System Tuning Guide Offered

In conjunction with its VAX/VMS system software, Software Techniques is offering a practical guide to system tuning. Written for novice or experienced system managers, *System Tuning — For Better Performance* provides information on basic performance issues such as how to perform tuning benchmarks, achieve better disk performance and tune system caches. Tuning tools available in VMS and from third-party vendors are discussed, and special attention is given to the problem of handling file and free space fragmentation. For a free copy, contact Sharon Donnelly, Software Techniques Inc., 6600 Katella Ave., Cypress, CA 90630-5105; (800) 332-8650 ext. 771.

Circle 412 on reader card

Hard Launches The 645-ISDN

Hard Engineering has launched the ISDN Basic Rate field service protocol tester. The 645-ISDN handles 2B + D monitoring, emulation and protocol decode.

All three protocol layers are analyzed including the diagnostic codes. The large super-twist LCD display is easy to read, and statistics and data are shown on the same screen. The device can analyze and record to disk at speeds up to 256 Kbps.

The 645-ISDN costs $7,995.

For more information, contact Michael Leigh, Communications Test Equipment Division, Hard Engineering, 3005 L&N Dr., Huntsville, AL 35801; (800) 367-3126.

Circle 411 on reader card

D-MON Reduces Downtime

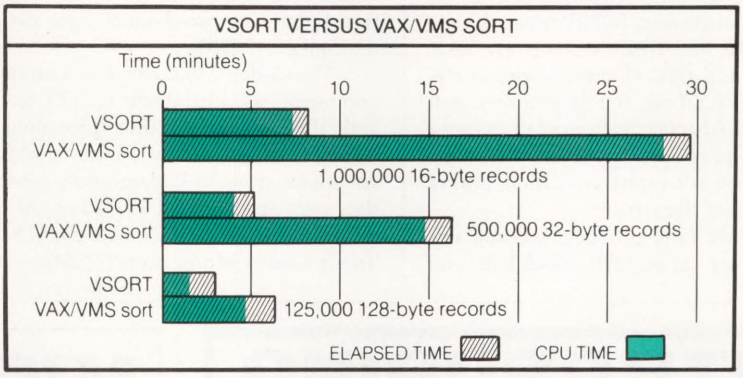
D-MON is new software from Bear Computer Systems for VAX/VMS, which allows the system manager to monitor the disk resource use of all accounts on the system accurately and efficiently. D-MON reduces downtime due to disk storage exhaustion.

D-MON maintains an automatic database of past and present use by directory and file owner without disrupting prime-time use. It generates reports that pinpoint which directories have fluctuated in disk storage space and monitors all disks on the system, including disk volume sets, and reports the

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. (Also available for RSX-11M.)
- *TAM* an efficient screen formatter for transaction processing applications. (Also available for RSX-11M.)
- *DIALUP* a data communications package that links RSTS/E and VAX/VMS 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, RSX and PDP are trademarks of Digital Equipment Corporation.

CIRCLE 282 ON READER CARD

totals and subtotals in every directory and all files not contained in any directory. It operates a three-tiered alarm mechanism that alerts the system manager of impending disk space shortages.

Find out more by contacting Candee Foster, Bear Computer Systems, 5651 Case Ave., North Hollywood, CA 91601-9985; (818) 508-1894, outside CA, (800) 255-0662.

Circle 418 on reader card

TCP/IP LAN Versions Available

Systems Strategies Inc, an AGS company, has a new version of its VAX Link connectivity software which runs across TCP/IP LANs. The new VAX Link TCP/IP products let workstation users on a TCP/IP network connect to IBM mainframe systems via VAX Link SNA and BSC communications software. With VAX Link TCP/IP products, each user on the LAN benefits from all of the same capabilities previously available on a single machine, such as terminal emulation, printer emulation and file transfer.

The VAX Link products offering this capability are SNA/3270, SNA/RJE and BSC/RJE running under the ULTRIX operating system.

Pricing for the software residing in the VAX server ranges from $3,500 to $7,000. Pricing for each VAX node on the network ranges between $1,000 and $3,500 for each VAX Link product.

Find out more from Lynn Paffman, System Strategies Inc., 225 W. 34th St., New York, NY 10001; (212) 279-8400.

Circle 419 on reader card

Codex 2362 Provides High-Speed Data Transmission

Codex Corporation has introduced the 2362 point-to-point leased line data modem. It has a high-density nest configuration and an optional four- or six-channel time division multiplexer (TDM).

The Codex 2362 complies with the requirements specified by the CCITT for V.33 and V.29 operation, thus providing the benefits of standardization for worldwide communications. In V.33 operating mode, the data rates are 14.4 and 12.0 kbps. At these speeds, the Codex 2362 makes use of 8-state Trellis Coded Modulation (TCM).

The Codex 2362 also can be nested in a Codex 2000 Series Nest Enclosure. It has an easy-to-use front panel soft-strapping, a 16-character user-friendly display, CQMS line parameter monitoring and full diagnostics including integral EPG.

Contact Kristen Sloan, Codex Corp., Maresfield Farm, 7 Blue Hill River Rd., Canton, MA 02021-9903; (617) 364-2000 ext. 5339.

Circle 421 on reader card

ezSNA/RJE Interfaces DEC, IBM Systems

Datanex Inc. now interfaces VAX and MicroVAX systems with IBM and compatible computers running DOS/VSE/POWER, in addition to JES2 and JES3. ezSNA/RJE software provides IBM 3777-4 SNA/RJE Workstations functionality to VAX and MicroVAX systems.

ezSNA/RJE uses standard DEC interface hardware (DMB32, DMF32, DPV11), can operate on a single VAX system or with its RJEnet option can provide RJE and file/transfer services to several VAX systems in a DECnet network and/or on a VAXcluster.

The product is priced at $7,500 for the

INTRODUCING

AUTOCAD®

RELEASE 9

FOR

VAXstation II/GPX

AND

VAXstation 2000

SETTING THE STANDARD FOR COMPUTER AIDED DESIGN & DRAFTING SOFTWARE

CSE COMPLETE SYSTEMS & SOFTWARE AUTHORIZED AUTODESK DEALER

COMPUTER SYSTEMS ENGINEERING INC.
3504 7th AVE. S. BIRMINGHAM, AL. 35222
(205) 328-CADD / (205) 328-2233

AutoCAD is registered in the U.S. Patent & Trademark office by Autodesk, Inc.
VAXstation is a registered trademark of Digital Equipment Corporation.

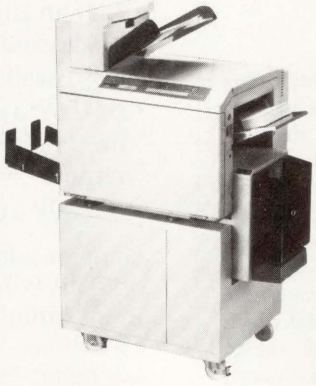
CIRCLE 280 ON READER CARD

WORKHORSE.

The DeRex S-3000 II: A heavy duty page printer without peers.

Fast, quiet, reliable and cost effective, the S-3000 has been designed specifically as a high-volume printer. And it is thoroughly backed by the expertise, technical support and nationwide service of DeRex.

- 30 pgs. per min./Up to 150,000 per month
- Less than 55 DBA
- Vector and Raster Graphics
- High resolution: 300x300 DPI
- Bar codes
- Dual input feeders/High capacity (2500 sheet)
- Remote or local attachment
- Compatible with IBM (including channel attach) DEC, H-P, Prime, UNISYS and most other popular computers
- Forms overlay—up to six forms
- Versatile output: up to 32 character sets



For heavier output, the S-6000-II is another DeRex field-proven, high speed, reliable printer. At 75 pages per minute, with both portrait and landscape orientations, it provides great versatility of output at higher speeds.

DE REX INC.
ELECTRONIC PRINTER SPECIALISTS
7716 Wiles Road
Coral Springs, Florida 33067
305/753-0840 • 800/245-7282

CIRCLE 117 ON READER CARD

937 Bestsellers

Our warehouses here at the Government Printing Office contain more than 16,000 different Government publications. Now we've put together a catalog of nearly 1,000 of the most popular books in our inventory. Books like *Infant Care, National Park Guide and Map, The Space Shuttle at Work, Federal Benefits for Veterans and Dependents, Merchandising Your Job Talents*, and *The Back-Yard Mechanic*. Books on subjects ranging from agriculture, business, children, and diet to science, space exploration, transportation, and vacations. Find out what the Government's books are all about. For your **free copy** of our new bestseller catalog, write—

New Catalog
Post Office Box 37000
Washington, D.C. 20013

VAX MANAGERS

ISN'T IT ABOUT TIME YOUR TAPE HANDLING WAS AS PROFICIENT AS YOUR DISK PROCESSING!

EDISON SOFTWARE SYSTEMS HAS THE TOOL KIT THAT PICKS UP WHERE VMS LEAVES OFF.

THE CONVERT & IMAGE TAPE HANDLERS

CONVERT CAN:

- CREATE & PROCESS STANDARD IBM LABELED TAPES
- PROCESS FILES FROM EBCDIC TO ASCII & ASCII TO EBCDIC
- TRANSFER PACKED & BINARY FIELDS
- READ OR WRITE VARIABLE & FIXED LENGTH RECORDS

IMAGE CAN:

- COPY ANY TAPE IN ANY FORMAT
- COPY A TAPE FROM ONE REEL TO ANOTHER
- COPY SELECTED BLOCKS OR FILES FROM A TAPE
- PRINT A SELECTED FILE OR BLOCK FROM A TAPE
- MERGE DATA FROM MULTIPLE REELS TO A SINGLE REEL
- COPY TAPE TO TAPE WITH ONE DRIVE

RELIABLE • ACCURATE
AND FULLY SUPPORTED BY:

EDISON SOFTWARE SYSTEMS

Call Today
(201) 906-1321
OR WRITE
P.O. BOX 211
METUCHEN, NEW JERSEY 08840

*DEC & VAX are trademarks of Digital Equipment Corp. IBM, DOS, OS are trademarks of International Business Machines, Inc. Convert Tape Utility is a copyright of Edison Software Systems 1982 ALL RIGHTS Reserved.

CIRCLE 119 ON READER CARD

MicroVAX 3000 and VAX computers and at $3,750 for the MicroVAX II.
For further information, contact Datanex Inc., P.O. Box 1728, Eugene, OR 97440; (503) 687-2520.

Circle 422 on reader card

Enhanced RAM System Quadruples Capacity

A single wide word 2000 memory system from Dataram Corporation captures up to 640 MB in 3.2 seconds, to meet needs for ultra-speed data in signal/image processing, state analysis, artificial intelligence, etc.

The rackmountable 15¾- x 19- x 24-inch units can be combined for total capacity up to 80 GB. A single wide word system provides a memory transfer rate of 200 MB/sec and permits easy interface with as many as eight I/O peripheral devices.

A multiported bus system provides easy interfaces for VAX, MicroVAX and Gould computers; Star and Numerix array processors; VME peripherals and various high-speed A/D devices.
Learn more by contacting Rick Plis, Dataram Corp., P.O. Box 7528, Princeton, NJ 08543-7528; (800) 822-0071; (609) 799-0071.

Circle 423 on reader card

CAE Tool Improves PCB Reliability

Systems Effectiveness Associates Inc. has introduced THERMAL, an engineering analysis program for use on PCs and VAX processors. This package lets engineers analyze the thermal aspects of printed circuit board designs. Component layout, use of cooling fins, air temperature, flow rate and direction all may be evaluated.

THERMAL promotes a responsive investigation of thermal and positional parameters by letting engineers change those characteristics and quickly review the effect on temperature distribution across the board.

License prices for THERMAL start at $3,500 for PC environments; VAX-based systems licenses start at $8,000.
Obtain more information by contacting Systems Effectiveness Associates Inc., 20 Vernon St., Norwood, MA 02062; (617) 762-9252.

Circle 424 on reader card

QLC-1000 Has Speed Capacity And Space

Qualogy Inc. has announced the DEC-compatible QLC-1000 optical controller. Because the QLC emulates a TK-50 tape drive, rather than the magnetic disk emulation, and because no more translation software is required, you can write files up to three times faster and read operations are up to five times faster. Optical media requires much less shelf space than tape and provides more storage capacity.
If you need more information, contact Qualogy Inc., 2241 Lundy Ave., San Jose, CA 95131; (408) 434-5200..

Circle 420 on reader card

Laser Printing Applications Enhanced

Enhancements to the DATA-NET peripheral sharing systems from Integrated Marketing Corporation provide features designed to ease applications in desktop publishing, CAD/CAM plotting, file transfer and conversions.

For A Full-Featured Tektronix Graphics Terminal, Just Add Your PC,
Mac II or Workstation

4105
4107
4115
4225
Emulation

Grafpoint, the technology pacesetter in terminal emulation, offers the broadest range of powerful terminal emulation packages for PCs, PS/2s, Macintosh IIs, and workstations. Grafpoint's emulation products are available for both asynchronous or networking environments.

Grafpoint's devotion to product innovation, compatibility, and customer support makes us the leader in Tektronix emulation. Grafpoint products have a 30-day no-risk guarantee, free updates, and technical support for 1 year. Find out why Grafpoint is *the* technology leader in Tektronix emulation. Call today for the Grafpoint distributor nearest you: (800) **426-2230**, in CA call (408) **446-1919**, Grafpoint, 1485 Saratoga Avenue, San Jose, CA 95129.

GRAFPOINT™
CIRCLE 124 ON READER CARD

Introducing ...

