DAT

Tristar Gemini

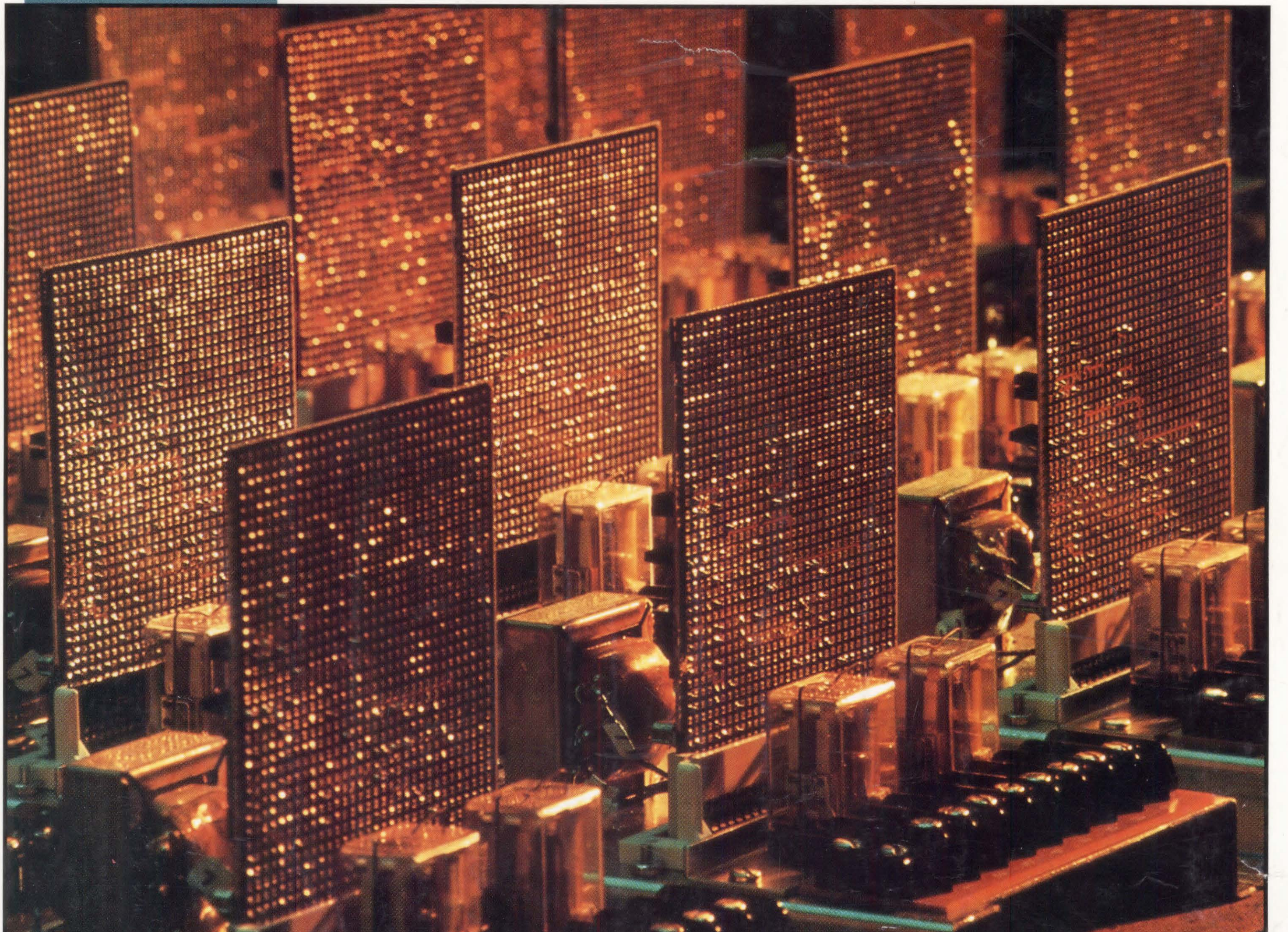
- New RISC Servers: DECsystem 5100 And 5500™ In Depth
- Microsoft Windows V3.0 Meets LanWORKS For DOS V3.0™
- Putting NAS™, POSIX And RISC/VMS™ On The Network

NOVEMBER ■ 1990

DEC Professional

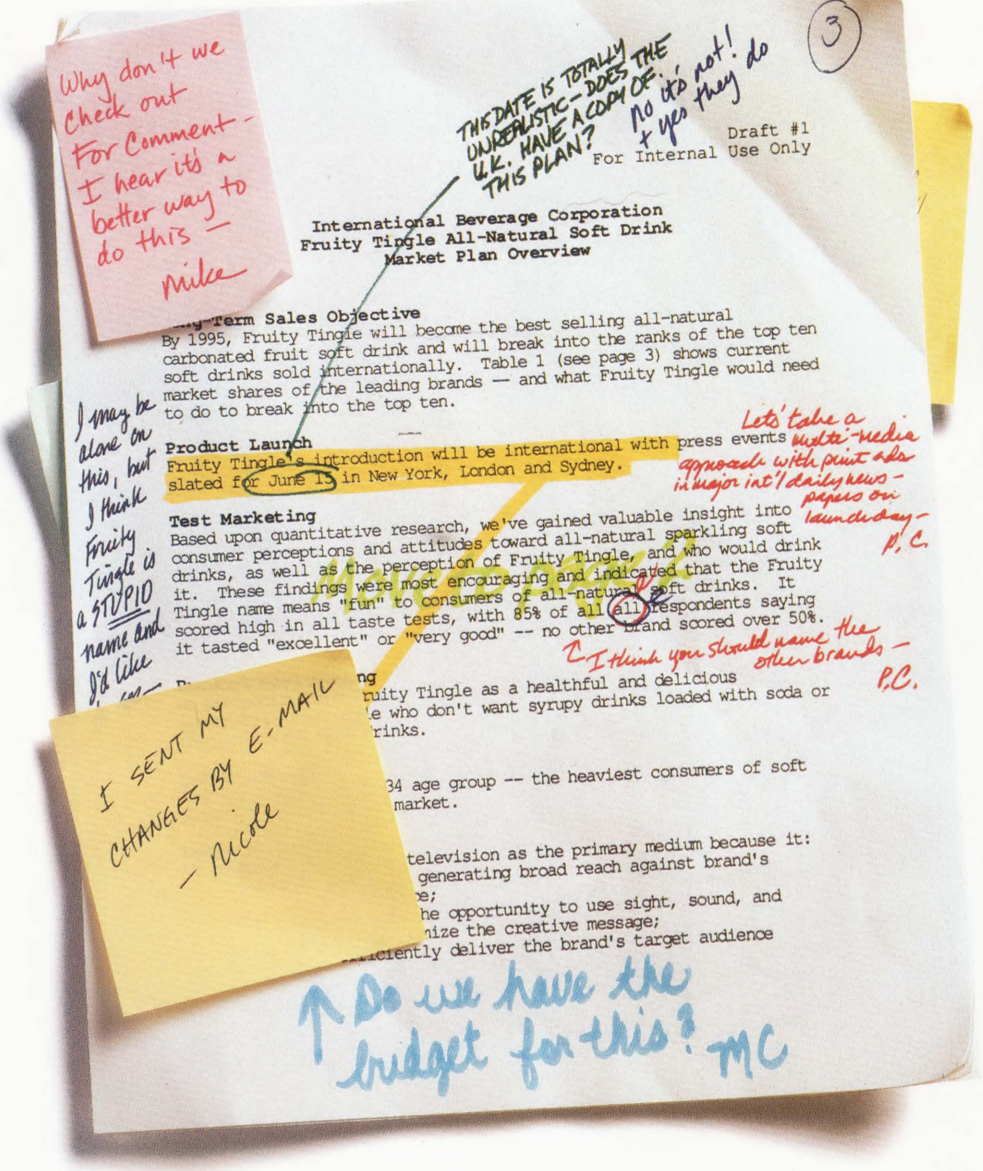
An Independent Magazine from Professional Press

$4.00 ■ VOL. 9, NO. 12



Design And Manufacturing

Does Anybody Around Here Know How To Use A Computer?



Why don't we check out For Comment - I hear it's a better way to do this — Mike

③

THIS DATE IS TOTALLY UNREALISTIC - DOES THE U.K. HAVE A COPY OF THIS PLAN?

No it's not! + yes they do

Draft #1
For Internal Use Only

International Beverage Corporation
Fruity Tingle All-Natural Soft Drink
Market Plan Overview

-Term Sales Objective
By 1995, Fruity Tingle will become the best selling all-natural carbonated fruit soft drink and will break into the ranks of the top ten soft drinks sold internationally. Table 1 (see page 3) shows current market shares of the leading brands — and what Fruity Tingle would need to do to break into the top ten.

Product Launch
Fruity Tingle's introduction will be international with press events slated for June 15 in New York, London and Sydney.

Let's take a multi-media approach with print ads in major int'l daily news-papers on launch day - P.C.

Test Marketing
Based upon quantitative research, we've gained valuable insight into consumer perceptions and attitudes toward all-natural sparkling soft drinks, as well as the perception of Fruity Tingle, and who would drink it. These findings were most encouraging and indicated that the Fruity Tingle name means "fun" to consumers of all-natural soft drinks. It scored high in all taste tests, with 85% of all respondents saying it tasted "excellent" or "very good" -- no other brand scored over 50%.

I think you should name the other brands - P.C.

I may be alone on this, but I think Fruity Tingle is a STUPID name and I'd like

ng
ruity Tingle as a healthful and delicious
e who don't want syrupy drinks loaded with soda or
rinks.

34 age group -- the heaviest consumers of soft
market.

television as the primary medium because it:
generating broad reach against brand's
e;
he opportunity to use sight, sound, and
nize the creative message;
iciently deliver the brand's target audience

I SENT MY CHANGES BY E-MAIL - Nicole

↑ Do we have the budget for this? MC

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

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

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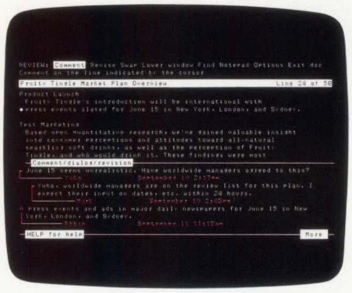

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REVIEW: Comment Revise Swap Lower window Find Notepad Options Exit doc
Comment on the line indicated by the cursor
Fruity Tingle Market Plan Overview                              Line 24 of 58
Product Launch
 Fruity Tingle's introduction will be international with
•press events slated for June 15 in New York, London, and Sydney.

Test Marketing
 Based upon quantitative research, we've gained valuable insight
 into consumer perceptions and attitudes toward all-natural
 sparkling soft drinks, as well as the perception of Fruity
 Tingle, and who would drink it. These findings were most
 Comment/dialog/revision
 June 15 seems unrealistic. Have worldwide managers agreed to this?
 ─────────Yuko               September 10 2:17pm
   Yuko, worldwide managers are on the review list for this plan. I
   expect their input on dates, etc. within 24 hours.
   ─────────Mark               September 10 2:45pm
A press events and ads in major daily newspapers for June 15 in New
 York, London, and Sydney.
 ─────────Robin              September 11 11:15am
 HELP for help                                                    More
```

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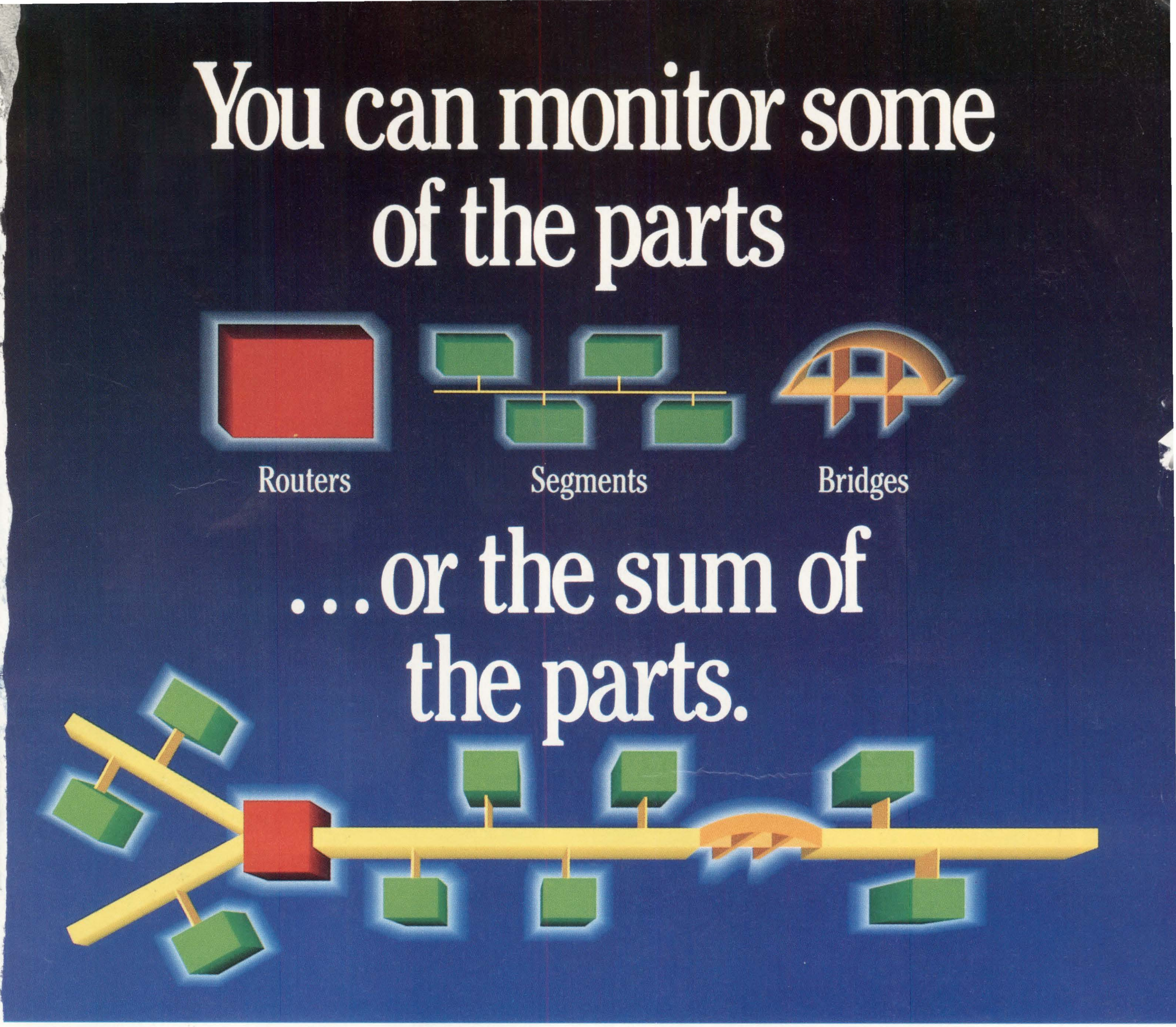
CIRCLE 183 ON READER CARD

You can monitor some of the parts

…or the sum of the parts.



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

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

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

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

Using one central LANCE workstation, you can:

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

LANCE does it all.

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

MT

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CIRCLE 143 ON READER CARD

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

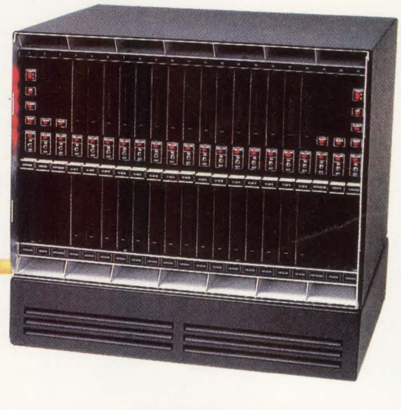
Only 3.5" high, the ELS-48 provides up to 48 ports, and runs 38.4 Kbps on all ports simultaneously. Fully LAT-compatible with extended DECserver command set, it offers unmatched performance at a low price.

MORE ports

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

MORE throughput

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



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

MORE than just LAT

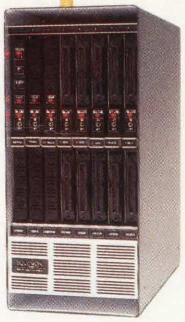
If you're in a multi-vendor environment, it's easy to network your VAX terminals and PCs with non-Ethernet hosts, or share modems and printers. Connections to non-LAT devices are made transparently without packet delays, providing fast response even during peak traffic periods.

MORE dependability

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

MORE wiring choices

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



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

MORE user-friendly

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

MORE space-saving

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

MORE networking features

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

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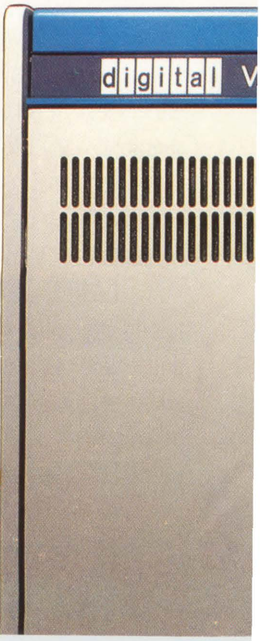

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CIRCLE 125 ON READER CARD

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MANUFACTURING

38 THE CFI PROCEDURAL INTERFACE
Bob Carver and Al Sanders
At the Design Automation Conference in June, the CAD Framework Initiative (CFI) demonstrated its first prototype guideline, a data model and procedural interface for circuit connectivity data. CFI has developed momentum through the participation of many vendors and users. The knowledge gained is sure to improve and speed the development of more guidelines to meet the integration needs of the CAD community.

44 MIND OVER MANUFACTURING
Larry R. Harris, Ph.D.
Expert systems are computer programs that automate judgment by storing the knowledge of human experts and applying that knowledge to a problem. Since manufacturing is critically dependent on human judgment in many areas, it's particularly ripe for the exploitation of expert systems. Manufacturers that ignore this technology do so at their own risk. It's essential to begin experimenting with expert systems to determine which areas in your company can benefit most.

50 VAXELN™: REAL-TIME VAX
Terry S. Berman
Although VAXELN, Digital's operating system for real-time applications, has been overshadowed by VMS, a study of how some of VAXELN's features are implemented can yield a wealth of VAX engineering knowledge. For those contemplating serious real-time design or future endeavors in systems programming, a look at VAXELN's internal workings can prove rewarding.

FEATURES

60 HARDWARE: DECSYSTEM 5100 AND 5500
Fay Elassy-Bortcosh
When Digital introduced new members of its second generation of DECsystem servers, the company underscored its commitment to open systems and the RISC/UNIX market. Digital engineers were able to leverage existing technology in a design that boosted performance without increasing costs. The result is two machines that meet state-of-the-art performance standards at competitive prices.

Continued on page 4.

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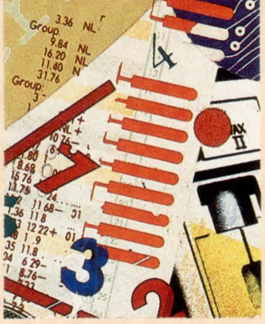

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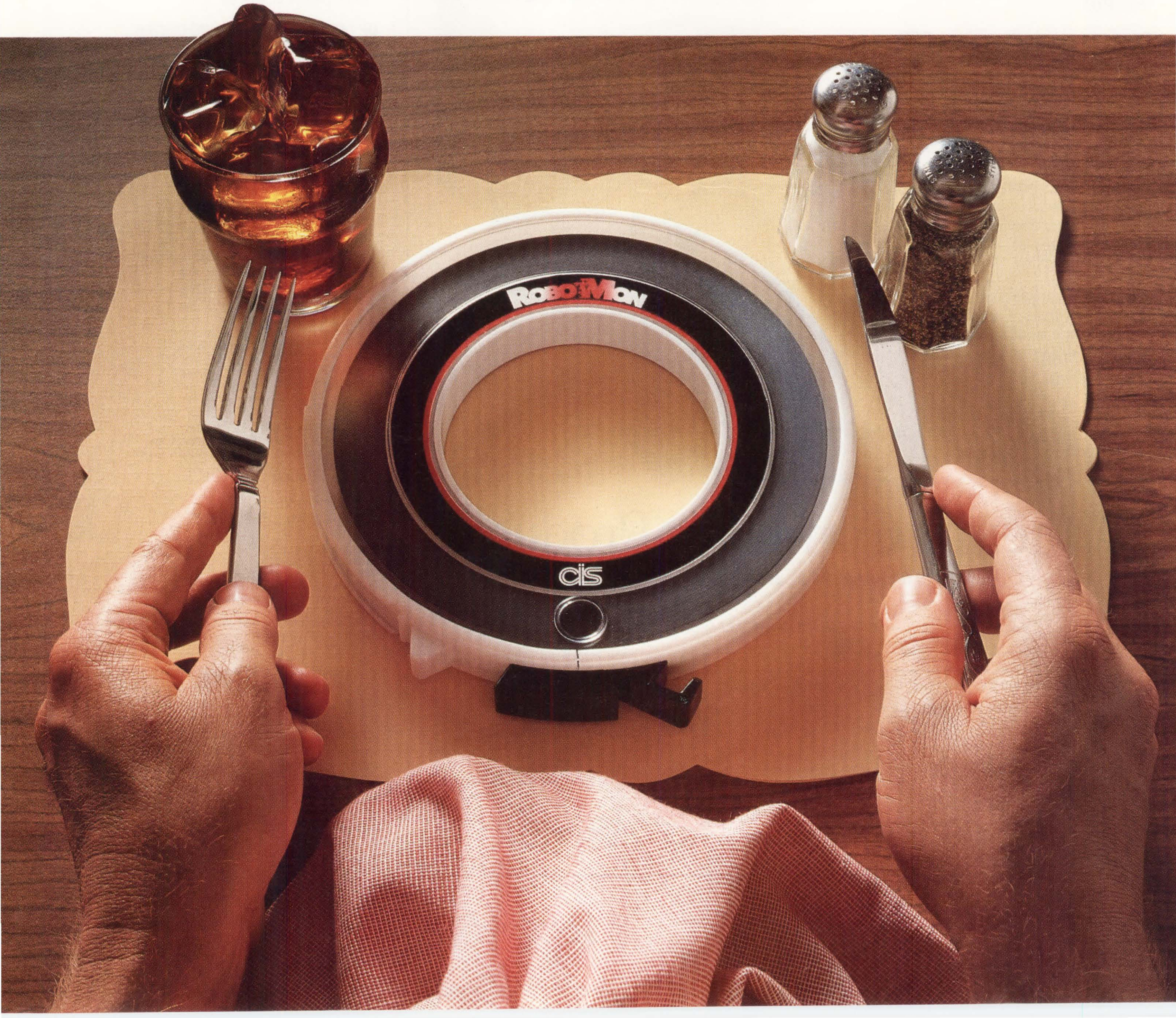

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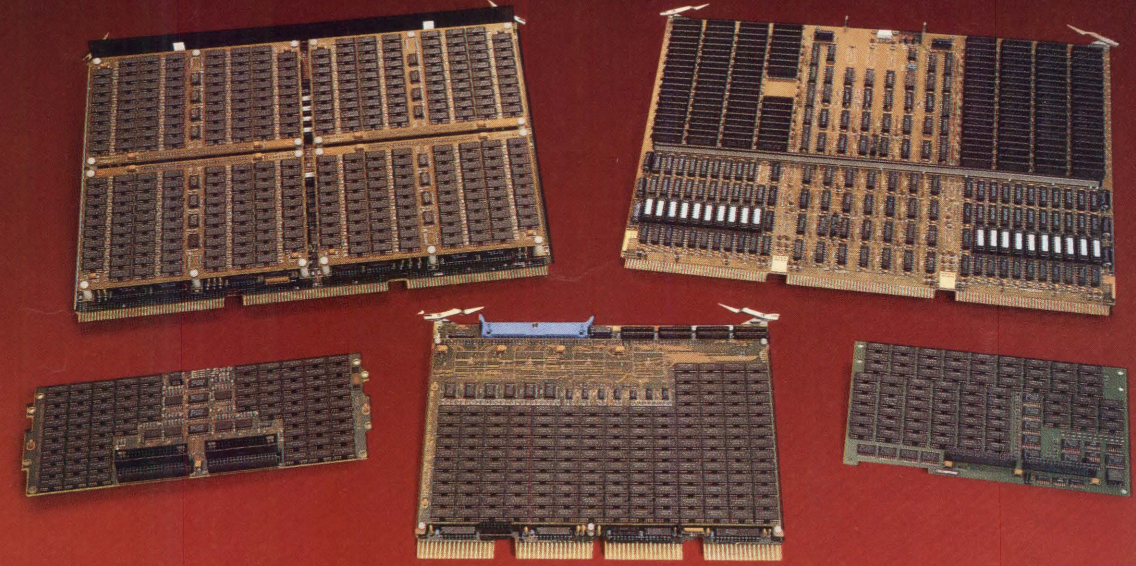

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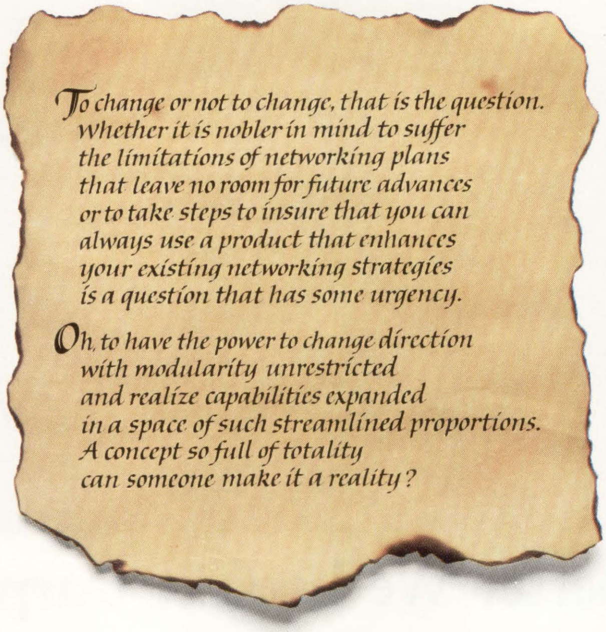
VISTA. To change

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

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



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

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

Advanced Architecture for Optimal Expandability

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

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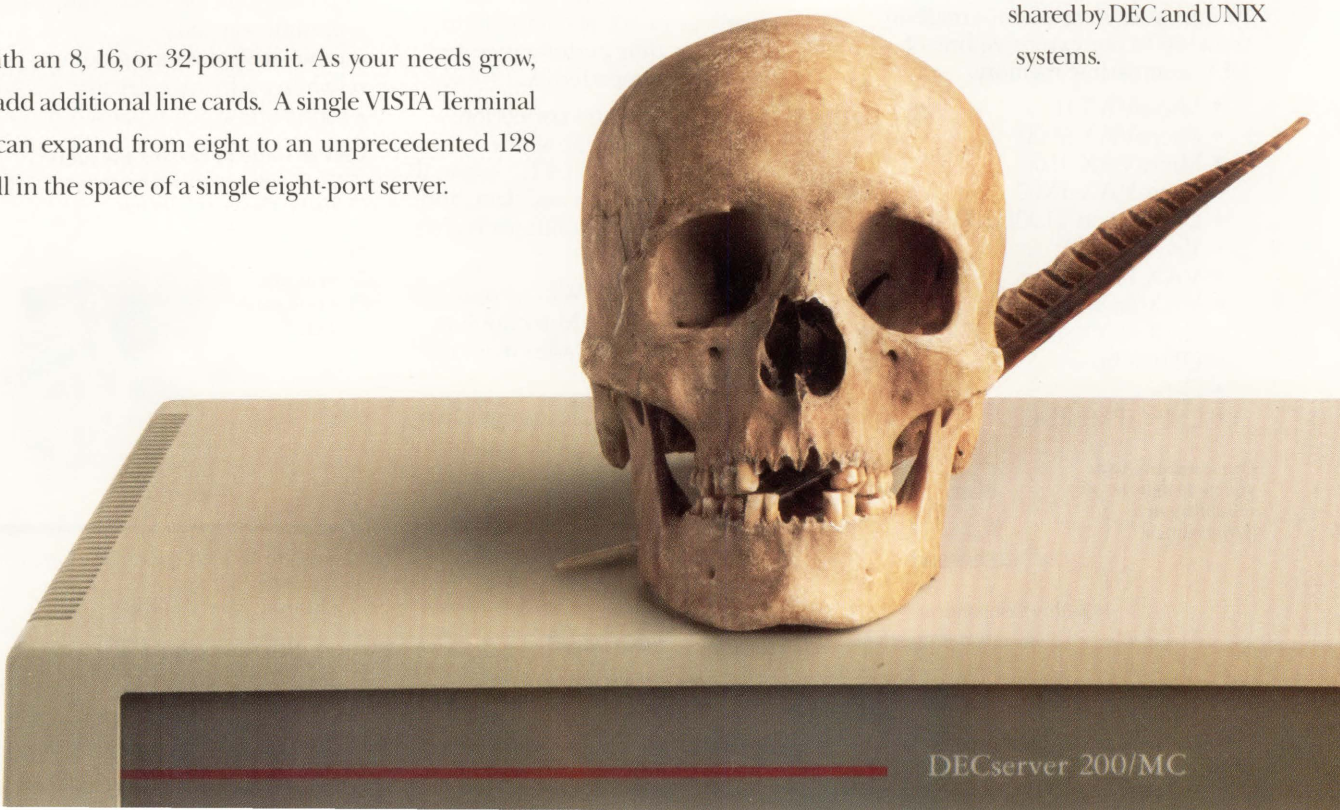

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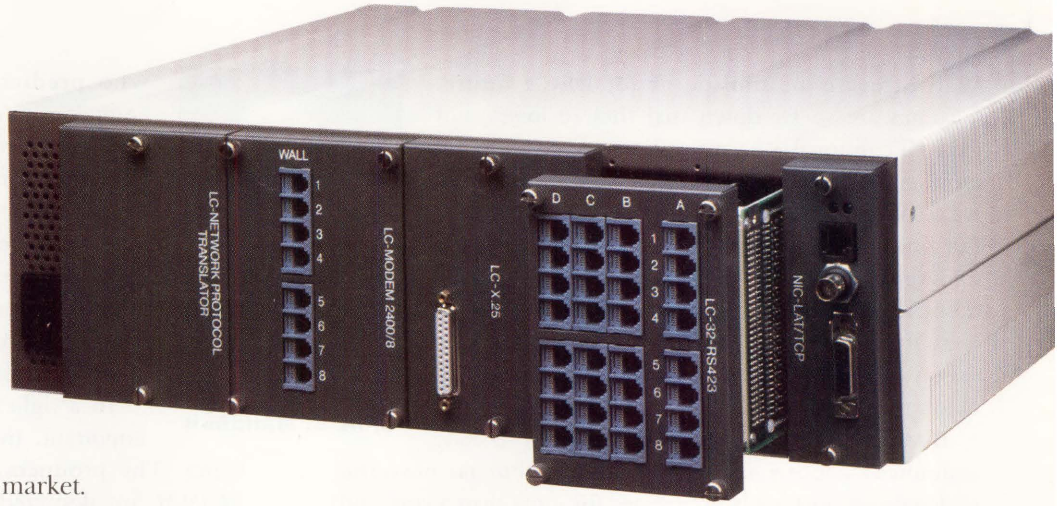

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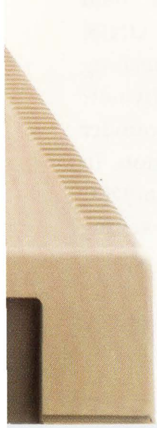

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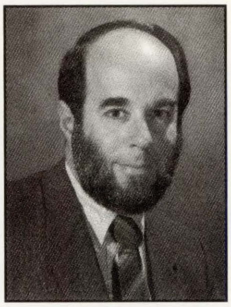
A TIME FOR OPTIMISM



CARL B. MARBACH

Wall Street is pessimistic about DEC's future. Earnings are so far down that they're losses, not gains. Traditional VAX processors are so short on mips, compared to the RISC boxes, that they seem weak. VMS consumes more CPU power than you can imagine. The mainframe VAX 9000 is late, is underpowered at 30 mips, and probably will be obsolete before it ships in volume.

Is it time for Digital to give up, or is there a reason to be optimistic? If Digital is the loser, then who's the winner?

IBM can't figure out what is going on. It recently announced another mainframe product, but no powerful midrange product has been released for more than a year, and there's still no Ethernet for the critical AS/400. Will the user interface be Windows or Presentation Manager? Will the operating system of the future be PC-DOS or OS/2? Who sells the most PCs? It isn't IBM, but some company that spells its name with kanji characters. The new RS-6000 is a nice workstation and server, but it has no communications with IBM mainframes or midrange computers, except SNA. Does IBM sound like the winner?

Hewlett-Packard has its own RISC processor. It even has a version of UNIX called HP-UX. However, its multiuser RISC machines are selling sluggishly. An insider told me that the number of new HP customers in the last six months could be counted by hand — some say on one hand. The acquisition of the Apollo workstation line only resulted in the phase-out of Domain as a processor and operating system in favor of a more standard version. As opposed to IBM, HP appears to have a vision for the '90s. It's just not having much success.

Companies such as Data General, Unisys and Wang are abandoning their proprietary systems for "industry-standard" solutions. They'll offer distribution, marketing, sales and support. But in a commodity market, these are things customers will shy away from. They'll be price-conscious. A price-sensitive market won't support the kind of sales and service the computer industry has been used to.

Most bad news today is about the economy. The deficit, high taxes, unstable interest rates, soaring oil prices and lower corporate earnings are headlines. But television networks still schedule their programming with computers, their advertising billing still runs each week, and payroll programs pay employees each period. Wall Street information networks give us up-to-the-minute data about trading, and the same analysts who predict that our industry is failing use computers to do their analyses.

While a recession may be upon us, there's a tremendous inertia about our systems that makes it hard to scale them back. Inventory can be adjusted over time, personnel can be furloughed or given early retirement, hiring can be postponed, but that VAX still needs service and software updates. And if you can produce a product that helps customers work better for less money, it still will be bought.

In a tight market, third parties become more important. Innovators help us get through tough times. The products you read about in *DEC PROFESSIONAL* are designed to help you get more from your system. Today you need them more than ever.

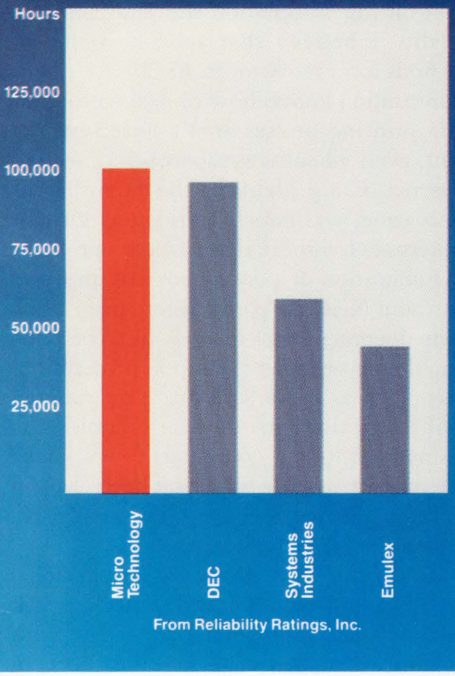
But what about DEC? Without its continued success, eventually there will be fewer platforms for products and services. But the evidence is that there are more DEC computers now than ever. As the price per VAX mip has dropped, more VAXs have been placed in the market. The rate of growth may have slowed, but there will be more VAXs at the end of 1990 than there were at the beginning.

Without counting out IBM or HP, DEC is well-positioned to take advantage of the technology and architecture of the '90s. The '90s will be the decade of platform independence, with a central network connecting multiple processors, workstations and servers into a coherent computing engine for the enterprise. DEC has all the pieces. It offers a networking strategy that embraces not only industry standards such as Ethernet, FDDI, OSI and TCP/IP but also proprietary protocols that interface seamlessly with these standards. It's only a matter of time before the RISC-based VAX appears, and by then VMS should have all the hooks and eyes it needs to integrate seamlessly with UNIX.

How would you like an operating system that ran all your UNIX software and met all the UNIX standards but was really VMS, with its 15 years of development? You could choose among a character-based VMS interface, UNIX interface or X-based Motif — all within the same operating system. If your processor offers more than 100 mips, why not?

They say that the three most important things to consider when buying a house are location, location and location. In the computer market, it's position, position and position. DEC is in a good position to launch us into the most exciting decade the computer industry has ever seen.

And you thought DEC was the safest choice for hard disks!


Field Mean Time Between Failure

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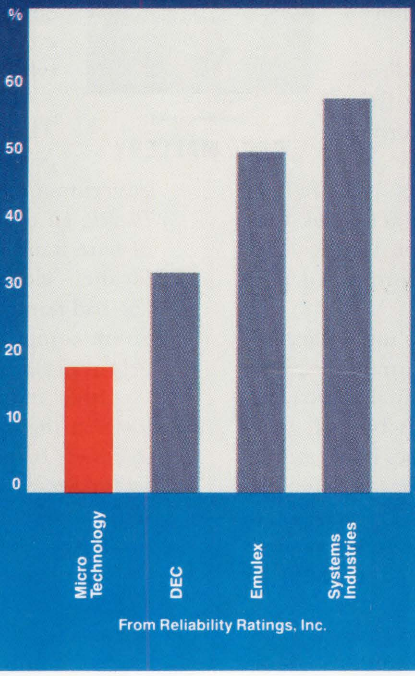
% of Sites Failed

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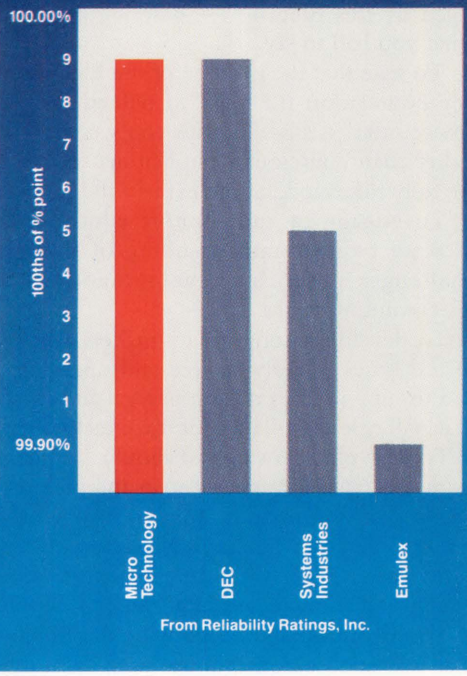
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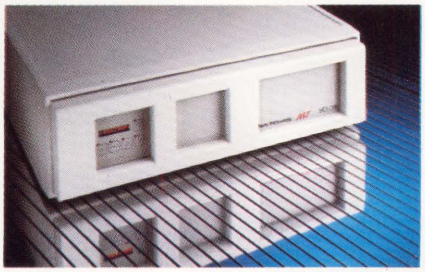
Reliability Ratings,* an independent research firm, will make you think again.

It proves that while the RA 90 is a good disk drive, the MDI-276 from Micro Technology is even better.

For example, the research showed our MDI-276 had the best MTBF: 101,235 hours. DEC finished a distant second at 97,082 hours. Systems Industries and Emulex trailed far behind.

The MDI-276 also had the fewest failed sites, beating DEC by 13%, Emulex by 32% and Systems Industries by a whopping 40%.



Our uptime was unsurpassed at 99.99%.

And our drive failure rate was 7% —nobody was lower. Compare that with reported failure rates of 15% for Systems Industries and 19% for Emulex!

So you can see, when it comes to hard disks, you only have two real choices. The company with a reputation for reliability, DEC. And the company proven to be more reliable, Micro Technology.

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*Results of an independent survey conducted by Reliability Ratings, an organization that specializes in providing unbiased reliability and service data to managers of DEC sites. Partial reprints available on request. Reliability Ratings' research department has no affiliation with Micro Technology Inc. Reliability Ratings is a registered trademark of Reliability Ratings, Inc. Per cent of sites failed is a function of both reliability and the average number of drives installed at end-user sites.

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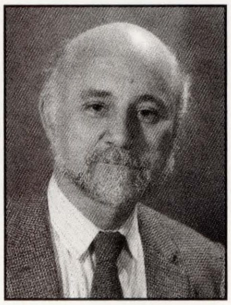
DEFENDING CYBERSPACE



DAVE MALLERY

Editor's note: DEC PROFESSIONAL received the following letter in response to "Policing Cyberspace" by Editorial Director Dave Mallery (September 1990). Because it eloquently represents the position taken by the advocates of the EFF, we are publishing it here.

I recently read your editorial titled "Policing Cyberspace." The words that you use — "I'm outraged by this rubbish" — describe my opinion of what you had to say.

To state that the purpose of the Electronic Frontier Foundation (EFF) is "to defend hackers from prosecution" is a lie. Perhaps you were misinformed rather than consciously duplicitous. To assure you are fully informed, let me explain the purposes of the EFF:

1. To engage in and support educational activities that increase popular understanding of the opportunities and challenges posed by developments in computing and telecommunications.
2. To develop among policy-makers a better understanding of the issues underlying free and open telecommunications and to support the creation of legal and structural approaches that will ease assimilation of these technologies by society.
3. To raise public awareness about civil liberties issues arising from the rapid advancement in the area of new computer-based communications media and, where necessary, to support litigation in the public interest to preserve, protect and extend First Amendment rights within the realm of computing and telecommunications technology.
4. To encourage and support the development of new tools that will endow nontechnical users with full and easy access to computer-based telecommunications.

Mitch Kapor has repeatedly stated that the EFF isn't a "hacker's defense fund." Declared Kapor: "Unauthorized intrusion into computer systems is improper behavior and should be illegal." The EFF's purpose is to see that First Amendment rights aren't trampled in over-reaction to real or imaginary threats posed by computer crackers.

To quote from the EFF Legal Overview:

"Advances in computer technology have brought us to a new frontier in communications, where the law is largely unsettled and woefully inadequate to deal with the problems and challenges posed by electronic technology. How the law develops in this area will have a direct impact on the electronic communications experiments and innovations being devised day in and day out by millions of citizens on both a large and small scale from coast to coast. Reasonable balances have to be struck among: traditional civil liberties; protection of intellectual property; freedom to experiment and innovate; and protection of the security and integrity of computer systems from improper governmental and private interference.

"Striking these balances properly will not be easy, but if they are struck too far in one direction or the other, important social and legal values surely will be sacrificed."

The speech in your editorial is protected by the First Amendment, and I wouldn't have it any other way. My speech in this message to you isn't. I composed it on my workstation and sent it to you electronically. I believe that speech is speech whether it finds form in ink or in ASCII.

The Constitution knows how to deal with print. That's why printing presses aren't seized by the government, even when newspapers print "secret" government documents. Craig Neidorf, the publisher of *Phrack*, an online magazine, was indicted on felony charges of wire fraud and interstate transportation of stolen property for the electronic publication of a document that someone else had removed, without Neidorf's participation, from a Bell South computer. The document later turned out to be publicly available, forcing the government to drop its prosecution.

Other individuals, such as Steve Jackson, have suffered losses at the hands of overzealous government officials. Major assets of his business, including computers, were seized by the Secret Service months ago. He still hasn't been charged with any crime. Yet the Secret Service won't return his property, nor will it state the legal basis for its raid.

Someone must stand up to this abuse of Constitutional rights, which is why I belong to the EFF and contribute to it financially. You owe Mitch Kapor, John Barlow and your readers, some of whom undoubtedly are EFF members, an apology for your intemperate and inaccurate diatribe.

William D. Weisman, Member of the Technical Staff
California Institute of Technology
Jet Propulsion Laboratory (NASA/JPL)
Altadena, California

P.S. This letter represents my viewpoint as an individual. I don't speak for NASA/JPL/Caltech or the EFF. Affiliation is given for identification only. I'm a data processing professional, not a cracker, and my duties have included work in maintaining the security of JPL's computers and networks.

Dave Mallery: Having spent an afternoon reading the press releases that the EFF sent, I failed to grasp most, if any, of the points made above. Perhaps my attention was distracted by the "poetry," but I think EFF has a distinct public relations problem in the writing of press releases.

I support the aims set out above with little hesitation. However, I'm very nervous about the rhetoric in the press releases and would like to see the charter of this organization in print. I welcome further input (perhaps with mutual devitriolization).

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Chances are that if your terminal server suddenly went down, so would everyone connected to it. Which can mean thousands of dollars in lost time, productivity, and salaries. And there would be nothing you could do about it until someone showed up to repair it. Whenever that might be.

That scenario will never happen with the Performance 8000 communications server from Emulex. The P8000 will continue to operate even if a power supply or network interface board has failed, because it features redundancy of critical components and a "hot swap" capability. So it isn't even necessary to power down the server to replace a failed component. Everyone on the network just keeps right on working. And producing.

The P8000 supports any combination of 128 terminals or other asynchronous serial devices. With its superior performance, all 128 ports can run at 38.4 Kbps concurrently. And it's ideal for use in crowded wiring closets, because it squeezes those 128 ports

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into a mere 5.25 inches of rackspace. That's less than one quarter the size of a DECserver 550.

You also get modular architecture which will adapt as you do. New types of networking interfaces can be added easily—allowing easy expansion for future communications requirements while protecting your investment.

In addition, the P8000 is compatible with both LAT and TCP/IP, so users cancommunicate with all computers on the LAN. Add to that the fact that the P8000 is designed for use with wiring closet cable management systems, and conforms to domestic and international agency approvals, and you begin to realize its many, distinct advantages.

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LETTERS

SERVERS FOR SUN

I'd like to correct a statement made in "Servers Set The Stage" by Bradford T. Harrison (June 1990). Omni Solutions no longer has a standalone Omni 1000 server planned. Our success has been and will continue to be hinged on cooperating with Sun Microsystems. Our product provides substantial performance enhancements for all Sun servers. The Omni 1000 is no longer a planned product, since it would compete with Sun.

Kent Winton, Vice President
Field Operations and Marketing
Omni Solutions
Mountain View, California

COBOL COVERAGE

A letter-writer recently took you to task for not having more coverage of COBOL ("Letters," page 18, June 1990). I agree that COBOL is a powerful developmental tool that the trade journals give short shrift.

COBOL is one of our major programming tools. We use VAX COBOL for customized system development and Microsoft COBOL for PC applications. We aren't old fogies stuck on COBOL as some might suspect. We also use other programming languages and products, such as Pascal, FORTRAN, BASIC, Lotus 1-2-3, dBase III+ and WordPerfect. I frequently find myself defending our use of COBOL to people who have read too many trade journals and done too little applications programming or system development.

My experience has been that the comments of COBOL detractors can be summarized in three general statements.

1. "COBOL is a 1960s language."

COBOL, FORTRAN, Pascal, BASIC, PL/1, C and Ada are much older than you think. There's nothing "new" in the 1980s sense in this list. These languages were in use before the 1980s and the microcomputer generation. My experience with VAX and Microsoft COBOL prompts me to say, "If you don't like 1960s COBOL, try 1990s COBOL. You'll find a big difference."

Microsoft has produced some fine products for the PC environment, including MS-COBOL. If you like COBOL, you'll love MS-COBOL on your PC. If you like mainframe COBOL, you'll love VAX COBOL as it runs under VMS. If you sneer at COBOL, you're also at liberty to sneer at Pascal and C as 1970s languages. All of these languages have evolved into worthwhile tools for the jobs for which they were intended.

2. "Why not use one of several high-powered mainframe or PC DBMSs such as System-2000, Adabase, IMS, Oracle, Focus, Ingres, dBase or Paradox?"

These are all good products for application system development. Like choosing a programming language, it's necessary to choose a DBMS appropriate to the application being developed. The hitch comes when it's necessary to customize an application beyond the ability of the DBMS.

All DBMSs support one or more programming languages for customization. dBase III+, for example, has its own language that resembles C and/or Pascal, depending on your point of view. Most mainframe and some PC DBMSs support COBOL and other languages for customization. It's often necessary to choose a customizing language when developing with a DBMS, and that choice commonly is COBOL.

3. "Operating systems and compilers (i.e., real programs) aren't written in COBOL."

Each programming language has strengths and weaknesses. Let each language do what it does best. Writing a compiler isn't the same as writing a report-generating application. There are languages that are letter-perfect for operating systems and compilers. A number-crunching application is best done in FORTRAN, PL/1, Pascal or Lotus 1-2-3. Database management and report generation are typically done with COBOL or with a DBMS customized with COBOL.

For many jobs, COBOL fills the bill.

Lowell McCoskey
Associate Director, Systems
Indiana Business Research Center
Indiana University
Indianapolis, Indiana

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

UNIX BACKUP REVISITED

I read Philip E. Bourne's "Achieving UNIX Backup" (April 1990) with considerable interest. As a UNIX training professional, I'm routinely faced with the problem of introducing VMS users to the world of UNIX system administration, and this article makes several valuable contributions.

However, I noted some technical errors. First, DEC's implementation of **tar** doesn't suffer from a "failure to support multiple tape volumes" as stated by the author. Such a limitation was a frustrating characteristic of earlier versions, but, as stated in **tar**'s Reference Page, "this utility supports EOT handling, which allows the use of multiple media." Therefore, multiple volumes are supported, albeit only for tape.

Second, in a discussion of the **dump** command's dump-level parameter, the author states that "files are saved that have been created or modified since the

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If you are backing up DEC equipment, you can add the speed and capacity of the 8mm standard in digital, helical scan tape backup. The industry's most advanced 8mm tape drive now interfaces to your TU/TA81 tape drive, your HSC tape channel, your DEC/VAXstation 3100 SCSI port, your Unibus, and your Q-Bus.

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Digital, Helical Scan Technology. This compact 8mm tape with a 2.5-10 GB formatted capacity has revolutionized the way DEC sites handle the once cumbersome task of backup. Available in configurations to handle even the most data intensive sites, the CY-8200 makes unattended backup a reality. Savings in media and storage costs, and savings in time babysitting a tape drive make this subsystem a very nice fit for your budget.

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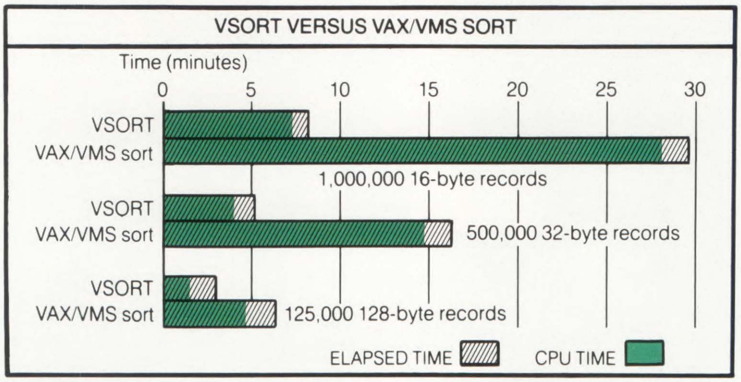
If you spend too much time sorting with the VAX/VMS sort utility, spend less — up to 75% less — with VSORT from Evans Griffiths & Hart, Inc. Compare the following elapsed and CPU times for VSORT (V03.07) and the VAX/VMS (V4.2) sort utility running on a VAX 11/780.



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.

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- *BSC/DV* a device driver for DEC's DV11.

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date and time of a lesser or equivalent dump level." This suggests that a level 3 dump would back up files changed since a previous level 3 (equivalent level) dump. This notion is common enough to be popularized in recent books but is nonetheless incorrect. As stated in **dump**'s Reference Page, "all files that were modified since the last [dump] date ... for the same filesystem at lesser levels will be dumped."

Finally, just to show that you can't believe everything you read in the Reference Pages, I'd like to add one point to the discussion of the **ltf** command, which is used in making ANSI-standard labeled tapes. Although **ltf**'s V3.1 Reference Page specifies the maximum block size at 20,480 bytes, empirical tests show that the actual maximum is 16,384 bytes. Attempts to use larger values result in the following message, which is very misleading, not to mention disturbing:

