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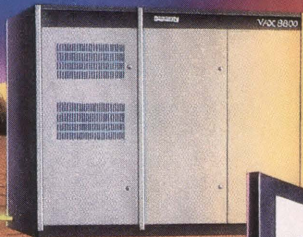
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## **Office Systems: A montage of progress**

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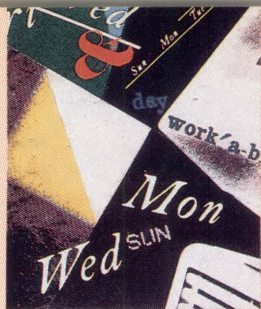
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The lab seal indicates that the product reviewed has been tested by one of our experts in our Laboratory and Testing Center.

#### ON THE COVER:

This month's cover is the work of Pennsylvania-based artist Michael Schroeder.



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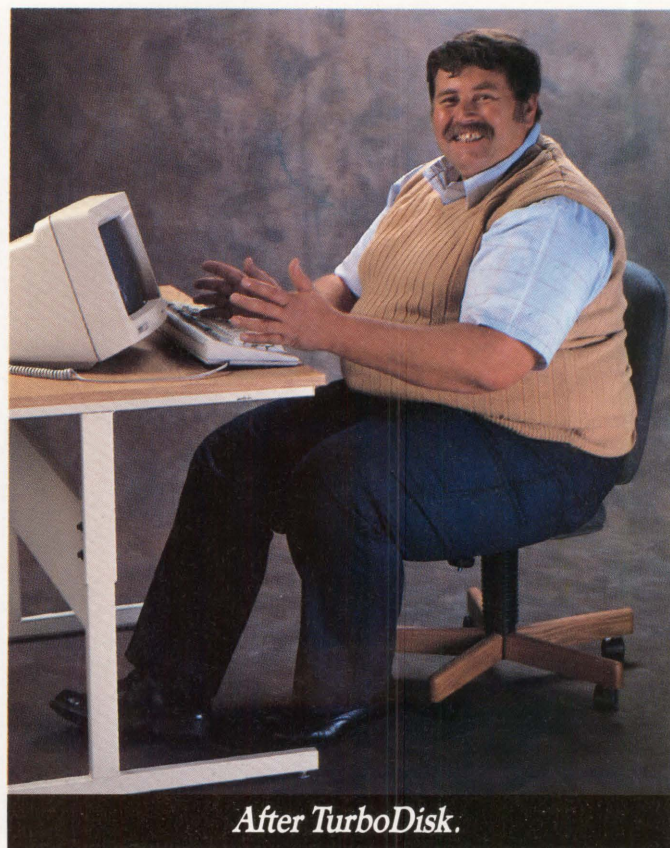
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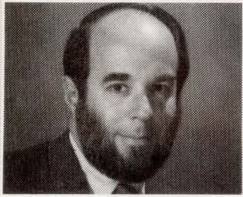
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# The Key To The Desktop

Getting computing power to the desktop has been many companies' goal for many years. So far none have succeeded, but IBM is getting close with the PC, Apple is moving with the Macintosh and DEC is scoring with *ALL-IN-1*.

In the past, Wang with its superior word processing systems began to penetrate the office market. Soon people began to see that connecting the word processing systems was a good idea. Further, if these systems could have access to other data, they could perform more functions than just word processing. The idea of electronic mail and shared databases made simple word processing machines impotent. Wang's moves into computers didn't meet expectations, and its presence in the office and on the desktop has been declining.

The PC was a personal productivity tool when first introduced, but it's now coming into its own as an intelligent workstation connected to a central computer. When the workstation is so connected, it can share databases, be on the electronic mail network, share devices (like disks and printers) and still be a personal computer. But even the PC hasn't made converts of us all.

DEC has been successful with *ALL-IN-1* because not only are the terminals or PCs connected to the computer, they're integrated with it. Office integration, not office automation, is what we've been looking for. Unfortunately, *ALL-IN-1* has its share of problems, and its detractors point out the resources it consumes and the load placed on the central computer. Those who love it do so because of its user interface and ease of use.

Apple and its third-party suppliers have produced a Macintosh computer that really is integrated with a VAX system. While maintaining the Macintosh interface (you have to see it to understand it), Apple has fit the Macintosh neatly into existing DEC networks. From a Macintosh implementation of DECNET to a Mac database that uses the VAX as its back-end processor, the Mac fits into DEC systems as an intelligent, easy-to-use personal productivity workstation.

Like the initial PC integration package, Macintosh integration was developed by third-party software companies. Later in the PC market, DEC "legitimized" these connections with the PC integration kit and MS Services for VMS. Now, once again, DEC is legitimizing Macintosh-to-VAX connectivity by announcing a joint agreement with Apple to develop and market integration software for the Mac.

The VAXMATE is DEC's second failure in the personal computer field, too little to late.

Ken Olsen has said, "DEC wants to own the desktop," and we take him at his word. But right now, it doesn't look like Digital has the resources to make a fight of it. DEC's one hope is the VAXSTATION. This powerful VAX-in-a-box could be the vehicle for DEC's attempt at owning the desktop. It has the horsepower, but none of the software to do the job. DEC can't do it alone; it needs hundreds, maybe thousands, of third-party software suppliers to make inexpensive packages for the VAXSTATION. Look at the breadth of software available for the PC and the Macintosh, and you can see how far DEC has to go.

Is it time for DEC to begin acting like a big company and consider some acquisitions that might help it? What if DEC bought Compaq? What if DEC acquired Sun? What if DEC gained control of Apple? Could DEC buy Lotus? Probably none of the above, but it should illustrate how far DEC has to go internally to compete with these savvy companies.

The key to the desktop is integration, and DEC is so close but yet so far away. It's going to take another bold move to get back into the fight. Without software, the VAXSTATION won't make it.



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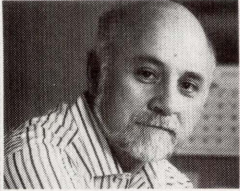
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## EDITORIAL

**Dave Mallery**

# The Cluster Chronicles

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On the Saturday evening prior to DEXPO/DECUS Anaheim, we had the inspiring experience of watching our first LAVC come up for the first time. BILBO::, our much overworked 750 with disk farm, met FRODO::, our trusty MICROVAX II, over the Ethernet and up they came!

Building a cluster out of an existing installation isn't without pitfalls and traps (there's many a gnome lurking), but the reward is elfin gold. I write this at the start of the second week. The cluster is beginning to balance properly, though there's much to do with batch queues and dial-in lines.

We're using our Xyplex cluster controllers and their load balancing algorithm to allocate users to the lighter loaded node. At this point, most of the hard-coded device references have been rooted out of the hundreds of programs, and all of the major systems are running again.

The performance is still a little erratic but it's so much better than before the cluster that there's really no comparison. Best of all, from now on (or until we get really big), all we have to do to beef performance is add another node. The next node is a VAXSTATION 2000, due any day.

The entire disk farm on the 750 (2.5 gigabytes of DR-type drives on the CMI bus) is being MSCP-served by the 750. The performance is quite good. I believe that the SI cache is making up for the overhead. We couldn't get FRODO:: to boot off the 750, however, but the jury is still out. The entire system is running VMS 4.6 because LAVC support is included in the distribution and only needs to be unlocked. The licensing of all this is an article in itself.

There's no end to the interesting "gotchas" that surface. For years, we've been doing a bit of PC software using a Logcraft Cardware board in the UNIBUS of the 750. Guess what? There's no such board in the Q-bus of the MICROVAX II. Users of the PC software that get load-balanced onto FRODO:: find themselves without their faithful Cardware.

FRODO:: (MICROVAX II) is a DECNET router. This enables our far-flung clusters — Al Cini's in New Jersey, David Bynon's ("Yuppie Cluster") in Maryland and Phil Naecker's in California — to join BILBO:: and FRODO:: via asynchronous DECNET. (There's a great piece there: BIFF:: meets FRODO:: in a cluster culture crash.)

We've been keeping copious notes and will be publishing all our findings on a regular basis. Hopefully, we'll have this sorted out and working before V4.7 arrives.

We expect 1988 to be the year of the cluster. We have ours running now, so we can help you get yours going (or keep it going). On tap is the whole issue of Mac Ethernet connectivity (on order) and the dawn of X Windows for VMS. Both subjects top our list. Stay tuned.





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## LETTERS

### THE TRADE SHOW QUIZ DEBATE

Regarding the article "The Great American Trade Show Quiz" by John C. Dvorak (November 1987), I would like to point out that the quiz precludes the majority of women from ever being able to find out if they are "true party animals." This is a great disappointment.

You may not be aware that most women won't "Look for the booths with the cutest hostesses (see question four, choice D), or "Hit on the hostesses and try to get a date" (see question five, choice D). What this means is that women must choose one of the other choices and unfortunately get socked with some points that might eliminate the possibility of being dubbed "a true party animal."

Wise up! Not all people attending trade shows are men.

**Jolene Pickett**  
Iowa City, Iowa

### CACHING IN ON MORE INFORMATION

Laurence Koolkin's "Caching In On RSTS/E" (November 1987) is based on a misreading of the documentation on caching. \$SET CACHE/ALL does indeed cache all read requests, not just those for files whose UFDs are set for caching or those based on application software use of MODE.

The ellipsis in his quotation left out important information: According to the online HELP facility, \$SET CACHE/ALL "caches all read requests. *The type of caching (sequential or random)* for a particular file depends on the file's UFD entry or the OPEN MODE specification." (Italics denote the section

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

skipped in Koolkin's quotation.) That \$SET CACHE/ALL caches all read requests is easily verified, even if the UFD entry and program make no reference to caching.

As an example, I ran a worst-case virtual array accessing routine that took three times as long to run with \$SET CACHE/NOFILE as with \$SET CACHE/ALL.

Koolkin's program is still useful for some purposes. Unless a file is marked for sequential caching, or the program uses MODE 256% + 2048% all caching is done randomly. If you want sequential caching, you must intervene manually, and using Koolkin's program for that purpose will help. Alternatively, some systems may not have enough memory to cache all I/O, and may want to cache on a file-by-file basis, setting UFD entries and using \$SET CACHE/FILE. For these uses, Koolkin's UFD-marking procedure is a definite aid. For those who want to randomly cache all read requests, however, \$SET CACHE/ALL is all you need.

**Kelvin Smith**  
Stamford, Connecticut

### CLEARING UP THE CASE

In the chart of vendors of CASE tools published in the article by Sue Ann Hawley, "CASE For Sale" (December 1987), you left out Cadre Technologies Inc. of Providence, Rhode Island.

Cadre's *Teamwork* is widely used by systems analysts to develop large-scale scientific and engineering software development projects because it's the first and only set of automated programming tools designed specifically for the workstation environment. With more than 2,000 licenses issued worldwide, Cadre is the leading supplier of workstation-based CASE tools.

Cadre also is a technology leader. Last June, at the Design Automation Conference, Cadre sponsored the second annual Software Roundtable where the company announced and demonstrated EDIF as an interchange format to allow the transfer of data among CASE tools from various vendors.

Thanks for letting us clear this up.

**Karen Chiacu**  
Manager, Marketing Services

*Editor's note: DEC PROFESSIONAL regrets the oversight.*

*Cadre Technologies is also a Cooperative Marketing Participant with DEC. For more information enter 427 on reader card.*

### ANNIVERSARY WISHES

Congratulations on your eighth anniversary! Dave Mallery made me feel sentimental talking about his 11/70 (Number 104). If memory serves me correctly, I believe I was the engineer who swapped the backplane after Frank and Ed worked on it all night. I still

# Our Biggest Competitor is Backup and Restore.

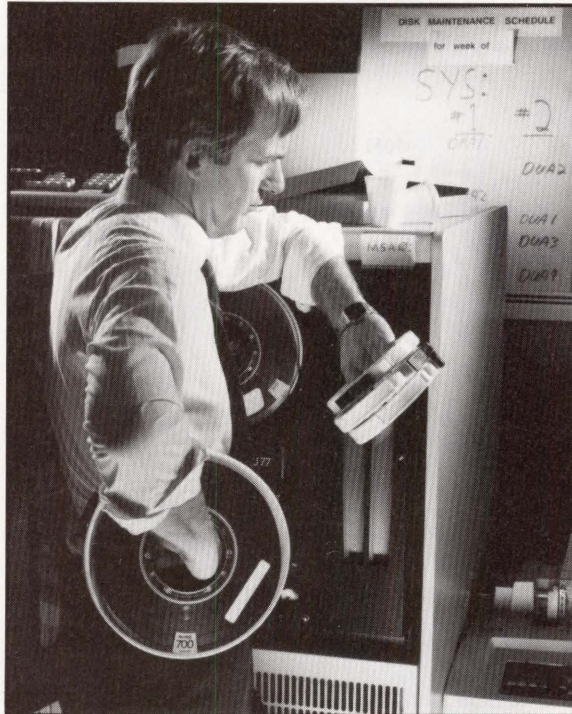
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DP

remember coming out to the site and waking Carl Marbach and Dave up at 5 a.m. Did I ever thank you for breakfast?

**Sal Villari**

**Digital Equipment Corporation  
Blue Bell, Pennsylvania**

## REFLECTING BACK EIGHT YEARS

It has been a long time since I've had the pleasure of talking with Dave Mallery at a DECUS Symposium. Speaking as someone who was around in New Orleans when Dave and Carl Marbach

decided to launch *The RSTS Professional*, it was a real pleasure to read the eighth anniversary articles (November 1987).

It was equally rewarding to read a RSTS article in that issue. As current chairman of a still very active RSTS SIG, I hope this letter will correct any misunderstanding someone might have after reading Dave's account of the evolution of Professional Press from *The RSTS Professional* days. That "friendly" operating system for PDP-11 users is alive and well. It's currently sold by DEC and is under active development for the foreseeable future. The current Version 9.4 has been made even friendlier than it was in the old days by inclusion of a largely VMS-compatible DCL command language and DCL procedures, single syntax for inactive, batch and indirect command processor, VAX-compatible FAST backup, autogeneration of a default monitor and system management commands built into DCL.

There is even a new crop of gurus out there to assist with those few exotic things you might wish to do. I guess the reason so little is written about RSTS these days is because of what I modestly call "Mustain's Law of SIG Activity." Loosely stated, this law holds that the more DEC has screwed things up, the more active a user group has to be to ensure mutual survival.

As a user of both VMS and RSTS on multiple machines, I feel qualified to say that anyone looking for a low-cost, multiuser system, with a rich supply of low-cost software in a business environment not rich in computer experts, should look at the modern PDP-11s running RSTS on today's fast disks.

I know there's still a lot of love left for RSTS, so I forgive the demise of *RSTS Professional*. Dave and Carl have, over the years, been responsible for many of the good things in today's RSTS. All that quiet insistence and expertise in wish list and tech tips sessions has born fruit, and it's sweet indeed.

**Charles W. Mustain**  
**Chairman, DECUS U.S.**  
**Chapter RSTS SIG**  
**Louisville, Ohio**

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- SCROLLABLE REGION
- CHOICE LIST
- CLOCK
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- RUNNING TOTALS
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**Invoice Screen Content:**

Invoices: Create Review Print Exit

INVOICE

Invoice No.: 888784 Date: 09/18/87 Time: 17:37:23

Customer: William Jones  
Innovative Software  
351 Bulletin Avenue  
Needham, MA 02194  
(617) 394-5512

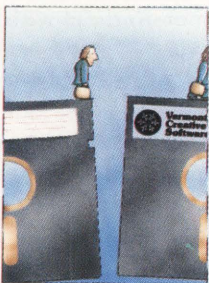
No.	PRODUCT	DESCRIPTION	QUANTITY	PRICE	AMOUNT
5	WDXE	Windows for Data XENIX	2	1295.00	2590.00
6	WDUM3	Windows for Data MicroVax	1	2900.00	2900.00
7	WDUM5	Windows for Data Vax 785	1	4900.00	4900.00
8	WD3B2	Windows for Data 3B2 Unix	2	1995.00	3990.00
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# ARISTALK

## MIGRATION PATTERNS

### QUERY:

**Louis Lange** (SIG 31/MESS 19): Does anyone know of manuals, listings, source code, etc., that have helpful hints for converting RSTS/E BP2 V1.6 or later to VAX BASIC V2.4 or later?

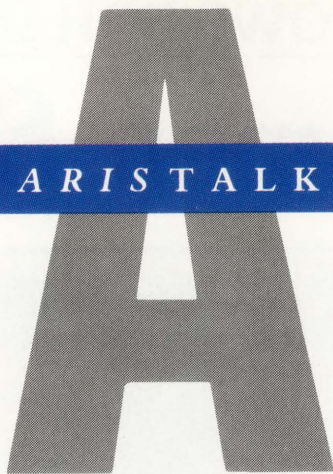
I'm having a devil of a time because they took away the RSTS/E feature of using record 256% (available in BP2) for writing prompts to the screen. It's not available on VMS! (Bummer!) Any ideas?

### REPLIES:

**Phil Anthony** (SIG 31/MESS 20): Drop back to RSTS. I had the same kind of problem when a client wanted to move from BP2 V1.6 on RSTS V8.0 to a MICROVAX II. I was called in to do some up-front work to determine how long the conversion of 300-plus programs and about half that number of subroutines would take. The answer was very expensive — a little more than one programmer year. Their DEC salesperson, who had counted on the sale, was somewhat miffed at my figures, but the local DEC VMS gurus pretty much confirmed them.

DEC's answer to your general question is that when you write your BP2 code, write it modularly, with all I/O screen handling and system services carefully isolated. Then, when the time comes to migrate, rewrite all the system-dependent routines, recompile and go. DEC doesn't seem to have any bright notions, though, about what to do with RSTS/BP2 features that don't exist under VMS, such as painted fields beyond which the user can't write.

Also, DEC's suggestion implies that you haven't written the BP2 code



## How To Use ARIS

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

*KERMIT* is available.

## SIG Identifications

Here's a list of the SIG categories referenced in this month's *ARIS*talk:

- 12 .....Site Management
- 31 .....Migration issues
- 37 .....VMS

already with I/O and system services in line, which strikes me as a silly assumption if it really wants people to migrate existing applications.

I hope your conversion goes more smoothly than that client's, if he had stayed with DEC. He's keeping his 11/70 until he can get an IBM 43xx with an application package from a software house customized to his needs. Too bad — both DEC and I lose a client.

**Louis Lange** (SIG 31/MESS 21): Thanks for your words of wisdom. I haven't had too much of a problem converting my BP2 code so far. Approximately 99 percent of it has been transportable easily so far. Someone else came up with a solution for me: Use CHR\$(155%). Hope it works. By the way, I'd love to hear some more BP2/VAX BASIC migration horror stories.

**Kevin Verble** (SIG 31/MESS 24): I may be too late, but maybe this could help someone else. We're converting some RSTS BASIC software to VMS BASIC. There was a nice article in the January 1986 issue about the differences between the two BASICS. This helped us in deciding how we could prepare and what we'd have to do. We did some modularizing like Phil talked about, and that helped — specifically with terminal I/O. We replaced the RSTS echo control and the like with the VAX INKEY\$ statement. This was a quick solution but probably has a lot of overhead with the single character I/O.

We haven't solved the RSTS message send/receive yet; we're looking at mailboxes. We used logicals for passing some limited information from program to program like RSTS did with core common. This works well. We haven't had any big problems yet, and it's gone faster than expected. The biggest surprise was the quick compiles on the VAX when compared to RSTS. I think this cut our conversion time the most. Hope this helps.

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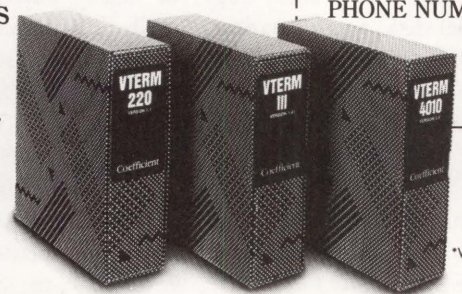
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## MONITORING PROGRAM EXECUTION

### QUERY:

**Jim Porter** (SIG 12/MESS 49): We're looking for a program that can trace a running program and display where the time is being spent (either by module name or line number) on our 11/780s running VMS.

Our busy programming staff has generated many long and complex programs which, at times, seem to take longer to run than expected. We don't want to have to modify and recompile just to get statistics using \$GETJPI, but would prefer to use something that can monitor execution without any changes to the source code. (We write programs using both VAX FORTRAN and Whitesmiths' C compiler.)

The only candidate we've found so far is called *IMON*, from Bear Computer Systems, which looks like it would do the job, but we wanted to ask for additional advice from *DEC PRO* readers before making a commitment. Any suggestions are very welcome, including responses from existing *IMON* users.

### REPLIES:

**Phil Anthony** (SIG 12/MESS 50): DEC's SPM can monitor individual programs in two modes. The first tells you how much time was spent executing each line, and the second tells you how many times each line was executed. It's expensive, but it's a very professional product and is fully DEC supported, if that's important to you. Frankly, it makes traditional C profilers look somewhat primitive.

**Jeff Corbett** (SIG 12/MESS 51): Jim,

1. Bear will give you a two-week demo tape for your own evaluation. The language we were using at the time (DIBOL) didn't work well with *IMON* because of its interpretive nature. It looked pretty good, though.
2. There have been submissions on many DECUS VAX SIG tapes. I suggest you check with your LUG librarian and get indexes from any tapes you can. The only one I've looked at was on Spring, 1983 and it was missing some modules necessary for it to work.

## BACK UP YOUR IMAGE

### QUERY:

**Mike Schmidt** (SIG 37/MESS 414): I'd appreciate any input regarding IMAGE BACKUP as a means to defragment my disk. I realize that products like *Diskeeper* will perform this function; however, given MICROVAX II VMS V4.2 FILES 11 structure, and save sets written from disk to tape, will the following steps result in a contiguous disk?:

1. Standalone IMAGE BACKUP.
2. Disk format and bad.
3. Standalone IMAGE BACKUP restore.

Also, please excuse my ignorance, but what exactly is an IMAGE BACKUP? My simplistic understanding is that it's a backup snapshot of the current disk/file configuration. This leads me to believe that when I restore an IMAGE BACKUP to a freshly formatted disk, the disk won't be contiguous because of the non-contiguous original IMAGE BACKUP.

### REPLIES:

**Hunter Goately** (SIG 37/MESS 415): Your method for getting a contiguous disk is the same one we used at Western Kentucky University. As I understand it, an IMAGE BACKUP is a copy of all of your files on a disk; a /PHYSICAL BACKUP is the exact snapshot of your disk. Doing an IMAGE BACKUP, IMAGE restore will produce contiguous files; a PHYSICAL to PHYSICAL would leave things exactly the same.

**Richard B. Gilbert** (SIG 37/MESS 416): An IMAGE BACKUP copies the disk on a file-by-file basis. A PHYSICAL BACKUP copies the disk block-by-block, in order, from block 0 to the last block. When you restore an IMAGE BACKUP, all the files are restored contiguously and all free space is contiguous. When you restore a PHYSICAL BACKUP, you get an exact block-for-block copy of the original disk, fragmentation and all.

It's not necessary to format the disk in order to compress it. Running BAD on a disk on an MSCP controller such as the RQDX3, KDA50, UDA50, etc., is a waste of time. The controller automatically detects and revector bad blocks and you should never see one.

**Wayne Steffen** (SIG 37/MESS 417): We have

RA60s on UDA-50s, and RC25s on KLESI here. On the RC25s, when we run BAD on a disk that was in use as FILES-11, we do get bad blocks. I haven't been doing much swapping around with those packs. Maybe the RSX reconfiguration task doesn't work as well as VMS?

**Richard B. Gilbert** (SIG 37/MESS 419): I'm not sure that the RC25 on a KLESI qualifies as an MSCP disk. I'm not familiar with the RC25, and I thought that the KLESI was a BI-bus mag tape controller. I'm reasonably certain, however, that the MSCP controllers that I mentioned (UDA50, KDA50, KDB50, RQDX3) won't show bad blocks when you run BAD.

**Phillip Crews** (SIG 37/MESS 420): It's possible to receive an error reading a block from an MSCP-controlled disk if the following conditions are met:

The controller attempts to read data and can't, so the controller decides to revector the block. The controller attempts to recover the data and can't, so the controller sets the FORCEDERROR bit in the sector header of the revector block, indicating that the data may not be acceptable, causing all subsequent reads of that block to return the SS\$\_FORCEDERROR condition until the block is rewritten!

I assume that this scenario could happen during a run of BAD, thereby indicating bad blocks. If you get a lot of them, assume that the pack can't reliably store data because blocks are going bad rather than being bad.

**Warren Odum** (SIG 37/MESS 425): I can assure you that the RC25 is an MSCP device; I've had one for two or three years. The KLESI (Low-End Storage Interconnect) is how it connects to the Q-bus or UNIBUS.

I've seen evidence that the RC25 controller is remapping bad blocks. But each MSCP controller doesn't necessarily implement full MSCP; sometimes it's a subset. I've heard that the RQDX1 and RQDX2 don't remap bad blocks.

I've also heard from DEC that the RC25 isn't for dirty environments. It seems that unwanted particles can fall off the removable pack onto the fixed platter after the former is inserted; i.e., the fixed platter isn't sealed totally! ■



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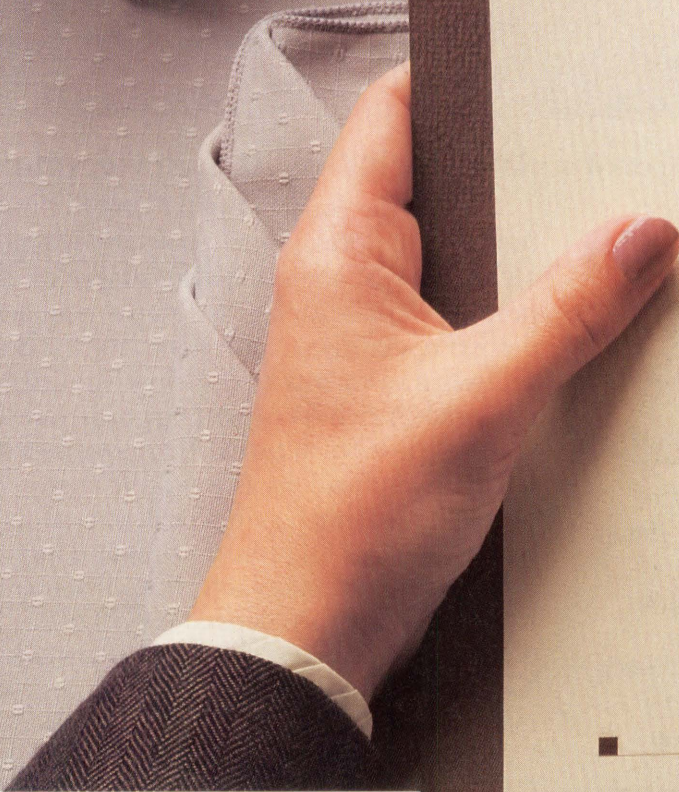
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## *Appetizers*

VT240/241 emulation

VT220 emulation

Tektronix 4010/4014 emulation

## *Entrees*

VT340 ReGIS graphics

Addresses LIM expanded memory

Keyboard remapping

Fast, accurate file transfer

Downloadable character sets

LAT protocol support

Automatic ALL-IN-1 and  
VAX Mail pickup

## *Desserts*

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LAN support

Microcom Networking Protocol\*

*\*MNP support \$50.00 when in season.*

# Introducing Reflection 4. VT241 emu

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

Reflection uses less RAM



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

We think you'll find our hearty command language ideal for

writing custom user interfaces, or for automating complex or frequently used routines.

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

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## *WRQ Specialties*

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Robust script language ideal for automating frequently used routines.

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Hot-key between your favorite PC program and leave your VAX session running.

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16 colors, all ReGIS commands, including: polygon fill, 4 cursor styles, mouse support.

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All menu items with dessert of Backup and LAN.  
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# ation to satisfy your ReGIS appetite.

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## DEC And Beckman Industrial Develop TMT-1

### *Diagnostic And Troubleshooting Tool Certifies LAN Wiring Interconnectivity*

A troubleshooting tool that certifies LAN wiring interconnectivity for suitability to conduct reliable information traffic is now available from Beckman Industrial, Instrumentation Products Division. This easy-to-use hand-held instrument, called the Transmission Medium Tester (TMT-1) permits convenient testing of Ethernet either thick or thin or twisted-pair LANs. It's the result of a joint design and development effort between Beckman and Digital Equipment Corporation.

The device performs a series of electrical tests individually or in automatic sequence under operator control. Results are displayed clearly in English and on a two-line, 20-character LCD display. Designed for field use without extensive technical training, the operator can initiate the automatic test sequence and locate LAN wiring problems simply by depressing three buttons on the unit's membrane key-

board. Preformatted tests include:

- 1. Distance and Length** — measures distances up to 600 meters and reports length of shorted or open line to an accuracy of +/- 30 cm.
- 2. Impedance** — determines characteristic impedance of coaxial or twisted-pair lines in the range of 50-150 ohms.
- 3. Noise** — measures both impulse and RMS noise. The RMS type can be isolated to any of three bands, 40Hz-150KHz, 40Hz-20MHz or 20MHz-200MHz.
- 4. DC Resistance** — detects shorts or opens.
- 5. Line Mapping** (Twisted-Pair only) — point-to-point verification of twisted-pair signal and ground wiring; can be used for office identification or security checks of the network. Accessory terminators are provided for making these ID checks.

High/low programmed limits are checked for all tests performed in the AutoTest mode, providing a quick

Go/NoGo evaluation of the line.

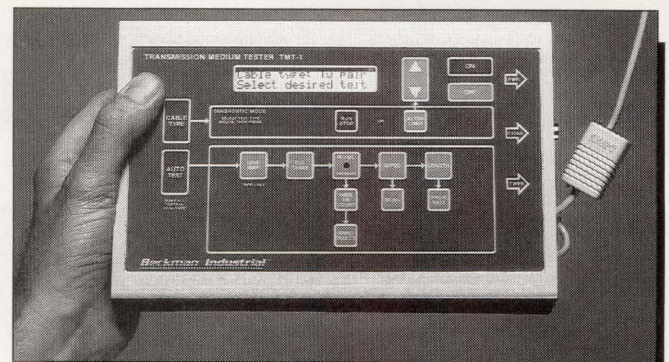
An operator may choose to run specified tests individually or alter programmed data via bypassing the AutoTest mode, instead selecting the diagnostic mode. By choosing this way, the user can execute electrical tests in any sequence or run one test repeatedly. LCD display prompts lead the operator through each test.

The TMT-1 is housed in a rugged ABS plastic case that measures 9.5-inches wide x 6.25-inches high x 2.25-inches deep. Operating controls are contained in a sealed membrane keyboard. The top surface includes the keyboard, clear window LCD display and red LED noise overlimit indicator. It weighs less than five pounds.

Either battery or AC line power is acceptable for unit operation. Normally, the four internal C-size NiCad

batteries supply operating power and are recharged after use with the supplied AC adapter. Upon powering up the unit, the display indicates how many battery hours remain on the charge. AC line power may be used for TMT-1 operations during battery-low conditions, or four standard C-size dry cells may be used in place of the NiCad batteries. Anytime power becomes inadequate to support accurate measurements, a LOW BATTERY SHUTDOWN warning appears on the display and the TMT-1 automatically powers-down.

The TMT-1 performance specifications for accuracy of testing and certifying interconnectivity in LAN environments was determined by DEC. According to Philip Spillane, business development manager at Beckman Industrial, DEC perceived the need for such a tool to



replace the cumbersome and interpretive nature surrounding present methods of troubleshooting and testing LAN wiring. Beckman was invited by DEC to participate in developing such a product, and the result is the TMT-1, the best among several entries.

According to Spillane, the device works somewhat like radar. To measure distance and noise, a signal is transmitted down the line and reflected back to the unit. By knowing either the propagation rate of the conductor or the length of the conductor, it's possible to accurately measure where in the LAN a disturbance is located. It's the first tool developed for and aimed at LAN certification and replaces the use of three pieces of test equipment: multimeter, noisemeter and TDR. For example, a Time Domain Reflectometer (TDR) works essentially the same way, but the pulse on the screen must be interpreted by an experienced technician. And four technicians may come up with four different readings. With the TMT-1 there is no guesswork. The display states what is happening on the line and where within inches.

In tests conducted in September at DEC, a short was placed in a cable at 10 meters down the line; the TMT-1 determined that the short was at 9.82 meters. This type of troubleshooting accuracy simply has not been available until now.

Substantial software has

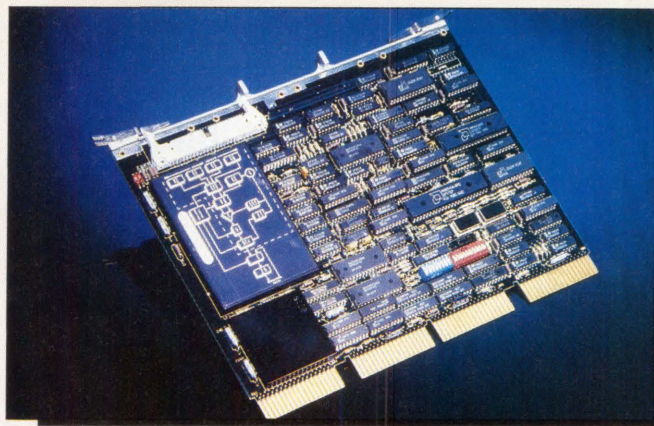
been built in to make the LAN certification process straightforward. For example, range limits for noise are preprogrammed in and the device reports places where these limits are exceeded. The pressing of three buttons is all that is required to start and complete automatic operations. So far, in all DEC tests, the prototypes have been performing in excess of specifications with impedance (Z) deviations of one-tenth of an ohm and standard deviations in distance measurements of one-tenth of a meter being obtained.

DEC has begun placing the TMT-1 devices in field offices around the country and considers it a critical tool for its field engineers. It's a cost/labor saving device that takes the guesswork out of LAN troubleshooting and testing.

Shipments to other LAN maintainers will begin in March. The TMT-1 includes a dual 50 ohm/shorting BNC terminator, eight 100 ohm and office ID terminators, a three-foot BNC/BNC Ethernet link, three-foot 6MMP twisted-pair link, line supply/charger, carrying case and operator instruction manual. A two-year warranty also is included. The TMT-1 can be purchased via the *DEC Direct Plus* catalog or from Beckman Industrial, Instrumentation Products Division. It is priced at \$3,200.

For more information, contact Beckman Industrial, Instrumentation Products Div., 630 Puente St., Brea, CA 92621; (714) 671-4822. **Enter 411 on reader card**

—Ron Levine



## Analog-To-Digital Conversion At The Speed Of Light

*ADAC Fills The Need For Fast Analysis*

**A**DAC Corporation has developed a very high-speed data acquisition subsystem contained on a full-quad Q-bus style board. It's designed to provide accurate high-speed measurements in both MICROVAX and PDP-11 system environments.

The 1032ADC includes a software-selectable multiplexer that can be configured to be either 16-differential or 32 single-ended channels, followed by a software programmable amplifier that can be set for gains of one, two, four or eight on a channel-to-channel basis. A fast track and hold circuit acquires multiplexed data and settles to rated accuracy in less than one microsecond. The high-speed 12-bit analog-to-digital converter is of successive approximation design; it performs a full conversion in less than three microseconds.

With high-speed data acquisition of 200KHz, what type of environment is the 1032ADC most suited to? According to Don DiRocco, ADAC's marketing manager, the 1032ADC is used at one company that manufactures

helicopter frames. One of the preliminary tests performed on the helicopters involves smashing the frames against the wall to analyze the impact data. The 1032ADC also is used in the analysis of bird sound waves, sparrows in particular, because of the high frequency of the sparrows' songs.

To take advantage of the front-end speed of the model 1032ADC, the ADC is followed by a 512-word FIFO that allows the conversion process to occur at precise clock-set intervals, independent of computer latency times for processing the data. A dual DMA structure allows ping-pong filling of memory buffers, eliminating delays due to parameter loading inherent in single DMA systems.

The 1032ADC allows any MICROVAX or PDP-11 system to be used for high-speed data acquisition applications. The 1032ADC lists for \$2,900. For further information, contact ADAC Corp., 70 Tower Office Park, Woburn, MA 01801; (617) 935-6668.

**Enter 413 on reader card**

## Raster Image Processing Capabilities Broaden Ion Printing Applications

*The S3000G Ion Page Printer Offers Flexibility, Enhanced Graphics And 30 PPM Output*

The Delphax S3000G ion printer is a 30-page-per-minute printer that produces high-quality printed output at the industry-standard matrix density of 300 x 300 dot-per-inch resolution. It's supported by a 3.5-inch floppy disk drive that can be used to download fonts or emulations.

The S3000G is a non-impact page printer aimed at OEMs whose printing requirements include both text and graphics. Non-impact printers, such as those based on ion printing technology, offer better print quality than older, impact printing technologies such as high-speed, data-processing line printers or slow speed, word processing characters.

"The S3000G ideally is suited for a range of applications, including word processing, spreadsheets, charts and diagrams, computer-aided engineering printouts as well as for production-like printing, such as checks, airline tickets, invoices and business forms," commented Delphax president and chief executive officer, Gary Sharpe.