TPTool

A Whole New Breed

TPTool is the practical, inexpensive alternative to traditional word processing on VAX/VMS.

- Extensive built-in printer support, and customizable to virtually any printer
- Unmatched price/performance
- 80+% of traditional word processing features at a fraction of the price
- Priced from $345 to $1295 per CPU
- Free on-line demo available

Another fine software product from:

GrayMatter
Software & Consulting

(206) 285-7414

CIRCLE 278 ON READER CARD

Four different models let you connect many computers and peripherals in a network environment. The enhanced products meet the changes in plotting applications, desktop publishing software and file conversion from the 5¼-inch format to the emerging 3½-inch format standard.

Each of the DATA-NET ports can be selected individually by the user as input or output ports, while any or all ports can be designated as the chosen output.

DATA-NET products are priced from $795.

More information is available from Integrated Marketing Corp., 1031-H East Duane Ave., Sunnyvale, CA 94086; (408) 730-1112.

Circle 425 on reader card

OTC 2161 Targets MIS, Networking Environments

Output Technology Corporation has announced its compact 600 LPM matrix line printer, the OTC 2161, aimed at heavy-duty MIS and networking environments, in both the PC and mini/mainframe worlds.

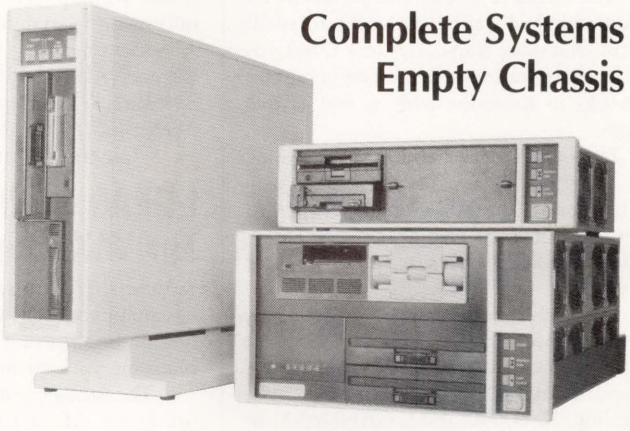
Output Technology Corporation's 600 LPM line printer.

The printer's ability to deliver consistent 600 LPM speed while printing both upper- and lowercase characters is a great benefit. The 2161 uses OTC's TriMatrix (3-headed) print mechanism to achieve its high speed and also incorporates a proprietary, patent-pending two-line-per-pass printing technique. Two complete lines of text are delivered at a full 600 LPM, all with

Q-BUS SYSTEM PACKAGES

ZOLTECH DELIVERS — CUSTOM OR STANDARD

Complete Systems
Empty Chassis



Zoltech's modular design allows literally thousands of configurations to be built with its V-series family of system chassis. Zoltech will deliver anything from empty metal shells to completely tested turnkey systems: You decide what you want to do and Zoltech will do the rest. Q-Bus and VME systems are our specialty, but we also do custom designs.

VME TOO . . .

CIRCLE 172 ON READER CARD FOR VME

ZOLTECH CORPORATION

7023 Valjean Avenue, Van Nuys, California 91406 USA
(818) 780-1800 Telex 755451

CIRCLE 174 ON READER CARD FOR Q-BUS

a single pass of the print mechanism.

The printer costs $6,450.

Learn more by contacting Marie Hartis, Output Technology Corp., 9922 E. Montgomery, Ste. 6, Spokane, WA 99206; (800) 422-4850 or (509) 926-3855.

Circle 417 on reader card

MICR Imprinted In One Operation

The MicroVAX II-based Checkprinter from Ramstar Corporation prints both MICR and alphanumeric data on blank check stock in one operation at an output of up to 400 documents per minute.

Three models are available. The T-1500 prints alphanumeric data in 136 positions, spaced 10 characters per inch. Print speed is 300 checks or payment coupons per minute with a standard 48-character set. Model 2002 prints up to 400 documents per minute. Model 2000 prints 160 characters in width at 360 documents per minute.

The price of the T-1500 is $146,400.

More information is available by contacting Ramstar Corp., 222 Agricultural Bldg., The Embarcadero, San Francisco, CA 94105; (415) 362-1525.

Circle 416 on reader card

mMUX Benefits Small Business Offices

Gandalf Data's new mMUX multiplexer and PAD (packet assembler/disassembler) brings line savings, local switching, contention and low-cost access to public and private X.25 packet-switched digital networks to small groups of remote users. The cost-effectiveness lets corporations extend their computer networks to locations with as few as five people.

The mMUX can be used as a component of a MUX 2000 System multipoint network, providing local switching for up to eight subscribers as well as network access to Gandalf's Starmaster virtual connectivity system.

The four-channel mMUX costs $995, the eight-channel mMUX is $1,495.

Find out more by contacting Kerry Hawkins, Gandalf Data Inc., 1020 South Noel Ave., Wheeling, IL 60090; (800) GANDALF; in IL, (312) 541-6060.

Circle 427 on reader card

QUEMAN Automates Queue Processing

Data Center Software's new product, QUEMAN, automates the complete control and processing of all output (print, terminal and server) queues, batch queues and print forms in a VAX environment.

QUEMAN's full screen displays of all queue activity easily monitors, detects and corrects any problems such as stalled or runaway jobs, stalled printers, batch queues stopped, special forms jobs, etc.

A special ZOOM feature lists detail information with reference to each job in the queue while providing specific processing information pertaining to jobs that currently are executing.

Contact Alan J. Finkelstein, Data Center Software, 218 Maple St., Danvers, MA 01923; (617) 777-1221.

Circle 428 on reader card

The Checkprinter from Ramstar Corporation prints both MICR and alphanumeric data in one operation.

I-DEAS Available For VAXstation 8000

Structural Dynamics Research Corporation has announced SDRC's I-DEAS (Integrated Design Engineering Analysis Software) applications package for the VAXstation 8000.

The package provides powerful tools for use in MCAE and may be used with any VAXstation family of workstations. Its also supported by DEC's Local Area VAXcluster Systems. I-DEAS will support the Local Area VAXcluster for the VAXstation 8000 when available from DEC.

I-DEAS runs on the VMS operating system. An average configuration on the VAXstation 8000 ranges from $32,000-$35,000.

Find out more by contacting Jere Brooks Hunter, Structural Dynamics Research Corp., 2000 Eastman Dr., Milford, OH 45150-2789; (513) 576-2400.

Circle 429 on reader card

Ethernet Expander Introduced By RAD

RAD Data Communications has introduced its LE-6, a miniature Ethernet expander that provides an extended twisted-pair interconnection between the transceivers and controllers of any Ethernet LAN. Replacing the bulky AUI cable with two shielded twisted pairs, RAD's LE-6 lets Ethernet V1.0, V2.0 and IEEE 802.3 run on a universal cabling system such as IBM's.

LE-6 features include 10 Mbps transmission, SQE testing ("Heartbeat"), AC/DC coupling, back-to-back frames and signal compatibility with all Ethernet standards.

The LE-6 set sells for $445.

More information is available by contacting Jeff Kahn, RAD Data Communications, 151 West Passaic St., Rochelle Park, NJ 07662; (201) 587-8822.

Circle 430 on reader card

CAD/CAM Productivity Boosted With Euclid-IS

MATRA DATAVISION announced its support of the VAXstation 8000. When the VAXstation 8000 is combined with EUCLID-IS, it delivers a state-of-the-art

CAD/CAM/CAE solution to address the many and complex needs of the modern engineering environment.

EUCLID-IS combines solids and surfaces to solve design and manufacturing problems. This combination lets the engineer describe the most demanding geometry exactly. The visualization of this geometry is what the VAXstation 8000 is designed for. The anti-aliasing and depth cuing produce clear images that are displayed at 500,000 vectors a second. This performance leap is brought about through multiple dedicated processors. This pipeline architecture allows the EUCLID-IS software to be decomposed to boost the interactive speed and productivity of the engineer.

More information can be obtained by contacting MATRA DATAVISION, 30 Commerce Way, Woburn, MA 01801; (617) 938-1230.

Circle 431 on reader card

Storage Solutions For Q-bus Market

A new line of DEC-compatible mass storage subsystems has been announced by Winchester Systems Inc. This 5¼-inch family provides more than 5,000 configuration alternatives for Q-bus and UNIBUS computers. DEC users can choose from different drives, enclosures, controllers and storage media to configure a fully integrated subsystem.

Winchester Systems supports 40 different disk drives. These drive options include fixed Winchester disk, removable Winchester disk, ¼-inch streaming cartridge tape, 2 GB cartridge tape, optical disk and floppy disk units. The various disk drives serve as building blocks for the complete subsystem. The drives support ESDI, ST506 and SCSI interfaces.

Learn more by contacting Michael Veneto, Winchester Systems Inc., 400 West Cummings Park, Woburn, MA 01801; (617) 933-8500; (800) 325-3700.

Circle 432 on reader card

Lion Cabinets Unveils New Products

Lion Cabinets recently introduced new products for the DEC-compatible market. The L23A-AR 19-inch rackmount kit is BA23A-AR equivalent. Wide J-style end panels allow side-to-side ventilation of mounted computer equipment. They're for the BA23A chassis and are compatible with the DEC J-style end panels used in MicroVAX II (Q5) configuration.

The 22-inch wide cabinets (40 or 60 inches high) are designed to mount DELNIs, DEC server 100/200 and other communications equipment.

Find out more by contacting Lion Cabinets Ltd., Buslingthorpe Green Industrial Estate, Meanwood Rd., Leeds LS7 2HG; (0532) 624040; FAX: (Group 3) (0532) 623476.

Circle 434 on reader card

Select Any Media Type With MMAC

Cabletron Systems has introduced the Multi-Media Access Center (MMAC), a two- or eight-digit card slot unit that supports unshielded twisted-pair, fiber optic, RG-58 coax cable and/or standard AUI transceiver cable connections.

MMAC users can select up to seven interface cards per enclosure. (The eighth slot must contain an intelligent repeater module.) The interface cards can be mixed within the MMAC or the unit can comprise all one media interface.

The MMAC also has Remote LAN-

AVERAGE DISK ACCESS TIME...

6.39 msec.

What can this kind of performance do for you?
Add one of **MasterDisk's** disk storage systems to your DEC computer and discover what you can do with significantly increased speed and storage:

- **Make a MicroVAX II outperform a VAX 8600***
- **Double the number of users on the system and get a better performance for each user***
- **Improve disk system throughput by as much as 450%***

MasterDisk is the most convenient and cost effective means available to attain the maximum throughput from your existing DEC system.

Storage Capacities - 152 megabytes to 2.93 gigabytes

Compatibility - All Q-Bus and Unibus systems including MicroVAX II, & 3000s; PDP-11s, and VAXs

Warranty - Exclusive TWO YEAR WARRANTY with Nationwide service and support

Mounting/Packaging - Rack mount, floor stand, table top or internal mounting

Delivery - Within 30 days, complete and ready for simple customer installation

*Actual field application data reported by some of our enthusiastic customers

MasterDisk®

Call Department D2 for information.

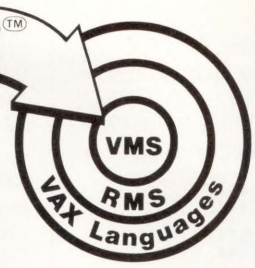
(617) 443-7711

American Digital Systems Inc.

75 Union Avenue, Sudbury, MA 01776-9990

CIRCLE 178 ON READER CARD

FILE-PACER™



You can buy time for your VAX...

by piercing layers of inefficient file I/O and still maintain total VMS compatibility.

If file-I/O intensive applications are consuming your system's resources FILE-PACER will buy you marked improvements in performance. This means increased throughput or extended life for your current hardware. However you look at it you're buying time for your VAX.

FILE-PACER is a layered software product consisting of I/O routines which substitute for built-in I/O statements in any VAX/VMS language. It makes all RMS parameters accessible in all languages providing a homogeneous interface to RMS. FILE-PACER improves performance of all RMS file types, even across DECNET. Up to 50% improvement has been observed.

Call for information including a detailed benchmark study and how to obtain our demo.

spi **Software Products International Inc.**

P.O. BOX 818 ■ SEVERNA PARK, MD 21146

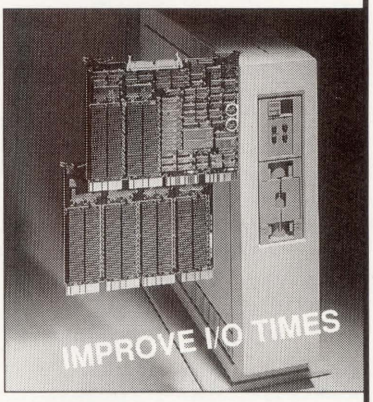
(301) 544-4400

VAX, VMS, RMS, DECNET are trademarks of Digital Equipment Corporation

CIRCLE 181 ON READER CARD

SHIFT YOUR MICROVAX INTO HIGH GEAR WITH MSCP RAM DISK

Available in 16MB, 48MB, or 80MB for all DEC Q-Bus computers. Ideal for disk intensive applications.



ELIMINATES ROTATIONAL LATENCY and SEEK TIMES

BATTERY BACKUP OPTION AVAILABLE

SEE FIRST TECHNOLOGY INC.
3255-7 Scott Blvd. Suite 103 Telephone (408) 748-7717
Santa Clara CA 95054-3013 Facsimile (408) 748-7621

*VAX, MSCP are trade marks of DIGITAL EQUIPMENT CORPORATION

CIRCLE 157 ON READER CARD

Build Your Own Mainframe Computer System For Under $8K!