```
ltf: FATAL > Error writing file /dev
  rmt0h:
No such device or address
```

Tim Maher, Ph.D.
Consultix
Seattle, Washington

Philip E. Bourne, Ph.D.: Dr. Maher is correct in his assessment of **tar**, which supports multiple volumes under ULTRIX. The ability to handle multiple volumes is vendor-specific. For example, Convex UNIX, which like ULTRIX is based on the BSD version of UNIX, doesn't support multiple volumes.

Dr. Maher is also correct in his assessment of **dump**. The article notes that one dump strategy is to perform a level 0 dump followed by a sequence of level 5 dumps. To restore a filesystem, it's only necessary to restore the level 0 dump followed by the last level 5 dump. Each level 5 dump saves all files created or modified since the last level 0, *not* the last level 5. The alternative is to make a 0 level dump followed by level 1, 2, 3, and so on. This reduces the time (and tape) needed for backup but makes restoring the files more cumbersome and time-consuming. ■

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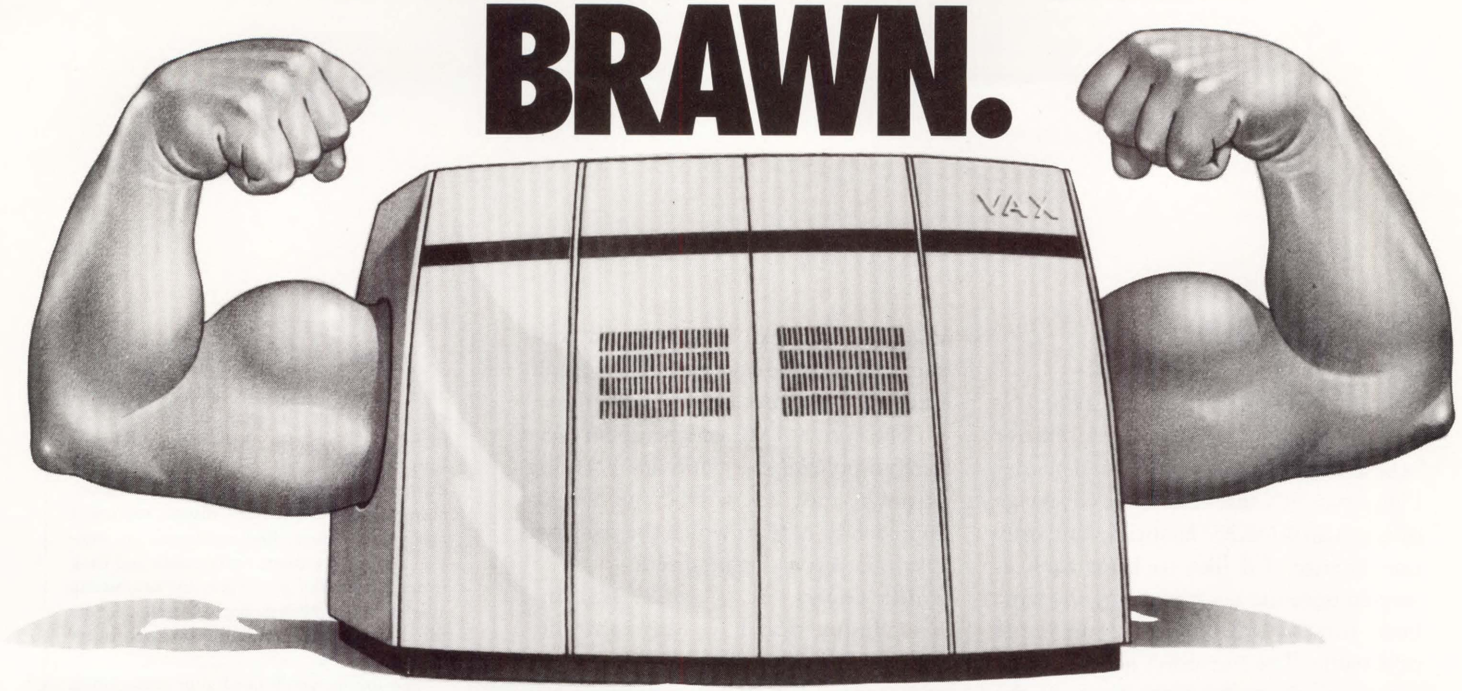

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CIRCLE 363 ON READER CARD

ARISTALK

NODE LICENSING

QUERY:

Kevin Verble *(SIG 12/MESS 297)*: Is a PCSA [now LanWORKS] member license tied to the PC or the nodename? I have two PCs that could take advantage of the LanWORKS facilities, but only one license. I'd like to boot each as needed onto the network using the same boot floppy, which means the same nodename. The PCs don't have to be on the network at the same time. If the licensing is by nodename, this should abide by the license.

REPLIES:

Comet *(SIG 12/MESS 406)*: Most software licensing agreements let you do what you wish. Having backup copies of licensed software is allowed. DEC's licenses for VAXs use the License Manager Facility (LMF) (VMS V5.x). The licenses usually aren't tied to a particular processor apart from the License Unit Requirement Table (LURT) requirements. If you can get the software to run on a machine, then it's OK as long as there aren't other copies running. This covers the case in which you have licenses based on the number of concurrent users, e.g., an eight-user VMS or DECnet license.

Greg Schulz *(SIG 12/MESS 414)*: A portable restricted license lets you have a product installed on several nodes, but you can use it on only one system at a time. An example is DECcp. You can have it installed on all nodes but can run it only on a given node or cluster to collect data and then go to a different node and collect data. This is similar to an interpretation of copyright law that says you can make a backup of a compact disk to tape and play either at different locations but not the same time.

The current LMF scheme doesn't lend itself to policing networkwide licensing, but why not use a DNS namespace approach to LMF in which the registry is distributed versus centralized?

Philip Gravel *(SIG 12/MESS 415)*: In a VAXcluster, you have this capability. Suppose the cluster has three nodes rated at 100 units each. If you purchase a 100-unit clusterwide license, after loading it into the cluster's LMF database you can use it on any node in the cluster, but only one node at a time. The only problem is that it takes privileges (sysprv, cmkrnl, sysnam) to load and unload licenses. The typical user would be unable to do this. As you point out, this can't be done on a network basis. Maybe there's some hope for the future.

VAXSTATION 3100 PRINTER

QUERY:

Philip Mitchell *(SIG 23/MESS 255)*: I have six VAXstation 3100s installed and would like to use the printer port on them. Whenever I try to use a dot-matrix printer, it prints gibberish. I've tried to attach the printer using the correct cable. I haven't, however, been able to figure out the setup selections necessary to have the Print Screen or Print Portion of Screen options work correctly. If I attach a PostScript printer to the port, it works OK.

REPLIES:

Rob Vugteveen *(SIG 23/MESS 256)*: To my understanding, the printer you connect to a VAXstation 3100 should be able

How To Use ARIS/BB

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

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

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

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

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

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

XMODEM and Kermit are available.

SIG Identification

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

12	Site Management
23	MicroVAX
24	PCs
37	VMS
43	Editors

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CIRCLE 114 ON READER CARD

to print Sixel or PostScript. Not every dot-matrix printer knows what Sixel is. When you do a Print Screen, the VAXstation isn't sending the ASCII characters you see on the screen to the printer port. It maps the pixels displayed into Sixel or PostScript code, depending on your choice in the Print Screen menu.

Richard B. Gilbert *(SIG 23/MESS 257)*: Print Screen uses DEC's Sixel format. It only works with a DEC printer. Try an LA50 or, better yet, an LA75.

CLUSTERED DISK UPGRADE

QUERY:

Todd Dorn *(SIG 37/MESS 1344)*: I have a MicroVAX 3500 with a TK70 tape drive and two RD54 disks. I have a clustered system with an RD54 disk containing an older version of VMS copied when a local TK50 tape drive was available. I want to get the VAXstation 2000 disk drive (clustered system) up to the same level that my 3500 is running. How do you perform upgrades on clustered disks without having the tape drive local to the clustered disk system? I've heard that Remote System Manager is the only means.

REPLIES:

Richard B. Gilbert *(SIG 37/MESS 1345)*: Copy the saveset from the TK70 to one of the disks on your 3500. Then copy the saveset from the 3500 to the 2000. For a VMS upgrade, it must be placed in the root directory:

```
@sys$update:vmsinstal dua0:
```

Robert G. Schaffrath *(SIG 37/MESS 1346)*: If you copy the savesets, be sure you have ample free space on the RD54 to do the upgrade. You'll need about 35,000 blocks for the upgrade to function. An alternative, assuming you don't mind playing with hardware, would be to temporarily remove the RD54 from the VAXstation 2000 and connect it to the MicroVAX 3500. Upgrade the 3500 and then return the RD54 to the VAXstation 2000. Do this only as a last resort.

Dan Osburn *(SIG 37/MESS 1365)*: If you boot the VAXstation from the system disk of the MicroVAX with no local files on the VAXstation, you can simply do a backup command to install your system image on the VAXstation disk. Mount the VAXstation disk from the MicroVAX, and do the backup command from tape to the workstation. I don't often use tape, but I load workstations by booting them as LAVc diskless satellites. Then I do disk-to-disk backup from my MicroVAX system disk to the workstation disk.

LSE FROM VAXSTATION

QUERY:

Rod Falanga *(SIG 43/MESS 235)*: I enjoy DEC's Language-Sensitive Editor (LSE) when developing or maintaining code and want to use it on a VAXstation 3100/3500. I like being able to re-edit a file starting where I left off when I saved it. I've become used to this on my VT340 and want to do it on a VAXstation. I've been disappointed, though, because when I re-execute LSE, FileView appears not to retain the logical that points to the file last edited and saved. Can I do anything about that?

REPLIES:

Patrick Mahan *(SIG 43/MESS 236)*: FileView creates a subprocess to run the application you request, i.e., LSE. If the logical name is placed in the process's logical name table, it will disappear when you exit LSE (i.e., log out of the subprocess). I've noticed this when trying to define my TPU$SECTION and TPU$COMMAND logicals for EVE. I want to define these logicals only once at logon and be able to use them for editing from FileView and DECterm. However, just using:

```
DEFINE TPU$SECTION section-file
```

won't work, because FileView and DECterm are separate processes under VMS. Defining them in the job table also doesn't help. I had to define them at the group level. Thus, it may be that the logical you refer to isn't being kept around for later use.

Paul Manning *(SIG 43/MESS 251)*: LSE recalls where you are and which file you're using through local logicals. Use LSE to edit a file during a DECterm session and, after you close the file, do a SHOW LOGICAL/PROCESS LSE*.

This shows the three logicals that the editor uses to find the last file and its position. You can use FileView to control what the logicals are set to. Create these logicals and set them where they are.

DECWINDOWS EMULATION

QUERY:

Nick Ceccacci *(SIG 24/MESS 298)*: I'm looking for a way to use my IBM PS/2 to log on to a VAX and run DECwindows. I don't need the full-blown support of LanWORKS. There are vendors that manufacture RS-232-based X terminals. Is there a way to emulate this behavior on an IBM PS/2? The PC has the memory and capability to do windowing. I don't want to invest in the hardware and software to hook up one or two PCs to run DECwindows applications.

REPLIES:

Greg P. Schulz *(SIG 24/MESS 299)*: Can't you just add a DEPCA/Ethernet card to your PS/2 and bring up LanWORKS and DECwindows?

NIK *(SIG 24/MESS 300)*: I don't think a DEPCA will work in a PS/2. We had to use a 3Com board.

Al Lilianstrom *(SIG 24/MESS 302)*: DEC sells a board called DEMCA for the Micro Channel bus. Also, if you want to use the DECwindows display facility in LanWORKS, a fast PC and healthy VAX are necessary. I've experimented with it on a 12.5-MHz AT and a MicroVAX II as a server, and it isn't worth it.

Ralph Brandt *(SIG 24/MESS 304)*: The board used with PS/2 on LanWORKS is the 3Com 3c523. We have 50s, 55s, 60s, 70s and 80s working. ■

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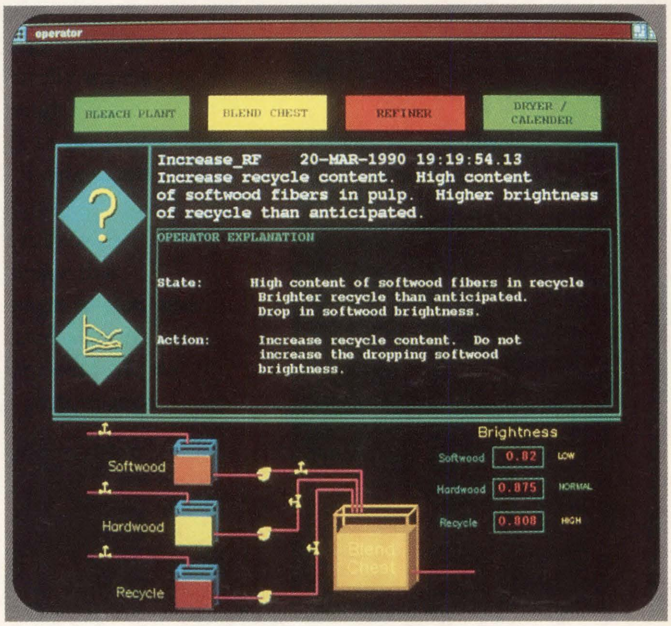
CIRCLE 326 ON READER CARD

PRODUCT WATCH/ BRIAN O'CONNELL

Manufacturing Management

Mitech's RTAC Process Control Software Package Keeps Manufacturers Safe And Sound



```
Increase_RF     20-MAR-1990 19:19:54.13
Increase recycle content.  High content
of softwood fibers in pulp.  Higher brightness
of recycle than anticipated.
OPERATOR EXPLANATION

State:        High content of softwood fibers in recycle
               Brighter recycle than anticipated.
               Drop in softwood brightness.

Action:        Increase recycle content.  Do not
               increase the dropping softwood
               brightness.
```

Mitech's RTAC uses a knowledge base of human expertise to solve problems in manufacturing plants.

Mitech's Real Time Advisory Control (RTAC) VAX/VMS software package is among a handful of process control systems based on a distributed, multitasking software architecture, providing insight into all of a manufacturing plant's process data activities. It can respond to critical events and alarms in real-time without crashing.

RTAC helps processing plants operate more safely and profitably in four ways:

1. It prevents operational, environmental and safety problems.
2. It resolves information overload by interpreting all plant data, diagnosing problems before they occur and providing advice to control system operators while the plant is online.
3. It allows companies to increase capacity and product quality while decreasing waste products.
4. It provides the knowledge of a handful of plant experts to the whole workforce.

RTAC uses knowledge-based technology that integrates information gathered from process plant experts with data gathered from plant information sources. These sources include distributed control systems, databases, MIS computer systems, supervisory systems, simulators and sensors.

According to George Carrette, Mitech vice president of development, the combination of process control with expert systems is a new development in automated plant management. "Human expertise, through expert systems, is the most important component of RTAC."

A modular software system built around a main RTAC processor, RTAC modules are distributed among multiple computers. A typical RTAC system uses 2 MB of memory for rule execution and uses 15 to 20 percent of available CPU.

There are two types of rule execution: scheduled and event-driven. Scheduled rules are used to gather data from the control and supervisory systems, such as collecting temperature readings every 10 minutes. Event-driven rules monitor, diagnose and respond to events such as alarms.

RTAC comprises eight modules:

1. The Developer's Interface is a development tool for entering sensor and rule information.
2. The Simulator is a built-in real-time device that lets you test rules offline.
3. The External Systems Interface generates separate I/O processes for each control system, network or database.
4. The Message Interface lets you automatically trace a message through a logic diagram back to the sensor from which it originated.
5. The Dynamic Graphics Package is a full-color graphics interface that displays messages as plots and diagrams within a plant.
6. The Performance Monitor provides performance information about the system load as well as communications with other systems.
7. The Value Monitor is a watch window that lets you call up current sensors and variables remotely.
8. The Examiner enables Mitech's user-support personnel to aid customers in system troubleshooting.

RTAC communicates transparently with one or more plant control and supervisory systems through high-speed networks or data highways. RTAC communicates with control systems via standard protocols and networks such as DECnet, Ethernet or RS-232.

Run-time versions of RTAC are priced at $15,000. Full development models are priced from $22,000.

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All things considered, there simply isn't a better escape from backup hell than the new VAXBI bus-compatible MAP-8216. You might say, it's the answer to every VAX user's prayers.

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CIRCLE 369 ON READER CARD

PRODUCT WATCH/ ERIC SCHOENIGER

Massive Performance

Active Memory Technology's DAP/CP8 Massively Parallel Computers Enhance VAX Performance

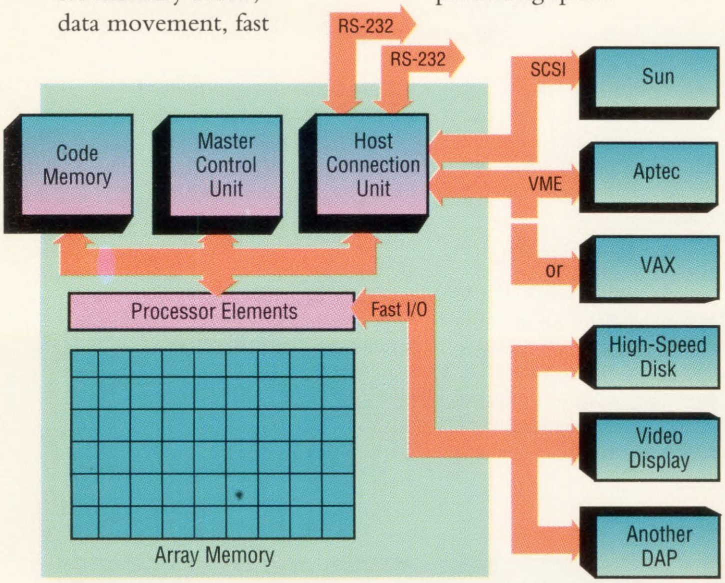
Active Memory Technology announced the DAP/CP8 family of massively parallel computer systems. The systems are based on the CP8, a custom 8-bit, VLSI co-processor chip that enhances the performance of the company's Distributed Array of Processors (DAP) systems by up to 1,000 percent.

In the DAP/CP8 family, which consists of the 510C and the 610C, an 8-bit co-processor is added to each 1-bit processor in the DAP. The 510C contains 1,024 8-bit co-processors and 1,024 1-bit processors. The 610C contains 4,096 of each processor. The 8-bit co-processors are used for complex arithmetic such as floating-point operations. The 1-bit processors are used for memory access, data movement, fast I/O and Boolean operations.

Existing 510 and 610 systems can be upgraded by installing new array boards containing the additional co-processor chips. Existing source code runs unmodified. Only a recompilation is needed.

"The new DAP/CP8 family will open new market opportunities, particularly in the simulation and modeling area," says CEO Geoff Manning.

A DAP/CP8 can be attached to a computer system such as the VAX to achieve speed improvements of several hundred times for many applications. The DAP incorporates a high-speed I/O facility that can simultaneously transfer data at 40 MBps in each direction with minimal effect on processing speed.



An 8-bit, VLSI co-processor chip enhances the performance of Active Memory Technology's DAP architecture, shown above.

The 510C and 610C are SIMD machines in which 1,024 and 4,096 processor elements, respectively, simultaneously execute the same instruction on data within their local memory. The processor elements (PE) are arranged in a square array, each comprising a general-purpose bit-organized processor and an 8-bit wide co-processor (the CP8). Each PE has local memory that ranges from 32 kilobits to 1 megabit.

Program control is performed by a master control unit (MCU), which takes instructions from the code store, interprets the instructions and controls the PEs, memory and data transfers. The MCU also issues tasks to the co-processors, which execute a separate microcode instruction stream in parallel. A host connection unit (HCU) controls the interaction between the DAP and a host through a SCSI or VME bus interface. The VME bus offers connection to other devices at up to 4 MBps.

The 510C transfers between memory and processors at 1.3 GBps. It performs Boolean operations at 10 billion per second and character-handling at 1 billion per second.

The 610C transfers between memory and processors at 5.1 GBps. It performs Boolean operations at 40 billion per second and character-handling at 4 billion per second.

FOR MORE INFORMATION

Active Memory Technology
16802 Aston St., Ste. 103
Irvine, CA 92714
(714) 261-8901
Circle 400 on reader card

DAP/CP8 systems are supported by a range of software. A high-level language, FORTRAN-Plus, is an extended version of FORTRAN that allows the handling of matrices and vectors of any size. An assembly language, APAL, provides low-level control of the MCU and PE array. An interactive debugging system lets you examine the state of the memory in terms of high-level program language variable names. And a DAP run-time system supports host-DAP communications and access to fast I/O and VME devices. DAP program development takes place on Sun hosts under UNIX and on VAX hosts under VMS.

Active Memory Technology also announced a downsized version of the product called the UltraDAP. Based on 1-micron CMOS technology, the 4,096-processor system will feature 1.2 Gflops 32-bit peak performance and 80,000 mips 1-bit peak performance. It's scheduled for release late this year or early next year.

The DAP/CP8 family is priced from $205,000, depending on configuration.

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CIRCLE 256 ON READER CARD

A New Reflection

Walker Richer & Quinn's Reflection Terminal Emulation Software Serves Up Reduced Memory Requirements

"People testing it are impressed with the fact that they get more versatility and speed without having to ante up more memory," states Craig McKibben, Vice President of DEC Development at Walker Richer & Quinn (WRQ). "In fact, V4.0 requires less memory than the previous release. ..." The product to which McKibben is referring is version 4.0 of WRQ's Reflection series terminal emulation software.

Reflection 4 Plus emulates the VT241 and the graphics features of the VT340. It can be configured to run with less than 215 KB of PC RAM. Reflection 2 Plus emulates the VT320 and runs with less than 125 KB of PC RAM. Shrinking Reflection's memory requirements leaves room to run memory-intensive PC applications such as WordPerfect and Lotus 1-2-3, with Reflection working in the background.

Version 4.0 of Reflection 4 Plus and Reflection 2 Plus packs more features into less memory by using dynamic memory, or code overlays, which are loaded as needed.

FOR MORE INFORMATION

Walker Richer & Quinn Inc.
2815 Eastlake Ave. E.
Seattle, WA 98102
(206) 324-0350
Circle 433 on reader card

A feature called "state save" swaps Reflection completely out of memory but maintains the connection to the host and the screen you're viewing. To switch from a large PC application to the terminal session you preserved in state save, you restart Reflection.

A notable feature of V4.0 is its proprietary file transfer for VMS and UNIX/ULTRIX hosts. It recognizes standard wildcard characters within file names, which simplifies the transfer of multiple files. The wildcard syntax also lets you exclude specified files. You can attach as many as 10 of these exclusions to a wildcard transfer and further restrict file selection on the basis of file creation date.

Reflection V4.0 can specify VAX file attributes so that in the course of a transfer it can construct a file in the format required by the host. It also features speedier file transfer (particularly for X.25 and other long-distance links) due in part to the incorporation of a sliding-window protocol. Using this protocol, V4.0 sends more data between acknowledgements from the host, which keeps the data moving at a rapid pace. Implementation of the "modified Huffman" data-compression algorithm also speeds file transfer.

Reflection 4
REFLECTION 2/4
REFLECTION 4+

Reflection 4 Plus emulates the graphics features of the VT340.

Reflection's file transfer is free for the host program, which is uploaded from PC disks. Reflection also supports public domain protocols, Kermit and XMODEM, as well as VMS and UNIX/ULTRIX hosts. When combined with WRQ's TELNET manager, V4.0 performs FTP file transfer.

Other V4.0 features include the ability to print in landscape mode and, in Reflection 2 Plus, the ability to produce a 132-column display with a standard VGA or EGA video adapter. A server version of Reflection is available with a built-in counter to control the number of simultaneous users on a network.

In a related development, WRQ and Lotus Development recently announced the jointly developed Lotus-mode keyboard map for users of PC Reflection and 1-2-3 for VAX/VMS. The map is designed for PC users who connect to VAXs. They can use familiar 1-2-3 PC keystrokes in 1-2-3 for VAX/VMS. The mapping file becomes part of their Reflection configuration file and does keystroke translation for them. Keyboard mapping for 1-2-3 for VAX/VMS can be used with V2.2 or higher of Reflection 2 or 4 for the PC.

Reflection V4.0 is packaged with both 5 1/4-inch and 3 1/2-inch disks. Upgrades are free for users who have had Reflection for less than 90 days. For those who have had Reflection longer, upgrades cost $100. U.S. prices for Reflection 2 Plus and Reflection 4 Plus are $269 and $369, respectively.

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PACS*				✓	✓				
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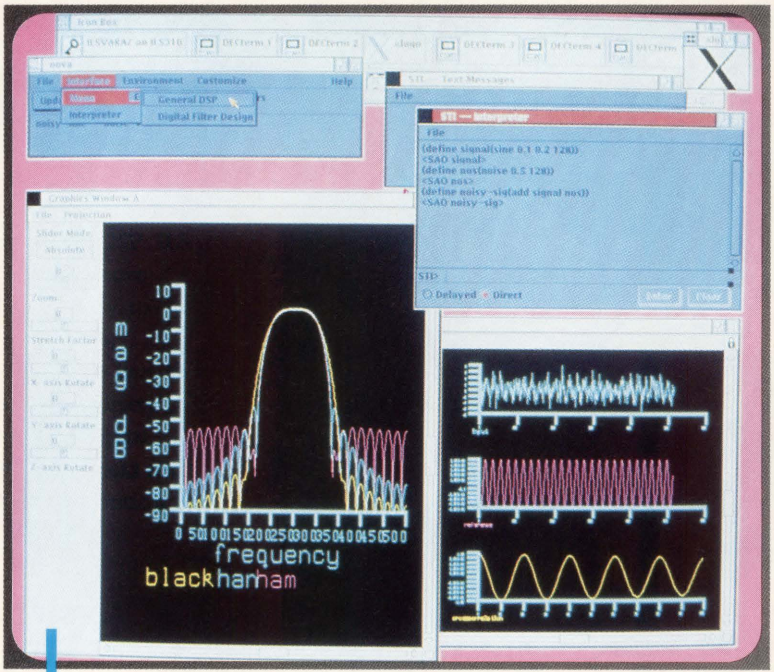
Digital-Signal Solution

Signal Technology's N!Power Links Digital-Signal Processing And Object-Oriented Techniques

One of the hottest trends in the high-tech marketplace is the incorporation of digital technology directly into product design and performance. Compact laser disks, digital telephones and even hearing aids illustrate how embedded Digital-Signal Processing (DSP) chips and digital analysis have changed digital technology.

Signal Technology, a DSP developer, has released an object-oriented, DSP-influenced software package called N!Power. Based on object-oriented programming techniques using the C language, N!Power adopts X technology in developing increased network interoperability, menu interfaces and 2- and 3-D graphics capabilities. Signal also released V6.1 of its Interactive Laboratory System (ILS) standards-based DSP software package.

According to Bruce Hannah, Signal's vice president of marketing and sales, X solves one of the universal industry questions of the '90s. "We had to ask ourselves where we were going and how we would take our existing products with us and improve upon them," explains Hannah. "The answer, we felt, was in providing a very strong emphasis on maturing open architectures and multivendor solutions. We wanted to segue from a tightly defined DSP to a numbers-crunching system with an X front end," he says.


Icon Box
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DECterm 1
DECterm 2
xdemo
DECterm 3
DECterm 4
DECterm
X
nova
File
Interface
Environment
Customize
Help
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Digital Filter Design
STI Text Messages
File
STI — Interpreter
File
STI>
○ Delayed ● Direct
Graphics Window A
File Projection
Slider Mode
Absolute
Zoom
Stretch Factor
X-axis Rotate
Y-axis Rotate
Z-axis Rotate
mag dB
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
0 50 100 150 200 250 300 350 400 450 500
frequency
blackharham

```
(define signal(sine 0.1 0.2 128))
<SAO signal>
(define nos(noise 0.5 128))
<SAO nos>
(define noisy-sig(add signal nos))
<SAO noisy-sig>
```

An X Window System interface display showing windowing capabilities, menu selections and graphics from N!Power.

N!Power is based on an object-oriented software kernel that transparently manages all data functions as high-level objects. Users benefit from N!Power's object-oriented focus in two ways:

1. The user doesn't have to monitor data types. Objects recognize data types and what can be done to them.
2. At the programming level, developers can reference data and functions in high-level object terms, freeing themselves from file and data concerns and making code easier to write and share.

N!Power features more than 200 core mathematical, analysis and control functions that can be invoked through the application's symbolic language or called from menus. N!Power also contains a bidirectional 3GL interface, so users can create symbolic language functions in C or FORTRAN and add such functions to the N!Power environment.

N!Power runs on any VAX processor with VMS V5.1-1 or later and on the DECstation/DECsystem series with ULTRIX V3.1 or later. Optional software capabilities include C and FORTRAN compilers, and N!Power is available on any X server and on selected X terminals.

The ILS software package is designed primarily for use in scientific data analysis via DSP. ILS consists of more than 90 ready-to-run modules, allowing the user to perform a variety of high-level signal processing tasks such as data acquisition and waveform display and editing. Application areas include acoustics, vibration, speech and voice processing, biomedicine, radar and sonar. ILS is available on VAXs, DECstations/DECsystems and X terminals.

N!Power on VAX/VMS, ULTRIX and Sun systems is priced between $6,000 and $24,000. ILS V6.1 on VAX/VMS and ULTRIX systems is priced between $6,400 and $24,750.

FOR MORE INFORMATION

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CIRCLE 236 ON READER CARD

PRODUCT WATCH/ PAMELA F. FULLERTON

Managing Without Managers

Managers And Users Can Maximize Their VAX Use With Russell Information Sciences' Xecutive Office System And Calendar Manager

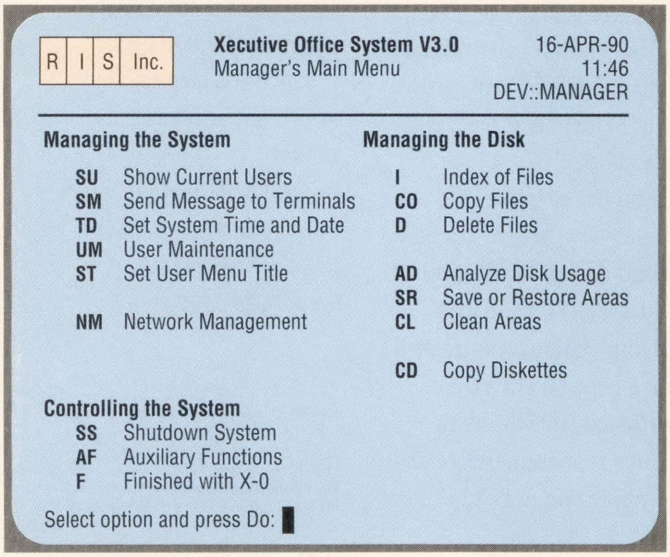
Have you ever wished that someone would develop a powerful, menu-driven operating environment that would make it easy for you to get the most out of your VAX? Russell Information Sciences (RIS) has granted your wish with the Xecutive Office System (X-O).

"X-O provides a protective shell around the VMS operating system," says Dick Russell, president of RIS. "It protects the operating system from user interference. Users get everything they need without having to deal with the complexities of VMS, and system managers get tremendous security with the new option of delegating selected functions safely to non-VMS users."

X-O's menu interface lets you add and delete users, manage printer queues, advise users on disk usage and selectively back up user directories. You can add almost any application, utility or custom DCL procedure to users' menus quickly.

A standard keyboard lets you easily access applications, with each application maintaining its own familiar interface. A hotkey lets you interrupt conforming applications while another function is performed and then returns you to the point of interruption. A user can lock or unlock accounts, transfer files among accounts, copy, list and delete files and maintain a personal menu without the help of the system manager or accessing DCL.

A full manager's menu lets system managers perform routine tasks from tailorable menus. The menu compiler provides multilevel nested menus and a simple English syntax to add and tailor functions.



```
 R | I | S | Inc.     Xecutive Office System V3.0        16-APR-90
                      Manager's Main Menu                    11:46
                                                      DEV::MANAGER
 ------------------------------------------------------------------
 Managing the System                 Managing the Disk

     SU  Show Current Users              I   Index of Files
     SM  Send Message to Terminals       CO  Copy Files
     TD  Set System Time and Date        D   Delete Files
     UM  User Maintenance
     ST  Set User Menu Title             AD  Analyze Disk Usage
                                         SR  Save or Restore Areas
     NM  Network Management              CL  Clean Areas

                                         CD  Copy Diskettes

 Controlling the System
     SS  Shutdown System
     AF  Auxiliary Functions
     F   Finished with X-0

 Select option and press Do: █
```

Xecutive Office System V3.0's manager's main menu.

Managers can deny users' access to applications or file types. They can efficiently manage disks by analyzing disk usage and free space and moving accounts to another disk. They also can autoconfigure terminals and printers by turning them on at startup.

X-O is available for any VAX or VAXstation running VMS and can be used to control complete systems, clusters and networks or any group of users within a system. It costs from $795 to $34,995.

RIS also released Calendar Manager V3.4, which lets you schedule meetings to the nearest minute. You can schedule video or telephone conferences with automatic worldwide time zone adjustment. You also can select standard or military time when scheduling calendar appointments.

DECnet scheduling has been improved in V3.4 with automatic confirmation of resources and facilities that are designated "first come, first served." A new link to VAXmail is included in all print windows. Printouts and report files displaying calendar appointments show the location and starting and ending times of each appointment.

FOR MORE INFORMATION

Russell Information Sciences Inc.
25201 Paseo de Alicia, Ste. 111
Laguna Hills, CA 92653
(714) 768-5000
Circle 435 on reader card

In addition to full and view-only proxy levels, a restricted proxy is available that can see only blocked or open times, not descriptions. Schedules of up to 21 proxy accounts can be viewed simultaneously.

Ease of use is enhanced with single-key command access. Automatic rescheduling of edited appointments, a single-screen weekly summary, holiday support, multiple-day blocking and complex meeting scheduling are available.

Calendar Manager includes a user interface that allows "data free" entry. Intuitive cursor movements select the details of a meeting. Schedules of attendees, resources and facilities are searched, with conflicts automatically resolved. If a requested facility or resource isn't available, Calendar Manager finds an alternative.

Calendar Manager V3.4 is available in VMS standalone, ALL-IN-1 and X-O integrated versions. It costs from $795 to $34,995.

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CIRCLE 120 ON READER CARD

PRODUCT WATCH/ ERIC SCHOENIGER

Sales Lead Retriever

Marketrieve Company's Marketrieve Plus Sales Automation Software Tracks Leads Through The Marketing Process

Sales is among the most vital elements of your organization. You'd like to automate the process of lead tracking and market analysis to increase the productivity of your salespeople. But where do you find a software package that fits your needs? And how do you oversee the sales history and lead record of your entire sales force? Marketrieve Company can help.

Marketrieve Plus is a sales force automation software application designed to increase sales productivity in the corporate multiuser environment. It can share data with other applications such as order entry, accounting systems and spreadsheets running on the same computer or on other computers.

Marketrieve Plus tracks a lead from the time of inquiry through the sales process and after the sale to perform account management activities. Sales and lead tracking functions generate daily action lists, manage prospects, customers and contact relationships, and reduce paperwork. Data is centrally available to increase management control of the marketing and sales process. The system performs marketing effectiveness analysis, generates forecasts automatically, analyzes a salesperson's lead portfolio and provides management with salesperson activity information.

The software is written in Cognos' PowerHouse 4GL application generator and includes the Quiz report writer, which gives management easy access to information with standard or customized reports.

Capabilities include letter writing, literature fulfillment management, data security, sales histories, company and parent organization relationships and lead source analysis. Optional modules include Cognos' PowerPlay, which is a graphics reporting tool for managers, and Appointment Scheduling, which lets you schedule appointments within Marketrieve Plus.

A Pipeline file details where each prospect is in the sales cycle. It can be defined differently for each salesperson or product. A Literature Fulfillment file tracks which literature has been sent to which prospects as well as when it was sent, who sent it and what should be sent next. This feature includes a batch function that automatically generates coded labels for all literature to be sent on a given day.

With Marketrieve Plus, you can track multiple sales to the same company and multiple accounts in different offices within a national or international organization. This information is linked, so it need only be entered once. Updates are performed automatically.

The software derives its forecasting from individual forecasts made and revised by each salesperson during the course of the sale. You can generate forecasts by product, salesperson, leads, territory, time period and other parameters.

Marketrieve Plus is suited for users with no computer experience. The software provides online help, and the company provides training. It runs on DEC and HP minis and on MS-DOS-based PCs and networks. License fees start at $1,995 per user for the PC version and at about $1,000 per user for the minicomputer version.

FOR MORE INFORMATION

Marketrieve Co.
350 Harvey Rd.
Manchester, NH 03102
(603) 434-0442
Circle 401 on reader card

Cognos Corp.
67 S. Bedford St., Ste. 100E
Burlington, MA 01803
(508) 535-7350
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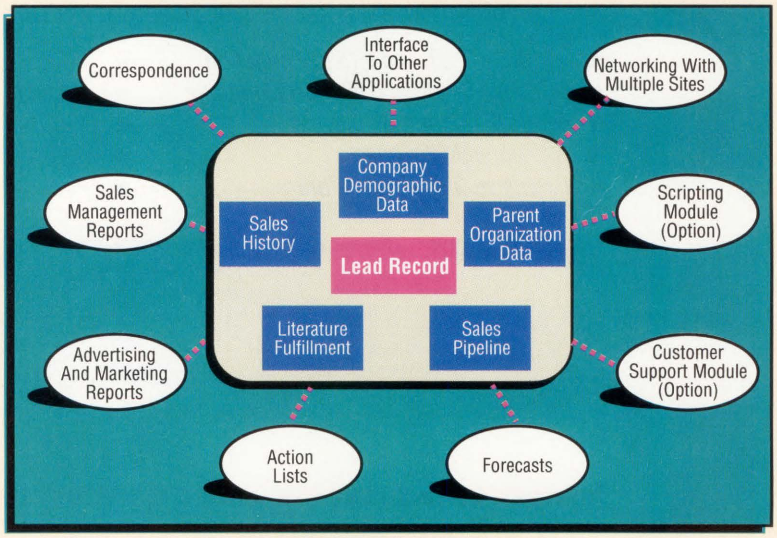
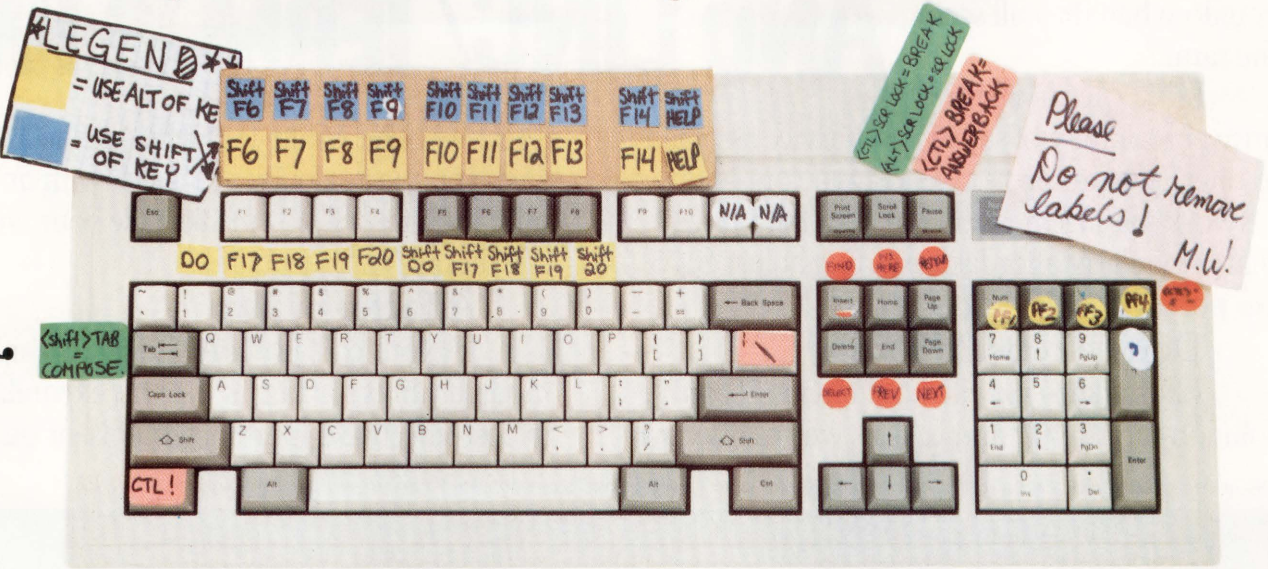


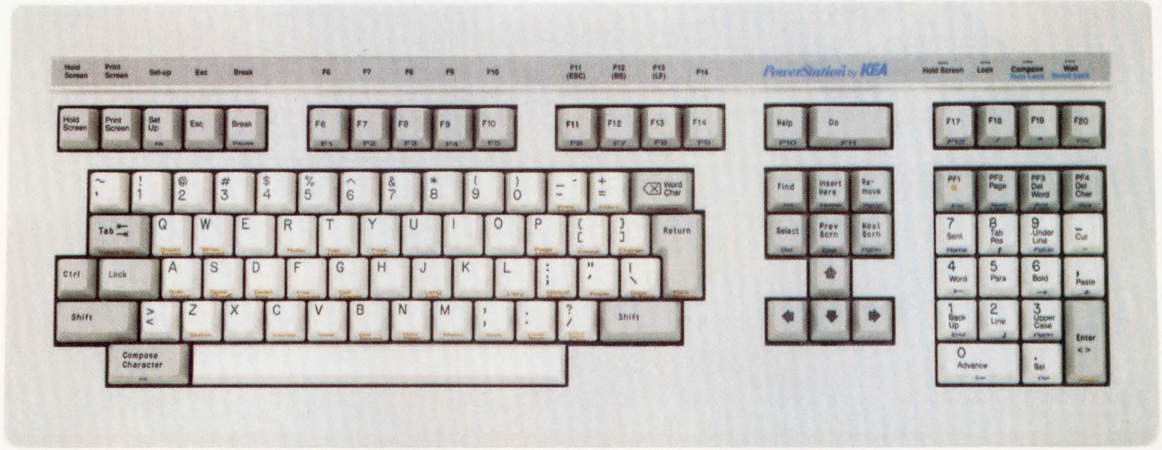
Marketrieve Plus lets you control the marketing and sales process.

Which terminal emulation keyboard would you rather use?

A.


LEGEND
= USE ALT OF KEY
= USE SHIFT OF KEY
Shift F6 Shift F7 Shift F8 Shift F9 Shift F10 Shift F11 Shift F12 Shift F13 Shift F14 Shift HELP
F6 F7 F8 F9 F10 F11 F12 F13 F14 HELP
N/A N/A
(CTL) SCR LOCK = BREAK
ALT SCR LOCK = SCR LOCK
(CTL) BREAK = ANSWERBACK
Please Do not remove labels! M.W.
DO F17 F18 F19 F20 Shift DO Shift F17 Shift F18 Shift F19 Shift 20
FIND
SELECT PREV NEXT
PF1 PF2 PF3 PF4
(shift) TAB = COMPOSE
CTL!

B.


PowerStation by KEA

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

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

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

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

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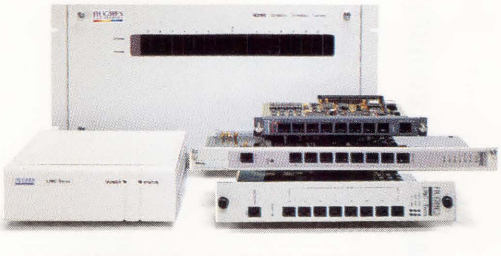

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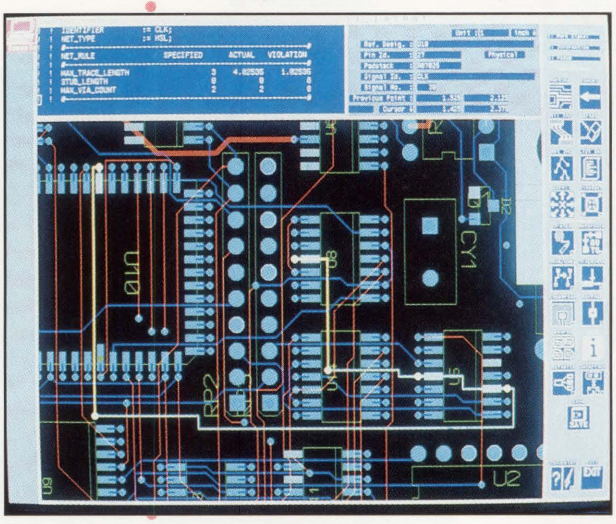
THE CFI PROCEDURAL INTERFACE

An integration milestone for multivendor computer-aided design tools.

BOB CARVER AND AL SANDERS