The RIP controller, located in a separate printed circuit board within the printer enclosure, emulates

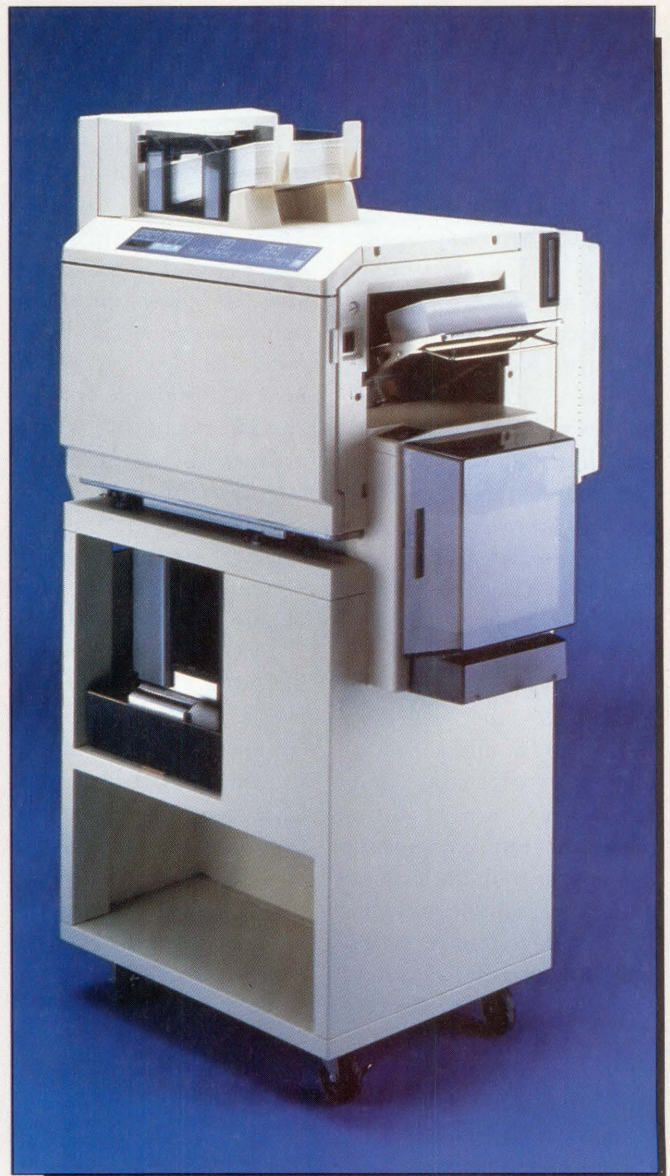
the LaserJet Plus and Diablo 630 printer command languages, providing software capability with most document composition programs. Through its open architecture, the S3000G allows OEMs the flexibility to interface with host systems. Standard interfaces include Centronics and Dataproducts; Delphax will design custom interfaces on request.

The RIP motherboard contains an Intel 80286 microprocessor for local memory and self-diagnostic commands. The RIP provides for all-points addressability and a variety of line, arc and circle drawing commands.

The S3000G ion printer is rated at a monthly duty cycle of 250,000 pages, with vendor field service recommended at 400,000 pages. Dual 500-sheet feeder and stacker bins are standard; 2000-sheet feeder and stackers are available.

It supports a selection of typographic quality type fonts and sizes, including Delphax Roman, Pacella and Courier. The fonts are available in fixed-pitch and proportional-spacing type styles and are printable in a portrait or landscape mode.

According to Tom Kinney, vice president of sales and marketing, "With the introduction of sophisticated raster image processing on



*The Delphax S3000G ion printer is a 30-page-per-minute non-impact page printer. The printer is suited for applications where text and graphics frequently are used.*

the printer, we are taking full advantage of the high-quality output that ion printing technology produces and that users are demanding. Furthermore, ion printing continues to be the most reliable, cost-effective printing method for applications as diverse as data processing

and desktop publishing."

The price range is from \$20,000 to \$25,000. To obtain further information, contact Delphax Systems, 35 Pacella Park Dr., Randolph, MA 02368; (617) 961-2312.

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# Complex document production. Simple method to get there. This is WORD-11. The ultimate in VAX word processing.

This is a WORD-11 document, and this is how we did it.

Set up newspaper columns format—  
2 to 16 columns :10  
Type document and check spelling 3:15  
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Print document 1:00  
Total time: 4 min., 41 sec.

Calculated on a per page basis of columned documents and graphics.

That's it, WORD-11—simple operations, great results, and business documents that have character. For over ten years we have been perfecting WORD-11—refining it, making it faster, easier to use, and expanding the features.

Now with release 4.1 we have achieved a long sought after level in VAX/VMS word processing.

WORD-11 is now the unquestionable leader in ease of operation. With optional menus, on-line help, and a color coded keyboard, a new user can be writing simple pieces in 30 minutes. The majority of editing functions require only 1 or 2 key strokes, making all operational skills come very quickly. In addition, the transition from other word processing programs is more forgetting a lot of operations you don't need rather than learning new skills.

WORD-11 delivers even more cost effectiveness to word processing with efficient resource

usage—which translates to more users on your system.

Some features may seem like just subtle differences, but sometimes subtle differences produce more than just subtle results in speed and clarity. The bottom line is that WORD-11 delivers the highest level of speed, simplicity, and cost saving efficiency, plus the fullest functionality of any word processing package in the DEC market today.

All this and total system application—from VAX 8978 to Micro VAX 2000—WORD-11 performs brilliantly on all VAX systems.

For more information about WORD-11 call, or write.



Data Processing Design, Inc.

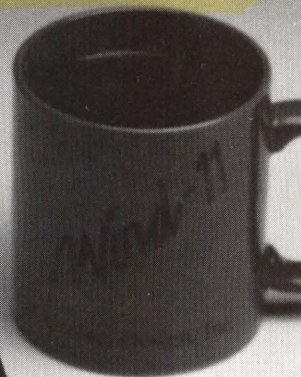
1400 N. Brasher Street  
Anaheim, CA 92807

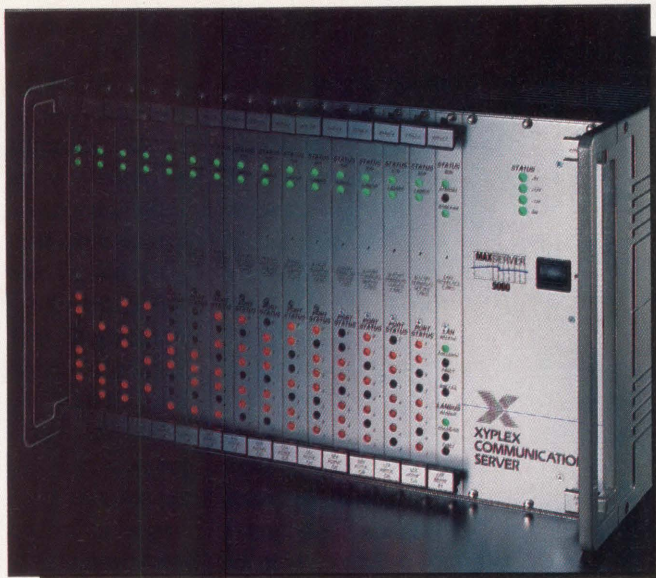
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1-714-970-1515 California

1-416-225-7788 Canada

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## Get Uninterrupted Service With The MAXserver 5000

*The MAXserver 5000 Incorporates Management Functions Into One Program*

When purchasing communications servers, the customer's strongest concerns center around the need for high-reliability, LAN/WAN connectivity and compact packaging. Xyplex has addressed these concerns with the development of the MAXserver 5000. It's the first VAX communications server to combine superior throughput and uninterrupted service with LAN/WAN connectivity.

According to Xyplex President Paul L. Rosenbaum, "The MAXserver 5000 breaks new ground in VAX communications servers, offering high-performance and superior functionality. It features high-density packaging for space savings and fault-tolerance for non-stop communications."

The MAXserver's functional advantages over other

servers include the integration of LAN/WAN. The high-performance WAN interface card plugs into the MAXserver 5000's LANBUS backplane.

Communication speeds up to T-1 levels (1.544 Mbits/sec) are supported with the WAN card, which allows remote terminal populations to access an Ethernet link.

Any MAXserver micro-processor-based board, such as the eight-port terminal server card, can be "hot swapped" for another without interrupting the operation of any other device on the server, and without losing a single packet of data. This is the result of LANBUS backplane technology, that ensures maximum uptime and flexibility in configuring the server.

MAXserver 5000 eliminates single active points of failure with a provision for

multiple intelligent network interfaces. For example, if an Ethernet connection fails in the MAXserver box, a secondary Ethernet card provides continuous access to the network. In addition, the power supply easily can be swapped or augmented with an optional redundant power supply failure. As users are added to the MAXserver, network processing power is added too, for an aggregate total of 15 mips.

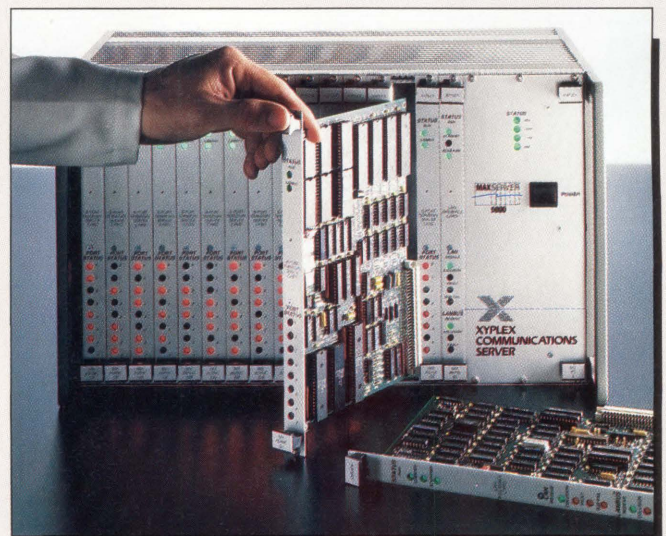
MAXserver systems are built around communications protocols that maximize overall performance. All communication servers offload CPU-intensive terminal overhead-handling tasks from the VAX. In addition, performance can be achieved through a VAX front-end processing option. This increases the amount of VAX processing cycles available for computational tasks, often eliminating the need for a costly upgrade to a larger VAX. MAXserver 5000 is designed to meet existing and future cabling needs. Organizations with changing networks can

locate patch panels and distribution boxes in wiring closets or equipment rooms. Punch down blocks are available for use with existing telephone wiring, and direct connections can be made from the network backbone to the terminals in a distributed environment.

The MAXserver 5000 is controlled by Xyplex's Advanced Network Management software. It provides integrated configuration, control and diagnosis throughout all LAN/WAN locations of the Xyplex System from a single, unified software package.

The cost of the MAXserver 5000 configured with 120 ports is less than \$250 per port. The basic MAXserver 5000 configured for Ethernet lists for \$9,995 in rack mount or standalone configurations. Eight-port terminal server cards list for \$1,295. All prices include a three-year warranty. For further information, contact Xyplex Inc., 100 Domino Dr., Concord, MA 01742; (617) 371-1400.

**Enter 414 on reader card**  
—Suzanne Garr

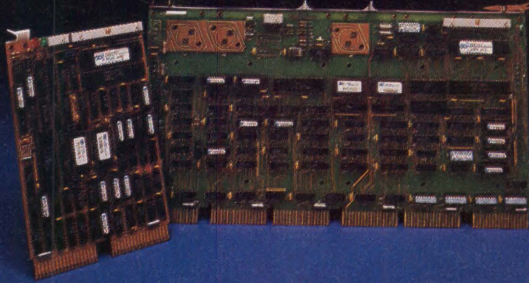


*The MAXserver distributes the Ethernet across its backplane, eliminating DELNIs and dozens of cables.*



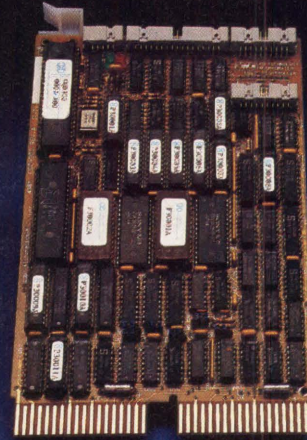
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Intelligent SCSI Host Adapters



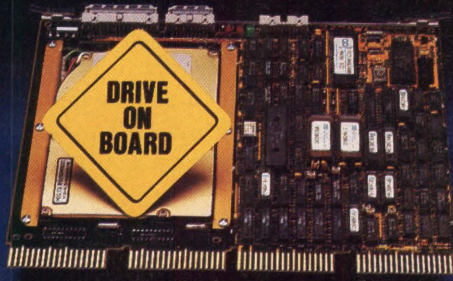
CQD200 CDU700

High-Speed ESDI Controller



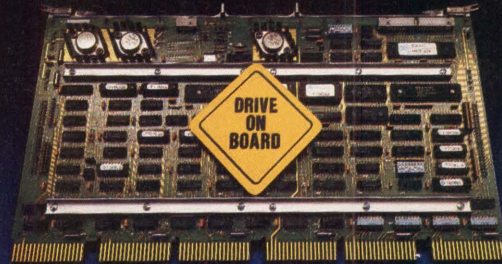
CQD300

"Q-Card™", On-Board Q-Bus Disk Subsystem



CQD100

"U-Card™", On-Board Unibus Disk Subsystem



CDU600

## MSCP Compatible Controllers and Subsystems For MicroVAX, MicroPDP-11, LSI-11, PDP-11.

### **CQD100 (Q-Bus), CDU600 (Unibus) —**

A cost effective disk subsystem that consists of on-board 3½ inch drive(s) and an MSCP compatible controller. Formatted Capacity: 20MB-140MB/drive.

### **CQD200 (Q-Bus), CDU700 (Unibus) —**

An intelligent SCSI host adapter that offers the best solution to bridging DEC MSCP protocol and SCSI optical, magnetic disk and tape products.

### **CQD300 (Q-Bus) —**

A high performance dual wide MSCP disk controller that interfaces up to two ESDI drives with 15MHz transfer rate.

### **CQD50 (Q-Bus) —**

A low cost dual wide MSCP disk controller that interfaces up to two ST506 drives.

All the above controllers feature a user-friendly on-board utility for formatting and configuration.



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## Liberty Electronics Debuts Its Freedom ONE Line Of Terminals

*Freedom ONE Plus And Freedom ONE Turbo Add To DEC-Compatible Series*

Liberty Electronics recently has added two new DEC-compatible terminals to its low-cost Freedom ONE line-up, the Freedom ONE Plus and Freedom ONE Turbo. The terminals emulate a wide range of ANSI standard terminals, such as the Digital VT220, VT100, VT52 and Data General DASHER series. In addition, the Freedom ONE Turbo has a PC emulation mode that allows it to be used with multiuser PC systems.

Freedom ONE terminals feature a flat, 14-inch, high-contrast monitor that has exceptional character resolution. The monitor sits on a tilt-and-swivel base that houses the electronics.

Contrast and brightness adjustment is provided by a sliding bar on the CRT housing. The terminals are available in amber and green screen models.

Freedom ONE terminals come with a choice of detached, low profile, adjustable keyboard styles:

DEC VT220 and Data General D210/211. Both keyboards have fully programmable function keys.

Other features include a password security system, menu-driven setup (full screen), a status line, a bi-directional auxiliary data port, and a four-function calculator.

The password security feature allows the user to specify a six-character password which controls access to the terminal and the setup screens. The password is stored in RAM, and may be erased by removing the battery inside the terminal. The four function calculator, accessed through terminal function keys, is capable of eight-digit integer arithmetic. Values are entered through the numeric keys on the main keyboard, not the 10-key pad.

For more information, contact Liberty Electronics, 332 Harbor Way, South San Francisco, CA 94080; (415) 742-7000.

**Enter 416 on reader card**

—David W. Bynon

## Software Through Pictures Opens Up Many Windows

*Interactive Development Environments Gives Developers And Analysts The Tools For Creating Better Software*

**S**oftware through Pictures, from Interactive Development Environments (IDE), is an integrated set of products for the analysis, design and prototyping stages of the software development cycle for the Digital VAXSTATION II, 3200 and 3500 under VMS.

"DEC's high-performance graphics workstations coupled with IDE products give developers and analysts the tools for creating better software in a faster, more cost-effective manner," commented Dr. Anthony I. Wasserman, IDE president.

*Software through Pictures* supports several software engineering methods and consists of the following products: Structured Analysis, Structured Analysis for Real-time Systems, Structure Design, User Software Engineering and PICTURE.

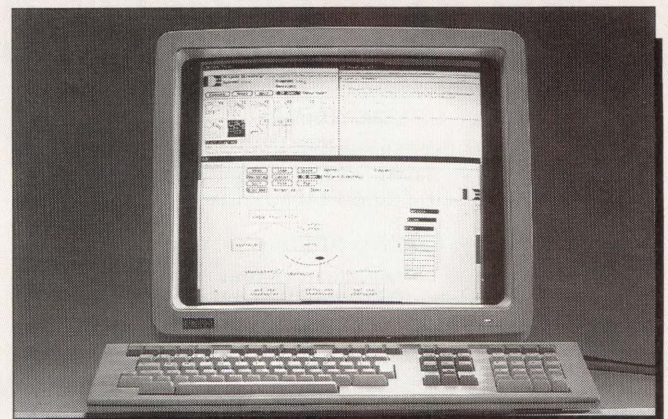
The *Software through Pictures* graphical editors are used to develop dataflow diagrams, state transition diagrams and structure charts, define data elements and create entity relationship models. The editors are

linked to the IDE Data Dictionary, which supports definition of names, types, constants and associated text. The error-checking utilities check for undefined items, inconsistent use of names, improper decomposition of a process and mismatches in data flows.

*Software through Pictures* is based on the concept of Visible Connections, IDE's open software architecture that allows you to customize and extend its development environments. The Visible Connections approach allows users to combine products, such as Source Code Control Systems (SCCS) and desktop publishing systems, and create a completely integrated software development environment.

*Software through Pictures* products are priced from \$5,000 to \$17,000. For more information, contact Interactive Development Environments, 150 Fourth St., Ste. 210, San Francisco, CA 94103; (415) 543-0900.

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# MASS 11<sup>®</sup>

We do More  
We do it Better

and

# We do it with All-In-1<sup>™</sup>

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* Integrated with All-In-1 file cabinet	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	* Choice of editors: WPS/EDT/MASS-11	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>
* Updated twice a year	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	* Text and graphics integration with output to many laser printers	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>
* Identical product on PC/Communications to VAX	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	* Ability to mix font and point sizes anywhere in a document	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>
* Great response time & superior performance (4:1)	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	* Floating footnotes and Table of Authorities	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>
* Multiple users per VMS account (shared WP)	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	* Split screen editing and statistical typing	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>
* Full PostScript support/43 font styles	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	* Laser printer support (including LN03, QMS, Talaris, HP, Xerox, and PrintServer 40)	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>
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The leading third party word processor for the VAX\*

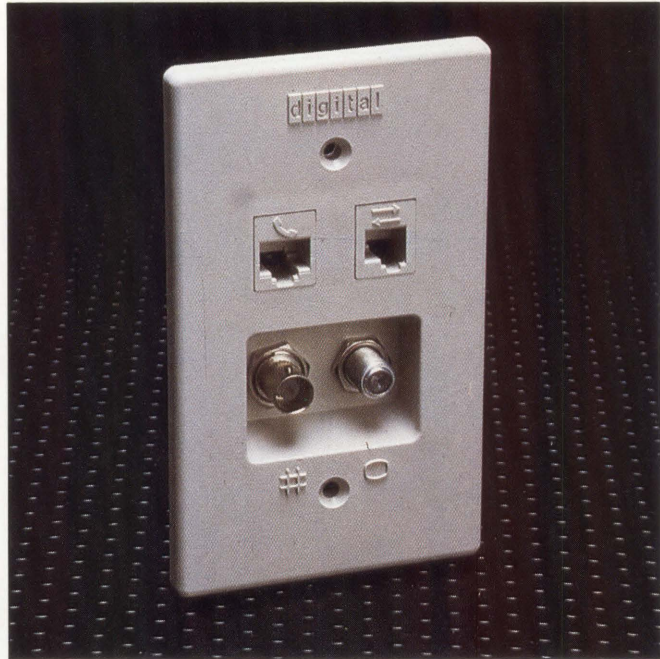
\* Computer Intelligence Reports

**MEC** MICROSYSTEMS  
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# Making The DECconnection

HOOKING UP to Digital's DECCONNECT

office cabling system. BY PHILIP A. NAECKER

TWO YEARS AGO, DEC announced the DECCONNECT cabling system, a strategy for hooking together the electronic devices in an office. More than just a wiring standard, DECCONNECT includes a family of Digital products that integrate four separate communications technologies into a single comprehensive network: Ethernet, twisted-pair terminal communications, telephone and video.

The DECCONNECT system works best when implemented at the time the office is wired initially, but it also can be retrofitted into an existing office. It's designed to provide the flexibility required in today's office: easy recabling, easy addition of new offices or new

devices in a single office, and potential for future growth.

Let's take a closer look at DECCONNECT, both as an overall cabling strategy and then in some actual implementations.

## Plug It In

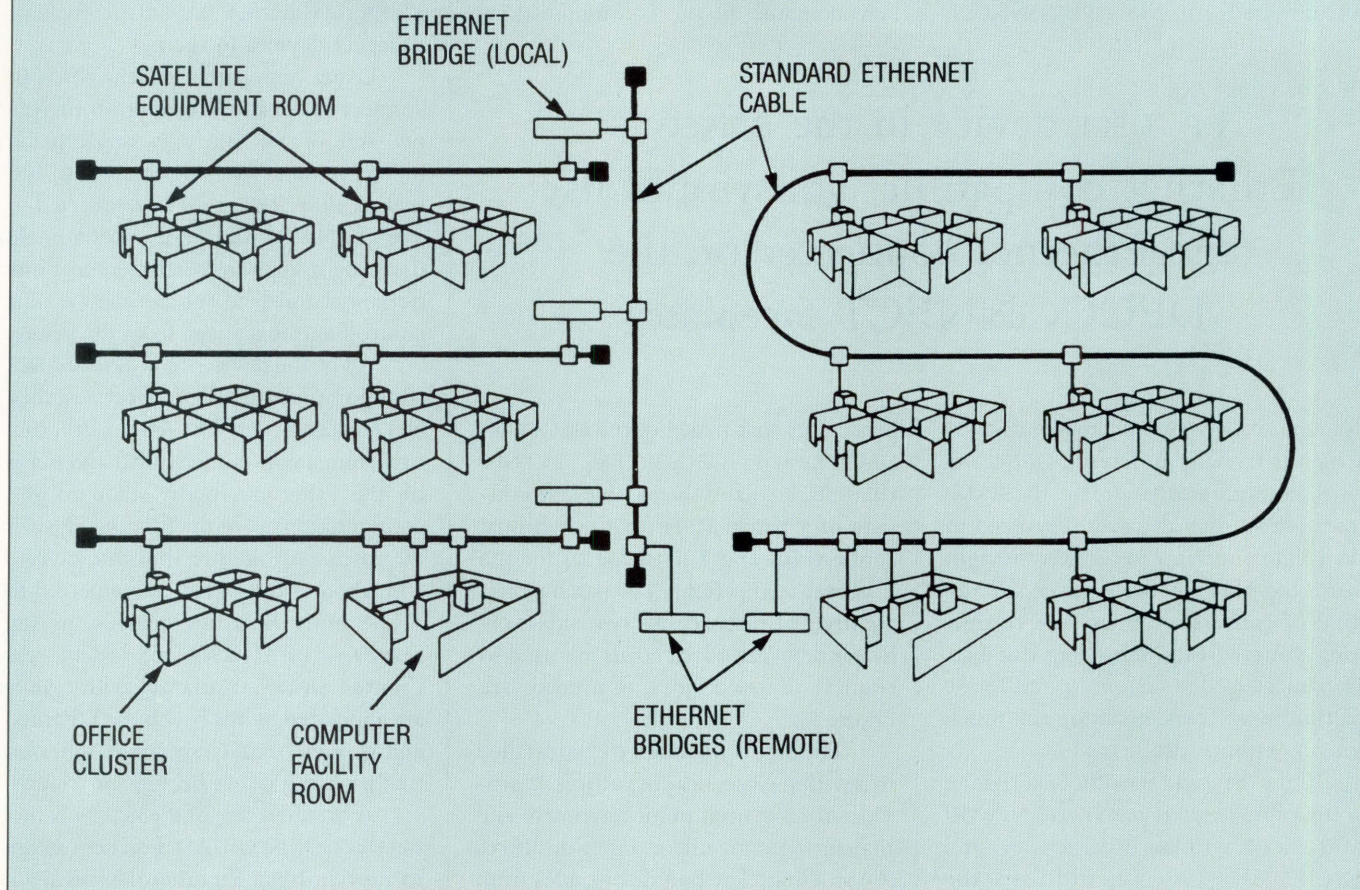
The DECCONNECT system starts at a plug on the wall, or actually four plugs that make up the DECCONNECT Faceplate (see photo above). The faceplate has a place for each of the four technologies supported by DECCONNECT, each with its own plug (either a modular jack or a coaxial connector). It's not required that every office use each of the plugs, or that there even be a wire

behind each of them.

For example, not many offices need support for video today, although that may change in the future. The two plugs that probably will be used in most offices are the telephone and the terminal communications, and some offices probably will need ThinWire Ethernet.

The telephone connection will support a number of standard phone jacks, including plain four-wire RJ-11s and the various wiring standards used by Bell, Northern Telecom and other phone vendors. The connection for the terminal is called a Modified Modular Jack (MMJ), and it's similar to the RJ-45 (six-pin modular jack) except that the little locking tab is keyed (offset) to prevent

Figure 1.



The DECONNECT system is intended to integrate large office communications.

accidentally plugging the terminal into the phone jack. The video connector is a screw-type coax plug like the kind used in your home video or cable TV system.

The Ethernet connector on the faceplate is standard BNC of the type used by ThinWire Ethernet. Each faceplate represents the beginning of a single ThinWire Ethernet segment. Each segment can have up to 29 devices daisy-chained together, within the limitations of ThinWire. The catch is that each segment is a simple non-branching run of ThinWire coaxial cable.

Each device on the segment is connected with a T-connector inline on the cable, and there can be no cable between

the T-connector and the actual device. For instance, if the device is a PC or a VAXSTATION 2000, you must place the T-connector on the back of the CPU, and there are *two* Ethernet cables running to the CPU (one for the devices to the left and one for the devices to the right). If the device is a non-ThinWire Ethernet device (like a MICROVAX-II), you must use a Digital Ethernet Station Adapter (DESTA) to connect the transceiver cable from the MICROVAX to the ThinWire cable.

The DESTA has a T-connector on one end and a transceiver cable receptacle on the other, and the DESTA must sit right on the ThinWire; there can be no branching segments of ThinWire

cable. To add a new device at the end of the segment, unplug the terminating resistor from the last connector in the segment, plug in the next segment of ThinWire cable with another T-connector and device on it, and plug in the terminating resistor at the end.

### The Big Picture

Let's trace a DECONNECT system from the computer or terminal to the network. If the terminal is a VT300 series, the DECONNECT MMJ receptacle on the back of the terminal is plugged into the faceplate using a short patch cord with MMJ plugs on both ends. If you have an older terminal that has a DB25 connector (the common

25-pin connector on the back of most terminals), you'll need an adapter to convert the 25-pin connector to the MMJ.

The electrical interface specification for terminals in the DECONNECT

working on the wiring, and doors on the front open up to provide even more access to important parts of the system.

An SER is logically divided into two sides: active and passive. The active side contains all the communications

with the device side of the SER. The reason for using a patch cord is flexibility. First, you only need to connect those offices that are in use. For example, you may have all your offices wired for ThinWire Ethernet, but only a few have Ethernet devices in them.

Using the patch panel, you can connect those active offices on the office side of the SER to a single patch block on the device side of the SER, and that patch block would be connected to a single DEMPR. Furthermore, if a single device fails, you can patch the most important channels to another device, thus controlling the damage from the failure.

All of the devices in a standard SER configuration are Ethernet devices; they all take data in one side (either Ethernet or terminal communications) and put it on the Ethernet. In the standard SER configuration, all of the Ethernet devices are cascaded together into one or two DELNIs, and the DELNI is connected to a backbone Ethernet, usually of the Standard or ThickWire variety. As Figure 1 shows, in a large facility, SERs are connected by the backbone Ethernet, and groups of SERs are interconnected further using either bridges or routers.

A bridge is one of the key tools that the DECONNECT LAN designer can use to prevent busy Ethernet devices from swamping the entire Ethernet network. In a properly designed network, most traffic is local; i.e., between two devices that are close physically. For example, a diskless VAXSTATION probably would use a nearby VAX as the boot node, not a VAX halfway across the campus. Because most Ethernet devices talk to nearby devices, there's relatively little traffic between segments of the network.

A bridge is an intelligent store-and-forward device that only forwards those messages that cross segments. If a bridge sees a message that doesn't belong to another device in the same segment, the bridge forwards the message. But local messages (messages between two nodes within the same segment) aren't forwarded by the bridge.

Note too that segments hooked together by bridges and repeaters are

## IF THE device in the office is Ethernet compatible, you would use the Ethernet connector on the DECONNECT faceplate.

system is called RS423 (actually, DEC423 which is trivially different). DEC423 is close enough electrically to the RS232 interface so that all you really need to do is figure out how to connect the right wires together; there's no need for any kind of conversion unless you're running your wires a very long distance. (Technically, RS232 is only good for 50 feet; in most cases, it can be run much longer without problems.)

If the device in the office is Ethernet compatible (e.g., a VAXSTATION, VAXMATE, a PC with an Ethernet card or a MICROVAX), you would use the Ethernet connector on the DECONNECT faceplate. The office telephone also is connected to the faceplate.

From the faceplate, the wires can be treated as a bundle and run to a central point for each group of offices. The DECONNECT system is a *radial* wiring topology, meaning that the wires to the offices run radially from a central location, like the spokes on a wheel. That central location under DECONNECT is called the Satellite Equipment Room (SER).

Each SER (see Figure 1) is designed to handle 64 offices, and SERs are hooked together by a backbone Ethernet (see Figure 2). An SER consists of two standard 19-inch racks and all the associated brackets, bolts, doors and cable managers. The SER is designed to be left open on three sides to facilitate

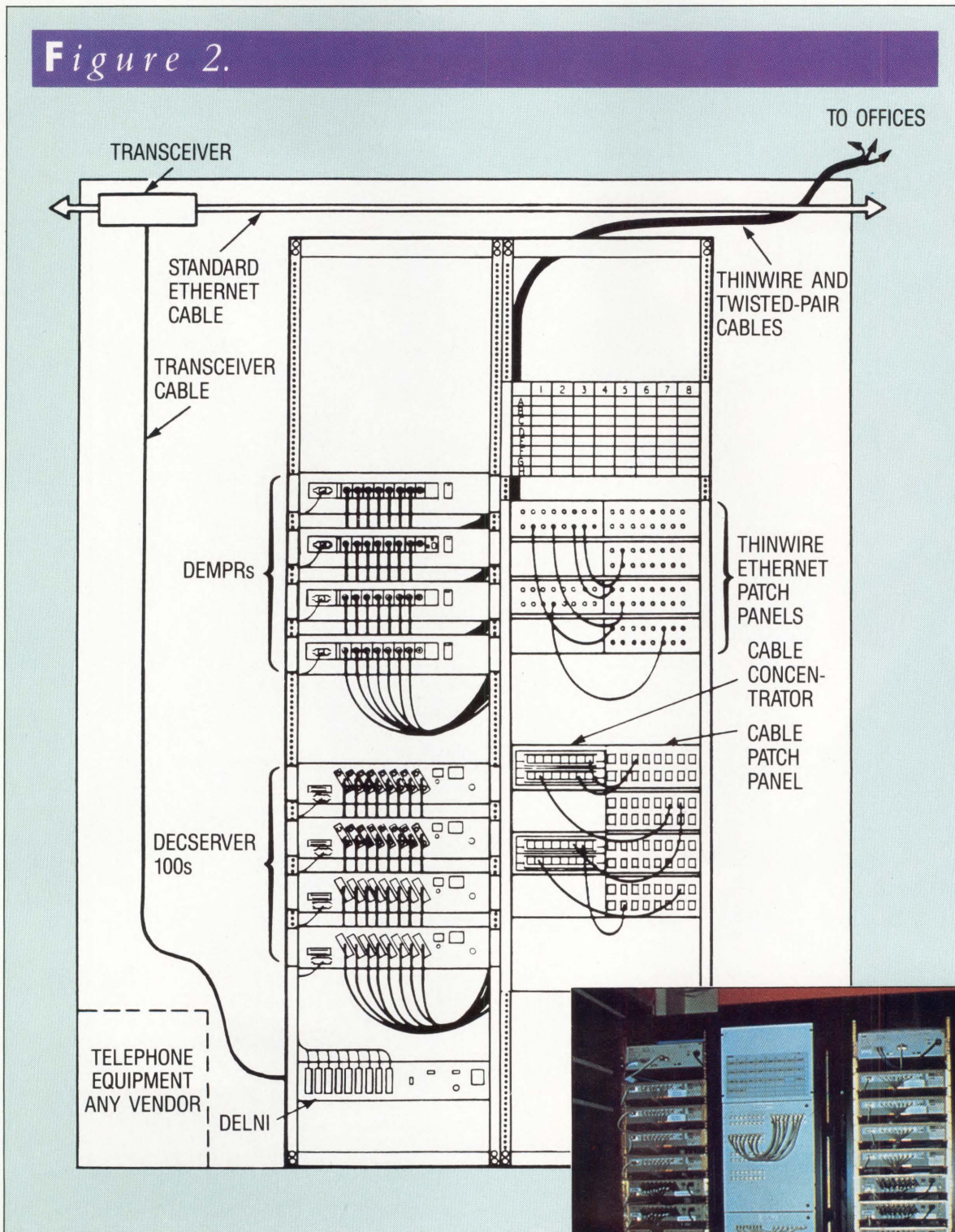
processors that make up the DECONNECT system (DECSERVERS, DELNIs, DEMPRs, etc.) and the passive side consists of a patch panel for the terminal connections and a patch panel for the Ethernet connections. The patch panels are divided further into two sides: office and device. Patch cords are used to connect the two sides as needed (see Figure 1).

The SER is intended to be installed in a wiring closet near the offices. It provides for a central point to control and manage a reasonable number of offices (64) as a unit. The bundle of cables from the offices is decomposed into four cable groups in the wiring closet, one each for the four communications technologies. The telephone and video groups are routed to the appropriate punch block for those wires, and the terminal and Ethernet bundles are routed to the SER. In the SER, the cables are connected to the back of patch panels on the right, the "office side" of the SER.

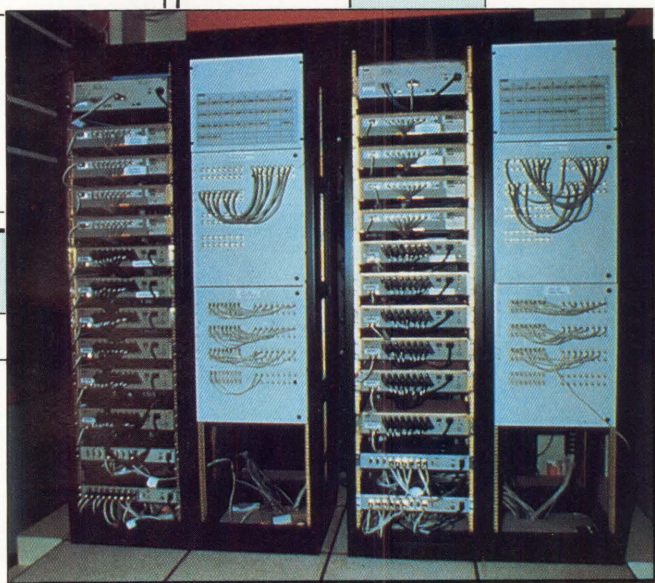
On the left half of the SER, the active side, there's space to rack mount a number of devices. Table 1 describes some of the most frequently used devices that would appear in the active side of an SER and gives their purpose. (More information is contained in the DECONNECT Glossary.)

A patch cord, a short length of terminal or Ethernet cable with connectors on both ends, connects the office side

Figure 2.



A satellite equipment room.





Client Data Base

Digital Computer	VAX/VMS	30 terminals	5 workstations
General Electronics	I170/RT11	10 terminals	no workstations
Chicago Elect. Sales	PDP8	01 terminals	no workstations
2nd Street Banking	6600	52 terminals	10 workstations
Jacks Elect. Outlet	VAX/UNIX	29 terminals	no workstations
Sansone Bail Bond	PDP	01 terminals	01 workstations
Sunnyvale Digits	PRO350	01 terminals	no workstations

Select one of the following:  
1--Continue Listing  
2--Sort by (N)ame, (C)omputer Model  
3--End Session  
Enter Selection: █

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DB25 connector for printer port	✓	Compose key disable control ✓
Tilt and swivel base	✓	Graphics model available ✓

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## DECONNECT Glossary

The DECONNECT system is awash with three letter acronyms (TLAs) and other abbreviations. Here are short lexicons of the most frequently used acronyms and names from the DECONNECT world.

**Baseband** — A network that implements both ThinWire and Standard Ethernet.

**Bridge** — Performs the same functions as a repeater. It's also used to join two separate Ethernet LANs into an extended LAN. The bridge does this by intelligently forwarding only interLAN traffic, isolating the local traffic (packets) to the individual segments. In this way, a Bridge in a properly designed Ethernet network can allow the cumulative bandwidth of the segments in a LAN to far exceed the 10 MBPS limit of Ethernet.

**Broadband network** — A cable TV-like system that uses expensive transmitters but can carry many different communications channels, including video, on the same cable.

**Cable Patch Panel or Cable Concentrator** — Connects into a Modified Modular Jack.

**Cascading DEMPRs** — A topology whereby DEMPRs can themselves be hooked together in a branching configuration.

**DEC423** — The standard under which terminals are wired into DECONNECT, which is similar to the RS422 and RS423 standards.

**DECROUTER** — Similar to a DECSEVER, but connects together DECNET nodes instead of terminals.

**DECSEVER** — A terminal server that connects multiple terminals to one or more host computers.

**Digital Ethernet Local Network Interconnect (DELNI)** — Allows up to eight Ethernet devices to share the same connection (transceiver) to the Ethernet (either ThinWire or Standard). There are two reasons this is important: Ethernet transceivers are expensive, and they must meet certain minimum spacing requirements. A DELNI logically spaces Ethernet connections without extra cable coils, and it's more cost effective than individual transceivers.

**Digital Ethernet MultiPort Repeater (DEMPR)** — Provides a way to hook multiple ThinWire branches, called segments, into a single logical Ethernet. Because ThinWire Ethernet segments can have at most 29 stations, there must be a way to hook together multiple segments, which is physically a branching configuration that's not allowed by the Ethernet standard.

**Digital Ethernet STation Adapter (DESTA)** — Serves the same function as a transceiver in a ThinWire configuration, connecting the transceiver cable from an Ethernet device to the network.