Recipe: Start with one PC-386/286 computer running PC/MS-DOS and/or SCO Zenix,*
Add one or two of your own SMD disk drives,
Add one SMD disk controller for PC-286 bus (we provide),
Format each disk drive up to 512MB/volume in DOS,
Add our PC/MS-DOS or Zenix software disk driver for the drives.

Load: Software disk driver with formatter/partitioner on diskette media.

Modify: Config.sys file and reboot.

Voila! You now have a micro computer system that looks like a minicomputer and possesses the power, reliability and properties of a mainframe.

For further information, contact:

UPPER BOUND MICRO COMPUTERS, INC.
18 Elizabeth Street
West Conshohocken, PA 19428

Phone: 215-825-0505
FAX: 215-828-8618

*PC-DOS is a registered trademark of IBM; MS-DOS and Zenix are registered trademarks of Microsoft Corp.; SCO is a trademark of The Santa Cruz Operation, Inc.

CIRCLE 187 ON READER CARD

VIEW and management, allowing you to remotely or locally configure the unit and to gather network statistics.

Cost varies from $500 to $900.

To find out more information, contact Bob Levine, Cabletron Systems Inc., P.O. Box 6257, Rochester, NH 03867; (603) 332-9400.

Circle 437 on reader card

AirMail Operates On The VAX

MiniSoft has announced a new electronic mail system designed to operate on the VAX. Features include distribution lists, message archiving, message forwarding, full screen editing on any terminal or PC and automatic mail notification.

Its best feature is its integration with the Universal ACCESS operating environment. AirMail takes advantage of Universal ACCESS's file transfer, windowing and printing features. On any terminal or PC you can run AirMail in one window while continuing to work on other applications in other windows. AirMail will monitor the mail system and alert you to any incoming messages. Once the messages are answered, AirMail users can return to their other applications, where they left off.

For more information, contact MiniSoft Inc., 16315 NE 87th, Ste. B101, Redmond, WA 98052; (206) 883-1353; (800) 682-0200.

Circle 438 on reader card

Conversionware Family Expanded

Rapitech Systems Inc. has added a VMS FORTRAN to ANSI FORTRAN-77 translator to its family of automated computer-language translation products known as Conversionware.

The technology is available on a wide range of UNIX-based computers. FORTRIX-VMS (V1.0) recognizes and translates a set of the most popular extensions to the FORTRAN language as implemented on VAX/VMS computers.

Get more information by contacting Dr. Larry Woodruff, Rapitech Systems Inc., Montebello Corporate Park, Suffern, NY 10901; (914) 368-3000; (800) FORTRIX.

Circle 436 on reader card

PlanTRAC/EasyPLAN Is Easy To Use

The Small Products Division of Computerline Inc. has unveiled PlanTRAC/EasyPLAN, a computer-aided project planning tool that brings the power of PlanTRAC to those who aren't project planning professionals. EasyPLAN now is included free with each PlanTRAC system.

To create a project plan with EasyPLAN, define activities and relationships between activities using the arrow and function keys. EasyPLAN displays the project plan as it's being built and helps you by checking the planning logic automatically as each activity or relationship between activities is entered.

EasyPLAN has a single-key schedule calculator function that calculates the project schedule based on the project plan, duration and progress entered for each activity.

PlanTRAC is available on VAX and MicroVAXs and prices start at $5,995.

For more information, contact Susan Carroll, Computerline Inc., P.O. Box 308, 52 School St., Pembroke, MA 02359; (617) 294-1111.

Circle 441 on reader card

VIS1ON

Everything You Always Wanted in A Project Management System And Less . . .

Less Hassle.

If you have ever had to use ARTEMIS or PROJECT/2, you will appreciate VISION. As easy to learn and use as a micro system and with the power of your DEC VAX, Prime or IBM mainframe.

To find out more about why 9 of the top 10 Defense Contractors chose VISION for their project management systems, give us a call.

SYSTONETICS

1561 E. Orangethorpe Ave. • Fullerton, CA • 92631 • (714) 680-0910 • Telex 692-327

Sales and Support Offices: San Jose, CA • Houston, TX • Atlanta, GA • Vienna, VA • Denver, CO • Bellevue, WA • Eatontown, NJ • and offices in Japan, Denmark, Korea, United Kingdom, Singapore, Italy, Norway, Saudi Arabia, and Australia.

ARTEMIS is a registered trademark of Metier Management Systems, Ltd. PROJECT/2 is a registered trademark of Project Software and Development, Inc. IBM is a registered trademark of International Business Machines Corporation DEC VAX is a registered trademark of Digital Equipment Corporation Prime is a registered trademark of Prime Computer, Inc.

CIRCLE 232 ON READER CARD

CentreCOM Features Heartbeat Switch

A tabletop 8-port transceiver recently introduced by Allied Telesis Inc. features a user-selectable heartbeat switch for applications in baseband Ethernet LANs. CentreCOM 800 permits network updating or off-line operation by changing the switch setting. A two-color LED shows the heartbeat status.

A single CentreCOM 800 connects 8 stations for remote operation through a single Ethernet coaxial cable tap. Eight more CentreCOM 800s can be "cascaded" from the original unit to serve 64 stations. Existing baseband LANs can be expanded without adding costly coaxial cable or taps.

CentreCOM costs $795.

Learn more by contacting Allied Telesis Inc., 2685 Marine Way, Ste. 1220, Mountain View, CA 94043; (415) 964-2771.

Circle 426 on reader card

FORTRAN Enhancements Help DEC Users

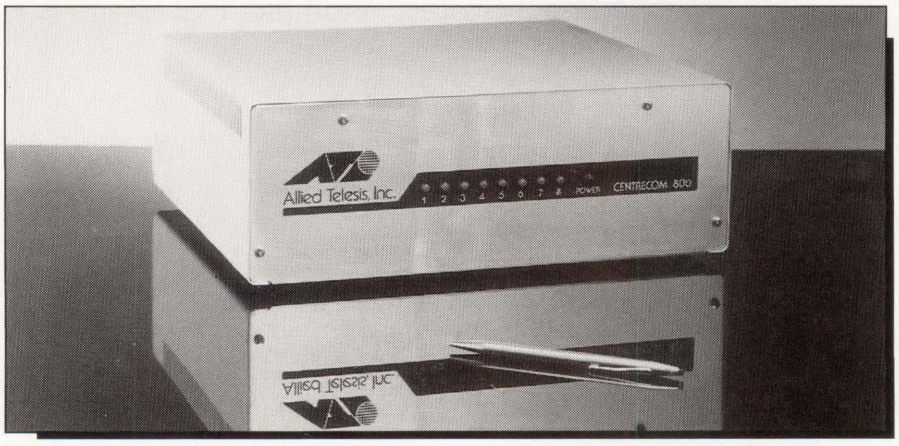
Computer Translations has enhanced its VM77 converter to run on VMS-based computers. VM77 is a conversion tool that identifies and converts non-standard DEC extension in FORTRAN programs, producing highly portable FORTRAN code conforming to the ANSI-77 FORTRAN standard.

Pure ANSI-77 FORTRAN is supported on most modern UNIX systems, thus allowing the easy migration of VMS-based programs toward UNIX, including VAX equipment running ULTRIX.

Additional aspects of the DEC extensions have been incorporated into the VM77 converter to provide even greater automatic conversion of source code. The new extensions include associate variable, close options, find and rewrite, logical inside IF, define file and byte data types.

More information can be obtained by contacting Joe Chisolm, Computer Translations, 2235 W. Potter, Phoenix, AZ 85027; (602) 582-9515.

Circle 440 on reader card



CentreCOM 800 is a baseband multiport transceiver.

FCX Saves Time And Cuts Costs

Innovative Computer Systems has introduced FCX, a file compression/expression utility designed to streamline file transfer operations. FCX V1.0 is for use in VAX/VMS environments.

FCX can reduce the time and cost normally required to transfer files over local and wide area networks and save disk space. It permits one or more files of any type or size to be compressed into a single file, with space savings ranging from 30 percent to 70 percent. Files then can be expanded selectively from the compressed format file to their original size, when needed.

Obtain a brochure by contacting Ann Stephenson, Innovative Computer Systems Inc., 72 Crooked La., Cherry Hill, NJ 08034; (609) 779-1422.

Circle 439 on reader card

Microcom Debuts The MLB/1500

Microcom Inc. has announced the MLB/1500, an Integrated Services Digital Network (ISDN) Basic Rate Interface that connects two geographically separated LANs with a dial-up connection through an ISDN network.

The Microcom LAN Bridge is a Media Access Control (MAC) level transparent bridge. It passes LAN packets, unaltered, from one LAN to another. Networks using Novell Netware, 3COM 3+, DECnet or TCP/IP can be connected without users knowing they're attached to a geographically remote network.

The MLB/1500 is priced at $12,500. Learn more information by contacting Microcom Inc., 1400 Providence Hwy., Norwood, MA 02062-5078; (617) 762-9310.

Circle 443 on reader card

Psi Software Enhances PLANNER

Psi Software has released version 5 of PLANNER project management software for VAX systems. The new release has enhanced user interface, improved VMS functionality, greater speed, better reporting and advanced networking capabilities.

PLANNER is an interactive, multiuser system that offers managers a cost-effective and accurate tool for scheduling and managing project activities and resources. It's easy to learn and use, and so flexible it can be used in many project environments, from aerospace and banking to health care and engineering.

Find out more by contacting Maureen B. Murphy, Productivity Solutions Inc., 128 Technology Cntr., Waltham, MA 02254-9164; (617) 899-8900.

Circle 442 on reader card

SQR Release 1.5 Now Available

SQ Software has release 1.50 of its Structured Query Report Writer (SQR) for the Oracle database. SQR combines a structured procedural approach to report writing with a straightforward command syntax to create a powerful tool for developing reports and other applications. SQR is available for the Oracle database on VAX/VMS, etc.

Features include unlimited program size and the ability to store programs in run-time files. Programs of any size with any number of queries, columns and variables may be written. Run-time files are prescanned SQR programs that eliminate the analysis and initialization steps and begin executing immediately. Run-time files may be distributed without program source code for added security.

Versions for VAX/VMS range from $1,500 to $16,800.

More information is available from SQ Software, 2000 Lee Rd., Ste. 120, Cleveland, OH 44118; (216) 397-0551.

Circle 447 on reader card

INTRODUCING THE BRIGHTEST IDEA EVER IN VAX COMMUNICATIONS SERVERS.

The MAXserver™ 5000 from Xyplex.

Before you buy a terminal server, look at what Xyplex has to offer.

Xyplex introduces the MAXserver 5000, with more performance, more reliability, and more capability than anything Digital has to offer. All at a much lower price! Here are just some of the eye-opening facts:

Blazing performance. Digital's DECserver™ 500 is based on an old single-processor design so it slows down as you add users. But the MAXserver 5000 uses advanced parallel processing, so you get the same high performance with 120 users as you get with one user.

Shining reliability. Did you know that when one DECserver 500 component fails, the whole server can fail? Not with MAXserver 5000. Xyplex has designed it for uninterrupted service, with redundant power supplies and multiple network interfaces. Plus our "hot-swap" serial cards allow you to change cards without disrupting the network.

LAN and WAN brilliantly integrated. MAXserver even integrates both LAN and WAN, as well as TCP/IP connectivity, in one package. Its open architecture and expandable design means you'll be able to communicate with existing and emerging industry-standards, with simple, straightforward connections to UNIX-based systems.