```
!  IDENTIFIER         := CLK;
!  NET_TYPE           := HSL;
!  #-------------------------------------------------#
!  NET_RULE              SPECIFIED   ACTUAL   VIOLATION
!  #-------------------------------------------------#
!  MAX_TRACE_LENGTH          3       4.02536   1.02536
!  STUB_LENGTH               0       0         0
!  MAX_VIA_COUNT             2       2         0
!  #-------------------------------------------------#
```

The CAD Framework Initiative's programming interface (PI) allows electronic design tools from different vendors to exchange design data without file transfer. Computervision's THEDA software for electronic design was used in a demo of design data exchange via the PI.

At the June Design automation Conference (DAC) in Orlando, Florida, the CAD Framework Initiative (CFI) demonstrated its first prototype guideline, a data model and procedural interface (PI) for circuit connectivity data developed by the CFI Design Representation Technical Subcommittee. For the DAC demonstration, 20 organizations implemented the PI for 30 computer-aided design (CAD) tools.

Fifteen "producer" software tools (applications that store circuit connectivity, or netlist, data) were freely accessed over the PI by an equal number of "consumer" tools (tools that process netlist data). These tools included schematic capture packages, logic simulators, object-oriented databases, layout systems and a synthesis package. The software was running on workstations from Digital, Hewlett-Packard, IBM and Sun Microsystems.

The success and extent of participation in the demo made it clear that formal publication of the PI guidelines this month will place powerful interfaces in the hands of CAD vendors and users to help overcome compatibility problems that now consume an enormous amount of engineering time. The presidents of three companies that participated in the demo — Cadence Design Systems, Mentor Graphics and Valid Logic Systems — already have stated their intent to implement the PI in future products.

PI Significance

The significance of the PI goes beyond the standard, because its development provides a unique case history of a successful development project carried out by a consortium. At the start, there was skepticism about whether an organization of groups with often competing objectives could achieve success. Nevertheless, the project was completed nine months after the definition of the PI specification.

This was the first time CAD users and vendors worked together through a standards organization to prototype a number of implementations in vendor tools. CFI needed to balance the desires of users for very tight integration against their need to avoid being tied to a single system.

The project began in September 1989, with the first of several Design Representation Technical Subcommittee meetings, to formulate a data model for circuit connectivity data. From the beginning, the evolution of the data model was heavily influenced by two sources: the Electronic Industry Association (EIA) Electronic Design Interchange Format (EDIF) and the Structural Procedural Interface (SPI) developed in Europe under the ESPRIT (E1085) program.

The original data model specified five kinds of circuit design objects: cells, cellinsts, nets, ports and portinsts. Later, a library object was added to provide a more specific mechanism for a consumer to select from several designs in a test or demo suite. The result was the current "six-box model" (see Figure 1).

Because it was very difficult, until recently, to provide independent products that communicate at a procedural level, previous approaches to sharing design information relied on file interchange formats. CFI wanted to develop a procedural interface that would provide a tight link among tools.

In November 1989, it was decided that tool linkage should be based on a remote procedure call (RPC) mechanism rather than direct binding. It was also decided that, rather than delay the project to define an RPC mechanism, an existing one should be used. In response, HP provided its Network Computing System (NCS) technology.

Although NCS isn't part of the CFI specification, its inclusion in the project contributed significantly to the definition of an efficient PI that allows the sharing of large amounts of information among tools running in different processes on separate workstations from different manufacturers (see Figure 2). With the RPC package, each participant was able to build a single executable program that runs with any other participant's tool.

The final PI document was distributed to CFI members in January, and the project moved from the specification to the implementation phase. Austin-based Microelectronics and Computer Technology (MCC), a research organization and a member of CFI, used its CAD Framework Laboratory (CFL) to develop an early prototype that included a sample producer and consumer for testing purposes. This software, along with RPC stubs from HP and a demo design provided by Zycad, was mailed to participants in March.

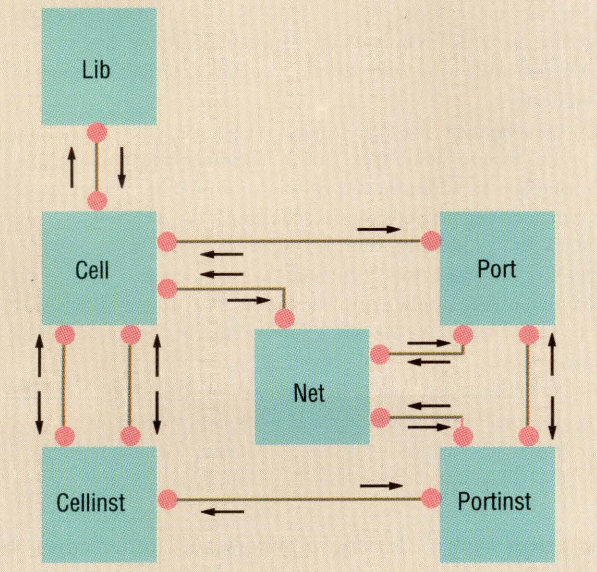
The workstations donated to the project were delivered and installed at MCC CFL in February and March. Digital provided a DECstation 5000, HP an HP 9000 Model 375 and an Apollo DN 4500, IBM a PowerStation 530, and Sun a Sparcstation 330.

Integration Dry Run

A dry run was held at MCC in late March and early April. Participating companies installed their demo software, and testing for interoperability began. A review in May revealed that only nine of more than 200 possible combinations of tools didn't successfully exchange data. Fixes that allowed all tool combinations to work were completed in June.

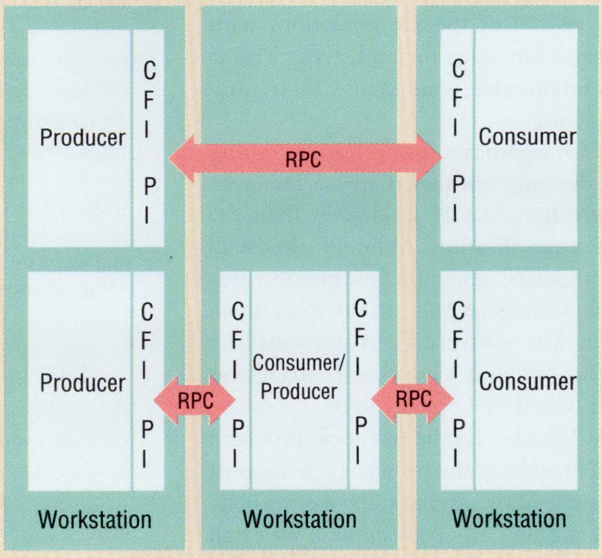
The median time for participants to implement the PI in their tools was three weeks (the longest was eight weeks, while the shortest was one week), suggesting that the PI data model mapped

Figure 1.



The CFI integration project data model.

Figure 2.



Remote procedure call in the CFI procedural interface.

well to the individual tool data models. For most tools, once the PI was implemented, integration with all others in the demo required about two days.

Problems were encountered, of course, and participants surveyed by CFI offered suggestions for improving the PI guidelines and assisting future CFI development projects. In a few cases, the library object concept was unnatural, because the specific tool design model offered no grouping mechanism above the cell level. Engineers implementing the PI in such tools generally had to develop routines that responded specifically to the library name and cell name of the demo design. Their burden was increased because the library object, not originally a part of the PI model, was a late addition to the project.

The lesson learned was that, although review and decision-making must be quick and efficient in a joint-development project, additions shouldn't be considered without thorough review by all participants. The lesson was underscored by the fact that the decision to use a single design example made the library object unnecessary for the DAC demonstration.

Some participants complained about the number of procedures to implement, indicating that they'd prefer generic operations using object type as a parameter instead of specific operations with separate functions for each type. This is a fundamental issue that CFI is now reviewing.

One significant lesson learned during the dry run was that there's a lot more to writing clear PI guidelines than the syntax specification. Although almost all the required semantic information was outlined at some point in the spec, much of it was scattered throughout the document and as a result often was overlooked by implementers.

While the sample test tools provided by CFI early in the project cycle to assist the integration proved to be a great help, they weren't rigorous enough to catch many semantic errors, with the result that many weren't discovered until late in the integration cycle.

CFI TO CIM

The CAD Framework Intiative (CFI) experience holds a lesson for software vendors and users in other environments, especially manufacturing, who want to use networks to improve productivity: Don't wait for existing standards bodies to provide solutions to your integration problems.

Networks have had surprisingly little impact on many classes of applications, especially large production applications that have been in place for many years. The reason is that networks aren't solutions — they're enabling technologies. Networks enable application developers who know how to use them to get more work done, but in and of themselves they don't provide a mechanism to integrate applications.

Although many manufacturing software applications use networks to some degree, there isn't a widely accepted mechanism for using networks to "lash together" disparate applications. This is because connecting large production applications isn't easy with the available tools. We need tools that will help us lash together related but unintegrated applications that exist on multiple platforms.

The procedural interface (PI) designed by the CFI is an excellent example of the functionality that's required in these new tools. The tools must provide mechanisms that will:

1. Mix and match, in real-time, manufacturing and commercial applications from different vendors, platforms, locations and users.
2. Link applications in previously unforeseen ways, in much the same way that the X Windows System and, earlier, the Mac interface, lets users cut and paste among applications and thus leverage them against one another.
3. Leverage investments in a particular program (e.g., a computer-aided design [CAD] program or circuit simulation package in the case of CFI or an order-entry application in the case of computer-integrated manufacturing [CIM]), or in a human resource, platform or hardware configuration.

On an intercompany basis, standards such as X.400, CALS and ANSI X.12 now specify the application-to-application exchange of data. But these standards probably aren't explicit or complete enough to deal with the complex data passed among applications in an organization, nor are they real-time.

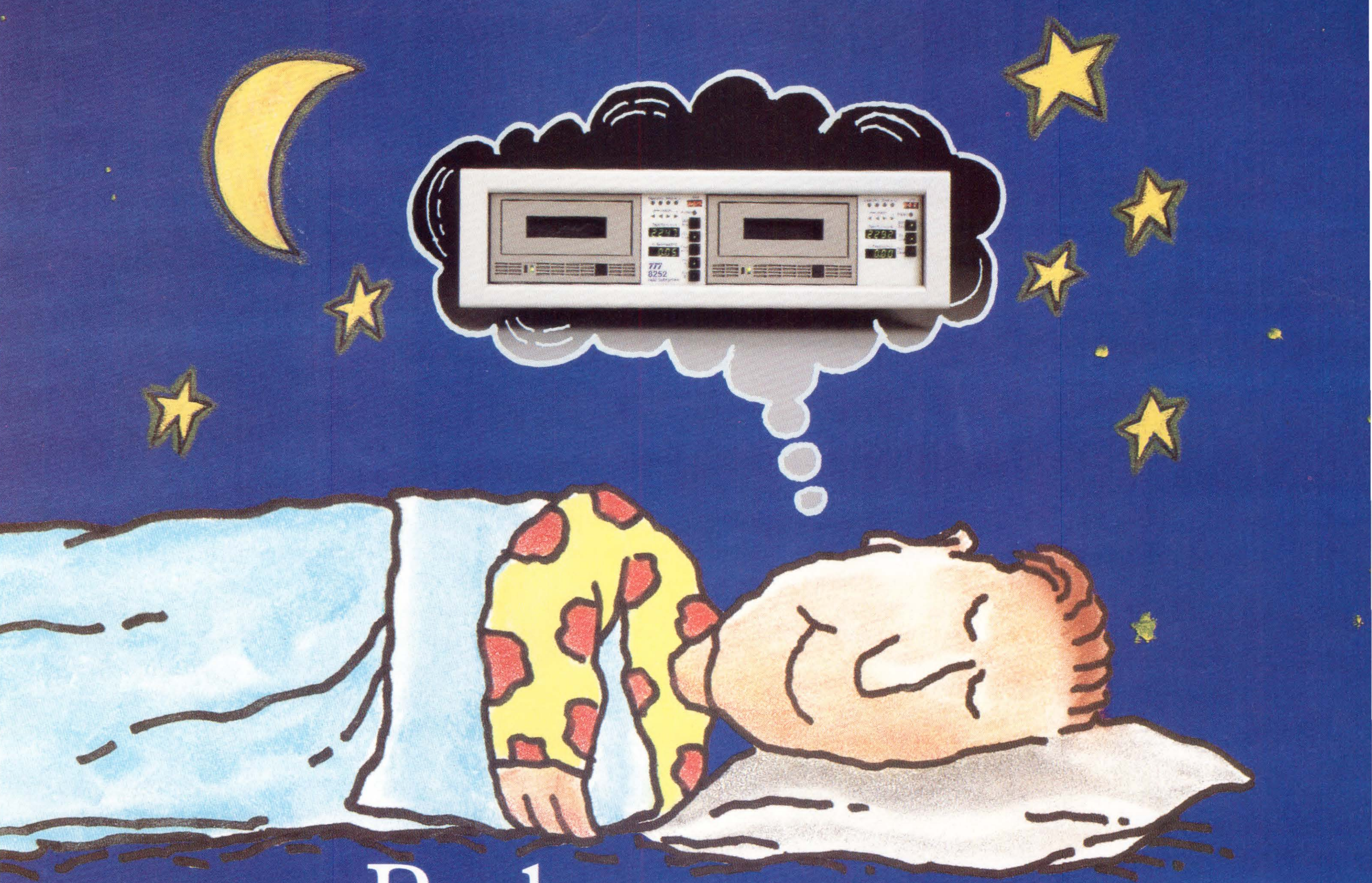
For example, consider an integrated manufacturing environment with applications such as order entry (possibly specialized and home-grown), CAD applications feeding the shop floor, manufacturing support systems such as material management, shipping and billing. How to lash together many different and apparently unintegrated applications from different vendors on different platforms with different users is the challenge facing the manufacturing software industry.

CFI was a relatively easy win, because the shared data has been exchanged among applications for many years in the form of static files. But in manufacturing applications, the data is more varied and complex. In addition, the volume and type of data are more similar to traditional data processing than scientific/engineering computing. In manufacturing and commercial data processing, there's a lot of data and many klunker and dinosaur applications that embody the business rules of the organization.

It won't be easy for manufacturing applications to follow the lead of the CAD community. But the size of the rewards to be reaped from linking manufacturing applications makes it worth the effort.

CFI is a good model of how vendors and users can drive the process. Don't wait for the traditional standards organizations to tell you what you need. They don't work well on such a scale. And by then it may be too late. — *Philip A. Naecker, Technology Editor.*

An example of semantic errors that arose during integration had to do with legal identifier names. The specification stated that identifiers could consist of letters, numbers and underscores, but there was no statement of the requirement that identifiers had to start with a letter. As a result, when some producers



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returned identifiers that started with a number, some consumers initially broke because they hadn't allowed for this case.

Remote Procedure Calls

The use of RPCs to connect producers and consumers was of great value, because this prevented name conflicts that were sure to occur if tools had been directly linked. When a producer was first started, it registered its name with an NCS location broker, which determined which producers were available at any time on the network.

When a consumer was initiated, it looked for a UNIX environment variable that specified the name of the intended producer. The consumer then requested that the location broker open a connection that established communication between the specific producer and consumer pair.

The flexibility provided by the RPC, however, isn't without cost. Significant overhead and performance degradation are associated with RPCs made over an Ethernet. When tools are linked directly, only a few seconds are required to extract all data, even when thousands of procedure calls are made. The RPC mechanism, on the other hand, adds about 4 ms per call, or an extra two to five minutes to extract design data.

One potential way to reduce the number of calls is to provide PI functions that offer a higher level of granularity. A consumer, for example, could ask for all cellinst IDs in a cell or all properties on a port. The disadvantage of this approach is that it restricts the capability of a consumer to extract only the data it needs.

A second possibility is to add a caching mechanism to the RPC stubs. With this approach, when a consumer initializes a list, the stub would request all elements of the list and respond locally as the consumer stepped through the list. This would allow the PI to specify only the low-level calls and let implementors add performance enhancements.

CFI TECHNICAL SUBCOMMITTIES WRITING the formal PI guidelines have been working to resolve these problems. The guidelines are scheduled for public release at the ICCAD conference in November.

CFI has developed tremendous momentum through the participation of many more vendors and users than was anticipated when the project was conceived. The knowledge gained is sure to improve and speed the development of additional guidelines to meet the integration needs of the CAD community. *—Bob Carver is Vice President of the CAD Framework Initiative and a member of the technical staff at Microelectronics and Computer Technology Corp. Al Sanders is a member of the technical staff of the CAD Framework Laboratory at Microelectronics and Computer Technology Corp.*

CFI And The Role Of Frameworks

The CAD Framework Initiative (CFI) was formed in 1988 to develop worldwide industry guidelines for electronic design automation tools and their supporting frameworks to remove barriers to integration. More than 50 organizations now participate in CFI, including major computer-aided design (CAD) tool vendors, users and such hardware platform suppliers as Digital, Hewlett-Packard, IBM and Sun Microsystems.

The role of CFI is to define guidelines for CAD frameworks, not to endorse any single implementation. Definition of problems and specification of work are carried out in seven technical subcommittees that focus on architecture, systems environment, design data management, design methodology management, design representation, intertool communication and user interfaces.

The development of the CFI procedural interface (PI) was carried out chiefly by tool vendors and sophisticated users with internally developed CAD software. For future projects, however, broad involvement is likely by representatives of engineering groups who aren't necessarily CAD specialists and by computer companies.

One of the stated objectives of CFI's guidelines is to consider the integration of CAD tools in the context of the overall engineering environment. Closely related to this is the fact that a framework can be viewed as a set of CAD-specific extensions to the underlying operating system offered by a computer vendor.

CAD is an application that stresses many of the same elements of framework technology as other related domains. For this reason, computer vendors almost undoubtedly will play a major role in providing framework solutions.

Frameworks may become the operating systems of the '90s. If so, computer vendors will need to apply the technology across the broadest possible customer base to make frameworks an economic reality. Users then will have access to virtual resources more carefully targeted to engineering design than those of the underlying hardware platform. — *Andy Graham, president, CAD Framework Initiative.*

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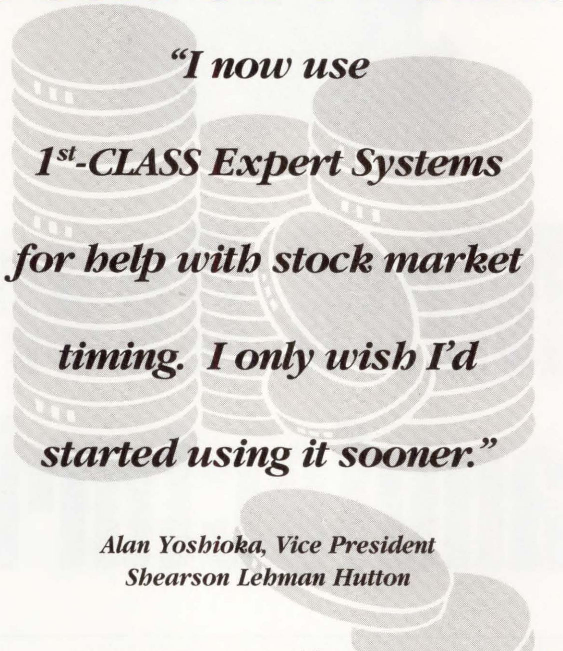

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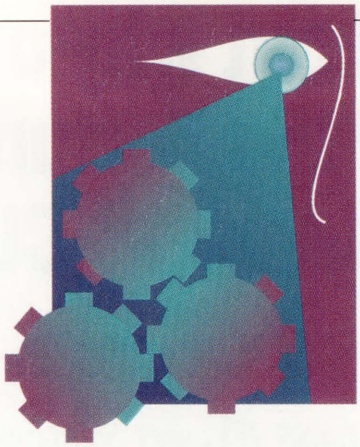

Mind Over Manufacturing

Manufacturing is ripe for expert systems. Here are some ways AI is being put to work on the shop floor.

LARRY R. HARRIS, PH.D.

EXPERT SYSTEMS ARE COMPUTER programs that automate judgment. Using artificial intelligence (AI) techniques, they store the knowledge of human experts and apply that knowledge to the problem at hand. Since manufacturing is critically dependent on human judgment in many areas, it's particularly ripe for the exploitation of expert systems. Expert systems applications in manufacturing include areas such as diagnostics, scheduling, configuration and pricing.

The distinction between expert systems applications and conventional computer programs is most easily made by an analogy to teaching a new driver how to find his way around town. Conventional programming is much like giving precise instructions to the driver. This method works fine, except that it isn't very robust and it must be repeated for each destination. The expert systems approach is similar to teaching the driver navigational skills such as map reading and heuristics such as the fact that odd and even addresses are on different sides of the road. These generic rules are not only useful in finding specific locations, but they also allow the driver to eventually become self-sufficient.

This analogy has an impact on how we should program judgmental applications. Rather than treating the computer as a blind executor of instructions, we should teach it the basic rules of thumb of a particular problem area. Once this is done, we can hope to have a self-sufficient problem-solver that can apply those generic rules to solve many problems.

The basic difference between conventional programming and expert systems is that conventional programs provide only blindly executed instructions, whereas expert systems possess generic rules of thumb that can be applied at the discretion of the inference engine. In a sense, the THEN clause of an IF...THEN expert system rule corresponds to the notion of the instructions in a conventional program. The IF clause tells when it's appropriate to carry out the instructions. It's as if each set of instructions were documented along with when it should be used. Using this information, it's up to the inference engine to determine which rules to execute in which order.

Diagnostic And Repair Systems

One area in which human judgment is employed in manufacturing is diagnostics and repair. Good diagnostic technique requires knowing the cause-effect relationships inherent in the product's design and the best sequence of tests to isolate a problem. It's unreasonable to expect that all field engineers (FE) have access to this information and, even if they did, that it could be employed effectively by all FEs.

GOOD DIAGNOSTIC TECHNIQUE REQUIRES knowing the cause-effect relationships inherent in the product's design . . .

A far more effective solution would be to store a model of the equipment sufficient to provide cause-effect information to an expert system. In addition, we'd store the diagnostic process of the best diagnostician. Armed with this information, which is made available in an extremely dynamic form, each FE can be significantly more effective repairing a wider range of products. At one level it can be viewed merely as an active form of documentation. On another level it dramatically broadens the base of people who can carry out repairs.

The range of AI technology needed to address diagnostic applications is almost as broad as the complexity of the products being repaired. In many cases, a decision tree is sufficient to express the diagnostic approach (see Figure). With this method, the AI tool is used to store and traverse a very large decision tree. Often these applications employ image data that can dynamically illustrate which tests should be performed and which adjustments should be made.

In other cases, a rule-based application is defined in which the salient structural features of the product being diagnosed are represented as IF-THEN rules. The inference engine then propagates the initial or boundary conditions of the failed scenario to determine the proper response.

The third style of expert systems for diagnostics is model-based. In this case, the product is modeled to an appropriate level of detail by simulating each component and the electrical or mechanical links among them. The initial or boundary conditions of the failed scenario are described as the initial value of certain variables. The connection links within the model will then automatically propagate these values into the model, allowing theoretical readings to be compared to the actual readings. Variations in these readings can trigger specific responses from the computer model.

It's always possible to have a pure rule-based or a pure model-based approach. More likely is a combination that employs the model to implicitly store all the cause-effect relationships and uses rules to represent the diagnostic strategies. In any case, the result is the capturing and dissemination of an important body of knowledge about a product. Rather than being published in a passive representation such as a book, it's distributed in the active form of a program that can relate the general structural information to the specifics of the problem at hand.

Scheduling Systems

The manufacturing process is full of scheduling decisions, such as which machines should process which orders and which trucks should deliver which finished goods. A variety of linear programming methods exist for optimally scheduling these processes. But because of their inherent complexity, the restriction to linear constraints and the time they take to run, many shops don't use them even though they could have a significant impact on productivity.

The human judgment that makes these scheduling decisions often includes elements that aren't typically put into the automated system, e.g., taking into account seniority when scheduling machinery operators. Many of the expert systems used for scheduling employ a

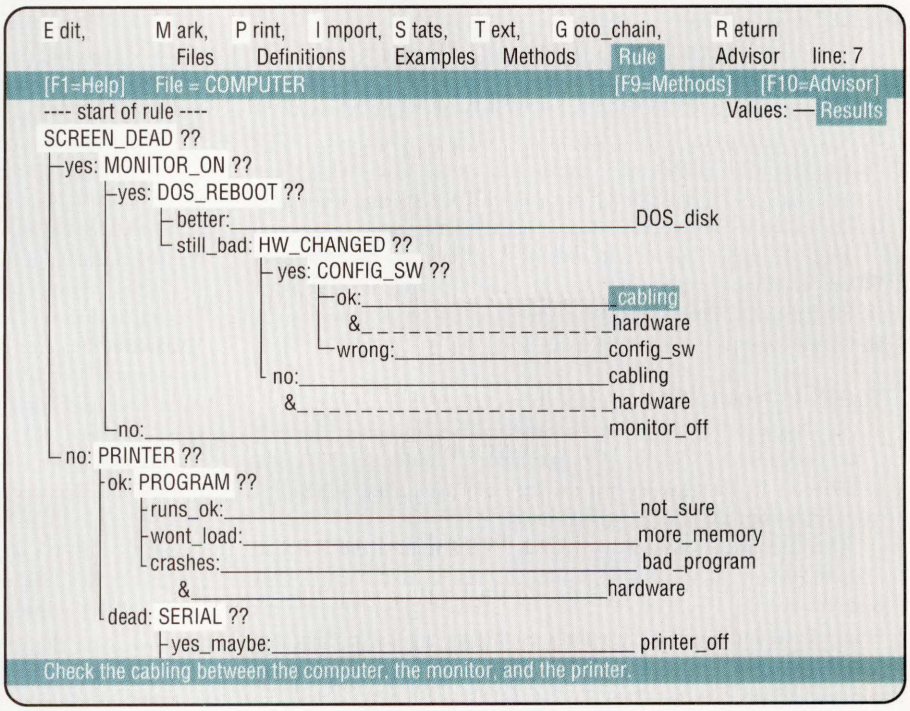

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Figure: In many cases, a decision tree is sufficient to express the diagnostic approach.

graphical user interface (GUI) that allows the shift supervisor to preschedule certain individuals before invoking the expert system or to override recommendations. In other cases, the expert system only deals with how schedules should react to sudden changes such as a breakdown or illness. The large initial schedules are generated by linear programming models, because they're better at handling the combinatorics involved. The expert system quickly recommends alterations to the overall schedule when sudden changes occur.

These systems determine the ripple effect of each scheduling alternative and then find the minimum cost sequence to reschedule everything. The savings can be tremendous, particularly if such decisions are currently made on a seat-of-the-pants basis.

Configuration Systems

Configuration systems validate incoming orders to make sure they're complete. In a sense, they apply engineering judgment to the order to ensure that all the

ROUGH 'N' READY

When computers go to war, they need as much protective equipment as G.I. Joe. And in harsh environments such as a shop floor or weather station, the CPU must be protected at all costs. Ruggedized computers are built-in insurance policies that provide shock and vibration isolation and environmentally sealed chassis that prevent wear and tear on the CPU.

Digital, which produces the Industrial VAX (IVAX) series of ruggedized computers, has now turned its mission-critical spotlight away from the IVAX and toward products such as the rack-mount VAX 4000 system server and the rack-mount MicroVAX 3000 Series Q-bus system.

According to Custom Product Manager Garrett Keane, the decrease in the popularity of the MicroVAX II, on which the IVAX series was based, led to a general movement toward more recently released CPUs such as the VAX 4000 and MicroVAX 3000.

"The IVAX lost popularity because of the form factor of the latest MicroVAX II cycles," says Keane. "Products like the 4000 and the 3500 are rack-mountable and were designed with that in mind," he continues.

The rack-mounted VAX 4000 Model 300 is a mechanically reconfigured VAX in a 19-inch rack-mountable BA441 chassis. The Rackmount MicroVAX 3000 Series System provides MicroVAX 3400 and 3800 systems in a standard 19-inch rack-mount BA212 chassis, using 14 inches of vertical rack space. The rack-mount system includes a 12-slot Q-bus backplane offering the same functionality as the standard MicroVAX 3000 Series.

Digital's new "hardened consoles" adhere to the National Electrical Manufacturers Association (NEMA) and the European IP 52 standards, both regarded as de facto standards domestically and in Europe.

Tough Agreements

While Digital continues to offer ruggedized rack-mount enclosures, it has designated a handful of ruggedized computer developers as proprietors of its mission-critical line of ruggedized VAXs for manufacturing and military installations.

Through an agreement with Codar Technology and Rugged Digital Systems, Digital will co-develop ruggedized VAXs that operate under harsh conditions for the U.S. government. Ruggedized computers are used by the military aboard ships, aircraft and trucks in applications that include intelligence analysis, launch control and satellite tracking.

Digital's Ruggedized Suppliers Marketing Agreements (RSMA) program is designed to promote the sale of mission-critical ruggedized VAXs for military applications. Under terms of the agreement, Digital will sell to Codar and Rugged Digital specialized VAX and PDP configurations that will be ruggedized to meet government specifications for use in harsh military environments. The ruggedized VAXs use Digital's software development tools and support VMS and ULTRIX.

The Codar Model 600M series of ruggedized computers is designed for tactical applications. The Model 600M is available with a MicroVAX II, MicroVAX 3500, VAX 8250 or VAX 8350 CPU. Rugged Digital offers multiprocessor VAXclusters, LANs, high-capacity disk arrays and workstation clusters. Its R/650 and R/630 ruggedized product lines are available on the MicroVAX 3500 and MicroVAX II, respectively.

In a separate agreement, Digital has aligned itself with enclosure manufacturer Crenlo to make NEMA 12 rated enclosures for VAXs and workstations. NEMA 12 encompasses protecting indoor computers from dust, dirt and noncorrosive liquids. According to CIM Marketing Product Consultant Bob Maiorana, Digital will continue to develop monitors, keyboards and joysticks, while Crenlo will develop the enclosures.

"Our ruggedized enclosures are based on NEMA specifications," says Maiorana. "Hardware enclosures are usually either NEMA 2 or 12. They make up the bulk of the ruggedized specifications out there today." NEMA 2 encompasses protecting computers against limited amounts of dirt and water.

Other companies, however, are beginning to muscle onto Digital's turf without the benefit of an RSMA agreement. Specialized Systems Technology's SSTA-R31 ruggedized package houses the MicroVAX, VAXstation and DECstation 3100 and includes space for fixed and removable peripherals, memory, a graphics board and a SCSI controller. Personal Computer Quality Technology's Ultra-Reliable Microcomputer PC is splash- and dust-proof and is guaranteed to function without interruption on dirty factory floors, in contaminated air and in harsh outdoor environments. It's targeted for use in process control, data analysis, CAD/CAM, CIM, networking and military applications.

As of this writing, there were no ruggedized VAXs operating on U.S. warships, aircraft or terrain-based vehicles in the Persian Gulf, according to Digital MIL-SPEC program manager Tom Creamer. —*Brian O'Connell, East Coast Editor*

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required parts are ordered and that the rated capacity of each of the components is sufficient for the product to work properly. Configuration systems eliminate costly re-orders and, in some cases, post-assembly testing.

The most well-known configuration expert system is the XCON system employed by Digital to configure VAXs. Digital has claimed annual savings in excess of $40 million due to XCON and has avoided building additional assembly and test centers.

> CONFIGURATION SYSTEMS ELIMINATE costly re-orders and, in some cases, post-assembly testing.

Much like diagnostic systems, the underlying architecture of configuration systems can be either rule- or model-based. Rule-based systems may employ a bill-of-materials-like configuration database that stores information about which parts require other parts. It then can validate the order by traversing this database to ensure that all needed parts are ordered.

Model-based configuration systems represent the product line as individual components and the electrical or mechanical links among the parts. The links may also have a capacity requirement associated with them. The expert system takes into account the specific components being ordered and ensures not only that all required components are ordered but also that all capacity requirements are met.

Pricing Systems

Another area in which expert systems can help a manufacturer is quoting prices to customers. This sounds like an easy task, but because of a bewildering array of discounts — some percentage-based, some absolute, some regional — it's easy to get confused. The goal is to allow the marketing department the flexibility to introduce promotions as it sees fit and then automatically apply these discounts to each order. What must be avoided are different quotes being given for the same order by different individuals.

Any automated system provides this capability, but experience shows that in many companies maintaining these pricing programs as rapidly as marketing introduces new promotions is virtually impossible. The contribution of expert systems is that each promotion can be represented as a rule that specifies the conditions of the promotion. As such, the promotions are far less procedurally related to one another and therefore can be added or deleted with much less interaction.

In one situation, the maintenance of the pricing module was turned over to the marketing department so that the introduction of promotional programs was completely under its control. So that the marketing department could avoid programming tasks, as many as 20 types of discounts were predefined in the system. Marketing merely used a natural language system to update tables to specify which products were available under which discounts. The expert system consisted of meta-rules that defined how each type of discount should be handled. The only time additional programming was necessary was when new types of discounts were introduced.

THE AI TECHNOLOGY IN EXPERT SYSTEMS can be applied to a wide variety of areas within manufacturing. As we go through several life cycles of products that employ AI technology, we'll undoubtedly see deeper benefits. For example, large-scale products will be designed with built-in diagnostic systems, not just to assist field service but also to continuously monitor critical functions and advise the operator before breakdowns occur. As such, the AI component will be an integral part of the product.

Manufacturers ignore this new technology at their own risk. It's essential to begin experimenting with expert systems to determine which areas within your company can benefit most from this technology. —*Larry R. Harris, Ph.D., is founder and chairman of AICorp, Waltham, Massachusetts.*

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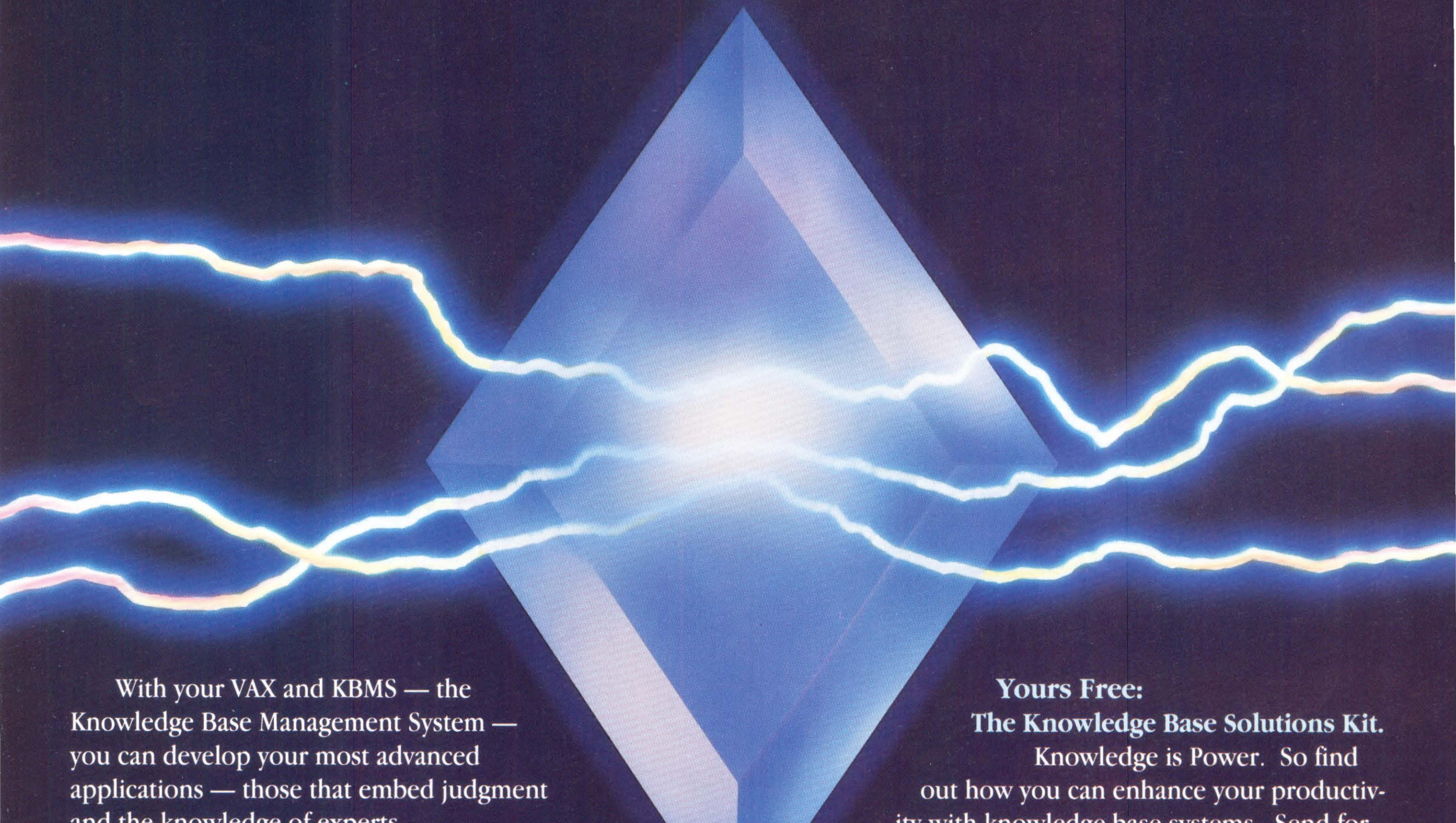

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VAXELN:

REAL-TIME VAX

A study of features implemented in Digital's operating system for real-time applications.

Terry S. Berman

ALTHOUGH VAXELN, THE DIGITAL OPERATING system for real-time applications, has been overshadowed by its more popular cousin VMS, a study of how some of VAXELN's features are implemented can yield a wealth of VAX engineering knowledge. We'll explore the implementation of two facilities: the interjob message-passing facility and the resource-allocation facility. These exemplify VAXELN's exploitation of the VAX processor and allow us to examine the VAX virtual memory management scheme and how the VAX variable bit-field instructions can be used.

Real-time application development is performed under VAX/VMS. The full range of VAX/VMS tools (e.g., editors) can be used, therefore, to develop the application programs. The programs are then loaded onto the target machine using the VAXELN toolkit. The target machine can be one in a wide variety of Digital hardware, including members of the VAX 8000, 6000 and 3000 series, and MicroVAX processors. Digital also offers three VAX processors that execute VAXELN only: the Q-bus-based KA620, the VAXBI-bus-based KA800 and a recently announced real-time daughter-board, the rtVAX 300.

VAXELN encourages the use of high-level languages. Currently, the VAXELN toolkit supports the development of applications in Ada, C and Pascal. In addition, VAXELN supplies a set of specialized tools that facilitate real-time development. These include an interactive debugger that operates over DECnet, a system resource monitor and a performance analysis tool. Recent VAXELN features provide support for DECwindows, a command language interface (i.e., a subset of VAX/VMS DCL) and enhanced run-time libraries.

VAXELN Enlightenment

Figure 1 provides an overview of the VAXELN kernel, i.e., the main component of the operating system. Components such as the file services, network services and debugger are external to the kernel.

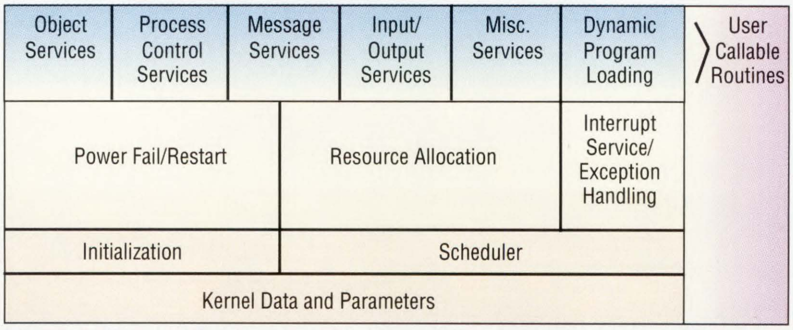
Object Services
Process Control Services
Message Services
Input/ Output Services
Misc. Services
Dynamic Program Loading
User Callable Routines
Power Fail/Restart
Resource Allocation
Interrupt Service/ Exception Handling
Initialization
Scheduler
Kernel Data and Parameters

Figure 1: The VAXELN kernel. The blue portions represent routines that can be called by a user process. Other portions of the kernel control and allocate system resources.

The principle characteristic of VAXELN from a user's perspective is that it's object-oriented. This means that VAXELN defines a set of objects and associated operations that are visible to the applications program. Objects include processes (programs in execution); jobs (families of processes);

events and semaphores, for synchronizing or signaling process actions; messages, ports and areas, for interjob communications; and devices, e.g., terminals. Operations on these objects include the services required to create and delete objects (e.g., create a process, delete an area) as well as manipulation of the various objects (e.g., wait for an event, signal a semaphore, send a message, and so on).

The shaded portions of the kernel in Figure 1 represent routines that can be called by a user process. These routines perform the services required for creation, deletion and manipulation of VAXELN objects. Other portions of the kernel control and allocate system resources such as memory or DMA registers, perform system scheduling (i.e., determine which process should execute next), respond to interrupts and service the system timer. In addition, the kernel includes routines that execute following system power-on to initialize the kernel and start execution of predefined user processes. VAXELN routines execute either as a result of a user call to a service routine such as object creation or are triggered by an external event such as a device interrupt.

The process is the basic unit that executes on any VAX processor. VAXELN supports the execution of multiple concurrent processes. It uses a pre-emptive, priority-based scheme (i.e., each process is assigned a particular priority) and always schedules the highest priority ready process for execution. This ensures that time-critical events such as high-speed data transfers from an external device can be serviced before lower priority events.

An essential feature of a practical real-time system is the ability to communicate between processes. For example, Figure 2 shows two processes. Process A places data in a buffer whenever this data is received from an external device such as a keyboard. Process B interprets the data. Process A must therefore pass this data to Process B. Moreover, it must do so such that the time required for Process B to interpret the data is short enough so that the data to be processed by Process B doesn't accumulate indefinitely, causing the buffer to overflow.

VAXELN provides the concept of process families, or jobs. Each process within a job shares a common memory area. Thus, these processes can communicate quickly by using this memory area. Processes in different jobs, however, must use some other mechanism to communicate with one another.

Although the operating system designer can't control the amount of time required to perform a specific user application function, the amount of overhead time imposed by the operating system can be optimized. This is particularly important for real-time applications and is a fundamental design characteristic of VAXELN.

One way to implement a VAXELN interjob message facility is to copy the data from one job memory area to the other. This, however, is very inefficient. Instead, VAXELN "maps" the data from its location in the memory area of one job to a memory area in the other. This requires only that certain addresses be set rather than actually moving the data.

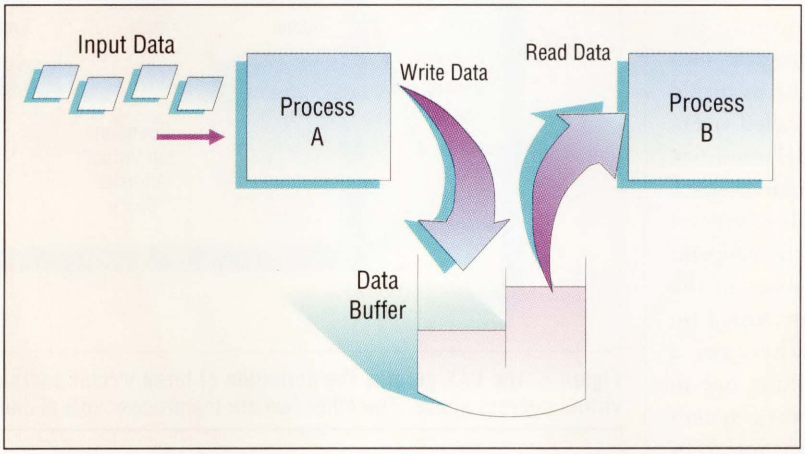

Figure 2: An essential feature of a real-time system is communication between processes. Here, Process A places data in a buffer when data is received from an external device. Process B interprets the data.

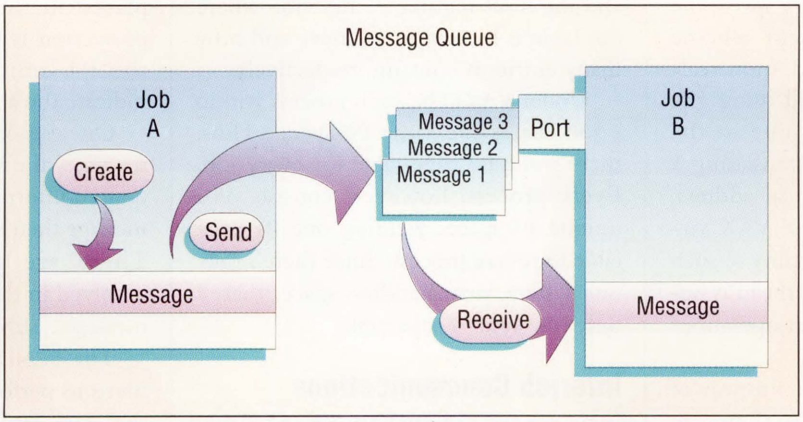

Figure 3: An overview of the VAXELN message-passing facility.

Figure 3 provides an overview of the VAXELN message-passing facility. Prior to receiving a message, a job must establish a port object. A port is fundamentally a message queue. The port can be identified to other jobs either by associating it with a systemwide name or by a pre-established naming convention. A job can then create a message and send it to the desired port by making calls to the corresponding VAXELN routines. Similarly, the receiving job calls the VAXELN routine for receiving messages. Once the message is received, the job can access the data.

To implement this scheme, there must be a mechanism for identifying the location of the message data in the sending job and where it should be put in the receiving job. Then, VAXELN must change the process page tables (i.e., the tables that control the mapping of virtual to physical memory) so that the message data is removed from the sending job's address space and appears in the receiving job's address space. In addition, it must provide some way for the receiving job to know that the message is queued and a means for the sending job to locate the queue.

Virtual Memory Management

Let's examine virtual memory management and how it functions on a VAX processor. Then we'll explore how VAXELN takes advantage of the memory-management hardware to implement interjob message communications.

The original idea behind virtual memory was to allow large programs to be written without requiring the programmer to break the program into pieces that could fit into the available memory space (sometimes called overlays). Instead, using virtual memory management, a very large address space is mapped into a much smaller physical address space. A portion of the program is kept in memory. The pieces of the program that aren't in use are stored on a mass storage device. Whenever a reference is made to something not in physical memory, the operating system brings the appropriate information from the mass storage device into memory.

Since all data and code in a VAXELN system must be contained entirely within the available physical memory space, the virtual memory management scheme isn't strictly required. Indeed, most real-time operating systems avoid using virtual memory management due to the overhead associated with translating a virtual address into a physical address. VAXELN, however, uses the VAX virtual memory management facility to such great advantage that this overhead is negated and it performs certain operations much faster.

The VAX permits the definition of three virtual address spaces as shown in Figure 4. The first is referred to as system virtual address space. The system virtual address space is unique and is usually reserved for operating system code and data structures. The other two virtual address spaces are the process virtual address spaces and are referred to as P0 and P1.

Each virtual address space is defined via the use of a page table and two internal processor registers. Each entry in the table defines where a particular page (i.e., 512 8-bit bytes) of virtual memory is physically located and the protection (e.g., read-only) to be applied. The first entry in the table describes virtual page 0, that is, addresses 0 to 511. Each subsequent entry in the table describes the next virtual address page. The two processor registers — the base register and the limit register — describe where the table is located in memory and how many entries it contains, respectively.

Under VAXELN, each process within a job shares the same P0 space. Thus, there's one P0 page table for every job. Every process, however, consists of a unique P1 space, yielding one P1 page table for every process. Since there's only one system virtual address space, there's only one system page table.

Interjob Communications

Now we can explore how VAXELN uses VAX virtual memory management to quickly pass messages between jobs. To define a message, a process calls the VAXELN routine CREATE_MESSAGE. The CREATE_MESSAGE routine determines how many pages the message will occupy and then allocates the pages within the process P0 virtual address space. It also creates a data structure that describes the message object. The message descriptor data structure elements relevant to our discussion are described in Figure 5.

The memory allocation function entails adding pages at the end of the P0 address space. There are three steps to this procedure. First, the physical pages that will be mapped are determined. Second, the physical address values (known as page frame numbers) are placed in the P0 page table, and the protection is set for each page. Finally, the P0 limit register is updated to indicate the additional entries.

Once space has been allocated for the message, the user process can place the desired information in the message. The message then may be sent to another job. There are two VAXELN routines involved in the sending and receiving of messages: SEND and RECEIVE.

The SEND routine must know two items to perform its function. These are the data structure that describes the message and the data structure that

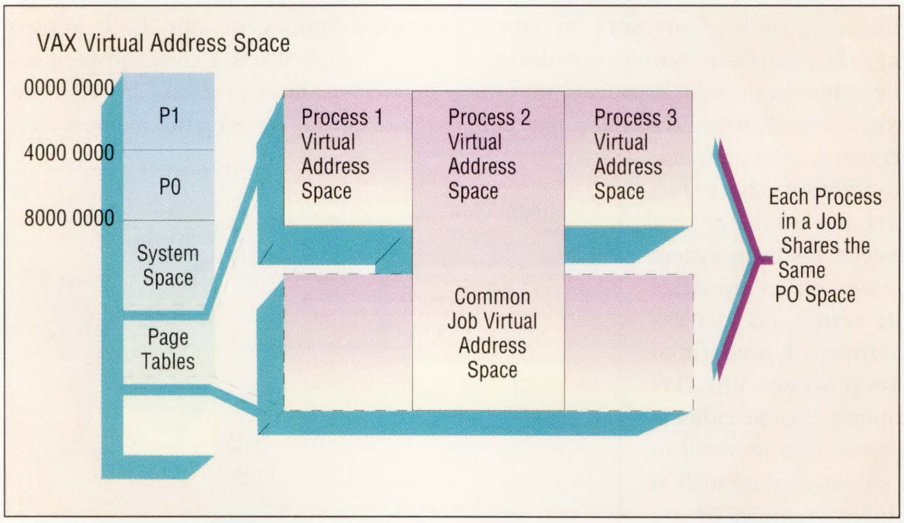
VAX Virtual Address Space
0000 0000
4000 0000
8000 0000
P1
P0
System Space
Page Tables
Process 1 Virtual Address Space
Process 2 Virtual Address Space
Process 3 Virtual Address Space
Common Job Virtual Address Space
Each Process in a Job Shares the Same P0 Space

Figure 4: The VAX permits the definition of three virtual address spaces. One is the system virtual address space. The other two are the process virtual address spaces, P0 and P1.

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describes the destination port. Optionally, the length of the message in bytes can be specified if it's less than the created message size. The object identifiers used to locate the message descriptor and the port descriptor as well as the optional message-length field are supplied by the calling process.

The message descriptor contains the address and length of the message and was defined by the CREATE_MESSAGE routine. The port descriptor contains the address of the destination port and was defined by the CREATE_PORT routine.

SEND uses the message descriptor to locate the entries in the P0 page table, which map the message to the process virtual address space. These entries are then removed, and the P0 limit register is updated. Thus, the message data is no longer accessible by the sending process.

The next step in the sending process is to locate the port queue. Since ports must be accessible to all jobs within a system, the port address is located in system virtual address space. The exact location is established when the port is created and is contained in the port descriptor. The message is linked to the next location in the port queue and is then available to the receiving job.

Prior to receiving the message, the receiving job must wait for the message to be queued to the port. This can be achieved using the VAXELN services that wait for objects (i.e., WAIT_ANY or WAIT_ALL) in conjunction with the port. Once the wait has been satisfied, the job can execute the RECEIVE routine.

The RECEIVE routine uses the physical address of the message data (from the queued message descriptor) and maps this data into the virtual address space of the receiving job. This entails placing the physical address of each message page into the P0 page table and updating the P0 length register. In addition, the RECEIVE routine creates a message descriptor using the queued descriptor information and the starting virtual address of the message data. Thus, the message is mapped into the address space of the receiving job without any movement of data.

Resource Allocation

One of the more frequently performed operating system tasks is to allocate and de-allocate system resources. For VAXELN, these resources include physical and virtual memory pages, input/output mapping registers, ports, page tables, and so on. VAXELN represents a resource as a bitmap as shown in Figure 6. Using this representation, VAXELN can exploit the use of the VAX variable length bit-field and character string instructions to implement the allocation/de-allocation functions.

A bitmap is simply a continuous sequence of bits and an associated length.

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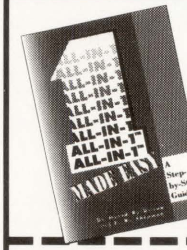

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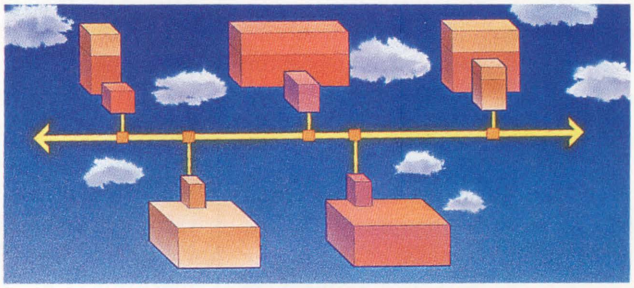

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FIELD	PURPOSE
Forward Link	Pointer to next message.
Backward Link	Pointer to previous message.
Object Type	Identifies structure as a message descriptor.
Create Size	Size in bytes of message buffer as specified in the create_message call.
Send Size	The number of bytes specified in the SEND call (usually the same as create_message).
Count	The number of pages occupied by the message buffer.
Frame	The starting physical frame number of the message buffer.
Virtual PTE	The system virtual address of the first P0-page page table entry used to map the message buffer.
Destination ID	The ID of the port to receive the message.

Figure 5: Major message descriptor fields.

Each bit in the bitmap represents the status of a particular component of the resource. If the bit is set (i.e., a 1), then that component is available; otherwise it's considered allocated. For example, if the first eight bits of the bitmap representing physical memory pages are cleared (all 0s), then this indicates that physical pages 0 through 7 have been allocated. In addition to the bitmap and its associated length, VAXELN keeps track of the first position within the bitmap where allocation is possible. This avoids unnecessary searching from the beginning of the bitmap each time an allocation request is made.

There are two characteristics of resource allocation/de-allocation that make it particularly suitable for representation by bitmaps. First, the components of a particular resource are ordered sequentially. For example, memory pages are ordered starting at 0 for the first page and, for example, 4,095 for the last page. Second, resources are normally allocated or de-allocated in groups. Thus, it's reasonable to assume that a process may require many contiguous memory pages to contain a particular data structure, e.g., a message.

A major problem associated with resource allocation is the possibility for a high degree of fragmentation. This means that although there may be enough memory pages, for example, to satisfy a particular request, they aren't contiguously located and can't be efficiently allocated. This situation arises over time as requests for allocation and de-allocation of various-sized blocks of a resource are made.

VAXELN uses a method known as "first fit" to allocate resources. This approach has been shown to provide good overall performance with respect to the fragmentation problem. In the first-fit method, whenever a request for a particular number of components is made, VAXELN searches the bitmap for the first instance in which that number is available and allocates from that point. To save time in subsequent requests, VAXELN sets a pointer if the location following the allocated area is the next possible area from which to allocate. When resources are de-allocated, this pointer is changed if the resource being returned is at a lower location within the bitmap than the current location. This ensures that the allocation routine will always start its search at the first possible location within the bitmap.

On a lot of machines, working with bit fields is laborious. On some machines, for example, determining where the first set bit is within a bitmap could entail testing every byte within the map to determine whether its value is 0 and then masking (i.e., performing a logical AND operation) to determine which bit within the first non-0 byte is set. On a VAX, however, the find first set (FFS) instruction is all that's required to accomplish this task. Moreover, finding the first non-0 byte within the bitmap can be performed directly by the skip characters (SKPC) instruction.

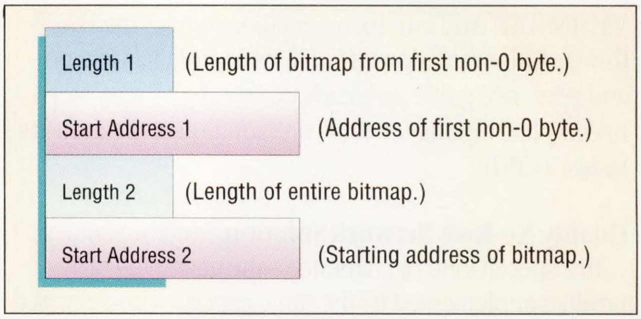
Length 1
(Length of bitmap from first non-0 byte.)
Start Address 1
(Address of first non-0 byte.)
Length 2
(Length of entire bitmap.)
Start Address 2
(Starting address of bitmap.)

Figure 6: VAXELN represents a resource as a bitmap and exploits the VAX variable length bit-field and character string instructions to implement allocation/de-allocation functions.

Armed with the FFS and SKPC instructions, it's easy to envision how VAXELN implements the resource-allocation routine and why the bitmap representation is so well-suited for the VAX. To locate the first available set of bits, SKPC is used to skip over all byte locations within the bitmap whose value is 0. Then FFS is used to determine which bit within the non-0 byte represents the first available resource component.

Following this, the required number of bits is extracted, using the variable field extraction instruction (EXTV), and tested. If enough contiguous bits are found, then the actual bits in the bit string are complemented to indicate that they've been allocated. Otherwise, the process is repeated, locating the next non-0 byte with SKPC. To de-allocate resources, the appropriate bits within in the bitmap are set and the pointer to the bitmap is updated.

The interjob message-passing facility and the resource-allocation routines are two instances of how VAXELN exploits the VAX hardware to achieve high performance. Other examples abound, such as the use of the VAX queue instructions to maintain scheduler queues or the use of the asynchronous system trap (AST) to signal process-switching within the scheduler. For those contemplating serious real-time design or future endeavors in systems programming, the study of the internal workings of VAXELN will prove highly rewarding. *—Terry S. Berman is manager of system services at TRW in Fairfax, Virginia.*

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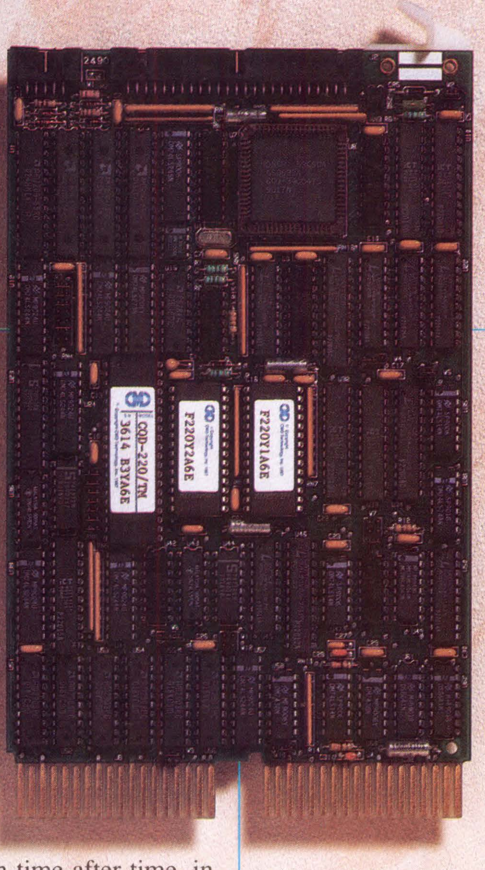

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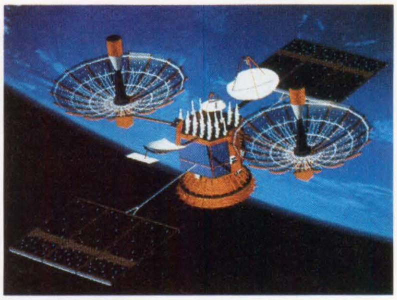

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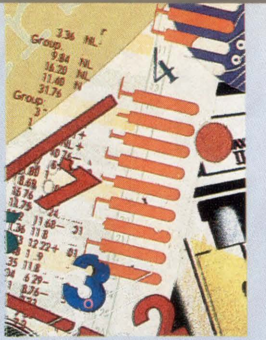


HARDWARE

DECsystem 5100 And 5500

Fay Elassy-Bortcosh

The DECsystem 5100 And 5500 Underscore Digital's Commitment To Open Systems And The RISC/UNIX Market.

This fall Digital introduced new members of the second generation of DECsystem servers first introduced April 3 with the DECsystem 5000 Model 200. The new systems underscore Digital's commitment to the RISC/UNIX market and open systems while responding to user demands for compact UNIX servers that deliver more performance and functionality at a lower cost than current systems.

The new generation includes the DECsystem 5100 at the low end and the DECsystem 5500, which offers the highest single-stream performance in the family. Together, the servers feature support for FDDI networking, increased support for UNIX software standards, and SCSI and VMEbus options along with the traditional DSSI, SDI and Q-buses.

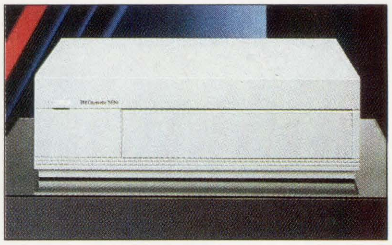
The first generation of DECsystems was introduced in January 1989 with the DECstation 3100. In the months that followed, the DECstation 2100, the DECsystem 3100, the DECsystem 5400 and the DECsystem 5800 were introduced, rounding out the first generation of DECsystems.

Server Profile

The second-generation entry-level server, the DECsystem 5100, provides a significant price/performance improvement over the DECsystem 3100. However, the real advantage is in its greatly expanded communications capabilities and compact packaging. The desktop machine is designed for communications, NFS and compute serving. It supports 12 asynchronous lines or a combination of eight asynchronous and two synchronous lines for LAN and WAN use. It also features five internal storage devices (see Figure 1).

The high-end DECsystem 5500 is board-upgradable from the DECsystem 5400 and is designed to handle departmental, compute and file serving needs. The 5500 boosts CPU speed 50 percent to 30 MHz, up from 20 MHz on the 5400. A new memory subsystem doubles the width of the memory bus from 32 bits on the 5400 to 64 bits and enhances the memory controller (see Figure 2).

The new DECsystems use the R3000 family of microprocessors from Mips Computer Systems. The 5100 runs the R3000 chip at 20 MHz, generating more than 19 mips of performance. The 5500 is built



The DECsystem 5100 (above) and the DECsystem 5500 (left) extend the second generation of DECsystem servers.

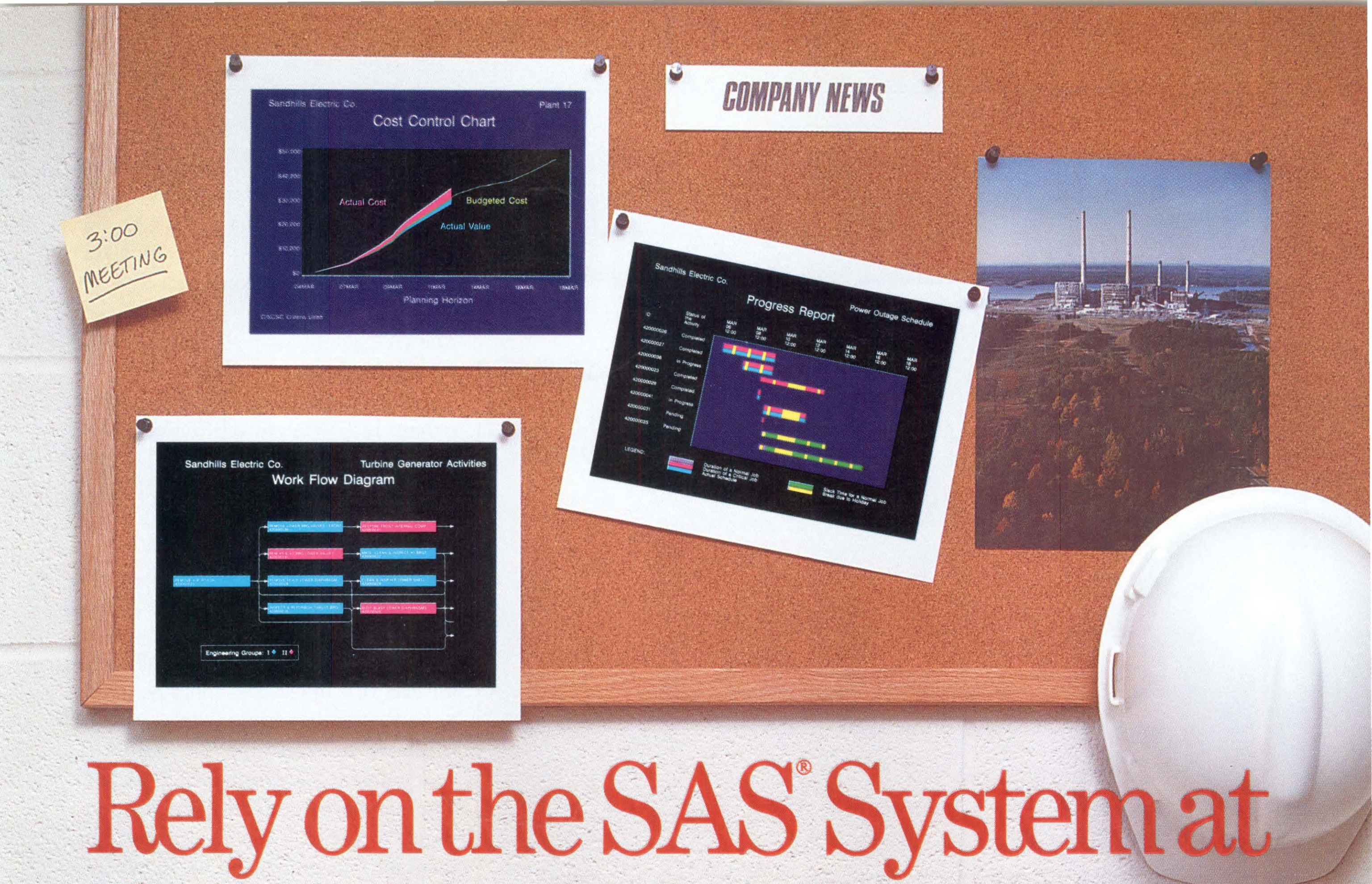

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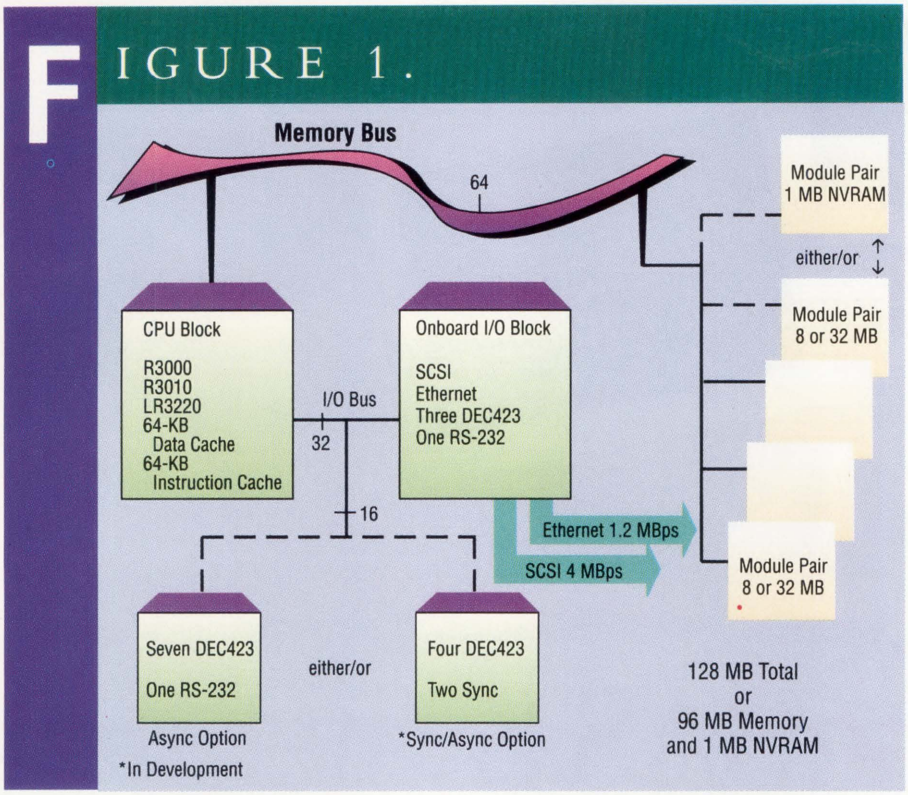
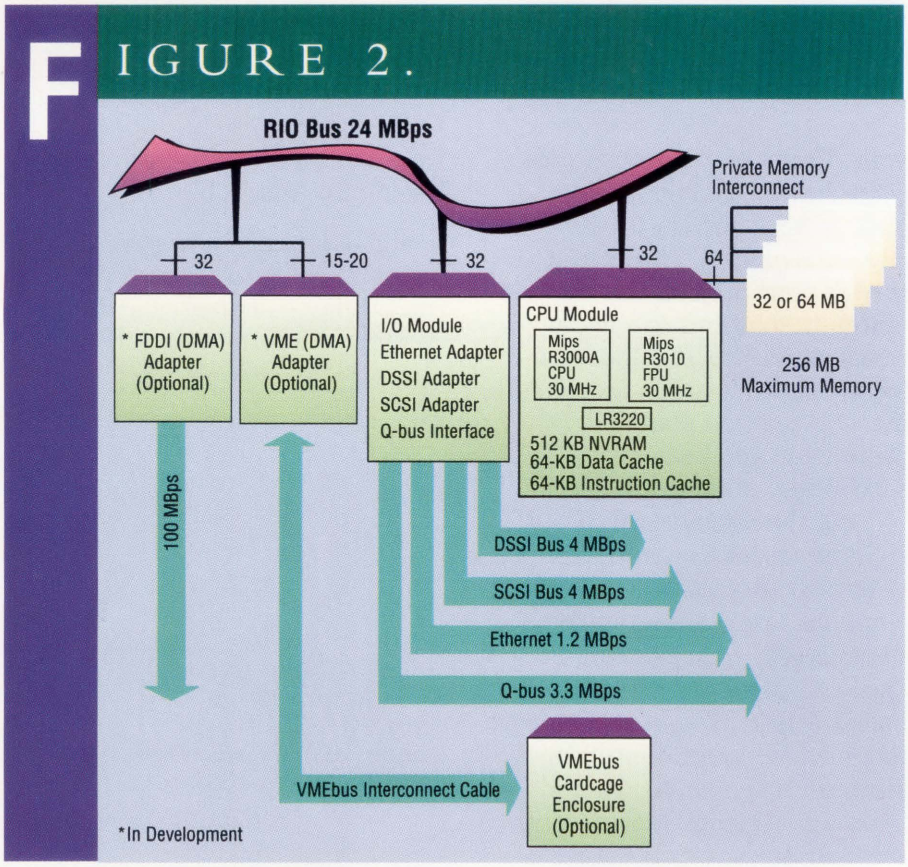
FIGURE 1.


Memory Bus
64
Module Pair
1 MB NVRAM
either/or
Module Pair
8 or 32 MB
CPU Block
R3000
R3010
LR3220
64-KB
Data Cache
64-KB
Instruction Cache
I/O Bus
32
Onboard I/O Block
SCSI
Ethernet
Three DEC423
One RS-232
16
Ethernet 1.2 MBps
SCSI 4 MBps
Module Pair
8 or 32 MB
Seven DEC423
One RS-232
either/or
Four DEC423
Two Sync
128 MB Total
or
96 MB Memory
and 1 MB NVRAM
Async Option
*Sync/Async Option
*In Development

The DECsystem 5100 is designed for communications, NFS and compute serving.

FIGURE 2.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Interconnect
32
15-20
32
32
64
32 or 64 MB
* FDDI (DMA)
Adapter
(Optional)
* VME (DMA)
Adapter
(Optional)
I/O Module
Ethernet Adapter
DSSI Adapter
SCSI Adapter
Q-bus Interface
CPU Module
Mips
R3000A
CPU
30 MHz
Mips
R3010
FPU
30 MHz
LR3220
512 KB NVRAM
64-KB Data Cache
64-KB Instruction Cache
256 MB
Maximum Memory
100 MBps
DSSI Bus 4 MBps
SCSI Bus 4 MBps
Ethernet 1.2 MBps
Q-bus 3.3 MBps
VMEbus Interconnect Cable
VMEbus
Cardcage
Enclosure
(Optional)
*In Development

The DECsystem 5500 can handle departmental, compute and file serving needs.

around the R3000A chip and generates more than 28 mips of performance. In addition, the new machines use the R3010 floating point chip and the LR3220 write buffer along with a 64-KB instruction cache and a 64-KB data cache. The DECsystem 5000, also based on the R3000 chip, runs at 25 MHz.

A key performance feature of both systems is a Network File System (NFS) accelerator, PrestoServe, from Legato Systems. PrestoServe is nonvolatile RAM (NVRAM) that functions like a CMOS-based disk cache. For the 5100, 1 MB of NVRAM is available as an option on the memory bus. For the 5500, 512 KB of NVRAM is standard on the CPU module.

The NVRAM is a very fast disk cache for data that otherwise would be stored on disk. PrestoServe is a combination of hardware and software. The hardware component is RAM with battery backup. The software intercepts synchronous writes to the disk file system and puts them into the nonvolatile cache instead.

The use of NVRAM in the machines optimizes the performance of synchronous writes by 300 percent by eliminating situations in which the server must wait for writes to be made to disk and a write-complete message to be returned. NFS applications make extensive use of synchronous writes. Since updating the disk index structure also requires synchronous writes, virtually every disk write access can be speeded to some extent through the use of the accelerator.

To ensure the safety of the data stored in NVRAM, PrestoServe includes a number of recovery provisions. In the event of an abnormal shutdown due to a power, hardware or software failure, system software automatically handles the recovery of data from the NVRAM. In a normal shutdown, system software automatically flushes the cache to disk.

The system manager also has several system management options. The NVRAM can be flushed to disk prior to normal disk backup, and the system manager can turn off the NVRAM completely. All writes then go directly to disk. The system manager can also assign

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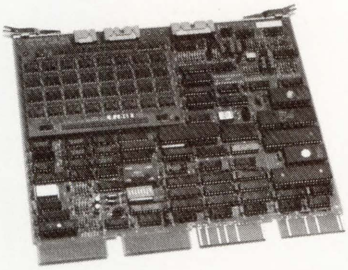

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the NVRAM only to certain disks.

Both new DECsystems ship with ULTRIX V4.1. This version includes support for the X/Open Portability Guide, IEEE's POSIX 1003.1, AT&T's System V Interface Definition and the X/Open Transport Interface. Also included is ULTRIX/SQL, which can work with relational databases from Informix, Ingres and Oracle as well as Digital's Rdb/VMS and VAX SQL and IBM's DB2. In addition, ULTRIX V4.1 features an option for factory-installed software for turnkey solutions. The 5100 takes advantage of this option by supporting factory-installed software, which the 5500 will also support in the near future.

From The Top Down

The 5500 brings two large pieces of the open systems environment to midrange machines: SCSI and VMEbus interconnects, with support for FDDI in the near future.

The 5500's internal CPU bus is the RIO, which performs the same function as the TURBOchannel in the DECstation and DECsystem 5000. DSSI, Ethernet and SCSI adapters on the main board deliver increased throughput, because they needn't contend with the delays inherent in traversing a traditional bus. Additional I/O is handled by the Q-bus, which allows for the option of adding extra DSSI, Ethernet and SCSI controllers as well as other Q-bus devices in a variety of combinations.

DSSI, Ethernet and SCSI are on the CPU I/O set. Additional disk and Ethernet controllers can be added on the Q-bus. Other Q-bus communications options also are supported.

In addition, the 5500 offers a VMEbus option as an external device. The VMEbus adapter doesn't reside on the Q-bus, but rather it talks with the RIO bus through an RIO-VME adapter. The optional VMEbus is housed in an eight-slot expansion box connected by cable to the adapter in the 5500 box. The VMEbus provides greater bandwidth than the Q-bus and allows the 5500 to accommodate any VME device, such as graphic accelerators or real-time data collection instruments.

The FDDI network is the international standard high-speed fiber optic LAN. Support for this dual-ring, timed token passing network will be available with the new DECsystems in the near future.

> The 5500 accommodates up to 28 GB of storage.

The 5500 also includes a floating point co-processor that implements the IEEE arithmetic functions and the LR3220 read-write buffer — a six-word-deep write buffer that passes through all writes. The LR3220 performs several functions that enhance memory throughput. It can notify the memory subsystem of potential page mode writes, and it can identify block reads that request data already present in the write buffer and notify the memory controller accordingly.

The 5500 provides from 32 to 256 MB of high-speed ECC memory, which can be increased in 32- or 64-MB increments. The system provides 40-MBps peak write bandwidth (38-MBps sustained) and 120-MBps peak read bandwidth (34.3-MBps sustained). The system accommodates up to 28 GB of storage and a variety of storage options: SCSI with the RZ series of drives (RZ56, RZ57), DSSI with the RF series of drives (RF31, RF71 and RF72) and SDI with the RA series of drives (RA70, RA90 and RA92).

You can mix and match your storage options, combining DSSI and SCSI drives in the same system. This lets you keep older drives while adding new drives of a different format.

For mass storage and backup purposes, the 5500 supports a 1.2-GB DAT drive (TLZ04) and a 95-MB (TK50) or 296-MB (TK70) magnetic cartridge tape drive. A 600-MB CD-ROM (RRD40) is available

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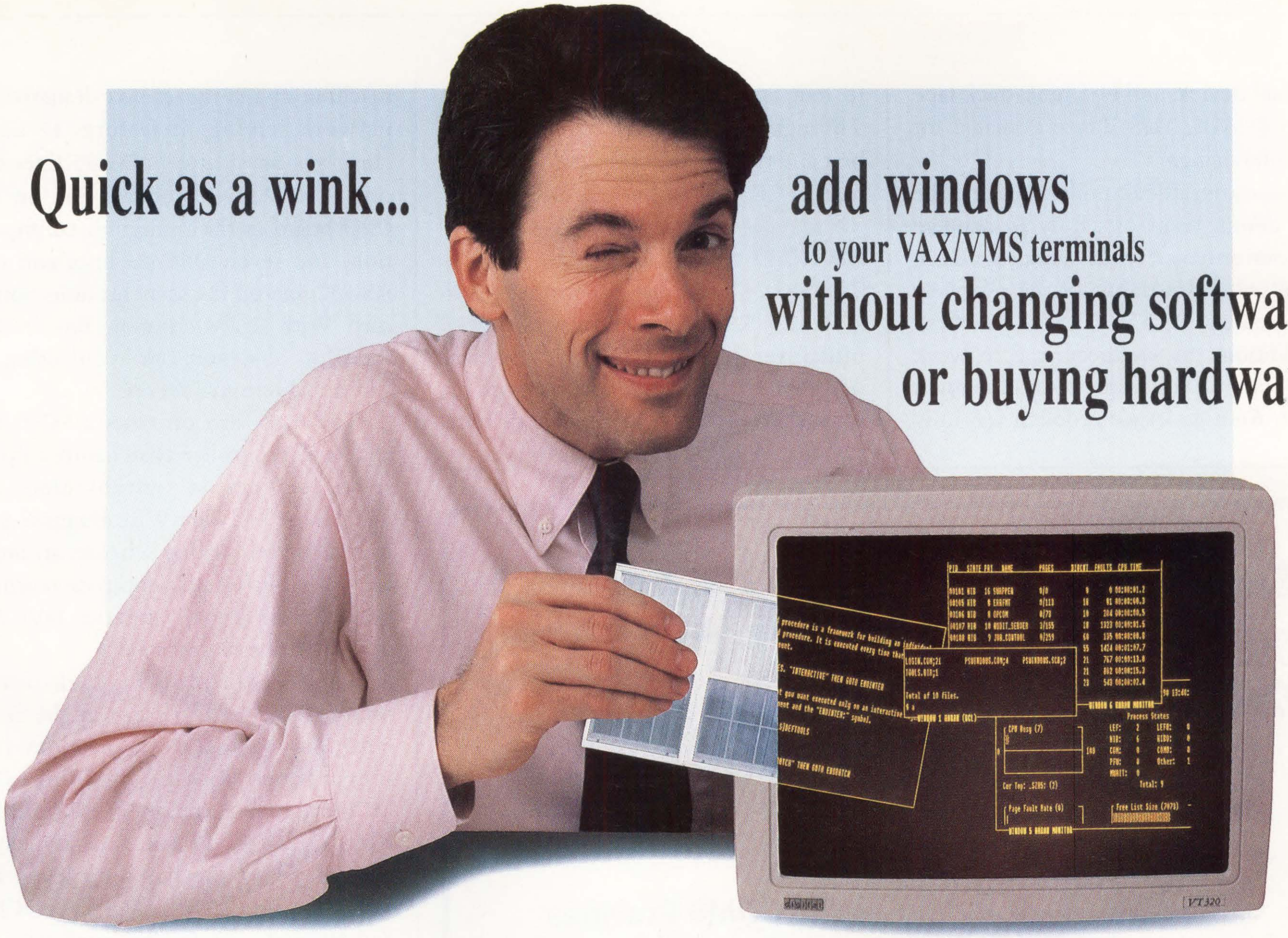

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as a load device, and two nine-track tape drives (TSV05, TU81E) are available for data interchange.

The most difficult problem facing the 5500 design team was how to achieve high performance while working within the physical constraints of the relatively small pedestal (27.1 x 20.8 x 17.7 inches). In addition, the engineers had to work with very limited space on the main board. Another major problem was how to reduce radiated frequency emissions. Through mechanical adjustments to the box and the addition of shields, the 5500 meets FCC emission standards.

No Small Potatoes

The 5100, Digital's most compact (18.26 x 15.75 x 5.9 inches) and lowest priced multiuser UNIX-based system, was developed in response to customer requests for a low-cost, open systems machine in a compact box designed for network serving. It features 12 asynchronous lines: three DEC423 lines and one RS-232 (full modem) line on the CPU board as the minimum configuration, and seven DEC423 lines and one RS-232 line on the asynchronous option card. With 12 asynchronous lines within the 5100 box, you can avoid using an additional terminal server.

The 5100 also provides a SCSI disk and tape controller that handles up to seven devices, a switch-selectable ThickWire and ThinWire Ethernet port to match your wiring scheme, an interface for either asynchronous or synchronous option cards, and the NVRAM option on the memory bus.

The synchronous/asynchronous option card, used in place of the asynchronous option card, provides two synchronous lines (using Motorola's MC68302, which runs at speeds from 128 Kbps to 256 Kbps) and four asynchronous lines. At the data-link level, the 5100 supports HDLC, SDLC, DDCMP and BISYNC. At the network level, it supports X.25 and SNA protocols. The provision for two synchronous lines is

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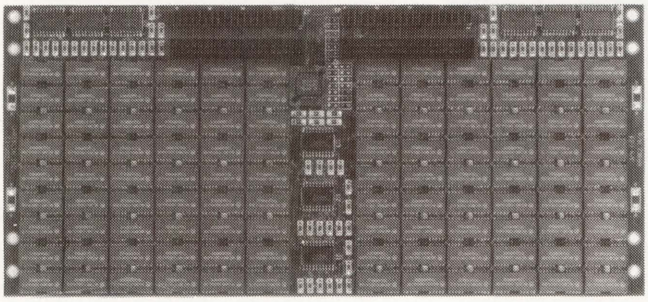

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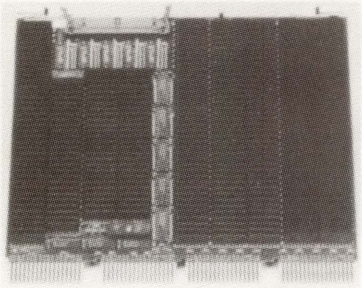

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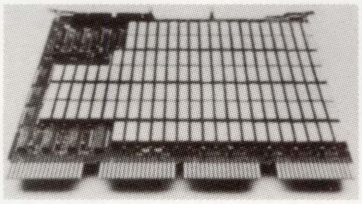

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The 5100 houses up to 1 GB of internal storage.

critical for users who need synchronous capability for LAN and WAN communications.

The 5100 offers 128-KB direct-mapped instruction and data caches and a 64-bit-wide data path to parity-protected main memory, which implements page mode write and four-word block cache refills. The 64-bit-wide data path doubles the size of the data path on the DECsystem 3100.

The system supports from 8 to 128 MB of memory comprising 4- or 16-MB single in-line memory modules. Memory can be upgraded in 8- or 32-MB increments. The system features 40-MBps peak write bandwidth (38-MBps sustained) and 80-MBps peak read bandwidth (23-MBps sustained). Memory data integrity is provided by byte parity.

The 5100 houses up to 1 GB of internal storage. The system can accommodate up to five half-height SCSI devices on two shelves. The lower shelf can contain 5 1/4-inch removable or 3 1/2-inch fixed devices, while the upper shelf can contain up to three 3 1/2-inch fixed devices, either RZ23 or RZ24. Additional external storage is provided through expander boxes.

While the 5100 has the capacity to connect many storage devices, the SCSI controller only handles up to seven devices. However, you can take advantage of the availability of full- and half-height slots to combine larger external drives with the smaller internal drives in any combination of up to seven devices.

For external loading and backup media, the 5100 accommodates 4mm DAT (TLZ04), CD-ROM (RRD40) and reel-to-reel tape (TSV05).

COMPLICATING THE DECSYSTEM 5100 and DECsystem 5500 product development was intense pressure from customers. For the 5100 in particular, users urgently demanded a more powerful UNIX server in a desktop package at a low price to replace the DECsystem 3100. The result is two machines that meet state-of-the-art performance standards in their respective classes at highly competitive prices: roughly $42,000 for the 5500 with 32 MB of memory and roughly $11,000 for the 5100 with 8 MB of memory. *—Fay Elassy-Bortcosh is an engineering manager at Digital Equipment Corporation in Maynard, Massachusetts.*

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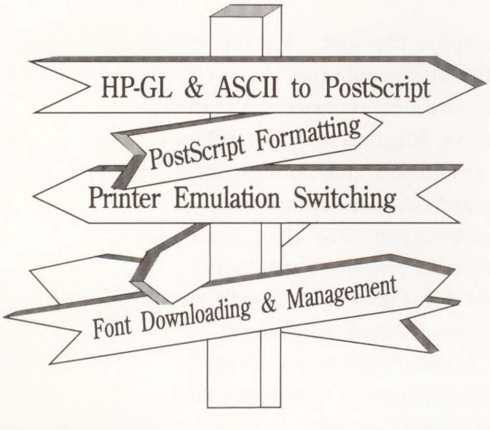
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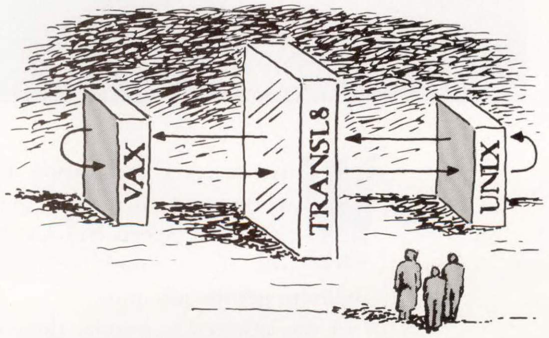

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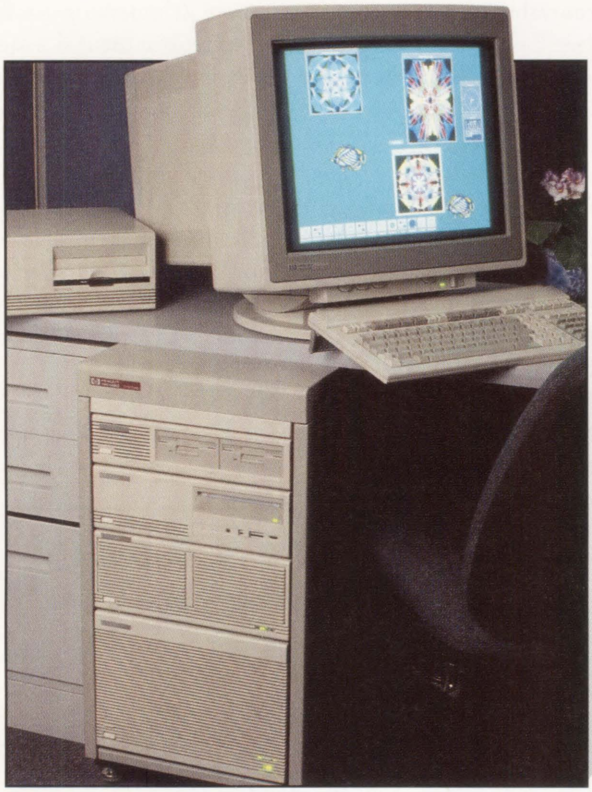
Putting The WORK in Workstation



What makes a workstation a great workstation? Is it mips, graphics processing speed and sub-20 ms disk access time? Or is it the ability to get the job done?

I was inspired to ponder these questions after seeing an Apple Computer television commercial. In it, two managers standing outside a glass-enclosed computer room watch employees wait to use a Mac while dozens of IBM PS/2s, ATs and PC clones sit idle. One manager asks, "Which PC is the best?" The other responds, "It's the one with the most memory, megahertz, mips." "I don't think so," replies the first. "I think the best PC is the one people use."

Likewise, the best workstation is the one people use. Mips, memory, graphics speed and resolution and fast, plentiful disk storage are necessary components of a great workstation, but they aren't worth anything if you don't use them.

I recently put Hewlett-Packard's HP 9000 Model 834 through its paces in our Lab. What I discovered was a complete system that engineers, designers and software developers can use.

The Model 834 is HP's entry-level RISC workstation. The central processor, a 15-MHz HP-PA RISC chip, produces 14 mips. The 15-MHz floating-point coprocessor is rated at 2.02 Mflops. Standard memory is 8 MB of ECC RAM expandable to 96 MB. Standard I/O ports

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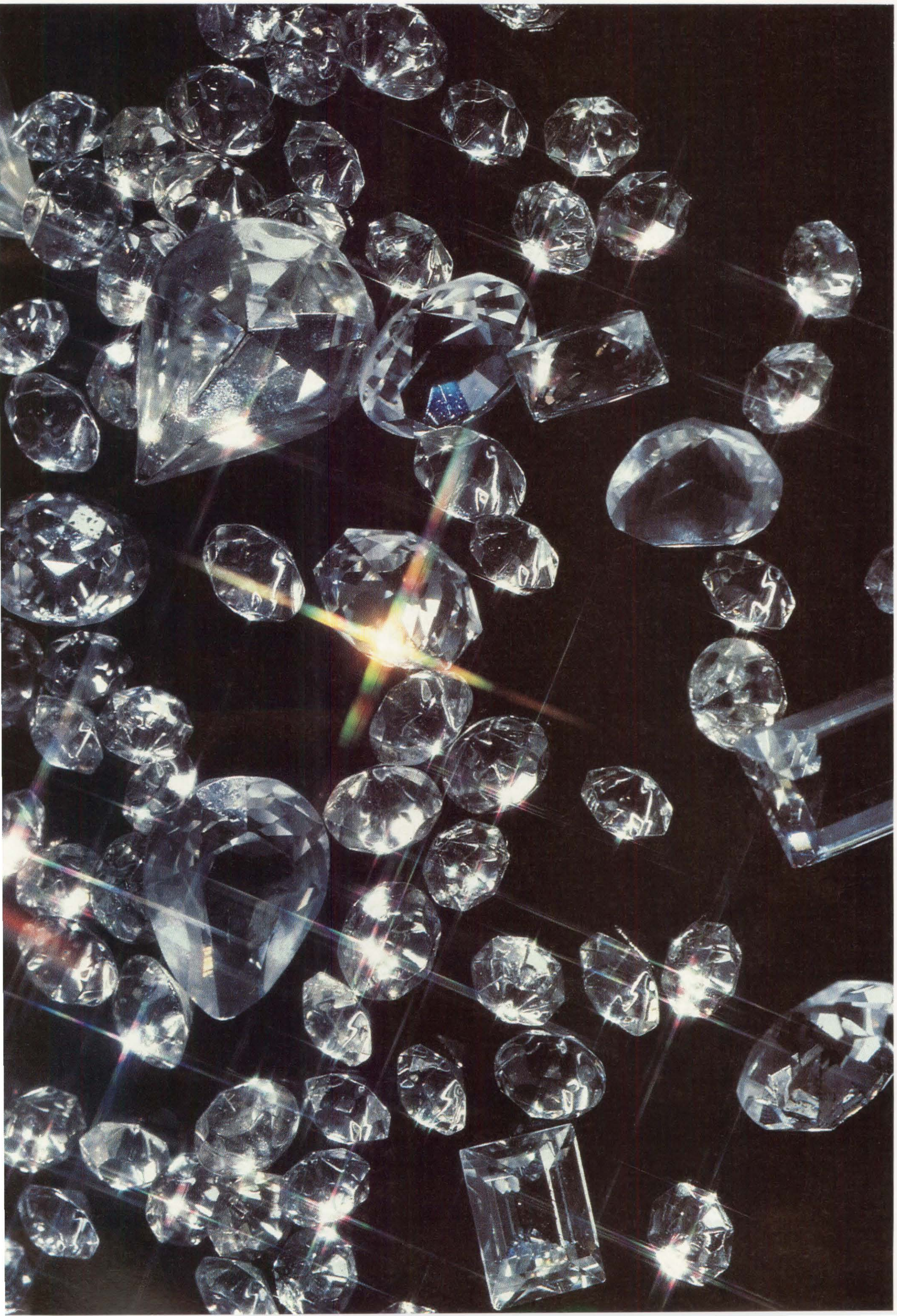

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include HP-HIL (Human Interface Loop), HP-IB (Interface Bus) and LAN.

The system features a single central bus (CTB) that interconnects the main processor, memory, LAN interface, HP-IB interface and display controller. Unlike the Model 835 processor, the Model 834 is a restricted-configuration system. The backplane of the base Model 834 has slots for two additional memory cards and one additional channel I/O (CIO) adapter slot. The CIO slot can be used for options such as the six-channel async multiplexer.

> **“The HP A1020H Display Controller supports 1,280 x 1,024 displayable pixels on eight planes.”**

You have a choice of three graphics co-processors. Our system came equipped with CHX, a high-resolution, 10-plane 2-D color processor with an integer-based graphics accelerator. The monitor is a 19-inch Trinitron (1,280 x 1,024 resolution) with an antiglare coating. A 16-inch monitor is optional. For 3-D color and solids-rendering applications, order the SRX or TurboSRX model.

System software features include the HP-UX (SVID-compliant) operating system, which is object code-compatible with all HP 9000 Series 800s and source code-compatible with all HP 9000 Series 300s. The system supports the C, FORTRAN 77 and Pascal programming languages, as well as HP's Allbase/DBMS, GKS, NFS, the X Window System and HP Network Services.

CHX Check

The CHX graphics subsystem is based on the HP A1020H Display Controller and the HP 98556A Graphics Accelerator. CHX uses a traditional four-stage pipeline architecture to achieve high-performance 2-D vector processing. Dual-ported memory is used between each pipeline stage. This allows each stage to operate independently, increasing throughput. The graphics processor is a dedicated Motorola MC68020. It works in conjunction with a 2-D integer-based transform engine to provide real-time, interactive pan and zoom functions for 2-D applications. A 32-bit graphics bus connects the accelerator to the display controller.

The HP A1020H Display Controller is no slouch. It supports 1,280 x 1,024 displayable pixels on eight planes. The eight-plane frame buffer supports 256 simultaneous colors from a palette of 16.7 million. In a second mode, the eight color planes can be used as four double-buffered planes. This is necessary to achieve interactive pan and zoom. Two additional planes allow the Model 834 to do cursors, windowing, character generation and menus independently of the main frame buffer. Circle, vector and polygon generation is provided by a hardware scan converter.

Through a multifunction cable, the display controller connects to human interface devices such as a monitor, keyboard and mouse. The cable supports three signals: HP-HIL, audio and RGB. The HIL is an HP standard interface for keyboard, mouse and other compatible devices.

Graphics performance of the Model 834 is rated at 276,000 vectors per second. Even without the accelerator, the Model 834 can generate a respectable 116,000 vectors per second.

System Processing Unit

The Model 834 processor is contained on a single board called the System Processing Unit (SPU). At the core is a single-chip HP-PA RISC processor with 140

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CIRCLE 324 ON READER CARD

hard-wired instructions. HP's RISC scheme uses a load/store design and register-to-register operations to reduce memory access times. Performance is further enhanced by 128 KB of high-speed cache. The cache memory reduces CPU requests for instructions and data stored in main memory.

Like other RISC processor designs, the Model 834 processor pipelines instructions. Up to three instructions in separate stages of operation (i.e., fetch, execute or store) can be in the pipeline simultaneously. The gross effect is that one instruction completes every 66.7 nanoseconds. That's once per CPU instruction cycle. Most CISC processor instructions take three or more CPU cycles to complete.

The SPU manages all processor, memory and I/O functions for the system. The SPU accesses memory and I/O devices via the 10-MHz central bus. The central bus provides a 32-bit data path and supports a sustained data rate of 22.3 MBps. The SPU accesses the HP-IB (disk and tape adapter) and the LAN adapter through a CIO adapter, which connects to the central bus.

Complementary Components

When you've used as many workstations as I have, you become numb to the fact that most have as much raw horsepower as midsize minicomputers. Compared to the DECstation 3100, the RISC workstation with which I'm most familiar, the Model 834 is very fast. Yet what impressed me most about the Model 834 wasn't the speed but the total package.

The Model 834 is a complete system. It isn't a pile of hardware today with a promise of software tomorrow. The Lab system came equipped with CD-ROM tools, HP's SoftPC, GKS, Allbase, compilers, an integrated software development tool, the OSF/Motif GUI and VAX-to-HP migration software. In every sense, HP has created "pig heaven" for the hard-core workstation user.

The Model 834's operating system, HP-UX 7.0, has "industry standard" stamped all over it. HP-UX 7.0 is based on AT&T's UNIX System V Release 3.0 but contains selected features from UNIX 4.3 BSD. Additionally, HP-UX conforms to the IEEE's POSIX 1003.1 standard and X/Open's Portability Guide Issue 2. This means that software developed on the Model 834 will port to other standards-based operating systems.

Other features of HP-UX include support for the DoD C2 Trusted System Requirements, diskless operation via NFS, disk mirroring, MS-DOS emulation support (SoftPC) and industry networking standards. In the Lab, we connected the Model 834 to our Ethernet. With TCP/IP on our VAX 8800 and MicroVAX II, I could copy files and log on to these non-HP systems. The standard Xterm program, which comes with

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CIRCLE 318 ON READER CARD

X, provided the necessary VT100 terminal support for the Digital environment.

The novice will benefit from HP's menu-driven System Administration Manager (SAM). With SAM, common system administration duties are as easy as a click on the mouse. Although SAM isn't an X-based program, HP has encapsulated it with the SoftBench Encapsulator.

Finally, HP-UX for the Model 834 includes X and OSF/Motif. Unlike DEC and Sun Microsystems, which developed proprietary X-based GUIs (DECwindows and OpenLook, respectively), HP uses OSF/Motif. Although, as of this writing, the IEEE POSIX working group hasn't selected a standard GUI, Motif is the logical choice. Version 1.1 of Motif includes many enhancements to the toolkit and builds on HP 9000, DECstation and several other platforms.

SoftBench

Virtually every UNIX workstation built today comes with an enhanced version of X. But for all that X-based GUIs bring to workstations, they have a serious shortcoming: They leave behind two decades of productive software.

For years to come, software developers will convert popular software to X, because this is the direction in which workstation users want to go. However, until the mass of UNIX software is converted or rewritten, you're stuck in between. Terminal emulation on the workstation is the only thing that links you to traditional software tools.

HP has an interim solution to the GUI software problem. Using SoftBench, HP's integrated software development system, you can encapsulate standard UNIX utilities in a Motif-style interface. The Encapsulator, as HP calls it, is a component of SoftBench that uses a message server to link communications between the SoftBench visual interface and nonscreen-oriented utilities. Communication among SoftBench, the message server and the UNIX utilities is facilitated by a C-like language called EDL. The message server communicates with the UNIX utilities through standard input, output and error.

Using EDL, you describe a user interface consisting of standard widgets, such as pull-down menus, buttons, accelerators, scroll bars and output workspace. User events, such as a button push, are linked to user-defined functions that send commands. Creating a menu and linking it with a function is simple:

```
menu = example(top, Pulldown,“Commands...”);
make_object(menu, “run”, MenuButton,“Who”, NULL,
          make_event(User, “Select”, run_who()));

function run_who()
{
  send_command(“who | sort” &get_context());
}
```

Several additional object and module calls are necessary to make an actual EDL encapsulation program.

SoftBench is far more than just an encapsulator. It's a complete programmer's workbench, with the message server as its hub. All SoftBench tools, including an editor, program builder, debugger, static analyzer, tool manager and development manager, interface with the message server. In a network environment, each tool can run on a separate system. For instance, a compiler server could be set up for several programmers to share.

FORTRAN Migration

Because most engineers and scientists continue to develop programs using FORTRAN and because DEC prevails in this arena, HP developed an HP 9000 Series 800 migration tool. PORT/VX is a tool that helps migrate FORTRAN applications from VAX/VMS to HP 9000 Series 800 HP-UX systems. It features a code analyzer, translator, file transport utility and migration libraries.

Using PORT/VX, you can take a tape in VAX/VMS BACKUP format with source code and data, load the source and data onto the HP 9000, convert it, compile it and run it. The PORT/VX Data Translator (DTL) converts both formatted and unformatted VAX/VMS records into HP-UX format. VAX floating-point data is converted to IEEE floating-point format.

The heart of PORT/VX is the Migration Library, which contains emulations of the VMS Run-Time Libraries and System Services. The Migration Library makes it possible to convert VAX FORTRAN programs that rely on VMS. For example, the VMS System Service SYS$SPAWN converts to the appropriate **fork()** procedure in HP-UX.

I tried PORT/VX on a VAX FORTRAN program that makes heavy use of VMS System Services. The program's output, which displays processes on the system, wasn't exactly the same, but it ported with only minor changes. That's impressive.

IF I HAD TO LAUNCH a single complaint against the Model 834, it would be HP's persistence in using proprietary storage devices. Neither the disk drives nor the cartridge tape drive was standard. It's time for HP to get on the SCSI bandwagon so customers can take advantage of the commodity peripheral market.

In a sea of 14-mip workstations, the HP 9000 Model 834 stands out as a useful, long-term tool, not a diskless, single-board wonder. It's a tool that embraces software standards, present and future. It's a tool that you can use, because it has the components to get the job done. Its performance and HP quality just make it that much sweeter. ■

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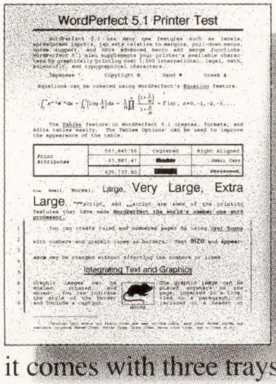

WordPerfect 5.1 Printer Test

WordPerfect 5.1 has many new features such as labels, spreadsheet imports, tab sets relative to margins, pull-down menus, mouse support, and more advanced macro and merge functions. WordPerfect 5.1 also supplements your printer's available characters by graphically printing over 1,500 international, legal, math, scientific, and typographical characters.

Japanese   Copyright ©   Hand   Greek

Equations can be created using WordPerfect's Equation feature.

$$\int_0^\infty x^{n-1}e^{-x}dx = \int_0^1\left(\log\frac{1}{x}\right)^{n-1}dx = \frac{1}{n}\prod_{m=1}^{\infty}\frac{\left(1+\frac{1}{m}\right)^n}{1+\frac{n}{m}} = \Gamma(n),\ n\neq 0,-1,-2,-3,\ldots$$

The Tables feature in WordPerfect 5.1 creates, formats, and edits tables easily. The Tables Options can be used to improve the appearance of the table.

Print Attributes	567,845.56	Centered	Right Aligned
	-67,987.47	Shadow	SMALL CAPS
	635,735.03	[illegible]	Strikeout

Fine, Small, Normal, Large, Very Large, Extra Large, superscript, and subscript are some of the printing features that have made WordPerfect the world's number one word processor.

You can create ruled and numbered paper by using User Boxes with numbers and graphic lines as borders. Text size and appearance may be changed without affecting the numbers or lines.

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MOUSE

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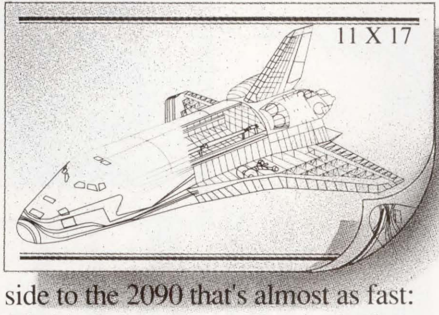

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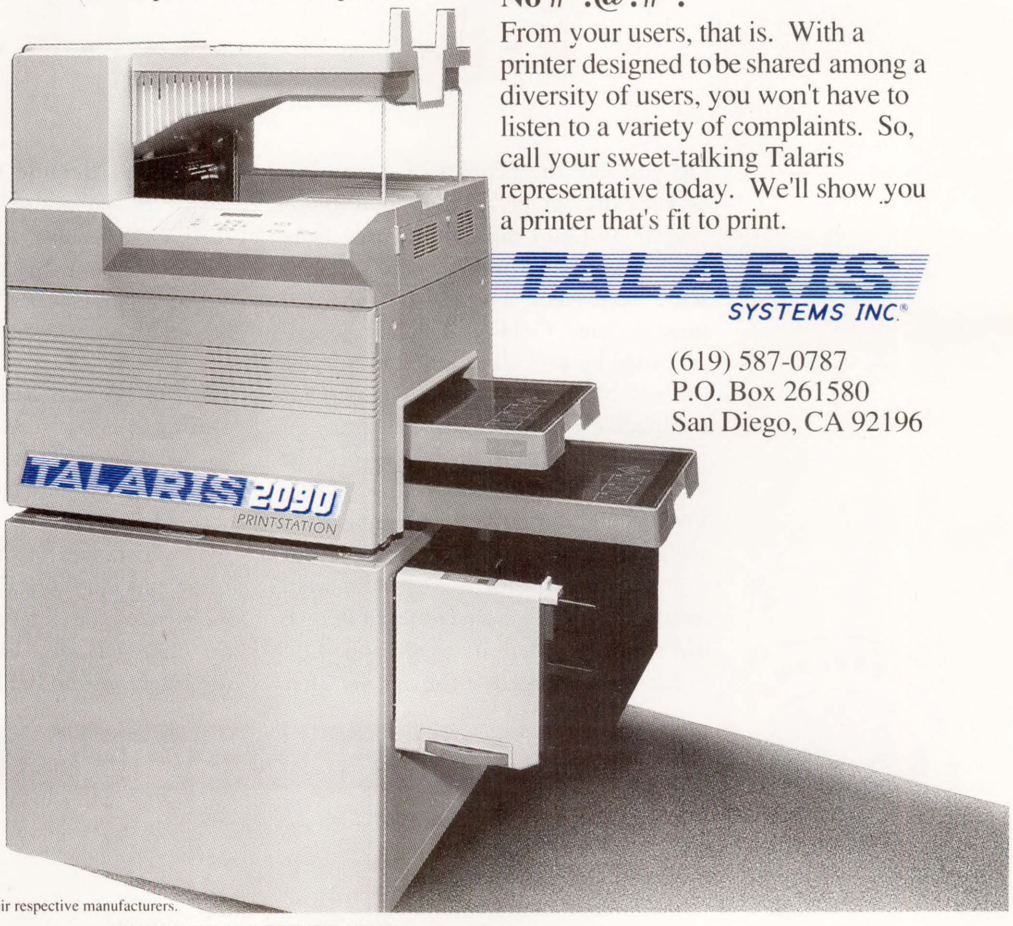

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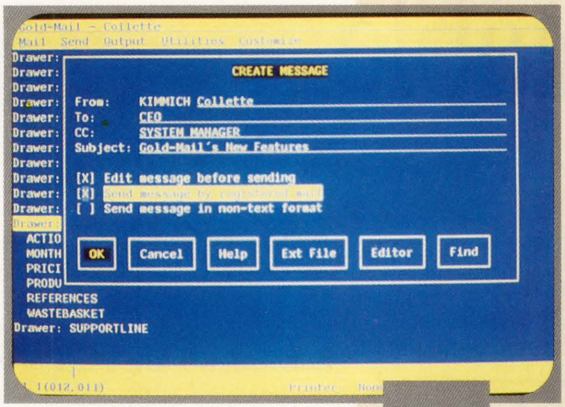
Data Processing Design's Gold-Mail VMSmail Enhancement Package Yields A Wealth Of E-Mail Features.



```
Gold-Mail - Collette
Mail  Send  Output  Utilities  Customize
Drawer:
Drawer:                      CREATE MESSAGE
Drawer:
Drawer:  From:    KIMMICH Collette
Drawer:  To:      CEO
Drawer:  CC:      SYSTEM MANAGER
Drawer:  Subject: Gold-Mail's New Features
Drawer:
Drawer:  [X] Edit message before sending
Drawer:  [X] Send message by registered mail
Drawer:  [ ] Send message in non-text format
Drawer:
  ACTIO
  MONTH   OK   Cancel   Help   Ext File   Editor   Find
  PRICI
  PRODU
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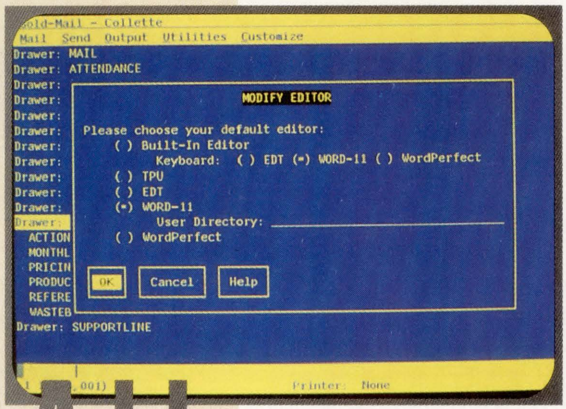
  WASTEBASKET
Drawer: SUPPORTLINE

 1(012,011)                       Printer:  None
```

Gold-Mail allows flexibility in creating a message (left) and choosing a text editor (right).



```
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Mail  Send  Output  Utilities  Customize
Drawer: MAIL
Drawer: ATTENDANCE
Drawer:
Drawer:                      MODIFY EDITOR
Drawer:
Drawer:  Please choose your default editor:
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Drawer:      ( ) EDT
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  ACTION     ( ) WordPerfect
  MONTHL
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E-MAIL

GOLD MINE

Do you like the benefits of e-mail but become discouraged because you find it cryptic and too difficult to use? Data Processing Design addresses this problem with Gold-Mail, a VMSmail enhancement package. Gold-Mail encourages use of e-mail by providing functionality not offered by VMSmail. It's 100 percent compatible with VMSmail messages.

We tested Gold-Mail V1.1 on our VAX 8800 running VMS V5.3-1. It uses VMSINSTAL for an easy and familiar installation procedure. Requiring about 6,500 blocks of disk space, Gold-Mail installs all files in subdirectories under the directory specified at installation. Old versions are purged automatically after installation. Because the process quotas for Gold-Mail are greater than the standard VMS defaults, it may be necessary for the system manager to change quota values in the user's authorization file record.

Skimming The Surface

During installation, Gold-Mail extracts a list of system users from a VMS data profile file. As messages are created, forwarded or replied to, you can search for the valid names of other mail users by using the Find key. This directory services feature provides an efficient method for finding names that don't come immediately to mind. The ability to search

MARTHA L. COSGROVE

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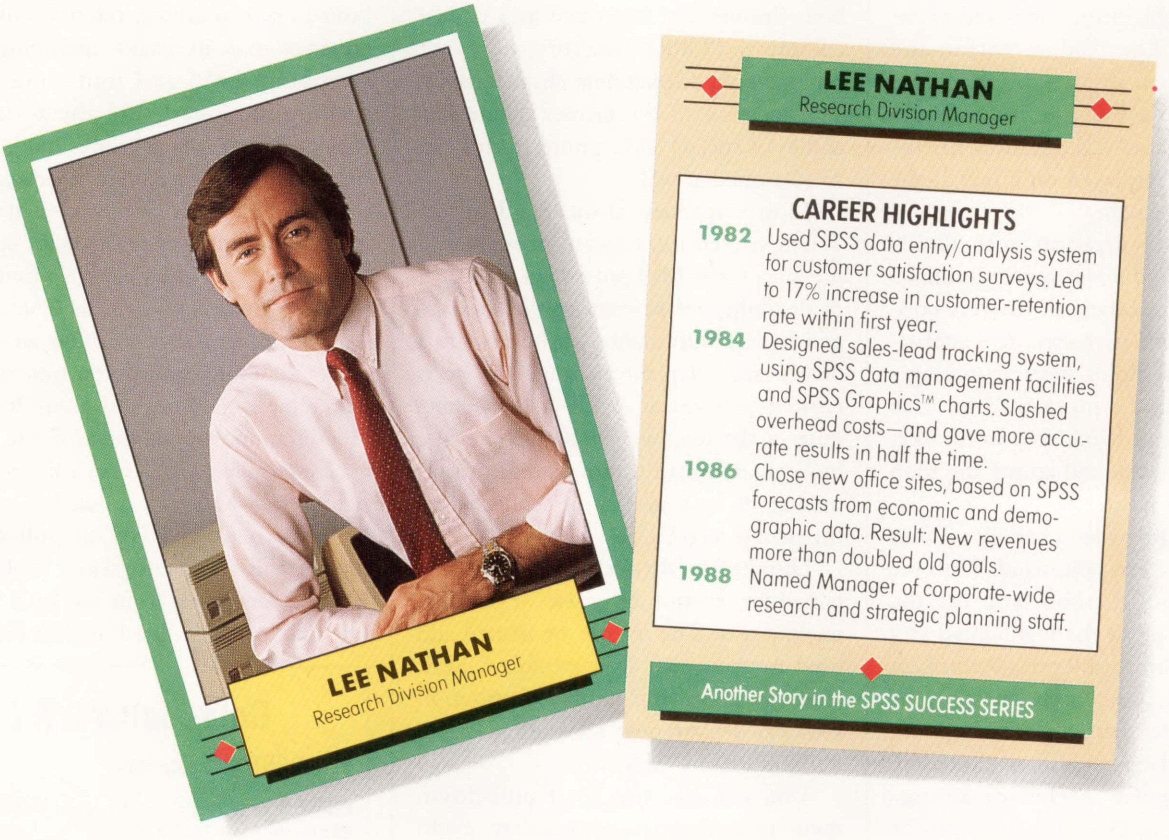

LEE NATHAN
Research Division Manager

CAREER HIGHLIGHTS

1982 Used SPSS data entry/analysis system for customer satisfaction surveys. Led to 17% increase in customer-retention rate within first year.

1984 Designed sales-lead tracking system, using SPSS data management facilities and SPSS Graphics™ charts. Slashed overhead costs—and gave more accurate results in half the time.

1986 Chose new office sites, based on SPSS forecasts from economic and demographic data. Result: New revenues more than doubled old goals.

1988 Named Manager of corporate-wide research and strategic planning staff.

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CIRCLE 160 ON READER CARD

for a user to whom you want to send a carbon copy message while creating a message is most helpful.

When Gold-Mail is invoked, the main screen is displayed, providing the name of the program and, if customized, the user's name. The available pull-down menus — Customize, Mail, Send, Utilities and Output — appear on the menu bar at the top of the screen.

The Workspace Window, the largest part of the main screen, lists the names of the drawers available. Drawers are opened by highlighting them and pressing Return. The folders within the drawers are then displayed. Opening a folder provides a listing of the messages it contains. Status and instructional information are displayed on a line at the bottom of the screen.

Message organization with Gold-Mail's drawer and folder system is simple. As with a file cabinet, all drawers contain folders with messages. A wastebasket folder that holds deleted messages until it's emptied is maintained for each drawer. You can name the wastebasket whatever you want and empty the trash whenever you want.

Gold-Mail provides a variety of ways to execute the same command. With the point-and-shoot method, you use the arrow keys to move the highlighted area to the menu choice and press Return (or another indicated key). By selecting the underlined letter from the menu option, the associated command is executed. Logically assigned accelerator key sequences, such as PF1-? for help, can be used to bypass prompts and dialog boxes.

Digging Deeper

I began by choosing C for the Customize menu from the main screen. A variety of personal selections can be made from this menu. You can change the display of your name or choose the editor and printer you wish to use.

The Mail profile can be modified by choosing M, which displays a dialog box that allows you to customize your personal settings. The ability to name your wastebasket folder, purge deleted messages on exit, forward your mail to another user when you're out of the office, or choose the name of the drawer and folder to which new mail will automatically be moved provides flexibility when setting defaults. I enjoyed sending messages in batch mode, which permitted me to choose the day and time to send a message. I could use this feature to provide a means of reminding myself to perform a task or of communicating with someone while out of the office.

Customizing printers such as an HP LaserJet II is as easy as putting an X in a box. Printers not identified as a choice fall into an "Other" category and won't provide bold or underline characteristics. The location of the printer queue and names of special VMS printer forms can be identified as well.

Most important is the Send menu. When you create, forward or reply to a message, Gold-Mail provides a great deal of flexibility by permitting the message and header information to be modified before and after the message has been created (see screen at left at the beginning of the review). Sending a message by registered mail causes a confirmation message to be issued to the sender when the mail is read by the recipient.

Distribution lists can be easily maintained for creation of system or personal mailing lists. The list can be named and used to send mail to a group of users. You can create and modify distribution lists and deliver new mail using PF1-N without exiting Gold-Mail.

You can use the Mail pull-down menu to read, move, copy, delete, mark, search, open and close mail folders; exit or quit; and ask for help easily without using DCL commands. You can use the arrow keys to move the highlighted area among folders and drawers and then press the appropriate key to manipulate your messages.