**Ethernet** — The DECONNECT LAN comes in two flavors, ThinWire and Standard, sometimes called ThickWire. Both ThinWire and Standard Ethernet are implemented using a Baseband network.

**Local Area Networks (LANs)** — Characteristics described by most of DECONNECT; the rest of it deals with cabling systems and terminal communications.

**Local Area Terminal (LAT)** — Protocol used by DECSEVER. The supporting host computer software is also called LAT. Terminals plug into the terminal server, which packages up the terminal communications in Ethernet packets and ships them off to the host, where they're unpackaged. The process is reversed when characters are sent from the host to the terminal.

**Modified Modular Jack (MMJ)** — The plug used on a DEC423 terminal.

**Repeater** — Used to hook together network segments. A repeater can extend the length, topology or interconnectivity of the physical network beyond the limits imposed on a single segment. A repeater boosts the amplitude, adjusts the waveform and corrects the timing of the Ethernet electrical signal.

**Satellite Equipment Room (SER)** — A rack that stands in a wiring closet. It provides a single point for managing the wires and connections for a single office cluster in a DECONNECT system.

**ThickWire Ethernet** — More expensive than ThinWire (both for the cable and for the transceivers), but it has several advantages for large networks. In particular, you can connect large numbers of Ethernet devices to a ThickWire network (only 29 on a single ThinWire segment). More important, there's no disruption when adding or removing devices from a ThickWire network whereas a ThinWire network may have to go down temporarily.

**ThinWire Ethernet** — Has a thinner, easier to manage and cheaper cable, but it's not appropriate for large networks.

**Transceiver** — Used to connect an Ethernet device to the network in a ThickWire configuration. The Transceiver can be installed or removed without disrupting the network.

**Transceiver Cable** — Connects an Ethernet device to the ThickWire network.

**TRANSLAN** — Performs the same function as a bridge, but in a wider geographic area, logically connecting Ethernets separated by distances from hundreds of feet to thousands of miles.

**Terminal Server** — Connects to the patch panel or concentrator.

themselves standalone networks. Should the bridge or repeater fail, the network will continue to function locally, although intersegment traffic will be limited.

After you've made it to the Ethernet, you just need to hook up a computer at the other end. In the DECONNECT strategy, all DEC host computers (and many other resources, such as printers and modems) are connected directly to the Ethernet as well. In a Standard Ethernet connection, a transceiver is hooked onto the network cable and the CPU is connected via a transceiver cable, which can be from two to 50 meters long. In a ThinWire connection, the transceiver is replaced by a DESTA, but the connection is otherwise the same.

### By The Book

Of course, to be useful as a standard, there must be a published guide to implementing DECONNECT. Digital has issued three little-known but useful books (see Table 2) describing the DECONNECT system from end to end. The *General Description* provides an overview of the DECONNECT system, including an overview of the hardware components and an outline of the process of planning and installing a DECONNECT site.

The *Planning and Configuration Guide* provides everything you need for planning a DECONNECT installation, ordering the parts and validating a configuration as supportable. Most of the configuration rules for both ThinWire and Standard Ethernet configurations are described in this document. It also goes into detail about the advantages and disadvantages of various configurations, and has more than 70 figures, not including the wiring diagrams (pinouts) for the DECONNECT components themselves.

The *Installation and Verification Guide* contains most of the information needed in the field to construct and test a DECONNECT system. It includes detailed instructions for wiring an SER, for installing all of the components of a DEC-

Table 1.

Device	Description
DECSRV-B	DECSERVER-200s. Connects terminals to computers via the Ethernet. Comes in two flavors, with or without modem control.
DELNI	Digital Ethernet Local Network Interconnect. Allows up to eight Ethernet devices to share the same transceiver (connection to the Ethernet).
DEMPPR	Digital Ethernet MultiPort Repeater. Connects up to eight ThinWire Ethernet segments into the same logical Ethernet.
Bridge	Connects local or remote Ethernets together, isolating local traffic to each local segment.

Typical SER devices.

Table 2.

Part Number	Title
EK-DECSY-GD-001	<i>DECCONNECT System General Description</i>
EK-DECSY-CG-001	<i>DECCONNECT System Planning and Configuration Guide</i>
EK-DECSY-VG-001	<i>DECCONNECT System Installation and Verification Guide</i>

DECCONNECT documentation.

CONNECT system, and for testing the components after they're installed. This document, like all of the DECCONNECT documentation, is incredibly detailed.

For example, it contains nearly four pages on how to attach a ThinWire connector to a ThinWire cable (it's not hard; it's just that the documentation is very complete). There are more than three pages on how to adjust and calibrate the wire stripper used on ThinWire. It explains how to run wires to the offices, where to label the wires, how to use the tools, how to test the installed wires, how much slack to leave in the wires and how to set the dip switches on the devices.

At first, such detail may seem burdensome, but the advantages are far reaching. Because the manual gives precise instructions on how to configure every DECCONNECT system, there's a good chance that every DECCONNECT

system will be done in exactly the same way. For example, the documentation spells out how to bundle the cables and how to label the bundles, how to run the cables through the cable managers and even how to name the SER itself.

Thus, anyone who's familiar with DECCONNECT can walk into *any* DECCONNECT installation and immediately understand the cabling system and begin installing new equipment or diagnosing problems. Don't you wish you could say the same about your communications network?

### Reality Sets In

Now that we've traced a DECCONNECT configuration from the office through the Ethernet backbone to a bridge, let's take a look at a few of the practical issues associated with DECCONNECT.

First is the problem with retrofitting an existing environment with DEC-

CONNECT; it's very hard and for no good reason. First, there's no help given in any of the documentation. It assumes that you're moving into a brand new office, can run wires anywhere you please and needn't worry about any existing wiring because there isn't any.

Furthermore, the *Installation and Planning Guide* is organized in a cookbook fashion. That's fine if you want to bake the same cake as the cookbook writer, but if you want to bake a slightly different cake, you need a reference guide, not a cookbook. Even the ordering forms in the installation guide assume that you're building a DECCONNECT system from end to end. If you already have some parts of your cabling in place, it's hard to separate the parts that you don't need.

I'm now working on my fourth DECCONNECT configuration, and only one of those has been in a new facil-

ity. The others were all retrofits to existing facilities with some kind of cabling system in place, an existing computer room, and all of the problems that go along with mixing old and new. It would be easier if the DECCONNECT engineers and documentation writers would take a look at providing some

ductors for each terminal connection.

Obviously, most of the components of DECCONNECT can't handle the extra lines required for modem control. Apparently, the reason fewer conductors are used in the cabling system is that it allows the use of smaller and easier to handle Centronix-style 36-pin

provision in DECCONNECT for wiring any terminal-to-CPU connections except via terminal servers or DEC423 ports on the CPU. If you have existing DMF-32s, DZ-11s or similar, you're up the DECCONNECT creek without a cable! You can make it work, but you have to cheat to do it.

I've integrated VAX-based terminal multiplexers by purchasing a DECSERVER-100 cabling kit (as above for the modem connections) and buying an extender cable to connect the octopus cable from the back of the VAX to the back of the SER patch panel. However, as part of the deal you get an extra transceiver cable (which you can use if you're careful not to order too many) and some brackets and stuff (which make excellent doorstops). Note, however, that because the DECSERVER-100 cable doesn't pass modem control, this solution doesn't provide modem control from the VAX-based multiplexer to the SER.

Fortunately, the DECCONNECT documentation provides complete pin-outs for every cable and connector, so if you're a member of the cable-making public, you can roll your own solution. Even then, things are tough because you're boxed in by:

1. Thirty-six-pin connectors on the back of the standard SER cable concentrators.
2. The key or tab on the MMJ plug that prevents you from using it with a standard RJ-45 like those found in replacement parts from various catalog supply houses. You'd have to make up a bastardized patch cord with an MMJ on one side and an RJ-45 on the other.
3. The tight tolerances on the SER; so replacement parts better fit exactly.

The DECCONNECT system is a great place to start if you're cabling an office. If you have the good fortune to be cabling a new office for the first time, you should find that the DECCONNECT system will serve you well for years to come.

## IF YOU have the good fortune to be cabling a new office for the first time, you should find that the DECCONNECT system will serve you well for years to come.

strategies for dealing with existing facilities. An index for the documentation would be a good place to start.

Don't get me wrong. I like the documentation because it's clear and has lots of excellent diagrams and figures. But it isn't organized well if you aren't installing a DECCONNECT system from scratch. Now that I know the documentation and DECCONNECT thoroughly, I don't need to refer to the index as often. But for that first non-standard installation, I would have given up one DECSERVER for a two-page index.

There's also the matter of modem control: DECCONNECT doesn't support it. Of course modem control requires some extra signalling lines in the cabling, but you'd think that there would be enough lines in the DECCONNECT standard. Wrong. The MMJ jack used for DECCONNECT terminal connections has eight pins on it, but consider:

1. At most, six pins are used anywhere inside the DECCONNECT components for any one terminal connection.
2. Only five conductors are used in the DEC423 to RS-232 adapters.
3. Only four conductors are needed for a standard DEC423 connection.
4. The octopus cable for the DECSERVER-100 uses only three con-

cables and connectors instead of the larger and bulkier Telco-style Amphe-nol 50 connectors.

Also, it's true that the majority of terminal connections don't need modem control. But it's equally true that most sites have at least some need for modem control, so the fact that it isn't supported seems like a simple denial of reality: "Modem control is yucky and requires extra control lines that we usually don't need, so we won't support it. Let's pretend it's gone."

If you have the misfortune to want to integrate modems into a satellite equipment room, you have to do some adjusting to the DECCONNECT standard. First, you can get a version of the DECSERVER-200 (DECSERVER-200/MC) that supports modem control. This version has eight DB25 connectors on the back instead of a single 36-pin DECCONNECT connector. Plug your modem directly into one of these connectors, bypassing the SER patch panel. This works reasonably well, if you purchase an extra DECSERVER-100 (not a DECSERVER-200) cable kit to hook the ports not assigned to a modem back into the SER patch panel to make them available for the rest of your users.

The next problem is that there's no

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# The Electronic Timesheet

AN EASY-TO-USE office automation package for  
time accounting, project costing and billing.

BY MICHAEL G. GONZALES



*THE ELECTRONIC TIMESHEET (ET)*, a VAX-based office automation package from fbn Management Science Corporation of Toronto, Ontario, offers a computerized solution to time accounting, project costing and client billing. *ET*'s target market is professional services organizations, such as consulting firms and project-oriented environments.

*ET* permits data entry on employee time, employee expenses, external expenses and interdepartmental transfer charges. Both time and expense data can be entered by individual employees from workstations or centrally by a data entry operator. Error reduction is achieved through a variety of logical checks. Also, the program catches and rejects unauthorized charges before they

are posted against a project. After the charge ceiling has been reached for a particular project, the project manager may decide whether additional charges should be rejected. In addition, the project manager may disable charging to any project at any time.

Because *ET* permits direct and immediate data entry by employees, a completely up-to-date database is possible. Thus, *ET* can produce up-to-date reports on demand that center on:

## 1. The Employee

- a. Detailed Labor Report — This report format lists all time entries in sorted order by employee name and then by project.
- b. Daily Hours Charged Report — This

type of report lists all time entries in chronological order for a particular employee.

- c. Summary Labor Report — With this report format, it's possible to list hours charged by a particular employee for a specific reporting period.

- d. Detailed Expense Report — An itemized listing of expenses incurred by a particular employee during a specific reporting period is given by this report format.

## 2. The Project

- a. Detailed Project Cost Report — This report lists daily time and expense charges for activities in a project.

- b. Summary Project Cost Report — This report summarizes time and expense charges for a particular project

during a specific reporting period.

### 3. The Client

a. Detailed Client Charges Report — This report itemizes daily time and expense charges to a particular client.

b. Client Billing Report — This format yields a summary of all labor and expense charges for all projects belonging to a particular client. Thus, this report can be used for billing purposes.

ET is basically a menu-driven package with plenty of easily understood online help available. The menus and help enable persons with minimal computer sophistication to use the system effectively in a short period of time. The available online help is structured so that it reduces the potential for the uninitiated user to get caught in a maze of menus.

Training is provided via two online tutorials, the User Tutorial and the System Manager Tutorial. The User Tutorial teaches data editing, how to post entries against projects, conducting online enquiries and how to generate individual time and expense reports. The System Manager Tutorial tells the system manager how to set up the system and track the definition of employees, clients, projects, activities (project subdivisions), project teams, suppliers and expenses. In addition, the system manager assigns system users and their privileges.

## Features

ET offers plenty of features, among them:

### 1. Time Charging

The following sequence illustrates how you would charge time to a project. First, you log on and select "ENTER time" from the Functions Menu (see Screen 1). Next, enter time-charge data (see Screen 2).

During data entry, ET performs a series of logical checks, and echoes a project description along with the number of hours already charged by the employer on that date (see Screen 3). Last, you approve the transaction, assuming the logical checks are completed successfully.

LABOR TRANSACTION SELECTOR

> > > ENTER time  
DELETE a time entry

EXIT

Use the UP and DOWN ARROW keys to point > > > at desired application.  
Press <RETURN> to select the application.

Screen 1: Select time-entry function.

ENTER TIME

Employee number: 1                      MIKE GONZALES

Project number:

Activity number:

Date:                                      --

Time code: 1

# hours worked: .00

Memo:

Screen 2: Input of time-charge information.

ENTER TIME

Employee number: 1                      MIKE GONZALES

Project number: 22335                    COMPUTING RESOURCES — MEMO ACCOUNT

Activity number: 07                      TUNING & OPTIMIZATION — COMPUTER RESOU

Date: 7-FEB-86                          Prior charges (today) 7.00 hrs.

Time code: 1

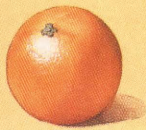
# hours worked: .50

Memo:                                      ADJUST RESHASHTABLE

Screen 3: The Electronic Timesheet performs checks, echoes information.







ASCII



COM.FILE



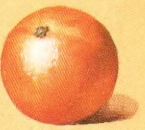
CPT



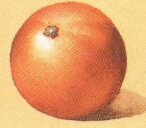
Convergent/DEF



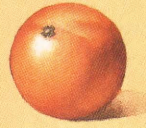
DEC/dx



DCA (RFT)



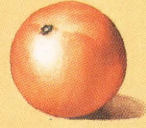
NBI



Xerox 860



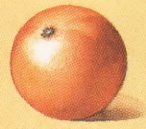
XeroxWriter



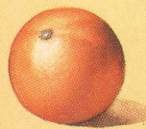
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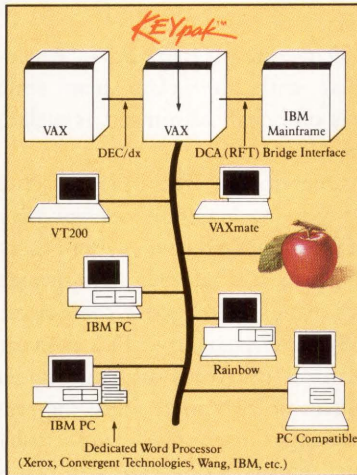
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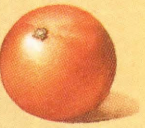
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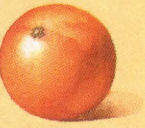
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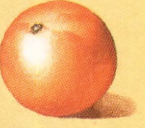
DisplayWrite 3/4



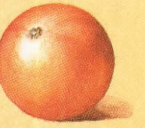
MASS-11



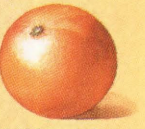
MS Word (MAC)



MS Word (PC)



MultiMate

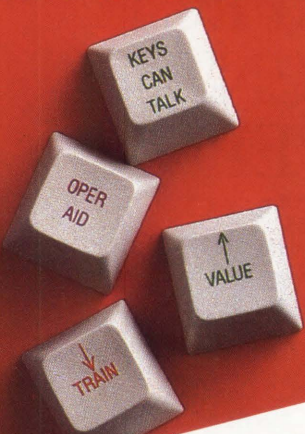


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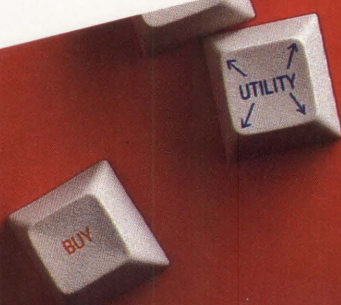


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ects; however, a project is associated with only one client.

4. Activities — These are further subdivisions of a project.
5. Employees.
6. Suppliers.
7. Project Teams.
8. Expense Categories — Included are such expenses as travel, meals, etc.

### User Classes

*ET* ensures data integrity and confidentiality of client-related data via the use of user classes. These classes are:

1. User — This class allows an individual to input his own charges and expenses, conduct enquiries and generate reports relating to himself only.
2. Privilege Classes — All privilege classes include the User privilege.

a. Project Manager — Within this class, the user can produce labor reports for employees in his resource center, produce project cost reports, initiate projects and assign employees to projects.

b. Data Entry Operator — An individual with this class may enter charges on behalf of himself as well as others.

c. Operator — The operator class allows you to maintain control files. These files contain data on system users, clients, projects, activities, employees, project teams and expense categories.

d. System Manager — This class can perform all functions available under *The Electronic Timesheet*. Thus, the system manager can enter transactions, product reports and listings and maintain data files.

### Documentation And Tutorials

*ET* comes with a well-written, easy-to-understand users manual, containing seven chapters. Chapter 1 is an overview and summary of *ET*. Chapter 2 details *ET* features. The third chapter describes *ET* from the standpoint of logical design. Chapter 4 is titled "Installation and Initiation of the Electronic Timesheet." The issues involved in setting up a functioning system are treated in Chapter 5. Chapters 6 and 7 document

### *The Electronic Timesheet*

fbn Management Science Corporation  
871 Bathurst St.  
Toronto, Ont. M5R 3G2  
(416) 534-6878

Price: \$1,295. Quantity discounts available.

Evaluation kit with software, documentation and video cassette: \$95

Hardware: VT2xx and VAXs.

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the User Tutorial and System Manager Tutorial, respectively.

To use either Tutorial, you need the appropriate chapter from the users manual. Both tutorials are segmented into separate lessons, concentrating on some specific function of *ET*.

*ET* is a neat office automation package. Some formalities require concentration, such as the requirement that the TAB key, not RETURN, be pressed after filling certain fields. These were minor inconveniences, however.

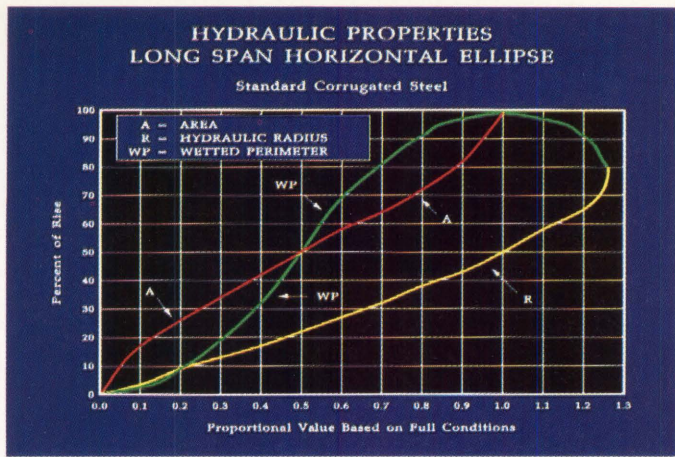
In its promotional material, fbn Management Science Corporation claims that *ET* offers several advantages over a manual system. These advantages include:

1. Productivity gains through reduction of unnecessary paper work by facilitating automatic and systematic collection of data.
2. Reduction of errors.
3. Project cost control.
4. Improvement in cash flow by providing up-to-date client billing and project costing reports on demand.

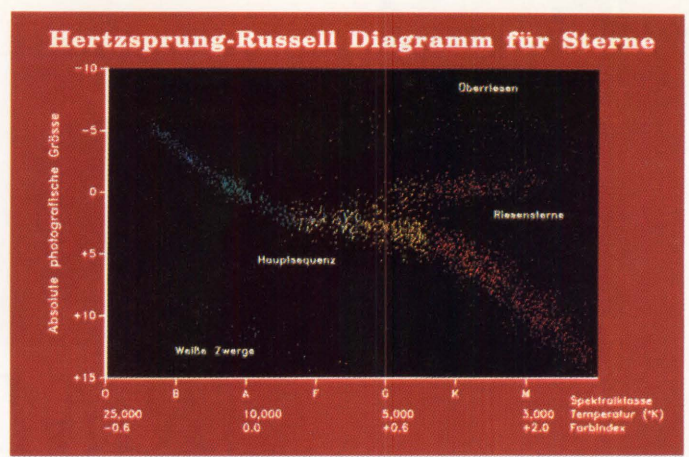
As you become familiar with *ET*, you'll realize that *ET* does fulfill each of these advantages.

This package is pleasant and fun to use and I recommended it enthusiastically. —*Michael G. Gonzales is assistant professor of computer and information science at Gwynedd Mercy College, Gwynedd, Pennsylvania.*

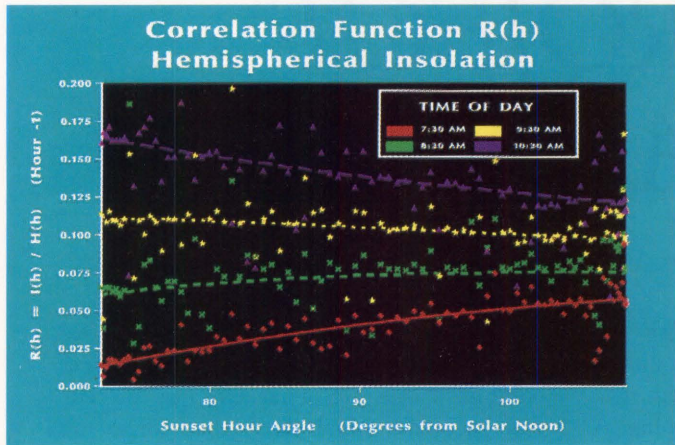
ARTICLE INTEREST QUOTIENT  
Enter On Reader Card  
High 404 Medium 405 Low 406



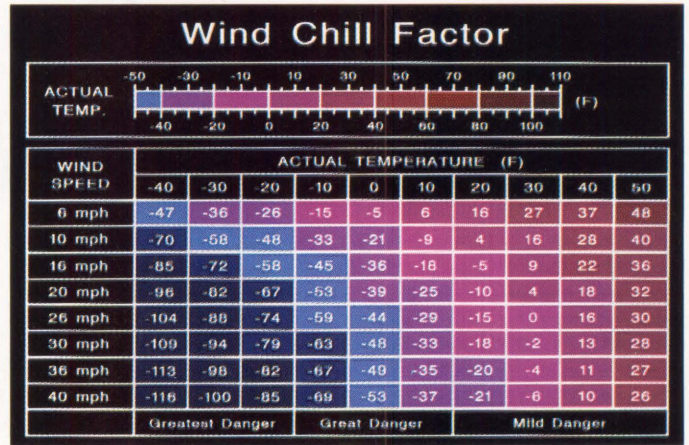
PicSure Plus' curve smoothing clarifies data representation. Shielding adds a professional look.



European text fonts offer a global graphics solution. Multiline annotations aid data interpretation.



Large datafiles can be read directly from disks. User retains complete control over all chart elements.



PicSure Plus' menus allow easy data entry/editing. Extensive color table control for dynamic graphics.

# Precision Visuals' PicSurePlus™

## Practical Presentation Graphics for Your VAX

### The Need

You need PicSure Plus™ if your work requires:

- Producing technical presentations or reviewing data
- Supporting a cross section of graphics users, from novice to expert
- Building custom user interfaces for specific applications
- Accessing and charting information from databases
- Pushbutton access to stored charts, datasets, command files, and metafiles
- Managing graphics production while maintaining device independence.

### The Product

PicSure Plus is an interactive graphics system for producing charts and graphs. Prompting menus guide novice or occasional users in creating line, bar, scatter, pie, text, and table charts. Experienced users can access PicSure Plus features by entering commands, or building tailored menus for specific applications and environments. These user-interface options offer a flexible gateway to the most powerful set of charting functions available today.

### The Features

- Powerful prompting menu interface speeds chart building for novice and occasional users
- Integrated command interface available for more advanced users
- Interactive positioning of all chart elements
- Directory keeps track of saved charts, datasets, command files, and metafiles—

so users don't have to understand the computer's file system

- On-line tutorials and instant HELP facility for new users
- Easily combine multiple charts into a single image
- Draw charts simultaneously on multiple graphics devices for high production chart building
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- Powerful numeric functions to perform arithmetic and statistical operations on your data
- Programmer's interface for accessing custom subroutines, databases, and the operating system
- Automatic layout and text sizing for word charts.

### The User Interface

Users can move from prompting menu mode to command mode and back again, anytime. PicSure Plus also offers special commands for building prompting menu sessions. These user interface tools help you automate the production of frequently used charts, or design custom interfaces for end users.

### The Environment

PicSure Plus runs on the entire VAX family, as well as a wide range of minicomputers and mainframes. Compose graphs on terminals and get hardcopies on laser printers, inkjet printers, pen plotters, and film recorders.

### The Offer

PicSure Plus is the only graphics software solution with the range of features for even your most sophisticated charts, combined with user interfaces for the first-time user, occasional users, and experts. If you need functionality and ease-of-use in your graphics software, get the full story on PicSure Plus, and let us arrange a test drive.

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**SOFTWARE**

# P RIMAVERA P3 PROJECT PLANNER

By David B. Miller

## A Sophisticated Project Management System For The VAX And PCs.

A project manager's job isn't easy. The number of tasks to be performed and monitored, even for a small project, can be overwhelming. A good project manager always must know whether the project is running as scheduled, what resources are available to complete the steps involved and how costs are running in relation to the budget. The *Primavera P3 Project Planner* from Primavera Systems Inc. of Bala Cynwyd, Pennsylvania, is designed to make that job easier. First written for the IBM PC and compatibles, it's now available for the VAX. We test drove version 2.6.

The term project management often is associated with endeavors like the construction of buildings. Also, government agencies have been interested in project management and control for many years. However, with the advent of computer software able to perform such complex tasks as schedule calculations and cost control, project management has gained popularity in many other areas such as finance and data processing.

A "project" consists of a group of related activities that must be completed in some predetermined and planned sequence. These activities are linked together in a network using such methods as critical path or precedence diagramming.

Associated with each activity are time factors such as planned duration, preferred start-

ing and ending dates, absolute starting and ending dates, the percentage of activities completed thus far, what activities precede and succeed it, and those that could run concurrently.

A manager is most interested in the path of activities requiring the greatest amount of time, known as the critical path. It's important that the critical path be kept in line with original schedule projections in order to keep the project on time.

Along with time data, a project manager must know a lot about the resources associated with that activity, regarding availability and cost. For instance, siding a home has certain costs for the resources of labor and materials. In addition, because prices and availability of materials and labor fluctuate over time, a manager must know what funds may be required depending on the progress of the activity and the time of year it's occurring.

For the manager to stay abreast of progress, it's critical that changes and updates can be made in the project schedule and the impact of those changes determined quickly. It's also necessary that timely reports in both tabular and graphical format be generated to show areas of progress and activities that are



# Your network's darkest secrets exposed.

```

SUMMARY-Delta t From 7.45 From 7.52
2 SCP CONN D=17 (FAL/DAP,V4) S=CAL
8 3.2827 NSP CTRL Connect Confirm D=8C39
9 0.0049 NSP DATA Link D=1413 S=8C39 ACM=0 SEC=1
10 0.0024 NSP DATA Link D=8C39 S=1413
11 0.0047 NSP ACK Oth-Data D=1413 S=8C39 ACM=1
12 0.0064 DAP OS=UAX/UWS FILSYS=RMS-32
13 0.0590 NSP ACK Data D=8C39 S=1413
14 0.0300 DAP OS=UAX/UWS FILSYS=RMS-32
15 0.0041 NSP ACK Data D=1413 S=8C39 ACM=1
16 0.0061 DAP Directory List SVSSMANAGER:*_EXE:*
17 0.0019 NSP ACK Data D=8C39 S=1413
18 0.0024 DAP Vol=SVSSYSROOT: Dir=(SVSMGR)
19 0.0166 NSP ACK Data D=1413 S=8C39 ACM=2
20 0.0096 SCP DISC Reason=0
21 0.0025 NSP CTRL Discconn Confirm D=8C39
32 0.1320 7.47 +7.52 DRP ENDMODE Hello S=7.52 BLKSZ=
33 0.3271 7.47 +7.55 DRP ENDMODE Hello S=7.55 BLKSZ=
34 0.1660 7.47 +7.53 DRP ENDMODE Hello S=7.53 BLKSZ=
35 0.0700 7.47 +7.54 DRP ENDMODE Hello S=7.54 BLKSZ=
37 0.5942 7.47 +7.50 DRP ENDMODE Hello S=7.50 BLKSZ=
  
```

```

SUMMARY-Delta t DST SRC
2 0.0174 09002B0000F*AA0004001D0C LAT Change Node=ERD131, Desc=ERD
6 0.2277 09002B0000F*AA0004000A2B LAT Service Node=ATHEMA, Desc=non
16 1.001B 09002B0000F*AA000400022C LAT Change Node=NCUAX2, Desc=none
17 0.1628 09002B0000F*00002B04F3D0 LAT Change Node=TSRU2B, Desc=NMF
20 0.2443 09002B0000F*AA0004003B08 LAT Service Node=RSXTST, Desc=Tes
21 0.0488 09002B0000F*AA0004003308 LAT Service Node=UAXT, Desc=none
26 0.4496 09002B0000F*AA0004001A0C LAT Change Node=CADDE, Desc=ESD v
33 0.4342 09002B0000F*AA0004000F08 LAT Service Node=UAXK, Desc=none
59 0.7602 09002B0000F*AA0004000114 LAT Service Node=CIRCUS, Desc=***

DETAIL
LAT: 0000 001. = Undefined
LAT: ... ..0 = Host is accepting new sessions
LAT: Node groups:
LAT:
LAT: Node group length = 2 bytes
LAT: Group byte 0, Groups , , , 3 enabled
LAT: Group byte 1, Groups , , , 12 enabled
LAT: Node name = "TSRU2B"
LAT: Node description = "NMFCC CMPTRS"
Frame 17 of 511
Use TAB to select windows
  
```

## Unveil what protocols hide!

The Sniffer's DECnet protocol interpreter handles key protocols, including SCP, NSP, and DRP, as shown in this SUMMARY analysis of Ethernet frames. You can CAPTURE information based on lower level protocol content, node addresses, pattern matching, and/or frame error conditions, then instantly DISPLAY information in the format you prefer for analysis and understanding.

Yes, your DECnet™ has secrets. Secrets like excessive retransmissions, or unexplained timeouts. And you're paying for them. With lower network performance, high network maintenance costs, inefficient network planning and expansion, or even network downtime.

to home in on areas you want to analyze closely. And in moments, you'll see your LAN's protocol and traffic information laid out in the display format you choose for analysis and action. **The Sniffer takes you inside the critical networking protocols.**

All the key DECnet protocols: LAT, MOP, DRP, SCP, NSP, DAP, and NICE. And there are software modules for TCP/IP, Sun protocols (including NFS), ISO/MS-Net, XNS/MS-Net, and Novell NetWare®, with more on the way.

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Go below the SUMMARY view to see the DETAIL behind all network packets. The Sniffer sheds light where darkness reigned. Even LAT is fully decoded. Now you can tune and adjust your network configuration to meet your requirements. Get the most out of your network investment by seeing what's actually happening... before you invest more in your network.

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Ask for Dept. G93

Please specify Ethernet® Token Ring® ARCNET® or StarLAN version.



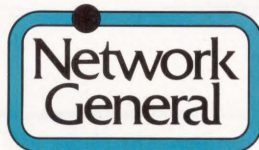
**The Sniffer:**  
A complete system for network analysis that delivers big benefits: Better LAN performance, maintenance, and planning. Payback is often a matter of weeks.

## Enter The Sniffer. Exit network secrets.

Attach the Sniffer™ to your LAN, and turn it on. You'll feel at home with the Sniffer's intuitive menu structure after just a few minutes.

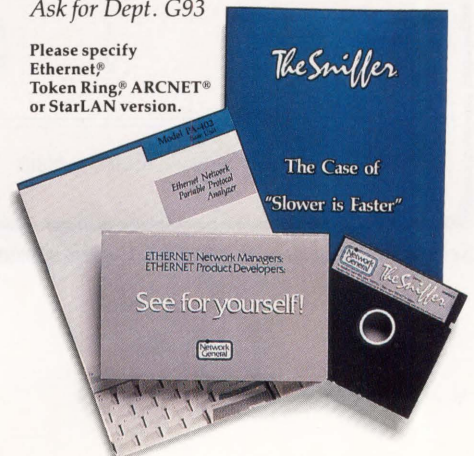
Capture all the information on the network.

Or, using the menus, select various triggering and filtering combinations,



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Mountain View, California 94043

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behind schedule or over budget. Therefore, extensive schedule calculation and recalculation, as well as report generation, are important parts of any project.

*Primavera's* purpose is to simplify the project manager's job by providing

a clear, straightforward method for entering project data, fast computation of time schedules and resource allocation, and flexible reporting on project progress. These facets of project control take an enormous amount of time even

for relatively small projects. It's *Primavera's* job to cut down on that time and reduce the manager's headaches.

## Features

The *Primavera P3 Project Management System* boasts the following features:

1. **Schedule Calculation** — Given initial duration information and what activities precede, succeed and run concurrently, the program can schedule a project taking such factors into consideration as length of the work week and holidays. A project schedule can be recomputed at any time because of additions or deletions from the schedule network, or changes in the activity, resources, calendar or cost data.

2. **Resource Control** — Because no project has unlimited resources and manpower, *Primavera* must take the availability of these into consideration when completing a schedule. Some activities may be completed only if a certain amount of resources are available. Some resources must be shared among multiple activities.

The process of distributing resources according to time line and availability factors is referred to as leveling. No golden rule applies to leveling for any particular project.

However, *Primavera* can aid the project manager by making it easier for him to see the effects of decisions made for a certain group of activities in relation to resources available. *Primavera* will calculate the best possible fit in terms of how resources can be allocated for various activities.

3. **Cost Control** — *Primavera* allows you to establish cost accounting codes and report on the progress of project activities in relation to planned budget versus actual cost. Also, you can predict and measure an activity's anticipated cost against what you originally planned.

4. **Reporting** — You can custom tailor a host of reports and graphs to gain perspective. Progress, budget and resource information can be reported for all or selected activities, in any order.

```

                                HOME DAVE

SELECT an existing project.....1
LIST project names and titles .....2
ADD a new project .....3
DELETE a project .....4
DUPLICATE and rename project.....5
MERGE several projects .....6
CREATE a target schedule .....7
BACKUP one or more projects .....8
RESTORE one or more projects.....9

EXIT PRIMAVERA .....X

Press selection ~ ~ ~ ~ ~
  
```

Screen 1. Primavera's opening menu of functions.

```

                                CONFIRM selection

                                Project name is DAVE

Project Title: DAVE'S CONDOS
Company Name: MILLER'S CONSTRUCTION CO.

Report Center Heading: PROJECT SCHEDULE

Project Start Date: 13DEC82   Project must Finish no later than: 6SEP84

Network Type (PDM or ADM): PDM   5 Workdays Per Week

Schedule data date: 5JAN83       Start Day of Workweek: MO

                                TARGET #   DATA DATE
                                1         Not on file
                                2         Not on file

-----
Commands: Advance   Edit   Help   Return
  
```

Screen 2. Choosing the SELECT option from Screen 1 confirms the choice and provides general details.

You also can generate network scheduling diagrams and resource bar charts as well as line graphs displaying actual and planned costs for comparison.

5. Sorting And Selection — *Primavera's* powerful sorting and selection features allow managers to customize and make daily operations simpler.

6. Exporting To Other Applications — Output files from *Primavera* can be converted to ASCII so that spreadsheet and database programs can use them.

### Installation

The VAX addendum to the documentation clearly explains the installation procedure. It's simply a matter of restoring one backup saveset and defining a few logicals in the local login command file. Up to three users may access the main program simultaneously. Some files must reside in individual directories because they're not shareable.

The utility P3SET is included to allow custom configuration of printers and terminals. The user manual describes the utility in IBM PC terms so you must translate for the VAX.

I think of *Primavera* as I do a database package — with many powerful extras built in. The package presents you with two main menus and a host of data entry screens along the way. After entering P3 to start the program, *Primavera* initializes some project files and displays the opening menu (see Screen 1). From here you can carry out the usual file maintenance duties, including selecting, adding, deleting and backing up project files.

To work on a particular project, you must choose the SELECT option. At this point, you're presented with a screen to confirm the choice (see Screen 2). You enter main commands from the command line at the bottom of the screen. If any changes must be made to the displayed information, choosing Edit allows you to move the cursor to the selected piece of information.

Advance places you into the Project Data Menu, where most of the ac-

tion takes place. From this menu, the following functions are carried out:

1. Project Data Functions — These can be entered, edited or deleted, and the project calendar can be created or modified (see Screen 3). Here's where

you enter information concerning holidays and other days off. Dates like Christmas and New Year's Day need not be entered for succeeding years after being entered initially. Any floating holiday requires individual entries

```

Project calendar based upon: 5 workdays per week. Start of Workweek: MO

Project start date: 13DEC82   Project must finish no later than: 6SEP84

Holidays and non-workdays (year designation is omitted if standard):

25DEC00  1JAN00  21FEB83  30MAY83  4JUL00  5SEP83
24NOV83

Commands: Edit Help More Print Return Transfer
  
```

Screen 3. Workdays and holidays are entered in the Primavera Project Calendar.

```

autoSort          ACTIVITY DATA          DAVE
Activity number:   29                      TF: 0
Title: GROUT PRECAST PANELS              PCT: 0

ES: 15MAR83      EF:22MAR83      Orig. duration  6  Actual start:
LS: 15MAR83      LF:22MAR83      Rem. duration   6  Actual finish:

Activity Codes: CONC 2 107

FINANCIAL SUMMARY:  Resource 1      Resource 2      Resource 3
Resource code       LABORERS      OP ENG          IRON WKR
Cost acct code/type 105L          105L           105L
Budgeted cost       0.00         0.00           0.00
Actual cost this period 0.00         0.00           0.00
Actual cost to date  0.00         0.00           0.00
Percent expended    0            0              0
Percent complete    0            0              0
Earned value        0.00         0.00           0.00
Cost to complete    0.00         0.00           0.00
Cost at completion  0.00         0.00           0.00
Variance            0.00         0.00           0.00

Commands: Add Delete Edit Help More Next Return autoSort
          Transfer View Window
  
```

Screen 4. One of the Primavera activity screens — for entering financial data.