A brighter approach to packaging. The MAXserver 5000 can serve up to 120 users in one-sixth the space it takes with 8-port terminal servers. With computer room space at a premium, the MAXserver has a smaller footprint, uses less power, and gives you two or three times the number of ports as a DECserver 500 *in the same amount of space.*

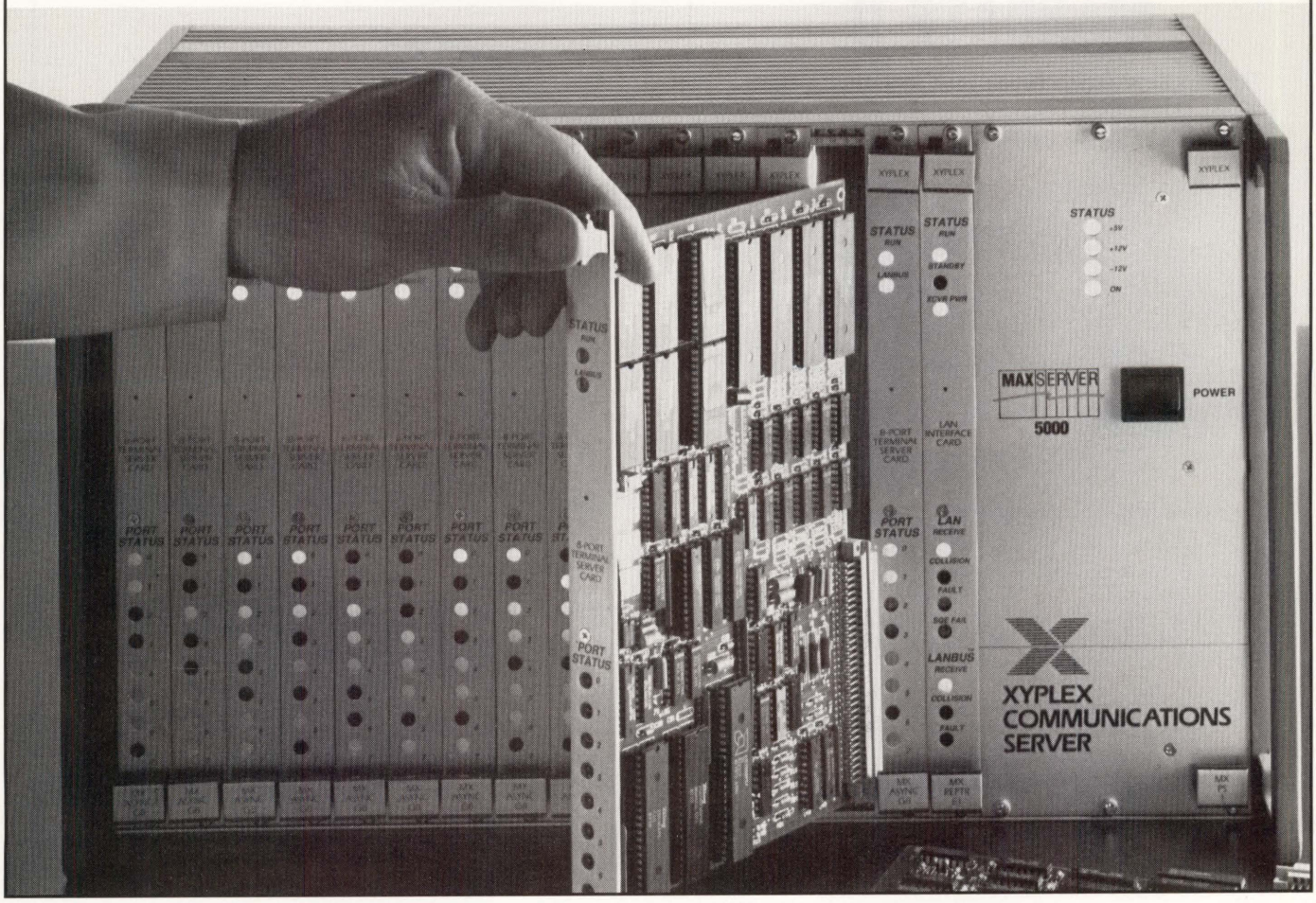
See the price and see the light. Here's the clincher: Xyplex offers all of the above advantages – and more – for a much lower price. See for yourself how Xyplex delivers more server for less money.

Shouldn't you find out about the brightest VAX communications server ever offered? Call Xyplex for complete product information and a free in-depth report comparing the MAXserver 5000 with the DECserver 500.

Xyplex and MAXserver are trademarks of Xyplex, Inc. DECserver is a trademark of Digital Equipment Corporation. UNIX is a trademark of AT&T Bell Systems. © Copyright 1988. Xyplex, Inc.

XYPLEX

Xyplex, Inc.
100 Domino Drive
Concord, MA 01742
1-800-338-5316



CIRCLE 171 ON READER CARD

R68802 Offers Single Chip Solution

The Semiconductor Products Division of Rockwell International Corporation has announced its LNET R68802 LAN. This offers computer and communications OEMs a single-chip solution supporting the Cheapernet (10BASE2), StarLAN (1BASE5) and Ethernet (10BASE5) versions of the IEEE 802.3 Carrier Sense Multiple Access with Collision Detect (CSMA/CD) access method standard.

In addition to managing the CSMA/CD algorithm, performing parallel-to-serial/serial-to-parallel conversions of data streams up to 10 Mbps and assembly and disassembly of packet formats, the R68802 provides a versatile DMA interface with a large 32-byte FIFO buffer for both transceiver and receiver data. Other features include support for eight- and 16-bit processor data busses and an interface to the Manchester Code Converter (MCC) used to connect the R68802 to an IEEE 802.3 defined Media Attachment Unit (MAU).

To learn more, contact the Semiconductor Products Division, Rockwell International Corp., 4311 Jamboree Rd., P.O. Box C, Newport Beach, CA 92658-8902; (714) 833-4700.

Circle 450 on reader card

Model 572 Offers Hardware Solution

Telebyte Technology has announced a hardware solution for a problem that has plagued designers of VAX/MicroVAX multiuser systems: how to simplify the wiring between the CPU and remote terminal clusters. The Model 572 allows up to eight terminals/printers to communicate with the CPU over a single, 2-twisted pair cable.

Packaged on a DEC dual PC board, the Model 572 installs in the CPU where it draws power from the computer bus. The input/output signal interface is compatible with the DHV-11- or DLV-11-type multiplexers. A ribbon cable connects the DHV/LV-11 to the Model 572.

The multiplexing controller system consisting of the Model 572 sells for $395. The Model 570 Quick Mux sells for $548. The total system costs $943.

Find out more product information by contacting Telebyte Technology Inc., 270 E. Pulaski Rd., Greenlawn, NY 11740; (516) 423-3232, (800) 835-3298.

Circle 448 on reader card

Dorlen Releases Enhanced Water Detector

Dorlen Products, manufacturer of Water Alert, a surface water detection system, introduced its newest version, Model SS-3(T). The SS-3(T) is designed to be used with Dorlen's PS-3(T) power/supply/ tester. The SS-3(T) doesn't require batteries and is capable of being remotely tested from the PS-3(T) location. DPDT isolated contacts are provided making the detector ideal for interfacing with existing alarm/security systems. Sixteen SS-3(T) detectors can be connected to a single PS-3(T).

Monthly or quarterly testing provides assurance that the system is operating properly.

For complete information, contact Len Woloszyk, Dorlen Products, 7424 W. Layton Ave., Milwaukee, WI 53220; (414) 282-4840.

Circle 453 on reader card

MANDATE II

The First Ideal Travel Partner For Mini Computer Users

The MANDATE II is a fully integrated completely portable system in an easy to transport package.

The system is fully self-contained and has the following features:

- DEC compatble
- 10 Slot Q-bus Backplane
- Rugged Enclosure
- Compatible with MICROVAX II 11/73 and 11/23
- Up to 16 MB of Memory
- 740 MB Hard Disk and Minifloppy Disk
- True VT100 Compatible CRT
- Custom Configurations Available

To find out you can purchase MANDATE II, call or write:

Trans-Data-Com, Inc.
1200 Executive Dr., East Suite 142 Richardson, Texas 75081
(214) 669-0406 FAX: (214) 699-7893

CIRCLE 283 ON READER CARD

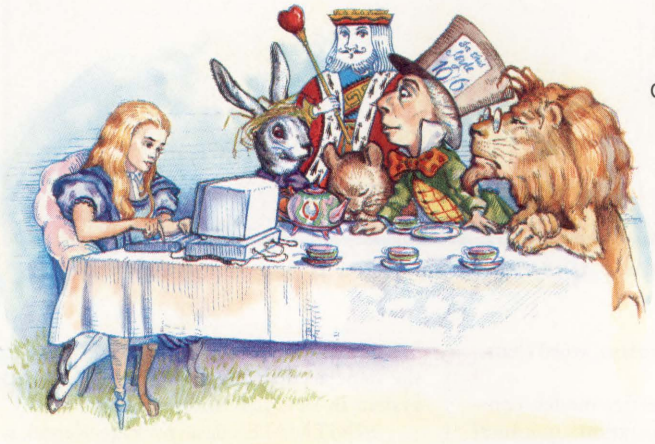
RSX CONSULTING

- M, S, M-PLUS, Micro-RSX
- Performance Analysis/Tuning
- Device Drivers a Specialty
- Call-Up Support Service
- Disk Corruption Recovery

James A. McGlinchey
(Author of "The RSX Clinic")
Software Engineering Consultant
5 Skyline Drive
Post Office Box 81
Essex Junction, VT 05452-0081
802-879-6014

CIRCLE 130 ON READER CARD

Now on Both VMS™ and Ultrix™: The VAX™ Office System for the Highest Common Denominator.



Alis® Designed for the professional office.

The only integrated VAX office system with the architecture and capabilities to satisfy the demanding professional user. Alis has all the benefits of communications-based office automation systems. And combines them with the advantages of graphics-based personal computer applications and the presentation quality output of desktop publishing systems. Multi-window Alis networks workstations, PCs, and terminal-based multi-user systems company-wide, making full use of the graphics capabilities that each device offers.

Alis. The multi-vendor office system.

Alis' multi-vendor networking allows VMS and Ultrix VAXs and VAXstations, 68000-based workstations and MS-DOS PCs to be combined into one integrated office system.

To find out more, call John Butler, V.P. of Marketing, at Applix (617) 870-0300.

Alis combines text, spreadsheets, graphics and database in single, always editable documents ☐ handles proportionally-spaced and multiple-size fonts WYSIWYG-style ☐ provides automatic formatting of reports, letters, memos, etc. ☐ sophisticated equation-solving spreadsheet ☐ drawing, scanned images and business graphics ☐ personal and office databases ☐ integrated electronic mail and meeting scheduling ☐ multiple windows ☐ supports graphic workstations, PCs and terminals.

Alis, and Applix are registered trademarks of Applix, Inc.
Ultrix, VMS, and VAX are trademarks of Digital Equipment Corporation.
MS-DOS is a trademark of Microsoft Corporation.

Alis®

digital™
Cooperative Marketing Program

from APPLIX®

The integrated software system for the professional office.

Finally, some answers in Wonderland.

APPLIX, INC., 112 TURNPIKE ROAD, WESTBORO, MASSACHUSETTS 01581 (617) 870-0300

CIRCLE 238 ON READER CARD

Emerson's New Series Is VAX-Compatible

The Industrial Controls Division of Emerson Electric Company has a new series of online, plug-compatible uninterruptible power systems (UPS) configured expressly for VAX 11/725, 11/730, 11/750 and 8200/8300 computers.

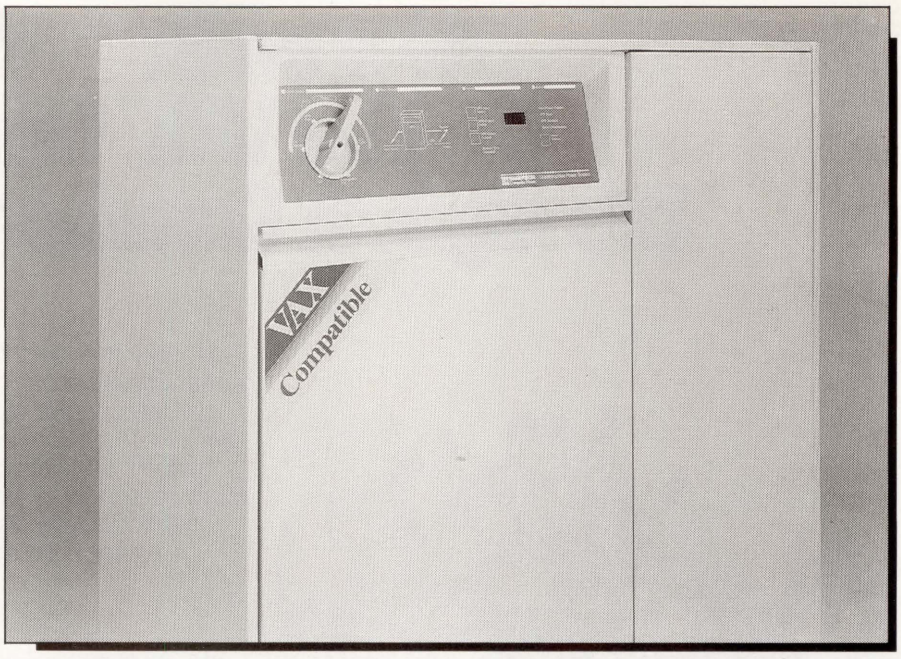
The AP101/VAX Series provides users and resellers with a streamlined connection between the electric power source, the UPS system and the computer system.

For optimum performance, DEC recommends voltage and power input frequency be maintained within five percent and 1 Hz, respectively. The AP101/VAX improves on these specifications by guaranteeing that voltage will stay within two percent and frequency within .03 Hz.

List prices range from $8,500 for 3 KVA to $16,500 for 10 KVA models.

Find out more by contacting Deb Behrens, Emerson Electric Co., Industrial Controls Division, 3300 S. Standard St., P.O. Box 1679, Santa Ana, CA 92702-1679; (714) 545-5581.

Circle 452 on reader card



Emerson Electric's AP101/VAX line of UPS is plug compatible with VAX.

Novell Announces Netware VMS

Novell Inc.'s NetWare VMS lets VAX/VMS computers function as a network file and print server for IBM PCs and compatibles operating with NetWare V2.0a. NetWare VMS is compatible with NetWare V2.0a and NetWare V2.0a applications and also operates with NetWare V2.1.

Only the standard VAX Ethernet controllers are required to connect the VAX to the PC network. NetWare VMS can coexist with DECnet and LAT networks concurrently. NetWare VMS also can be used to connect to remote VAX systems. PC users can log in through NetWare VMS and access file and printer resources at the remote VAX running NetWare VMS through DECnet.

NetWare VMS pricing is server-based and ranges from $5,500 to $26,500.

Receive more information by contacting Cheryl Snapp, Novell Inc., 122 East 1700 S., Provo, UT 84601; (801) 379-5900, (800) 453-1267.

Circle 449 on reader card

Interactive Drawing Package For VAXs

Precision Visuals has introduced a graphics product for interactively creating, revision and displaying line drawings. DRAW can be used to generate logic diagrams, training aids, engineering designs, floorplans, word charts, maps, etc.

DRAW has three interface modes: command mode for fast operation, graphical menu mode for novice or occasional users and tablet mode for maximum precision and for digitizing line art. Output can be directed to a wide range of hardcopy devices including DEC.