The Gold-Mail file system is maintained from the Utilities menu. The ability to spawn a subprocess, attach to a process, purge unwanted messages and compress disk space provides timely maintenance.

Printing a message or extracting information to a file is accomplished through the Output menu. The accelerator key sequence, PF1-P, can also be used to print messages. With the Print Messages menu displayed, I specified the date and time at the Print After: prompt to print a message that included bold and underscore attributes. The message printed at the designated time with the formatting requested.

Gold-Mail offers a choice of editors, including WordPerfect, EDT and Word-11 (see screen at right at the beginning of the review). Word-11, Gold-Mail's built-in screen editor, offers features to enhance mail messages, including line wrapping, bold and underline. The spelling dictionary and thesaurus are handy. There are also line-draw, multiple-column and multiple-ruler features.

The documentation is well-written and easy to follow. Online help, operating like the standard VMS Help facility, is available from anywhere in Gold-Mail. Data Processing Design offers an interactive demonstration if you have a dial-out telephone line and a modem. A video training tape is also available.

Editor's note: Gold-Fax, a sister product to Gold-Mail, is scheduled for release by early next year. With pull-down menus and accelerator keys, Gold-Fax lets you send faxes from the VAX without a fax machine, black box or PC. ■

Gold-Mail V1.1

PLATFORMS: VAX/VMS

PRICE: From $1,900 on the MicroVAX II to $3,500 on the VAX 8978

DATA PROCESSING DESIGN INC.

HEADQUARTERS:
1400 N. Brasher St.
Anaheim, CA 92807
(714) 970-1515

PRODUCT LINE: Office automation products

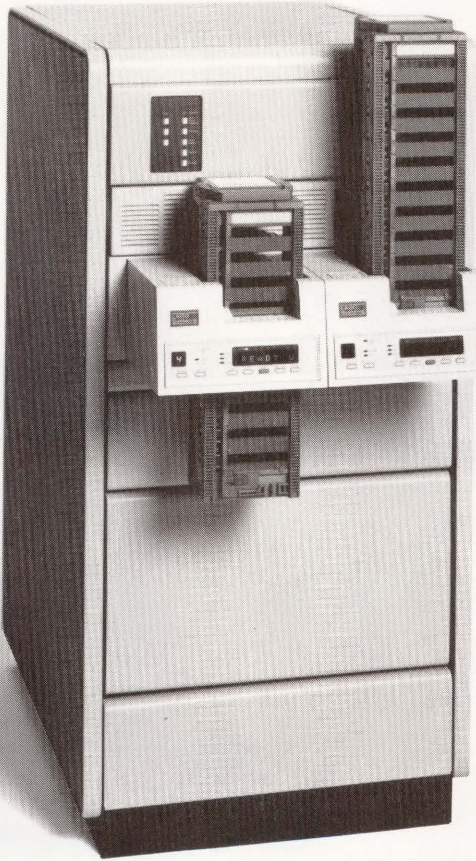
FOUNDED: 1977

OWNERSHIP: Private

BRANCHES: Anaheim, CA; Bethesda, MD; Burr Ridge, IL; Concord, MA

CIRCLE 434 ON READER CARD

HOW TO SAVE $63K AND GET 3480-COMPATIBLE VAXCLUSTER BACKUP



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Only LAGO Systems offers you high-performance VAXcluster® tape backup with an incredible $63K savings. Our LS/280T is fully DEC® TA® series compatible and affordable. What's more, it can search an entire 200 megabyte cartridge in only two minutes and write one in less than 5 minutes. At just over half the price,* LAGO's LS/280T cartridge tape subsystem gives you the functionality of a TA90. For thousands of dollars less.

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Each IBM® 3480-compatible tape cartridge stores more than 200 megabytes of user data. With the LS/280T's 10-cartridge autoloader you get on-line capacity of 2 gigabytes per drive. A two drive subsystem gives you over 4 gigabytes of storage. That's nearly twice the unattended backup capacity of DEC's TA90. Plus the autoloader comes standard with every LS/280T.

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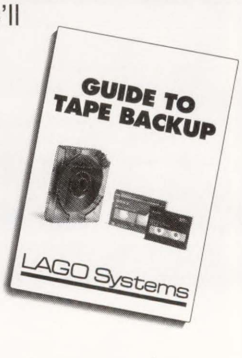
There's no point in being fast if you can't be dependable. That's why the LS/280T was designed for the ultimate in data reliability. Data integrity is assured by a field-proven tape path design with air bearings to minimize head and tape wear. Five modes of built-in diagnostics, accessible from the subsystem control panel or a remote terminal, minimize downtime.

Max Tape Performance Now

Call us today for more details on how to save $63K and get 3480-compatible VAXcluster backup. Just for the asking we'll also send you a free copy of our informative booklet, "Guide To Tape Backup."



LAGO Systems, Inc.,
141 Albright Way,
Los Gatos, CA 95030.

408-374-1818

LAGO Systems

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*Difference in list price between a DEC TA/90 and LAGO's LS/280T.

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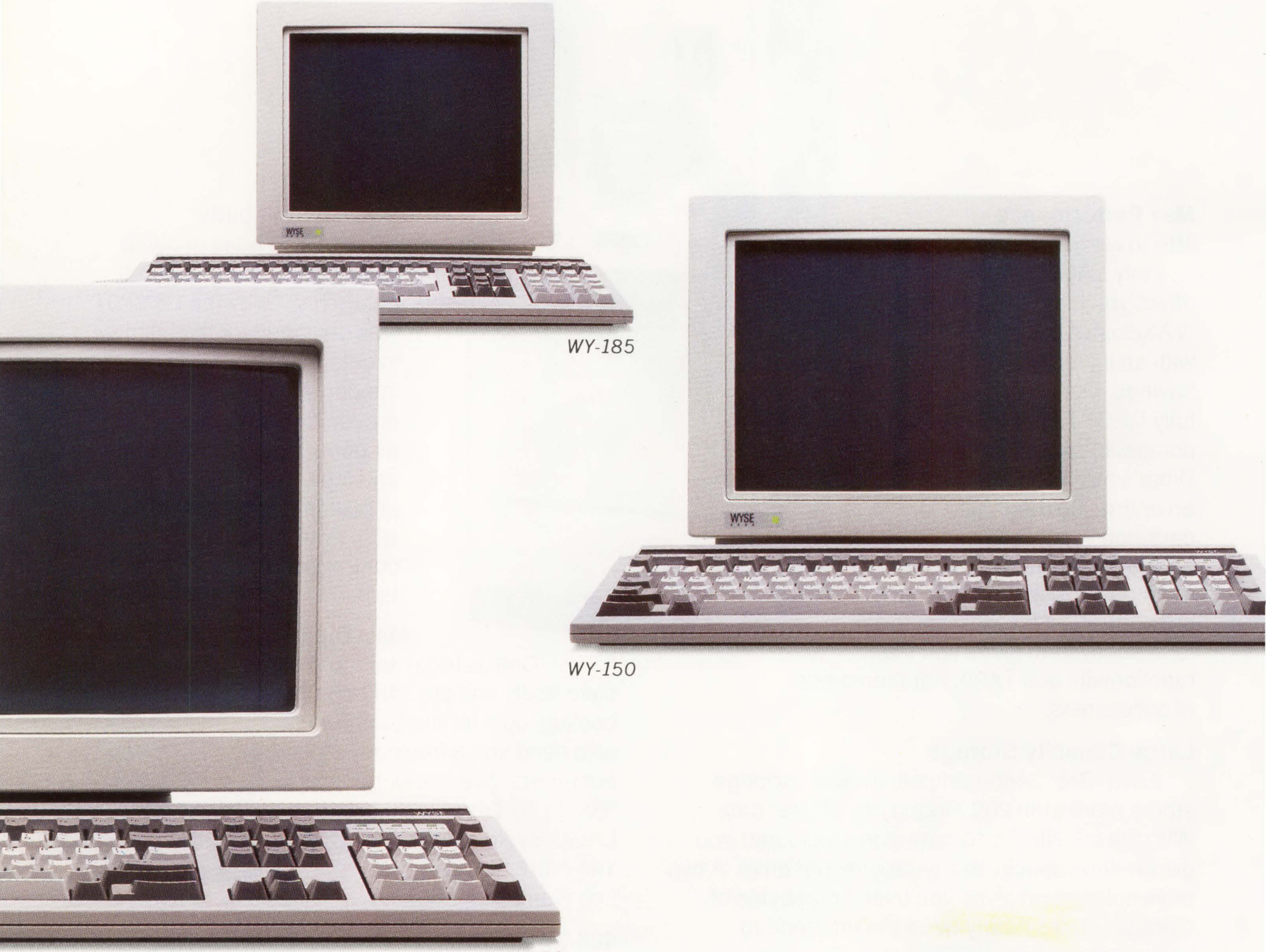
CIRCLE 274 ON READER CARD

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


WY-185
WY-150
WY-370

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

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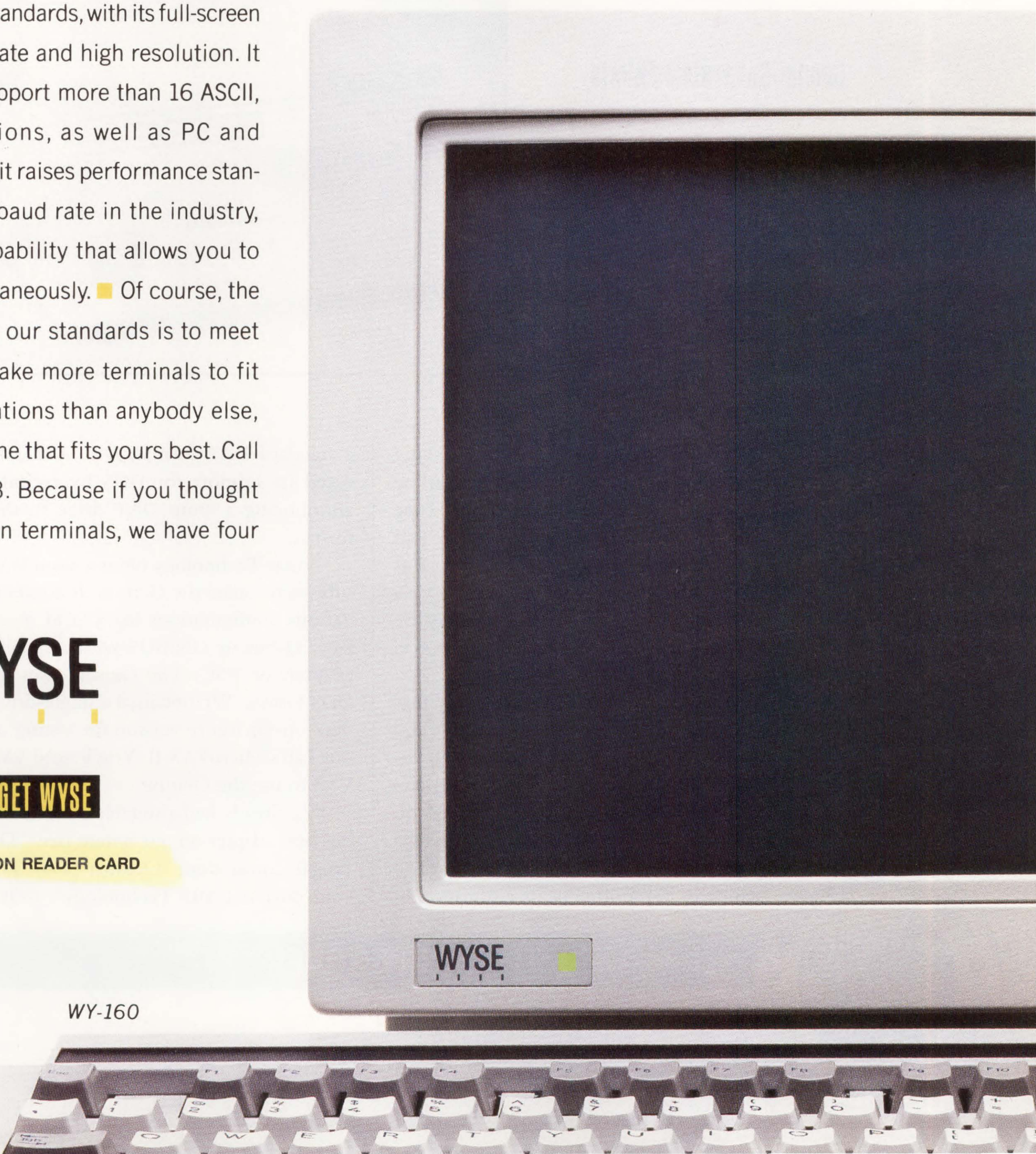
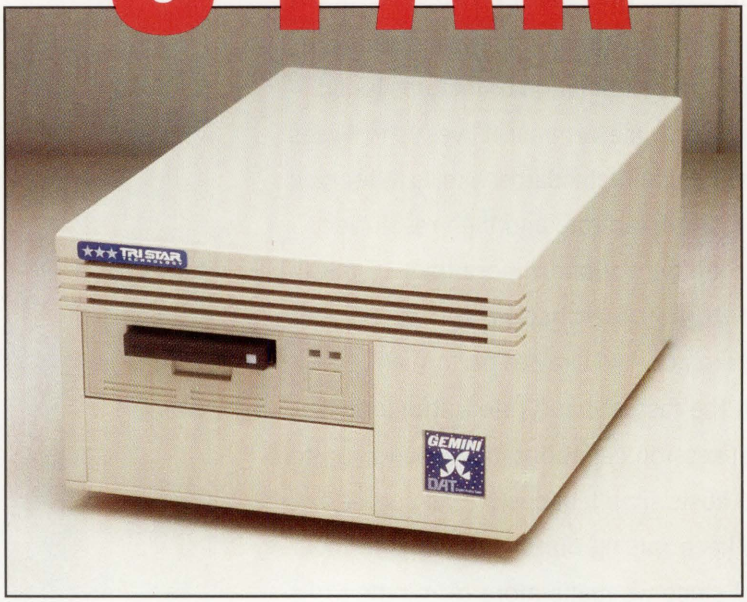
CIRCLE 226 ON READER CARD



WY-160

SUBSYSTEM STAR

Tristar Technology's ★ Gemini Subsystem Enlists ★ The Advantages ★ Of 4mm DAT Technology.



Two cartridge tape formats are vying for dominance in the storage market: 8mm and 4mm Digital Audio Tape (DAT). There are advantages and disadvantages to each alternative. But with a capacity of from about 1.3 to 2.5 GB per cartridge, you'll probably be moving from your present reel-to-reel tape drive sooner than you think.

There are two DAT recording formats: Digital Data Storage (DDS) and Data/DAT. The DDS standard was developed jointly by Sony and Hewlett-Packard, while Data/DAT is based on Hitachi technology. DDS is now supported by 15 manufacturers. As the ANSI standards committee nears ratification of a standard DAT format, DEC has indicated its support for DDS by recently announcing a 4mm DAT drive in that format.

Tristar Technology offers a 4mm DAT subsystem called the Gemini. It comes in various configurations for a SCSI interface, Q-bus or UNIBUS with a suitable adapter, or HSC. The Gemini uses the DDS format. We obtained a single-drive, desktop-enclosure version for testing on our Lab's MicroVAX II. You'll need VMS V5.3 to use the Gemini.

We already had a suitable SCSI-to-Q-bus host adapter on our system (see "The Frugal Connection," October 1990). This controller is CMD Technology's CQD-

BARRY SOBEL

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CIRCLE 126 ON READER CARD

240/TM. It supports both disk and tape SCSI devices.

We daisy-chained a Kingston Technology SCSI disk and the Gemini to the controller with the Gemini first at SCSI ID 1, the default setting. The CQD-240 documentation includes complete descriptions of how to set the jumpers. You just need to ensure that there are no SCSI device address conflicts. Tristar's documentation also includes specific descriptions about how to set the switches. After everything is set, attach the interface cable between the controller and the Gemini and you're ready to go. The Gemini appeared on our system as MUA0:.

The DAT drive in the Gemini subsystem is capable of a formatted capacity of 1.3 GB. Tristar's specifications indicate a sustained transfer rate of 183 KBps.

Dynamic Backup

The operation of the Gemini is straightforward. The tape is inserted with the clear window facing up and the arrow pointing to the drive. Like the cassette player in your car, you'll feel the drive grab and pull the tape in. When the red light stops flashing, the tape is ready. Pressing the square button on the front of the unit causes the cassette to rewind and eject.

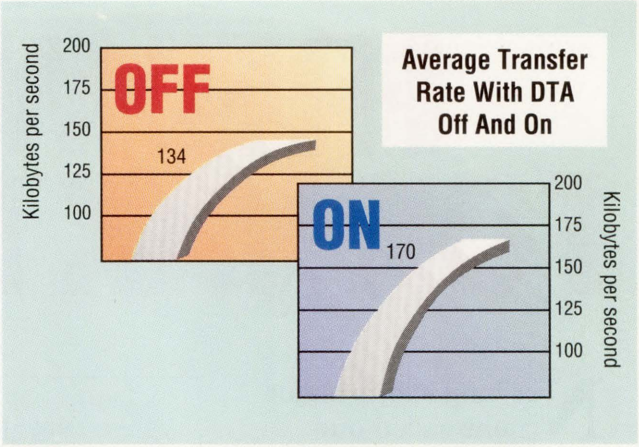

Figure: The average results (not accounting for controller overhead) after backing up 64,989 blocks to the Gemini.

The Gemini manual cautions you not to eject the tape during system access to the device, i.e., during a MOUNT, ALLOCATE, BACKUP or DISMOUNT operation. This is good advice. I pressed the rewind/eject button during a MOUNT and put the drive in a mount/dismount state. A reboot was required to clear it. For the same reason, don't turn off power to the drive while a tape is loaded.

We backed up the SYS$LIBRARY directory on our MicroVAX II and got the results shown in the Figure. The directory contained 64,989 blocks.

We obtained our statistics running the Dynamic Tape Accelerator (DTA) from Touch Technologies. We wanted to compare our results with DTA turned on and off. In both cases we followed Touch Technology's suggestions for BACKUP qualifiers to increase performance:

```
$ BACKUP SYS$SYSROOT:[SYSLIB...]
    MUA0:MYBACK.BCK
    /REW /NOCRC /BLOCK=40960 /GROUP=0
```

The /NOCRC and /GROUP=0 qualifiers were used to disable VMS-level error checking. The Gemini, like other high-density devices, performs its own hardware-level error detecting and correcting. For a complete description of these and the other qualifiers used, see the DTA documentation or DEC's BACKUP utility manual.

TRISTAR'S DOCUMENTATION IS well-organized and easy to follow. Complete installation instructions are included. There's even a short introduction to helical-scan technology and a description of the DDS format.

The Gemini DAT drive was easy to install and use. Just follow the instructions about how to operate the drive and handle the media. Aside from that, BACKUP and the other VMS tape-handling functions work the same as they do with nine-track tapes. You also have the advantage of storing considerably more data in a much smaller package. If you've been unable to consider unattended backup before, Gemini could make it a realistic alternative. ■

For More Information

CMD Technology Inc.
3851 S. Main St.
Santa Ana, CA 92707
(714) 549-4422
CIRCLE 427 ON READER CARD

Hitachi America Ltd.
2000 Sierra Pt. Pkwy.
Brisbane, CA 94005
(415) 589-8300
CIRCLE 428 ON READER CARD

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Santa Ana, CA 92704
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Park Ridge, NJ 07656
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Touch Technologies Inc.
9990 Mesa Rim Rd.,
Ste. 220
San Diego, CA 92121
(800) 525-2527
CIRCLE 431 ON READER CARD

Gemini

PLATFORMS: DEC Q-bus and UNIBUS, HSC, embedded SCSI, the Sun family of products and PCs

PRICE: From $2,400 to $7,000, depending on configuration

TRISTAR TECHNOLOGY INC.

HEADQUARTERS:
10 Reuten Dr.
Closter, NJ 07624
(201) 784-1557

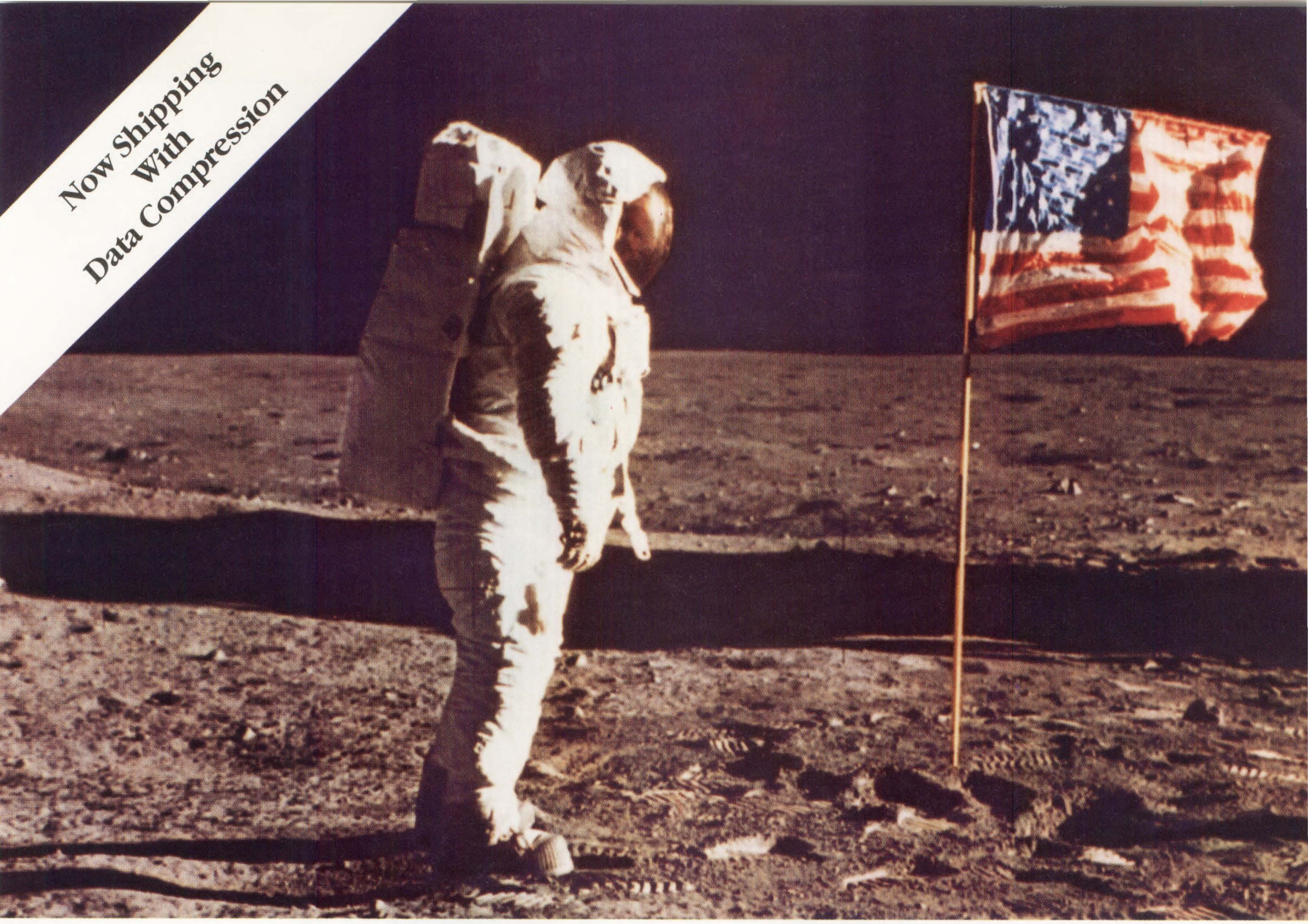
PRODUCT LINE: Disk, tape and optical subsystems

FOUNDED: 1987

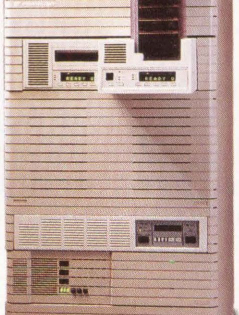
OWNERSHIP: Private

BRANCHES: Gaithersburg, MD

CIRCLE 426 ON READER CARD



Introducing Our SI2480 Tape Drive. Because Leading Edge Has Always Meant Having All The Right Stuff.



At last, a cost-effective tape subsystem that has everything going for it. The new SI2480 is indeed leading edge technology for today's demanding VAXcluster backup. Now, you can get high performance, reliability, and unattended backup in one rackmountable 3480-compatible tape solution.

With the SI2480, the right stuff means the kind of performance that can put your operation in orbit. With a 3MB per second transfer rate, this HSC-compatible system lets you handle backup or restore assignments in a flash. While high-speed search lets you locate files in an average of less than 20 seconds.

Capacity takes off too, with the SI2480. Dependable ½-inch 3480-compatible cartridges hold 200 MB each. A 10-cartridge stacker/loader brings capacity to 2 GB. Plus you can put up to four SI2480s in a cabinet for unattended backup of up to 8 GB.

And when it comes to reliability, we don't promise you the moon. We just give you a system you can count on thanks to extensive diagnostics, MTBF ratings over 15,000 hrs., as well as worldwide field service.

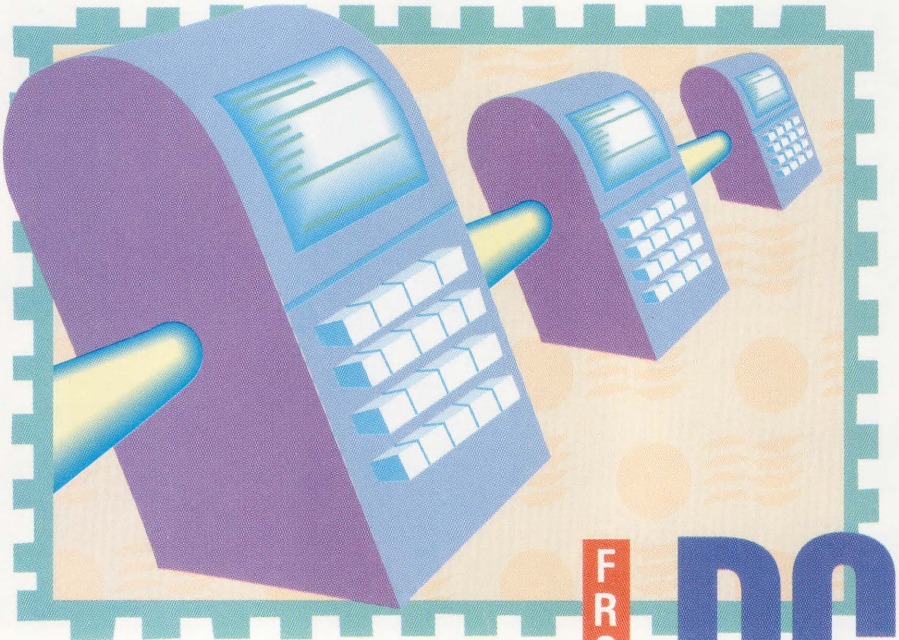
So, if you're looking for a backup system that will blast you into the future, look no further than the SI2480. Just call **800-333-2220**. And we'll help you land one safely.

SYSTEM INDUSTRIES

HSC and VAXcluster are trademarks of Digital Equipment Corporation. Photo: NASA.

CIRCLE 164 ON READER CARD

Cappcomm Software's Mail Call-VMS Delivers A Robust Messaging And Management Solution For PC-Based VMSmail Users.



VMSMAIL FROM THE PC

There are mail users, and then there are *power* mail users. On VAXclusters, power mail users are those disk space consumers who spend most of their uptime VMSmailing memos, messages and documents around the cluster or managing their mail files and archives.

For PC power users, VMSmail functions usually are performed by terminal emulators or as part of DEC LanWORKS for DOS. Cappcomm's Mail Call-VMS is a less expensive way to communicate that takes advantage of PC-to-VAX client/server configurations to deliver a robust mail solution.

The program is installed in MS-DOS on your PC but acts as a software front end to the Electronic Messaging Facility of VMSmail. That is, you write your mail message on your PC word processor before logging onto the host. You also manage your SEND and RECEIVE files on the PC. Mail Call-VMS even performs the host access functions for you. It does this with the knowledge it gains during installation.

EVAN BIRKHEAD

Harder Working Hardware

ORACLE provides linear performance increases for VAX 6000 and 9000 SMP systems.

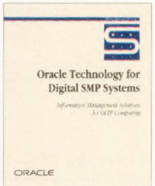
Businesses are making significant investments in Digital's VAX SMP systems, largely on assurances that these systems can be expanded as needed. But scalable hardware doesn't mean much without scalable software.

On VAX SMP systems, ORACLE delivers linear increases in performance as additional processors are added to the system.

This is because ORACLE takes full advantage of DEC's symmetric multiprocessor (SMP) architecture. So performance benchmarks rise linearly to an impressive 66.0 TPS on a six processor VAX 6360 system.*

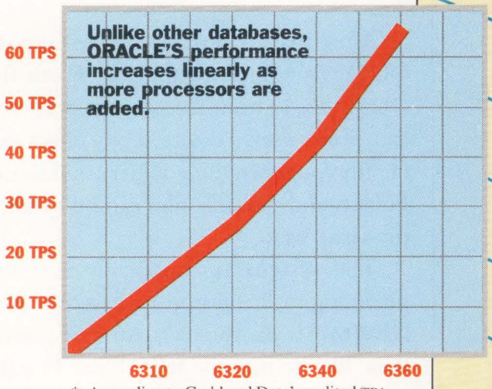
And the better the performance, the lower the cost per transaction. Which means customers making a major hardware investment don't have to settle for a minor performance return.

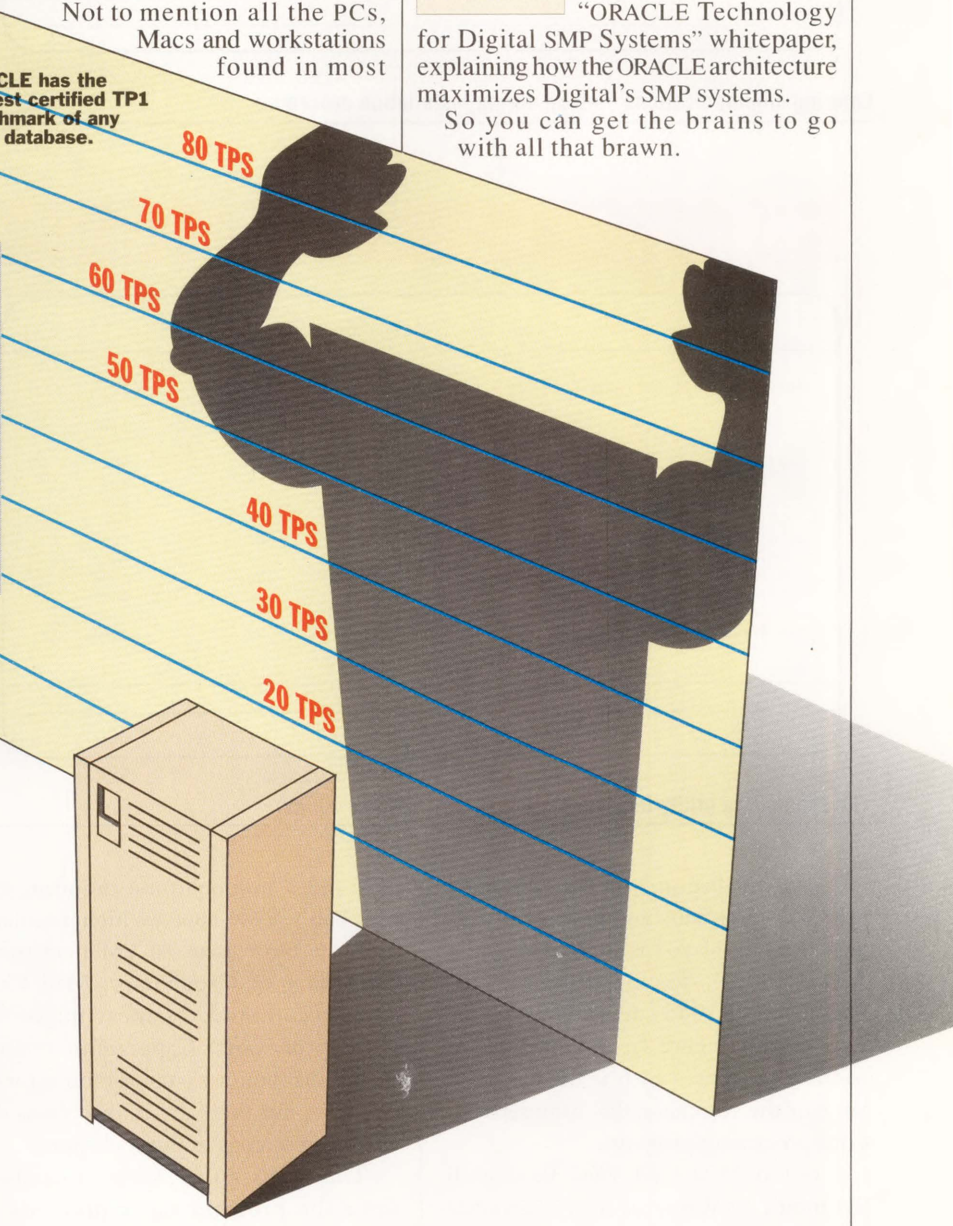
But more than just linear performance gains, ORACLE offers an unequalled OLTP solution for virtually any computer system. VAX/VMS, VAX/ULTRIX, RISC/ULTRIX, even IBM mainframes. Not to mention all the PCs, Macs and workstations found in most companies. Which may be why 41% of all VAX 6000 database customers are running ORACLE.**


Oracle Technology for Digital SMP Systems

Call 1-800-633-0527 extention 1609 to sign up for a free Oracle Data Management Conference. You will also receive the "ORACLE Technology for Digital SMP Systems" whitepaper, explaining how the ORACLE architecture maximizes Digital's SMP systems.

So you can get the brains to go with all that brawn.




ORACLE has the highest certified TP1 benchmark of any VMS database.

---

* According to Codd and Date's audited TP1 performance benchmarks

** According to Sentry Market Research, 1990.

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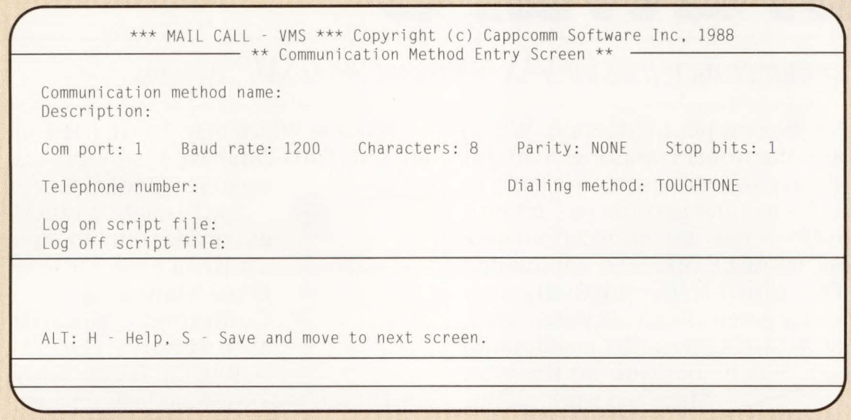
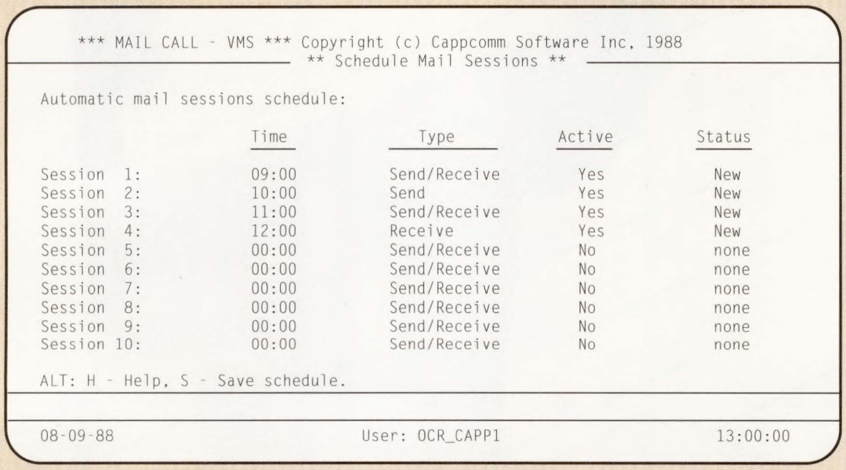
Figure 1.



```
       *** MAIL CALL - VMS *** Copyright (c) Cappcomm Software Inc, 1988
                     ** Communication Method Entry Screen **

  Communication method name:
  Description:

  Com port: 1    Baud rate: 1200    Characters: 8    Parity: NONE    Stop bits: 1

  Telephone number:                                Dialing method: TOUCHTONE

  Log on script file:
  Log off script file:


  ALT: H - Help, S - Save and move to next screen.
```

Entering communications method during installation procedure.

Figure 2.



```
    *** MAIL CALL - VMS *** Copyright (c) Cappcomm Software Inc, 1988
                       ** Schedule Mail Sessions **

  Automatic mail sessions schedule:

                     Time          Type          Active       Status

  Session  1:        09:00        Send/Receive     Yes          New
  Session  2:        10:00        Send             Yes          New
  Session  3:        11:00        Send/Receive     Yes          New
  Session  4:        12:00        Receive          Yes          New
  Session  5:        00:00        Send/Receive     No           none
  Session  6:        00:00        Send/Receive     No           none
  Session  7:        00:00        Send/Receive     No           none
  Session  8:        00:00        Send/Receive     No           none
  Session  9:        00:00        Send/Receive     No           none
  Session 10:        00:00        Send/Receive     No           none

  ALT: H - Help, S - Save schedule.

  08-09-88                   User: OCR_CAPP1                     13:00:00
```

The scheduling utility lets you slate Mail Call-VMS sessions.

Upon installation, you tell the system your VMS username and password (your password is displayed as asterisks, even on the PC screen); communications information such as baud rates and host phone numbers (see Figure 1); and information on the local system such as the hard disk name or the command that summons the word processing program.

I tested Mail Call-VMS V2.0 with XyQuest's XyWrite on an AST 286 PC/AT-compatible, which had a 40-MB hard disk and a monochrome monitor, and our Lab's VAX 8800, which regularly supports more than 80 VMSmail users. According to Cappcomm, Mail Call-VMS accommodates most major PC word processors. Cappcomm recommends that you use a color monitor with your PC, but there are no problems deciphering screens in monochrome.

The user's guide is easy to follow, since the program has a finite set of functions that are easy to execute. The installation procedure involves two diskettes, and Cappcomm sends you sets of disks in 5 1/4- and 3 1/2-inch formats.

Sophisticated File Management

Rather than sift through the list of commands and functions available in Mail Call-VMS, let's look at some of the mail functions that typical users would use most often.

On the basic level, Mail Call-VMS lets you send messages to VMSmail from a folder on the PC called CREATED. From there, VMSmail, acting as the application's back end, treats the message like any other message. The message created with Mail Call-VMS looks the same as a VMSmail message, with similar addresses and headers. Mail Call even lets you add personal descriptions, or nicknames, to sender names. The system prompts you to correct invalid addresses much as VMS does.

After mail is sent, it moves into an OUTBOX folder on the PC. From the OUTBOX, as from the other folders, you can print, view, delete, copy, forward, file (in your own filing folder), and so on. Folders and multiple files can be handled the same way.

The system automatically receives incoming mail and stores it in a file called NEWMAIL on the PC. After it's read, these files go into the READ file. This file reminds you of such things as whether you haven't archived all of your mail messages.

A common procedure, which I used virtually every time, is to send and receive mail during one session. From here, you can give your own names to archived files.

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At this point, most of Mail Call-VMS' functionality involves file management. For example, it displays the current number of messages in each of the four mail folders above and in other folders you create. Alt-H lets you scan the possible options for manipulating these messages. Messages are stored in a PC directory.

> **Mail Call-VMS is an excellent package for PC-VAX environments because of the way it capitalizes on the client/server model.**

The system uses the following procedure to log into and out of the VAX. Status messages inform you of your progress during each session:

1. The modem is initialized.
2. The network number is dialed.
3. The network connection is established.
4. Mail Call-VMS logs you into VAX/VMS.
5. Your password is supplied automatically.
6. The system waits for the DCL prompt.
7. The system requests the VMSmail application.
8. The system waits for the VMSmail prompt.
9. Mail Call-VMS sends and receives mail to and from VMSmail.
10. Mail Call-VMS exits VMSmail.
11. Mail Call-VMS logs out of VMS.
12. Mail Call-VMS disconnects from the network.
13. Mail Call-VMS hangs up the modem.

There were other utilities I found useful. For example, Mail Call-VMS lets you schedule mail sessions that you don't have to monitor (see Figure 2). Simply enter which mail messages are to be sent and the times of day they're to be executed. In addition, a text editor called Mail-Ed was useful for cutting and pasting and otherwise rewriting and updating messages.

Additionally, the system lets you keep an address book of usernames and mail addresses, which is helpful for sending mail to distribution lists. It also lets you send binary files with a utility called Mail-Anything, which uses Kermit.

THE BIG ADVANTAGE of Mail Call-VMS is that you save login time, and thus money for connect fees, by building all of your VMS commands and mail messages offline. Perhaps most of all, Mail Call-VMS is an excellent package for PC-VAX environments because of the way it capitalizes on the client/server model.

—*Evan Birkhead, formerly Senior Editor of* DEC PROFESSIONAL, *is News Editor of Professional Press' sister publication* LAN Computing. ■

Mail Call-VMS V2.0

PLATFORMS: IBM PC/XT, PC/AT, PS/2 or compatible with hard disk and 512 KB internal memory

PRICE: Site licenses range according to size of VAX host from $2,900 on the MicroVAX II to $15,500 on the VAX 6000 Model 440. Starter kits for 11 to 25 PC licenses cost $3,750, and corporatewide licenses (i.e., VAX 9000) cost $30,000

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NETWORKING

NAS, POSIX And RISC/VMS On The Network

Bradford T. Harrison

In 1987 DEC was flying high with its "one architecture, one operating system" philosophy. In September of that year, then DEC Vice President Jack Shields proudly announced at DECWORLD that the company was selling more than 70,000 VAXs per year. President Ken Olsen acknowledged that while ULTRIX sales were strong, VMS remained the operating system of choice. "The most interesting technology is developed in the proprietary world," Olsen said.

Then the computer industry discovered UNIX in a very big way. For years, academics and researchers had been relying on UNIX, and now the time was right for the compact but powerful operating system to penetrate new markets. Processor power was plentiful, largely due to Reduced Instruction Set Computer (RISC) technology and the Motorola MC68000 architecture, and growing computer companies were in search of a multiuser, multitasking operating system that would be easy to port to their new machines.

DEC suddenly discovered that its "one architecture, one operating system" sales pitch was being used by the competition to sell competing RISC/UNIX products. Hewlett-Packard, with its HP-PA/HP-UX products, and Sun Microsystems, with its Sparc/SunOS combination, posed a strong challenge to DEC. Like VAX/VMS, RISC/UNIX products were available from the desktop to the data center, but unlike VAX/VMS, RISC/UNIX was "open." Software written in C was easily ported among UNIX systems, and UNIX licensing fees cost a fraction of their VMS counterparts.

DEC has since built its own RISC/UNIX product line, and the shine that VAX/VMS once evinced is proportionally less bright. RISC/UNIX and the drive to open systems took DEC by surprise, and the company continues to reel. But with technologies such as NAS, POSIX and RISC/VMS, DEC is rapidly changing its marketing pitch to unite with RISC/UNIX, bringing the company once again to the forefront of commercial computer technology. DEC reports that its RISC/UNIX solutions are taking hold and exhibiting what surely will prove to be a long and friendly coexistence with VMS systems.

Reduced Instruction VMS

According to Phil Auberg, VMS marketing manager at DEC, the company is in the process of porting VMS to a RISC-like architecture. The new architecture will enable VMS to enjoy the same price/performance advantages of RISC/UNIX systems. A RISC/VMS system will still play in any environment in which traditional VAX/VMS machines, including clusters, reside, but the price/performance characteristics will be more competitive. "We're looking at a long-term enhancement of the VAX architecture," says Auberg. "VMS will be optimized to take advantage of RISC, but it will continue to take advantage of VAX hardware designs."

Auberg stresses that DEC has no intention of phasing out VMS, which will remain the company's dominant operating system. "It will be the operating system where you'll find the greatest range of what people like to call 'features,' "

FIGURE.

NAS Software Availability

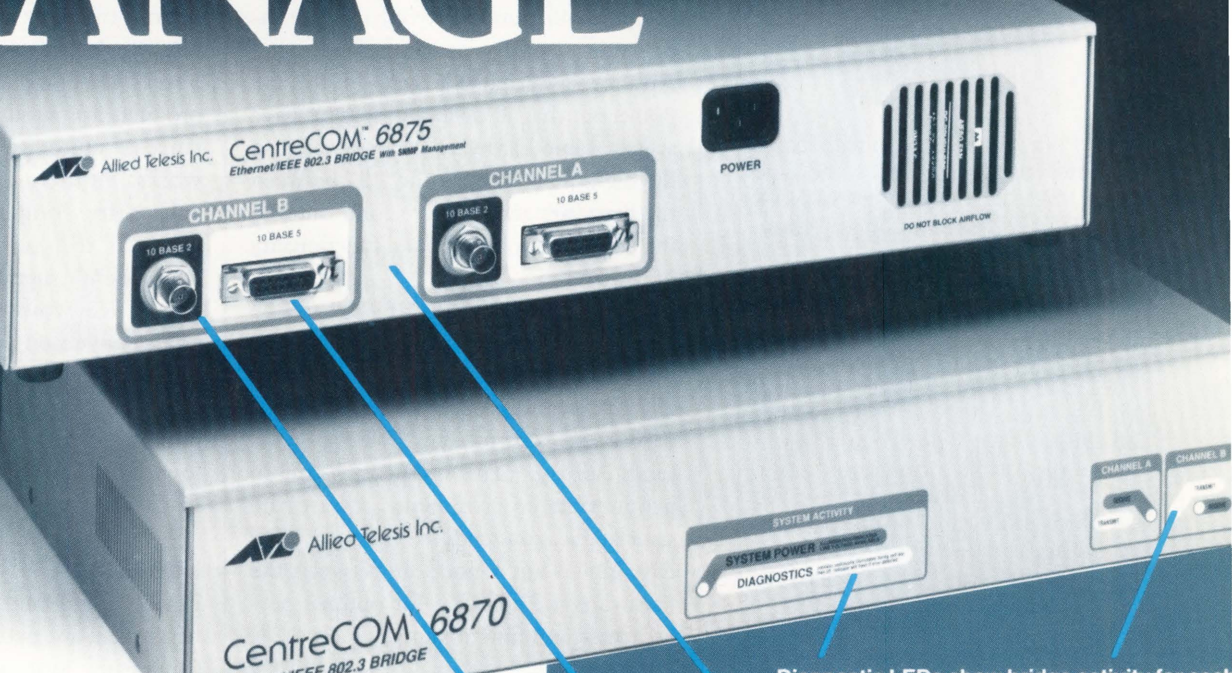
	Servers		Clients		
	VMS	**ULTRIX**	**MS-DOS**	**OS/2**	**Mac**
Windowing Services (X)	Yes	Yes	Yes	Planned	▨ Yes
Forms Services	Yes	Planned	Planned	Planned	Planned
Graphics Services	Yes	▨ Yes	Yes*	Yes*	Yes*
Terminal Services	Yes	Yes	Yes	▨ Yes	▨ Yes
Application Control Services	Yes	▨ Yes	Planned	Planned	Planned
X.400 Mail Services	Yes	Planned	▨ Yes	Planned	▨ Yes
EDI Services	▨ Yes	Planned	Planned	Planned	Planned
CDA Services	▨ Yes	▨ Yes	Planned	Planned	Planned
SQL Services	▨ Yes	▨ Yes	▨ Yes	▨ Yes	▨ Yes
Repository Services	Yes	Planned	Planned	Planned	Planned
File Sharing Services	Yes	Yes	Yes	▨ Yes	▨ Yes
Print Services	Yes	Yes	Yes	▨ Yes	▨ Yes
POSIX	Planned	Yes		Planned*	

* = Third-Party Solution   Yes = Shipping in 1990   ▨ = Announced in FY 1990

Courtesy Digital Equipment Corp.

NAS is a comprehensive solution for linking the disparate components on DEC networks.

DIVIDE AND MANAGE



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says Auberg.

VMS was developed in parallel with the VAX architecture and relies on VAX architectural characteristics such as the memory interface and Process Control Blocks (PCB). Proponents of UNIX stress the portability and relative hardware independence of that operating system, but Auberg says that's largely myth. He points out that all operating systems have at least some hardware dependencies, so the big issue is whether the "fit" between the hardware and software contributes to the overall performance and functionality of the system.

"The emphasis on UNIX has obscured the fact that hardware can still be used to implement important system characteristics like data security and integrity and fault tolerant systems," contends Auberg. "This is especially true in production environments, where the same application tends to be run day after day. You want a good fit between the hardware and software for optimal performance and functionality."

NAS

DEC is thus recommending that customers mix hardware architectures and operating systems on their networks. "Each site is a unique situation," says Rich Kittle, strategic marketing manager for VMS development. "We've set up a new account manager concept to deal with the situation. Each site has a single [DEC sales-] person in charge."

Philip A. Naecker, Technology Editor, points out that DEC's Network Application Support (NAS) products occupy the same position that VMS used to hold. "The emphasis is still on the one-architecture concept," said Naecker at a recent *DEC PROFESSIONAL* editorial meeting, "but now the central mechanism is NAS."

The Figure shows NAS' primary components. Along with the LanWORKS products for integrating PCs and Macs with VMS systems, NAS represents a comprehensive solution to tying together the many disparate components found on DEC networks. However, it remains more a marketing pitch than a completely seamless solution to the problems involved in multivendor and combined UNIX/VMS networks. Given its intended scope, however, that's hardly surprising.

"NAS is the glue that's tying it all together," says Kittle. "It opens a lot of options to the customer." DEC is selling NAS as the key to interoperability on heterogeneous networks, and NAS products are rapidly growing in importance as customers integrate their networks. Furthermore, a variety of third parties are complementing NAS with products that integrate machines that DEC doesn't support into NAS. For example, Keyword Office Technologies offers conversion utilities that connect to the VAX products ranging from lesser-known UNIX platforms to the once-popular CPT word processor. This allows file sharing among virtually any machines connected to the VAX.

Portable IX

Equally important to a tightly integrated heterogeneous network are the Portable Operating System Interface (POSIX) standards (see "POSIX And Portability," June 1990). According to Kittle, VMS is the first non-UNIX operating system to incorporate POSIX 1003.1, the core operating system interface defined by the POSIX committee and IEEE. POSIX-compliant VMS will be available soon. POSIX compliance is already available in ULTRIX.

"With POSIX you get both standards and high functionality," says Kittle. "POSIX is finding industrywide acceptance, and as more POSIX-compliant applications become available on UNIX systems, they'll be easily ported to VMS."

POSIX-compliant applications developed on VMS will also be easily ported to UNIX. An application written to support POSIX is classified as:

1. Strictly conforming, meaning that all system calls are POSIX-compliant.
2. Conforming, meaning that non-POSIX-compliant calls are based on some other industry standard such as ANSI C.
3. Conforming with extensions, meaning that non-POSIX-compliant calls are

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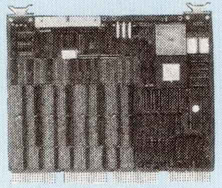

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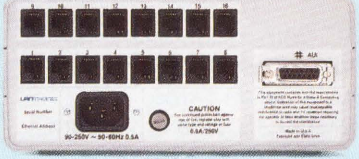

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part of a proprietary or nonstandard system.

"The high functionality of VMS will still be available within a standards-based framework," says Kittle. "Or, an application may be written to be completely portable across operating systems that support POSIX."

Auberg warns, however, that open operating systems are only one part of the open systems equation. "Now we need open standards for integration among operating systems, database interfaces, user access and networking protocols." DEC is supporting a variety of standards in these areas, primarily via NAS, while waiting for official standards from ANSI, IEEE and ISO. DEC's philosophy is to support all standards — de facto and de jure — and to provide migration paths to the official standards as they solidify. The process can be long and tedious, as demonstrated by the time required just to get POSIX into the field. But it's definitely happening.

The move toward open systems has accomplished much, but it has also shown how difficult it is to achieve complete agreement. POSIX 1003.1 is certainly a breakthrough, but bear in mind that a host of other POSIX standards exist for such diverse areas as system administration (1003.7) and transaction processing (1003.11). The POSIX committee has wisely built extensive flexibility into the POSIX standards process. But this also means that users must build extensive flexibility into their systems.

The Application Broker

We can assume that hardware architectures will proliferate on the network for commercial reasons and for specific application environments. We can also assume that operating systems will continue to provide nonstandard features, restricting at least some of the applications that may be run on them. Thus, a distributed mechanism is required that matches applications to operating systems and operating systems to hardware architectures.

In such an environment, when a user working at a VT1000 or some other X terminal clicks on the icon representing the application he wishes to run, the mechanism transparently looks at system resources to find where the appropriate operating system interface and processor time are available to run the application. If the required operating system isn't already available on an appropriate architecture, the mechanism searches for an appropriate architecture, downloads the operating system and runs the application. If the user is at a workstation and the application can be run locally, the mechanism selects that environment for the user. If it can't be run locally, the mechanism runs it remotely and user interaction occurs across the network via the X protocols.

Auberg refers to such a mechanism as an "application broker," after the "location broker" as defined in the Network Computing System (NCS). In combination with NAS, this arrangement will ensure that older applications written to proprietary operating system interfaces and new applications written to standards such as POSIX 1003.1 play in the same environment.