RESOURCE CODES			DAVE	
Resource code: LUMBER		Units: LF		
Description: LUMBER				
RESOURCE LIMITS AND PRICES:				
Normal limit	Max limit	Through	Price/unit	Through
400	500	6SEP84	0.12	15JUN83
0	0		0.13	15DEC83
0	0		0.14	13MAR84
0	0		0.15	6SEP84
			0.00	
			0.00	
Commands: Add Delete Edit Help List Next Print Return Transfer Usage				

Screen 5. An example of a Primavera resource screen. Up to 96 resources can be defined for the project.

should the project span more than one year.

Data is entered for each activity once you have the activity network designed. As many as 10,000 activities can exist in the project, along with 5,000 "continuation records," which may be required for certain activities requiring additional data storage pertaining to successor records.

At a minimum, the activity title, duration, number and successor activity numbers and their relationship to the activity are required for correct schedule calculations. Other data to be entered includes activity codes (used to help in sorting and selecting), constraints on the activity (maximums, minimums, date constraints, etc.), financial data (costs of resources and other information), resource data (what resources are available at what times and prices) and more. Indeed, it pays to plan ahead carefully so that all data is entered accurately. Screen 4 shows one of the subsequent activity screens. This procedure probably will

take longer than anything else in the system.

2. Dictionary Data Functions — Three main dictionaries, those for activity, resource and cost accounting codes are established here. Activity codes (e.g. EXCA for excavation in a building project) are established and can be entered into an activity for sorting and selection purposes. You then may select those that contain the activity code you wish to see at the moment.

Resource codes are defined to indicate what resources are available and how much each costs, per appropriate unit, for different time periods (see Screen 5). Up to 96 resources can be defined for the project and a total of six resources can be assigned to any one activity. The resource code EXCAVATE may be defined to hold the costs of running equipment and supplying laborers for various time periods. As Primavera computes a project schedule, the resource dictionary data is accessed to determine current costs and availability.

Cost account codes are assigned to a maximum of 60,000 cost accounts within six cost categories. These codes

can be included in an activity record to associate cost data with its specific account. The project manager then will be able to obtain a detailed listing of how costs are running for any particular account; e.g., labor costs for excavation work.

3. Schedule Calculation Functions — Computations simply require setting the desired schedule logic and determining whether preconfigured schedule reports are to be produced or not. In addition, warning reports can be generated that point out activities that have no successors, are out of sequence or are part of a loop. A network with 60 activities on a VAX 8250 took 35 seconds to compute, which included report generation.

Schedule calculations may be done at any time. Primavera also provides the option of skipping the schedule computations and restricting recalculation to cost data if that's all that's needed.

4. Reporting — Primavera's menu of available reports is impressive. From the activity menu, reports either may be created or simply executed if their specifications already exist. With the program's report specification procedure you can create a variety of output of the tabular, bar chart or network diagram variety.

Creating any type of report follows the choosing of the report type, its hard-copy layout in terms of appearance (spacing between lines, etc.), the content (what fields from activity records should be included), the sorting order and any selection criteria. Figure 1 shows a tabular schedule report. Each company probably has its own set of standard reports that it generates for projects it undertakes. A project manager should be able to find the flexible reporting capabilities of Primavera to easily fit his needs.

The screen displays for entering all this data for reports are consistent. Information is balanced nicely on the screen and menus for functions like adding, editing and moving to new windows always appear at the bottom. Clear





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# F

## FIGURE 1.

MILLER'S CONSTRUCTION CO. REPORT DATE 14OCT87 RUN NO. 2				PRIMAVERA PROJECT PLANNER PROJECT SCHEDULE		DAVE'S CONDOS START DATE 13DEC82 FIN DATE 6SEP84				
SR-02				DATA DATE 17JAN83 PAGE NO. 2						
ACTIVITY NUMBER	ORIG DUR	REM DUR	PCT	CODE	ACTIVITY DESCRIPTION	EARLY START	EARLY FINISH	LATE START	LATE FINISH	TOTAL FLOAT
109	5	5	0	PNTR6	CLEAN UP	22MAR84	28MAR84	23MAR84	29MAR84	1
111	10	10	0	TILE6121	RESILIENT FLOORING AND BASES	29MAR84	11APR84	30MAR84	12APR84	1
114	14	14	0	CARP6131	PANELING, FINISH CARPENTRY AND MILLWORK	12APR84	1MAY84	28MAY84	14JUN84	32
115	10	10	0	HVAC5403	INSTALL CONDENSERS AND A/C TRIMOUT	12APR84	25APR84	1JUN84	14JUN84	36
116	5	5	0	ELEC5503	TV TRIMOUT	12APR84	18APR84	8JUN84	14JUN84	41
117	13	13	0	CARP6130	INSTALL CABINETS	12APR84	30APR84	13APR84*	1MAY84	1
119	5	5	0	PLBG5303	SET APPLIANCES	1MAY84	7MAY84	1JUN84	7JUN84	23
120	13	13	0	PLBG6303	PLUMBING CONNECTIONS AND TRIMOUT	1MAY84	17MAY84	16MAY84	1JUN84*	11
121	12	12	0	ELEC5503	ELECTRICAL CONNECTIONS AND TRIMOUT	27APR84	14MAY84	30MAY84	14JUN84	23
125	5	5	0	CARP5133	BATHROOM ACCESSORIES	18MAY84	24MAY84	8JUN84	14JUN84	15
130	10	10	0	CARP7	CLEAN UP	25MAY84	7JUN84	15JUN84	28JUN84	15
138	5	5	0	PNTR6120	PAINT TOUCH UP	8JUN84	14JUN84	29JUN84	5JUL84	15
140	15	15	0	CRPT6133	INSTALL CARPETING	15JUN84	5JUL84	6JUL84	26JUL84	15
142	5	5	0	DRPS6134	INSTALL DRAPES	6JUL84	12JUL84	27JUL84	2AUG84	15
144	10	10	0	CARP6	CLEAN UP	13JUL84	26JUL84	3AUG84	16AUG84	15
146	10	10	0	CARP6	PUNCH LIST	27JUL84	9AUG84	17AUG84	30AUG84	15
148	5	5	0		BUILDING COMPLETE	10AUG84	16AUG84	31AUG84	6SEP84	15

One of many types of Primavera report configurations.

online help is provided along the way in the form of full-screen displays that temporarily replace the data screen. The only thing I'd change would be to replace IBM PC keyboard terminology with VT-terminal series syntax for keys like Home, Insert and Delete.

It's impossible to explore all of the capabilities of Primavera here, but there are a few features that deserve special note:

1. Autosort — This feature provides a method for quickly sorting the activities in the project database. If you wish to edit activities in a certain order that meet a certain criteria specification, you can invoke Autosort to allow you to "see" only those activities. This is useful because a single activity occupies a number of different windows. For a large project with many activities, it could take forever to advance through those requiring no modification. Autosort can be invoked at any time. The sort

and selection criteria remain active until it's invoked again.

2. Autocost — Changes can be made to the standard cost and resource control calculations that Primavera uses. You can modify standard computations for all or only part of the project. A thorough knowledge of Primavera's computation rules is necessary before toying with this feature, although Autocost is explained clearly in the user's manual.

3. Target Schedules — If more than one schedule is desired for comparison purposes, up to two can be saved as target schedules. When new calculations are performed, you can make comparisons between the current and target data.

4. Transferring and Merging Projects — To avoid having to repeat data entry between common projects, you can export data to another project. Merging projects establishes a single, unified network derived from the combination of data from single projects.

5. Batch Processing — Rather than enter all data interactively, Primavera

supplies a batch entry system allowing both network creation and update using ASCII input files. The documentation provides file record layouts and examples of typical batch streams. Once the project is created, you can use either the batch or interactive methods to make modifications.

6. Primavision — This package allows plotters to generate crisp network logic diagrams rather than those produced by the main program and printed by conventional devices. Supported plotters include Hewlett-Packard, Houston Instruments, Calcomp and Ioline. A separate Primavision manual explains this feature in detail and provides much help in producing network diagrams that not only are clear but also uncongested and easily followed.

7. PC to VAX Data Transfer — Through the utility EXPRJ, project files residing



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### Documentation

The documentation is divided into a nice tutorial; a reference guide containing clear explanations of *Primavera's* functions, commands, error messages and abbreviations; and a short project management handbook explaining the basic concepts. Program limitations also are indicated and explained.

The VAX addendum provides information regarding VAX installation, keyboard differences and the like. It's a worthwhile addition. In other parts of the manual, you'll have to substitute VMS alternatives for such data as device and directory names. If you're a heavy user of both VMS and MS-DOS, the confusion over syntax may take a little time to overcome. Otherwise, the documentation does an admirable job in explaining a complex software package in reasonable terms. Because project planning is a specialized field (unlike word processing where you'd expect many users to know the basic jargon), *Primavera* users will encounter the language of project management extensively.

Despite its obvious sophistication, problems were encountered with this software. For example, whenever I attempted to duplicate a project, I was logged out. No warning or logout message was displayed; rather, the message "Duplicating project files..." flashed merrily, giving the impression that everything was going according to plan. However, after five or 10 minutes of waiting for the duplication of only 16 files, pressing any key suddenly prompted the machine to ask for my username and password.

After logging in again, a directory listing indicated that all files had been copied. After using these files, I determined that they were copied intact and were usable. There's not much the user can do wrong to cause this phenomenon; you need only choose the DUPLICATE function from the utility

menu, enter the name of the project to be copied, then the name of the new project.

Another problem was that the utility menu screen displayed the remnants of a couple of lines that appear to want to say "Project in the current directory:" and "...underway." Processing wasn't affected, however.

*Primavera* does an excellent job of tackling the complex task of project management. While the learning curve initially may be high, the savings in time and effort is well worth it. Computations are fast, reporting is flexible and help screens are there when you need them.

The program is not going to make everyone a great project manager, just as a spreadsheet program won't turn a clerk into an overnight financial wizard. However, for those who have project management skills (and a VAX), *Primavera* is worth a look. — David B. Miller is associate director of computer services at Beaver College in Glenside, Pennsylvania.

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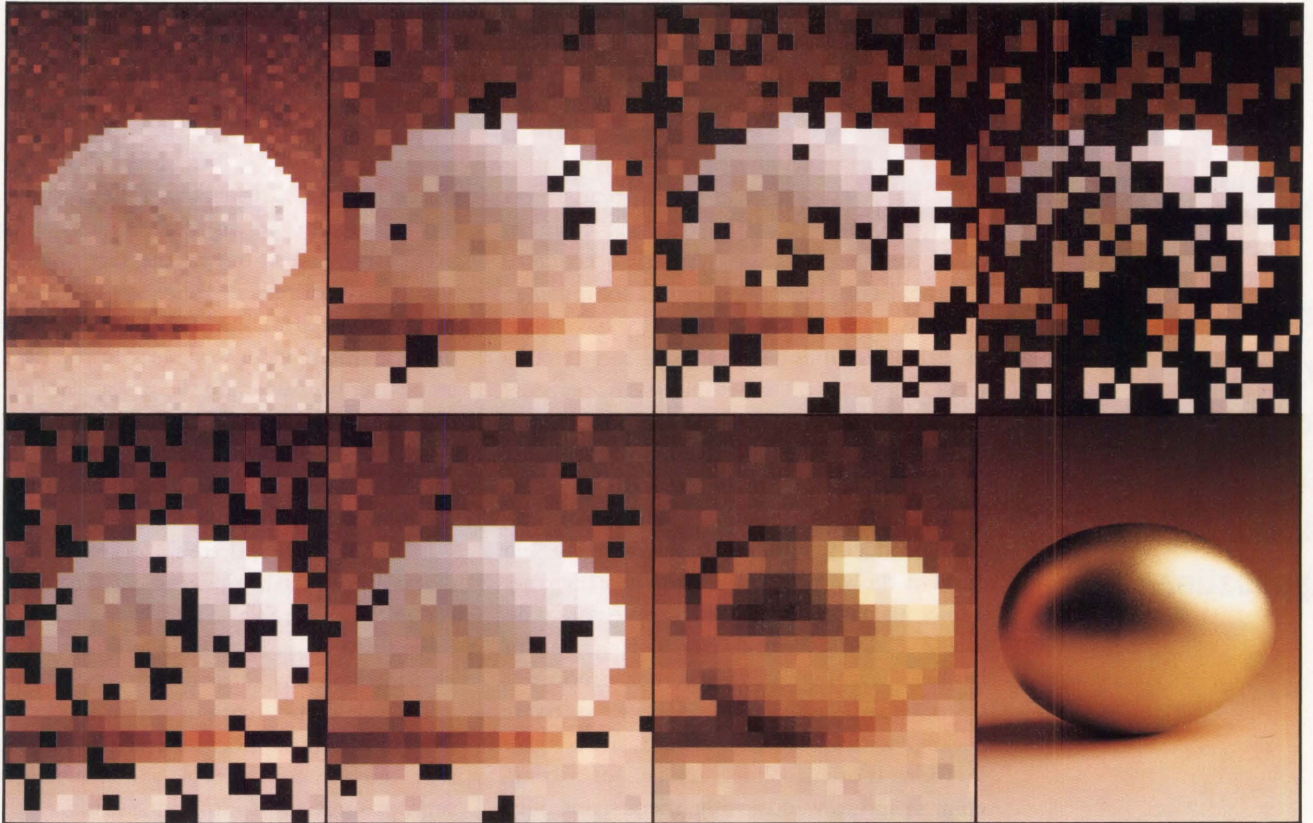
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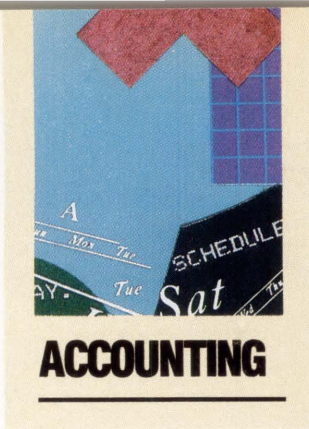
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# C-CALC PLUS

By Charles E. Schofield

**This Spreadsheet  
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Applications.**

Spreadsheets have been in existence for some time. With the acceptance and rapid growth of the personal computer in business, new birth and maturity have been given to the number one spreadsheet contender, *Lotus 1-2-3*. Unfortunately, the personal computer couldn't fulfill the needs of all corporations who required the use of a spreadsheet. Today, several options exist to solve this dilemma. One option is to purchase a spreadsheet product that will operate where the data lies. For the VAX family of machines there are numerous packages that will enable you to do this. *C-Calc Plus*, from DSD Corporation of Bothell, Washington, is one such product.

*C-Calc Plus* is an accounting software package with spreadsheet features and a whole lot more. It offers column and cell formatting, column and row addressing, menu-controlled commands (*Lotus* type interface), transportability of spreadsheets to different machines and/or packages, large worksheet capacity (1024 columns, 65,553 rows), graphic capabilities, the ability to access and control external programs and more. *C-Calc Plus* runs on either VMS or UNIX operating systems. It also uses the extensive SMG VAX library, allowing for some windowing and quicker screen redrawing.

Three important aspects to consider when evaluating a product such as *C-Calc Plus* are documentation, technical support, and the product itself. I evaluated each of these areas from the standpoint of both a beginner, and an experienced user.

The Achilles heel of many software packages is its documentation. Poor documentation can cast an otherwise superior package into mediocrity. It's unfortunate that *C-Calc Plus*

suffers from this malady. The manual is incomplete and convoluted. It lacks a comprehensive index, error messages are not adequately addressed and examples often are difficult to reproduce. These problems may only be minor inconveniences to the experienced user because online help is available. But, it's clearly not oriented toward the beginner, though DSD is attempting to remedy this by providing supplementary texts in addition to the manual.

To get started, there's a 30-page manual that will help the beginner understand and use *C-Calc Plus*. There's also a *C-Calc* pocket guide. Keep this; it's an invaluable tool that will see you through any difficulties.

The technical support provided by DSD is superb. The support team is patient, pleasant, and knowledgeable, and provided me with prompt and thorough assistance. Until you have dealt with an incompetent support group, you can't appreciate the quality attention serviced by DSD.

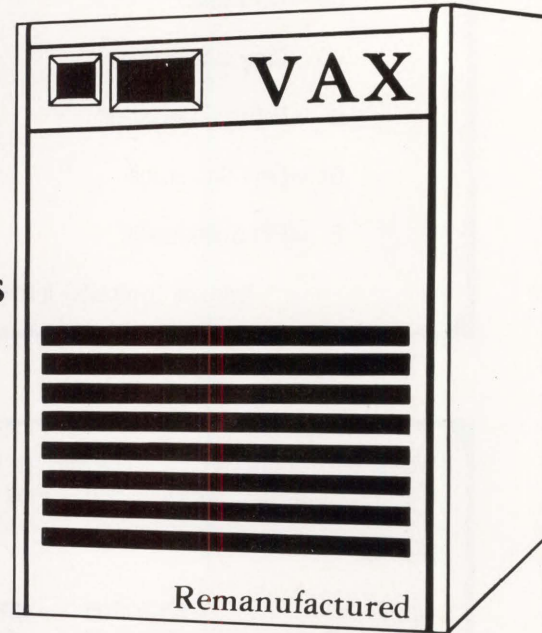
## Using *C-Calc Plus*

*C-Calc Plus* offers two modes of operation: Command-Line Mode and Direct-Entry Mode. They differ in that with Command-Line Mode a "/" is used to bring up a menu from which the command is picked, while in Direct-Entry or Power Mode, commands can be entered using abbreviations such as "C", which tells the program to calculate the current worksheet. Either mode can be entered from the start or switched to from within the program. The Power Mode is faster once you begin to remember the different command ab-



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C-Calc Plus

DEMO USE ONLY: Professional Press (ID#16949) through Thu Dec 31 00:00:00 1987

- |                           |                         |
|---------------------------|-------------------------|
| C =Create a New Worksheet | H =Help                 |
| CD =Change Default Device | I =Index Listing        |
| CN =Consolidate           | P =Print a Worksheet    |
| CO =Copy a Worksheet      | PL =Plot Worksheet Data |
| D =Delete a Worksheet     | RE =Rename a Worksheet  |
| DA =Data Conversion       | RI =Rebuild Index       |
| E =Edit a Worksheet       | T =Tutorial             |

Type the Symbol(s) followed by a <Return>.

Screen 1: The main menu.

Worksheet: (2) BUDGET	Region: A1..E20			
Object Code/Trans	Prev Yr Bud	Prev Yr YTD	Curr Yr Bud	Curr Yr YTD
<b>Revenue</b>				
Cash	\$70,000.00	\$78,000.00	\$130,000.00	\$42,000.00
Accounts Recv	\$5,000.00	\$4,000.00	\$25,000.00	\$19,000.00
Interest Earned	\$12,000.00	\$13,600.00	\$23,000.00	\$5,600.00
Total Revenue	\$87,000.00	\$95,600.00	\$178,000.00	\$66,600.00
<b>Expenses</b>				
Salaries	\$50,000.00	\$49,780.00	\$55,000.00	\$23,000.00
Payroll Taxes	\$12,000.00	\$11,988.00	\$13,500.00	\$8,000.00
Benefits	\$17,000.00	\$16,570.00	\$19,000.00	\$8,200.00
Total Personnel	\$79,000.00	\$78,338.00	\$87,500.00	\$39,200.00
Utilities	\$20,000.00	\$22,000.00	\$20,000.00	\$12,000.00
Rent	\$50,000.00	\$50,000.00	\$55,000.00	\$15,000.00
Total Expenses	\$149,000.00	\$150,338.00	\$162,500.00	\$66,200.00
Net Income (Loss)	\$-62,000.00	\$-54,738.00	\$15,500.00	\$400

Screen 2: A report generated using the print option from the main menu.

C-Calc Plus

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routines allowed the developers to access areas on the screen for input and output. Each cell can be addressed by the program as an individual or group rather than dealing with the whole page. The drawback is that the overhead on the CPU is slightly higher, and the speed of a repaint deteriorates significantly with the number of items on the worksheet. But, it's still quicker than products that don't take advantage of the SMG library. Indications from DEC are that V5 of VMS should improve this situation.

C-Calc Plus also contains a windowing feature that is handy. Up to four different areas of a single worksheet can be layered onto the screen, cutting down a work session considerably by eliminating time-consuming moves.

The graphics ability of C-Calc Plus is as DSD states, high performance. You can produce bar, stacked bar, line, stacked line, pie, scatterplot or X-Y plot graphs. Figure 1 was created by plotting three sets of items which represent the yearly revenue and expenses of a fictitious project called Professional Press. The many and varied parameters are set up or modified easily through menus, and output can be directed to several devices, including VT125, VT240, VT241, Textronix 4010, HP7470 (two pen) and the HP7475 (six pen).

One thing that sets C-Calc Plus apart is the power link feature. It allows you to execute programs or home-grown functions, while still in C-Calc Plus. I tested this capability by creating

abbreviations, but having the Command-Line Mode available is helpful.

The large capacity of the worksheet is impressive, as is the ability to sort by rows or columns, move with ease throughout the worksheet and have flexibility of input/output. Screen 2 is a

report generated using the print option from the main menu of Screen 1. More than 100 mathematical functions are available. Outside worksheet consolidations can be performed and worksheets can be encrypted for security.

As stated before, C-Calc Plus takes advantage of the VAX screen-management routines (SMG). These



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**ACCOUNTING**

# D OWN TO EARTH

By David W. Bynon

## Business Computer Services' Multicompany Accounting System.

Once in a while I come across a software package that is grand enough, for one reason or another, that I want to shout about it. The *Down to Earth Accounting System*, by Business Computer Services of Oklahoma City, is such a package.

Let me explain what sets the *Down to Earth* package apart from the crowd: price and function. It isn't flashy or full of special features you'll never use. It's just good standard accounting and business software.

Business Computer Services developed the *Down to Earth Accounting System* in modules using DBL. DBL is an enhanced DIBOL-compatible compiler and run-time package from Digital Information Systems Corporation of Rancho Cordova, California. These modules include Accounts Payable, Accounts Receivable, Purchase Order, General Ledger, Inventory, Order Entry, Payroll, Job Cost, Report Writer, Bill of Materials, Point of Sale, and Resource Scheduling.

Because *Down to Earth* is written in DBL, it's available for many computer operating systems including VMS, RSX-11M, PC-DOS, MS-DOS, UNIX and several PC LANs. This range of system compatibility is a welcome benefit for companies who must migrate from one system to another, or who use many different systems.

*Down to Earth* was designed with standards. Every module works the same way. *Down to Earth* users need only learn a handful of function keys and some special symbols. For

example, if the software expects numeric data, the entry field will display the number sign (#) and, if alphanumeric data is to be used, dots (...) will be displayed. HELP for every prompt is as close as the F4 key. Online help provides enough detail so that the documentation rarely is needed.

Most of the *Down to Earth* modules are connected to other modules. For instance, Order Entry needs the databases maintained by Inventory and Accounts Receivable. This interfacing of modules isn't unique; most accounting systems share data among functions. However, the *Down to Earth* design allows you to buy only what you need now, with the ability to add more later.

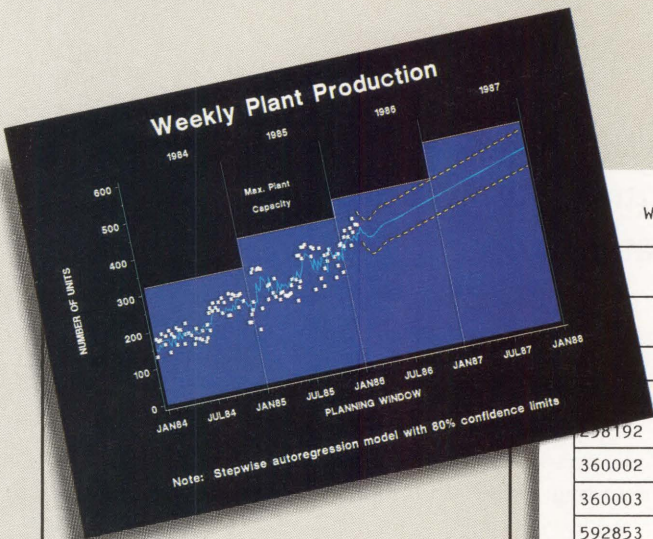
*Down to Earth* is a multicompany system. This means that accounting records can be maintained for one or more companies on the same system. This is facilitated through the use of a two-character company code. Because of this multicompany capability, the *Down to Earth* system incorporates some basic security features. Everyone using it must be granted an operator ID by the system manager. The ID, which is basically a password of six characters, identifies the person and the functions he has access to.

The *Down to Earth Accounting System* is anything but picky about its hardware configuration. At your disposal are tables and text files that allow you to define what you have. For example, the printer table will maintain from one to 24 printer definitions and the screen characteristics table will maintain, if necessary, various screen characteristics for



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	Quantity on Hand	Quantity on Order	Projected Reorder Date
	123980	10000	THU, FEB 12, 87
	89450	5000	FRI, FEB 20, 87
258192	20110	1000	MON, MAR 30, 87
360002	8585	0	TUE, FEB 10, 87
360003	15985	500	TUE, FEB 10, 87
592853	469120	20000	WED, FEB 18, 87

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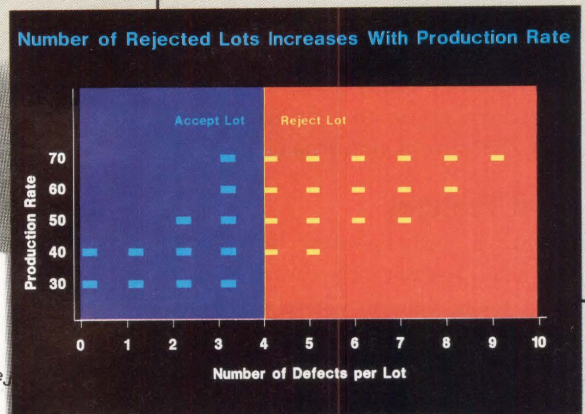
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60	6	4		6.5	83
70	7	4	10	7.0	85

\* Computer Intelligence, January 1986.

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

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every terminal on the system. Finally, if the *Down to Earth* help information doesn't suit your needs you can change it.

## Installation

The installation is simple. It has two parts: installation of the DBL run-time modules, and installation of the *Down to Earth* software. To install the distribution tapes or floppies, the VAX/VMS Backup utility is used to restore save sets to their appropriate directories. Then, accounts must be added for the *Down to Earth* system administrator, and possibly for the users, file protection and ownership must be set, logical names must be defined and login command procedures must be written.

I performed the installation in approximately 45 to 50 minutes. If a kit install procedure had been written, it would have taken approximately 10 minutes. Perhaps this was an oversight on the part of the developer. It would be easy for a software developer, such as Business Computer Services, to develop a VMS kit install procedure or a batch command file for an MS-DOS system.

*Down to Earth* is completely menu driven. Screen 1 displays the *Down to Earth* main menu, which appears when the software is started, and when you exit from a primary function. To select a function from the main menu, you must enter the function number, ID and a two-character company code. The ID associates you with the functions and companies you're permitted to access.

When you select a function from the main menu, a new menu will be presented (see Screen 2). Once you have been granted access to a function, no further checking is performed.

## Special Features

Accounting and business software would be useless without reporting and analysis tools. This is where *Down to Earth* shines. Two modules, the Report Writer and Sales Analysis, are available for management information.

The Report Writer is a comprehensive report generation tool. With it you can define databases to be reported on, define report structures and reporting

reports and graphs. It's designed to answer the important who, what and what if questions. For instance, reports and graphs can be generated on individual

Another welcome feature of *Down to Earth* is its functions to load and unload its databases.

criteria. By the way, the Report Writer isn't limited to *Down to Earth* data files. Any database can be reported on as long as you know its structure.

The Sales Analysis module produces sophisticated sales and forecasting

products, categories of products, customers and salesmen. Sales forecasting produces item demand reports, taking into account the season, past history and other important factors.

I'm impressed with the flexibility

```

Down To Earth Accounting
-----
Application      ##
Operator ID
Company Code

***** Available Applications *****

1 = General Ledger           7 = Inventory
2 = Accounts Payable        8 = Bill of Materials
3 = Accounts Receivable     9 = Order Entry
4 = Payroll                 10 = Job Costing
5 = Purchase Order          11 = System Manager
6 = Item/Resource Scheduling 12 = Report Writer

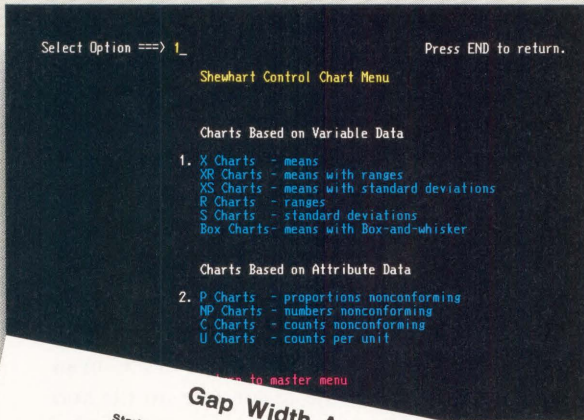
***** Function Key Usage *****

F1 (PF1) Abort           F5 (Right Arrow) Program Specific
F2 (PF2) Back Field     F6 (Down Arrow)   Program Specific
F3 (PF3) End            F7 (Left Arrow)  Program Specific
F4 (PF4) Help           F8 (Up Arrow)    Program Specific
  
```

Screen 1: Down To Earth main menu.

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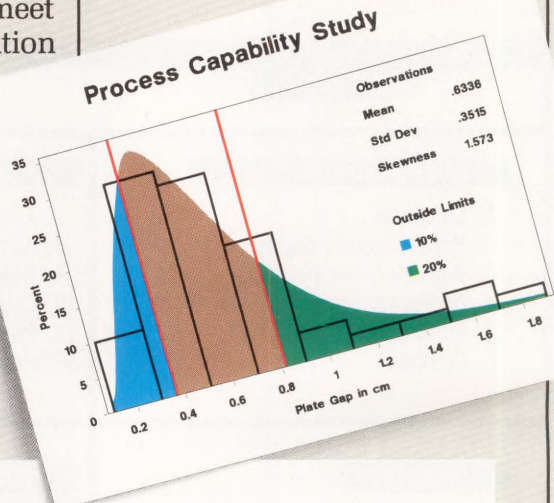
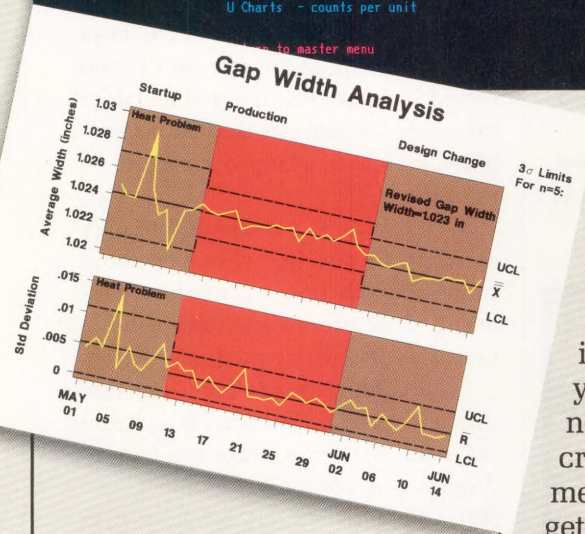
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and the amount of data *Down to Earth* allows you to collect. The Inventory is a good example. It collects 30 fields of data, which covers descriptions, manufacturer's codes, pricing, reorder data

**Down to Earth design allows you to buy only what you need now . . .**

and inventory control information. Many of the fields, such as category and vendor, are linked to additional databases. In this way, the *Down to Earth* system can validate the field entries. This

ensures consistency and a higher level of accuracy.

Another welcome feature of *Down to Earth* is its functions to load and unload its databases. The unload feature writes an indexed database file to a sequential file. This sequential file then can be moved to another type of system for processing; i.e., PC to VAX or VAX to PC. The load feature provides the opposite functionality; sequential files can be loaded into an indexed database.

**Performance**

A primary concern in using a software system such as *Down to Earth Accounting*, is the load it places on the host system. A software product such as this one easily could consume high-quantities of three critical VAX resources: CPU, memory and I/O.

*Down to Earth* performance is good, but not exceptional. The average user

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process, when given free reign of quota, maintains a working set size between 500 and 1,800 physical pages of memory. This is low, but *Down to Earth* doesn't incorporate shareable code.

Because of the number of files in an interaction, the queue rate on file and record locks can be high, but it's never excessive. I would rate the data accessibility, even with a large database, to be exceptional.

The system's page fault rate only seems to be affected when you move from one function to another. This makes sense because each major function is an executable module.

The only *Down to Earth* function that lacks good performance is its screen I/O. I feel the screens take too long to display and consume too much I/O. When I loaded my MICROVAX system with four active *Down to Earth* users I found the buffered I/O, which is linked directly to terminal activity, to be high (compared with FMS transaction processing applications). I assume that part of this problem is because of the menu screens, which are somewhat complex.

With its multicompany abilities, *Down to Earth* is perfect for accounting firms and VMS or UNIX timeshare systems. In the time I had the software for evaluation, no problems or program bugs were experienced. I was amazed at how easily and transparently I could go between the VAX/VMS version and the PC-DOS version. It's been a pleasure to work with.

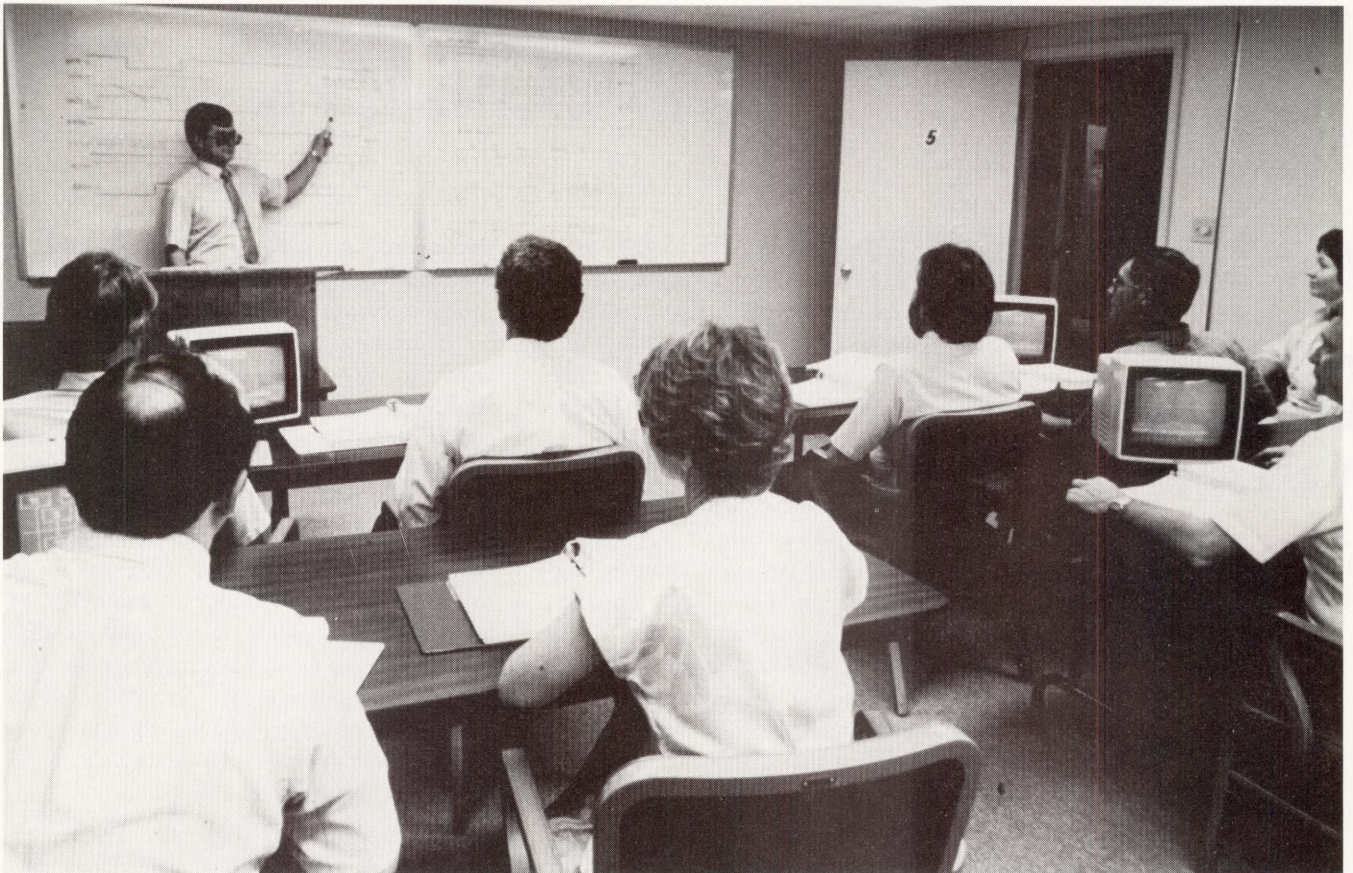
PAYROLL		Bynon & Associates	
Select Function	##		
<b>*** Maintenance Routines ***</b> 1. Employee 2. Pay/Deduction Codes 3. Workman Compensation Codes 4. Additional Employee Deductions 5. Employee State/City Wages & Taxes 6. Company		<b>*** Check Processing ***</b> 7. Automatic Pay (salaried only) 8. Activity/Time Sheet Entry & Edit 9. Print Activity/Time Sheet Proof 10. Calculate and Print Payroll 11. Print Certified Payroll Register 12. Post Checks	
<b>*** Reports ***</b> 13. Master Listings 14. Employee Totals 15. Employee History 16. Federal Tax Report 17. State/City Tax Report 18. W-2 Form Printing		<b>*** Miscellaneous ***</b> 19. End of Month 20. End of Quarter 21. End of Year 22. Purge Employee History 23. Federal Tax Table Maintenance 24. State/City Tax Table Maintenance 25. P/R to G/L Distribution 26. Other Available Reports 27. Print Queued Files	

Screen 2: Payroll menu.