DRAW's primitives include polyline, polygon, arc, circle, ellipse, markers, rectangle, text and library symbol. DRAW's system library contains more than 300 symbols.

DRAW runs on VAX/VMS systems with VT240, and VT340. Pricing starts at $3,500.

For information, contact Chris Logan, Precision Visuals Inc., 6260 Lookout Rd., Boulder, CO 80301; (303) 530-9000.

Circle 451 on reader card

i-Logix Releases V1.2 Of STATEMATE

i-Logix Inc. has announced V1.2 of STATEMATE. This version includes real-time functions in the simulation process and extensions to the dynamic tests for reachability, deadlock and non-determinism.

STATEMATE is a graphical system engineering environment that's suited for use in the specification and design of real-time systems. Now you can build specification models incorporating a user-definable lock. This allows the specification to be tested in a simulated real-time environment. The behavioral model can thus be exercised with the same accuracy as running the proposed system in its target environment.

STATEMATE's basic package, Kernel, is priced at $10,000 per standalone workstation. The analysis and simulation package, Analyzer, is $25,000. The product runs on VAX/VMS.

More information is available by contacting Elizabeth McKinley, i-Logix Inc., 22 Third Ave., Burlington, MA 01803; (617) 272-8090.

Circle 445 on reader card

Relief From Storage Bottlenecks Announced

Westford Disk Systems Inc. has relief from storage bottlenecks for MicroVAX machines trapped in BA23 chassis. This provides up to 240 MB of formatted storage capacity in less than one-half cubic foot on the desktop.

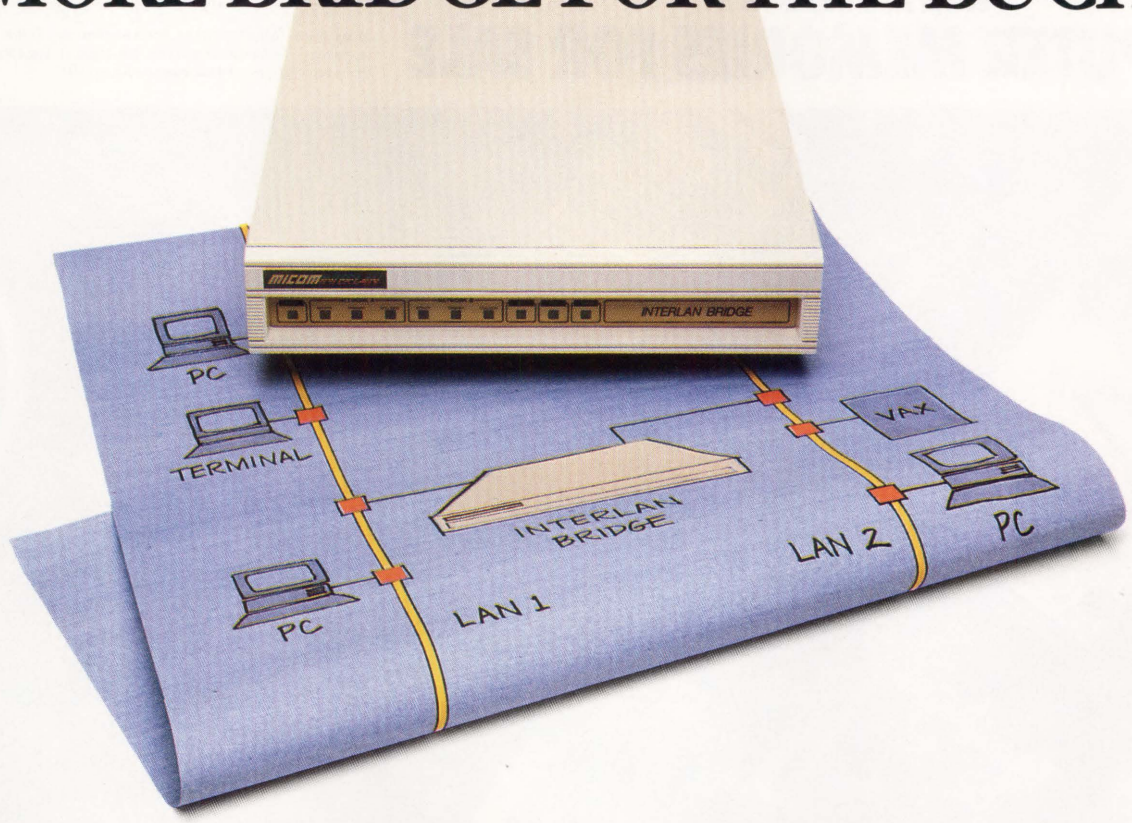
This provides a solution for users of the BA23 MicroVAX II. It provides large amounts of high-speed disk storage, while using little space on the desktop and only one Q-bus slot inside the MicroVAX chassis. Benchmark tests show the effective transfer rate to be 3.4 to five times faster than an RD54.

Prices start at $5,800, and at the high end, run down to $11 per MB.

For further information please contact Martin Galligan, Westford Disk Systems Inc., P.O. Box 43, 224 South St., Carlisle, MA 01741; (617) 371-7015.

Circle 446 on reader card

FROM MICOM INTERLAN: MORE BRIDGE FOR THE BUCK.



THE POWER OF THE DEC LANBRIDGE 100 FOR HALF THE PRICE.

Here's good news for anyone who's ever needed a DEC LANBRIDGE 100, but hesitated to plunk down eleven grand for it.

Now you don't have to.

Introducing MICOM INTERLAN's IB3000 Data Link Bridge. It's everything you've always wanted in a network bridge. All the performance and features of DEC's LANBRIDGE 100—for just $5495.

Make the most of your network—and your budget.

The IB3000 is actually more than just a bridge. It's a whole family of bridge products, all distinguished by high performance, interactive network management, and IEEE 802.1 support. From a fully upgradable starter product to the top-of-the-line IB3000, with an aggregate listening rate of 28,000 packets per second, the IB3000 family combines advanced design with exceptional price/performance.

MICOM INTERLAN. Better bridges for the buck. Better choices for your network.

The IB3000 Bridge family is the latest in a long line of MICOM INTERLAN products combining innovative hardware architecture with advanced network management software. Whether you're looking for a better bridge, or simply a better deal, we're the people to talk to *before* you make your choice.

To order or obtain more information, call MICOM INTERLAN today at 1-800-LAN-TALK (in Massachusetts, 1-800-TELL-LAN).

DEC and LANBRIDGE 100 are trademarks of Digital Equipment Corporation.

MICOM INTERLAN Division, 155 Swanson Road, Boxborough, Massachusetts 01719

MICOM INTERLAN

CIRCLE 140 ON READER CARD

Remember how computers remembered? Mercury delay lines? Punched cards with 90 columns and round holes? Hand-wired magnetic cores? In case your memory needs refreshing, The Computer Museum would like to share its memories with you.

The Computer Museum Memory Poster
We have created a limited edition, 20"x32" poster of the picture shown below. Printed in full-color, it includes an identification key to help you recall the memories you've forgotten. To get your poster, along with an information kit on museum membership, exhibits and activities, send a tax-deductible contribution of $25 or more to:
Memory Poster, The Computer Museum,
300 Congress Street, Museum Wharf,
Boston, MA 02210.
Please allow six weeks for delivery.

CIRCLE 268 ON READER CARD

YES! Please refresh my computer memories. A tax-deductible donation of $25 or more made payable to The Computer Museum is enclosed.

Name_____

Address_____

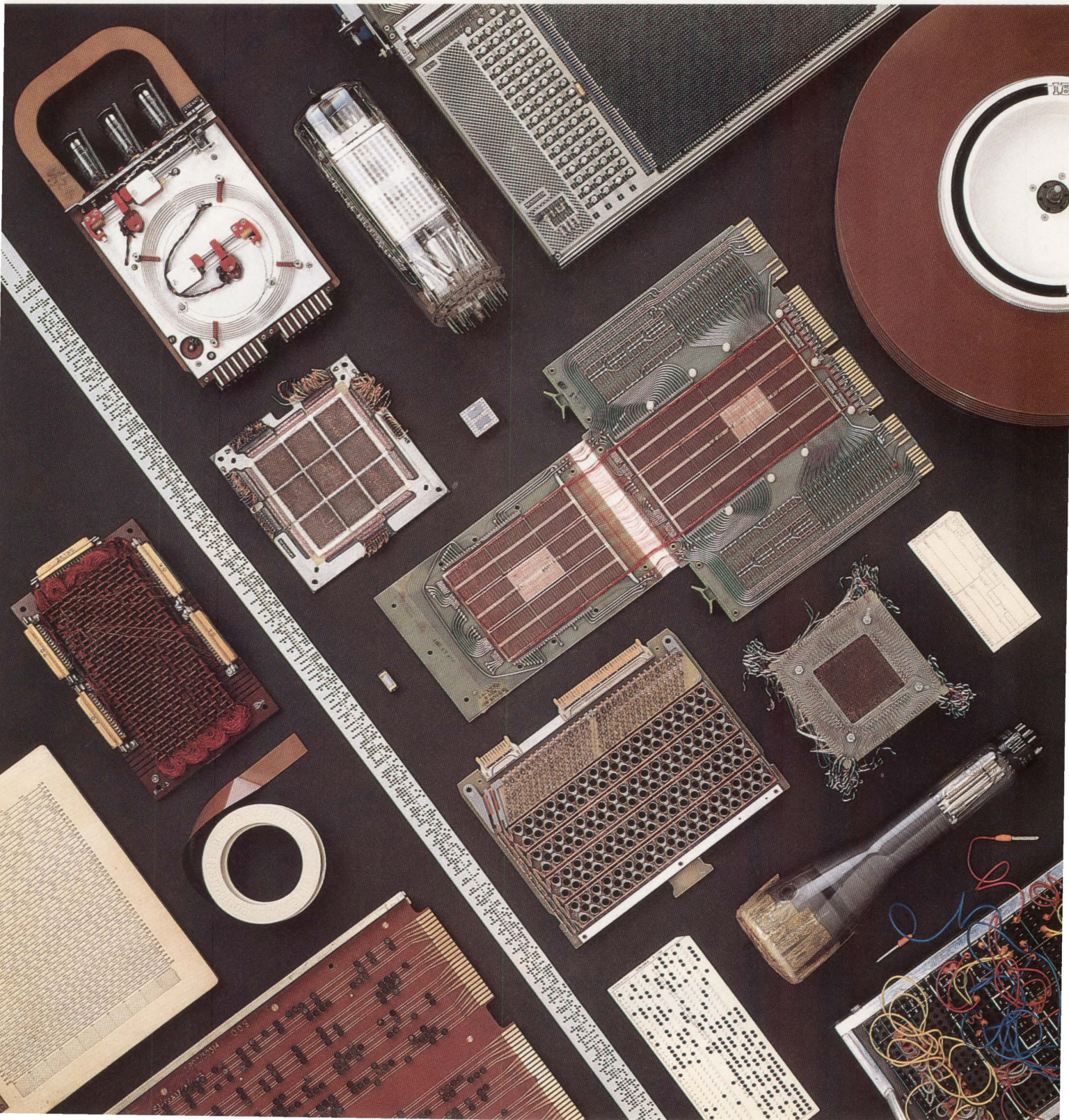
City_____ State____ Zip_____

The Computer Museum
Located on Museum Wharf
300 Congress Street, Boston, MA 02210
(617) 426-2800

E

COMPUTER MEMORIES FOR SALE

Special thanks to this publication, Scitex America Corp. (color separations), Grafik Communications, Ltd. (design), David Sharpe Studio (photography) and VM Software, Inc. (poster).



No other application development software is quite this fast.

Sure, you expect speed. But not this much speed. Truth is, anyone who has ever developed applications is surprised by PROGRESS. Like the developers who gave it the highest satisfaction rating among the 4GL DBMSs recently surveyed by DATAPRO.*

Well, hold your horses.

Because now there's something even better: new PROGRESS V4. It's designed for building, modifying, and customizing database applications. It requires less code than other 4GLs, it's crash-proof, and it's transparently portable across VAX/VMS, UNIX, XENIX, ULTRIX, MS-DOS, LANs, and CTOS/BTOS.

But now it's been enhanced with over 25 major new features, to give you even more speed, flexibility, and control.

For only $95†, you can test drive a complete copy of PROGRESS V4. And if it's not as fast as we say it is, we'll refund your money. So call today.

And hang on tight.

Send $95† for your PROGRESS V4 Test Drive.
Or call: Progress Software Corporation
(Formerly Data Language Corporation)
5 Oak Park
Bedford, MA 01730
1-800-FAST 4GL
(In Massachusetts,
call 617-275-4500)
FAX: 617-275-4595
Telex: 509965

PROGRESS®
FASTEST FROM START TO FINISH.

Offices in: Boston, San Francisco, Washington, D.C., Amsterdam, Brussels, Cologne, Copenhagen, Helsinki, London, Melbourne, Munich, Oslo, Paris, Sydney, Stockholm, Vienna, Zurich

*DATAPRO Reports on Software, DATAPRO 70 © 1986, 1987, DATAPRO RESEARCH CORPORATION †For international orders please call for shipping and handling information.

PROGRESS is a registered trademark of Progress Software Corporation, developers of advanced software technology for business and industry. The following are trademarks of the following companies: VAX, VMS and ULTRIX of Digital Equipment Corporation: UNIX of AT&T; MS-DOS and XENIX of Microsoft Corp.; CTOS of Convergent Technologies Corporation; BTOS of Unisys Corporation.