"The main factor standing in the way of such networks," says Auberg, "is cost. The hardware especially is still very expensive. A dedicated host system will be required for the application broker mechanism."

Auberg hints that such configurations are in the works and represent the future of multivendor, heterogeneous distributed computing. "UNIX certainly isn't the only answer," says Auberg. "There's a lot more involved." ■

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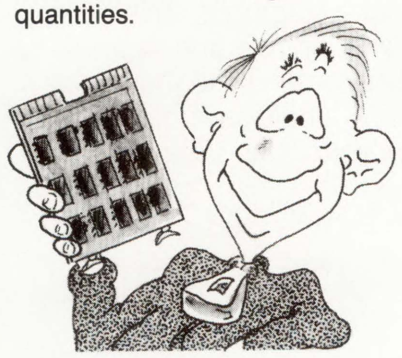

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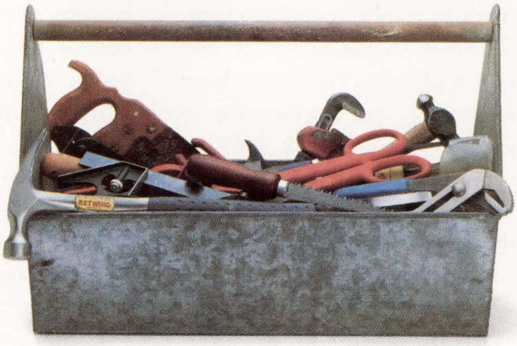

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WORKSTATIONS

Windows V3.0 Meets LanWORKS V3.0

David W. Bynon

The last time I wrote about Microsoft Windows and PCSA (now LanWORKS), I was a frustrated user (see "High-End PCs As Low-End Workstations," January 1990). Evidently, from the calls and letters I received, so are many of you. Windows/386 and PCSA V2.2 go together like oil and water. Shake the combination long enough and the two will mix, but not for long.

While neither product is perfect, Windows V3.0 and DEC LanWORKS for DOS V3.0 are vastly improved products. Best of all, they work together and complement each other. If you've been burned by the previous combination of Windows and LanWORKS (PCSA), you'll be interested to read about what has been fixed and what the new features of Windows V3.0 are. If you're looking for a way to get the most from your 286 and 386 systems, Windows multitasking and memory management are better than ever.

User Interface

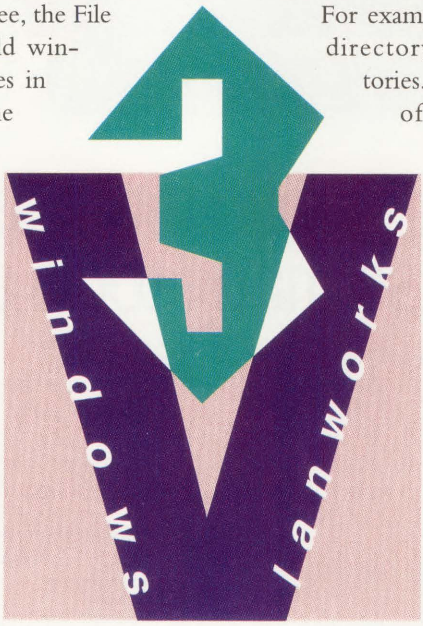
The new version of Windows enhances Windows/386 V2.11 with a new memory management system, improved multitasking and scores of end-user improvements. The best news is that the MS-DOS Executive is no longer the primary user interface used by Windows.

When I first saw Windows V3.0, I thought it was OS/2. It has the same 3-D widgets as the OS/2 Presentation Manager. Also, like OS/2, the new Windows uses a Program Manager to manage applications, a File Manager to manage the file system and a Print Manager to control printing and printer setup. Gone is the dreaded MS-DOS Executive of Windows V2.11.

The Windows Program Manager lets you group program icons in child windows called groups. Double-clicking on a program icon runs the application. To conserve desktop space, the group windows can be reduced to icons (in OS/2, groups are listed as choices in a pull-down menu). Although not as flexible as third-party program managers such as hDC's Windows Express, Windows Program Manager is a welcome addition. Perhaps its only serious omission is the inability to specify an initial directory.

The Windows File Manager uses child windows to give you one or more views of the file system. The File Manager's main window displays icons of the available disk drives and a directory tree of icons for the default (currently selected) disk. When you click on an icon in the directory tree, the File Manager opens a child window with a list of files in that directory. With the child window, all the usual file operations (copy, rename, delete, and so on) are available. These commands work the same way they did in the MS-DOS Executive. However, you now can copy or move files by dragging them into new directories (child windows).

The best news about File Manager is that it now understands network disks. Using the File Manager, you can connect and disconnect LanWORKS file service disks. No longer do you have to go to DOS and issue a NET USE command. Curiously, Windows sees LanWORKS virtual disks as removable disks (floppies). Virtual disks must be connected prior to starting Windows.



The File Manager does have a couple of small annoyances. First, it doesn't let you look at more than one directory tree at a time. So, if you want to copy files from disk to disk, you'll have to use the older method of selecting the file, then choosing "Copy..." from the File menu. The second annoyance is caused by the combination of Windows and LanWORKS. When you start File Manager or select a new default disk, File Manager scans the directory tree. On a fast hard disk, this operation takes less than a second or two, depending on the number of directories you have. Scanning a LanWORKS file system disk, on the other hand, can take forever.

For example, my personal VMS directory has 182 subdirectories. If I make the mistake of selecting drive M: (LanWORKS access to my VMS directory), I wait 20 to 30 seconds for the directory search to complete. On the other hand, using LanWORKS virtual disks, the directory scan isn't perceptibly slower than a local hard disk scan.

The Windows Print Manager is a queue manager for the Windows environment. It recognizes two types of print queues: local and network. A local queue is a list of files printing on a local printer. The network queue refers to the

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LanWORKS server queue. When the Print Manager prints to a local printer, an icon representing the job appears at the bottom of your screen. The print job runs in the background so you can continue to work. When the Print Manager prints to a network queue, the file is sent directly to the LanWORKS server queue. Although the Print Manager prints flawlessly to LanWORKS queues, the status functions fail. This appears to be due in part to LanWORKS' not being 100 percent compatible with Microsoft LAN Manager V2.0.

Memory Management And Multitasking

The cosmetic changes to Windows would be little more than a facade if not for the serious changes under the hood. The most important difference between Windows V2.11 and V3.0 is the use of protected mode on 286, 386 and 486 processors. Protected mode allows Windows V3.0 to directly address 16 MB of memory without using the memory magic, such as expanded memory. Under Windows V3.0, memory is no longer wasted. This is an incredible boon for LanWORKS users who try to use all of its features, i.e., DECnet, LAT, LAD, and so on. Because Windows V3.0 breaks the 640-KB memory barrier, it no longer matters how much memory LanWORKS uses.

For 386 and 486 system users, Windows V3.0 has yet another surprise: 386 enhanced mode. In 386 enhanced mode, Windows uses the Intel 80386 processor's virtual memory capability. A hidden disk file, WIN386.SWP, is used for swap file space. The size of the file determines the potential memory capability of the system. A second hidden file, 386SPART.PAR, manages system partition space. When running in 386 enhanced mode, Windows views its total memory capability as the sum of real memory and the swap file. Finally, you can make use of all of your system's memory and more.

In all, Windows V3.0 has three operating modes: real, standard and 386 enhanced. Real mode is provided to maintain backward compatibility with Windows V2.11 applications and 8086 systems. Avoid this mode at all costs. When I start Windows in real mode on my DECstation 316 with 8 MB of memory, Windows reports a total of 250 KB free. Standard mode supports 286 processors. Like 386 enhanced mode, standard mode uses protected mode memory management but doesn't support

> **"Windows Version 3.0 has three operating modes: real, standard and 386 enhanced."**

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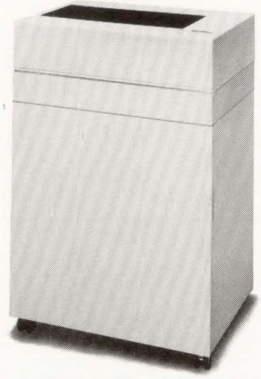

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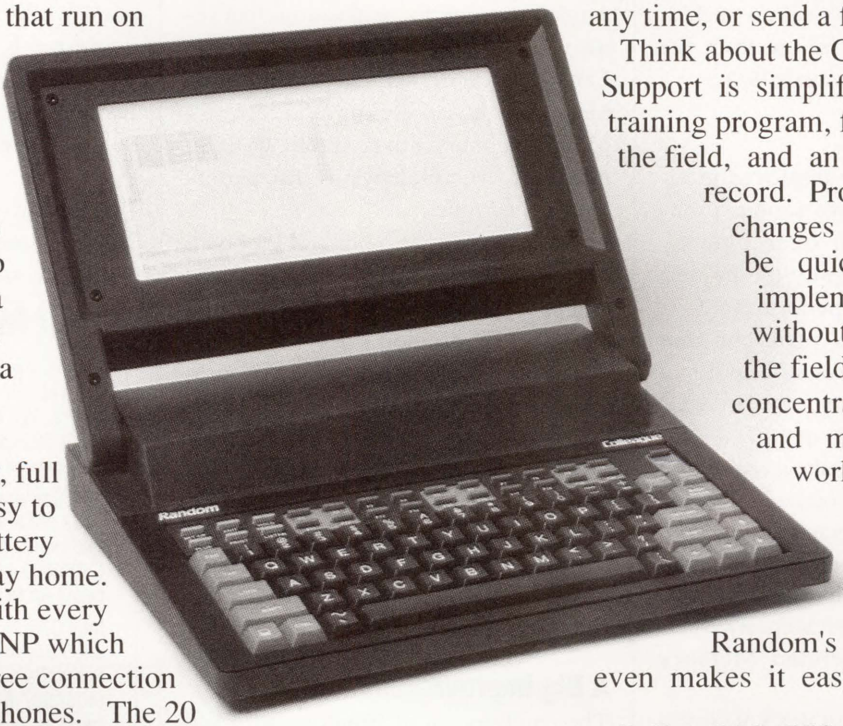

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virtual memory.

Another Windows V3.0 improvement is its DOS command multitasking capability. Windows/386, the first Windows version to provide a DOS multitasking environment, was less than adequate. Windows V3.0 classifies DOS tasks as either foreground or background. Background tasks time-slice the CPU in a round-robin fashion. Foreground tasks have exclusive use of the CPU. The first new feature you notice is the ability to specify the foreground and background priority. While Windows V3.0 compares well to other DOS multitaskers such as DESQview/386, it's a far cry from the likes of UNIX, VMS or even OS/2.

> **“*I'm enjoying the VAX integration LanWORKS brings to my DECstation 316, and my investment in Windows software is safe.*”**

LanWORKS Update

LanWORKS is a vastly improved product. PCSA V2.2 had two serious problems that have been overcome by LanWORKS V3.0: memory use by network drivers and poor performance.

The most serious problem that LanWORKS V3.0 overcomes is its use of memory. Specifically, PCSA V2.2 couldn't take advantage of extended or expanded memory. To take advantage of all PCSA V2.2 features, you had to be able to run your DOS programs in less than 400 KB of memory — that's all you had left after PCSA loaded. LanWORKS now supports both Expanded Memory Manager (EMS) and Extended Memory Manager (XMS).

Supplied with LanWORKS V3.0 is a standard extended memory manager called HIMEM.SYS. If your system has extended memory, you can use DEC's HIMEM.SYS to load the LanWORKS redirector (REDIR). All other LanWORKS drivers (LAD, LAT, DNP, RCV, CTERM and NML) must be loaded into expanded or conventional memory.

An expanded memory manager isn't included with LanWORKS. DEC endorses Quarterdeck's expanded memory manager (QEMM), highly regarded as the best available. When LanWORKS is used in conjunction with QEMM, it's possible to keep more than 512 KB memory free for DOS programs. However, QEMM isn't compatible with Windows V3.0. To support programs that require expanded memory, Windows V3.0 simulates expanded memory for applications that require it. If you want to load the LanWORKS drivers into expanded memory, you can use the Windows expanded memory driver (EMM386.SYS). However, Microsoft warns that performance may suffer.

If you plan to use Windows V3.0 with LanWORKS V3.0, you must replace DEC's HIMEM.SYS with the HIMEM.SYS driver supplied with Windows. Microsoft's HIMEM.SYS is enhanced to support SMARTDrive and RAMDrive, the Windows disk cache and RAM disk drivers. If you load LanWORKS after loading Windows, the LanWORKS NETSETUP utility will overwrite the Microsoft HIMEM.SYS file. You can tell the difference by the size of the file. The Microsoft driver is larger.

A Big Improvement

The combination of Windows V3.0 and LanWORKS V3.0 is far better than I expected. If you'd asked for my opinion six months ago, I'd have told you to consider Open Desktop (SCO's UNIX/X Window System).

Today, I'm enjoying the VAX integration LanWORKS brings to my DECstation 316, and my investment in Windows software is safe. The only Windows software I had to pay to upgrade was Aldus PageMaker, and that was only because my support had expired. The dozen or so other Windows software packages I use were shipped to me free. I feel confident that the Windows software industry is strong and getting stronger. Best of all, Windows software enjoys a significant performance boost with Windows V3.0. The performance increase, a result of the new memory management techniques, is especially evident in graphic software such as PageMaker or Micrografx's Designer.

Oddly, DEC is pushing its PC DECwindows system and is playing down Microsoft Windows. I can't see myself using a PC as an X server. The PC world is full of Windows software, and the price is right. The X software market is just getting started, and the prices are sky-high. Let's face it, DECwindows on a good workstation is a Cadillac, but the world needs Chevys. A good 386 with plenty of memory, Windows V3.0 and LanWORKS V3.0 is the Chevy of workstations. The only thing missing is concurrent use of TCP/IP and LanWORKS. I'm hard at work on that problem. I'll let you know what I come up with. ■

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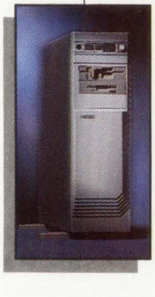

And, as if we had planned it, *PC Magazine* came along with its Service and Reliability issue in which Northgate's dedication to customer support was well evidenced. "As we learned more about its service policies, it became clear that Northgate stops at nothing to please its customers." No wonder "Northgate was the hands-down winner when it came to customer loyalty."**

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* *PC Magazine*, September 11, 1990 ** *PC Magazine*, September 25, 1990
†*InfoWorld*, July 30, 1990 ††*Computer Currents*, August, 1990

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DIGITAL WATCH

Perestroika Comes To Maynard

Brian O'Connell

The problems involved with doing business in Eastern Europe, while not well-documented, are beginning to come to light. Horror stories abound. For example, it takes one month to open a bank account in Czechoslovakia (in some cases the paperwork must be signed by the Czech Finance Minister). The wait for depositing a check? Try 22 days. One American businessman had to wait four months after entering Yugoslavia to set up his company: The bureau that registers new ventures is open two days each week for only two hours.

Yet stateside, companies are falling over one another to establish a beachhead in Eastern Europe. Recent political reforms have allowed the likes of Data General, which has a joint venture to sell computers in the Soviet Union, Gillette, which is building a manufacturing plant in Leningrad, and General Electric, which purchased controlling interest in a Hungarian light-bulb manufacturer, to wade into what appears to be a bureaucratic and political swampland.

At the head of the line, passports ready and pockets stuffed with cash, is none other than DEC. Springtime on the Baltic saw DEC forming overseas operations in East Germany and Hungary to bolster the foundering Eastern European high-tech community. DEC's venture in Budapest and its consulting and service operation in West Berlin are among the first volleys fired by a prominent computer maker in what promises to be an all-out war among the U.S. computer superpowers for supremacy in Eastern Europe.

"We've been sensitive to the emergence of the global marketplace," says Clifton Clarke, DEC's manager of international trade and policy and point man east of the erstwhile Berlin Wall. "We've been watching the events unfolding in Eastern Europe not only as concerned citizens but also as businessmen."

European Initiative

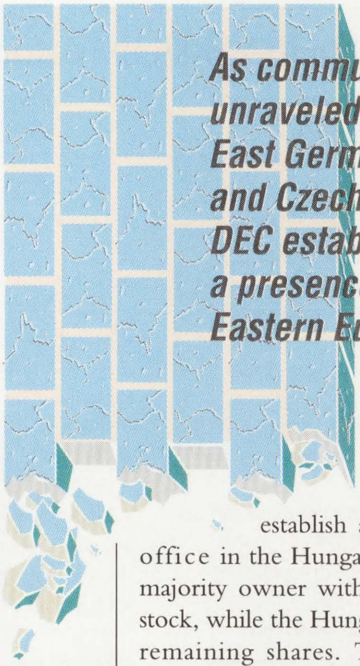
DEC is no stranger to the European economic culture. In 1964, DEC opened a sales office in Munich. In 1969, it established a permanent European headquarters in Geneva. But it wasn't until 1988, Clarke notes, that DEC began to look at the Eastern Bloc countries as a good place to sell computers.

"In the spring of 1988, we began to look at Hungary as a viable marketplace," Clarke explains. "Political, social and economic reforms were taking place there that indicated great change. They abolished the one-party system and indicated that they'd be willing to protect intellectual property and encourage foreign investment. The Soviets didn't do anything about it."

In January 1989, months before the world watched the Berlin Wall crumble in November, DEC sent a group of six company strategists, led by Clarke, to examine firsthand the business conditions in Eastern Europe. Traveling through Warsaw, Prague and Budapest, the contingent spoke with users, government officials and scientists who were eager to see the Americans export their computers and knowledge.

"We agreed that Hungary was the furthest along in terms of providing an ideal business climate," says Clarke. "We knew it was an emerging marketplace with enormous potential, but we realized that Hungary's only chance to integrate into the global marketplace was by undertaking complete reform. This is where high tech came in."

Almost overnight, as communism unraveled in Hungary, East Germany, Poland and Czechoslovakia, DEC established a presence in Eastern Europe through its joint-venture operation in Budapest. In February 1990, DEC joined with KFKI and Szamalk, two leading engineering firms, to establish a sales and services office in the Hungarian capital. DEC is majority owner with 51 percent of the stock, while the Hungarian firms split the remaining shares. The joint venture sought to market DEC's highly profitable MicroVAX computers. But, as in any dealings in the multitiered U.S./Eastern Bloc bureaucracy, there was a catch.



As communism unraveled in Hungary, East Germany, Poland and Czechoslovakia, DEC established a presence in Eastern Europe.

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East. "COCOM was a critical path for us. They controlled the technology that would be made available, and consequently they had to be dealt with," says Clarke.

COCOM spent a good portion of the spring and early summer of 1990 in a hotel in Paris deciding what computers would be allowed into Eastern Europe. For years, the U.S. government had prohibited the sale of most mainframes and minicomputers to the Eastern Bloc for military reasons. In 1979, President Carter further tightened restrictions in response to the Soviet invasion of Afghanistan. Early this year President Bush gave his blessing to liberalizing computer trade restrictions, stopping short of allowing computers such as the VAX 9000 into the Soviet Union.

Clarke points out that DEC often is consulted by government regulatory agencies, such as the U.S. Department of Commerce. "As far as high technology," he says, "DEC has achieved world-leader status. Often the government is preoccupied by budgetary and trade problems — they don't have time for everything. Consequently, in high-tech matters, DEC's opinion is greatly sought by the U.S. government."

It was determined that DEC could sell the MicroVAX 3000 and lower to Eastern European countries, with an allowance of VAX 6000 sales that had to include routine licensing arrangements. Heavier restrictions were placed on mainframes and minis for the Soviet Union. So DEC pressed on.

Eastern Economics

In March, DEC announced a second Eastern European operation. The new center in West Berlin fell under the jurisdiction of Digital GmbH, DEC's West German subsidiary. This venture concentrated on consulting and support services to current DEC customers overseas, both resellers and users, in support of the unified German marketplace.

DEC is taking a long-range view in its dealings in Eastern Europe. It's positioning itself nicely in a marketplace that's long on talented labor but short on the tools necessary to rebuild bridges or modernize offices, for example. DEC must wait in line with the rest of the American corporate pioneers in Eastern Europe for return on its investment while the ongoing communist cash crunch abates.

Ever the opportunist, last fall DEC aligned with West German microchip manufacturer Siemens to provide key chips for the DECsystem 5000. Was DEC surprised to discover that Siemens had the inside track on licensing agreements with East Germany's largest computer maker (Robotron) and optics manufacturer (Carl Zeiss)? Any suggestion that DEC was maneuvering into front-runner status in East Germany, through its newfound friend in Siemens, is met with emphatic denial by DEC.

"We don't believe in alliances of geography," argues Clarke. "There are a lot of reasons to do business with a specific company."

DEC is equally sensitive about inferences to the downsizing of its stateside operations through voluntary layoffs while increasing company visibility overseas. Pointedly, Clarke blames the

Views From An Insider

Soviet emigre Tibor Vais has an educational and occupational background that any young Muscovite would hope for. A Ph.D. in economics from the Soviet Academy of Sciences, a position as research consultant to the Soviet Central Committee in Moscow and recognition as an authority on Eastern European software technology at Harvard University are just a few mileposts in the Soviet's career. Vais emigrated from the Transcarpathia region of the Soviet Union 12 years ago and is currently vice president of engineering at CompuServe Data Technologies.

Well-versed in the ways of doing business in Eastern Europe and the Soviet Union, Vais considers DEC's move to that region a shrewd one but warns of an Eastern Europe in transition that isn't any easier to do business with than the old one.

"It's a risky venture with the opportunity for great, long-term profit," says Vais. "It's a huge marketplace with the mechanisms in place to attract companies like DEC."

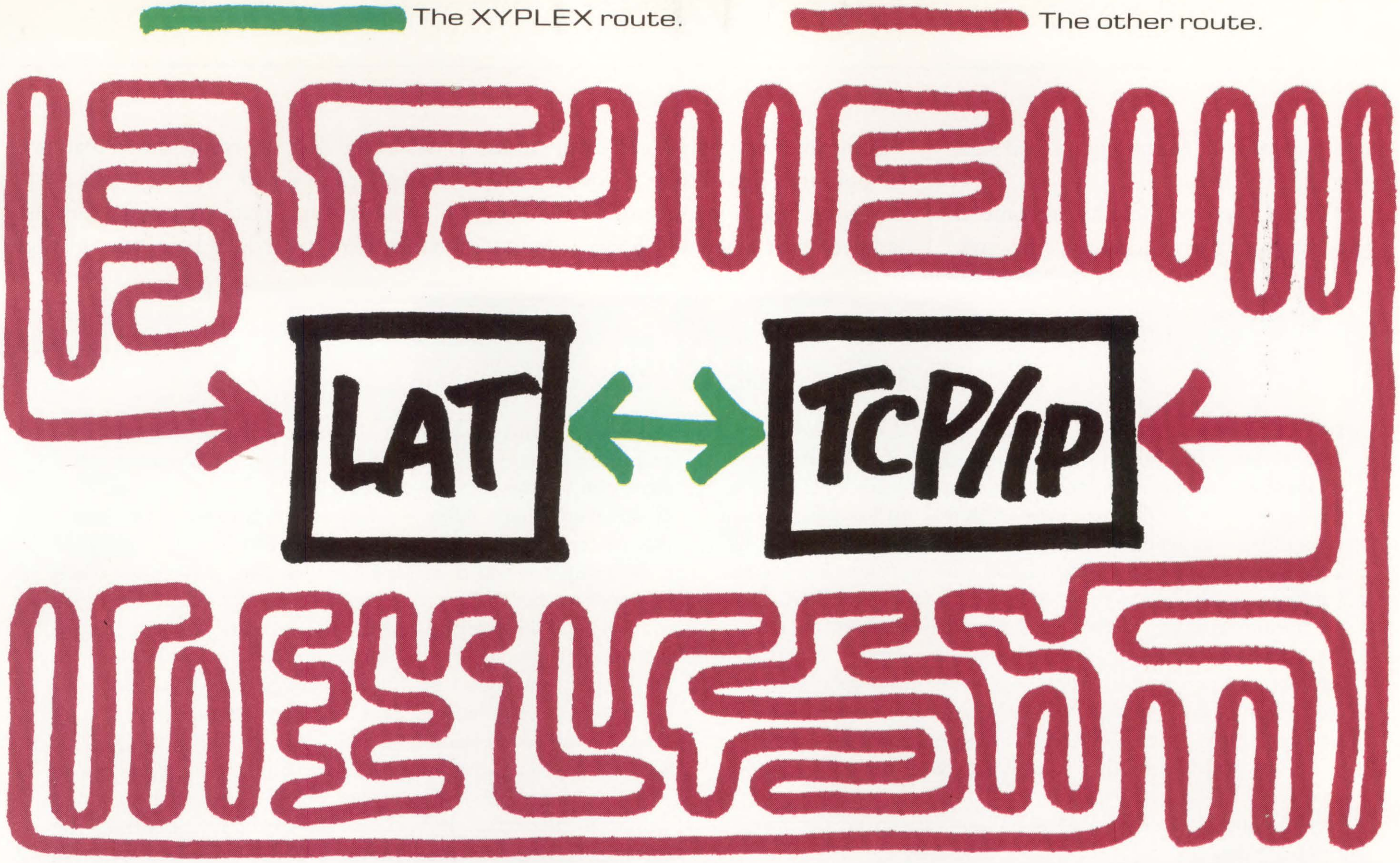
According to Vais, DEC computers and products are well-known in Eastern Europe. He cites wide-open cloning of VAX and PDP hardware and the outright pirating of VMS software during the past 20 years. "It's no secret that DEC products were stolen," he notes. "PDP-11s and VAX/730s, 750s and 780s were most prominent. Bulgaria was one of the chief culprits. They had the latest VMS software."

Vais adds that this could work to DEC's advantage, as most scientists, engineers and computer specialists are already familiar with some of the primary components of the VAX product line.

Vais believes the best opportunities for DEC exist in Hungary, Czechoslovakia and East Germany. "East Germany will reap the immediate benefits of a unified German marketplace." The Czechs, though, are at the forefront. "They have the lowest debt to the West and their economy is in place. Hungary is better off in terms of economic reform and is more sophisticated in areas like banking and infrastructure."

As for his homeland, Vais quotes Mikhail Gorbachev, who told students at Stanford University in June that "those who come first will get our business." Vais believes that with creative financing DEC can take advantage of the current spirit of cooperation in the Soviet Union. "We have a very qualified workforce," he explains. "DEC will find some very smart people there who are willing to work cheaply." The Soviets currently rely on engineering labor from India and Israel to run their computers, says Vais.

Vais claims that if DEC commits to long-term goals and uses its finances wisely, the chances of success in Eastern Europe are good. "There is a great need for high tech in Eastern Europe that isn't being filled. But as more companies seek to compete there, DEC will find the road a bit harder to travel. They should be glad that they came there early." —*B.O.*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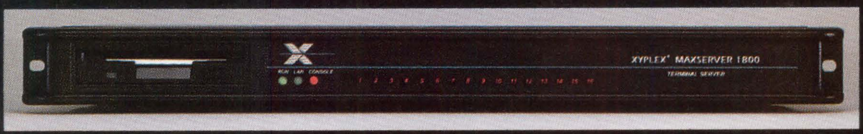

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U.S. government for any perceived shift of company focus.

"The U.S. government has to come to grips with its own economy," he says. "Companies are no longer competitors — countries are. We're a country undergoing major economic transition, saddled with a terrible budget deficit. We're buying on credit more than we can afford to spend.

"Our long-term economic forecast runs downward, while the global

INDUSTRY WATCH

MERGER MANIA

If The Vendor Fits ... — ASK Computer Systems has aligned with Hewlett-Packard and EDS, a subsidiary of General Motors, to purchase database software developer Ingres for $123 million. Under the terms of the agreement, ASK will shell out $63 million on its own and will sell 30 percent of its company stock to HP and EDS to finance an additional $60 million. Ingres' net income fell from $6.2 million in June 1989 to $76,000 in June 1990.

According to Eric Carlson, vice president of product operations, ASK decided that its acquisition of Ingres was the best way to gain an edge in open systems technology. "To make open systems a true priority," says Carlson, "we needed to make sure we controlled that technology. We needed engineering and application expertise to be integrated with other folks. That's what open systems is all about.

"Essentially, we have a $400 million start-up on our hands," he concludes.

According to Ingres spokesperson Margeret Eppenheimer, the merger won't affect Ingres' relationship with DEC. "Clearly there will be some consolidation between ASK and Ingres, but our products, strategies and relationship with companies like DEC will remain the same," she says.

... But If It Doesn't — The highly anticipated merger between VAX/VMS software vendors Raxco Software and UIS has bitten the dust. According to Raxco CEO Richard Lefebvre, the alliance dissolved due to insurmountable accounting and legal issues.

"When we first looked at the merger," explains Lefebvre, "we both saw many complexities in taxes and other monetary issues that were mainly due to overseas merger complexities. You can't do a proper analysis unless both companies sign a letter of intent. The books need to be examined — combined and separately. At that point we were concerned there would be problems."

Lefebvre adds that the parting wasn't acrimonious. "This is no Lotus and Novell scenario," he insists. "No one tried to renegotiate a new deal here." He also says that while he couldn't rule out renewed merger negotiations with UIS, any deal would appear to be "dead" for now.

Says UIS Vice President Helen Gardiner, "Both of us were enthusiastic about combining products and operations. After extending the letter of intent once to try and solve our administrative issues, both companies have decided that pursuing this merger will only add to the confusion in our marketplace."

DEC Broadens Downsize Efforts — DEC has determined that its July voluntary layoff projections of 6,000 employees might not do the trick and that an additional 2,000 may have to go. According to DEC Senior Vice President Jack Smith, DEC's recent earnings woes and the continuing downward spiral of the U.S. Gross National Product, a major economic indicator, might force DEC to reduce its workforce by 25 percent more than its midsummer estimate. DEC employs 125,000 and has cut its workforce by 3,000 through its voluntary layoff program. In addition, Smith indicated that new severance packages would be less generous than the earlier retirement agreements. Some DEC employees received two years' salary plus benefits to leave the company.

Share And Share Alike —In a unique prelude to the annual Interop trade show held this October in San Jose, California, 50 networking companies banded together long enough to jointly demonstrate networking compatibility via the Simple Network Management Protocol (SNMP). The bicoastal arrangement, in which half the firms met on the West Coast and half met on the East Coast, was hosted by Xyplex. Participating outfits included Cayman Systems, Chipcom, DEC and Hewlett-Packard.

DEC Trade Agreement — DEC has teamed with Quotron Systems, a leading distributor of financial information services, to provide Quotron's F/X Trader electronic foreign exchange trading systems to more than 40 banks worldwide. Through a multiyear agreement, DEC will act as Quotron's service agent responsible for the implementation of FIX Trader. The agreement includes site preparation, hardware and application installation and ongoing service and support.

Gaga Over IMKA — AICorp announced an agreement with the Carnegie Group to license technology developed by the Initiative for Managing Knowledge Assets (IMKA). IMKA was formed in April by the Carnegie Group, DEC, Ford Motor, Texas Instruments and US West Information Group to develop next-generation software technology that will harness enterprisewide corporate knowledge for use in critical applications. AICorp intends to integrate IMKA with its Knowledge Base Management System (KBMS) expert system management tool.

DEC In Pittsburgh — DEC has opened a metals and glass research center in the Iron City to aid in providing new solutions in process control and corporate business management. The Industry Solution Center is staffed with more than 200 person-years of metals and glass industry experience and will include third parties that have agreements with DEC to provide applications and design industry integration plans. Issues to be highlighted by DEC's new venture include supervisory process control, laboratory information management, process modeling, real-time expert systems, product and quality tracking, order processing, and scheduling and distribution.

Alligator Alliance — Epoch Systems announced a joint marketing agreement with Cayman Systems that will enable users of Cayman's GatorBox and GatorShare products on Apple Macintosh networks to access the Epoch-1 InfiniteStorage Server.

The Epoch-1 is a family of NFS- and TCP/IP-compatible network storage servers that transparently integrate high-capacity, low-cost optical disks with high-speed magnetic disks. The GatorBox is an AppleTalk-to-Ethernet gateway that runs GatorShare networking software. GatorShare translates the NFS protocol used by the Epoch-1 into the Apple Filing Protocol used by AppleShare. —*B.O.*

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marketplace grows robust," he adds. "As a firm, we must invest where there's activity. While we won't drop the U.S. like a hot potato, the U.S. must readjust its resources to compete in the global marketplace."

Industry skeptics claim that Hungary and East Germany harbor a vast amount of "gray market" DEC hardware and software that was copied from pre-1979 DEC exports and pirated into Eastern Europe during the 1980s. Because DEC has been an outspoken opponent of illegal diversionary gray market computer products, rumors abound about compensation payoffs by the Hungarians to DEC. For the record, DEC says it has settled what it calls "the outstanding intellectual property issue" with the Hungarians, although details of the agreement are unavailable.

DEC's chief competitors also harbor high hopes of doing business in Eastern Europe. IBM and HP are appraising that marketplace and want to do business there. DEC, though, has proved to be the ground-breaker. "After the reforms," says Clarke, "we were there first. There's a vast difference between announcing that you're going to do something and doing it. DEC did that first — we're there and going to work."

> **“The U.S. must readjust its resources to compete in the global marketplace.”**

In a stodgy, bureaucracy-laden marketplace such as Eastern Europe, where phones don't work and technical magazines such as *DEC PROFESSIONAL* are hoarded like pineapples, only the adventurous or those with deep pockets will prosper. Evidently, DEC has decided to pioneer high-tech efforts in Eastern Europe for the long term because the market is there and the Japanese aren't — yet. ■

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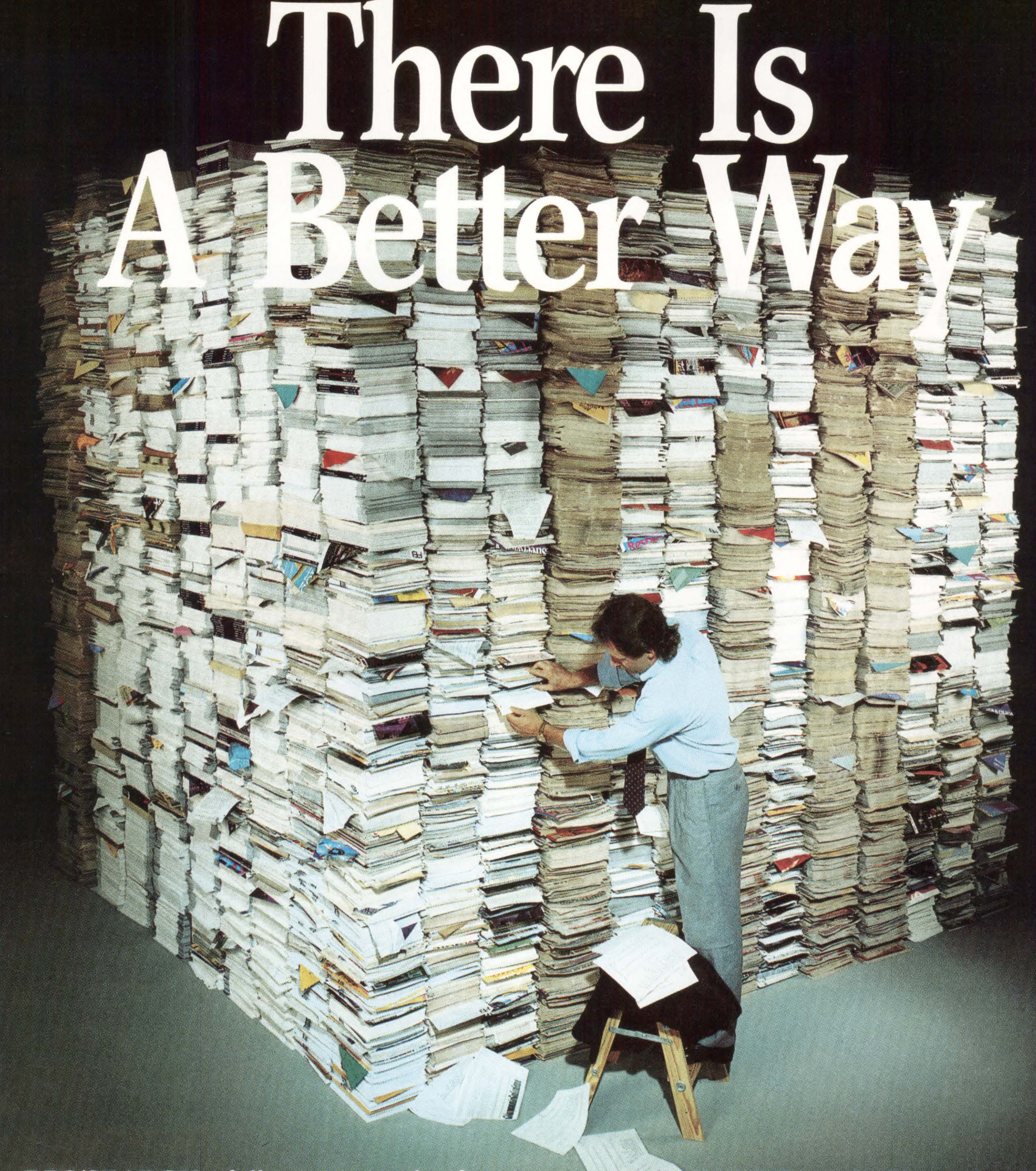

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BOOKSHELF

An X Foundation

With any large software system or standard, accurate and easy-to-use reference material is essential. With the likelihood of MIT's X Window System becoming the underlying standard for most future graphical user interfaces (GUI), X is no exception. Although DEC, HP, Sun, OSF and other major producers of X-based GUIs provide programmer's guides for their implementations of X, they document their systems in reference to their toolkits. Most X programmers will want, if not require, a foundation knowledge of X. Oliver Jones provides this with *Introduction to The X Window System.*

Covering such a wide topic as X isn't easy, yet the author has found a logical approach. Jones does a good job of explaining Xlib (the lowest layer of X) and showing how to apply its features. In 12 information-packed chapters, Jones explains the essentials. Few necessary details are overlooked. However, few practical programming examples are provided, limiting the book's ability to teach new X programmers to develop X applications.

Chapters 1, 2 and 3 introduce X, a basic X application and X concepts. The author explains, in moderate detail, the X network protocol, the Xlib interface, resources and events. Jones uses the standard helloworld.c example to instruct. A good understanding of this information is vital to X programmers.

Of particular interest is the section on events, in which you can come to grips with the concept of a modeless interface. Jones explains, "Events are delivered via windows. You select the event types you want delivered to your application from each window by setting the event_mask attribute of that window. ..." Event processing is a primary function of any GUI. Jones makes it understandable.

Introduction to The X Window System
Oliver Jones
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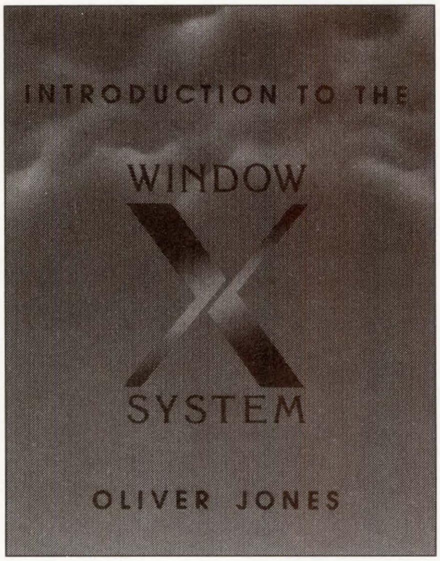

***Introduction to The X Window System* by Oliver Jones is useful to the DECwindows programmer who reaches below DEC's toolkit into Xlib.**

For the new X programmer, the most important section is Chapter 4, "Windows." It documents the life cycle of a window and the use of the Xlib call XCreateSimpleWindow. Jones writes, "The structure of the X Window System encourages applications to use many windows. In X, windows are plentiful and inexpensive. ... Once we understand the life cycle of windows, we can start manipulating them in interesting ways." After explaining how to create and map windows, Jones completes the topic with a discussion of window configuration and attributes. Through windows, the X programmer can display graphics and text. Jones explains these important functions in Chapters 5 and 6.

In Chapters 7 and 8 you learn the secrets of X pizzazz. Chapter 7 documents the use of color images. It explains the use of color maps and color cells and details the important relationship among the frame buffer, a pixel value and the color map. Chapter 8 covers the usefulness of Pixmaps, bitmaps and images. This is interesting and useful because X is primarily a graphics system, not a user interface.

In Chapters 9 and 10, you learn the relationship among the pointing device, the keyboard and your X application. Chapter 9, "The Mouse and Pointer," explains how to manage pointers and cursors and how to solicit pointing device events. Chapter 10, "The Keyboard," details keyboard events and keyboard focus and discusses the use of keycodes and keymaps. The two final chapters, "Advanced Event Handling" and "Communicating Between Applications," are for the programmer who has mastered X basics.

Although *Introduction to The X Window System* is full of information, its cramped format, with little white space between subtitles, text, tables and figures, may scare potential readers. Figures and other graphics are adequate to support the text but are less than state of the art.

While not directly applicable to pure DECwindows programming, the book is useful to the DECwindows programmer who reaches below DEC's toolkit into Xlib. With *Introduction to The X Window System,* Jones has written a programming guide appropriate for all but the most novice X programmer. *—Reviewed by David W. Bynon, Workstations Editor*

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FIELD SERVICE

Fresh For The Field

Ron Levine

Editor's note: This is the first of two articles discussing new service tools. This month, Field Service Editor Ron Levine reviews test instruments, diagnostics and software.

Many innovative tools were introduced to the field service arsenal this year. As systems become more complex, more integrated and more networked, smarter test equipment is required to aid the technician in monitoring and troubleshooting. In today's environment, software products as well as test and measurement devices play a key role in system and equipment servicing.

Service companies, software vendors and test equipment manufacturers have unleashed an array of service aids for field use. To review all the service tools released this year would require a whole issue devoted to the subject. I've picked out a few that have had or will have the greatest impact on equipment service. They were chosen for ease of use, portability, cost and service delivery improvement.

Test Instruments

The trend in test and measurement tools is toward miniaturization. This is bringing the power of bench-level testing devices into the field.

Transmission Medium Tester —This type of tool is a must for those serious about LAN installation, certification and troubleshooting. At the push of a button, you can verify the capability of an installed LAN to conduct reliable transmissions and trace LAN problems in a network's wiring and connectors, pinpointing a coax or twisted-pair wiring fault to within one foot.

The TMT-1, from Beckman Industrial, was the first instrument of this type (see "The Network's Physical Exam," September 1989). Beckman owns a number of patents that separate the TMT-1 from the new wave of competitive products. It's the only one that can fully replace the time domain reflectometer (TDR) and the expertise required to read and interpret TDR waveforms.

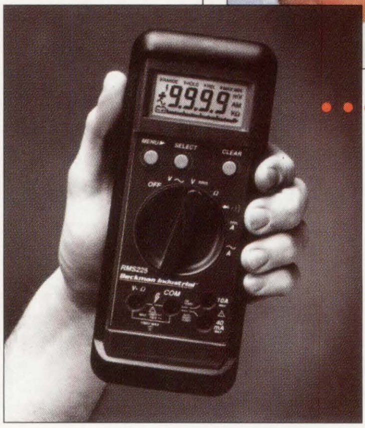
More than 70 percent of LAN problems are cable-related, and it's estimated that the average self-maintainer spends about $70,000 each year to keep a LAN serviced. The addition of a transmission medium tester can reduce these costs significantly while improving mean time to repair. The TMT-1 Plus includes a printer for recording TDR data (in numeric and TDR format) and the LAN cabling test results. The TMT-1 Plus costs $3,900.

Data Evaluator — Data evaluators are data communications monitors/testers that look at data transmissions between two devices on a network. The tool spans the gap between a breakout box and a protocol analyzer. Just as a transmission medium tester checks the physical layer (i.e., cabling), the data evaluator examines the flow of data over the network.

The DLM 200 hand-held unit from Benedict Computer provides full remote (offsite) capability to evaluate synchronous and asynchronous communications lines and RS-232C-type devices. Special features enable it to capture and later display the flow of data in both directions, examine data in most common formats, generate programmable transmission tests, and gather statistics on system and operator performance.

The unit's automatic configuration feature permits any user to capture pertinent data within seconds. It will be commercially available during the last quarter of this year. The DLM 200 costs $2,295.

RJ45
RJ11
TEST
PALADIN
Patch Check

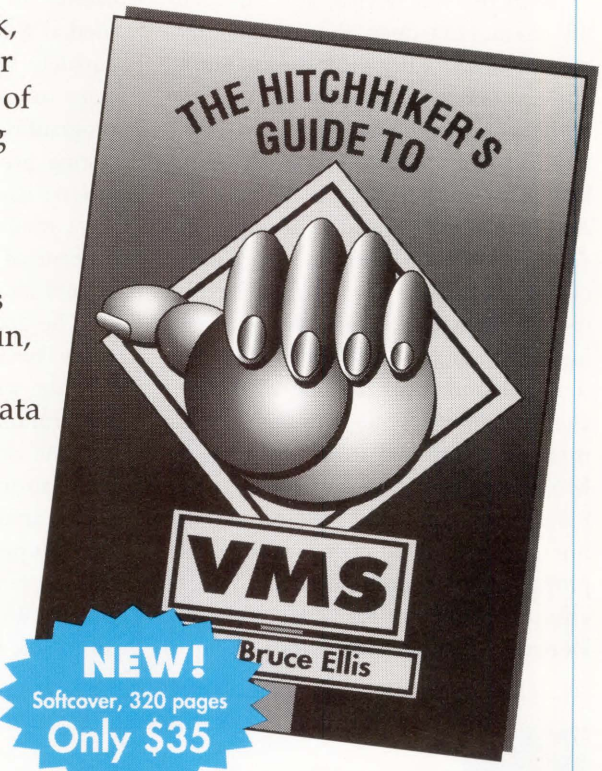


Paladin's continuity tester Patch Check (above) and Beckman's RMS225 Digital Multimeter (left).

Continuity Tester — Maybe all you require is a tool that identifies the exact relationship of two connections at each end of a modular cord assembly. In your case, a continuity checker is what's needed.

Patch Check, introduced in September by Paladin, is a hand-held instrument that checks continuity of telephone

Follow programmer Billy Bitsenbites on his misadventures through VMS internals . . .



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(RJ11) and computer data link (RJ45) wiring. It can also verify the correct wiring configuration of unshielded twisted-pair in the 10BASE-T baseband medium.

With this test device, you can identify, via an LED, open, shorted and cross-connected wires. By depressing a button, you can review a sequential comparison of the wire position and continuity of the modular plugs at each end of the cable. Patch Check costs $50.

All-In-One Telephone Tool — In April, Paladin also introduced a tool to cut and strip flat line cord and crimp modular telephone plugs without making adjustments. Named the PA 1530, this tool cuts and strips flat line cord up to eight conductors wide with the stripping function controlled to a preset length. Most two- and four-position handset plugs, two-, four- and six-position RJ11 line cord plugs and eight-position RJ45 plugs can be accommodated in three crimp cavities. The PA 1530 costs $130.

Portable Disk Drive Tester — One of the major problems in field-level disk drive testing is that there's no correlation between the test systems used by drive manufacturers and those used by customers. A drive may perform to specifications on the high-volume test systems used at the factory but not perform adequately in the field. This causes questions to arise concerning whose testing program is right, the proper execution of testing procedures, and if performance criteria have been properly interpreted. As a result, it's reported that up to 40 percent of problem drives returned for repairs are listed as "no problem found."

The 3000S Single-Port Test System from FlexStar addresses this dilemma. It uses the same test programs available in the firm's larger test systems designed for volume drive manufacturers, ensuring correlation and reproducibility of test results among field, depot and manufacturer. It provides full menu-driven parametric testing of any 5 1/4-inch or smaller Winchester disk drive employing an ST506, ESDI, SCSI or AT interface. It can also be used to test other SCSI interface peripherals.

With the basic 3000S, you can configure the system to a specific interface in less than two minutes by replacing the primary controller card in the tester. Once configured, it can perform a comprehensive bank of interface-independent analog and digital parametric tests and measurements. The 3000S was introduced in May. It costs $2,995.

Digital Multimeter — Multimeters keep getting smarter and more powerful. Their ease-of-use in the field is greatly improved with each new model. In July, Beckman began shipping its RMS225 Digital Multimeter. Features include a menuing scheme (reducing the array of buttons and switches), automatic capture and hold of the last stable reading (permitting probe removal without loss of display), audio warning alert for overload and wrong function set conditions and a self-resetting fuse.

The RMS225 is a true RMS meter, unusual for a multimeter priced at $149.

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Diagnostics And Software

The ability to look into online performance, decipher operating conditions and isolate real or potential trouble spots is imperative in preventing downtime and decreasing mean time to repair when faults occur. Diagnostics and monitoring programs tackle this important area of service.

Error Log Monitoring Programs —

- A VAX/VMS system error tracking program called the Maintech Error-Log (MEMO) can be installed at no charge for Maintech maintenance clients. MEMO is a standalone product that enhances the service vendor's ability to track and respond to device errors. Disk and tape drive, memory, terminal, Ethernet and CPU events are observed.

MEMO lets you define your own error thresholds, sampling intervals and alarm responses. It reads any device recognized by VMS and can selectively monitor or ignore each device on the system. When a device exceeds its user-selected error count for error type (hard, soft, media) and time interval, an alarm is activated. MEMO notifies terminals or users (either by broadcast message or the Mail Utility) of the impending problem. Alarm responses can be user-customized.

- Available on VAX/VMS V4.6 or later is TRW's Event Sensing Program (ESP) (see "VAX Health Check," June 1990). This system-level monitor runs as a detached process to watch system activity and automatically signal the operator of any unusual hardware events. It also notifies the system manager and designated terminals if user-selected thresholds are exceeded. ESP displays, in plain English, a record of hardware events and interpretations of their associated error codes.

ESP monitors and reports on disk and tape drives, bus lines and communications, memory, CPU and other system events. The program is menu- and prompt-driven, and error displays can be node-oriented or clusterwide. ESP is free to TRW service customers. License fees for others range from $895 to $42,960.

- MAXwatch is another new hardware monitoring program for VAX/VMS systems. Announced in September by Bell Atlantic Business Systems Services, it keeps an eye on CPU and DEC-compatible peripheral performance levels. Hard- and soft-fail conditions are tracked. When user-set thresholds and parameters are exceeded, warnings are issued. MAXwatch can be programmed to automatically call Bell Atlantic's DEC system support facility in Minnesota.

MAXwatch is designed for remote access and predictive problem diagnosis. The software resides on the system disk and is provided at no cost to Business Systems Services customers.

- The Electronic Service Specialists (ESS) unit of Bell Atlantic Computer Technology Services released the Pro-Guard 2.7 integrity monitor for VAX/VMS. It monitors the system for hardware errors, notifies system operators of conditions that exceed set limits, and keeps a log of its activity. A diagnostic history of each node on your VAX network is also maintained. Responses to error conditions can be configured by the user.

Pro-Guard runs on VAX standalone, networked or VAXcluster systems running VMS V4.0 or later. It runs as a standalone package or in conjunction with ESS' RX-Link Remote Diagnostic Service. The license fee is $995.

Multiple Processor Monitoring — Maintech's Master Console V4.0 provides operations personnel with up to 16 windows on one terminal to display the activities of as many as 16 processors. This central monitoring system logs all processor information as it's output and displayed on the monitored processors' local hardcopy console. It eliminates the need for redundant hardware and maintenance and storage of console log sheets.

Master Console works with PDP, MicroVAX and VAX systems, dynamically displaying each processor in a scrollable window on a single monitor. It allows you to reduce the number of control consoles from as many as 16 to one, maintains daily electronic logs, stores historical data on tape, provides audible and visual alarms for prioritized error reporting and lets your computers help with troubleshooting via string, alarm and date/time searches of console log files.