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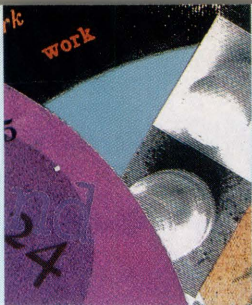
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**LEGAL**

# DEC VS. EMULEX

## Employees And The Protection Of Technology.

By Christopher A. Bloom

Most technology companies are aware of the dangers posed by employees who steal proprietary information. Naturally, they take precautions to protect against such theft. Often, however, they don't take precautions against the other side of the coin: misuse of information by employees.

Such misuse occurs when a company hires an employee from a competing company. The new employee brings information belonging to his former employer. If the employee uses information proprietary to the former employer or if a restrictive agreement binds the employee, the company receiving this information can become trapped in a web of lawsuits and liability that can even ensnare the technology it owns.

Emulex Corporation is caught in this web. Having sought to establish a business providing peripheral products to the DEC marketplace, Emulex endeavored to come as close as possible to DEC functionality and technology. So, Emulex sought to hire those most knowledgeable about DEC products: DEC employees.

Under these circumstances, it was only a matter of time until Emulex confronted a new employee improperly using DEC's inside information about products.

In the Spring of 1985, Emulex hired Chuck Hess, a consulting software engineer who had been with DEC for more than 10 years. Hess was one of the engineers involved in the implementation of Digital Storage Architecture (DSA). According to court

documents, when Hess left DEC in July, he took with him materials related to DSA and its implementation on then current products.

Hess negotiated for an executive position with Emulex while still at DEC. While negotiating, according to DEC, Hess gathered copies of DSA specifications contained in its development computers. Online files of confidential information systematically were transferred to computer tapes. Later, Hess took these materials to Emulex, where he made them available to a number of employees. In its court filings, Emulex concedes not only that DEC's information was taken by Hess, but also that the computer tapes were delivered to Emulex and loaded onto its computer, although Emulex contends it was unaware of the content of those tapes at the time.

It's not clear whether Emulex wanted or intended to take these materials from DEC. Emulex's Chairman Fred B. Cox and President Steve Frankel deny knowledge of these activities. And Emulex characterized Hess' actions as an aberration in violation of company policy, stating that the company had Hess sign an agreement before hiring that prevented him from such actions.

But Emulex, in court documents, admitted that at least some of the information accumulated by Hess was seen by up to 11 of its employees.

Although Emulex may not have intended the direct theft of DEC's information, there's no doubt that Hess' knowledge of DEC's



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products was an important reason for Emulex to hire him.

On July 5, 1985, DEC filed suit against Emulex. In its suit, DEC accused Emulex of patent infringement and theft of trade secrets. DEC considered the materials taken by Hess to be trade secrets. When trade secrets are stolen, the court can require the return of the

stolen materials and prevent the use of trade secrets wrongfully obtained. Much as a small vial of a concentrated chemical, when emptied into a stream can poison the lake into which the stream flows, secret information when wrongfully released in a company may taint its legitimate activities. A court attempting to clean up the improper ex-

ploitation of that information may issue broad, injurious decrees. That's what happened to Emulex.

## A New Environment

DEC, like many CPU manufacturers, is reluctant to open its technological architecture. Instead, DEC seeks profit from a broad array of products applying its closed technology. At one time, companies like DEC favorably looked upon peripheral manufacturers because they found those manufacturers stimulated demand for its CPU. But DEC and others now believe large profits from their technology can be lost to peripheral manufacturers. Thus, CPU manufacturers such as DEC are under pressure to retain and exploit all proprietary features of their products.

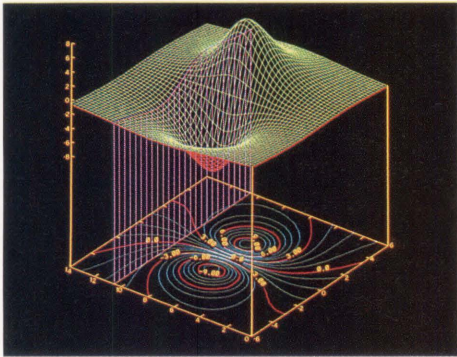
In the face of this pressure, Hess' actions may have given DEC an excuse it was looking for. Before he left DEC, Hess apparently attended a meeting at which DEC officials were planning a patent infringement action. DEC believed that Emulex's controller products violated patents issued to DEC on Mass Storage Control Protocol and various buses for DEC's VAX, MICROVAX and PDP-11 computers. Hess' actions provided the opportunity and DEC seized it.

In the lawsuit, DEC obtained a preliminary injunction against Emulex that prevented Hess from being employed by Emulex in any capacity on the design, development, modification, manufacture, marketing or sale of any DEC-compatible project. Also, it prevented Emulex from using or disclosing any of the information taken by Hess and made Emulex return to DEC any documentation taken. Under the circumstances, if it had stopped there, Emulex could've contained the blazes.

However, as originally written, the order went on to prevent Emulex from developing, manufacturing or marketing any product that implemented "any portion of any of the protocols specified in Digital's DSA technology," or was plug compatible with such a product.

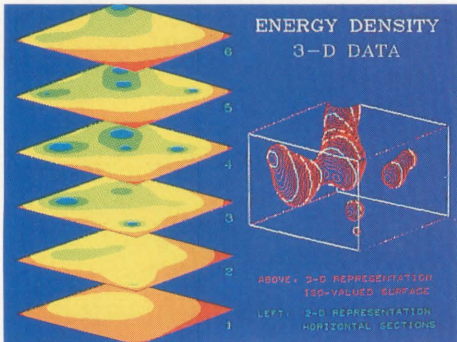
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# GRAF<sup>KIT</sup>



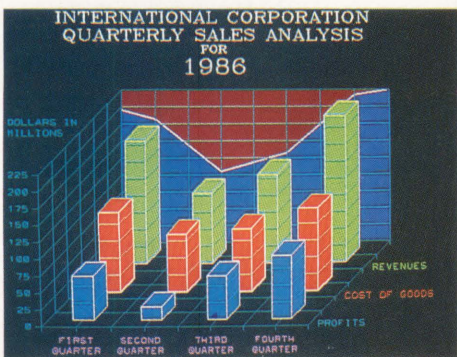
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order was sweeping and it presented an obstacle to Emulex's business. Emulex had to forego or halt developing or marketing a number of products. Hess worked for Emulex less than eight days, but the harm caused by the order that resulted from his employment will last much longer.

Emulex appealed and some of the broad language of this order has been modified. Even so, Emulex still has to contend with an injunction, further appeals and additional legal expense. The courts probably will examine most of Emulex's products for intellectual property violations both major and trivial. Further, DEC certainly will be looking for damages for breaches of its proprietary rights. Whatever the outcome, the litigation is interfering with Emulex's ability to conduct its business by requiring it to defend itself.

### Peripheral Manufacturers

Emulex, founded in 1979, created DEC peripheral equipment, including controllers and multiplexers. These functionally emulated the storage products available from DEC and could be used with little modification to DEC's software. With approximately \$105 million a year in sales, primarily from DEC-compatible equipment, Emulex is at the mercy of DEC's decisions with respect to peripheral manufacturing.

By its lawsuit against Emulex, DEC has sent a message to makers of peripheral equipment: DEC will use all available legal avenues to protect its technology. For peripheral manufacturers marketing to the DEC marketplace, this message is ominous. All peripheral manufacturers must be wary when creating plug-compatible equipment for DEC computers.

Even without legal constraints, the environment for peripheral manufacturers is treacherous. A peripheral manufacturer is strongly dependent upon the CPU manufacturer. The peripheral manufacturer must offer products strictly compatible with the CPU architecture, providing a superior price performance for the user. The peripheral manufac-

turer will succeed only if it knows as much about the technology of the CPU as the CPU manufacturer itself.

The emulator must use that knowledge to provide a product with either equivalent functionality at a lower price or enhanced functionality at a competitive price. Further, the peripheral manufacturer must know and anticipate the

unmet needs of the CPU manufacturer's customer and meet those needs first.

The lesson of the Emulex case is clear. It is as important to protect against pirated information entering the company from other sources as it is to protect against the theft of information from the company itself.

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protect itself at the time of initial employment, during the course of employment and upon termination of employment. Prior to initial employment, the employer should ascertain that the prospective employee's experience and knowledge doesn't violate the rights of others. The employer should obtain a full disclosure of past employment, and determine whether the applicant is bound by any written agreement restricting future employment or use of confidential information.

At the same time, the employer must look to the future and expect that the newly hired employee eventually may leave. Thus, the employer must structure the proper agreements to protect its information and products that may be developed by the new employee during the course of employment.

In some cases, a contract containing restrictions must be signed by the employee prior to commencement of work or it may not be enforceable. According to documents filed by DEC in court, Hess signed an employment agreement with Digital in which, among other things, he promised to "respect and safeguard Digital's confidential information." Based on such an agreement, when Hess' misconduct was uncovered, DEC was in a position to show a breach of his duties based on the agreement.

During an employee's tenure, the company must make sure that any development method or information used by an employee belongs to the company or that at least the employee has a right to use the information. It isn't sufficient simply to promulgate a policy statement, such as the one Emulex had: "All employees must respect the confidential nature of the documents and projects ... [of] a previous employer." A company must go further, actively counseling and supervising its employees in the use of confidential information.

A company also can protect itself by maintaining records regarding access to its premises and the use of confidential information. In the Emulex case, DEC had such records. To obtain the in-

formation, Hess needed access to DEC's facility and use of its computer. According to Digital, Hess worked nights and weekends downloading confidential information to his computer account, copying that information onto tapes and, thereafter, deleting the information from his account. Nevertheless, the computer that provided the information tracked the access and transfer of information and created a record of Hess' activities. Thus, DEC had a record of Hess' access to and use of DEC's computer.

The Emulex case underlines the benefits of keeping these records. With such records, DEC could prove what Hess had done in the weeks prior to his termination. Through their records, DEC demonstrated that Hess had downloaded confidential development information to magnetic tape.

Taking this one step further, companies should let all employees know that such security measures exist. This knowledge won't stop an employee committed to stealing information, but it may deter an ambivalent employee.

When an employee departs, an employer should determine if any proprietary information has been taken. Records pertaining to use of and access to confidential information can be helpful regarding development matters. Use of an exit interview with a terminated employee also can assist.

At an exit interview, the employee should be reminded of his contractual and other obligations not to take an employer's property, including an employer's intellectual property. He may believe the information is his own. The employee should be asked whether he has taken that information; if he admits having done so, he should be asked to return it. A closing interview might discourage an employee from taking materials that don't belong to him. From a personnel point of view, it's also important to clear up the employee's benefits and determine what the company is doing right or wrong in relationship to the employee's departure.

Someone intent on stealing won't necessarily tell the truth in this inter-

view. So other more reliable methods must be used to determine whether information has been stolen. A record of such an interview nevertheless may be helpful from a legal perspective; it can demonstrate that the employee knew he wasn't supposed to take the information. For example, it appears that at his exit interview, Hess lied to his immediate supervisor. DEC effectively used this exit interview in court to show that it had been misled in its investigation.

## Protection Program

All companies, small or large, can implement appropriate programs to protect their technology. Protection should begin when employees first enter an organization.

The Emulex case illustrates clearly the need for an effective program for protecting technology against employee misuse. A computer company would be well advised to incorporate the following five elements into its program:

1. Pre-employment screening to assure that a new employee doesn't violate trade secrets of prior employers or contractual commitments to such employers or others.
2. Carefully drawn agreements with all individuals who have access to secret materials.
3. A system to track confidential information and limit access to such information.
4. An exit interview upon an employee's departure to determine whether the employee has taken any secret information and remind him of his continuing obligation to maintain confidence.
5. Protection of intellectual property rights with appropriate legal action.

With a strong trade-secret program, a technology company can protect its technology and maintain an advantageous market position in that technology.

## Lessons Learned

A peripheral manufacturer such as Emulex is in a precarious position. Although they can compete best with access to information not publicly available, CPU

manufacturers like DEC, by obtaining and enforcing patents, can prevent use of even publicly available information on its technologies.

For a company dependent on another for its technology, even the best trade-secret program may not be enough. Look at what's happening to Emulex. Even if Emulex had prevented Hess from bringing the secret DEC information to Emulex, DEC might nevertheless have sued. If DEC's patents are upheld, DEC could prevent Emulex from using patented processes or require Emulex to pay a royalty on sales. Because of its dependence on sales to DEC customers, Emulex must continue to sell peripherals for DEC products.

The best solution for the peripheral manufacturer may be to change the business environment. Such a peripheral manufacturer could enter into a license or joint venture agreement with the CPU manufacturer on which it depends. Both companies may find synergistic benefits, resulting in greater market share and profitability.

Also, the peripheral manufacturer might avoid putting all of its eggs in one basket by diversifying into new markets. Such diversification won't avoid lawsuits, but may ensure survival if the peripheral manufacturer infringes on the CPU manufacturer's rights.

DEC and other CPU manufacturers also should consider the business implications of the changing relationship with peripheral manufacturers. Peripheral manufacturers like Emulex can help drive the sales of the CPU manufacturers. Required to provide better price/performance, the peripheral manufacturer can enhance the value of the CPU itself.

DEC is taking an aggressive stance with peripheral manufacturers who compete directly. In so doing, according to some industry observers, DEC is forsaking those who helped it get where it is.

In the future, it's entirely possible that these peripheral manufacturers no longer will exist or, if they exist, DEC won't be as important to them. What

does that mean to a company like DEC? Will the decline of peripheral manufacturers increase DEC's short-term profitability? Or will it result in a long-term lessening of demand for DEC's products?

At this time, no one can answer those questions authoritatively. But the Emulex case raises them, and industry

members and observers seriously should consider them.—*Christopher A. Bloom is an attorney with the law firm, Keck, Mahin & Cate, Chicago, Illinois.*

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**UNIX**

# UNIX IN THE OFFICE

By Dr. James Meade

## Ease-Of-Cost Propels UNIX In The Office.

As recently as three years ago, leading office consultants were sounding the death knell for UNIX in the office. They felt that UNIX was well suited to engineers, but too complex for the often non-technical office user. UNIX had few tools for programmers. It wasn't one language, but several. Above all, it was hard to use, making it unacceptable in a marketplace whose most important single demand was ease of use.

The expected "Year of UNIX" never came, but UNIX did. It came, not with a bang, but with a whimper. The whimper lasted, built to a low roar, and is growing steadily.

Dataquest, the San Jose, California, research firm, says that software revenues for UNIX approached \$3 billion in 1987 and could rise as high as \$7 billion in 1990. UNIX systems represented eight percent of all computer shipments in 1987, and Dataquest projects a rise to 10 percent by 1990. And not all the shipments are to the traditional UNIX stronghold, namely engineering. Some are going to the office.

If UNIX is succeeding in the office, it's doing so in spite of itself. The office consultants pronouncing the death of UNIX probably had logic on their side. As an operating system, UNIX doesn't offer the ease of use of VMS or DOS.

Why the success? Observers speculate on a variety of explanations for the UNIX invasion. Students who learned the operating sys-

tem in school now are becoming influential in the marketplace. Others suggest naive office users aren't as naive in 1988 as they were in 1983, and are no longer afraid of UNIX.

Development tools for UNIX, nonexistent in 1983, are becoming commonplace today. VARs and OEMs hide UNIX from end users, giving them its benefits without forcing them to work with it directly. The government has become a UNIX user on such a large scale that it alone gives UNIX a substantial market. UNIX workstations, like those from Sun and Apollo, now are spilling over from science and engineering departments into business departments.

### Cost Is The Key

As is often the case in business, what looks like a multitude of reasons for a trend probably boils down to a single reason: cost. UNIX is cheaper than other operating systems. Economics is the reason that office users are turning to an operating system that many don't like. Ease of cost, it turns out, is more important in the office than ease of use.

"The reason is economics, based on the combination of portability of applications and low equipment costs combined with the cost savings of a multiuser system that lets you put dumb terminals instead of PCs on desktops," concludes Neal Nelson of Chicago-based software house Neal Nelson Associates.

You can take low-cost machines like the IBM PS/2, Nelson points out, "drop in the Santa Cruz UNIX and have a capable multiuser system for \$10,000." With that system, he says, you can support eight to 16 office users. The



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17 F1 001 18461 10P400P 00138 4 * C
18 F1 001 18461 10P400P 00148 4 * C
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22 F2 002 MER2201 ZERO RECORD
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24 F2 002 MER2251 *** END SE
25 F2 002 MER226A END SYNC
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29 AR 015 1C391 COMMAND PASSE
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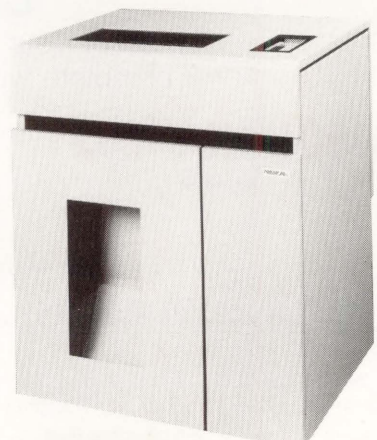
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## . . . 10 users can connect dumb terminals to one computer at a cost of \$10,000, instead of running 10 standalone personal computers that cost \$20,000.

makers of Santa Cruz UNIX, he adds, have recognized the call for UNIX-based office systems and provide a word processor, a spreadsheet, and a *dBASE II* lookalike.

Restaurants, hotels and chemical companies buying these low-cost UNIX machines account for hundreds of thousands of purchases, according to Nelson, even if their activities aren't as well publicized as those of companies like General Motors. "There are thousands of one- and two-man programmers installing [UNIX-based] Altos boxes around the country," he claims. "Nobody knows who the customers are. Altos keeps growing."

Virtually all of the other reasons for buying UNIX translate into cost savings. Why has the government selected UNIX as a standard? Because it wants hardware independence. Why is hardware independence important? Because a single vendor has no incentive to keep prices down. A multiuser system is attractive because 10 users can connect dumb terminals to one computer at a cost of \$10,000, instead of running 10 standalone personal computers that cost \$20,000.

UNIX even is saving costs in cases where other technologies were expected to. Analysts are lamenting the fact that the long-awaited "Year of the PC LAN" failed to materialize. "As a multiuser system, UNIX gives the benefits of the LAN without the headaches," points out Erwin Morton, president of Syntactics Corporation in Santa Clara, California, makers of UNIX-based word processing and desktop publishing.

"It may be that the promise of the LAN hasn't materialized," Morton con-

tinues, meaning that technical connectivity problems remain. Again, cost looms as a telling factor. "Another reason may be that things are being sold on the basis of cost. You can buy an Intel 386 box for \$5,000, \$6,000 or \$7,000. You can't put together eight PCs and an LAN at a cost of \$500 a user."

### Available Products

The office user no longer has difficulty finding top-quality UNIX spreadsheets. He can run them on DEC machines or on the workstations of competitors like Sun and Apollo.

"We have people looking for the kind of price/performance advantages people like Sun are delivering," says Jay Yesselman of Access Technology Inc. of Natick, Massachusetts, makers of the popular *20/20* spreadsheet for the VAX.

"UNIX is not just in the typical, technical workspace any more. We're doing a lot of Sun business now, and the interest is just beginning."

Nor is there any longer a dearth of UNIX-based word processing. Companies like Syntactics are beginning to realize the wisdom of their decision to build in UNIX. "UNIX was a good place for us to go," says Morton. "UNIX is a different world from DOS. When we originally went into UNIX in 1982, we were convinced UNIX was going to explode in six months. It's been a long six months. We think of it as a rolling six months. Now we don't think there'll be an explosion. I don't see that UNIX will replace DOS, but research services now project that UNIX will grow faster than DOS.

"UNIX offers the DOS user an upgrade to a multiuser system. OS/2, the

natural upgrade, is multitasking but not multiuser." When users do opt for UNIX instead of OS/2, they find well-developed desktop publishing available from companies like Syntactics.

WordPerfect Corporation of Orem, Utah, makers of one of the leading word processors for the IBM PC, last year announced a version of its word processing package for the VAX. The company already offers versions for the UNIX-based boxes, according to Ross Wolfley, director of DEC products marketing, and they're planning to announce an ULTRIX version as well.

"We anticipate definitely having an ULTRIX version. We want to be on the operating systems that make sense. We believe, at this point, that it will make sense to be there. ULTRIX appears to be one of the best UNIX-based systems around."

Once rare, UNIX-based applications software for the office is becoming commonplace. Software development tools, equally rare at one time, are making their way into the UNIX marketplace. Standards like the new X windows, developed by MIT and supported by DEC, now make it easier to port applications across operating systems.

Also, vendors now are offering up-to-date development tools for the UNIX market. JYACC Inc. of New York, makes an application manager called *JAM* that provides authoring tools and library functions for building applications in UNIX and a number of other operating systems including VMS and MS-DOS.

"Most of the people who use the package for UNIX are developing end user applications used in the office," according to Executive Vice President Frank Vafier. "For example, one large bank developed a foreign exchange trading system. Another bank developed a branch automation system. We're seeing diverse applications. Brokerage firms are developing applications for traders."

Like much of the rest of the software that has grown up in the UNIX en-

vironment, JAM isn't causing the UNIX explosion but is responding to it. "We're not Sun," says Vafier, who doesn't believe that application developers like JAM have caused the move to UNIX. "But once you've made the decision to go with UNIX, you have to develop your applications. You need to develop on that UNIX computer, and you need tools like JAM."

Digital, for all its efforts to be a "one operating system" company, is finding itself a two operating system company with VMS and ULTRIX. "Our system software strategy is oriented to supplying what the customer wants to buy," says Roger Heinen, a corporate consulting engineer at DEC. "ULTRIX is just as profitable in terms of dollars to Digital as selling VMS. It really makes no difference to us. What makes a difference from the salesman's standpoint, I think, is being able to make a sale to a customer, so we can sell them support

and consulting. On the individual sale of a piece of hardware, it makes no difference to us whether it's VMS or ULTRIX."

Digital hasn't announced any plans for an ULTRIX version of its popular ALL-IN-1 office software. Most of its own software products are for VMS or the older operating systems. Nevertheless, its support for ULTRIX means that office users can buy Digital hardware with the UNIX operating system. Third-party software, increasingly, will meet their office needs.

### Problems

The steady growth of UNIX in the office shouldn't imply that the technical problems that have plagued UNIX for the non-technical user have gone away. When users turn to UNIX as the low-cost alternative, they sometimes find themselves coming up short on technical support.

"The small Intel-based machines technically do not have the support of other machines," explains Syntactics' Morton. "The rule seems to be that the system administrator is the secretary sitting closest to the machine. We can make our product as easy as we like. But we can't necessarily make the operating system easy. For example, the administrator still has to know what it means to do a multiuser backup.

MIS directors have been slow in warming up to UNIX. "Anything but UNIX," laments William A. Gilbert, director of computing at MIT's Whitaker College. "Our site has both UNIX and VMS. The majority of the time when problems come up, they're problems with UNIX. Mainly they have to do with word processing. UNIX has no version numbers, for instance, so people accidentally blow away files they need."

Portability, the most common reason for opting for UNIX over other operating systems, is hardly the simple matter it appears to be. "UNIX is theoretically vendor independent, but it's not really what it was cracked up to be in that regard," says Morton. "It's easier to port UNIX from one machine to another, than to port operating systems. But easier is a relative term. That doesn't mean it's easy. It just means it's doable. It's non-trivial to port UNIX applications, but it's easier than porting operating systems."

There are problems with UNIX for the office user and there always have been. If cost were no consideration, office buyers might opt for something other than the operating system that has long been popular with engineers. But cost is a big consideration. So, more and more office users are heading toward UNIX. And the revolution that most thought would never happened is progressing and, in its own fashion, happening after all. —*Dr. James Meade is a Fairfield, Iowa-based free-lance writer.*

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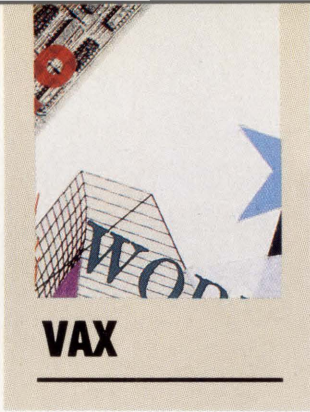
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# M MODIFYING MODULES

By Gerard Croce

## A Simple Method Of Controlling PEs That Is Well-Adapted To The VMS Operating System.

One of the difficulties of software development is the problem of managing the programming environment (PE). This article, along with a supporting DCL command procedure (see Program 1), describes one method of controlling PEs that is well-adapted to the VMS operating system.

A PE can be thought of as a collection of tools, techniques, and resources for writing software. At the lowest level a PE is characterized by objects, such as disk directories, symbols, logical names, command verbs, etc. I'll be focusing on a method for initializing and changing these low-level systems-related values. To understand how this method works, let's look at some of the issues involved in coordinating a typical software project.

### A Common Solution

Most medium and large projects need a way of separating tested modules from those being written and debugged. Individual programmers have to modify and build parts of the software in their own accounts, and also be able to access modules that have been written, tested and released by other members of the group.

One way of handling this is to have a "common" or "public" directory for tested software, and corresponding "work" directories in user accounts. Project programmers can copy source files from the common area into their work area for modifying. They also

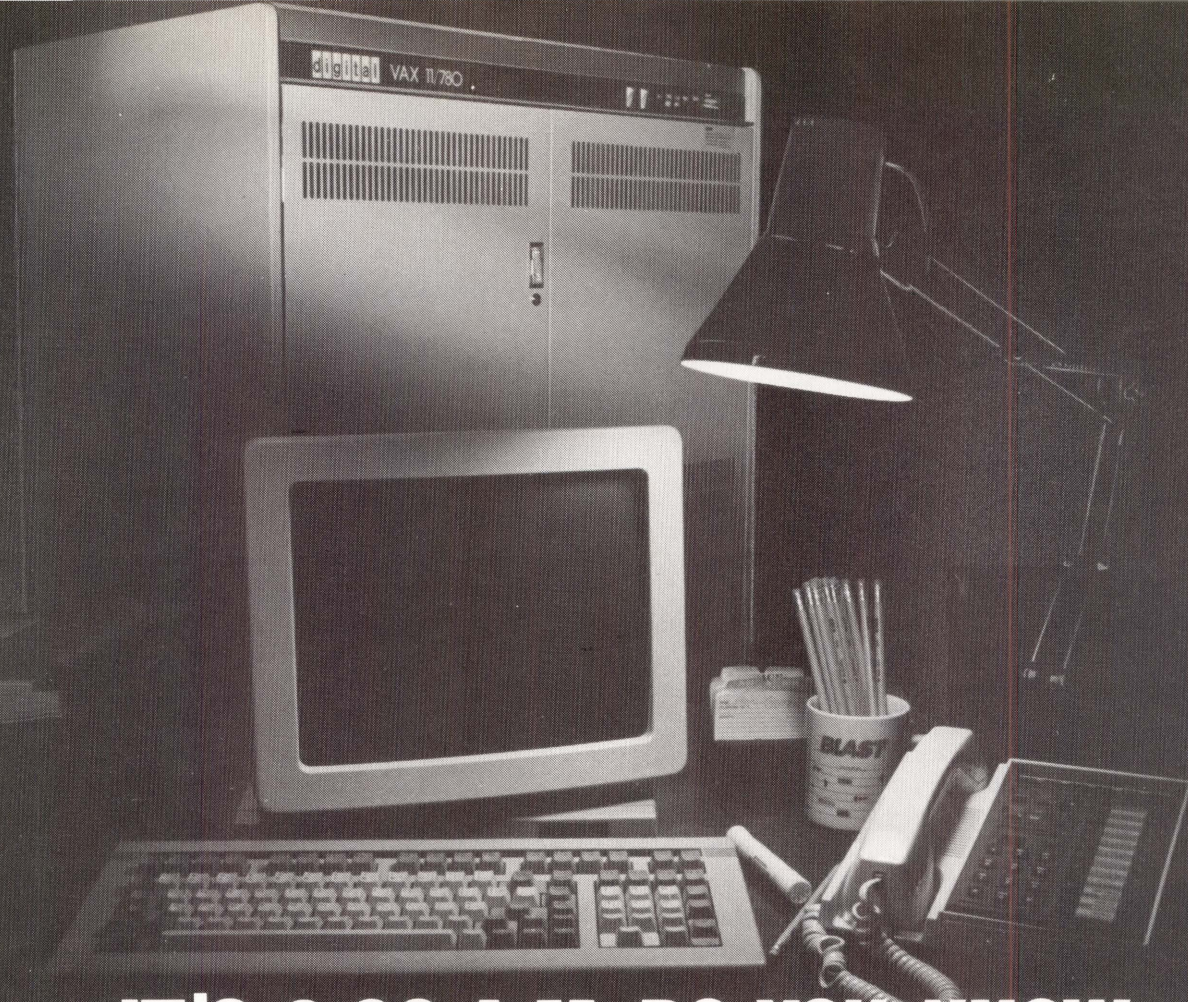
can link their test modules with the balance of the released software by using the logical name of the common area in linker argument files, so that users only need copies of the source and object files that they're actually changing. Some formal protection mechanism is required to prevent untested modules from finding their way into the common area, which usually is owned by a group librarian.

DEC's Code Management System (CMS) can be adapted easily to this scheme. Users "reserve" a source module into their work area for modifying and later "replace" the tested version into the library. The group librarian periodically "fetches" all the source files from the library into the common area and compiles the entire system there, so users can link their local modules with the newly released group modules.

Under this simple arrangement the structure supporting a PE consists of the common and work area, symbols and logical names to refer to these areas, an optional CMS library, and an environment name that's descriptive of the project or software. The basic concept is that there's only one common area per PE, which users can "connect" to a work area in their own account. Many different PEs can be defined to separate project modules according to software function, revision level, specific features, or similar factors.

The DCL procedure ENV is a simple, standard way of defining and initializing this type of PE. ENV will:

1. Display the available PEs to choose from.
2. Define symbols and logical names for "work" and "common."



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3. Set the default work directory and CMS library.
4. Show CMS transactions since last login.
5. Run a local user-written startup command file.
6. Define the system prompt to be the PE name.

Once a project software is released, ENV becomes a tool for configuration management. The base release of a software system can be kept in a common area shared by several PEs, each being a different release or variant of the base, with the work areas containing modules that are unique to the variant.

Another application for ENV is the maintenance of software tools. Each tool can be allocated its own PE. The toolsmith modifies and tests tools in the work areas, and "releases" the finished product into the common areas, where they're available to users.

### Selecting The PE

ENV looks up the PE name, common directory, and optional CMS library in a data file written with a text editor. The

ENV finds the work area by searching down the directory tree in your login account for a subdirectory with the same name as the PE.

data file may contain comment lines (starting with a semicolon) and data lines (see Figure 1). Each data line is a separate PE.

Once you have written an ENV data file, select a PE by typing:

```
ENV PE_NAME
```

at the DCL prompt. If you don't specify a name on the command line, the list of defined PEs will be displayed for you. In the data file you can give each PE a one-line comment to be displayed in the listing.

If ENV finds the PE name in the data file, it next locates the common and

work areas. You can use the symbols "common" and "work" to set your default directory to either of these areas, and the logicals "common" and "work" can be used to refer to the directories themselves. After selecting a PE, the initial default directory is the work area. If you type the DCL "SET DEFAULT" command to move to another directory, typing "WORK" will return the default to your current PE work area.

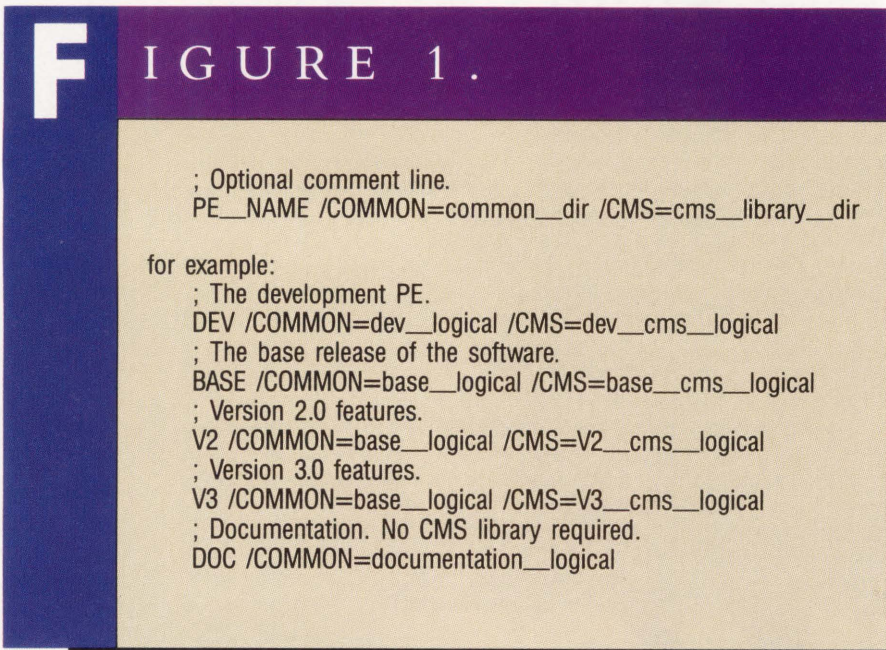
If the ENV data file names a CMS library for the PE, the default library is set, and ENV displays the history of transactions in the library since you last logged into the PE, which gives you an indication of any group activity during the interval.

Next ENV looks for a user-written command file named ENV\$INIT.COM in the work area and executes it if it exists. This file can be used, for example, to define any symbols or logicals that are unique to the PE.

Finally the system prompt is changed to the name of the PE. This is mainly useful for reminding you of the current meaning of "work" and "common."

### Getting To Work

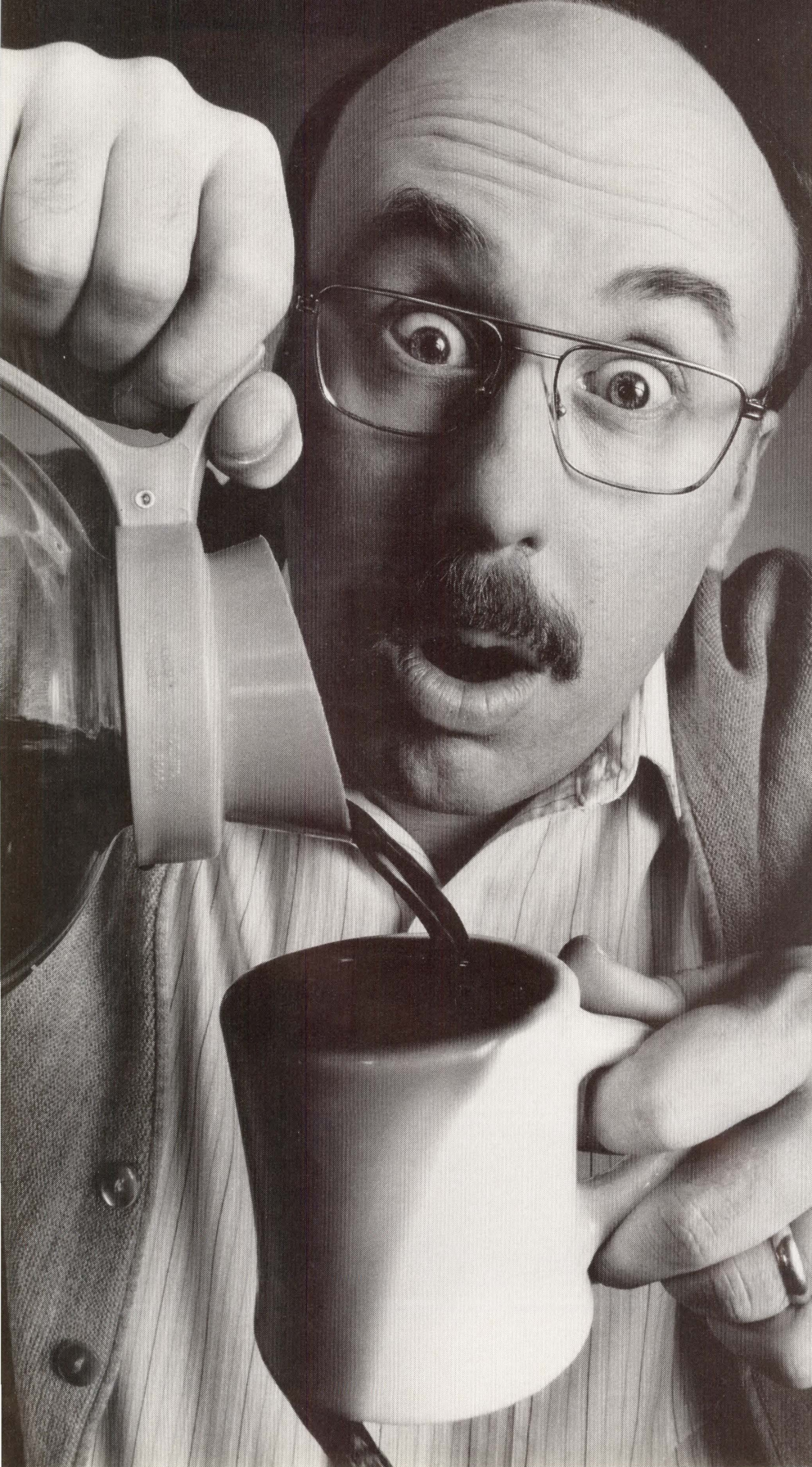
ENV finds the work area by searching down the directory tree in your login account for a subdirectory with the same name as the PE. If it's found, this directory becomes the work area; otherwise the common area also is defined to



*Syntax of the ENV data file. Common\_dir and cms\_library\_dir are logical names defined by the user. The /CMS qualifier is optional.*



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# CORTEX

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... to create a work area for any PE,  
 ... create a directory of the same  
 name as the PE anywhere in  
 your account.

be the work area. So if you want to create a work area for any PE, all you have to do is create a directory of the same name as the PE anywhere in your account. It's not necessary to create a work directory if you only want to scan the common files in a particular PE, or if you're allowed to work in the common area.