CIRCLE 154 ON READER CARD

Network DEC to UNIX?

What You Didn't Know--Will Help You!

TCP/IP Networking Software...

Did you know that most UNIX computers already support industry-standard TCP/IP networking protocols? And that Process Software Corporation gives you TCP/IP networking solutions for more DEC operating systems than anybody?

For VMS, RSX, RT-11, IAS, And TSX-Plus...

Network to UNIX using just our TCP/IP software and your standard DEC Ethernet hardware on the UNIBUS, Q-bus, VAXBI, or the new MicroVAX 2000. And run concurrently with DECnet, LAT, or LAVC.

Designed To Benefit You...

Say goodbye to special hardware, messy installation, and unneeded layers of software. Our TCP/IP products are modular, efficient, and designed for the operating system they run on. You benefit from ease of use, simple installation and virtually no maintenance.

For Every Application...

And we support the full range of popular TCP/IP applications, including FTP (File Transfer), TELNET (Virtual Terminal), TCP, IP, and UDP programming interfaces, and others.

You won't find a better lower-cost way to connect DEC to UNIX anywhere!

Interested? Call Process Software Corporation today.

PROCESS SOFTWARE 413-549-6994

35 Montague Road • PO Box 746 • Amherst, Massachusetts 01004

DEC, IAS, RSX, RT-11, UNIBUS, VAX, and VMS are Digital Equipment Corporation trademarks. Unix is an AT&T trademark. Ethernet is a Xerox Corporation trademark. TSX-Plus is a S&H Computers trademark.

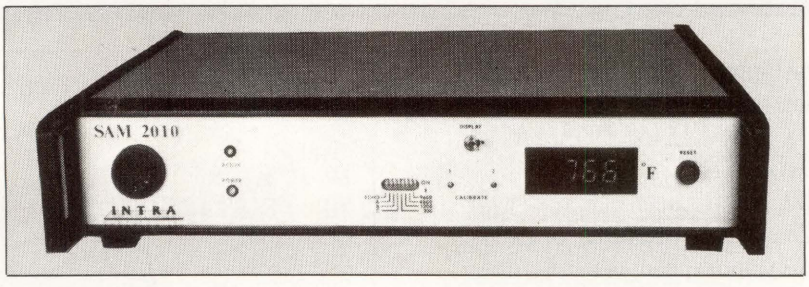
CIRCLE 153 ON READER CARD

SAM2010

ENVIRONMENTAL SECURITY SYSTEM

INTELLIGENT / POWERFUL / SENSITIVE

MONITORS computer room environment and PROTECTS your computers (DEC-VAX, microVAX, PDP/II, DG-MV Series, IBM 370, 4300 and others) from environmental hazards. **ABLE** to monitor multiple stations, alert users, telephone key people and conduct orderly system software and power shutdowns if nobody responds to alarms.



***PROTECTS** Your Computer, Programs, and Data Against:*

- Air-Conditioning Failure
- Excess Temperature, Humidity
- Smoke / Fire / Water / Assault
- A.C. Power Irregularities

BETTER THAN AN INSURANCE POLICY,
SAM-2010 AVERTS DISASTER BEFORE COSTLY DAMAGE OCCURS

Only the **SAM2010** system does all the above, **AUTOMATICALLY** when measured values exceed pre-set limits. 24 hours a day. No coffee breaks. No vacations.

THE COST — LE$$ THAN YOU THINK

TO FIND OUT MORE ABOUT THE **SAM2010** SYSTEM, WRITE OR CALL —

INTRA COMPUTER INC **875 AVENUE OF THE AMERICAS, NEW YORK 10001 (212) 947-5533**

CIRCLE 129 ON READER CARD

MegaTape Produces New Backup Subsystem

MegaTape Corporation has combined its field-proven MT-750 cartridge backup streamer with a new controller to produce a VAXBI-compatible backup subsystem.

The MT-750 VAXBI subsystem is attached directly to the VAXBI bus via the new MegaTape MBI-101 Controller. It provides a storage capacity of 630 MB in a single cartridge and operates using the TMSCP driver and backup utility resident in the VMS operating system.

The MBI-101 Controller is a standard VAXBI Module and occupies a single slot. It has a transfer rate of 4 MB per second and is TMSCP compatible. Model MT-750 streamers are currently in use on PDP-11, VAX and MicroVAX systems.

The MT-750 VAXBI subsystem is priced at $18,900 and includes all items required for installation and initial operation. To learn more, contact MegaTape Corporation, 1041 Hamilton Rd., P.O. Box 317, Duarte, CA 91010-0317; (818) 357-9921.

Circle 455 on reader card

CDRS Expands Disaster Recovery

Comdisco Disaster Recovery Services Inc. (CDRS) has added DEC and Tandem equipment plus an IBM System 38 to the IBM hardware currently available at its eight hot sites.

CDRS' Cranford, New Jersey, hot site now offers VAX 8700, VAX 11/780 and PDP 11/70 equipment.

CDRS' DEC offerings are dedicated solely to disaster recovery.

For complete information, contact Comdisco Disaster Recovery Services Inc., 6400 Shafer Ct., Rosemont, IL 60018; (312) 698-3000.

Circle 456 on reader card

Catalogues Available From Control Cable

Control Cable's *Product Catalog* now is available, featuring equipment needed for data processing and networking applications. Included are data cables, manufacturer's equivalent cables, bulk cable, connectors, data switches, adapters, null modems, wall plates, tools, test equipment and surge protection. In this version, Control Cable introduces its new product lines of baluns, LAN accessories, fiber optic cable and accessories, protocol devices, modems and multiplexers. To receive a free catalog, call or write Control Cable, 7261 Ambassador Rd., Baltimore, MD 21207; (301) 298-4411.

Circle 462 on reader card

IBM displays are getting attached to DEC, Data General and Prime® computers.

The fact is, IBM® 3151 ASCII displays are getting attached to all kinds of multi-user systems.

It's not surprising. IBM 3151 displays are inexpensive both to buy and own. Model 160 starts at $399,* including one-year warranty. Other models are available with a 3-year warranty. Add an IBM Maintenance Agreement, and you'll get five years of IBM service for just $54.

The 3151 family of displays provides most of the popular emulations compatible with DEC,™ Wyse,® Data General,™ TeleVideo® and more. Models 310 and 410 utilize unique cartridges which provide additional capabilities: auto dial, PC compatibility and concurrent dual host connectivity.

IBM ASCII displays are everything you'd expect from the company that ships more terminals than anyone. All models are equipped with high-quality IBM keyboards, designed for use with your ASCII applications. Non-glare 14" flat screens in green or amber/gold provide crisp character resolution.

Model 110/160

Model 310/360

Model 410/460

How can you get attached to an IBM ASCII terminal?

For a free brochure and to find a distributor near you, call 1-800-IBM-7257 ext. 84. Or call your IBM Marketing Representative.

IBM®

*This is IBM's single unit price for a purchase from IBM exclusive of taxes and shipping. Dealer prices may vary. Price is subject to change without notice. Prime is a registered trademark of Prime Computer, Inc., Natick, MA. Data General is a trademark of Data General. Wyse is a registered trademark of Wyse Technology. TeleVideo is a registered trademark of TeleVideo Systems, Inc. DEC is a trademark of Digital Equipment Corporation. IBM is a registered trademark of IBM Corporation. © IBM 1988.

ORDER NOW! Supplies Are Limited!

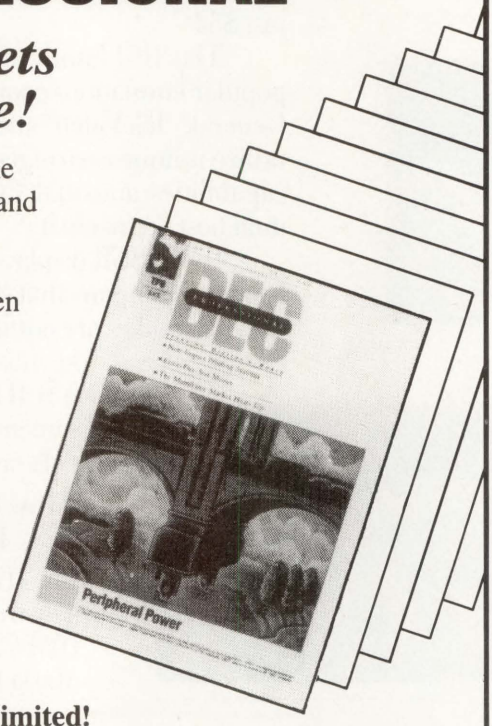
BUILD YOUR COMPUTER LIBRARY DEC PROFESSIONAL

Back Issue Sets Now Available!

DEC users read our magazine from cover to cover, use it and reuse it to help solve daily problems, improve their professional skills, and widen their perspectives.

Now you can build your computer library, receive issues you missed and replace well-worn copies.

Order the 46 available back issues of *DEC PROFESSIONAL*, September 1982 to present, as a set and save.



Order Now! Supplies are limited!

TO ORDER CALL (215) 542-7008 with your credit card information. Or complete and return the order form below. Payment must be included with your order.

▼ Clip and Send ▼ ▼ Clip and Send ▼

BACK ISSUE ORDER FORM – DEC PROFESSIONAL

☐ Please send _____ set(s) of 46 available back issues of *DEC PROFESSIONAL*. $138 for each set ordered. Includes shipping by surface mail. Add $10 for each set delivered to Canada.

PLEASE MAKE PAYMENT IN U.S. DOLLARS AND DRAWN ON A U.S. BANK.

☐ Check enclosed for $_____

☐ Charge to: ☐ VISA ☐ MASTERCARD

Account # _____ Expires ____/____

Signature _____ Date _____

NAME _____
PLEASE PRINT

ADDRESS _____

CITY _____ STATE _____ ZIP _____

COUNTRY _____ TELEPHONE ( ) _____

Mail completed form with payment to:

PROFESSIONAL PRESS INC., P.O. Box 504, Spring House, PA 19477-0504

DP688

PURVIS Introduces DEC Interface

PURVIS Systems has introduced an MIL-STD-1397 interface for PDP-11 and MicroVAX Q-bus computers. The Q-bus/NTDS interface allows DEC computers to directly communicate with tactical computers or peripherals, using MIL-STD-1397 functional and electrical characteristics, for the purpose of transferring digital data.

The Q-bus/NTDS, MIL-STD-1397 interface is a single quad-size card that plugs directly into the backplane of the Q-bus. The card supports 16- and 32-bit, full-duplex I/O transfers in all categories of operation.

The interface is available in three versions to support Type A (slow), B (fast) and C (ANEW) classifications. The Q-bus/NTDS is supplied with I/O driver and test software, wrap test cables and a user manual.

The price is $3,400.

To receive more information, contact Roy Hiipakka, PURVIS Systems Inc., 1272 W. Main Rd., Middletown, RI 02840; (401) 849-4750.

Circle 454 on reader card

OASYS Announces 80386 Development Tool-Kits

The OASYS 80386 development tool-kit is now available on VAX/VMS, ULTRIX and other 68000-based systems. OASYS' 80386 compilers use extensive global optimization techniques and employ superior register allocation in generating dense code. Full support is provided for two floating point units, the Intel 80387 and the WEITEK 1167.

The OASYS C 80386 compiler may be used with host system debuggers, such as dbx, or with the OASYS C and FORTRAN Source Level Debuggers for debugging in cross mode. OASYS' Designer C++, an optional C++ front-end preprocessor, also is available with the OASYS 80386 C compiler. The 80386 compilers operate with other components of the OASYS 80386 Tool Kit, for example, editors, profilers and math libraries.

Find out more by contacting Michael Olfe, OASYS, 230 Second Ave., Waltham, MA 02154; (617) 890-7889.

Circle 444 on reader card ■

ATTENTION VENDORS

The *DEC PROFESSIONAL* magazine will consider DEC-specific hardware and software products for review. We do not endorse or guarantee any products reviewed or discussed. For further information contact:

The Editorial Department, Professional Press, 921 Bethlehem Pike, Spring House, PA 19477.

Kimberly Disk and Tape EXTRAVAGANZA

NEW

Digital

RA82-AA,AD	$13,195
RA81-AA, AD	$10,500
RA60-AA	$12,500

NEW

Cipher

F880	$2,795
M890	$3,395
M891	$3,695
M990	$6,195

NEW

Fujitsu

M2333K	$3,900
M2344K	$7,195
M2351A W/TERMINATOR	$7,495
M2361A W/TERMINATOR	$7,995

ALL EQUIPMENT IS NEW AND IN STOCK WITH WARRANTY

KE
Kimberly Electronics

140 Route 17N, Suite 210, Paramus, NJ 07652

1-800-843-4009

In NJ 201-387-0872

Fax 201-261-2206

CIRCLE 216 ON READER CARD

COMPUTERS AND PERIPHERALS
IN STOCK PROMPT DELIVERY

NEW BUY DEC™ USED SELL

SYSTEMS
MODULES
PERIPHERALS

VAX⊛Q-BUS⊛UNIBUS

CALL TODAY
617-547-4005 • 800-892-9230
TELEX 374-8460 FAX (617) 354-1417

COMPETITIVE PRICING dda DEC DEALERS ASSOCIATION
LET US QUOTE YOU ON ALL YOUR DEC NEEDS
*DEC A TRADEMARK OF DIGITAL EQUIPMENT CORP

ELI HEFFRON & Sons inc.
139 HAMPSHIRE ST. CAMBRIDGE, MA. 02139

DEC PRO Garage Sale!