Other key features include remote VT220 support, VMSmail distribution of alarm messages and user-selectable window size and position. Master Console V4.0 consists of a 19-inch monitor, mouse and 105-key keyboard. Software resides on a host VAXstation. License fees range from $4,500 for four nodes to $9,500 for 16 nodes. A single-window

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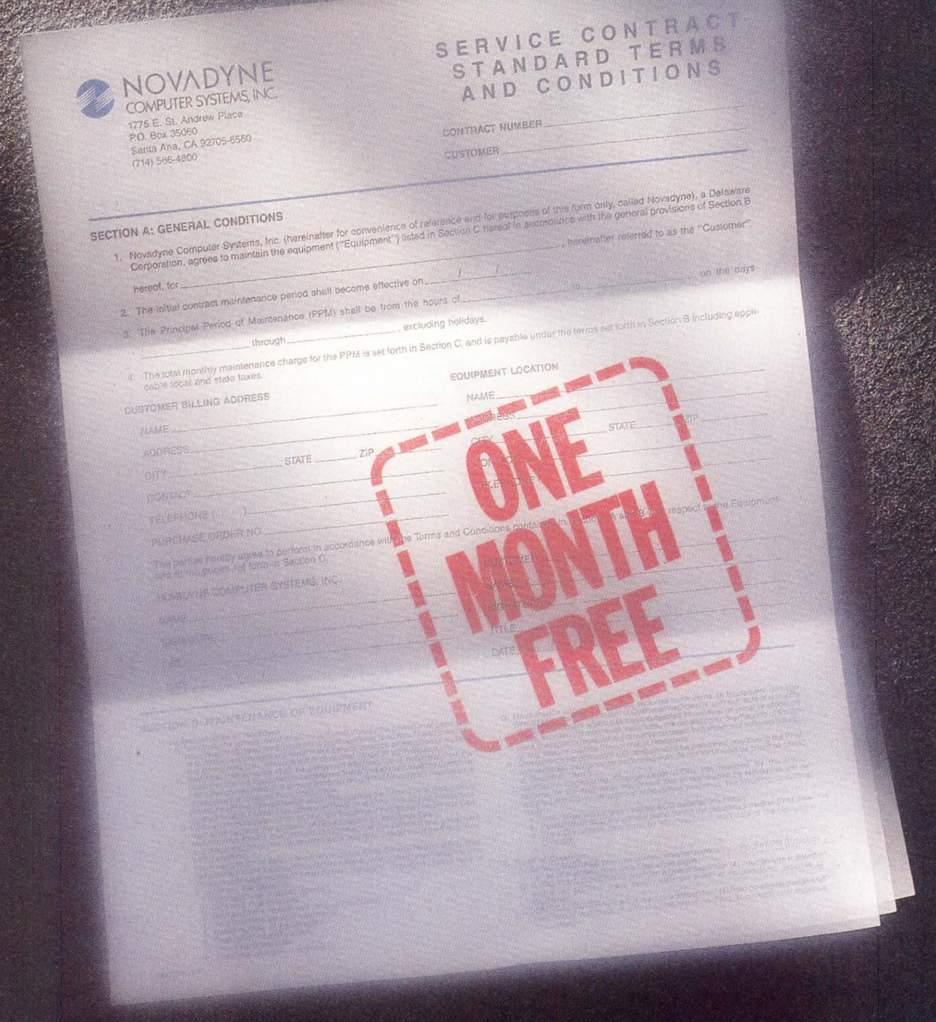

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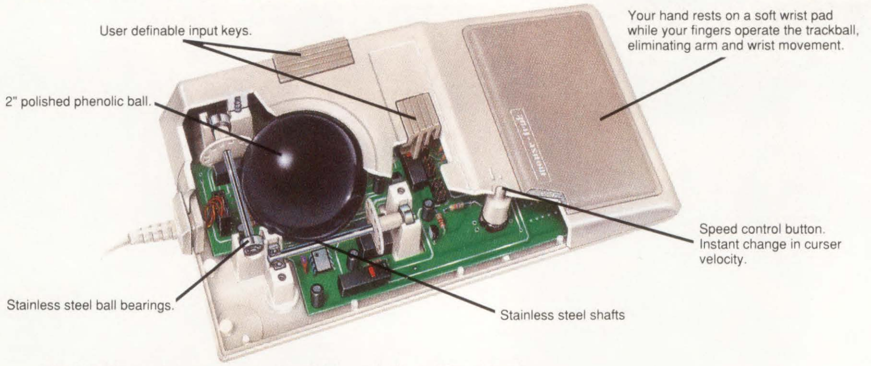
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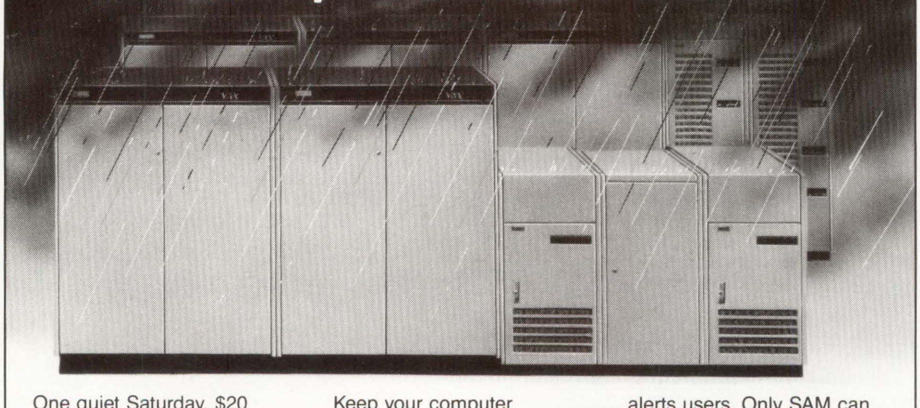

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version, called the MC-220, also monitors up to 16 processors.

Diagnostics —

■ ESS upgraded its RX-Link Remote Diagnostic Service this year. Available to anyone who maintains DEC equipment for a monthly subscription fee of $295, the service provides around-the-clock problem analysis and assistance. Each subscriber is equipped with a Remote Diagnostics Unit for accessing ESS' Diagnostic Support Center (DSC). The DSC is equipped with expert analysts, diagnostic tools, libraries and customer history records.

As an onsite upgrade to the service, RX-Link offers an optional support center in a box. With the box (a hard-disk drive) you get all RX-Link diagnostics at the location of choice, eliminating the need to download from the ESS support center.

■ Also available from ESS is Pro-Cure, a standalone, onsite, online troubleshooting package that diagnoses failures in VAX system devices. Users running VMS V4.0 or later can use Pro-Cure to guide them through preventive and corrective maintenance tasks on VAX standalone or VAXcluster systems. License fees range from $2,500 to $7,000.

■ A complete series of VAX diagnostic programs is provided by Parse. The diagnostics available for the entire line of MicroVAX, VAX 11/700, 6000 and 8000 computers verify proper operation of the system's hardware, report status and error conditions to the operator in plain English and isolate failing modules.

The diagnostic series of programs employs a common user interface. Once you're trained on one, you can run them all. All Parse diagnostics can be implemented remotely and are supported with an annual maintenance service. They can be licensed on a fully paid basis or rented quarterly. They aren't site- or CPU-specific. Each licensed unit can be used on any number of systems or sites.

IN A FUTURE ISSUE we'll look at the new service tools introduced by DEC and how service delivery and vendors are changing. ■

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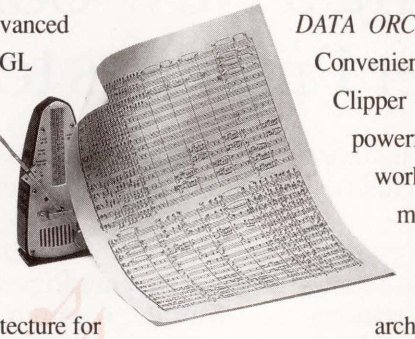

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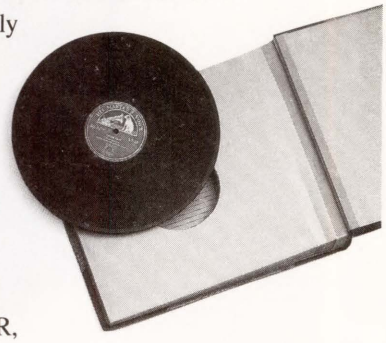

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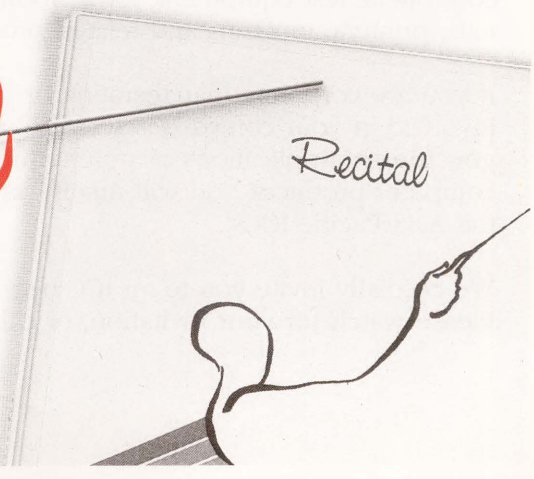

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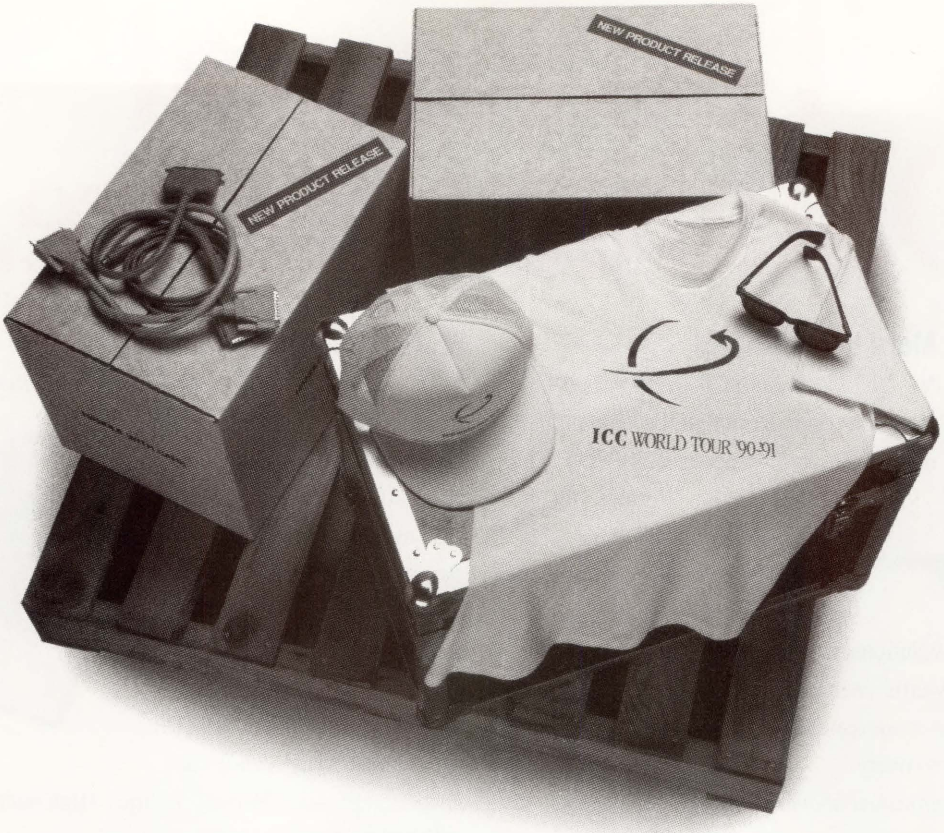

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DCL DIALOGUE

Bulldogging DECwindows

Kevin G. Barkes

The guy was a real cowboy, in every sense of the term. He wore boots, a hand-tooled leather belt with a large brass bovine-inspired buckle, a string tie and a hat the size of an RA60 disk pack. He called everyone "pardner," chewed tobacco and manipulated the mouse on his VAXstation like a lasso.

These characteristics would normally make me a bit wary. You can image what thoughts raced through my mind when his boss told me his name was Rabinowitz and he was originally from Bayonne, New Jersey.

I'd managed to avoid him for several weeks. But last Thursday I made a wrong turn down a seemingly endless wall of cubicles and found myself staring right into his belt buckle. Oh yeah, I forgot to mention that Rabinowitz is about 7 feet 2 inches tall and weighs a hair under 300 pounds.

"Why there you are, lil' fella!" he exclaimed, lodging a ham-sized hand on my shoulder. I was speechless, mainly because no one in recent memory had called me "lil' fella" and been contextually correct. I muttered an inoffensive welcoming noise and tried to back out quickly. But his grip tightened, and he propelled me into the leather chair in front of his VAXstation.

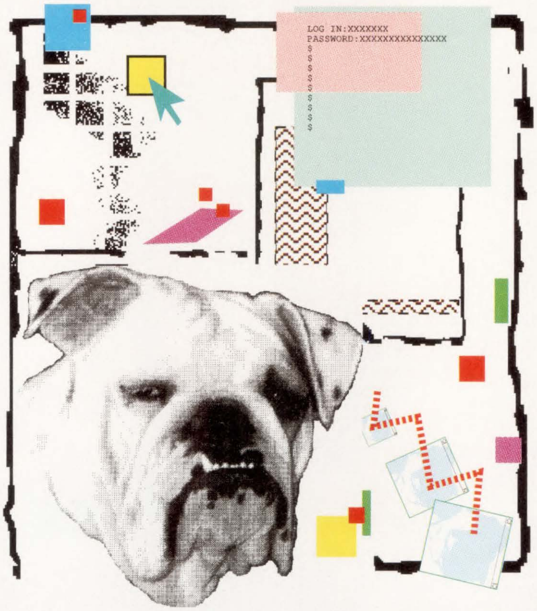
"Here's what I want, pardner," he drawled in his peculiar accent. "I need you to bulldog DECwindows for me."

"I beg your pardon?" I asked.

"Bulldog it, son. Get the sucker to do what I want." He tossed me a copy of *The Authentic Guide to Cowboy Lingo and Annotated Chili Recipes*. I opened it to a dogeared page and glanced at the highlighted entry:

Bulldog (v.) — to grab a steer by its horns and twist its neck, forcing it to fall to the ground in submission.

"I want my DECwindows session to start up with everything I use in the right position," Tex explained, "so's I don't have to wrassle moving windows around. That's the clock, the calculator, the calendar and three DECterm windows. And I want the Session Manager and FileView to come up as icons so's I can just jump right in on a DECterm without havin' to wait for them to start and then havin' to fiddle with the mouse."



Fortunately, Tex was using DECwindows V2.0, so a lot of what he wanted was easy to do. I had him position everything on the screen the way he wanted and customize each application to his taste. Then, using the MB2 mouse button, I clicked on the Icon Box and selected Save Settings to store its geometry. Next, I clicked MB2 on the clock and similarly saved its settings and geometry.

"Now it gets a bit tricky," I explained. "Graphical interfaces often aren't as intuitive as they ought to be."

I set the input focus on the calendar, selected Customize with the MB1 mouse button, dragged down to Save Settings, then released. I clicked on over to the calculator, used MB1 to click on File, dragged down to Save Geometry and released.

"Shoot, that's three diff'rent ways to save geometry," Tex observed. "Consistent, ain't it?" he asked sarcastically.

"It gets better," I replied. Going into the Session Manager, I picked Customize, then Autostart, then removed everything but FileView from the Autostart configuration.

"You deef, boy?" Tex snarled. "I said I want it to come up automatically."

"Hold your horses," I said, clicking on FileView. I selected Control, then Any Verb, and finally Create Public Profile File. When the box appeared, I entered FileView as the application. This got me another FileView window. I selected Customize, Window, then picked Icon as the initial window state.

"We all done now?" Tex asked.

"Not quite," I said, switching back to a DECterm and editing SYS$LOGIN:DECW$LOGIN.COM to contain:

```
$ SPAWN/NOWAIT/INPUT=NL:-
  RUN SYS$SYSTEM:DECW$CALENDAR
$ SPAWN/NOWAIT/INPUT=NL:-
  RUN SYS$SYSTEM:DECW$CALC
$ SPAWN/NOWAIT/INPUT=NL:-
  RUN SYS$SYSTEM:DECW$CLOCK
$ CREATE/TERMINAL/DETACH-
  /WINDOW_ATT=(X_POSITION=10,-
  Y_POSITION=375)
$ CREATE/TERMINAL/DETACH-
  /WINDOW_ATT=(X_POSITION=110,-
  Y_POSITION=225)
$ CREATE/TERMINAL/DETACH-
  /WINDOW_ATT=(X_POSITION=40,-
  Y_POSITION=110)
```

Then I called up SYS$LOGIN:DECW$SM_GENERAL.DAT to make certain

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the following lines were there:

```
wm*default.startupFocus: true
wm*default.autoFocus:    true
```

"Now, here's what's going to happen when you start up a new DECwindows session," I explained, saving the changes to his startup files. "First, the command file DECW$LOGIN.COM is executed. It starts your calendar, calculator and clock and creates three DECterm windows. I got the X and Y coordinates by guessing at them. We can adjust them later.

"At this point the Session Manager fires up, and it in turn invokes FileView. But they both initialize in their iconified states. In the meantime, you're in a DECterm window doing real work.

To prove it, I quit the session. Tex logged back on and the clock, calculator and calendar appeared, followed by three DECterms. He started editing a file while the Session Manager and FileView started and appeared in the icon box.

"Wheeeooo! This is slicker'n a snake's belly in a bucket of oil!" Tex cheered somewhat metaphorically. I started out of the office, but he grabbed my shoulder again. Actually, he grabbed the entire right side of my torso down to the navel, or so it seemed.

"Now I wantcha to customize my logo. I got rid of the Digital logo [see "Hacking By The Numbers," August 1990], but I want my own brand up there," Tex said.

"Sorry, I don't have the time," I alibied. "But you have DSNlink, right? [See "DSNlink: On-Demand Software Support," October 1990.] Just use interactive text mode and search for the phrase 'How to replace the DECwindows "Digital" logo.' DEC has provided sample C, DCL and UIL code to generate your own."

"You mean I need three languages just to customize that startup screen?" Tex asked, incredulously. "I thought GUIs were supposed to be easy to use."

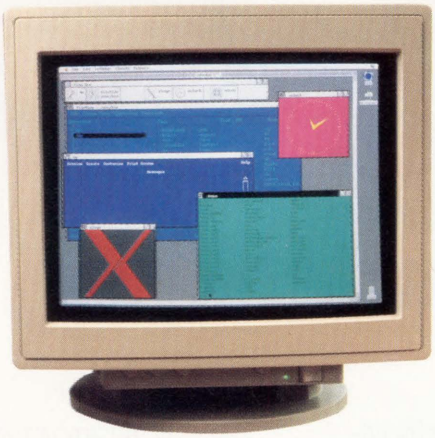
"Easy to use, yes," I said. "Easy to program, no. Personally, I prefer working with DCL from the command line, but you have to know how to get around in graphical environments. My productivity increases from DECwindows use come from the ability to work in several windows simultaneously."

Tex reached under his desk and pulled out a thermos. He opened it, and the vapor began to deform the plastic screw-on lid. "Thanks a heap, pardner," he said. "Here, have some chili."

The doctor says they'll be able to do the skin graft next week.

FOR A LISTING OF all FidoNet bulletin board systems (BBS) in the U.S. featuring message areas with DEC-related topics, send a self-addressed, stamped #10 business envelope to KGB Consulting, 4107 Overlook St., Library, PA 15129. The list is also available online from the SYS$OUTPUT BBS: (412) 854-0511; 1,200/2,400 baud. If you have FidoNet access, ask your local sysop to file request DECBBS.LST from 1:129/38. —*Kevin G. Barkes is an independent consultant and publisher of the monthly* KGB Report *newsletter.*

DECwindows on the Macintosh.



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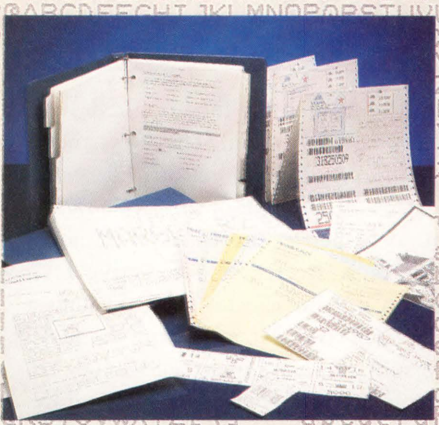

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THE MAC CONNECTION

Networking Alternative

Al Cini

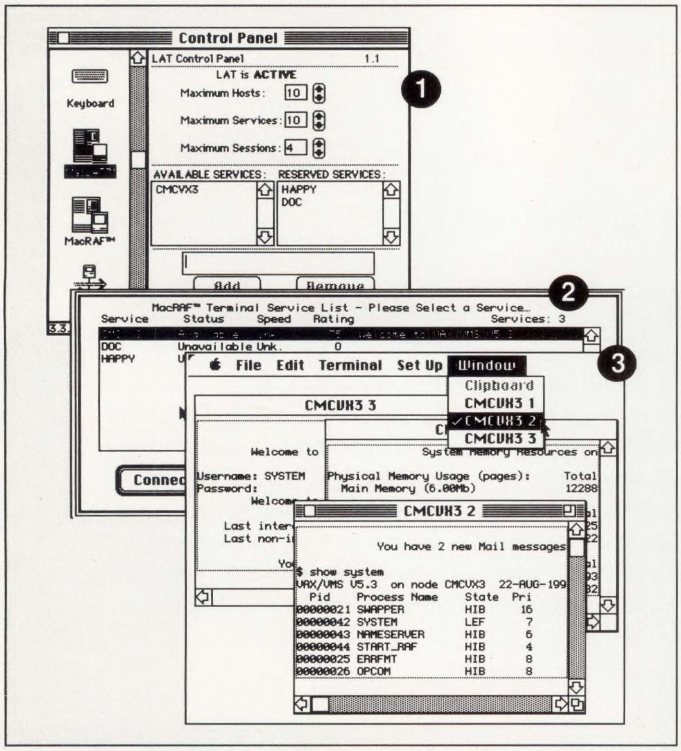
Datability Software Systems' MacRAF networking software provides Ethernet-based terminal emulation and remote file services using DEC's Local Area Transport (LAT) communications protocol. In a specialty field crowded with products from Alisa Systems, DEC and Pacer Software, MacRAF presents a new and interesting Mac-VAX networking alternative.

The MacRAF product distribution kit includes a server tape for the host VMS system and a client diskette for the Mac. Client and server installation are automated using VMSINSTAL and the Apple Installer utility. From removing the shrinkwrap to login, MacRAF is on the air in less than 30 minutes.

Once installed, MacRAF's file and print services are controlled through the Mac's Control Panel desk accessory using two supplied Control Panel Device (CDEV) files. When selected in the Mac's Control Panel, MacRAF's MacLAT CDEV lets you browse through the network's available LAT host services. Thirty different LAT services can be retained by the MacLAT CDEV, and MacRAF can support 10 concurrent sessions to any combination of these services.

Interactive terminal sessions are initiated by launching the supplied RAF Terminal application. The New menu option under the application's File menu lets you choose one of the LAT services found earlier in the MacLAT Control Panel and creates an interactive LAT session on the selected host through a Mac window. At your option, RAF Terminal can emulate VT52/100/220 terminals through its session window. The session window is also movable and resizable on the Mac desktop, and text captured from the host during the session can be reviewed by scrolling the window vertically (see Figure 1).

The New function can be selected repeatedly, creating several host sessions



```
LAT Control Panel                     1.1
              LAT is ACTIVE
   Maximum Hosts:      10
   Maximum Services:   10
   Maximum Sessions:   4
AVAILABLE SERVICES:   RESERVED SERVICES:
CMCVX3                HAPPY
                      DOC
```

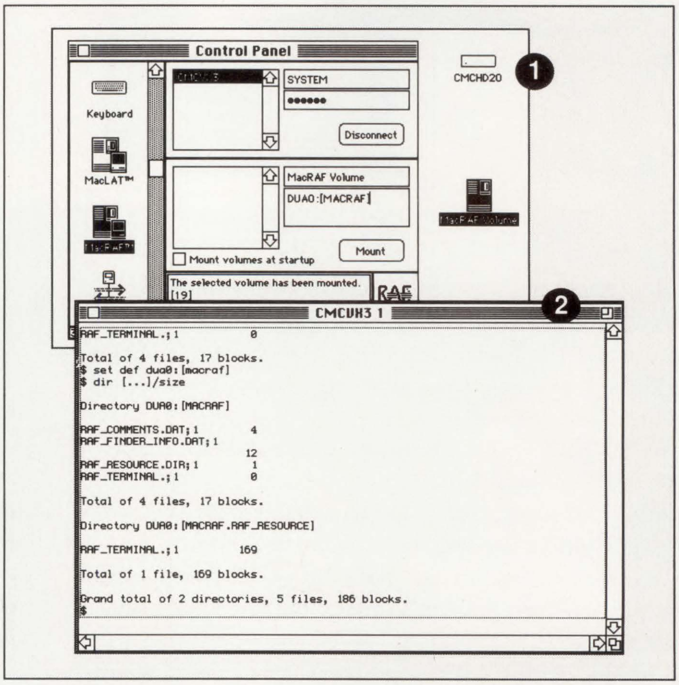
```
        MacRAF™ Terminal Service List - Please Select a Service…
Service     Status      Speed    Rating                Services: 3
DOC         Unavailable Unk.       0
HAPPY       U
```

```
Welcome to

Username: SYSTEM
Password:
        Welcome

   Last inter
   Last non-i

          Yo
```

```
System Memory Resources on

Physical Memory Usage (pages):      Total
  Main Memory (6.00Mb)              12288
```

```
                  You have 2 new Mail messages
$ show system
VAX/VMS V5.3  on node CMCVX3  22-AUG-199
  Pid     Process Name    State  Pri
00000021 SWAPPER          HIB     16
00000042 SYSTEM           LEF      7
00000043 NAMESERVER       HIB      6
00000044 START_RAF        HIB      4
00000025 ERRFMT           HIB      8
00000026 OPCOM            HIB      8
```

Figure 1: The MacLAT Control Panel Device finds available LAT hosts (1). Once found, the RAF Terminal Macintosh application lists the available hosts (2) as each onscreen session is initiated (3).



```
SYSTEM
●●●●●●

MacRAF Volume
DUA0:[MACRAF]
☐ Mount volumes at startup
The selected volume has been mounted.
[19]
```

```
RAF_TERMINAL.;1             0

Total of 4 files, 17 blocks.
$ set def dua0:[macraf]
$ dir [...]/size

Directory DUA0:[MACRAF]

RAF_COMMENTS.DAT;1          4
RAF_FINDER_INFO.DAT;1
                           12
RAF_RESOURCE.DIR;1          1
RAF_TERMINAL.;1             0

Total of 4 files, 17 blocks.

Directory DUA0:[MACRAF.RAF_RESOURCE]

RAF_TERMINAL.;1           169

Total of 1 file, 169 blocks.

Grand total of 2 directories, 5 files, 186 blocks.
$
```

Figure 2: The MacRAF Control Panel Device selects a LAT host as a file server and specifies which VMS directory will be served. A disk icon corresponding to this directory appears on the Mac's desktop (1). MacRAF represents each Mac file saved to the VAX as its separate catalog, resource and data components, as shown in this listing of the server directory after a copy of the RAF Terminal application has been stored there (2).

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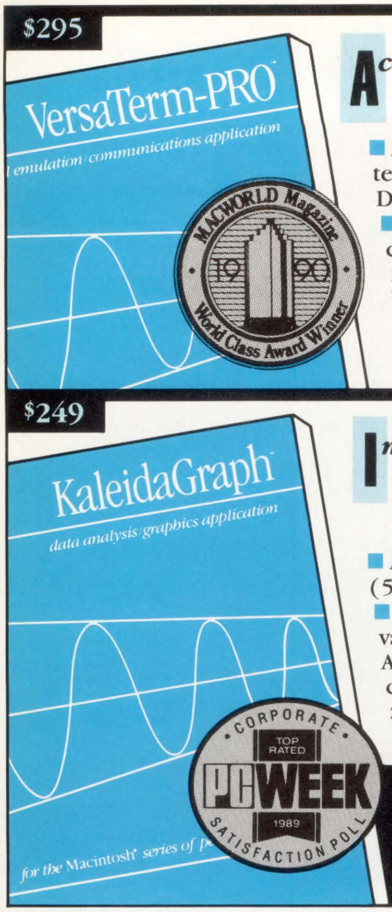
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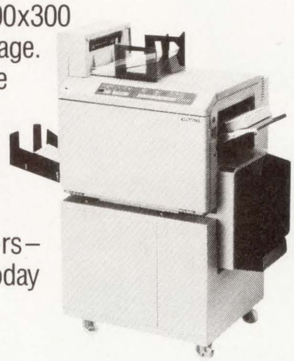

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(to a maximum of 10) through separate Mac windows. Conforming with the Mac's human interface guidelines, MacRAF lets you COPY host text from a session window and PASTE it into other Mac applications.

Hopefully, future MacRAF versions will provide a scripting capability, allowing the automation of commonly used host keystroke sequences. A Copy Table option under the Edit menu, useful for moving column-formatted host text into Mac-based spreadsheets and databases, also would be helpful.

File Services

Controlled by the supplied MacRAF Control Panel Device, the product's network file services allow a Mac user to connect to a designated VMS directory on a selected host and use it as if it were a locally connected Mac hard disk.

Uniquely, a MacRAF user can specify any valid VMS device and directory as his file server volume (see Figure 2). By contrast, the comparable file server software from Alisa, DEC and Pacer require that a VMS system manager define a list of specific VMS directories as file servers before they can be used from a client Mac.

Before discussing how MacRAF maps Mac files to VMS, let's review some Mac file structure basics. Each file on a Mac hard disk consists of two parts, called forks. A Mac file's resource fork includes Mac-specific information such as icons and application code. A Mac file's data fork contains application-specific information such as word processing document text and formatting information. In addition to a Mac file's forks, catalog information for a Mac file includes a unique code that ties the file to the Mac program that created it as well as a code that specifies the format of information contained in the file.

Following Apple's Apple Double specifications, MacRAF represents each Mac file using two files on the host VAX — one for each fork. Once SAVEd to the host file server directory, Mac files containing ASCII text can be edited

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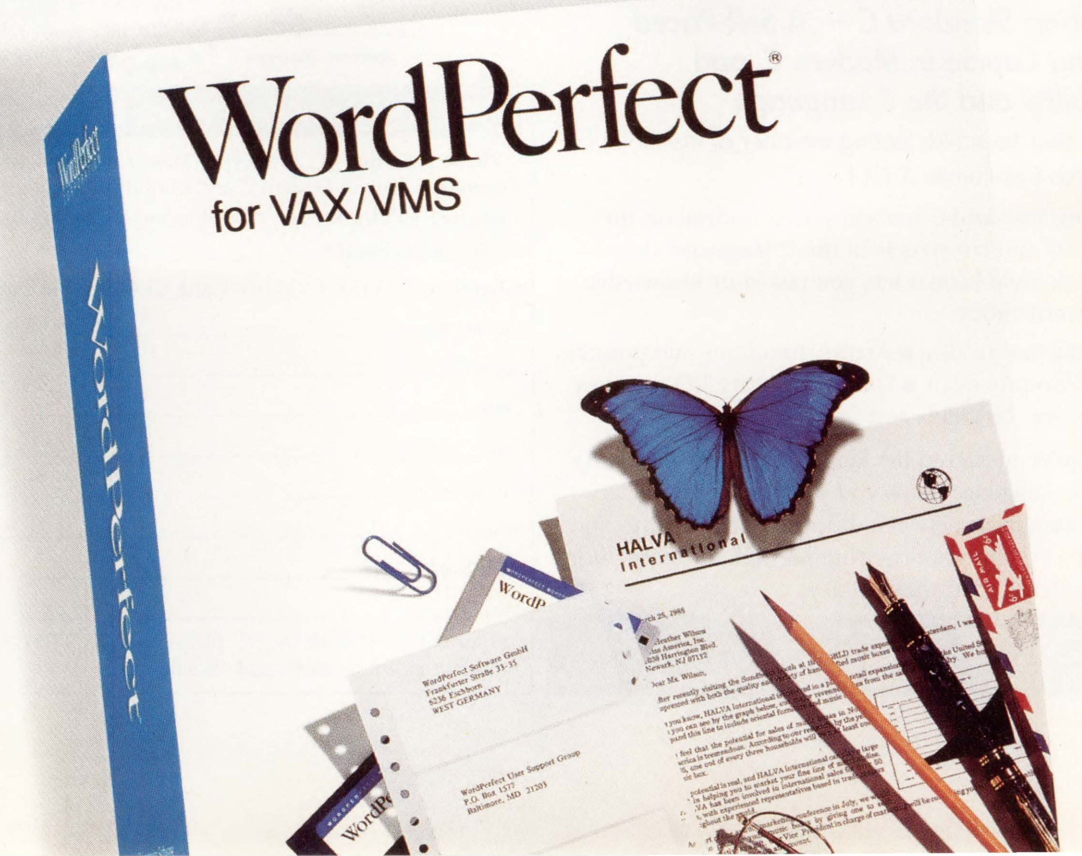

using any VMS text editor. Likewise, text files created on the VAX can be accessed directly on the client Mac with a Mac word processor.

The MacRAF file server provides no mechanism for associating VMS-created files with specific Mac applications. Any VMS-created files found in MacRAF's file server directories appear on the Mac user's desktop as a generic document icon with ASCII text characteristics.

Hopefully, like DEC's Lan- WORKS file server, a future version of MacRAF will provide an editable table that will associate specific Mac creator and type codes based on VMS file extensions or RMS characteristics. This feature is useful for integrating application files, such as word processing documents and spreadsheets, between the Mac and VMS environments.

Unlike other VMS-based file servers, MacRAF uses a proprietary transfer protocol to move files between the Mac and VAX. MacRAF's protocol automatically compresses redundant binary information found in the files it transmits, thereby accelerating file transfers.

While MacRAF's protocol isn't compatible with Apple's AppleTalk Filing Protocol (AFP), it seems to support all the necessary Mac file operations, including program launching and opening file server files from within Mac applications. However, some special AFP functions, such as Mac drop folders, aren't supported by MacRAF.

Like Pacer's PacerShare and unlike Alisa's and DEC's Mac file servers, each MacRAF file server user is represented by a separate VMS process running under the user's VMS account. While this approach incurs VMS process creation overhead on the host, it takes advantage of VMS' numerous user accounting and file security features.

MacRAF requires a Mac with 1 MB of RAM. An Ethernet interface that complies with Apple's EtherTalk standards is also required.

There's less to MacRAF than LanWORKS, but sometimes less is more. Ethernet-connected organizations that need nothing more than LAT-based terminal emulation and Mac file services may find MacRAF to be a simple-to-use, cost-effective Mac-VAX solution. ■

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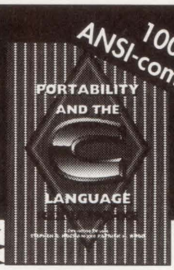

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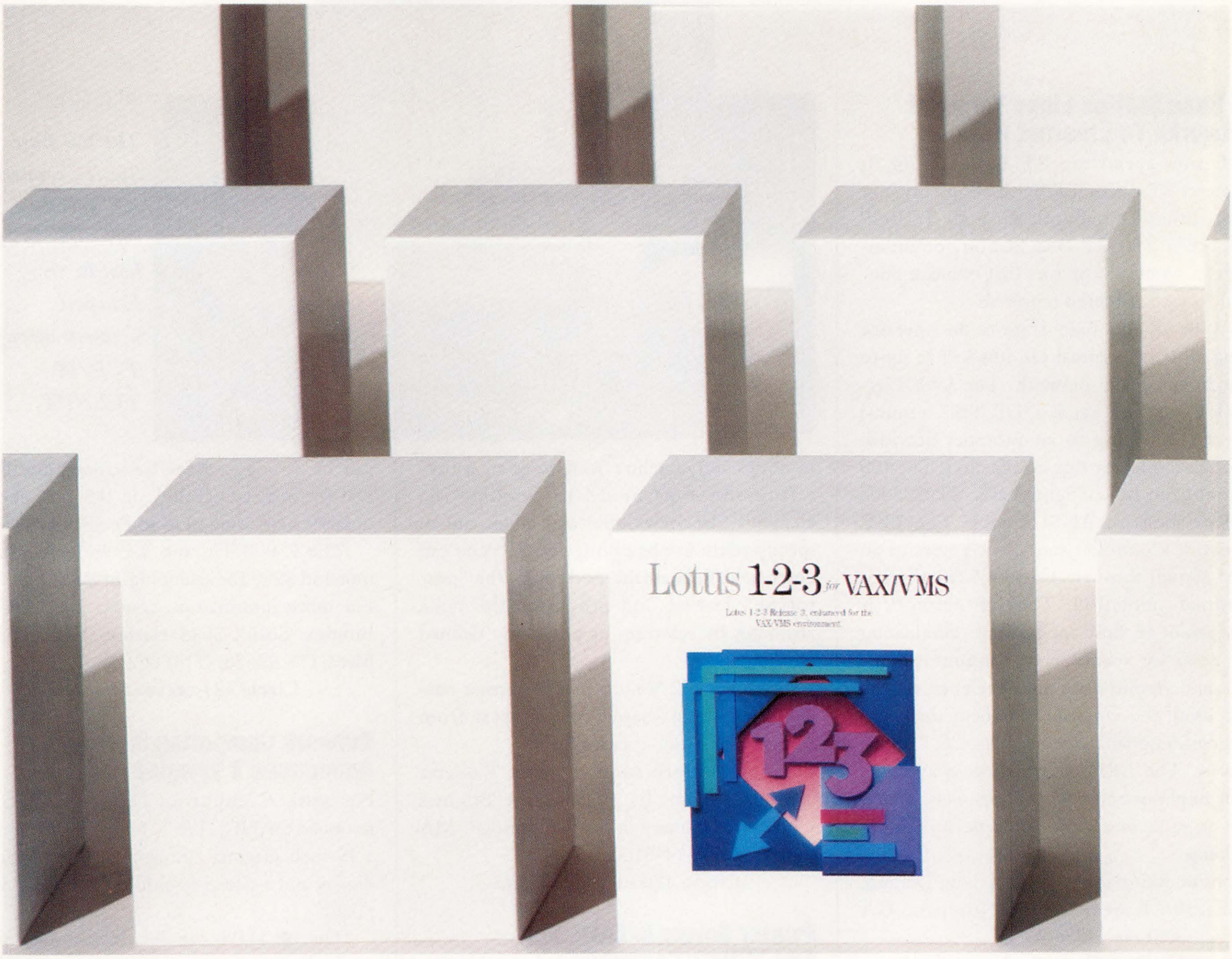

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Code AAZ

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CIRCLE 319 ON READER CARD

PRODUCTS

RF Base Station Links Terminal Networks To Ethernet Host

LXE announced the RF Base Station. It connects RF Terminal Networks to any host in an Ethernet network through TCP/IP TELNET. The RF Base Station communicates to wireless terminals that emulate standard ANSI hardwired terminals.

With an RF Base Station, an operator using an RF Terminal can hot key to up to four hosts on the network. The LXE Network Controller acts as a TELNET terminal server connecting to an Ethernet network through a thick or thin connection. The RF terminal can be configured as a VT52/100/220 or standard ANSI device. The LXE Network Controller can also connect to an IBM system through 3270 or 5250 wireless terminal emulation. The RF network is transparent to host applications, eliminating the need for special host communications software. Applications are developed on the host using the same development tools and programming language used for CRT applications. The LXE Base Station is available with single or multiple RF channels, which can be used to service multiple or remote buildings.

For more information, contact Tom Darling, LXE, 303 Research Dr., Norcross, GA 30092; (404) 447-4224.

Circle 407 on reader card

LXE 290
NETWORK CONTROLLER

The RF Base Station connects RF Terminal Networks to any host in an Ethernet network through TCP/IP TELNET.

Admins Adds Data Dictionary To Admins/V32

Admins Inc. announced Admins/V32 V4.0, a VAX/VMS integrated set of application development tools designed for developers of sophisticated end-user systems. V4.0 includes the Admins Data Dictionary (ADD).

ADD provides a repository for information about the various entities and relationships comprising an Admins-based information system. It encompasses a series of standardized screens used for specifying the system. The major screens support the attribute specification of data elements, prototype elements, file relationships, view relationships and codelists. ADD uses an entity-relationship-type model to describe data elements, dataviews, files and tables and to specify relationships among entities. You can enter field/field attributes through the "prototype" feature and propagate the same attributes by referring to previously defined attributes.

Admins/V32 V4.0 is free to current customers. Admins-based systems cost from $16,000 for a four-user site license.

For more information, contact Roberta Carlton, Admins Inc., Cambridge Business Cntr., 432 Columbia St., Cambridge, MA 02141; (617) 494-5100.

Circle 420 on reader card

Printer Server Is LAT- And TCP/IP-Compatible

Emulex Corporation announced the P3000-TL, a printer server that lets up to four parallel or serial printers share an Ethernet network. It's compatible with LAT and TCP/IP and works with many computer systems.

The P3000-TL supports multiple-host printer queuing. Both LAT- and TCP/IP-host computers can queue print jobs on it transparently. The product features a dual-processor architecture consisting of a 10-MHz 80186 CPU and a 25-MHz I/O processor. This architecture lets the product run all four ports simultaneously at 3,000 lpm for an aggregate throughput of 12,000 lpm. The product also features four expansion slots that can be configured for Centronics parallel, Data-products parallel or RS-232 serial operation by using plug-in PortPak boards.

The P3000-TL costs $2,595 for the base unit and $200 for each plug-in PortPak.

For more information, contact Dan Reese, Emulex Corp., 3545 Harbor Blvd., Costa Mesa, CA 92626; (714) 662-5600.

Circle 421 on reader card

Network Computing Devices Announces X Terminal

Network Computing Devices Inc. announced the NCD19b X terminal. It features a 19-inch diagonal bitmapped monochrome display and a screen resolution of 1,024 x 800 pixels.

The NCD19b can simultaneously access multiple-host computers running UNIX, VMS or ULTRIX, communicating the data for each session through a separate display window. Text, windowing and 2-D graphics are driven by its 16-MHz MC68000 16-bit processor. The product's 2 MB of DRAM is field-upgradable to 5 MB using single inline memory modules (SIMM). It provides full software functionality and supports TCP/IP, SLIP, DECnet, LAT and XRemote for local and remote serial communication. It also supports DECwindows and terminal-oriented applications and works with any X GUI, including OSF/Motif, Open Look or Xview.

The NCD19b costs from $2,295. A software license costs an additional $50 per unit.

For more information, contact Judy Estrin, Network Computing Devices Inc., 350 N. Bernardo Ave., Mountain View, CA 94043; (415) 694-0650.

Circle 422 on reader card

WordPerfect's Office Connections Supports EasyLink

WordPerfect Corporation and Western Union Corporation announced an e-mail gateway for WordPerfect Office users, the WordPerfect Office Connections LAN Server EasyLink Gateway.

The WordPerfect Office EasyLink Gateway gives Office users access to worldwide e-mail, fax, telex, Mailgram message, cablegram, telegram and Priority Letter services. EasyLink communications let you deliver messages to more than 7 million EasyLink users on different systems via e-mail, fax or paper-based delivery options. It also can extend WordPerfect Office LAN configurations across a WAN. Office LAN users can exchange documents, mail, calendar and scheduling messages with other WordPerfect Office users.

The WordPerfect Office Connections LAN Server EasyLink Gateway costs $495.

For more information, contact Beth McGill, WordPerfect Corp., 1555 N. Technology Way, Orem, UT 84057; (801) 222-5008.

Circle 419 on reader card

Alisa Systems Announces Enhanced Product Line

Alisa Systems Inc. announced V3.3 of AlisaTalk, its Mac-VAX integration package. V3.3 includes several enhancements. AlisaShare, an AppleShare-compatible file server on the VAX, now supports Access Control Lists (ACL) for improving the integration of Macs into VAXs. Optional logging of users improves security and control of file servers. AlisaPrint, the VAX-based print spooler, includes the AlisaPrint Whistle, which automatically notifies you when your print job is done. Support for Distributed Queuing System (DQS), AppleLaser Writer Prep V6.0 and LNO3R paper tray selection is included. Two versions of AppleTalk for VMS are included for support of either Phase 1 or Phase 2 AppleTalk.

AlisaTalk V3.3 costs from $2,950 for a five-user license.

Alisa also announced enhanced versions of MaxNotes, a Mac front-end application for the VAX Notes electronic conferencing system, and MailMate/QM, a Mac-based bridge that provides two-way exchange of messages between CE Software's QuickMail and DECnet mail services. Additionally, Alisa announced MailMate/MM, a Mac-based gateway for Microsoft mail that provides two-way exchange of mail with DECnet-based mail services.

MaxNotes V1.1 costs $750. MailMate/QM and MailMate/MM cost from $450 to $4,950 each.

For more information, contact Suzanne Young, Alisa Systems Inc., 221 E. Walnut St., Ste. 175, Pasadena, CA 91101; (818) 792-9474.

Circle 404 on reader card

Molecular Design Offers Link To Rdb/VMS

Molecular Design Ltd. announced the DBMS Interface Module to Rdb/VMS, a software link from its MACCS-II system for chemical information management to Rdb/VMS.

MACCS-II stores chemical information based on chemical structures. The interface between the two programs lets users access data stored in an Rdb database using MACCS-II's structural searching capability. MACCS-II users using Rdb and the software link can design an integrated system for managing the information needed by scientists conducting chemical and pharmaceutical research.

The interface is maintained and marketed by Molecular Design Limited. DEC provides technical and marketing assistance through its Rdb Solutions Vendor Program (RSVP).

For more information, contact Lise Dumont, Molecular Design Ltd., 2132 Farallon Dr., San Leandro, CA 94577; (415) 895-1313.

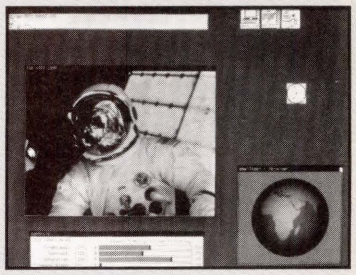
Circle 423 on reader card

Disca V1.4 Provides Disk Space Monitoring

Innovative Software Systems Inc. announced the Disca disk monitoring system. It provides disk space monitoring and reporting for VAX/VMS.

Disca contains error recovery algorithms, so it functions even when disks go offline or dismount. It uses about 0.0001 CPU seconds per disk per monitoring interval and continuously monitors the available free space on specified disk drives. As a detached process, it monitors free space at user-specified intervals. If the free space falls below the user-specified threshold, a warning message is sent via BROADCAST and/or MAIL utilities. Disca can generate information automatically

Real Time Video On Workstation Displays



RGB / View

The RGB / View™ video display controller integrates real-time video with computer generated text and graphics on high resolution displays.

The RGB / View accepts composite video (NTSC or PAL) or RGB component signals from a camera, tape recorder or video disc. Full motion video is displayed as a window on the workstation screen.

- Supports all displays from 768 × 1024 to 1280 × 1024 pixels
- Frame buffer independent
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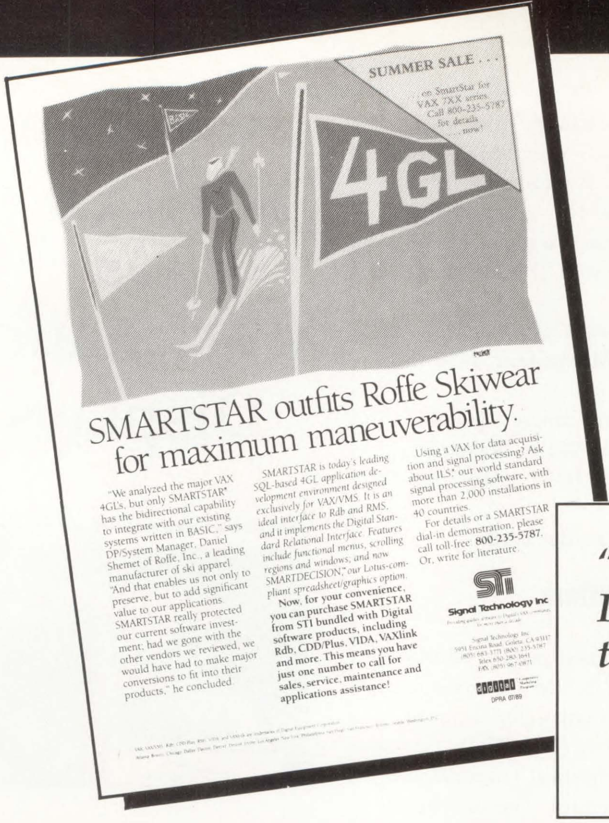

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"We analyzed the major VAX 4GL's, but only SMARTSTAR® has the bidirectional capability to integrate with our existing systems written in BASIC," says DP/System Manager, Daniel Shemet of Roffe, Inc., a leading manufacturer of ski apparel. "And that enables us not only to preserve, but to add significant value to our applications. SMARTSTAR really protected our current software investment; had we gone with the other vendors we reviewed, we would have had to make major conversions to fit into their products," he concluded.

SMARTSTAR is today's leading *SQL-based 4GL application development environment designed exclusively for VAX/VMS. It is an ideal interface to Rdb and RMS, and it implements the Digital Standard Relational Interface. Features include functional menus, scrolling regions and windows; and now SMARTDECISION,™ our Lotus-compliant spreadsheet/graphics option.*

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digital

DPRA 07/89

> *"We always think of Professional Press as colleagues: it's not your typical vendor-client relationship."*
>
> **Tony Baragona**
> **Senior Marketing Specialist**
> **SmartStar Corporation**

For SmartStar, DEC Professional Means the Right Decision Makers

As a member of the Signal Technology Group, SmartStar Corporation has been developing Digital-based application development software since 1983. SmartStar's initial decision to advertise in DEC Professional was based upon an analysis of its editorial policy and circulation.

"They Match our Target Audience"

"DEC Professional seemed to match our target audience as well or better than any other publication in the field," explained Senior Marketing Specialist, Tony Baragona.

"Ours is a sophisticated product and we need people who understand the technology as well as those who read news publications."

"DEC Professional's editorial subject matter appeals to the kind of people we're trying to motivate. They reach an audience the two news publications don't, and we need both kinds of prospects."

A Total Marketing Package

SmartStar relies primarily on trade shows, direct mail, onserts and postcard decks to generate leads.

"We use DEC Professional's mailing list extensively, since it's the only publication that specifically targets the Fortune 1000 market and these companies are the best target for our product," says Tony Baragona.

"We've also run onserts and we were pleased with the results, both in terms of lead counts and sales. We did onserts in other publications and DEC Professional was very strong in terms of response."

SmartStar has rounded out its marketing promotions with DEC Professional telemarket lead cards, plan-to-purchase surveys and reprints.

"We use DEC Professional as a total marketing package," continues Tony Baragona, "and part of the package is their people."

"We think of our DEC Professional sales rep almost as part of our marketing team. When we say, 'we want to do this, this and this, how can you help?' we can count on her to do battle for us."

"We always think of Professional Press as colleagues; it's not your typical vendor-client relationship."

DEC Professional

that lets system managers recover disk space. It can monitor error rates on disk drives and the conditions of the system queues. It runs on any VAX/VMS configuration, including VAXclusters, and requires VMS V4.4 or later. For more information, contact Innovative Software Systems Inc., P.O. Box 11458, Huntsville, AL 35814; (205) 883-8885.

Circle 424 on reader card

System Industries Expands Customer Service

System Industries announced that its Customer Service organization has expanded to include non-System Industries' storage peripherals connected to DEC systems. Among the supported products are non-DEC 5 1/4- and 8-inch disk drives connected to an HSC controller and nine-track and 8mm tape drives. Many controllers and interface boards are also covered.

System Industries Customer Service provides onsite maintenance, four-hour emergency response and around-the-clock coverage in most metropolitan areas. The hub of the nationwide operation is the SI-CARES 24-hour dispatching center, which is supported by a computerized escalation and tracking system. Customer Service engineers use specialized tools for high-speed disk formatting and diagnosis and are backed by spare parts inventories in major U.S. cities. The Technical Services group provides diagnostic and support capabilities for engineers in the field and education services in the field and at headquarters.

For more information, contact Brian Edwards, System Industries, 569 Cottonwood Dr., Milpitas, CA 95035; (408) 432-1212.

Circle 425 on reader card

Interactive Software Expands User Data Management System

Interactive Software Systems Inc. announced the UDMS:FormsManager and the UDMS: GraphWriter, two modules for its User Data Management System (UDMS) data management and retrieval product.

FormsManager lets users and developers prepare custom forms for ad hoc queries, data entry and online updates in an intuitive, window-based environment. Master/detail relationships inherent in most relational joins are handled in a user-controlled, read/write scrolling environment. Function-key mapping, linking across data structures, conditional branching, online referencing and query-by-example are featured. GraphWriter lets you chart your information in the style of your choice, including line graphs, pie charts or bar graphs with color and custom fill options. You can visualize trends, make projections and see relationships across multiple database environments. UDMS supports RMS, Rdb, Ingres, Oracle, Sybase, RS/1 System 1032 and VAX DBMS databases.

The FormsManager and GraphWriter modules cost from $500 to $12,000.

For more information, contact Bob Karulf, Interactive Software Systems Inc., 7175 W. Jefferson Ave., Ste. 2500, Denver, CO 80235; (303) 987-1001.

Circle 445 on reader card

MBLink Exchanges E-Mail Between cc:Mail And ALL-IN-1

AAC Associates Inc. announced V1.1 of the MBLink VAX Message Router cc:Mail User Gateway. It lets ALL-IN-1 and VMSmail users exchange e-mail with Novell PC LAN users operating cc:Mail.

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5,000 MIS PROS, 6 DATABASES
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Seattle, Washington 98104
PH:(206)343-0447FAX:(206)682-6866

* This represents only VAX-based end-users.

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CIRCLE 304 ON READER CARD

With V1.1, DEC's Message Router V3.1, ALL-IN-1 V2.3, DECnet PCSA Ethernet and async connectivity, and cc:Mail LAN Pack V3.1 are supported. The MBLink gateway functions as a full-featured VAX user agent/gateway that conforms to Message Router file structure and routing standards. It features the attachment and exchange of binary files such as Lotus spreadsheets, dBase files, WordPerfect documents and PC executable files between ALL-IN-1 and cc:Mail users. The PC LAN-based cc:Mail has a built-in directory service that works with an MBLink node translation table to provide non-VAX users with an automatic addressing capability.

MBLink costs $15,000.

For more information, contact John Spriggs, AAC Associates Inc., 8470-C Tyco Rd., Vienna, VA 22182; (703) 448-8666.

Circle 402 on reader card

Piedmont's MRP Package Backed By Guarantee

Piedmont Systems Inc. announced the Guaranteed MRP, an MRP package that comes with a money-back guarantee.

The Guaranteed MRP software package includes an onsite visit for a free comprehensive needs analysis. A realistic presentation is then made based upon the initial study. If the presentation is accepted, a multistage individualized implementation plan is set up, including deliverables. At the completion of each stage, you have a 30-day option to exercise the money-back guarantee or proceed. When the implementation plan is finished, you have a final 30-day option to exercise the guarantee provision. Software license fees are 100 percent refundable; other costs aren't.

For more information, contact A. Leonard Varah, Piedmont Systems Inc., 1 Corporate Pl., 55 Ferncroft Dr., Ste. 202, Danvers, MA 01923; (508) 774-2131.