You may find that sometimes it's convenient to be able to connect alternate work areas to a single common area or vice versa. Typing the command:

```
ENV PE_NAME ALT_WORK_NAME
```

will cause ENV to search for a directory of the alternate work name (instead of

the PE name) in your directory tree. For example, if you have subdirectories named RED.DIR and GREEN.DIR that you want to use with the COLOR PE, typing:

```
ENV COLOR RED
```

will connect the COLOR PE to the RED work area, and:

```
ENV COLOR GREEN
```

will connect the COLOR PE to the GREEN work area. —Gerard Croce is senior scientific analyst for SmithKline & French in King of Prussia, Pennsylvania.

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## PROGRAM 1.

```

$ 1
$ 1 ENVIRONMENT.COM
$ 1 A DCL command procedure that manages programming environments.
$ 1
$ 1 Include the following line in your LOGIN.COM file:
$ 1 $ env := @env.com
$ 1 Command parameters
$ 1 P1 = environment name
$ 1 P2 = alternate work directory
$ 1 A user guide to ENV is available for $10 from:
$ 1 Gerard Croce, 24 Spring Valley Rd., Frazer, PA 19355
$ 1
$ 1
$ 1 on warning then goto error_routine
$ 1 bell[0,32] = %X07
$ 1 say = "write sys$output"
$ 1 cms lib = ""
$ 1 env_name = ""
$ 1 data_file_open = "false"
$ 1
$ 1 Open the environment data file. The logical name ENV$DIR
$ 1 must be defined in the user's login command procedure.
$ 1 err_msg = "Can't open the environment data file ENV$DIR:ENV.DAT."
$ 1 open /error=error_routine/read infile env$dir:env.dat
$ 1 data_file_open = "true"
$ 1
$ 1 If the user doesn't name an environment, display the list of envs.
$ 1 if pl .eqs. "" then goto display_env
$ 1
$ 1 Read a line from the data file, parse the line, and see if it is the
$ 1 requested environment. Repeat until EOF or a match is found.
$ 1 The user can cancel reference to any env by giving an
$ 1 env name of "none". "help" displays a help screen.
$ 1 pl = f$edit(pl, "lowercase")
$ 1 if pl .eqs. "none" then goto cancel_env
$ 1 if pl .eqs. "help" then goto env_help
$ 1 err_msg = "Environment not found. Type ENV <return> for a list of env's."
$ 1 top_of_read_loop:
$ 1 read /end of file=error_routine infile inline
$ 1 goto parse_line
$ 1 after_parse:
$ 1 close infile
$ 1 data_file_open = "false"
$ 1
$ 1 Search for a subdirectory named for the env.
$ 1 Start at the default login directory, defined by SYS$LOGIN.
$ 1 By default, use the common dir for the work area.
$ 1 work_dir = common_dir
$ 1 if $logical("sys$logon") .nes. "" then set default sys$logon
$ 1 if p2 .nes. "" then goto do_p2
$ 1 temp = f$search([".."] + env_name + ".dir")
$ 1 if temp .eqs. "" then goto define_logical: 1 sub-dir not found
$ 1 The sub-dir was found. Use it for the work area.
$ 1 work_dir = f$element(0, "]", temp) + "." + env_name + "]"
$ 1 goto define_logical
$ 1
$ 1 If the user wants an alternate work directory...
$ 1 do_p2:
$ 1 err_msg = "Alternate work directory not found."
$ 1 temp = f$search([".."] + p2 + ".dir")
$ 1 if temp .eqs. "" then goto error_routine: 1 sub-dir not found
$ 1 work_dir = f$element(0, "]", temp) + "." + p2 + "]"
$ 1
$ 1 Logical names and symbols.
$ 1
$ 1 define logicals:
$ 1 define /nolog work 'work_dir'
$ 1 define /nolog common 'common_dir'
$ 1 work := set default work
$ 1 common := set default common
$ 1
$ 1 Set the default CMS library. ENV maintains the file LAST$ENV.DAT
$ 1 in the work directory for keeping the last login date.
$ 1 on warning then continue
$ 1 if cms_lib .eqs. "" then goto after_cms_notify: 1 No lib defined.
$ 1 set cms_lib:
$ 1 cms set library 'cms_lib' /nolog
$ 1 cms show library
$ 1 find_date:
$ 1 temp = f$search("work:last$env.dat")
$ 1 if temp .eqs. "" then goto rewrite_date
$ 1 open /read /error=after_cms_notify date_file work:last$env.dat
$ 1 read date_file last_time
$ 1 close date_file
$ 1 cms show history /since='last_time'
$ 1 rewrite_date:
$ 1 now = f$time()
$ 1 now = f$extract(0,11,now) + ":" + f$extract(12,11,now)
$ 1 open /write /error=after_cms_notify date_file work:last$env.dat
$ 1 write /error=after_cms_notify date_file now
$ 1 close date_file
$ 1 purge /nolog work:last$env.dat
$ 1
$ 1 Tell the user what the common and work areas are.
$ 1 after_cms_notify:
$ 1 common: 1 Move to the common area.
$ 1 say "common dir" + f$edit(f$environment("default"), "lowercase")
$ 1 work: 1 Move to the work area.
$ 1 say "work dir" + f$edit(f$environment("default"), "lowercase")
$ 1 say "(enter ENV HELP for more info)"
$ 1
$ 1 Reset the prompt. The symbol MYNAME must be defined in the user
$ 1 LOGIN.COM file. MYNAME is typically the user's initials.
$ 1 For example $ MYNAME == "GAC"
$ 1 You could use graphics characters here to highlight the prompt.
$ 1 set prompt = "'myname'-'env_name': "
$ 1
$ 1 Execute any user-written procedure in the work area.
$ 1 if f$search("work:env$init.com") .nes. "" then @work:env$init
$ 1 exit
$ 1
$ 1 Parse a line from the data file ENV.DAT.
$ 1 parse_line:
$ 1 inline = f$edit(inline, "compress, trim")
$ 1 ignore comment lines.
$ 1 if f$extract(0, 1, inline) .eqs. ";" then goto top_of_read_loop
$ 1 Tack on the sentinel character "/".
$ 1 inline = f$edit(inline, "collapse") + "/"
$ 1 env_name = f$element(0, "/", inline)
$ 1 inline = f$edit(inline, "lowercase")
$ 1 if f$element(0, "/", inline) .nes. pl then goto top_of_read_loop
$ 1
$ 1 linelen = f$length(inline)
$ 1 parse 100: 1 The /COMMON qualifier.
$ 1 pos = f$locate("/com", inline)
$ 1 This qualifier is required.
$ 1 if pos .eq. linelen then goto parse_400
$ 1 subline = f$extract(pos, 120, inline)
$ 1 pos = f$locate("=", subline)
$ 1 subline = f$extract(pos+1, 120, subline)

```

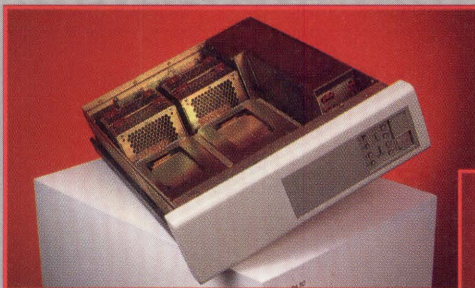
# PROGRAM 1 ... continued

```

$ common dir = f$element (0, "/", subline)
$ parse 200: ! The /CMS qualifier.
$ pos = f$locate ("/cms", inline)
$ if pos .eq. linelen then goto parse_300
$ subline = f$extract (pos, 120, inline)
$ pos = f$locate ("=", subline)
$ subline = f$extract (pos+1, 120, subline)
$ cms_lib = f$element (0, "/", subline)
$ parse 300:
$ goto after_parse
$ parse 400:
$ err_msg = "Environment 'env_name' has no /COMMON qualifier."
$ goto error_routine
$
$ ! Display a list of the available environments.
$ ! Comment lines which immediately precede a data line are
$ ! displayed on the same line as the env name.
$ display_env:
$ ten_blanks = "          "
$ comment_line = ""
$ top_of_display_loop:
$ read /end_of_file=end_display infile inline
$ inline = f$edit (inline, "compress, trim")
$ ! Process any comment lines.
$ if f$extract (0, 1, inline) .eqs. ";" then goto comment_seen
$ inline = f$edit (inline, "collapse")
$ env_name = f$element (0, "/", inline)
$ comment_line = f$extract (1, 65, comment_line) ! Max of 65 chars
$ spaces = f$extract (f$length (env_name), 10, ten_blanks) + " "
$ say env_name + spaces + comment_line
$ comment_line = ""
$ goto top_of_display_loop
$ end_display:
$ say "help          Additional information on the ENV utility."
$ say "none          Cancel the environment."
$ close infile
$ exit
$ comment_seen:
$ comment_line = inline
$ goto top_of_display_loop
$
$ ! Cancel reference to any env.
$ cancel_env:
$
$ on warning then continue
$ set message /nofacility /noidentification /noseverity /notext
$ if f$logical ("work").nes. "" then deassign work
$ if f$logical ("common").nes. "" then deassign common
$ ! The logical SYS$NODE must be the user's system prompt.
$ set prompt = " " f$logical ("sys$node")
$ ! Set default to the login directory.
$ if f$logical ("sys$login").nes. "" then set default sys$login
$ set message /facility/identification /severity /text
$ ! Display the directory and time.
$ exit_info = f$directory() + " " + f$time()
$ say exit_info
$ ! Execute any local procedure.
$ if f$search ("env$init.com").nes. "" then @env$init
$ exit
$
$ ! Display the error message.
$ error_routine:
$ say err_msg, bell
$ if data_file_open then close infile
$ exit
$
$ ! A simple help screen.
$ env_help:
$ say ""
$ say "Full documentation on the ENV utility is available."
$ say "-----"
$ say "To move from the WORK area to the COMMON area, type..."
$ say "    common"
$ say "To move from the COMMON area to the WORK area, type..."
$ say "    work"
$ say "To copy files from COMMON to WORK..."
$ say "    eg. copy common:file1,file2,file3 work"
$ say "    copy common:*.*pas work"
$ say "To search listing files in COMMON for a character string..."
$ say "    eg. search common:filename "string""
$ say "    search common:auto.lst "var3 := 5""
$ say "To use an alternate WORK directory..."
$ say "    ENV env_name alt work dir"
$ say "    eg. ENV tree maple"
$ say "To get a list of the available environments, type..."
$ say "    ENV <carriage return>"
$ exit

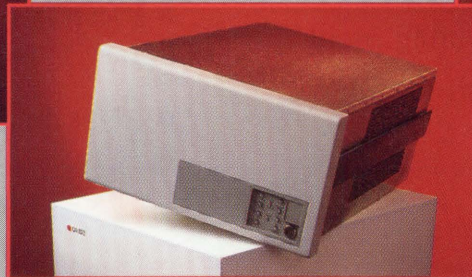
```

## POWERFUL TEAMMATES



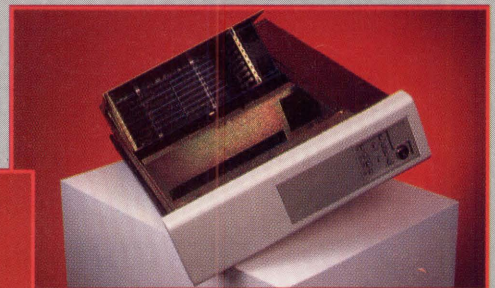
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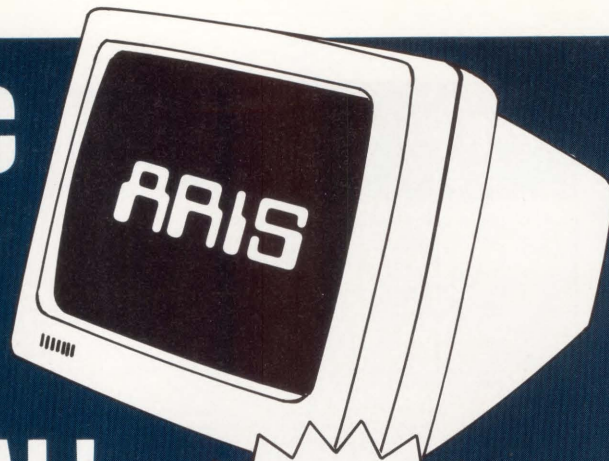
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# U SING NO- BRAND TAPE

By Robert H. Schor, Ph.D.

## ***MTLIB* Makes It Easy For RT-11/TSX Users.**

Looking for software to permit hardware-level control of industry standard mag tape drives? Check out NAB Software Services' version 5.1 of a magnetic tape library, *MTLIB*, written for users of the RT-11 or TSX operating system on DEC's PDP-11 line of computers. With it, you can read or write records of arbitrary size, space forward or backward over a specified number of records or tape marks (also called "file marks"), write tape marks, and rewind or unload a drive. The routines are callable from almost any programming language, including C, COBOL, DBL, FORTRAN, MACRO and PASCAL. In addition, a large number of utility programs are provided, with well-written and documented FORTRAN source code, for performing many of the most common operations with tape.

Mag tape is an important medium because it provides the most convenient method for exchanging large amounts of information among different computers. Aside from choosing one of three bit densities, it is a true device-independent medium. (The only alternative that comes to mind is the serial line but, at 9600 baud, it's slower than 4 MB per hour). Tape also provides an inexpensive method of offline archival storage. A \$25 reel of tape holds more than 20 MB even at the low density of 800 bits per inch.

Before the appearance of *MTLIB*, RT-11 users were restricted to using either:

1. A DEC-provided subset of the ANSI stand-

ard labeled tape method that wrote three tape files (defined by the presence of tape marks) per RT-11 file (one header file, the actual data and a trailer file) using a record size of 512 bytes (the inter-record gaps are thus bigger than the data records); or,

2. A series of .SPFUN calls to the handler (or alternatively using ISPFNx calls from FORTRAN) to cause the tape drive to operate at a hardware level of control. This method allowed the reading and writing of records of arbitrary size at the expense of a more complex program. *MTLIB*, in fact, uses such .SPFUN calls to provide access to the full power of the tape drive, but presents a more user friendly interface to the programmer.

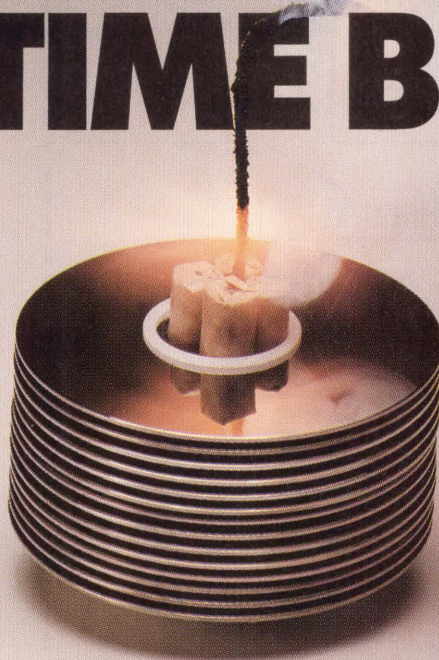
My experience with *MTLIB* over the past few years has been very favorable. I've used the generic tape calls to write PASCAL programs that can:

1. Read and write tapes in DOS format (a simplified file structure used in the original PDP-11 operating system, DOS, and still used in the distribution of programs on tape).
2. Analyze the structure of any mag tape and create RT-11 files from the tape.
3. Read tapes created by ROLLIN (another DOS program which created disk images, a precursor of BACKUP).
4. Read tapes produced on the PDP-10.

In addition, I have written a BACKUP alternative that puts devices (or files) on tape using very large tape records, providing maximum efficiency in writing tape, and an UNBACK routine that treats the tape file as a device, allowing individual file recovery from

# HOW TO DEFUSE DATA TIME BOMBS

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## COMPUTER TIME BANDITS — SURVIVING THE AUDIT.

Today's computer systems have evolved with a major flaw: System clocks must be manually set. "So what?" you ask. This year, two of the Big Eight accounting firms now audit clock integrity. Why? Because data is as important an asset as money, and traceable, secure timestamps could have prevented some real disasters:

- Hackers broke into government-funded university computers, changed system clocks, modified financial data and then returned clocks to entry time. **Result: An obliterated audit trail gave corrupt data to the university and free computer time to the hackers.**
- Payroll and production re-runs plagued a manufacturing plant. Wrong system clocks caused posting of incorrect job times. **Result: Manufacturing lines ran below efficiency, with a high cost in lost man hours and wasted capacity.**

## HOW TO LOSE MONEY, FAST. OR, ARE YOUR COMPUTERS IN SYNCH?

Computer networks need to be synchronized. When they aren't, things don't happen.

- A major international bank's computers wouldn't authorize funds transfers one Friday, because data timestamps conflicted. **Result: They lost a weekend of interest.**

*“Correctly synchronized clocks are essential in computer networks to make sure that all machines do the right thing at the right time... Time Source makes it a snap to synchronize computers and satellite earth stations...”*

BUSINESS WEEK

- Database servers in one distributed computer network kept overwriting data files with old information, because LAN clocks didn't match network system clocks. **Result: Weeks were spent doing data reconstruction.**

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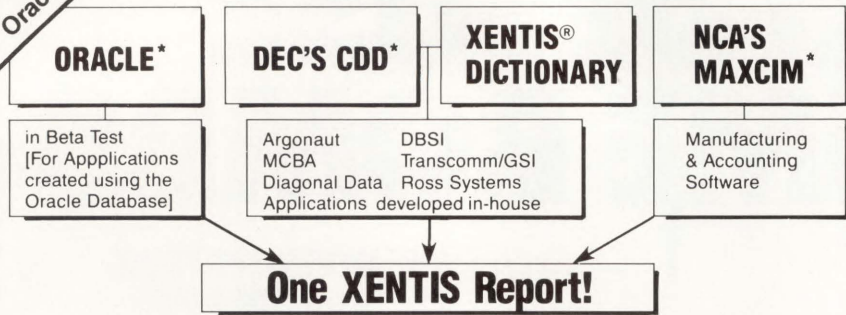
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the tape. All the tape I/O was easy and handled by *MTLIB*. The difficult part was figuring out the logic of the programs, to make them do what I wanted.

In version 5.1 of *MTLIB*, NAB Software provides many of the routines that I had developed earlier, along with well-documented FORTRAN code demonstrating how easy it is to use mag tape.

What can you do with *MTLIB* and the support routines? At the lowest device level, *MTLIB* allows you to manipulate the tape completely. You can rewind, unload, space forward or backward, write with extended record gap (useful in erasing a bad spot on the tape), and read or write records of arbitrary size.

In a typical call, you specify the tape unit (e.g., "MT2:"), a code for one of the eight basic commands you desire, the parameters such as number of bytes to transfer (or records to skip) and the address of the data buffer. The READ command returns a fifth parameter, the number of bytes actually read (or zero, if a tape mark is encountered), permitting you to read records of unknown size correctly.

For each language supported, a one-page demonstration program illustrates most of the common tape commands as well as the calling conventions peculiar to that language. The additional sample application programs provide many of the services you might desire. For example, a single-page FORTRAN program, TAPDUP, duplicates a tape of arbitrary format onto a second drive. Tape movement (rewind, skip forward or backward records or files) is performed by *MTAPE*. Another single-page routine, TAPLOG, examines tape to tell you its structure (how many files, the size of records in each file).

After the structure of a tape is known, the routines TAPRD and TAPWRT can transfer the information in other RT-11 files to and from the tape. If you want to read or write tape in DOS format, the programs DOSMTD (DOS directory), DOSMTR (DOS read) and DOSMTW (DOS write) handle these chores. (Should you desire instead to handle ROLLIN format tapes, you can



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modify the DOS programs to accommodate ROLLIN format using the information presented in the MTLIB Manual).

A BACKUP/RESTORE set, MTBAK and MTRST, allows you to write tape files that are compatible with RT-11's directory structure. You can back up a large file efficiently (by specifying a large data blocking factor). The advantages of MTBAK/MTRST over DEC's BUP routine are that you can:

1. Back up as much or as little as you desire.
2. Restore any file(s) you wish.
3. Use the DIRECTORY command to tell you which files are on tape.

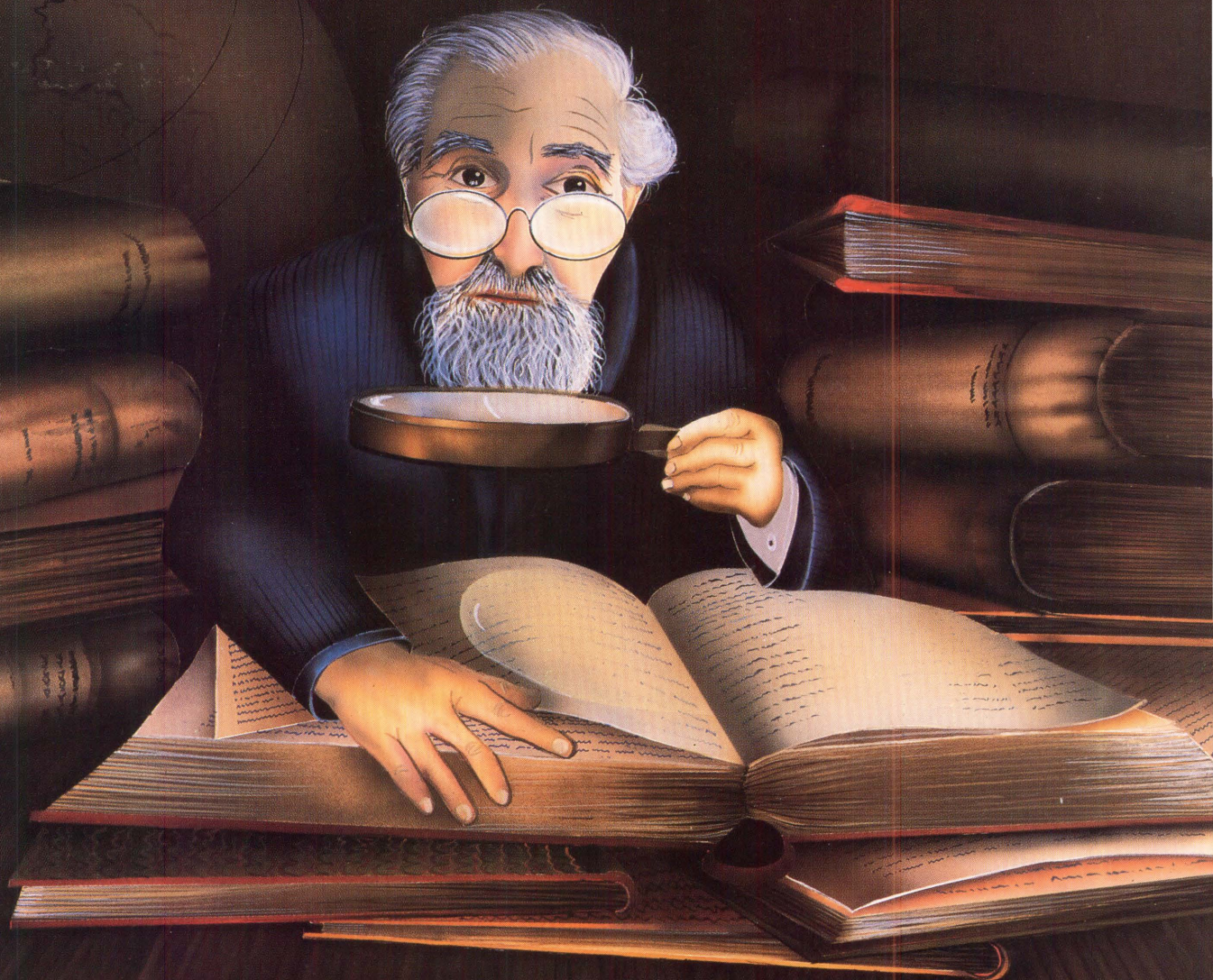
Plus, there are routines that convert data from ASCII to EBCDIC and back again, in case you encounter any tapes produced by a rival Blue computer.

I've used these routines and the basic library under RT-11 V4.0 to 5.4 and TSX-Plus V3.0 to 6.2 with both the MT and MS drivers. The routines also support MM and MU. The sample application routines are written for a generic driver, MT0, so if you use another handler, simply "ASSIGN MS MT0". When using the support routines, the handler must be loaded and the USR set NOSWP due to FORTRAN's memory structuring.

I was impressed with MTLIB when I first used it. Version 5.1 provides the improvements of a superb manual with a description of mag tape formats and many useful programs, written to serve as tutorial examples for those of you who wish to do even fancier tricks with tape. —Robert H. Schor, Ph.D., is associate professor at Ear and Eye Hospital of Pittsburgh, Pittsburgh, Pennsylvania.

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## ABBIT-9 V.A.S.T.

By Dave Mallery

### RAXCO Inc.'s VMS Performance Tuner.

*RABBIT-9 VAX Acceleration Software Technology*

(V.A.S.T.) from RAXCO Inc. of Rockville, Maryland, is a VMS performance tuner. One of a new class of product that has burst on the VMS scene in the last six months, it takes advantage of a deficiency in VMS to leverage a nice performance improvement from almost any heavily loaded VAX.

The deficiency is basically that VMS wastes the memory allocated to tasks that aren't really active. These tasks exist on almost every system. By forcing them to swap (not page), all their allocated memory is liberated momentarily for other users.

How you define "active" is very important; the results can be dramatic. *RABBIT-9* radically will shrink the LONGWAIT parameter as the load increases, causing processes to swap that may be even momentarily inactive. Then as the crisis eases up, it moves LONGWAIT back up again.

*RABBIT-9* is packaged nicely with good documentation and is accompanied by a fine utility program that allows you to continuously monitor the SYSGEN parameters that the product tunes along with the results in the running system. The utility also refers you to various notes that suggest other modifications you should make to parameters.

The product runs well in a cluster. We installed it on our three-node LAVC. According to our system manager, it went in cleanly. He also likes the monitoring utility so much that he suggests it be sold separately.

Besides modifying a number of SYSGEN parameters, you probably will have to increase the size of both the page and swap files. The neat thing is that the theory goes against your

natural grain which has an a-priori (at least mine has) that all swapping in VMS is bad.

Another nice feature is that there's really no risk involved. It never goes near your disk structure, so there's no possibility of damage.

The easiest way to pin some numbers on a product like this is to look at two simple tests:

1. How long does it take to spawn mail?
2. Does it change your hard-page fault rate?

Here are the numbers from a node (9MB MV2 with 20 interactive users) in our cluster: Mail spawn went from 12 seconds average to 8 seconds, and hard faults went from 2.5/sec to 1.3/sec.

Mail spawning is a good metric. Because it involves so much in system services, it's indicative of what you can expect from many other areas of VMS.

I don't know what the future holds for this class of product. Clearly, it addresses a deficiency that Digital probably will clear up in the future. The radical changes in the wings for V5 may have a big effect.

When the programs in *RABBIT-9* are started, they do a lot of muttering about "patent matters pending." I hope that doesn't mean that RAXCO is going to try to force DEC's hand in how it's fixed.

In the meantime, getting this much performance from your VAX for such a small amount of money, if even for a year or so, is a great bargain.



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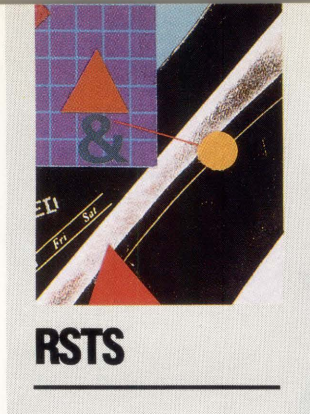
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# RSTS 9 DCL PROGRAMMING

By Mike Rechtman

## System Manager's Command File Aids.

Meda-Yehuda is a Kibbutz computer department serving a number of Kibbutzim in the Jerusalem area. Some of these have their own computers; generally PDP 11/73s running RSTS. The person in charge of such a site usually has little or no theoretical knowledge of system management and, with every problem, is on the end of a telephonic lifeline to us at a central facility.

With the introduction of RSTS version 9, and the new options available using DCL command files and symbols, it seemed like a good idea to build a set of aids for the less experienced system manager-cum-operator. Creating an account with the maximum number of privileges and defining it as a captive account help prevent the danger of such a system manager using the wrong option or switch, or the inconvenience of having to look up a less frequently used command. From experience, it seemed that the most common operations were (in order of decreasing frequency) display users, backup, reorder, shutting down the system, creating accounts and a number of other options that appeared with time. I decided to limit myself to VT100-compatible menus, and to try and make the command file as foolproof as possible. Readers might notice the command "sleep" (" \$ sleep 05:00") in a few of the command files. Because the DCL command or function SLEEP (or, as in VMS, WAIT) seemed sadly lacking, I decided to emulate it by using a CCL defined as:

```
$ Define/System/Command SLEEP-  
[Your__Account]SLEEP.TSK
```

where [Your\_\_account] can, of course, be any account. If the program is compiled under BASIC-PLUS, replace TSK with BAC. Program 1 provides a possible source for such a program.

Regarding the actual structure of the command files, because the account used is a captive one, the main menu is the account's LOGIN.COM. Some of the options are activated directly from this command file. Others, especially those that require more than the bare minimum of interaction with the user, are set up as separate command files. One file, ADDUSR, can be called directly using the account (i.e., [199,99]) as the first parameter, and either keyword ADD or DELETE as the second parameter.

*Note:* These command files were written to solve local problems in a particular environment. They probably have loopholes and bugs that will show up as soon as anyone tries to use them. Therefore, use these programs as templates, learn what you need on your site and copy whatever can be of use. —Mike Rechtman is a programmer from Mobile Post SHIMSHON, Israel.

*Editor's Note:* All the programs in this article are available in their entirety on ARIS. For information on dialing instructions see page 22.

---

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# A



# ADDUSR.COM

```

$ inquire/exit=INQ_QUOT1 TEMP "Detached job quota <0> "
$ if TEMP .lt. 0 .or. TEMP .gt. 10 then goto INQ_DET
$ if TEMP .ne. 0 then -
$     DET = "/DETACHED_JOB_QUOTA=" + f$string(TEMP)
$!
$ INQ_QUOT1:
$ inquire/exit=INQ_QUOT1 TEMP S "Logged_in Disk usage quota <500> "
$ TEMP S = f$edit(TEMP,S,-1)
$ if TEMP_S .eqs. "" then TEMP_S = "500"
$ if f$instr(1,"UNLIMITED",TEMP_S) .eq. 1 then -
$     goto I_UNLIMITED
$ TEMP = TEMP_S
$ if TEMP .lt. 0 .or. TEMP .gt. 10000 then -
$     goto INQ_QUOT1
$ QUOT = "/IN_QUOTA=" + f$string(TEMP)
$ goto INQ_QUOT2
$!
$ I_UNLIMITED:
$ QUOT = "/IN_QUOTA=UNLIMITED"
$!
$ INQ_QUOT2:
$ inquire/exit=INQ_QUOT2 TEMP S "Logged_out Disk usage quota <400> "
$ TEMP_S = f$edit(TEMP,S,-1)
$ if TEMP_S .eqs. "" then TEMP_S = "500"
$ if f$instr(1,"UNLIMITED",TEMP_S) .eq. 1 then -
$     goto I_UNLIMITED
$ TEMP = TEMP_S
$ if TEMP .lt. 0 .or. TEMP .gt. 10000 then -
$     goto INQ_QUOT1
$ QUOT1 = "/OUT_QUOTA=" + f$string(TEMP)
$ goto INQ_PASSWD
$!
$ I_UNLIMITED:
$ QUOT1 = "/OUT_QUOTA=" + TEMP
$!
$ INQ_PASSWD:
$ PASSWORD := "/NOPASSWORD PROMPT"
$ inquire/exit=INQ_PRIV PSWD -
$     "Do you want a password for account 'ACCT' <ND> "
$ if PSWD then PASSWORD := ""
$!
$ INQ_PRIV:
$ inquire/exit=DO_PRIV TEMP -
$     "What privileges do you want to grant 'ACCT' <SETPAS> "
$ PRIVL = f$edit(TEMP,-1)
$ if PRIVL .eqs. "NONE" then goto NO_PRIV
$ if PRIVL .eqs. "" then PRIVL = "SETPAS"
$ TEMP = PRIVL
$!
$ CHECK_1:
$ on error then goto PRIV_ERR
$ X = f$instr(1,TEMP,"NO")
$ if X .eq. 0 then goto CHECK_2
$ Y = f$instr(X+1,TEMP+","+",")
$ TEMP = f$left(TEMP,X-1) + f$right(TEMP,Y+1)
$ goto CHECK_1
$!
$ CHECK_2:
$ ! Remove all negated privs.
$!
$ CHK_PRIV = f$privilege(TEMP) ! Check whether privilege exist
$ if .not. CHK_PRIV then goto PRIV_ERR
$ CHK_PRIV = f$privilege(PRIVL) ! Do a syntax check
$!
$ DO_PRIV:
$ PRIVL = "/PRIV=( " + PRIVL + " )"
$ goto INQ_NAME
$!
$ PRIV_ERR:
$ say "You cannot grant an account 'PRIVL' privileges."
$ say "Try again.."
$ say ""
$ say "You are entitled to grant any combination of the following : "
$ say ""
$ show job/privilege
$ say ""
$ goto INQ_PRIV
$!
$ NO_PRIV:
$ PRIVL = "/PRIV=NONE"
$!
$ INQ_NAME:
$ ACT_NM = ""
$ on error then exit
$ inquire/exit=CREATE_ACC ACT_NM -
$     "Enter a name for account 'ACCT' "
$ if f$length(ACT_NM) .gt. 13 then goto TOO_LONG
$ ACT_NM = "/NAME=" + ACT_NM + ""
$ goto CREATE_ACC
$!
$ TOO_LONG:
$ say ""
$ say "Account name can only be 13 characters long. Try again.."
$ say ""
$ goto INQ_NAME
$!
$ CREATE_ACC:
$ on error then goto CREATE_ERR
$ set nodata
$ ! Allow Terminal data input to allow for
$ ! answer to Password inquiry.
$!
$ CREATE/ACCOUNT'CAP'DET'QUOT'QUOT1'PASSWRD'PRIVL'ACT_NM' -
$     'ACCT'
$ set data
$!
$ if .not. CAPTIVE then goto ENDIT
$ on error then goto ENDIT
$ if f$search("ACCT'login.com") .nes. "" then -
$     goto ENDIT
$ open/write/noreplace 1 'ACCT'login.com
$ write 1 "$! Dummy Login Com created ",f$time()
$ write 1 "$ Write 0 "" "" "" "
$ write 1 "$ Write 0 ""Have the system manager update you"" "
$ write 1 "$ Write 0 "" "" "" LOGIN.COM file !"" "
$ write 1 "$ Write 0 "" "" "" "
$ write 1 "$ _logout/full"
$ close 1
$ say ""

```

# BACKUP.COM

```

$! System manager's BACKUP and RESTORE command file :
$! All this command file does is choose between BACKUP and RESTORE
$!
$!
$! esc = f$chr(27)
$! clr = esc + "[2J"
$! wipe = esc + "[2K"
$! home = esc + "[1;1H"
$! line1 = esc + "[5;1H"
$! line5 = esc + "[9;1H"
$! line7 = esc + "[11;1H"
$! line16 = esc + "[20;1H"
$! scroll = esc + "[4;24r"
$! b_u = esc + "#3"
$! b_d = esc + "#4"
$! say = "write 0 "
$!
$! INIT:
$ on control_c then exit
$ on error then goto INIT
$ say clr,home
$ say b_u," Backup : "
$ say b_d," Backup : "
$ say scroll
$!
$ say line5, " Your Choice of : "
$ say line7, " 1 BACKUP or build a BACKUP command file."
$ say " 2 RESTORE a file or group of files."
$ MAX_OPTION = 2
$!
$ REFRESH:
$ say line16
$ inquire/exit=INIT OPTION -
$     "'wipe' Enter your choice and type RETURN "
$ OPTION = f$edit(OPTION,-1)
$ if OPTION .eqs. "" then exit
$ OP = f$string(f$integer(OPTION))
$ on error then goto INIT
$ if f$integer(OPTION) .ge. 1 .and. -
$     f$integer(OPTION) .le. MAX_OPTION then -
$     goto OPT'OP'
$ say ""
$ say "...Wrong !! - Enter a number between 1 and 'MAX_OPTION'..."
$ goto REFRESH
$!
$! OPT1:
$!
$! Obaccm
$ say clr
$ goto INIT
$!
$! OPT2:
$!
$! Orescom
$ say clr
$ goto INIT
$!
$ :
$ :
$ :

```

# BACCOM.COM

```

$! command file to BACKUP under RSTS/E V9
$!
$!
$! on control_c then exit
$! DEFAULT DEV = "MSO:"
$! say = "write 0 "
$! if f$privilege("INSTAL,TUNE,WACNT") then goto ANNOUNCE
$! say "You have not got sufficient privilege to BACKUP other accounts."
$! say ""
$! sleep 00:03
$! exit
$!
$! ANNOUNCE:
$! DUMMY = f$search("BACKUP.OLD")
$! if DUMMY .eqs. "" then goto INTERAC
$! say ""
$! say "You have the option of activating a previously built"
$! say "BACKUP command. You may : "
$! say " 1 BACKUP with the parameters you saved."
$! say " 2 Build a BACKUP command with new parameters."
$! say " 3 See the BACKUP command you saved, and"
$! say " then decide what to do"
$! inquire/exit=INTERAC DUMMY -
$     " Enter your choice <1> "
$! if DUMMY .eqs. "" .or. DUMMY .eqs. "1" then goto OLD_BACKUP
$! if DUMMY .eqs. "2" then goto INTERAC
$! if DUMMY .eqs. "3" then goto TYPE_OLD
$! say " .... Bad Choice. Enter Control-C to return to main menu"
$! say ""
$! goto ANNOUNCE
$!
$! OLD_BACKUP:
$!
$! OBACKUP.OLD
$! goto ENDIT
$!
$! TYPE_OLD:
$! say ""
$! say "This is the command you have saved "
$! say ""
$! type BACKUP.OLD
$! say ""
$! inquire/exit=ANNOUNCE DUMMY " Hit RETURN to continue "
$! goto ANNOUNCE
$!
$! INTERAC:
$! say ""
$! say "This command file will ask you for the parameters necessary"
$! say "to build a BACKUP set under RSTS/E Version 9: "
$! say ""

```

*continued*



# If the only thing your users remember about your database is this,



## give them System 1032/EUF

No matter how great the software, if you don't use it often, you forget.