- EQUINOX DS5 . . . loaded
- ABLE DH/DM 16 DHV ports for your VAX with full modem control and distribution panel
- DILOG 16 port VAX DHV same as above
- ABLE DH/DM for PDP UNIBUS with distribution panels
- SI 6100 UNIBUS controllers
- UNIBUS memory: 11/44 style1 MB boards
- UNIBUS 4- and 8- slot backplanes
- ABLE Enable + cache
- DLV-11, 4 MB memory, disk controller (DR), and other

call KEVIN at

215-542-7008

"We'll pay you CASH for your unneeded DEC equipment"*

*"Hi! I'm **Maggie Connelly**, a purchasing manager at Midwest Systems. Please accept my 'invitation' to call us about purchasing your used or new DEC* Equipment.*

*I think you'll be glad you called us, and for two very good reasons. The **first**, is that **we are active buyers... not shoppers.** We buy well over 5,000 DEC* products **every month** and are rated as the nation's largest purchaser of DEC* equipment. The **second** reason is simple. We buy both **individual** DEC* products and **complete** systems ... and make immediate cash payment.*

During the nine years that I've been at Midwest, we've helped thousands of people and companies who were faced with the task of selling their unneeded DEC equipment. I'm sure that you'll also enjoy working with us and our 16 very courteous and helpful buyers."*

*Please accept our invitation... **Call us today** on our toll-free number: **1-800-328-7000, ext. 9936.** (In Minnesota, call 1-612-894-4020). We look forward to talking with you.*
Thanks!

Maggie Connelly

MIDWEST SYSTEMS INCORPORATED
2800 Southcross Drive West, Burnsville, MN 55337

* DEC is a registered trademark of Digital Equipment Corporation.

digital

PUBLIC NOTICE!!

digital

BOSTON BOARDS & SYSTEMS, INC.

55 Rear Main Street, Kingston, MA 02364

Boston Boards & Systems

617-585-7777

Our Guarantee Is Our Reputation!!

Boston Boards & Systems

SPECIAL
VEGETARIAN PLATTER
W/BEVERAGE
$3.75

MICROVAX II
Systems & Peripherals

8000 SERIES
Systems
&
Peripherals

$1 MILLION + *DEC inventory
15% to 60% OFF DIGITAL LIST!!
CABLES TO CPU's!! CALL TODAY!!

WE ALSO BUY NEW & USED EXCESS *DEC INVENTORY

EMC² cipher CONTROL DATA EMULEX KENNEDY FUJITSU T.M. National Semiconductor

digital **FAX: 617-747-6255**
TELEX #920038BBS

Digital is a registered trademark of Digital Equipment Corporation

digital

EQUINOX DS-5

Cabinet (Rackmount)
Processor Set
1 24-RS
3 24-CS

List >$12,500

Best Offer
Over $8,500

Call Kevin
215-542-7008

WANTED
BARE-BONES 8200/8250
(No Unibus)
With or Without DEBNA & KDB50
Call Kevin Kennelly at
215-542-7008

REMTEC FUJITSU 2294K. 336MB, $2,495. (415) 463-3511.

FOR SALE DEC PDP 11/73 cpu only. 256k, 70 MB disk, tape backup. MDB chassis with DEC internals, RSTS/E, and accounting software. (214) 630-3835 ask for Jim.

REMTEC FUJITSU 2284. 168Mb, Disc Drive, $695. Fully guaranteed. (415) 463-3511.

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.

STOP! LOOK! $4,000/month with computers. Homebased. Proven. No experience/capital. Guaranteed. Free details. MacKenzie, Box 91181-FMB, Pasadena CA 91109.

- PRO 350/380 MEMORY BOARDS
- DISK DRIVES - BIG & FAST FOR PRO
- RAM-DISK Software for Micro/RSX,* 11M (+) & P/OS*

Call 415-420-9579
Proto Systems
1238 Josephine St, Berkeley, CA 94703

Buy, sell trade **LSI*** **PDP*** **VAX***

SYSTEMS & PERIPHERALS

- CPUs • MEMORIES
- DISC & TAPE DRIVES
- CRTs • TERMINALS • PRINTERS
- INTERFACES Etc.

dce DIGITAL COMPUTER EXCHANGE INC
27773 Industrial Blvd., Hayward, CA 94545
CALL-(415) 887-3100
FAX (415) 887-5590 TLX 709536

dda

* Registered trademark of Digital Equipment Corporation

NETWORK SUPPORT I specialize in PC to VAX (both IBM and Apple), DECnet and VAX-cluster design and installation. If you need some short term assistance, call me any time (412) 461-1772.

INFORMATION

Rates: 1 time: $600
3 times: $550
6 times: $500
12 times: $450

Size: 1/9 page — 2 3/16" x 2 3/4"

Camera ready mechanical required.

Typesetting and composition available.

For more information call Mary Browarek at (215) 542-7008.

MEADOWLARK ENTERPRISES
37 High Street
Danvers, MA 01923

We need to buy your excess DEC equipment now!

VAX & PDP-11

Turn your unwanted computer equipment into cash!

- *Large inventory*
- *Immediate availability*
- *Super Prices*

617-777-4666 dda
FAX-617-777-8433 800-DEC-DLER

CIRCLE 204 ON READER CARD

It's LOGO or it's NO GO! STO

dda DIGITAL DEALERS ASSOCIATION

Look for this logo — it's your insurance that you are doing business with a reputable dealer in the used DEC* marketplace. dda was formed in 1982 as a trade association to promote ethical dealings in the secondary hardware market.

For membership & other information:
DIGITAL DEALERS ASSOCIATION
313/475-8333
107 S. Main St., Suite 202
Chelsea, MI 48118

*DEC is a registered trademark of Digital Equipment Corporation.

CIRCLE 203 ON READER CARD

SITE MANAGEMENT

Our VAX/VMS site support services will get your team back to applications!

- **Analysis & Planning**
- **Performance Management**
- **Capacity Management**
- **Training**

For more information, call us at:
Continuum Consulting, Limited
(206) **485-HELP** (4357)
(206) **999-4VAX** (4829)

CONTINUUM™
A WASHINGTON CORPORATION

CIRCLE 207 ON READER CARD

VAX® RENTALS

MICROVAX II
VAX 700 SERIES
VAX 8000 SERIES
Systems & Peripherals

- Add-On Flexibility
- Purchase Options

3 Months • 6 Months • 12 Months

BROOKVALE ASSOCIATES
dda Digital Dealers Assoc.

EAST COAST (516) 273-7777
WEST COAST (206) 392-9878

CIRCLE 202 ON READER CARD

VAX CAREERS SOUTHEAST

Being in the right place at the right time is the best way to take advantage of a career opportunity! Making you aware of the right place and presenting your credentials at the right time is what I do best!

Numerous opportunities for all levels of VAX professionals. Skills in the following areas are highly valued:

- FORTRAN
- COBOL
- DATATRIEVE
- ORACLE
- DBMS-11
- RDB
- ADABAS
- MANUFACTURING
- HABITAT/SCADA
- DECNET/ETHERNET
- ALL-IN-ONE
- MASS 11

CALL or WRITE
BRENDA CAREY, C.P.C.
DIGITAL SPECIALIST
When you want to be in the right place at the right time!

(919-222-0231)
AMOS & ASSOCIATES
633B Chapel Hill Road Burlington, N.C. 27215

CIRCLE 201 ON READER CARD

ARE YOU EXPOSED?

Cover yourself with our **Disaster Recovery Services**

- VAX Hotsite Backup Systems
- Computer Ready Recovery Facility
- Telecommunications Lines
- Temporary Workspaces
- Consulting Services
- Coverage from $300/month

AD AMERICAN DIGITAL TECHNOLOGIES
Costa Mesa, California

Please Call:
(800) 669-7070 or (714) 957-8440

CIRCLE 200 ON READER CARD

DISK PACKS FOR DEC™

Go with the leader in Nashua hard disk storage media sales.

•New! •Error Free! •Preformatted!

For DEC RM05
256 MB Disk Packs.....$ 495.
For DEC RM03
67 MB Disk Packs.....$ 245.
For DEC RP06
176 MB Disk Packs.....$ 425.

Call Toll Free:
1-800-445-4832
MasterCard VISA

COMPUTER DISTRIBUTING COMPANY, INC.
39 East Freeport Blvd. • Sparks, NV 89431

CIRCLE 209 ON READER CARD

*ADDRESS CORRECTION FOR MAY ISSUE

For Dibol Programmers:

The Book The Publishers Wouldn't Publish!

The First Comprehensive work on DIBOL and DIBOL look alikes.

PRICE: $49.00 + $10.00 S/H

Send Orders To:
Neil Freeman Consultants
45-449 Hoene Place
Kaneohe, Hawaii 96744*

CIRCLE 208 ON READER CARD

East of the sun.
West of the moon.
Windjammer.

A place to live your fantasies.
A place to free your soul.

To cozy up to the Caribbean sun.
To dance among a thousand stars to the rhythms of steel drums.
To play on sparkling white and pink sand beaches.
To discover the underwater paradise of the reefs.
To find a new friend and share the intimacies of a sensuous night.

To come alive and live.
To remember for a lifetime.

6 days and 6 nights. From **$625.**

Reservations toll free
1-800-327-2600
In Florida **1-800-432-3364**

Windjammer 'Barefoot' Cruises
Post Office Box 120.
Miami Beach, Florida 33119.

CIRCLE 168 ON READER CARD

"Cap'n Mike, rush me my free, full color 'Great Adventure' booklet and show me the way to Paradise for 6 days and 6 nights from $625."
Windjammer 'Barefoot' Cruises.
P.O. Box 120, Dept. 4288 Miami Beach, Fla. 33119.

Name _____
Address _____
City _____ State/Zip _____

ADVERTISERS INDEX

Reader Service Number		Page
196	Access Technology	114-115
178	American Digital Systems	139
238	Applix	145
180	BLAST/Communications Research Group	83
195	Cardinal Data Corp.	103
279	Century Data	44-45
103	Chipcom Corp.	68
105	Clearpoint, Inc.	11
107	Coefficient Systems Corp.	56
108	Cognos Corporation	1
109	Comdisco Disaster Recovery Services, Inc.	99
111	CompuServe/Data Technologies	69
112	CompuServe/Data Technologies	71
113	CompuServe/Data Technologies	73
286	CompuServe/Data Technologies	75
193	Computer Associates	119
179	Computer Methods	125
268	Computer Museum	148
280	Computer Systems Engineering	134
114	Datability Software Systems, Inc.	I.F.Cover
234	Datasouth Computer Corp.	I.B.Cover
117	De Rex, Inc.	134
	DEC PROFESSIONAL	152
277	DECUS	107
116	Demac Software	25
184	Digi-Data Corp.	89
272	Dow Jones Service	95
119	Edison Software	135
120	EEC Systems, Inc.	7
121	EMC Corporation	B.Cover
255	Empress Software Inc.	111
264	Emulex Corp.	66-67
122	Equinox Systems, Inc.	2
282	Evans, Griffiths & Hart	133
123	FEL Computing	85
273	Gejac, Inc.	31
194	Gold Key Electronics	81
124	Grafpoint	136
265	GraphOn	159
278	GrayMatter Software	136
	IBM	151
253	ICEX	121
190	Interactive Technology	19
129	Intra Computer	150
130	James McGlinchey	144
131	Jyacc	53
132	Kea Systems Ltd	122
134	Logicraft, Inc.	59
135	Maintech, A Division of Volt Delta Resources	97
237	MCBA	113
137	MDBS, Inc.	61
138	MDBS, Inc.	63
139	MegaTape Corp.	35
139	MegaTape Corp.	36-37
140	MICOM/Interlan Systems	147
123	Mobius	85
287	Nemonix, Inc.	91
	Network General	123
235	Networx Data Products	21
188	Nissho Electronics	6
288	Oregon Software	98
145	Park Software	16
175	Persoft, Inc.	5
148	Precision Visuals	27
153	Process Software	150
	Professional Press	81,132,
154	Progress Software	149
276	Purvis Systems	29
249	Raxco	77
155	Relational Technology	23
156	Restor Communications	87
284	RTE Deltec	42
	SAS Institute	49
	SAS Institute	51
157	See First Technology Inc.	140
275	Signal Technology	17
181	Software Products International	140
269	Software Techniques	57
158	Sorbus	33
159	SPSS	117
160	Summus Computer Systems	55
161	Synctronics	20
243	System Industries	12-13
	Systems Compatibility Corp.	supplement
232	Systonetics	141
283	Trans Data Communications	144
165	TRW Customer Service Division	101
262	Transitional Technology, Inc.	15
285	Uniform	98
187	Upper Bound Micro Computers, Inc.	140
	VAX Professional	118
167	Walker Richer & Quinn, Inc.	8-9
168	Windjammer Barefoot Cruises	157
258	Wyse Technology	109
171	Xyplex, Inc.	143
172	Zoltech Corp. (VME)	137
174	Zoltech Corp. (Q-Bus)	137

More information about many of these advertisers is available electronically on our Automated Reader Information Service (ARIS). Dial (215) 542-9458.