Circle 503 on reader card

Quintus Announces Embeddable Prolog Development System

Quintus Computer Systems Inc. announced a Prolog development system that's fully embeddable in C applications. Quintus Prolog V3.0 lets commercial software developers write the high-level, inference-based portions of an application and then embed them in C code.

Quintus Prolog V3.0 includes QUI, a user interface based on the X standard. QUI supports the OSF/Motif look and feel across V3.0-supported platforms. It lets Prolog programs be run, edited and debugged while being viewed from a set of appropriate windows, with each window providing menus of other possible operations. QUI includes a window-based Prolog source-level debugger that allows full debugging of compiled code. It also uses the X resource manager to let users customize their QUI windows.

Quintus Prolog V3.0 costs $10,000 for Sun 3 and 4 workstations. The company plans to port the product to the DECstation by the end of the year.

For more information, contact Annette Adler, Quintus Computer Systems Inc., 1310 Villa St., Mountain View, CA 94041; (415) 965-7700.

Circle 410 on reader card

Lucas Deeco's Touch Assist Simplifies Flat-Panel Design

Lucas Deeco, a division of Lucas Duralith, announced Touch Assist, a DOS-compatible

Error Detection on DEC* Systems Is Easier Than Ever With

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MC

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CIRCLE 188 ON READER CARD

interactive touch-screen application generator. It's compatible with any Deeco SealTouch terminal or module and lets you develop or modify flat-panel touch applications quickly.

With Touch Assist's menu-driven graphical interface, you simply point and click. No compiling, recompiling or debugging is needed. As you design elements such as charts, graphs, buttons and diagrams, they appear on the PC screen in the same way they'll appear on the flat-panel display.

Touch Assist costs $195.

For more information, contact Karlene Noverr, Lucas Deeco, Div. of Lucas Duralith, 31047 Genstar Rd., Hayward, CA 94544; (415) 471-4700.

Circle 498 on reader card

Timeline Enhances Financial Information System

Timeline Inc. announced V4.4 of the Timeline Financial Information System.

The Timeline Financial Information System is designed for large organizations with complex financial information requirements and the need to process large transaction volumes. It includes General Ledger, Financial Reporting, Executive Information System (EIS), Cost Accounting, Accounts Payable, Purchase Order, Fixed Assets, Accounts Receivable, Inventory Control and Payroll. V4.4 includes an intelligent and automatic link to EIS. Extensive reporting relationships (nine alternate reporting lines for each account part) are also included. Other features include an expanded database of company information, improved security and dynamic maintenance of summary balances for ranges of accounts.

For more information, contact Lawson Abinanti, Timeline Inc., 3055 112th Ave. N.E., Ste. 106, Bellevue, WA 98004; (206) 822-1120.

Circle 412 on reader card

EM4105 V5.0 Features Multisession Support

Diversified Computer Systems Inc. announced V5.0 of EM4105, a combination Tektronix color graphics and VT320 terminal emulation and communications software product for connecting IBM-compatible PCs to VAX and UNIX hosts.

V5.0 features multisession support for such networks as FTP PC/TCP, DECnet, Sun PC-NFS, 3Com BAPI and Ungermann-Bass Net/One. It includes long packet support (1,000 bytes) and high-density landscape drivers for LaserJet II and III printers at selectable densities of 100, 150 or 300 dpi. It requires less memory due to code overlays. The emulator with an eight-color graphics driver loaded uses 256 KB of memory. The product also features mouse cursor control, Pan/Zoom, 4010/4014 and VT640 emulation support, and 4107 extensions such as 16 colors. VT320 emulation features include 132-column-mode support, a remappable keyboard, a DOS hot key, a DCL-like script language and VMS-like online help.

EM4105 V5.0 costs $395 for single licenses.

For more information, contact Diversified Computer Systems Inc., 3775 Iris Ave., Ste. 1B, Boulder, CO 8301; (303) 447-9251.

Circle 405 on reader card

Mini-Mux Extends Standard Eight Channels

Method Systems Inc. announced the Mini-Mux, a short-haul multiplexer. The Mini-Mux extends standard eight-channel multiplexer capabilities.

The solution is crystal clear.

Perceptics' Optical Storage Subsystems provide the transparent solution to your mass storage problems.

Now you can have on-line optical storage as readily as magnetic disk storage.

At the heart of every Perceptics optical storage subsystem is LaserWare, providing transparent magnetic disk emulation on VAX/VMS (including BI Bus) and Sun/Unix host systems. There is no need to modify your existing software or hardware.

You choose storage capacities from 690 MB to 6.8 GB on single drives or up to one Terabyte on a variety of jukeboxes. And our new multifunction drive systems give you the flexibility of interchanging nonerasable (write once) and rewritable (M-O) media in the same drive.

Perceptics, the full service source of optical storage subsystems, has a crystal clear solution to your mass storage problems.

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CIRCLE 355 ON READER CARD

The Mini-Mux uses an external triple output power supply (5V, +12V). It operates at data rates up to 9.6 Kbps, with receive/transmit lines for each channel. Each port can be set for DCE/CTE configuration. The common channel is four-wire twisted-pair. Internal jumpering is available. The jumper provides a one-, two- or three-mile option. The Mini-Mux operates in the DEC environment by reducing the cabling between a cluster of RS-232 devices to another remote location. A common application uses the Mini-Mux between two to eight terminals and printers on one floor with the mini on another floor up to 5,000 feet away. The product includes a five-year guarantee.

The Mini-Mux costs $395.

For more information, contact Dave Cox, Method Systems Inc., 3511 Lost Nation Rd., Ste. 202, Willoughby, OH 44094; (216) 942-2100.

Circle 510 on reader card

N1100-UN Series Upgrades UNIBUS-Based PDP-11s And VAXs

United Computer Technologies Inc. announced the N1100-UN Processor Upgrade Series for UNIBUS-based PDP-11s and VAXs. Its modular and plug-compatible design creates a universal PDP-11 processor replacement that can be used to upgrade almost any existing UNIBUS-based PDP-11 system.

The N1100-UN processor series is available in single- and dual-module versions. Features include 8 KB of cache memory, memory expansion up to 4 MB, a Private Memory Interconnect (PMI) architecture, a high-speed DMA cache, a FPJ11 floating-point accelerator, two asynchronous serial line interfaces, a device bootstrap and system self-test diagnostic routines. Software compatibility is ensured, because the N1100-UN Processor Series is based on the DCJ11 microprocessor and FPJ11 floating-point accelerator. Single or multiple N1100-UN processors can be used in conjunction with any PDP-11 or VAX containing UNIBUS support to create a co-processing, parallel or multiprocessor system that handles I/O- and CPU-intensive tasks.

The N1100-UN Processor Upgrade Series costs $8,500.

For more information, contact United Computer Technologies Inc., P.O. Box 1896, Woodbridge, VA 22193; (703) 690-4438.

Circle 501 on reader card

SL-GMS V4.0 Offers Xt Widget Integration

SL Corporation announced V4.0 of SL-GMS, an object-oriented graphical modeling system used to develop dynamic graphic screens for real-time applications.

SL-GMS offers Xt widget integration, HyperCardlike screen management and a data source manager for codeless connection between screen objects and data sources. It lets you create objects and attach them to external dynamic data with little or no programming. It offers complete Xt event handling, enabling developers to integrate Motif, Open Look or other X toolkit widgets with custom screen objects or icons created with SL-GMS. It also features PostScript output, complete FORTRAN and Ada bindings and the ability to create customized drawing editors and configurators for users. It supports major VMS, ULTRIX and UNIX workstations.

Byting More Than You Can Chew?

Sometimes the job of managing, scheduling and saving off-line back-ups can be hard to swallow.

That's why ISE designed a set of packages to help you. These include **MEDIA,** for off-line tape/disk library management; **VAULT,** for automating all your saveset management tasks; and **SCHEDULE,** for automating batch job initiation and other scheduling functions.

These products give you seamless integration with your VAX/VMS as well as cross integration with ISE's accounting packages, **ACT** and **PROJECT.**

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CIRCLE 258 ON READER CARD

SL-GMS V4.0 costs $12,500 for the development package and $1,500 for the run-time module.

For more information, contact Christopher Wilson, SL Corp., Hunt Plaza, Ste. 110, 240 Tamal Vista Blvd., Corte Madera, CA 94925; (415) 927-1724.

Circle 411 on reader card

Open Text Unveils PAT Text-Retrieval System

Open Text Systems Inc. announced PAT, a prefix string searching system for text retrieval. It can search the text of the 400-MB Old English Dictionary, for example, for matches to any arbitrary string in less than one second on a Sun-3/160.

PAT uses an index built in a preprocessing phase to achieve speed. Search time is logarithmic in the size of the database and independent of the size of the answer. PAT supports index points at every character or uses a flexible set of regular expressionlike word starter rules to specify the index points. It supports arbitrary stopwords and character mappings and the standard proximity, Boolean and set-algebraic operations typical in information retrieval systems. Searching can be restricted to regions of the database, called docs. PAT allows incremental building up of complex searches by using the results of previous queries. It's coded in C and runs on any computer with a 32-bit address space, a standard C library and the ability to treat files as seekable byte streams in the UNIX style.

For more information, contact Open Text Systems Inc., Unit 622, Waterloo Town Sq., Waterloo, ON N2J 1P2; (519) 746-8288.

Circle 409 on reader card

KBMS For VAX Provides Full Database Access

AICorp Inc. announced KBMS for VAX, a knowledge base management system. KBMS for VAX is the same object-oriented expert system that runs on IBM mainframes and PCs. It incorporates Intellect, the company's natural language system.

KBMS provides full database access, resource efficiency and a set of AI reasoning methods. It supports all major AI programming methodologies, such as forward and backward chaining, hypothetical reasoning and object-oriented programming. It also supports multidirectional reasoning, allowing application developers to mix inferencing strategies within an application. Its Data Flow System accepts input from various sources and automatically handles the external data access, generating SQL for RDBMSs. The product interfaces with relational databases such as Rdb and Oracle.

KBMS for VAX costs from $7,500 to $100,000, depending on VAX size, options and database interfaces.

For more information, contact Amy Metzenbaum, AICorp Inc., 100 5th Ave., Waltham, MA 02254; (617) 890-8400.

Circle 403 on reader card

Master Console Monitors Up To 16 Processors

Maintech announced Master Console V4.0. It provides 16 windows on one monitor to display the activities of up to 16 processors.

Master Console's central monitoring system logs processor activity as it's output to the console, eliminating the need for maintenance and storage of console log sheets and enhancing console log security. These log files can be backed up to any removable storage

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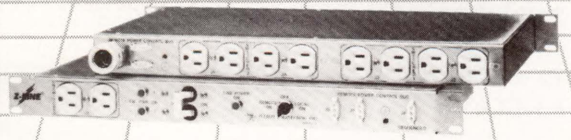

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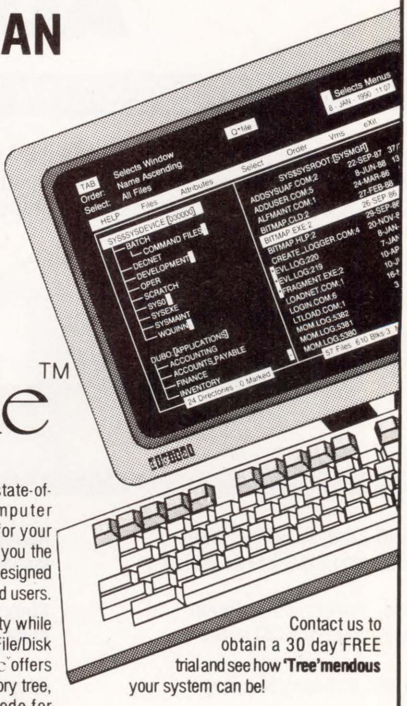
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Q*file
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MOM.LOG;5380
57 Files 610 Blks 3
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8-JUN-88
24-MAR-86
27-FEB-88
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CIRCLE 340 ON READER CARD

medium accessible by the Master Console host. V4.0 provides remote VT220 terminal and color support, VMSmail distribution of alarm messages, and user-selectable type and window size and position. Other features include scrolling console logs; historical archive and restore; date/time stamping of console activity; string, alarm and date/time searches of console log files; audible and visual alarms for prioritized error reporting; and concurrent local console operation (up to 9,600 bps). Master Console resides on a host VAXstation.

Licenses cost from $4,500 for four nodes to $9,500 for 16 nodes. MC-220, a single-window version, costs $2,995.

For more information, contact Christine Curtin, Maintech, 1133 Avenue of the Americas, New York, NY 10036; (212) 827-2603.

Circle 408 on reader card

Verbex Series 7000 Voice I/O Breaks Vocabulary Barrier

Verbex Voice Systems Inc. announced the Series 7000 Conversational Voice I/O System for manufacturing, distribution and automatic ID applications. It lets you capture data and perform transactions using a virtually unlimited vocabulary while speaking naturally and at a normal pace.

The Series 7000 can link multiple models of voice patterns by adapting to variations in an individual's speech. It automatically adjusts to changes in speech, letting you update current patterns at the workstation. The product has an active vocabulary of 2,100 words, expandable to 10,000. It recognizes sentences, commands and unlimited number strings and understands regional accents and foreign languages. Its design incorporates the TMS 320C30 chip. Optional job-specific VoiceWares are available. They contain all voice I/O application information. You can adopt any of these core application programs or tailor job-specific applications by using the Verbex Application Program Interface and Application Development Utilities for MS-DOS, UNIX and VMS.

The Series 7000 costs from $9,600 for the standalone peripheral and from $4,800 for the Series 6000 AT form-factor plug-in board.

For more information, contact Verbex Voice Systems Inc., 1090 King Georges Post Rd., Bldg. 107, Edison, NJ 08837; (201) 225-5225.

Circle 511 on reader card

BASISplus/DMXRV Provides Text And Image Retrieval For X

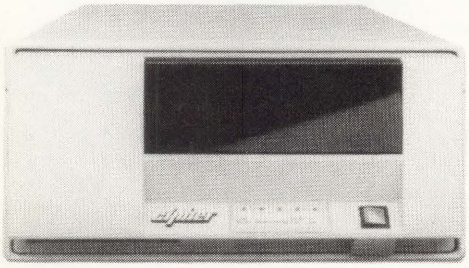
Information Dimensions Inc. announced BASISplus/DMXRV, an image processing module for VAX/VMS-based X applications of BASISplus, its text information management system. BASISplus/DMXRV combines the content-based text retrieval capabilities of BASISplus with access to images and graphics in one screen for manipulation and use of information.

BASISplus/DMXRV incorporates hypertext links embedded in BASISplus text files to access images stored in external files. A list of these images is displayed on the X workstation, allowing selection of any reference in the queue and display of the associated images in multiple windows. The product complies with DEC's Compound Document Architecture (CDA) and Digital Document Interchange Format (DDIF) standards, allowing images and graphics created using these standards to be accessed from BASISplus

ADS

APPLIED DIGITAL SYSTEMS INC.

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



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CIRCLE 247 ON READER CARD

text databases. It runs on major hardware platforms, including VAX/VMS.

First-copy licenses cost from $5,000 to $179,000 for BASISplus and from $500 to $7,500 for BASISplus/DMXRV, depending on CPU size and the number of users.

For more information, contact Edward Loss, Information Dimensions Inc., 655 Metro Place S., Dublin, OH 43017; (614) 761-8083.

Circle 508 on reader card

QMS-PS 410 Laser Printer Offers Multiuser Features

QMS Inc. announced the QMS-PS 410, a 4-ppm printer designed for personal PostScript printers.

The QMS-PS 410 features a 16.67-MHz/68020 MPU-based internal controller with 2 MB of RAM. RAM expansion up to 6 MB is available through user-installable 1-, 2- and 4-MB upgrade modules. Other features include a true PostScript interpreter, 45 resident Adobe Type 1 fonts, HP PCL Level IV emulation and an optional HP-GL emulation. QMS' Emulation Sensing Processor (ESP) technology lets the printer automatically switch between its resident HP PCL and PostScript modes and the optional HP-GL emulation. The printer has simultaneously active RS-232-C serial, Centronics parallel and AppleTalk interfaces. Maximum duty cycle is 6,000 pages per month. In basic configuration it includes a 50-sheet multipurpose paper tray. An optional 250-sheet letter/A4-sized paper tray is available.

The QMS-PS 410 costs $2,796. The optional paper tray costs $195.

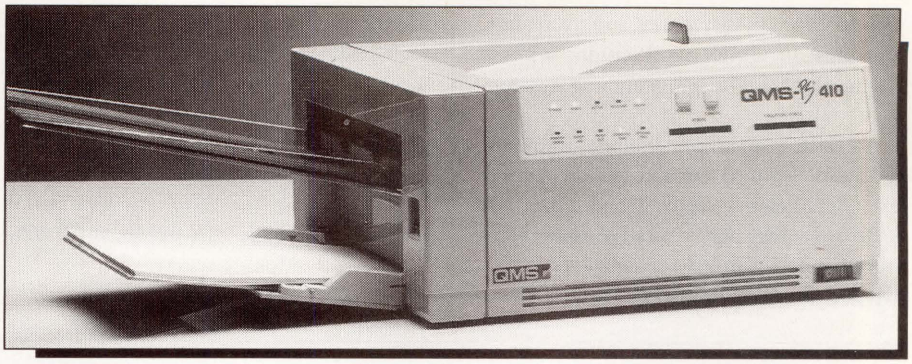
For more information, contact Carro McFadyen, QMS Inc., One Magnum Pass, Mobile, AL 36689; (205) 633-4300.

Circle 496 on reader card

M-G Set Provides Uninterruptible Power Without Batteries

Precise Power Corporation announced the motor generator (M-G) set. It provides uninterruptible power without batteries and is available in sizes of 15 to more than 105 KVA.

The M-G set's high inertia for energy storage is achieved without external flywheels by rotating the outside of the two-bearing machine. The "Written Pole" process allows the syncronous motor to start across the line with low inrush current and to accelerate the machine to synchronous speed. This feature lets you restart the motor without delay after any interruption. The Written Pole Generator provides 60-Hz frequency and constant regulated voltage to the load, even during input power interruptions of 15 seconds at full load (up to 45 seconds at no load). In 95 percent of outages, power is restored within several seconds, and the microprocessor-controlled machine automatically restarts and resumes normal operation without load disturbance. If the power outage is sustained, there's time for soft shut down of the load or to transfer to a dual feeder or a standby generator. The Roesel motor runs at unity power factor and eliminates harmonic feedback. The set provides 100 percent isolation for the utility and continuous power conditioning.



The QMS-PS 410 features a 16.67-MHz/68020 MPU-based controller.

For more information, contact Precise Power Corp., P.O. Box 9547, Bradenton, FL, 34206; (813) 746-3515.

Circle 514 on reader card

Security+ For VAX/VMS Monitors, Controls And Audits

The Parsec Group announced Security+, a layered security product for VAXs running VMS V5.0 or later.

Security+ can monitor, control and generate an audit trail of all terminal activity. Terminal monitoring can be performed actively or logged to a disk file for later review. Monitoring of processes can be scheduled automatically through a list of process criteria. You can delete idle processes through a Process Inactivity Monitor (PIM) or establish an automated schedule that switches to a different set of idle process selection criteria at the appropriate time. You can terminate idle processes by username, process name or image activated. The User Danger factor component lets you scan an entire VAX-user population and calculate a relative danger value for each user. System Service tracing lets you track service calls as they're made from a program or process.

Security+ license fees range from $2,000 to $30,000.

For more information, contact Edward Roberto, The Parsec Group, 9101 Harlan St., Westminster, CO 80030; (303) 426-9869.

Circle 502 on reader card

Data Encryption Security Available For 8mm Tape Backup

Contemporary Cybernetics Group announced the CY-8200-S, an 8mm tape backup subsystem series with data encryption security control for sensitive data. All data access is controlled by a card key, so even security-sensitive sites can take advantage of the 8mm backup standard.

With the CY-8200-S series of subsystems, unauthorized backups can't be performed without the Data Access Card. Authorized backups are uniquely encrypted to a specific Data Access Card. Without the card key issued to the subsystem owner, the encrypted data can't be read. The CY-8200-S drive reads tapes generated on standard 8mm tape drives. High-security-level card holders can write standard 8mm tapes. The security subsystem includes the two-line, 40-column drive status display indicating transfer rate, tape remaining and ECC. It's available with all models and interfaces offered by Contemporary Cybernetics Group for the DEC helical-scan 8mm tape drive.

For more information, contact Melissa Kidwell, Contemporary Cybernetics Group, 11846 Rock Landing, Newport News, VA 23606; (804) 873-0900.

Circle 500 on reader card

Saber-C V3.0 Offers Enhanced Debugging And Functionality

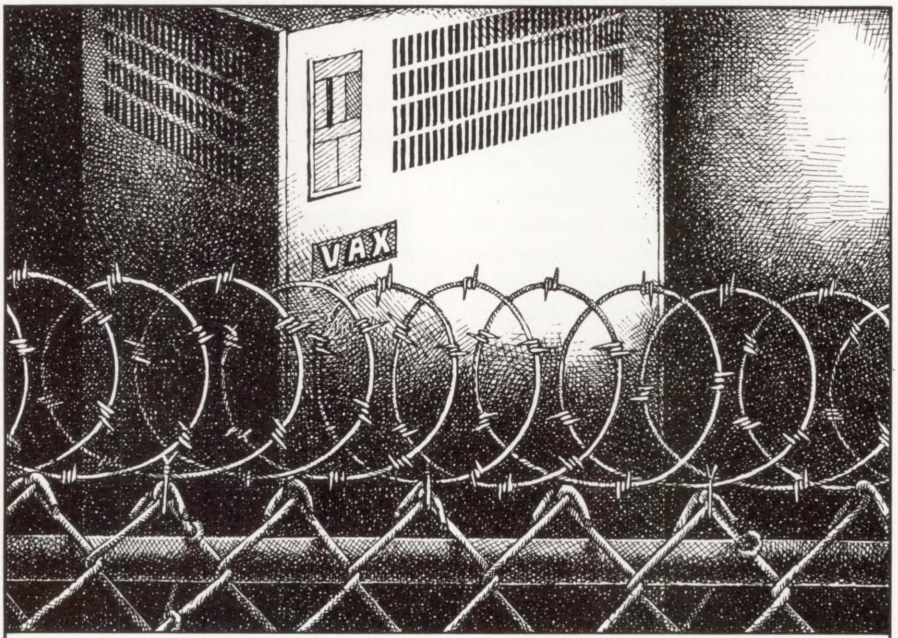
Saber Software Inc. announced V3.0 of Saber-C, its standard C programming environment. V3.0 offers debugging features and optimized functionality that integrates functions most commonly performed during the implementation and maintenance phases of software development. It gives programmers tools to develop, debug, test and maintain C programs on UNIX workstations without leaving the Saber-C programming environment.

Saber-C capabilities include automatic static and run-time error detection, source-level debugging, graphical code, data and error browsing, and a multiwindow GUI. Saber-C's debugger lets you debug source and object code modules, set breakpoints, examine the value and definition of objects, and trace and step through program execution. The product is available for Sun workstations and DEC workstations running ULTRIX.

Saber-C V3.0 costs $2,495.

For more information, contact Jill Colantone, Saber Software Inc., 185 Alewife Brook Pkwy., Cambridge, MA 02138; (617) 876-7636.

Circle 497 on reader card



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CIRCLE 316 ON READER CARD

Access Technology Extends Connectivity To 20/20

Access Technology Inc. announced 20/20 Gold, a package that bundles the 20/20 VAX/VMS spreadsheet with 20/20 add-in connectivity products. 20/20 Gold extends the functionality and benefits of 20/20 by providing transparent links to such VAX/VMS software applications as DBMSs, word processors and ALL-IN-1 software.

In addition to the 20/20 spreadsheet, the 20/20 Gold package includes the 20/20 Database Connection to any two VAX/VMS DBMSs, including Rdb, DATATRIEVE, Oracle, Ingres, PowerHouse, Sybase and System 1032 Informix. The 20/20 Word Processing Connection connects to WPS-Plus, WordPerfect, WordMARC or Mass-11. 20/20 Gold includes the 20/20 ALL-IN-1 Office Software Interface and 20/20 OpenLink. It's also available in French and German versions.

20/20 gold costs from $1,020 for a VAXstation to $22,100 for a VAX 6000.

For more information, contact Access Technology Inc., 2 Natick Executive Pk., Natick, MA 01760; (508) 655-9191.

Circle 513 on reader card

Polestar Windows V2.1 Adds Windowing To In-House Software

Polestar Software announced Polestar Windows V2.1. It includes a Programmable Interface that lets developers integrate windowing into their software.

Polestar Windows V2.1 supplies a "Mail Box" as a channel through which the application can control windowing functions. Windowing functions include open, close and switch windows, move and size windows, and cut and paste between windows. Developers can open windows into related applications, provide application control of windowing at specific points in the software, establish data links between different applications and provide the macro capability to simultaneously control multiple applications. New capabilities include simultaneous display windows, hot-key switching, multitasking, scripting, cut and paste between applications, print screen and terminal lock-out. The product works with VT100/220/320 terminals, compatibles and emulators.

Polestar Windows V2.1 costs $495.

For more information, contact Andrew Irwin, Polestar Software, 109 1/2 W. Broadway, Fairfield, IA 52556; (515) 472-2445.

Circle 504 on reader card

Mod-Tap Announces The SLT3 Single Line Tester

Mod-Tap System announced the SLT3 Single Line Tester, a product designed to verify the integrity of two-, three- and four-pair voice and data channels. Incorporating a three-in-one design, the tester features built-in modular jacks for testing USOC, 258A and RS-423 wiring sequences without the need for separate converters or adapters. The handheld tester is powered by a 9-volt battery.

The compact master and remote units separate for end-to-end testing of installed cabling. Shorts, opens, reversal or miswires are detected within seconds. Both pieces snap and lock together when not in use. Frame adapters are available for testing from the punch-down block to the wall plate.

The SLT3 costs $120.

For more information, contact Kathy Ducharme, Mod-Tap System, 285 Ayer Rd., Harvard, MA 01451; (508) 772-5630.

Circle 505 on reader card

Finlux Announces Three PC-Compatible Products

Finlux Inc. announced three products for IBM PC and compatible, mainframe, mini and UNIX environments. The EGA monitor, for users of IBM PCs and compatibles, features a flat-panel display, a resolution of 640 x 350 pixels and a viewing angle of up to 160 degrees. It connects to EGA and VGA graphics cards via the digital port.

The VGA monitor, designed for users of IBM PCs, XTs, ATs, PS/2s and compatibles, features an 11-inch flat-panel display, a resolution of 640 x 480 pixels and a viewing angle of more than 160 degrees. It operates in all VGA modes and connects to most VGA cards via the analog port.

The ELT220 terminal is VT220-compatible and can be used with host mainframes and minis, terminal networks and UNIX environments. It weighs less than three pounds, is one-tenth the thickness and weight of conventional CRT terminals and can be plugged into existing systems. It emits none of the radiating or static electricity of the CRT monitor and is flicker-free. It features a resolution of 640 x 400 pixels and a viewing angle of more than 160 degrees.

For more information, contact R. Napper, Finlux Inc., 20395 Pacifica Dr., Ste. 109, Cupertino, CA 95014; (408) 725-1972.

Circle 406 on reader card

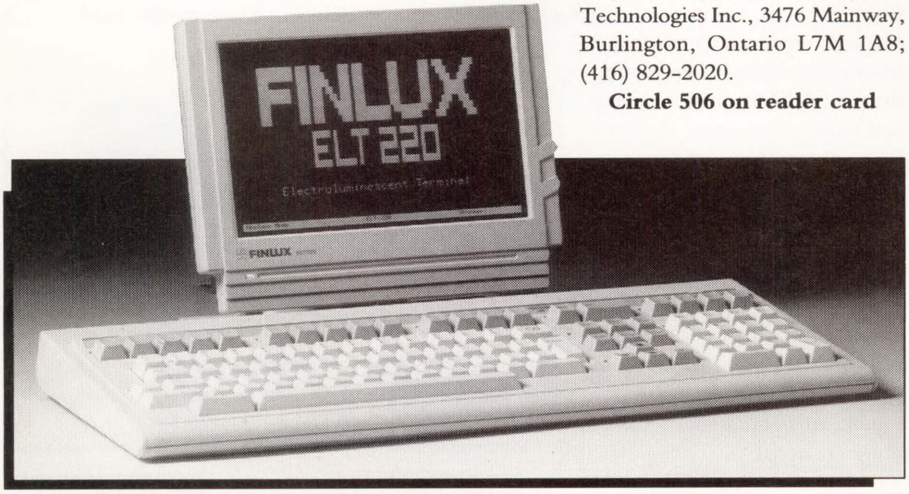
DiskView V1.2 Provides Window Into I/O Activity

Innovative Computer Technologies Inc. announced DiskView V1.2. It provides a window into the I/O activity of single- or multiple-disk devices in a VAX/VMS environment. I/O bottlenecks and disk load imbalances are displayed clearly, allowing you to quickly remove these system constraints.

DiskView V1.2 includes the DiskView I/O Performance Report. This provides such information on disk subsystems as average queue length and average I/O rate for each disk device, as well as the percent of CPU used during test periods. V1.2 includes histograms that let managers get a picture of I/O with respect to time in three forms: time for multiple disk, time for single disks and time for single files. Managers can trace crests in I/O histograms back to troughs in CPU use with an accuracy of within five minutes throughout any test period.

For more information, contact Douglas Rapien, Innovative Computer Technologies Inc., 3476 Mainway, Burlington, Ontario L7M 1A8; (416) 829-2020.

Circle 506 on reader card



The ELT220 is VT220-compatible and can be used with host mainframes and minis.

Cortex Documentor Automates End-User Documentation

Cortex Corporation announced the Cortex Documentor, a product that automatically generates end-user documentation for CorVision applications. CorVision automates most phases of the software development cycle. It's a repository-based application generator that runs on VAXs.

The Cortex Documentor extracts information captured during application development and automatically generates end-user documentation. It can be used by application developers and technical writers at any stage of the development or maintenance life cycle to produce documentation prototypes or complete user manuals. The product includes a separate interface that lets you preview a generated document online for additional editing or clarification. Because the Cortex Documentor is linked to CorVision's central repository, documentation changes are generated automatically as CorVision applications are modified, streamlining the task of maintaining documentation.

The Cortex Documentor costs $20,000.

For more information, contact Lynda Holland, Cortex Corp., 200 Fifth Ave., Waltham, MA 02154; (617) 894-7000.

Circle 507 on reader card

Uninet Offers Technology For Nonexpandable Workstations

Uninet Peripherals SLAT-1 series lets low-end, nonexpandable workstations connect such devices as terminals, printers and modems via the workstation's SCSI port.

The SLAT-1 series comes in three configurations: the SLAT-1/1C, with one Centronics parallel port; the SLAT-1/4A1C, with four RS-232 serial and one Centronics parallel port; and the SLAT-1/8A1C, with eight RS-232 serial and one Centronics parallel port. It supports standard and nonstandard baud rates up to 150 kilobaud, dial-in and dial-out modem capabilities and hardware flow control. It's available for Digital Equipment Corporation, Sun, Solbourne and Data General platforms.

The SLAT-1/1C costs $575, the SLAT-1/4A1C costs $900 and the SLAT-1/8A1C costs $1,595. Host software and site licenses cost $100 per processor type. Cabling costs $85 per device.

For more information, contact Paul Hammond, Uninet Peripherals, 1209 E. Warner Ave., Santa Ana, CA 92705; (714) 546-1100.

Circle 509 on reader card

KEYpak (UNIX) Permits Revisable Document Exchange

Keyword Office Technologies announced KEYpak (UNIX) document interchange software for UNIX systems. It lets PC, terminal, Mac and workstation users with different document editors exchange documents in editable form.

KEYpak (UNIX) improves workgroup, departmental and enterprisewide exchange of information among UNIX system users. It permits revisable document exchange and information sharing where users work with different UNIX systems, document editors, e-mail systems and workstation-oriented systems. It also enables sharing of revisable documents. The product includes support for more than 40 document interchange formats. It also includes support for such system-based document interchange formats as IBM DCA-RFT and DEX DX to facilitate document exchange between UNIX and other proprietary computer systems.

KEYpak (UNIX) costs from $600 for a multiuser system to $31,000 for an enterprise server-based system.

For more information, contact A.K. Jay Jaiswal, Keyword Office Technologies, 2816 11th St. N.E., Calgary, AB T2E 7S7; (403) 250-1770.

Circle 466 on reader card

Diskeeper/Plus V4.0 Offers DK View For Disk Monitoring

Executive Software announced Diskeeper/Plus V4.0, an online disk defragmentor. It includes DK View, a viewing feature that lets you monitor disk activity.

With DK View, you can monitor a whole disk at once or zoom in to view portions of it, including block-level detail. You can know the exact condition of the disks, watching the fragmentation and defragmen- tation process in real-time. Diskeeper/Plus V4.0 lets you perform all control functions interactively through its new menu system and includes more customizable startup commands and qualifiers. It also defragments multiple header files online. Even with users active on the system, the Multi-Header Consolidate (MHC) lets you safely target multiple header files, which decrease disk performance. The product runs on any supported VAX/VMS system and is compatible with VMS V4.6 to V5.4.

Diskeeper/Plus V4.0 costs from $250 to $10,600, depending on configuration.

For more information, contact Jeff Hodgson, Executive Software, 701 N. Brand Blvd., 6th Fl., Glendale, CA 91203; (818) 547-2050.

Circle 518 on reader card

Paralog's TDBS/A1 Enhances ALL-IN-1 Functionality

Paralog AB announced TDBS/A1, a product that provides enhanced functionality for ALL-IN-1 by integrating Paralog's Text Architecture Database System (TDBS).

TDBS/A1 provides flexible shared file cabinet functionality at the public, group and user level with capabilities and control features that let you make the information within an ALL-IN-1 environment a shared resource. It allows user-selectable substitution of text architecture databases for the folders in ALL-IN-1 filing cabinets. The product installs seamlessly and comes online with no need to modify local scripts or forms. It's fully integrated with ALL-IN-1 edit and mail features, and it integrates fully at the data level. It provides ALL-IN-1 with content-based retrieval and secure shared access to document databases so workgroups can share electronic documents. The product is available for VAXs supporting ALL-IN-1.

TDBS/A1 costs from $1,700 to $80,000, depending on host size.

For more information, contact Al Burgasser, Paralog AB, P.O. Box 373, Sherman, CT 06784; (203) 350-9066.

Circle 512 on reader card

Visibility Expands Manufacturing Control System

Visibility Inc. announced the Quoting and Estimating module for its Manufacturing Control System. The Manufacturing Control System is a synchronized manufacturing and financial software system. It manages make-to-order operations, from customer quotation through engineering, materials planning and purchasing to shop floor control, shipping, invoicing and financial reporting. It's written in PowerHouse and runs on VAX/VMS.

The Quoting and Estimating module displays quotes for multiple quantities and estimates delivery dates online. The estimator can establish quotes based on compilation of the cost to manufacture, fabricate or assemble an item, along with required materials or tooling. The estimator can open a shop order directly through Quoting and Estimating and observe the impact the sale will have on capacity and product schedules. As a quotation is entered, the database is automatically updated for all modules. If a quotation contains materials, operations or an outside process that isn't in the database, it can be added directly through the Quoting and Estimating operation.

For more information, contact Michael Regentz, Visibility Inc., 2 Main St., Stoneham, MA 02180; (617) 279-2100.

Circle 413 on reader card

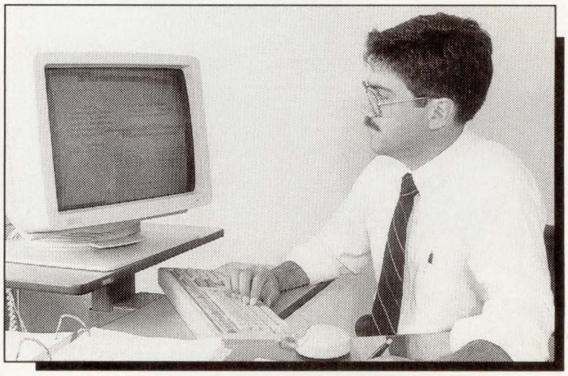
Wilco Announces Remote Printing For AutoFax

Wilco Communications Inc. announced the addition of a remote printing capability to its AutoFax VAX-to-fax system. AutoFax users or applications can now use the more than 1,000,000 worldwide fax machines as remote high-resolution 200- x 200-dpi output devices. The delivery interval for output generated by such applications as word processing, purchasing and receivables can be reduced from days to minutes.

The remote printing capability includes LN03 or HP LaserJet emulation, which lets DEC multinational character set output be printed in portrait or landscape mode at 12 or 16 cpi. Output can be merged with forms. Advanced attributes such as bold and underline are supported. AutoFax supports the WordPerfect and WPS Plus 2-D editors. The remote devices may be accessed from DCL, applications written in any DEC-supported high-level language, ALL-IN-1, VMSmail, WordPerfect or WPS Plus.

For more information, contact Terry Lamb, Wilco Communications Inc., 201 Rock Rd., Ste. 210, Glen Rock, NJ 07452; (201) 612-9414.

Circle 499 on reader card ■



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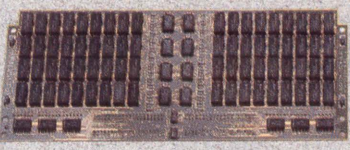
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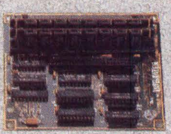
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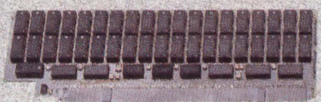
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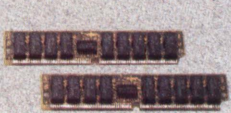
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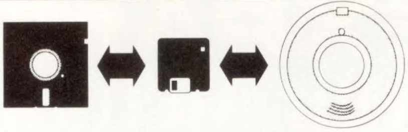

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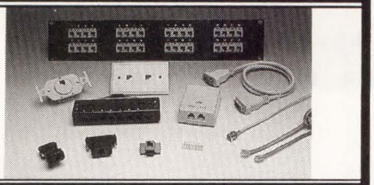

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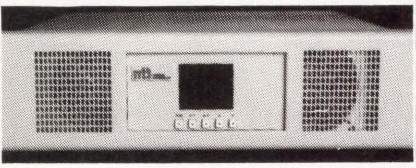

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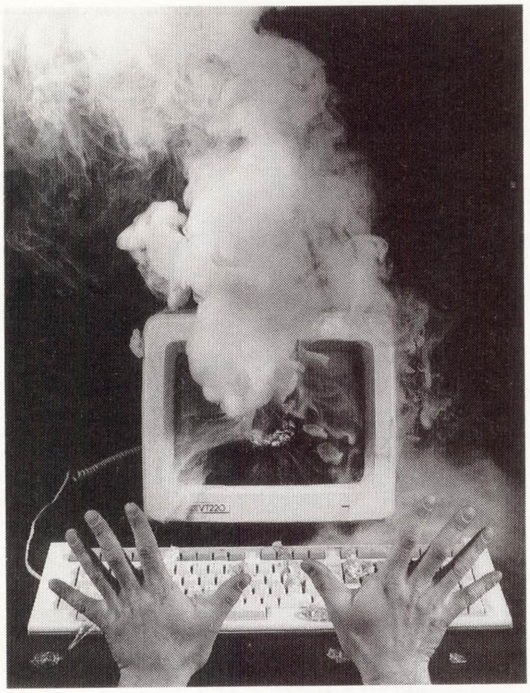

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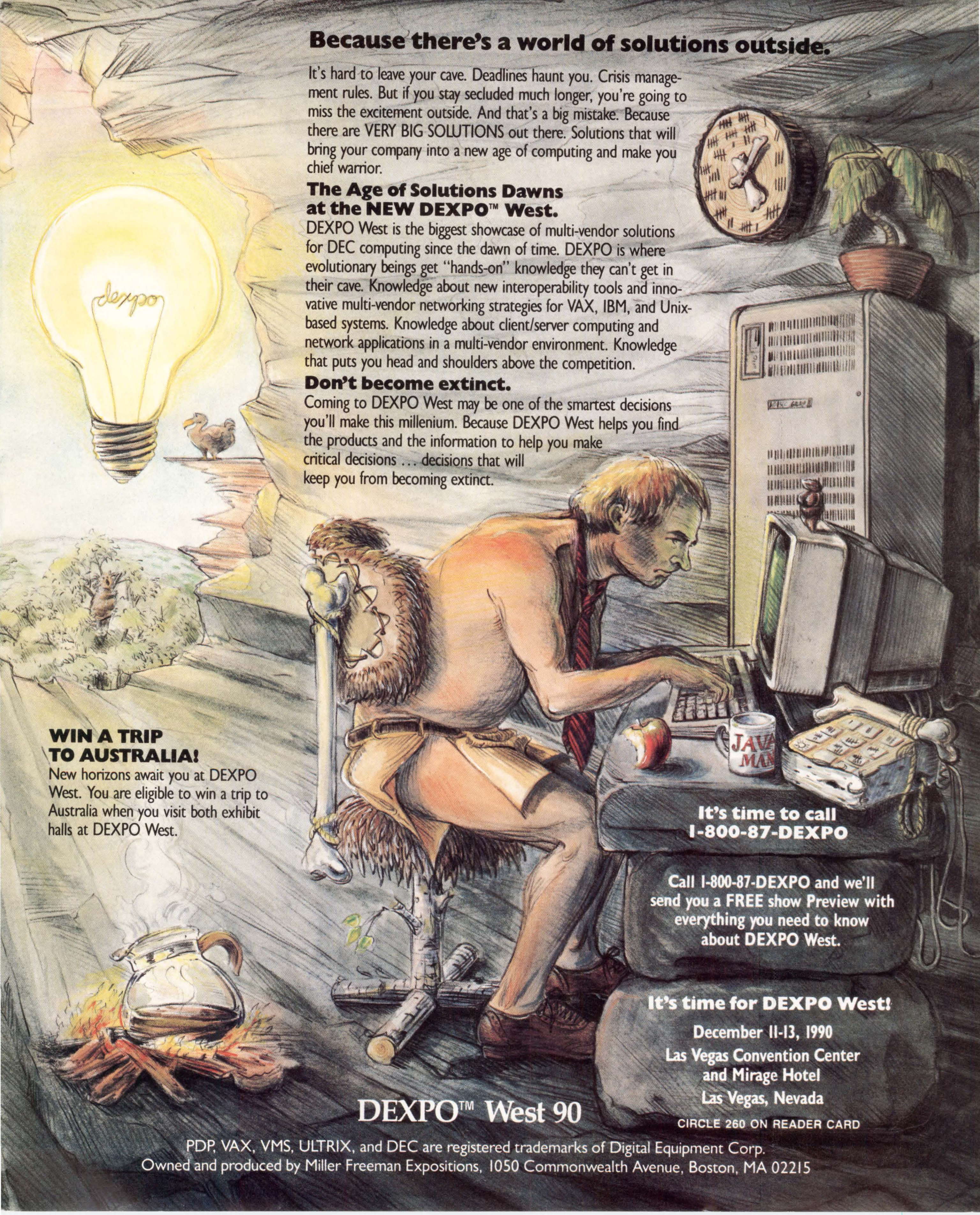

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JOHN C. DVORAK

MICROSOFT'S BILL GATES: HOME RUN HITTER?

BACK END

Microsoft Windows seems to be the hottest thing to hit the streets since baseball cards. Millions of copies have been sold. It's a bonanza for Microsoft and its wily chairman, Bill Gates.

But does anyone really use Windows? One cynic equated Windows with *War and Peace*: A lot of people like having it on the bookshelf, but it never gets read.

I've had mixed feelings about Windows since its release. I never could figure out the point. It's a fancy DOS shell, and it makes the PC more competitive with the Macintosh, or at least that's what they tell me. This is amusing, since the PC and its clones are taking over the world. These world beaters run DOS, not the Mac OS.

Well, the point of Windows isn't to set the world on fire. The point is to make money. When you learn that Gates paid Seattle Computer Products a mere $50,000 for the code for DOS, you appreciate his gift for making money. A lot of this has to do with timing and perception of reality. Gates is no slouch when it comes to either.

As a kid, Gates cornered the market on McGovern-Eagleton buttons and made a quick killing. He and Paul Allen cranked out the early BASIC for the MITS Altair 8800 in a market coup. In those days, Northstar BASIC was a superior product and the only real competition. But Gates licensed his BASIC, while Northstar kept its BASIC proprietary to Northstar hardware and the Northstar operating system (both superior products). It seemed like a good idea at the time, I'm sure. But the Northstar approach lacked vision, something Gates seems to have plenty of.

Gates' vision, however, isn't always accurate. He was the major pusher of the ill-fated MSX home computer standard. He was also the major pusher of the CD-ROM nonphenomenon. He swings for the fences every time he's at bat, but his home run record isn't that hot. He reminds me of former Oakland A's slugger Reggie Jackson. Jackson hit his share of homers, but he was no Babe Ruth. Neither is Gates.

What Jackson and Gates have in common is the big performance. Jackson hit an astonishing three homers in one World Series game. Gates made $2 billion on a $50,000 investment. Holy Toledo!

Like Gates, Jackson has a gift for promotion and sales. It's no coincidence that after retirement he opened a chain of car dealerships. He was always a salesman, even as a player. If he hit 25 home runs in a season, you'd swear it was 50. The most he ever hit in one season was 47, and he never hit more than 36 in one season after that. But when he hit one, he made a big deal of it.

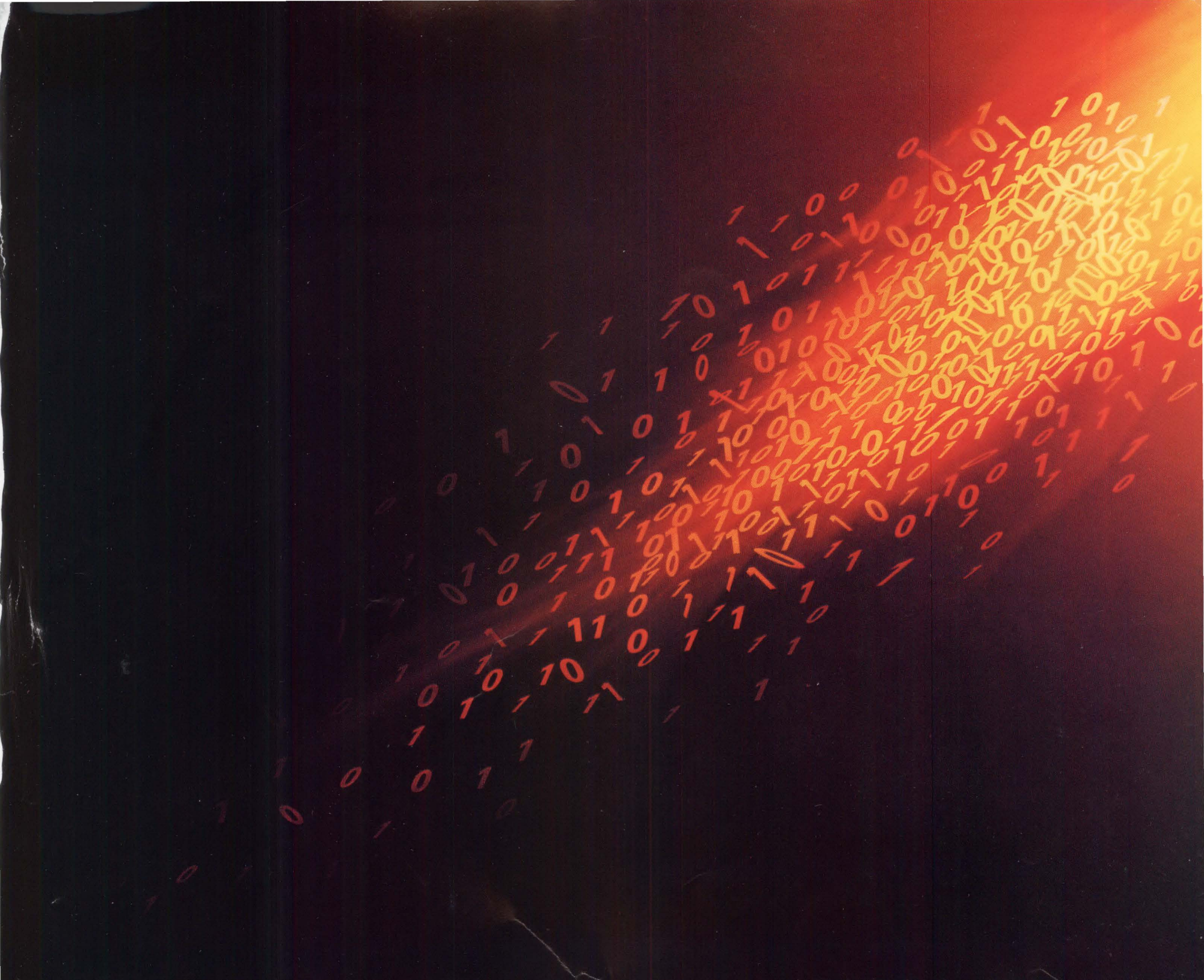
Gates' company is built on hard sell. But when Microsoft competes head-on, it comes in second. Compare Microsoft Word to WordPerfect and you'll see what I mean. Borland's languages are also killing Microsoft. But as with Jackson, you pay attention to Gates. Something phenomenal might happen — it has happened before.

Jackson put on a good show, and occasionally he did things to make you think he was great. I remember watching Bob Welch strike out Jackson in a clutch. But Jackson came back and hit a homer off Welch. Gates too is a clutch performer. His company gets the products out. If they're flawed on first release, they get better and better.

But computer software isn't a baseball game. Jackson could simply wait until his next time at bat. With Gates and Microsoft, you have to wonder what's going to happen. Is the company invincible? Digital Research is attacking from one side with DR-DOS V5.0. WordPerfect is attacking from another. Microsoft can't imagine desktop publishing. And it can't handle a database application, so it produces Microsoft Works — a softball product. It's as if a slew of pitchers were throwing the ball at Jackson all at once. Of course, this is why Gates makes the big bucks, isn't it?

Gates once said that he wants Microsoft to become the IBM of software. I assume that means he wants the company to become a near-monopoly, quality be damned. If so, it's an unusual goal. Perhaps he means that he wants to be just plain big. Then what? Nothing lasts forever. Someday Microsoft will be a memory, like United States Steel Corporation — it's now called USX and is doing something other than making steel.

Maybe Microsoft will grow into a monstrosity and become MSX Corporation. Wouldn't that be ironic? ■



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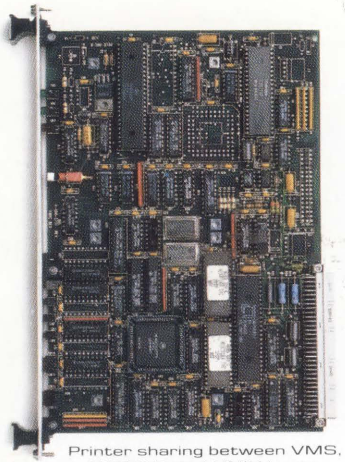
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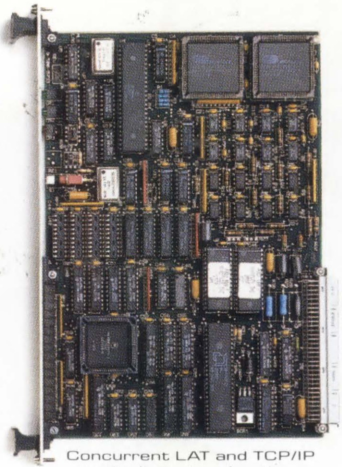
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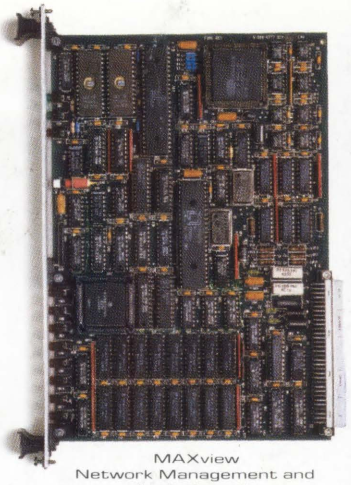
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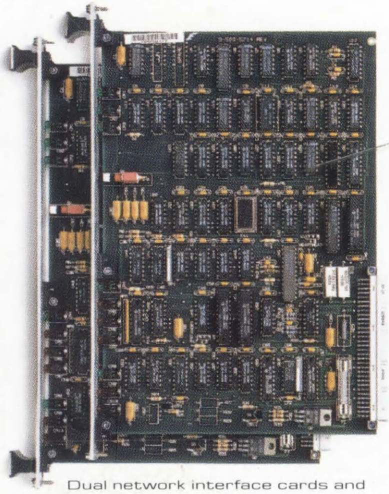
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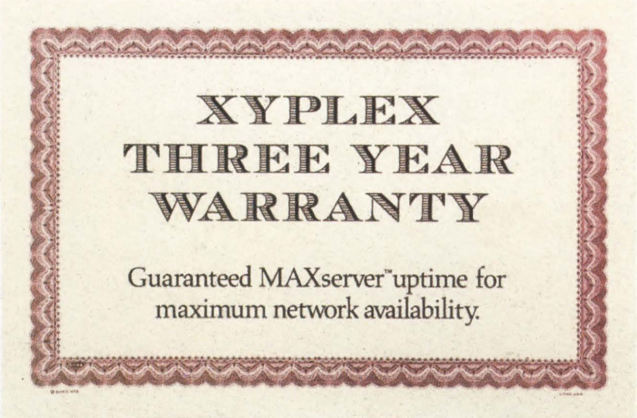
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