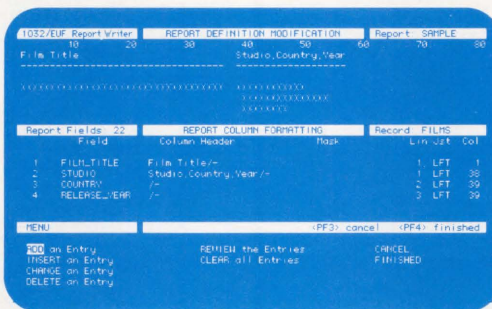
To make your infrequent users as effective as experts, give them System 1032/End-User Facility (EUF). They get what they need — reports, data views, browsing — in a pick-and-press methodology that eliminates the need to remember anything at all! All actions, data items and report names are shown on-screen when they are needed. The user just picks the right choice.

In fact, anyone can create a completely new report with calculations and formatting in five minutes, without typing anything more than the name of the report. The End-User Facility guides you from data selection to page layout. Whenever it asks a question, it gives a screenful of correct answers. You pick and press.

### Integrates Heterogeneous Databases

System 1032's End-User Facility gives you full access to VAX databases in RMS files and in several proprietary formats, in addition to 1032's own databases. (Your programming staff may even use this feature!) You can create efficient relational joins across any grouping of data in any available databases. Yet no new resource-wasting files or keys are created.

With all this power in the hands of users, you'll be glad to know that security is comprehensive. Access may be controlled down to the field level, by password, username, and work group.



### Gateway to Major Applications

Like all of System 1032, the End-User Facility integrates completely with 1032's elegant 4GL. EUF reports are easily incorporated into major applications, such as those you build with the new System 1032 Application Facility.

System 1032 is the foundation of applications that require comprehensive access to data: lightning-fast retrievals against multi-million record data bases, powerful programming in any mix of languages, full use of VMS resources and system services, and the ability to grow quick prototypes into full-fledged production applications.

Now, without burdening your MIS staff, you can give some of that power to your infrequent users. You get quicker, simpler access to your data with System 1032's End-User Facility.

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ENTER 300 ON READER CARD

# BACCOM.COM

```

$!
$ ACCT_LINE := ""
$ TEST_DEV := ""
$ ACCT_DATA := ""
$ GETACCT:
$ ACCT := ""
$ say "Enter the to backup account as [PROJECT,PROGRAMMER] or "
$ say "[*,PROGRAMMER], [*,*], DU2[XXX,YYY]. If there is more"
$ say "than one account, enter it at the next prompt."
$ say "All accounts to be backed up MUST reside on the same disk !!"
$ say "All files in the accounts entered, besides *.TMP files will"
$ say "be backed-up. To backup everything on the disk, enter ALL"
$!
$ INQ_ACCT:
$ say ""
$ inquire/exit=SHOW_ACCOUNTS ACCT -
$ "Enter the account as [PROJ,PROG] ('Z or RETURN to end) "
$ ACCT = f$edit( ACCT,32 )
$ if ACCT .eqs. "" then goto SHOW_ACCOUNTS
$ if ACCT .eqs. "ALL" then goto FULL_BACKUP
$ GOTACCT:
$ if f$instr(1,ACCT,"") .eq. 0 then -
$ ACCT = "[" + ACCT
$ if f$instr(1,ACCT,"") .eq. 0 then -
$ ACCT = ACCT + "]"
$ on error then goto BAD_ACCT
$ TEMP = f$parse( ACCT, "STATUS" )
$ on error then exit
$ if TEMP .lt. 0 then goto BAD_ACCT
$ DUMMY = f$parse( ACCT, "SY:" , "DEVICE" )
$ if TEST_DEV .eqs. "" then TEST_DEV = DUMMY
$ if TEST_DEV .nes. DUMMY then goto BAD_DISK
$ TEMP = f$parse( ACCT, "FLAGS" )
$ if ( f$instr(1,ACCT,"/") .ne. 0 ) then TEMP = -1
$ if ( ( TEMP .and. 127 ) .ne. 0 ) .or. ( ( TEMP .and. 3072 ) .ne. 0 ) -
$ .or. ( ( TEMP .and. 32768 ) .ne. 0 ) then -
$ goto BAD_ACCT
$ ACCT = f$parse( ACCT, "TEST_DEV'[*,*].*", )
$ inquire/exit=INQ_ACCT TEMP
$ "Confirm account 'ACCT' ( Y or N ) "
$ if .not. TEMP then goto INQ_ACCT
$ goto ADD_ACCT
$!
$ BAD_ACCT:
$ on error then exit
$ say "You must enter an account in the form : "
$ say "[XXX,YYY] - with NO filenames "
$ if TEST_DEV .nes. "" then -
$ say " or 'TEST_DEV':[XXX,YYY] "
$ goto INQ_ACCT
$!
$ BAD_DISK:
$ say ""
$ say "All accounts MUST be on the same disk 'TEST_DEV' !! "
$ goto INQ_ACCT
$!
$ ADD_ACCT:
$ if ACCT_LINE .nes. "" then -
$ ACCT_LINE = ACCT_LINE + ACCT + ", "
$ ACCT_LINE = ACCT_LINE + ACCT
$ if f$instr(1,ACCT,"[*,*]") .ne. 0 then goto DO_IT
$ goto INQ_ACCT
$!
$ FULL_BACKUP:
$ TEST_DEV = "_SY:"
$ say ""
$ inquire/exit=ALL_SYSTEM DEV " Disk to backup "
$ say ""
$ if DEV .eqs. "" .or. DEV .eqs. "SY:" then goto ALL_SYSTEM
$ TEST_FLAG = f$parse( DEV, "FLAGS" )
$ if ( TEST_FLAG .and. 4095 ) .ne. 0 then goto BAD_FLAG
$ if ( TEST_FLAG .and. 32768 ) .ne. 0 then goto BAD_FLAG
$ TEST_FLAG = f$parse( DEV, "STATUS" )
$ if ( TEST_FLAG .and. 255 ) .ne. 0 then goto BAD_FLAG
$ if ( TEST_FLAG .and. 512 ) .ne. 0 then goto BAD_FLAG
$ TEST_DEV = f$parse( DEV, "DEVICE" )
$ goto ALL_SYSTEM
$!
$ BAD_FLAG:
$ say ""
$ say " You must enter the designation of a disk to which you have"
$ say " read access, in the form DU1: , DR2: etc."
$ say ""
$ goto FULL_BACKUP
$!
$ ALL_SYSTEM:
$ ACCT_LINE = "'TEST_DEV'[*,*].*"
$ ACCT_DATA = "/Account_Data"
$!
$ SHOW_ACCOUNTS:
$ if ACCT_LINE .nes. "" then goto DO_IT
$ say "No accounts have been selected for BACKUP"
$ say ""
$ exit
$!
$ DO_IT:
$ say ""
$ say "Files to be backed up are : "
$ say "'ACCT_LINE'"
$!
$ EXEP := "[*,*].TMP"
$ say ""
$ say "You will now be asked for a list of files to be excluded"
$ say "from the BACKUP. The list will default to 'EXEP' if you"
$ say "type RETURN."
$!
$ INQ_EXEP:
$ say ""
$ inquire/exit=ASK_DEVICE FILE_SPEC -
$ "Enter the file spec ( [PRJ,PROG]FILNAM.EXT, RETURN to end) "
$ if FILE_SPEC .eqs. "" then goto ASK_DEVICE
$
$
$
$

```

# RESCOM.COM

```

$!
$ command file to RESTORE under RSTS/E V9
$!
$ on control c then exit
$ DEFAULT_DEV = "MSO:"
$ say "Write 0 "
$ if f$privilege( "INSTAL,TUNE,WACNT" ) then goto ANNOUNCE
$ say "You have not got sufficient privilege to RESTORE other accounts."
$ exit
$ ANNOUNCE:
$ DUMMY = f$search( "RESTOR.OLD" )
$ if DUMMY .eqs. "" then goto INTERAC
$ say ""
$ say "You have the option of activating a previously built"
$ say "RESTOR command. You may : "
$ say " 1 RESTOR with the parameters you saved."
$ say " 2 Build a RESTOR command with new parameters."
$ say " 3 See the RESTOR command you saved, and"
$ say " then decide what to do"
$ inquire/exit=INTERAC DUMMY -
$ "Enter your choice <1> "
$ if DUMMY .eqs. "" .or. DUMMY .eqs. "1" then goto OLD_RESTOR
$ if DUMMY .eqs. "2" then goto INTERAC
$ if DUMMY .eqs. "3" then goto TYPE_OLD
$ say " .... Bad Choice. Enter Control-C to return to main menu"
$ say ""
$ goto ANNOUNCE
$!
$ OLD_RESTOR:
$ RESTOR.OLD
$ goto ENDIT
$!
$ TYPE_OLD:
$ say ""
$ say "This is the command you have saved "
$ say ""
$ type RESTOR.OLD
$ say ""
$ inquire DUMMY "Hit RETURN to continue "
$ goto ANNOUNCE
$!
$ INTERAC:
$ say ""
$ say "This command file will ask you for the parameters necessary"
$ say "to RESTOR from a BACKUP set under RSTS/E Version 9: "
$ say ""
$ FILE_SPEC_LINE := ""
$ TEST_DEV := ""
$ GETFILE_SPEC:
$ FILE_SPEC := ""
$ say "Enter the account and files to RESTOR as "
$ say "[PROJECT,PROGRAMMER]FILNAM.EXT, i.e. [*,*] or [XXX,YYY]."
$ say "If there is more than one file specification, enter it at the"
$ say "next prompt."
$ say "All accounts to be RESTORed MUST reside on the same disk !!"
$!
$ INQ_FILE_SPEC:
$ say ""
$ inquire/exit=SHOW_ACCOUNTS FILE_SPEC -
$ "Enter the file spec as [PROJ,PROG]FILNAM.EXT (RETURN to end) "
$ if FILE_SPEC .eqs. "" then goto SHOW_ACCOUNTS
$ GOTFILE_SPEC:
$ on error then goto BAD_FILE_SPEC
$ TEMP = f$parse( FILE_SPEC, "STATUS" )
$ on error then exit
$ if TEMP .lt. 0 then goto BAD_FILE_SPEC
$ DUMMY = f$parse( FILE_SPEC, "DEVICE" )
$ if DUMMY .nes. "" then goto BAD_FILE_SPEC
$ TEMP = f$parse( FILE_SPEC, "FLAGS" )
$ if ( f$instr(1,FILE_SPEC,"/") .ne. 0 ) then TEMP = -1
$ if ( ( TEMP .and. 3072 ) .ne. 0 ) -
$ .or. ( ( TEMP .and. 32768 ) .ne. 0 ) then -
$ goto BAD_FILE_SPEC
$ FILE_SPEC = f$parse( FILE_SPEC, ".*", ".*" )
$ inquire/exit=INQ_FILE_SPEC TEMP -
$ "Confirm file specification 'FILE_SPEC' ( Y or N ) "
$ if .not. TEMP then goto INQ_FILE_SPEC
$ goto ADD_FILE_SPEC
$!
$ BAD_FILE_SPEC:
$ on error then exit
$ say "You must enter a file specification in the form : "
$ say "[XXX,YYY]FILNAM.EXT"
$ say " You may use '*' as a wildcard for any one part ( Project, "
$ say "Programmer, Filename or Extension ) or '?' as a wildcard for "
$ say "any character in the Filename or Extension."
$ say ""
$ goto INQ_FILE_SPEC
$!
$ ADD_FILE_SPEC:
$ if FILE_SPEC_LINE .nes. "" then -
$ FILE_SPEC_LINE = FILE_SPEC_LINE + FILE_SPEC + ", "
$ FILE_SPEC_LINE = FILE_SPEC_LINE + FILE_SPEC
$ if f$instr(1,FILE_SPEC,"[*,*]") .ne. 0 then goto DO_IT
$ goto INQ_FILE_SPEC
$!
$ SHOW_ACCOUNTS:
$ if FILE_SPEC_LINE .nes. "" then goto DO_IT
$ say ""
$ say "No accounts have been selected for RESTORE"
$ say ""
$ exit
$!
$ DO_IT:
$ say ""
$ say "Files to be RESTORed are : "
$ say "'FILE_SPEC_LINE'"
$!
$ ASK_DEVICE:
$ inquire/exit=BAD_DEST TO_DEV -
$ "Disk to write RESTORed files <SY:> "
$ if TO_DEV .eqs. "" then TO_DEV = "_SY:"
$ TEMP = ( f$parse( TO_DEV, "STATUS" ) .and. 255 )
$ if TEMP .ne. 0 then goto BAD_DEST
$ TO_DEV = f$parse( TO_DEV, ".*", ".*" )
$ TEMP = f$parse( TO_DEV, "FLAGS" )
$
$
$
$

```

# CUSP.COM

```

$! System manager - run a Commonly Used System Program
$!
$!     esc = f$chr(27)
$!     clr = esc + "[2K"
$!     wipe = esc + "[2k"
$!     reset = esc + "\r"
$!     home = esc + "[1;1H"
$!     line1 = esc + "[5;1H"
$!     line5 = esc + "[9;1H"
$!     line7 = esc + "[11;1H"
$!     line16 = esc + "[20;1H"
$!     scroll = esc + "[5;24r"
$!     b_u = esc + "#3"
$!     b_d = esc + "#4"
$!     say = "write 0 "
$!
$! INIT:
$! on control_c then exit
$! say clr,home
$! say ""
$! say b_u,"      System Programs menu : "
$! say b_d,"      System Programs menu : "
$! say scroll
$!
$! say line5, "          Your Choice of : "
$! say line7, "          1  Run REORDR - Reorder an account or disk"
$! say "          2  EDIT a file."
$! say "          3  SHUTUP system."
$! say "          4  Enable LOGINS after dummy SHUTUP."
$! say "          5  Run Error display program (ERRDIS)"
$! MAX_OPTION = 5
$! REFRESH:
$! say line16
$! inquire/exit=INIT OPTION -
$!     " " wipe Enter your choice and type RETURN "
$! OPTION = f$edit(OPTION,-1)
$! if OPTION .eqs. "" then exit
$! on error then goto BAD_OP
$! OP = f$string(f$integer(OPTION))
$! on error then goto INIT
$! if f$integer(OPTION) .ge. 1 .and. -
$!     f$integer(OPTION) .le. MAX_OPTION then -
$!     goto OPT'OP'
$!
$! BAD_OP:
$! say ""
$! say "...Wrong !! - Enter a number between 1 and 'MAX_OPTION'..."
$! goto REFRESH
$!
$! OPT1:
$! say clr,line1
$! say "REORDR should be run regularly, at intervals depending on the"
$! say "size of your disks, the number of users, and the types of"
$! say "activity. Once a month is a definite minimum."
$! say "Run a system DISPLAY to be sure no one is working in an account"
$! say "while it is being REORDRed !!. This command file will not allow"
$! say "anyone to LOGIN while it is running. Do NOT stop REORDR until"
$! say "the program has completed it's run !!"
$! say ""
$! say " Now Running. "
$! say ""
$! show users
$! say ""
$! inquire DUMMY "Hit ENTER or RETURN to continue"
$! say ""
$!
$! ACCT_LINE := ""
$! GETACCT:
$! ACCT := ""
$! say "You will now be prompted for the disks and accounts to REORDR."
$! say "to REORDR an entire disk enter e.g., DU1:[*,*]"
$! say ""
$! say "Enter account as DEV:[PROJECT,PROGRAMMER], DEV:[*,PROGRAMMER], "
$! say "or DEV:[XXX,YYY]. If there is more than one account, enter"
$! say "it at the next prompt."
$!
$! INQ_ACCT:
$! say ""
$! inquire/exit=SHOW_ACCOUNTS ACCT -
$!     "Enter the account as DNN:[PROJ,PROG] (*Z or RETURN to end) "
$! if ACCT .eqs. "" then goto SHOW_ACCOUNTS
$!
$! GOTACCT:
$! on error then goto BAD_ACCT
$! TEMP = f$parse(ACCT,,"STATUS")
$! on error then exit
$! if TEMP .lt. 0 then goto BAD_ACCT
$! ACCT = f$parse(ACCT,,"DUO:[*,*]",)
$! TEMP = f$parse(ACCT,,"FLAGS")
$! if ( f$instr(1,ACCT,"SY") .ne. 0 ) then TEMP = -1
$! if ( f$instr(1,ACCT,"/"/) .ne. 0 ) then TEMP = -1
$! if ( (TEMP .and. 127) .ne. 0 ) .or. ( (TEMP .and. 3072) .ne. 0 ) -
$!     .or. ( (TEMP .and. 8192) .eq. 0 ) -
$!     .or. ( (TEMP .and. 16384) .ne. 0 ) then -
$!     goto BAD_ACCT
$!
$! inquire/exit=INQ_ACCT TEMP -
$!     "Confirm account 'ACCT' ( Y or N ) "
$! if .not. TEMP then goto INQ_ACCT
$! goto ADD_ACCT
$!
$! BAD_ACCT:
$! on error then exit
$! say "You must enter an account in the form : "
$! say "      DUJ:[XXX,YYY] - with NO filenames "
$! say "The disk you specify must be mounted as a RSTS disk,"
$! say "and you must specify its physical name. i.e., DUO:, not SY:"
$! say ""
$! goto INQ_ACCT
$!
$! ADD_ACCT:
$! if ACCT_LINE .nes. "" then -
$!     ACCT_LINE = ACCT_LINE + ", "
$!

```

# SHUTUP.COM

```

$! Command file to close down the system, i.e., before BACKUP
$!
$! This command file serves two purposes :
$! 1) We use it before periodic backups, when we actually do not
$!    shut down the system, but remove all the users.
$! 2) It can be run from any keyboard, not necessarily KB0: ,
$!    and used to send a pre-SHUTUP message to all the users.
$!
$!     esc = f$chr(27)
$!     clr = esc + "[2J"
$!     wipe = esc + "[2k"
$!     reset = esc + "\r"
$!     home = esc + "\<"
$!     line1 = esc + "[1;1H"
$!     line5 = esc + "[5;1H"
$!     scroll = esc + "[4;24r"
$!     unscroll = esc + "[1;24r"
$!     b_u = esc + "#3"
$!     b_d = esc + "#4"
$!     say = "write 0 "
$!
$! if f$privilege("SHUTUP,SEND") then goto ANNOUNCE
$! say ""
$! say " You have insufficient privilege. You need SEND and SHUTUP."
$! say ""
$! sleep 00:03
$! _exit
$!
$! ANNOUNCE:
$! say clr,home
$! say b_u, "      System SHUTUP:"
$! say b_d, "      System SHUTUP:"
$! say scroll
$!
$! say line1
$! say ""
$! inquire TIM "How long before system SHUTUP in minutes <5>"
$! if TIM .eqs. "" then TIM = 5
$! say ""
$!
$! REAL = 0
$! if f$terminal() .nes. "0" then goto NOT_CONSOL
$! say "You have the option of running a 'dummy' system shutup"
$! say "e.g. if you want no users on the system before a BACKUP."
$! inquire/exit=NOT_CONSOL REAL -
$!     "Do you really want to shut the system <NO>"
$! say ""
$!
$! NOT_CONSOL:
$! LOGIN = 0
$! say "You may disable LOGINS from now : "
$! inquire/exit=LOOP1 LOGIN "Do you want to SET SYSTEM/NOLOGINS <NO> "
$! if LOGIN then -
$!     say "" set system /nologins
$!     REASON = ""
$!     inquire/exit=LOOP1 REASON "Reason for shutdown "
$!
$! LOOP1:
$! if TIM .le. 1 then goto CONT1
$! set noecho
$! broadcast/noheader/bell/logged_in -
$!     " SHUTUP NOTICE : 'TIM' minutes to system shutup ! "
$! if REASON .nes. "" then -
$!     broadcast/noheader/bell/logged_in -
$!         REASON FOR SHUTUP : 'REASON' "
$!
$! if TIM .gt. 6 then goto WAITS
$! sleep 01:00
$! TIM = TIM - 1
$! set echo
$! if TIM .gt. 1 then goto LOOP1
$! goto CONT1
$!
$! WAITS:
$! set noecho
$! sleep 05:00
$! TIM = TIM - 5
$! set echo
$! goto LOOP1
$!
$! CONT1:
$! broadcast/noheader/bell/logged_in -
$!     " FINAL SHUTUP NOTICE : One minute to system shutup ! "
$!
$! set noecho
$! sleep 01:00
$! set echo
$!
$! if .not. REAL then goto CONT2
$! say unscroll
$! run [1,2]SHUTUP
$!
$! NO
$! 0
$! 0
$! _exit
$!
$! CONT2:
$! say "At present on the system : "
$! sho user/attached
$! if .not. f$privilege("JOBCTL") then goto CONT3
$! say "You may now KILL one of the jobs on the system."
$! inquire/exit=CONT3 JOBNO -
$!     "Enter Job number of Job you want KILLED <NONE> "
$! if JOBNO .eqs. "" then goto CONT3
$! if JOBNO .eqs. "*" then goto CONT2
$! if JOBNO .nes. f$job() then goto KILLIT
$! say "!"
$! say " ***** You cannot commit suicide !! ***** "
$! say "!"
$! goto CONT2
$!
$! KILLIT:
$! command = "REMOVE/JOB 'JOBNO'"
$! on error then goto CONT2
$! 'command'
$! set noon
$! goto CONT2
$!
$! CONT3:
$! say clr,home,unscroll
$! exit

```

**David W. Bynon**

# When 4, 6, And 71 Won't Do

When Digital announced the new MICROVAX 2000, I knew what would happen: Folks would buy the cheap little boxes with great intentions, swearing up and down that they'd only put three or four users on it. It was a lie! They (me included) got greedy and wanted more. More of what, you ask? More memory, more disk storage and more serial ports, of course. And I'm here to tell you how to get them.

## Ports Are Ports

One of the primary limitations of the MICROVAX 2000 is that it has too few serial ports. Single user or multiuser, four serials aren't enough for all of the devices I'd like to put on the machine.

The solution to this problem is simple: the DECSERVER 100 or 200. The DECSERVERs provide eight serial port connections per unit. However, this expansion comes at a heavy cost compared to the value of a MICROVAX 2000. List prices on the DECSERVER 100 and 200 are \$2,950 and \$3,450 respectively, plus \$50 for the software and about \$300 for a DESTA and a short length of RG58 (ThinWire Ether-hose).

The terminal servers are expensive, but you get what you pay for in functionality and performance. Most notably, Digital terminal servers allow you to maintain multiple sessions, on one or more host systems, from a single terminal. Terminal servers also have proved to be better performers, under a moderate to heavy load, than traditional serial port multiplexers, such as the DZ-like device on the MICROVAX 2000.

Because MICROVAX 2000s are so

new, or because Digital may not want its terminal servers used with them, the DECSERVER documentation doesn't provide enough information. It took me a week of bloodshot eyes and pulling my hair out to discover why my MICROVAX II would load the DECSERVER 100, but the new VAXSTATION 2000 wouldn't. To get a DECSERVER to work on a MICROVAX 2000 CPU, you must define the logical name LAT\$DEVICE, reflecting the MICROVAX 2000's physical network device name, ESA0:.

## Memory Lapses

The next limitation of the MICROVAX 2000 is its memory capacity. Digital intentionally limited the 2000-class systems to 6 MB for marketing reasons. If it didn't, MICROVAX 2000 sales might have cut into those of the lucrative MICROVAX II. Despite DEC's fears, I'm not convinced that would have been the case.

For those who have reached the MICROVAX 2000's memory limitation, Clearpoint is manufacturing a 16-MB daughterboard to replace the 2- or

4-MB board from Digital. This upgrade is available for \$7,000, or about \$437 per MB, well above the current MICROVAX standard of \$200 to \$300 per MB. I hope we'll see some competition in this arena soon, causing Clearpoint to reconsider its pricing.

With 16 MB of memory aboard the MICROVAX 2000, its abilities more than double. Installation of the Clearpoint memory board, in conjunction with Digital terminal servers, instantly launches the MICROVAX 2000 from a one-to-four user system to a one-to-12 user system. Processing capabilities remain the same, but capacity takes a quantum leap.

## Cheap Thrills

The final MICROVAX 2000 limitation, for which we have solutions, is Digital's selection of disk drives, the RD33 (40 MB) and the RD53 (71 MB). Not being one to reinvent its own wheel, Digital used the RQDX3 (Q-bus disk controller for RDxx and RX50 drives) as the model for the MICROVAX 2000's disk controller; i.e., RQDX3 formatted drives work well on the MICROVAX 2000.

If you've been watching the DEC-specific ads, you know that Trimarchi Inc. specializes in formatting off-the-shelf drives for MICROVAX systems, at half the Digital price. So although Digital doesn't yet sell the RD54, a 159-MB (formatted) Maxtor drive for the MICROVAX 2000, Trimarchi does.

The last time I spoke with Tom Trimarchi, he mentioned that his company also had a 3.5-inch half-height drive for the MICROVAX 2000. The benefits of a 3.5-inch drive would be less power consumption, possibly better performance, and the fact that you can

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139 N. Gill St.  
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(814) 234-5659

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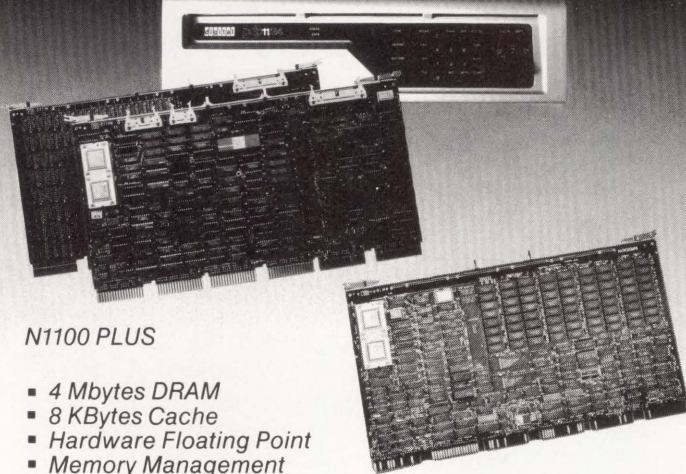
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mount two such drives in the same space as an RD53 or RD54 (full-height 5.25-inch drives).

**Miscellaneous Ramblings**

It's a well-known fact that Digital built the MICROVAX 2000 as a non-expandable system. Or did it?

Digital fact number one: The

“

**An SCSI to TK50  
 formatter converts the  
 SCSI commands to those  
 needed by the TK50.**

”

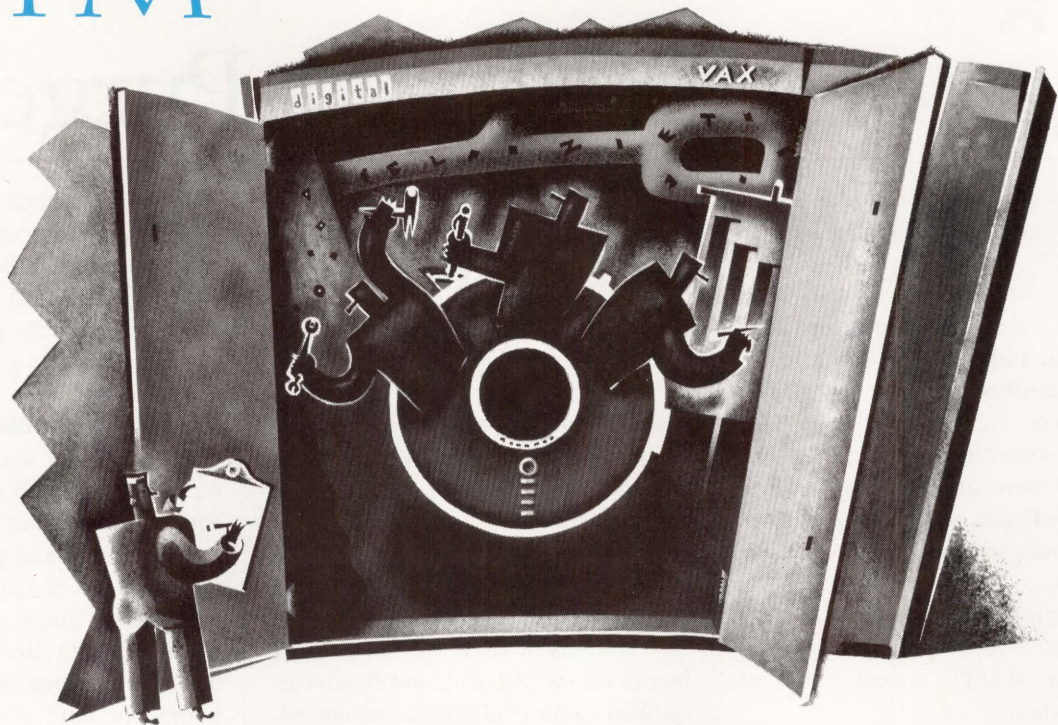
MICROVAX 2000 is a busless system (it has an internal bus with no external connections). True, but misleading. The main CPU bus is local to the MICROVAX 2000 motherboard, but it also has an SCSI bus with an external connection. (The SCSI bus rapidly is becoming the peripheral interface of choice.)

Digital fact number two: The SCSI bus isn't standard and is reserved for future use. True, but misleading. The SCSI port is used as the interface to the TK50 tape drive. An SCSI to TK50 formatter converts the SCSI commands to those needed by the TK50. In my own evaluation, it appears that DEC is bastardizing the SCSI commands to make the SCSI port appear to be non-standard. After more time at the bench, I'll know for sure.

Digital fact number three: The MICROVAX 2000 has a fully functional Ethernet controller called a DESVA. True, honest! No problem with expandability here. With Ethernet, the sky's the limit.

With all of these avenues of expansion, why haven't more companies, like Clearpoint and Trimarchi, taken advantage of the potential after-market for the MICROVAX 2000? ■

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# An Enhanced Purge

If your site is plagued with a plethora of identically

named files that may or may not contain useful information, this month's reader-submitted utility is for you.

PURGE\_COPIES.COM, by Kent Gardner of the Nuclear Medicine Division of University Hospital in Ann Arbor, Michigan, kills multiple versions of a file, but preserves unique ones (see Program).

The procedure repeatedly invokes the DIFFERENCES command to compare files, then DELETES excess copies of identical files.

"Given a file spec," Kent explains, "this command procedure compares all versions of a file with all other versions in the same directory. Only the highest version of each unique file is retained.

As an example, the command

```
@PURGE_COPIES Dxxx:[000000...]*.TXT
```

purges copies of .TXT files from all directories on device Dxxx.

"The file spec to be purged is passed to the procedure in parameter P1. Because the lexical function F\$SEARCH is used to return the full specifications, any valid file-spec should work (wild-cards are OK). If P1 isn't supplied, the default is all files in the current device and directory."

Versions of VMS prior to 4.6 had a bug in the /MAXIMUM\_DIFFERENCES qualifier to the DIFFERENCE command. If your site is up to VMS 4.6, you can speed up the procedure greatly by adding the qualifier.

As with any command procedure that performs file deletions, you're

urged to test PURGE\_COPIES on non-critical files to become totally familiar with its operation. Be especially careful when using logical name search lists. Once mastered, the procedure can be a useful addition to your utility tools.

## VMS V4.6 Enhancements

There are major items in VMS 4.6 that those lacking access to the release notes should know about.

For command procedure writers, the big news is that from 4.6 on, all commands, labels and full-line comments in .COM files must be preceded by a \$, or the command interpreter will bomb out with a syntax error. DEC notes that it's been telling that to users for a long time, but that previous versions of VMS have been forgiving in this respect. No more. If a non-data line doesn't start with a \$, DCL will throw

## PROGRAM.

```

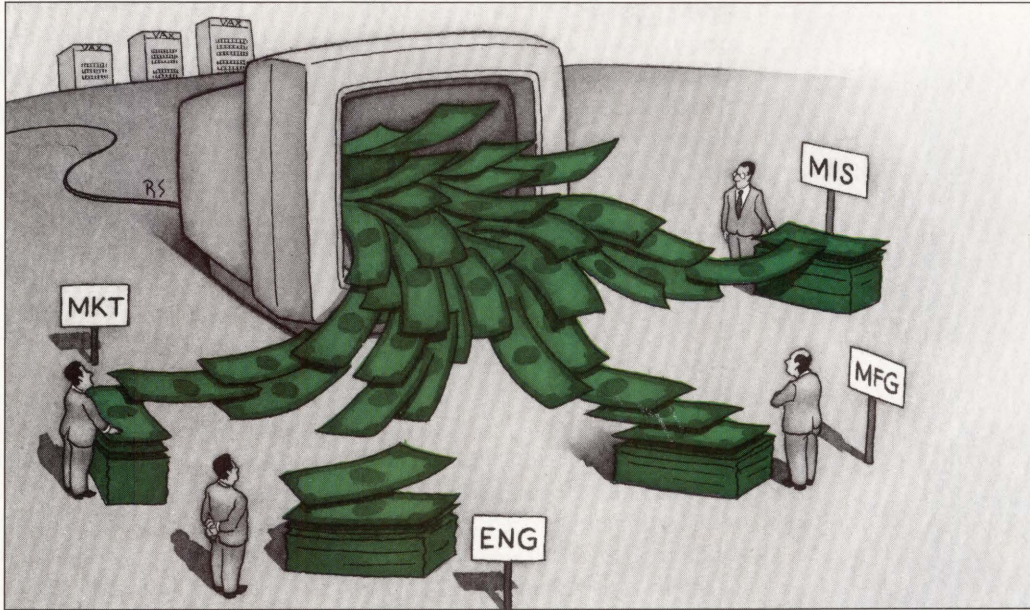
$! SEE HEADER AT BOTTOM OF FILE
$!
$! No spec, default to all files in current directory
$! if P1 .eqs. "" then P1 := "*.*"
$! No name, default to all files
$! if f$parse(P1, "NAME") .eqs. "" then P1 := "'P1'.*"
$! Replace any version # with version 0
$! P1 = f$extract(0, f$locate(";", P1), P1) + ";0"
$! Init stuff
$! LST_FILE := ""
$!
$! Loop for all input file-specs
$ GET NXT SPEC:
$ FILE = f$search(P1,1)
$! If no more files, then exit
$! if FILE .eqs. "" .or. FILE .eqs. LST_FILE then exit
$! Save this file-spec
$! LST_FILE = FILE
$! Log current file-spec to sys$output
$ write sys$output f$extract(0, f$locate(";", FILE), FILE)
$!
$! Init version counters
$! NXT_VER = 1
$! TOP_VER = 1
$! Loop to compare all versions to all other versions
$ TOP_FILE_LOOP:
$! NXT_FILE=f$search(f$extract(0, f$locate(";", FILE), FILE) + ";;-'NXT_VER'")
$! If there is a lower version to test, then test it
$! if NXT_FILE .nes. "" then goto TEST_DIFF
$! else, no more lower versions, get next top version
$! FILE = f$search(f$extract(0, f$locate(";", FILE), FILE) + ";;-'TOP_VER'")
$! If no top version left, then get next spec
$! if FILE .eqs. "" then goto GET NXT_SPEC
$! else, inc counters, and continue
$! NXT_VER = TOP_VER + 1
$! TOP_VER = TOP_VER + 1
$! goto TOP_FILE_LOOP
$!
$! TEST_DIFF:
$!
$! Inc next version counter
$! NXT_VER = NXT_VER + 1
$!
$! If files are different in size, then continue
$! if f$file_attributes(FILE, "EOF") .ne.
$! f$file_attributes(NXT_FILE, "EOF") then goto TOP_FILE_LOOP
$!
$! Historic debug paranoia
$! if FILE .EQS. NXT_FILE then goto TOP_FILE_LOOP
$!
$! Test files for differences
$! If you're running VMS 4.6 or greater, add
$! /MAXIMUM_DIFF=1 to the differences command
$! differences/output=NL:/window=1 'FILE', 'NXT_FILE'
$! If different, then continue
$! if $SEVERITY .ne. 1 then goto TOP_FILE_LOOP
$! else, delete lowest version
$! delete 'NXT_FILE'
$! Log deleted file-spec to sys$output
$! write SYS$OUTPUT " 'NXT_FILE' deleted"
$! Since file deleted, dec next version counter
$! NXT_VER = NXT_VER - 1
$! Continue
$! goto TOP_FILE_LOOP
$!-----
$!
$! Filename: PURGE_COPIES.COM
$!
$! Abstract: This command procedure will compare all versions of a
$! file with all other versions of the file. All files
$! (copies) that are not different from some higher
$! version will be deleted. P1 is the file spec to
$! purge.
$!
$! Author: Kent Gardner
$! Division of Nuclear Medicine
$! B1G412 University Hospital
$! Ann Arbor, Michigan 48109-0028

```



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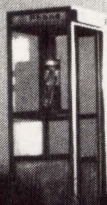
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up its hands in disgust and stop executing. So now you know why all your command files are blowing up!

System managers will be ecstatic to learn that Standalone BACKUP has been enhanced so that you can remove the booted disk after it's been loaded. Your system has to have at least 2 MB of memory so that Standalone's working set can be fully locked in. This means that the system disk now can be the target of a restore operation, a real boon to small system operators.

There's a new SET TIME/CLUSTER command that synchronizes the system clocks on cluster members to within a half-second.

Other 4.6 fixes reported by DEC include a VT300\_Series device type and DEC\_CRT3 qualifier for the SET TERMINAL command; a fix for the /MAXIMUM\_DIFFERENCES qualifier of the DIFFERENCE command and a new DCL command procedure to provide additional menu-driven system management assistance on MICROVAXs.