SALES OFFICES

VICE PRESIDENT Helen Marbach
NATIONAL SALES MANAGER Jeffrey Berman
ADVERTISING SERVICES MANAGER Connie Mahon
ADVERTISING COORDINATOR Lori Goodson
SENIOR ACCOUNT EXECUTIVE Dan Mainieri Jr.
CLASSIFIED ADS & USED EQUIPMENT Mary Browarek

REGIONAL SALES MANAGERS

MID-ATLANTIC Mark Durrick
INTERNATIONAL Helen B. Marbach
MIDWEST, SOUTHEAST Peter Senft

Professional Press, Inc.
921 Bethlehem Pike
Spring House, PA 19477
(215) 542-7008

NEW ENGLAND

Trish McCauley
Senior Account Executive
Professional Press, Inc.
238 Bedford St., Suite 3
Lexington, MA 02173
(617) 861-1994

NORTHERN CALIFORNIA and NORTHWEST

A. G. Germano
Regional Sales Manager
Alonna Doucette
Account Executive
Professional Press, Inc.
715 El Camino Real, Suite 206
San Bruno, CA 94066
(415) 873-3368

SOUTHERN CALIFORNIA and SOUTHWEST

David Beardslee
Regional Sales Manager
Karin Altonaga
Senior Account Executive
Professional Press, Inc.
1010 East Union Street
Suite 101
Pasadena, CA 91106
(818) 577-5970

From what they say, you'd think that all terminal manufacturers are industry leaders. And that their terminals provide unmatched performance, emulation, reliability, value, and just about anything else you could want. We say all that too, about GraphOn. And about our terminals. So we're not surprised that the other guys say it. They're not about to say that their terminals are almost as good as ours. But the fact is that people *are buying* terminals that are almost as good as ours. We know you want the best DEC and Tek emulations you can get—along with all the other features of a top terminal. So we're happy to send you specifications and other information about GraphOn monochrome and color terminals, but… It's one thing to read about all the features and benefits of a terminal. It's another thing to actually experience them. Face it. There's really only one way to judge a terminal. And that's to see it at work on your own applications, in your own environment. Phone us today for your special hands-on demonstration. 1-800-GRAPHON.

GraphOn

CIRCLE 265 ON READER CARD

GraphOn is a Trademark of GraphOn Corporation. DEC is a trademark of Digital Equipment Corporation. Tek is a trademark of Tektronix, Inc.
© 1988 GRAPHON CORPORATION • 1901 South Bascom Ave., Campbell, CA 95008 • 408-371-8500 • FAX 408-559-6235 • TLX 499576 GRAPHON

BACK END

John C. Dvorak

Nine Wacky Aspects Of 1988, Part 1

This is turning out to be a strange year. It's getting more weird as time goes by. Let's review some of the strange occurrences.

1. Sun Microsystems shenanigans — First, AT&T buys a piece of Sun Microsystems. People suspect a plot to corner the UNIX market. Meanwhile, Sun rolls out an 80386 machine, a 68020 machine and has a SPARC machine with its own proprietary chip inside it.

Can't these guys make up their minds? I always thought that Sun was supposed to compete with DEC. Now they're going in every direction and AT&T is riding shotgun. Weird, I'd say.

2. Chip wars — People are worried about Sun's SPARC chip. So Motorola rolls out an 88000 RISC chip, while Intel is hinting about its 80486. Microprocessor wars are just beginning.

3. IBM's indecision — At IBM, Bill Lowe, Entry Systems Division chief, makes noise about how IBM will never license the PS/2 patents. A few months later, someone else at IBM says it will license the architecture. Immediately, every Larry, Moe and Curly scramble to get a microchannel machine ready for shipping.

So much for all the malarkey that we'll see two IBM standards: microchannel and non-microchannel. By this time next year, the non-microchannel implementations will be fading faster than the S-100 bus did after the IBM PC was announced. Curiously, the ANSI specification has just come through committee for the S-100 bus, an incredible waste of time for the participants.

4. DEC/Apple silliness — DEC and Apple joined hands to skip around the Maypole for who knows why. VMS on a Mac should be amusing. Perhaps Apple will see how to do multitasking, and DEC will learn how to do marketing.

5. Apple/Microsoft silliness — Apple decides to sue Microsoft for infringing on its patents and copyrights. Apple says that *Windows* release 2.03 goes beyond a 1985 agreement between Apple and Microsoft. Meanwhile, clumsy HP, a company that doesn't do anything right except pocket calculators and certain expensive instruments, gets caught in the web of intrigue because it brings out a Window-based interface called *New Wave*, which is, at best, a hokey copy of the Mac user interface. "Another John Young innovation!" chimes a friend of mine who's critical of the HP CEO. I have to agree. Even the name New Wave is so passe' that it's an embarrassment. I hope nobody at DEC worries about HP as a competitive threat in the years ahead.

6. UNIX to inherit the throne? — The above lawsuit results in grumbling from developers who hoped to make a killing by porting their Mac programs to the IBM environment. Everything is put on hold. The Microsoft chairman begins to fret and notices an ominous trend: People are spending too much time talking about UNIX as an operating system. They wouldn't be doing so if MS-DOS had what it takes to carry the ball of progress. But, it's stuck at 640K.

We must have OS/2 — a performance-sapping memory glutton which requires hot new machines to run efficiently. But, UNIX is a performance-sapping memory glutton, too. The machines that can handle OS/2 can handle UNIX, can't they? So now everyone's talking about UNIX like they did in 1982, as if it were the perfect answer.

7. Program upgrade jokes — All our favorite programs are being updated, *Wordstar, dBASE* and *Lotus 1-2-3*. The upgrades have a common denominator: The program size is larger and the program isn't as sleek as the original. As the newer machines grow faster with more memory space, the software grows slower requiring more memory space. We're back where we started.

8. Network mania — The funniest event, to me, is the sudden popularity of networks and a surging increase in multiuser systems. I remember in 1977 when the first micros hit the market. The experts laughed at the little things. They only ran at about 100,000 instructions per second or .1 mips. "Not enough power to be called a real computer," said the skeptics, aware that an old IBM 1701 was no powerhouse. Now that 80386-based desktop machines are clocking in at four or more mips (with 10 mips just around the corner), the same skeptics are trying to push every single-user machine onto a network. Why are people so set against single-user machines? At first, they didn't have any power to be single-user machines; now they have so much power that they should be hooked to a network to sap their performance.

9. Laser printers as white elephants — Every Japanese company with a plastic extrusion plant is rolling out its version of a laser printer. It's beginning to look like the early days of the VCR wars when outlandish oddball formats like the Quasar cassette or the Sanyo V-Cord format were promoted. The battle ended when BASF gave up trying to push its crackpot streaming video recorder that ran the tape by a stationary head at an ungodly speed only to reverse at the end of the tape and race back the other way.

So in 1988, we're shown one laser printer after another, each with an incompatible cartridge system.

These are nine reasons why things are getting confused. Remember the year is only half over.

THINKS LIKE A DEC, PRINTS LIKE A DATASOUTH.

DEC is known for powerful systems.

Datasouth is known for powerful printers.

And now, your DEC and Datasouth's DS 400 make a powerful pair. Because the DS 400 is 100% code compatible with your DEC system. So the VAX thinks you've got an LA 120 printer.

But what you've really got is pure Datasouth. Draft text at 400 cps, memo quality at 180 cps, and near letter quality at 60 cps. Plus dot-addressable graphics, bar codes and OCR output.

You get a straight paper path for smooth forms handling. And the power to print multipart forms up to six layers thick. You also get Datasouth's 100% duty cycle, 24 hours a day. So you don't get any more emergency visits from the repairman.

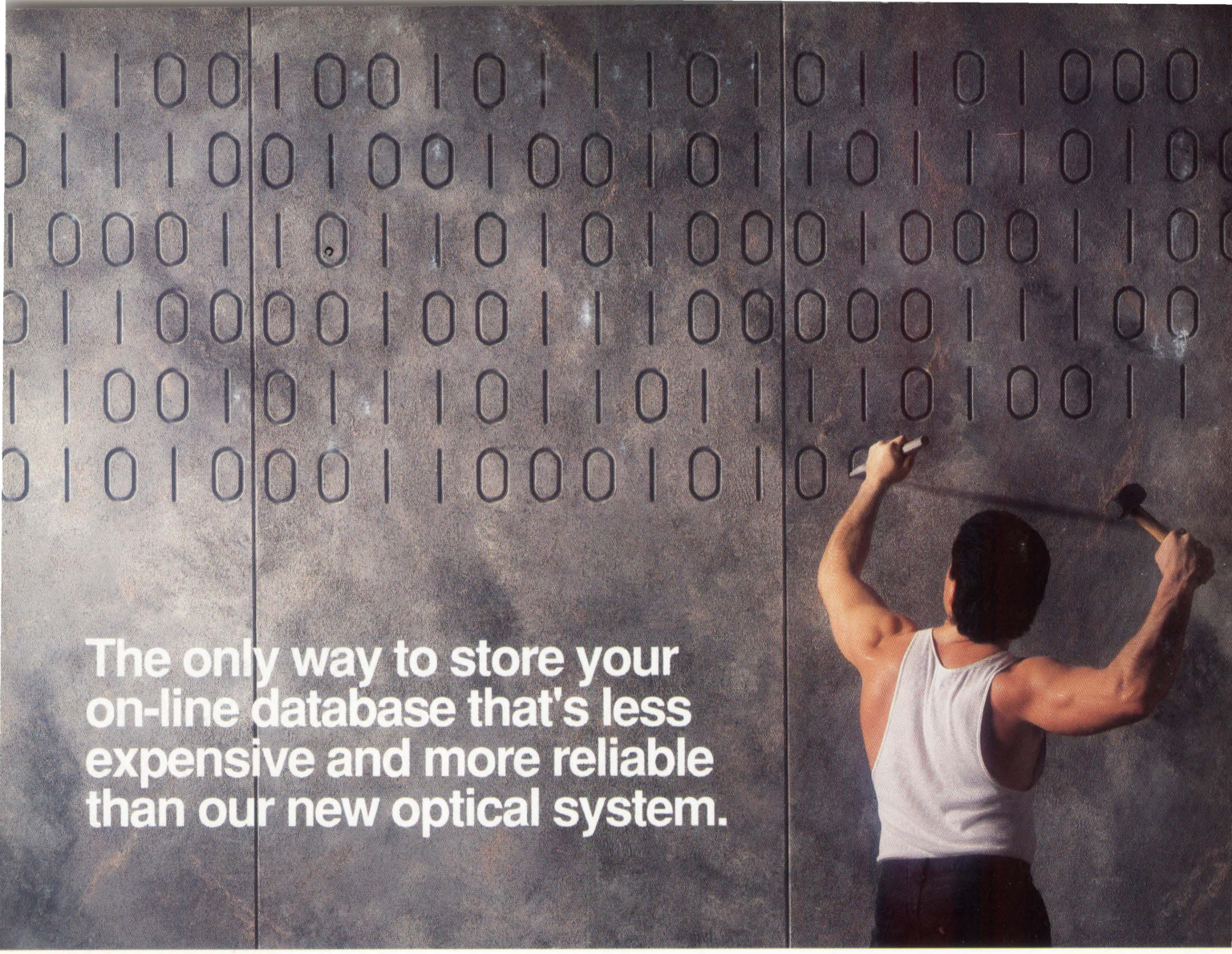
If you've got a DEC system, and need a better printer, better get one that's on the same wavelength. Call 800-222-4528 to find your nearest Datasouth distributor.

Datasouth
AMERICA'S HIGH PERFORMANCE PRINTER COMPANY

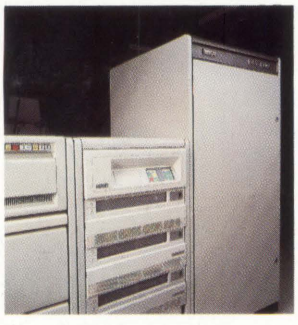
CIRCLE 234 ON READER CARD

P.O. Box 240947, Charlotte, NC 28224 • (704) 523-8500 • Tlx: 6843018, DASO UW • Sales: 1-800-222-4528 • Service: 1-800-438-5050 • West Coast Office: (415) 940-9828

DEC is a registered trademark of Digital Equipment Corporation.



The only way to store your on-line database that's less expensive and more reliable than our new optical system.



If you've been banging your head against the wall trying to find a low-cost, reliable way to store your large on-line database, EMC has the solution.

Because now, there's Archeion Database System. A rock-solid alternative to expensive magnetic disk storage.

This system, the newest addition to EMC's Archeion family of optical storage products, gives you the benefits of optical technology with the flexibility of a magnetic disk.

Benefits like unlimited user accessibility. Direct access capabilities. Unmatched durability, performance, and capacity.

Archeion Database System is ideal for both your relational database and archiving applications. It works in conjunction with any DBMS package you're currently using, so when you choose Archeion, you're not caught between a rock and a hard place when it comes to software compatibility.

Archeion will support up to 56 optical drives. Each drive provides one gigabyte on-line storage. What's more, Archeion has removable media. One drive can service many gigabytes of data.

Because it utilizes WORM technology, Archeion's media has a useful life of 30 years or more. And it's virtually indestructible. Data is actually burned into the disk so it's as safe as if carved in stone. This means data integrity like you've never known.

All this, for a fraction of the cost of magnetic disk storage.

The end result is simple: if you want a low-cost, reliable way to store your valuable on-line database, buy EMC's Archeion Database System.

Or get your chisel ready.

For more information on EMC's Archeion family of optical subsystems, call

1-800-222-EMC2
(in Massachusetts, 617-435-1000).

EMC²

The System Enhancement Company.
EMC Corporation, 171 South Street,
Hopkinton, MA 01748-9103

VAX is registered trademark of Digital Equipment Corporation. Archeion is a registered trademark of EMC Corporation.

CIRCLE 121 ON READER CARD