DEC reports multiple fixes to the SET HOST command, and notes that SET TERMINAL/PASTHRU/PERMANENT now works properly, as do the SET QUEUE, START/QUEUE and INITIALIZE/QUEUE commands.

In addition to ARIS and the VAX Echo areas on FidoNet boards, a great source of DCL information is the VAX PageSwapper, which appears in the *DECUS SIGs Newsletter*. The October 1987 issue contained this little gem from Dale Coy and Ron Schneider:

```
INTERACTIVEJOBS = F$CVSI  
(0,16,F$FAO("IAD",4,%X80002BFC))
```

which places in the symbol INTERACTIVEJOBS the number of interactive users on the system. Thanks to Carl Houseman for pointing this out in the VAX Echo. You can get more information about the *DECUS SIGs Newsletter* by writing to them at 219 Boston Post Road, BP02, Marlboro, Massachusetts 01752-1850.

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“

**There's a new SET  
TIME/CLUSTER command  
that synchronizes the  
system clocks on cluster  
members to within a  
half-second.**

”

The SET HOST/DTE/DIAL command now supports DF03, DF112 and Digital Modem Command Language (DMCL) modems.

TPU users fond of the EDT emulator take note: In the next major release of VMS, the EVE editor will support the EDT keypad, and DEC no longer will distribute the source or section files for EDTSECINI. If you want to keep using it, save it; it's scheduled to disappear.

VMS 4.6 also contains major changes to the AUTOGEN procedure and includes new Local Area Transport (LAT) software which includes a QIO interface for LTDRIVER functions, a new LATCP user interface and the ability to pass a terminal characteristic and the break character to the host.

## Reader Submissions

DCL hackers have been responding well to our call for user utilities, but we'd like to remind you of the rules:

1. Supply the procedures on magtape if you can.
2. Include an abstract so we don't have to wade through code to figure out what it does.

*Note:* My SYSS\$OUTPUT board now is carrying the Rainbow Echo for devotees of that "late," great PC. The number is (412) 854-0511; 300, 1200 and 2400 baud are supported. Or call your local FidoNet BBS and tell the SYSOP to contact me at 129/38. ■

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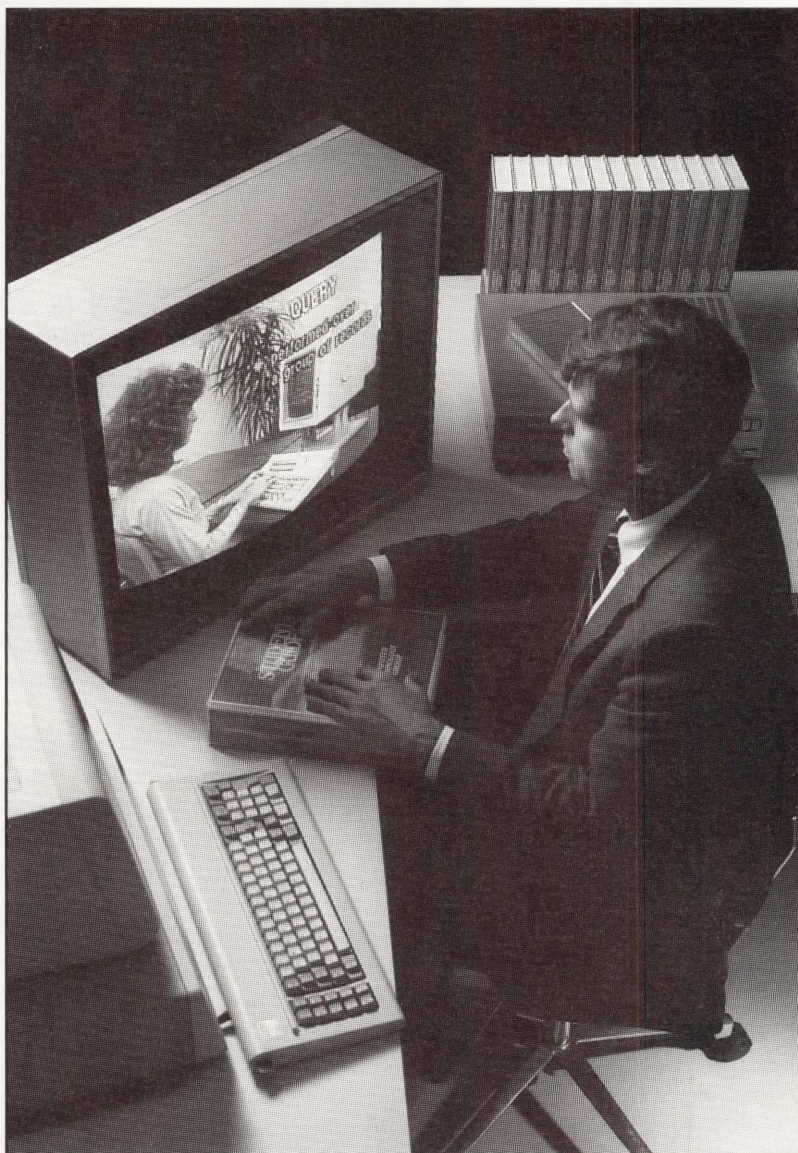
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## DEC WATCH

Shirley Ann Stern

# VAX SCAN: A Language For Building Tools

As a programmer, why would you consider yet

another computer language in addition to all those you already know?

Welcome to the Information Age, where the computer allows the transfer of all types of data easily and quickly. A lot of data lies at our fingertips, but the files often come from many computers and a variety of software packages made by different vendors. As a result, information may be jumbled together and not as usable as quickly and easily as it was obtained.

The solution is to reorganize such files into a format the computer can understand. Unscrambling files that contain valuable data in an unfamiliar format often involves non-numeric computing: moving, extracting, translating, converting, inserting and massaging text strings. While there are many programming languages available under VMS, we at Digital felt there was a need for a language that specifically would address this type of programming.

Also, CASE technology is becoming more visible in the computer industry, by providing processes and tools for every part of the software development life cycle. It made sense to provide a language that could help create these kinds of tools for application development.

VAX SCAN addresses both of these requirements. Like many of the other VMS productivity tools, it originally was developed by Digital as an answer to its own text processing problems.

VAX SCAN commonly referred to as just SCAN, is a compiled language that includes string operators for searching, comparing, extracting and assign-

ing character strings. A strength of SCAN is the constructs that permit matching of one or more complex patterns of text in the input data. SCAN then can create replacement text for the original patterns found in the input stream.

SCAN is a block-structured programming language that, at first glance, looks remarkably like PASCAL. Because SCAN is a high-level language, you can learn quickly, so that short programs can easily be written to produce tools for special-purpose applications. These short programs can be the "quick and dirty" ones that many developers become dependent on to get assigned coding tasks finished on time.

Thomas Harris, a senior software engineering manager at Digital, said, "VAX SCAN is a language designed for complex pattern matching and text manipulation. Because it's so similar to PASCAL, developers successfully can produce programs in SCAN after very short periods of exposure to the language."

The text replacement operation that SCAN performs explains its name. It refers to the way the incoming input stream is scanned or processed to find the patterns of text being matched. The output stream from the SCAN application consists of the input stream transformed by the replacement text. The construct in SCAN that performs

**VAX/SCAN is a language designed for complex pattern matching and text manipulation.**

the transformation is called a macro. Macros have a block structure containing the algorithm for creating the replacement text. SCAN applications can use multiple macros to perform a series of transformations.

The statements in SCAN are similar to those used in other high-level languages such as PASCAL or PL/1. All macros and procedures start with a MACRO or PROCEDURE statement and end with an END MACRO or END PROCEDURE statement. There may be any number of statements in between (see Program 1.)

All SCAN programs start with the MODULE statement and end with an END MODULE statement. A module name, in this case "general\_filenames," is a required element in the MODULE statement. The statements that follow are a series of TOKEN statements that define units of text. Input that matches the contents inside the braces is treated by SCAN as a single entity called a token. The name of each token is given after the TOKEN keywords.

A "TRIGGER macro" is used to find patterns of tokens and replace them with other text. When the pattern is matched, the contents of the MACRO are executed. The ANSWER keyword specifies the replacement text of the TRIGGER

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macro. The END MACRO statement marks the end of the macro's contents. Once reached, pattern matching and replacement for this macro ends and input scanning for other token patterns resumes. Note, however, that macros aren't executed directly.

Processing of a macro is deferred until it's invoked by a separate scanning operation.

The first procedure to be executed in every SCAN program is the Main attribute. In this case, the "main\_routine MAIN" procedure also is the only one in the application. All procedures require an END PROCEDURE statement.

In this example, START SCAN is the only statement in the main procedure. (More complex procedures may have any number of statements.) START SCAN specifies an INPUT FILE and an OUTPUT FILE for its operation. START SCAN opens the files and starts scanning, using the macros for pattern matching and replacement. The input file is scanned, processed and written to the output file until the procedure encounters a STOP SCAN statement or reaches the end of the input stream.

This example shows that SCAN was designed specifically to offer easy manipulation of strings of text that other more general-purpose computing languages weren't designed to offer. For these reasons, SCAN is especially useful for developing filters, translators and preprocessors.

Filter programs remove unwanted parts of a text stream. SCAN applications can read an input data stream looking for specified text patterns. When found, the unwanted parts can be removed, without changing the remaining text. The VAX/DEC Test Manager, a CASE product for the testing portion of the development life cycle, uses filters written in SCAN to remove run-time-sensitive information not needed by the product. A SCAN program can identify certain commands and strip these from the file, leaving the rest of the file untouched.

Translators often are used to make syntax changes to a text file according to a set of rules. A common situation where this is required is language conversion between vendors. For example, changing X's flavor of COBOL to Y's flavor. Even though COBOL is a standardized language, enough differences still can occur to cause problems during code porting. A SCAN translator can be developed to read an X COBOL program, recognize syntax differences, and produce a Y COBOL program with new syntax. If X COBOL has more capabilities than Y COBOL, but system calls

can perform the desired function, the translator can replace X COBOL statements with calls to Y system services.

A preprocessor program can be used to extend a language to increase its power. To do this, you can develop a SCAN application that recognizes the syntax of extensions and produces the corresponding code in the host language. SCAN was used in this way to develop a Japanese version of VAX COBOL. The product, J-COBOL, is a preprocessor that can handle two-byte Japanese characters and convert them into standard VAX COBOL. Prepro-

## PROGRAM 1.

```

MODULE general_filenames;

!
! This program transforms a specific full filename to a more
! general form. It replaces the device and directory with
! "disk:[directory]" and the version number with "*".
!
! Example:
!
!   user$:[bill.a1]payroll.exe;5
!
!           becomes
!
!   disk:[directory]payroll.exe;*
!

SET digit      ( '0'..'9' );
SET spec_char  ( 'a'..'z' OR 'A'..'Z' OR digit
                OR '$' OR '_' OR '*' );

TOKEN version      { { digit | '*' }... };
TOKEN spec_field   { spec_char... };
TOKEN colon ALIAS ':' { ':' };
TOKEN lb ALIAS '[' { '[' };
TOKEN rb ALIAS ']' { ']' };
TOKEN dot ALIAS '.' { '.' };
TOKEN semi ALIAS ';' { ';' };

MACRO find_file_spec TRIGGER
{
  [ spec_field ':' ] ! disk is optional
  [ '[' [spec_field \ '.' ] ']' ] ! directory is optional
  f:{ spec_field '.' spec_field } ! file is required
  [ ';' version ] ! version is optional
};
ANSWER 'disk:[directory]', f, '*';
END MACRO;

PROCEDURE main_routine MAIN;
  START SCAN
  INPUT FILE 'scan$input' OUTPUT FILE 'scan$output';
END PROCEDURE;

END MODULE;

```

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processors also can be developed to allow language extensions to be evaluated before they're formally built into the compiler for that language. Like in prototyping, the language developer can see if the design will work.

A significant feature of the SCAN language is that it's a member of the VMS Common Language Environment and adheres to the VAX Calling Standard. Because of this, SCAN programs can call subprograms written in other VAX languages such as FORTRAN and COBOL. In turn, these languages can call SCAN programs. SCAN programs can also call VMS Common Run-time Library routines, such as the general-purpose procedures found in LIB\$ that allocate resources or obtain the system date and time. Likewise, SCAN can call the screen management procedures from SMG\$. And since run-time support for SCAN is provided in the VMS Common

Run-time Library, a SCAN program can be executed on any VAX without concern.

VAX productivity tools can be used with SCAN programs. For example, the VAX Symbolic Debugger can be used to debug SCAN applications and the VAX Language-Sensitive Editor (LSE) provides SCAN language templates.

Like any other tool, SCAN has its weaknesses. You should avoid floating point arithmetic within a SCAN program, although integer arithmetic runs quickly. Also, you should avoid using SCAN for data that's in non-ASCII format. An example of such data is an object file composed of binary integers, varying length strings and floating point values. Pattern matching is very difficult in these cases. One of the Digital field specialists who uses SCAN constantly to solve customer problems also comments that it lacks the datatype flexibility

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needed to create record structures. SCAN also isn't useful for real-time applications because of its page faulting properties.

However, SCAN is the answer for the range of applications that fall into the text and message processing category. Used correctly, SCAN can increase productivity and with the support of other Digital CASE tools, can provide dramatic benefits to application developers. —Shirley Ann Stern is marketing strategist for MIS applications at Digital Equipment Corporation.

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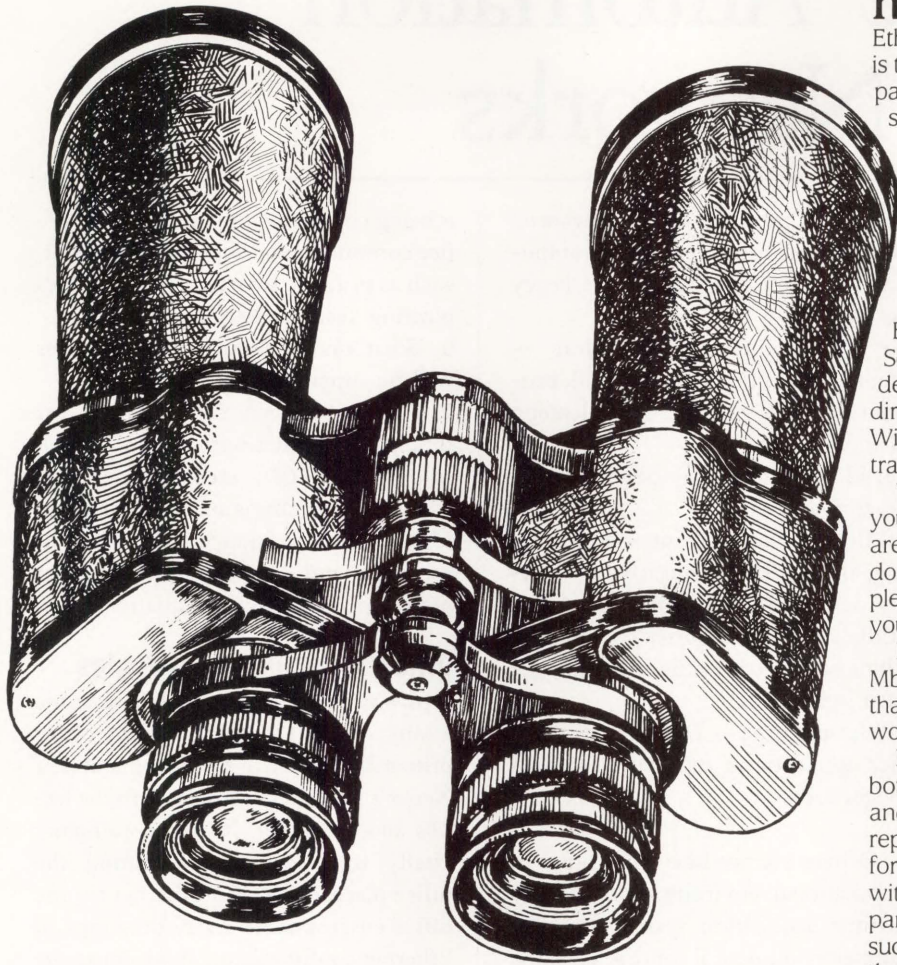
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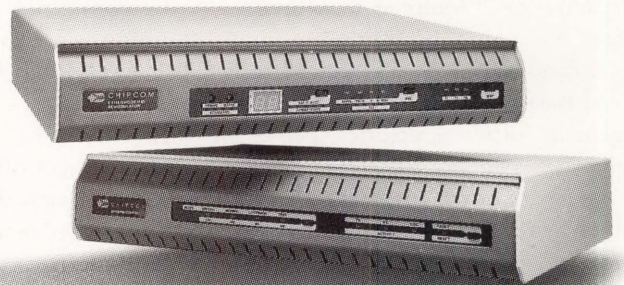
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# Office Automation And Networks

Ham and eggs. Death and taxes. A Coke (Classic, not the fake stuff) and a smile. Some things just go together. Like office automation (OA) and networks. "Sure," you say. "More like mixing oil and water."

Not true. Office automation is ripe for networks. Send files to another system. Send a mail message to a remote node. Share calendar files between networks. Without a network, such occurrences would be rare and difficult.

This month we'll explore some of the issues involved in office networking and tying in networks to office automation systems.

## Basic Issues

Before we get carried away, let's look at some statistics about offices:

1. Offices consist of space, people, office-specific functions, office-specific equipment and traffic.
2. Ninety percent of all offices have fewer than 30 users, eight percent have 30 to 300 users and two percent have more than 300 but fewer than 3,000 users.
3. An average office has about 115 users.
4. An average total office size is about 175 feet x 175 feet.
5. Individual offices average 10 feet x 10 feet.
6. Offices change regularly (people, organization, equipment, workload, etc.).
7. Offices usually need specific services:
  - a) Basic support — Calendar management, office directories, personnel records, schedules, basic computation.
  - b) Text/word processing — Correspondence, forms, mailings, data entry, message review.

c) Data processing — Advanced computational capabilities, file manipulation and access, graphic formats, heavy printing.

d) Management information — Database access (internal/external), program support (DSS), operations planning and monitoring.

e) Electronic mail — Send, receive, edit, forward, etc.

f) Record management — Indexing, filing, and retrieving internal and externally delivered documents.

8. Office traffic — "Bursty" or sporadic with most network traffic averaging one to 100 bytes.

9. Response time — Essential for some office applications, especially in client services areas.

Offices are not like other types of computational environments, such as real-time acquisition systems, factory automation, numerical control, scientific programming, or even specific commercial types of application programming. Office automation is a science unto itself; one that requires the occasional mad scientist-type to figure out what to do to solve complex office problems.

Office networks used for office automation require that the standard network planning cycle be considered and implemented. In addition, there are other considerations that may need to be considered if networks and office products are to work well together:

1. What kind of office products will be connected?
2. What is the expected increase of users and services offered?
3. How many different types of formats will be used in internal file organization?
4. Will dissimilar vendor machines be used to provide office services?
5. What kind of communications media

is being considered for connection to office computing and support equipment, such as printers, smart copiers, graphics plotting systems, FAX machines, etc?

6. What kind of electronic mail systems will be supported?

7. Has there been consideration for future office issues with networks such as ISDN and FDDI interconnects?

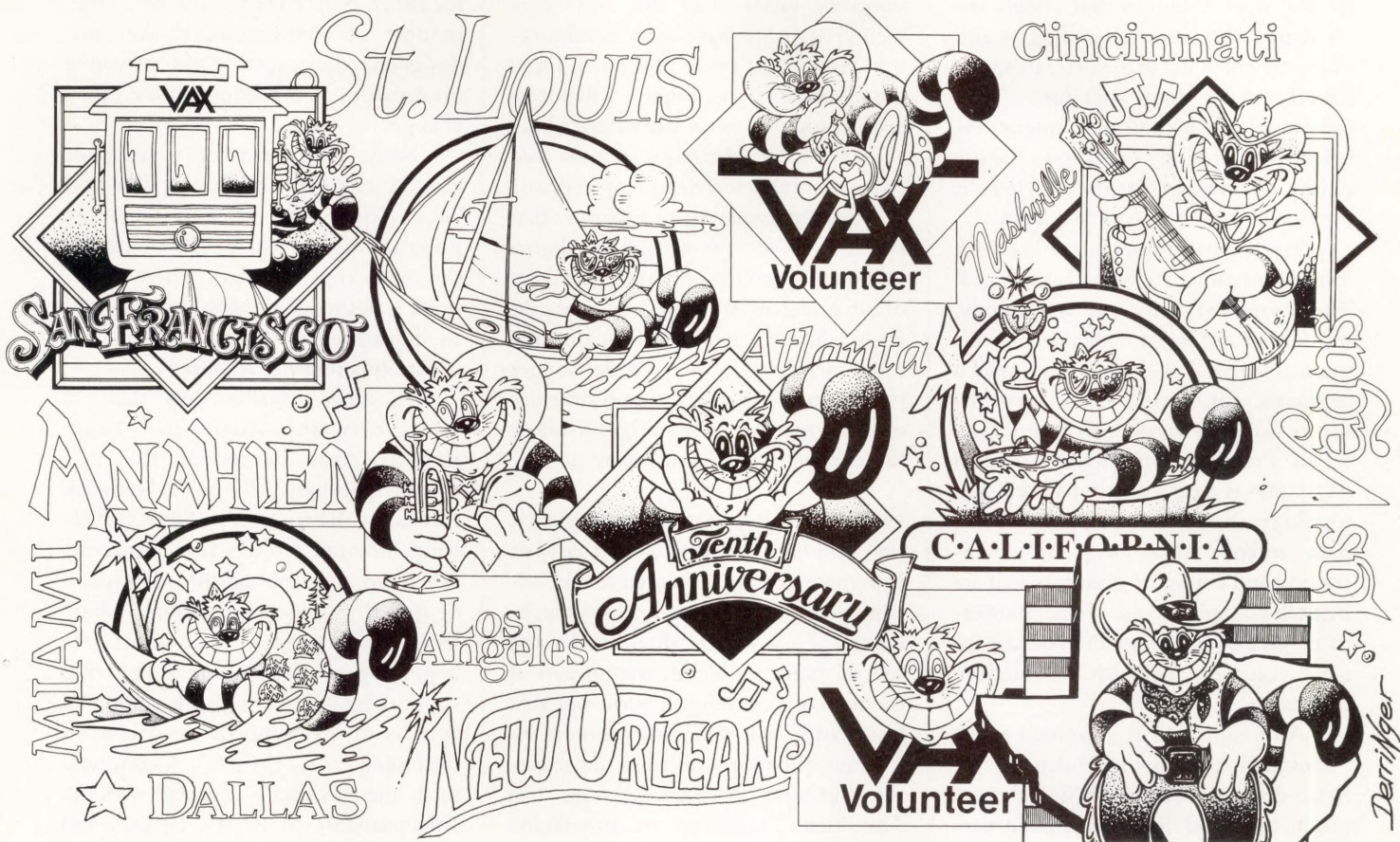
Although this is an incomplete list, it's provided to induce some thought processes and get you thinking about networks and office automation.

## Office Network Technologies

Office networks of the '80s have come a long way in the history of the office primarily because of the introduction of Xerox's Ethernet technology in the late '70s and early '80s. Xerox, a company vitally interested in automating the office place, developed Ethernet for the office environment. Early drawings of Ethernet configurations show corporate systems, departmental systems, disks, printers, optical storage systems, filing systems, facsimile systems, copier/printers and a host of other office products to be on the same network segment.

Some of this has reached fruition: Systems, printers, disks, and other types of peripherals have slowly but surely been popping up on Ethernets and finding happy homes in office networks around the world. But, many say, this is the tip of the iceberg.

So what's next? Voice on Ethernet. Yes, PBX communications and voice support. Also, there will be faster, fiber-based Ethernets capable of speeds beyond 10, 50 or 100 megabits per second (Mbps) to Ethernets of more than 100 MB per second. Coming soon are image processing subsystems tied



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together via Ethernet, optical storage subsystems allowing global storage and retrieval over Ethernet, still video (frame) over Ethernet that allows incremental animation technologies and video-oriented databases, etc. In short, Ethernet technology isn't just a coax cable anymore; it's a flexible, migration-oriented technology that allows the use of the technology in places where it previously hasn't been considered.

In addition to fiber, other Ethernet implementations are being introduced. The venerable twisted-pair technology, much used and much maligned, is making a comeback. AT&T has developed a technique for wiring office environments using a twisted-pair technology called Premesis Distribution System (PDS). PDS is a hub-based, twisted-pair topology that allows transmission of data and/or voice over simple-to-connect and configure networks that are flexible enough for the office environment but powerful enough to handle the data volumes required by modern offices.

Although PDS is supposed to be "transmission technology independent," AT&T designed PDS with its StarLAN product in mind. StarLAN, a 1-MB-per-second network, provides Ethernet-like connectivity with the flexibility of twisted pair. By supporting a slower transmission speed on the twisted-pair network, AT&T effectively allows a flexible and noise-tolerant network configuration permitting a reasonable number of connections to be included, all at a reasonable price.

Not to be caught short by AT&T, other companies have jumped on the PDS bandwagon and are offering PDS-compatible and certified (meaning AT&T has checked the network technology to ensure that it will work on PDS wiring topologies that are installed in the prescribed PDS manner). One-MB-per-second speed, however, isn't enough for some vendors. Companies such as 3Com are offering PDS-certified twisted-pair Ethernets that run at 10 MB

per second, just like the baseband coax implementation.

Such network offerings, while substantially faster than the 1-MB-per-second StarLAN, have some configuration issues that cause problems. First, the few twisted-pair Ethernets that have been introduced to the marketplace have shown a great reluctance to noise and other common interference problems.

Second, twisted-pair Ethernets that run at the 10-MB-per-second speed provide such speed for only short stretches of cable such as 70-to-100 meter lengths with a limited number of taps on the cable segments. To provide longer twisted-pair Ethernets requires the use of many repeaters and bridges to allow the connectivity among many nodes.

IN A RECENT OFFICE cabling experience, my customer wanted a twisted-pair Ethernet to be implemented to take advantage of the latest and greatest technology. Finally, after three weeks and several major problems, we got part of the network running. It turns out that fast twisted-pair technology is more intolerant of connection rules, noise factors and other interference issues than ThinWire, ThickWire or broadband Ethernets.

The bottom line is this: Twisted pair is here and coming along quickly. It makes sense for many applications, especially offices where there is probably already a ton of twisted pair running all over the place. It also makes sense because twisted pair is cheap, easy to run and available everywhere. Running twisted pair for Ethernet, especially the current 10-MB-per-second version run by different vendors, such as 3Com, DEC and others, requires a little more care than standard twisted-pair cable runs for terminals.

In my recent experience, I've found that interference from seemingly innocuous office equipment such as ballasts on incandescent overhead lighting caused interference problems. Don't jump into twisted-pair Ethernet just yet, but do consider it for the office environment because it's a reasonable

way to go for office networks.

Why rattle on about Ethernet? It was built for the office. It was designed for short, bursty traffic and for a large number of connections. It also was designed to be adaptable and extensible on demand, as conditions in the office change.

Some office networks are built around token ring networks. The IBM Token Ring (IEEE 802.5) is the most popular ring so far. IBM recommends the token ring in offices where a network is desired that requires connection to departmental computers and corporate (mainframe) resources.

In other, smaller (less than 70 nodes) networks without such larger resources that are mostly IBM PC-oriented, IBM will sell the PC Network reluctantly. Basically, it's a Sytek Broadband Ethernet product that allows the PCs to connect, not an IBM-developed or globally blessed technology. Many IBM office products, however, are beginning to appear with token ring support built in or with the option to install token ring as a preferred technology (e.g., the PS/2). A continual push into this area is expected with the enhancements to PROFS, DISOSS and other office products such as copier/printers and the like.

But, if you can't make up your mind and decide to implement both 802.5 (token ring) and 802.3 (Ethernet), there is hope. The Fiber Distributed Data Interface (FDDI) is moving along nicely. FDDI provides a high-speed (100 megabit per ring, dual ring) fiber-based network backbone that can be run over a distance of 124 miles.

A major purpose of FDDI is to provide connectivity between the IEEE 802 series of networks, effectively allowing, say, Ethernet nodes to converse, transparently, with token ring nodes. Today, it's difficult to accomplish such a feat, but this isn't going to last much longer. Through the incorporation of OSI architecture and protocols into software and the inclusion of FDDI between Ethernets and token ring networks, it

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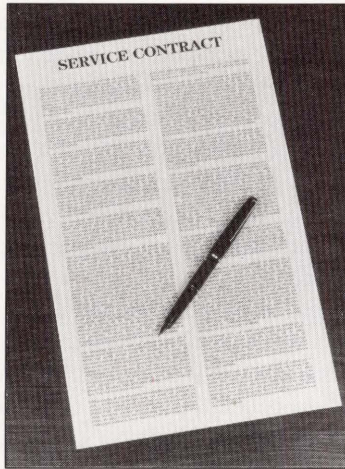
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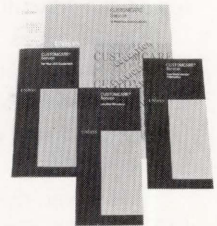
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soon won't matter much what kind of LAN was selected for the office: they'll all connect anyway, transparently.

Other office network technologies include demonstration networks that use infrared connections among office systems. Through this manner, cabling becomes a non-issue, but environment becomes a more important one. One major microcomputer vendor even is experimenting with the introduction of a keyboard and mouse system that uses infrared communications methods rather than cable.

This type of communications technology is attractive in the office because offices are volatile places. Nothing ever stays in the same place in most offices. Now when office equipment and systems move around, the network will move as well without recabling.

## Office Computing Systems

When looking at the office from a network point of view, you have to consider the types of systems that typically are in use in the office environment. Personal computers are welcome guests in many offices, with the IBM PC and PS being the most popular. Rapidly gaining is the Macintosh.

These types of computer systems provide word processing, spreadsheets, financial modeling tools, desktop publishing and many other related functions in the office.

However, this is starting to change. Office computing is giving way to a new term that is starting to permeate the overall office automation marketplace: departmental computing. Through the use of departmental computing systems, department offices can provide group connectivity technology, mail, word processing, scheduling and all the usual office functions, but at a reasonable price and with demonstrable results.

Using PCs in the workplace helps productivity, but the cost of providing each person his own PC is prohibitive. Cheaper PC hardware doesn't solve the problem, as software licensing still costs money, and management of resources

on multiple PCs is still a hassle. Through the use of a departmental hub system, a functional department in a company can allow sharing of services and provision of office automation functions to more individuals at a reasonable cost.

DEPARTMENTAL COMPUTING has some computer vendors worried. Because each department basically owns its own system, more system managers are individuals who have little formal computer science training or background and no experience in managing any type of computer. Further, these individuals also may be responsible for their own network realm (between the departmental system and connected PC systems) and applications, further complicating a tough job.

Departmental computing in the office also worries some MIS departments. Now the users of the network and hub components are in charge of their own systems, causing MIS management headaches and serious political problems throughout a company.

Why move to departmental computing? Reasons include the cost of doing business with MIS departments ("it takes too long and is too expensive to get MIS to do anything for us"), a need to be free from corporate control, greater autonomy in application decisions and cheaper, more powerful computers.

The MICROVAX II and MICROVAX 2000 are good reasons why departmental computing is a real craze these days. With a reasonable cost, a department gets autonomy and compute power.

Also, because the MICROVAX runs VMS or ULTRIX, migration to larger systems, as applications become too large for the MICROVAX system, is a breeze. Support of DECNET connectivity and terminal services on Ethernet makes the MICROVAX departmental solution an attractive one for many companies.

Frankly, the MICROVAX also worries some vendors. A friend at IBM recently said that one of IBM's greatest concerns was departmental computing

and LANs. Another concern was the MICROVAX. "Why?" I asked.

"Simple. The 9370 is too expensive for many departments and there are compatibility issues even between IBM operating systems. We also have the problem of network connectivity. The 9370 has Ethernet and capability for a token ring, but we only support TCP/IP at present and it's not known when (or if) SNA will be supported on IBM LANs," he responded.

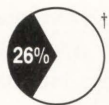
Don't expect IBM to place all of its hopes in the 9370. The System 36 is a neat little system and is capable of providing office functions. It, too, can talk to Ethernet nicely and some third-party companies have taken it upon themselves to develop compatibility packages for the System 36 that work like TCP/IP, DECNET and other popular networking technologies. Even though I'm a hard-core DEC user/programmer, I have a System 36 because some things work better there than on the VAXs. It installs cleanly, networks nicely and is easy to use and support.

ANOTHER ISSUE with office systems and networks is the coming wave of minisupercomputers. Right now we have superminicomputers, 32-bit architectures with enough power to provide computing features for most standard, current office functions. Minisupercomputers soon will be more popular and will allow parallel processing capabilities, image processing and interpretation and other very compute-intensive functions that aren't in offices today because of the need for major horsepower to run such tasks.

With the advent of a mini-Cray architecture in a department, the capabilities of generating big-time data loads on systems and networks becomes a reality. Instead of simple graphics and plots, high-resolution graphics and still video become feasible and probable.

Users will want to connect these resources and exchange high volumes of such data, a taxing task for a network.

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Storage to networked disks will be imperative, as will remote access from local machines and remotely networked machines.

Next comes the issue of input into office systems. Right now, it's not uncommon for typing to be the main method of access. Optical character readers and scanning systems are starting to become popular with less expensive systems becoming more available to the general office community. And, companies such as IBM, DEC, and Kurtzweil are experimenting with voice recognition systems that will allow nontypists (such as senior managers) to use computing hardware without the need to type in information.

With voice commands to PCs and departmental computers, multiple commands may be tried quickly and faster response to such commands will be essential to satisfy user demands.

How far off is voice recognition? Continuous speech is way down the pike, but there are already some \$5-to-10,000 word recognition packages that plug into PCs, have a respectable vocabulary and can be useful in the office environment. In a few more years when computing hardware becomes powerful enough to handle the logic necessary for such operations, voice recognition and storage will become commonplace and necessary in the office.

## The Format Problem

One of the major problems with networks in the office involves file formats and formats of interchangeable items. In other words, not all office system packages provide uniform, standardized formats for products; therefore, the transfer and support of such products from vendor to vendor is difficult.

Networks are lucky. Over time, standards have been developed to allow more networks to provide various types of connectivity.

Office packages, however, still generate files. To date, there is no standard internal file format mechanism for

all types of files generated in the office environment. Sure, there are DIF and DCA, but what about graphics interchange standards and other issues such as image graphics interchange? Some are starting to appear, but there's still a way to go.

Standards are just starting to hit office automation in the networking area. The X.400 is one of the most important standards to appear in a while. By adhering to the message transfer agent/user agent model proposed by the X.400 mail standard, non-compatible computer hardware and software architectures can exchange electronic mail messages.

Servers (message transfer agents or MTAs) can be developed to convert electronic mail messages from a particular vendor format to a format compliant with X.400 and send the message across the network.

There also are companion specifications to X.400, such as X.410 and X.430, that must be implemented if the X.400 mail service is to be successful. In the basic X.400 specification, two services are specified for the overall Message Handling System (MHS). The first type, Interpersonal Messaging System (IPS) is for messages serving interpersonal needs (what most users would consider electronic mail) as well as existing Telex and Telematic services already in use. The second model, Message Transfer (MT) serves a broader base (general, application-independent message transfer).

Other standards specify specific implementation instructions for these two basic services:

1. X.401 lists the basic service elements and optional user facilities.
2. X.408 specifies MHS conversion algorithms when manipulating data between different entities.
3. X.409 defines the notational and representative techniques used to specify and encode MHS protocols.
4. X.410 describes general MHS protocol techniques and the way in which OSI (X.200) protocols are used to support MHS operations.

5. X.411 specifies protocols for the MT service.

6. X.420 specifies protocols for the IPM service.

7. X.430 describes how Teletex terminals can access MHS.

In addition to knowing what each standard does, it's important to point out that the various standards have set up methods in which messages are to be formatted in the standardized environment. Also, the X.400 service offering provides for division of groups (called domains) and appropriate management entities (administrators) in each group. X.400 provides for directory servers that allow mail managers to keep track of who is on what machine.

Electronic mail has some serious problems in the office environment. How are date and time stamps handled if the connection between offices transcends time zones or country barriers? How are language-sensitive prompts handled? These things must be considered in office automation when networks are concerned.

Other standards for office automation are starting to appear. ANSI and NISO are starting to propose international standards for file formats, image formats, specialized mail formats and many other types of required file and communications formats necessary for the interconnection of office packages.

These standards, coupled with IEEE, ANSI and ISO network protocol and communications standards, will provide offices of the future with the needed connectivity among PCs, departmental computers and corporate resources.

Office automation and networks can coexist nicely. They need to. The office of today is going to change radically and the need for office and network connectivity will be essential. Concentration on network and office format standards plus well-planned office strategies and networks will allow unsurpassed network connectivity for future offices. ■





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# Bell Atlantic Challenges DEC

It's getting crowded in the DEC systems servicing field.

The latest entry, a giant third-party maintenance company, is Sorbus. In January, Sorbus joined other notable names, such as TRW, CDC, NCR, McDonnell Douglas and many smaller regional and local service organizations in vying for a piece of the lucrative, ever-growing DEC maintenance business. Sorbus is owned by Bell Atlantic and is, in fact, only one of the Bell Atlantic operating units aimed at the DEC marketplace.

Electronic Service Specialists Ltd. (ESS), the world's largest independent parts supplier and depot repair company for DEC computers and peripherals, was purchased by Bell Atlantic in 1986. In addition to systems and module repair and parts replacement, ESS also provides training for self-maintainers and third-party maintenance companies. Also there is a third Bell Atlantic company, TriCon, which finances VAR, dealer and/or end-user purchases of DEC systems, on a three-to-five-year basis.

Bell Atlantic has taken its various resources and put together some very innovative packages providing increased benefits and some solid alternatives to what other vendors offer the DEC maintenance market.

## Field Service By Sorbus

Sorbus is the country's biggest independent field service company, working on a full range of computer systems from micros to large mainframes, including all of the associated peripherals. In addition to being the largest inde-

pendent maintainer of IBM systems in the United States, Sorbus maintains more than 400 other brands, with 3,000 hardware products overall. With having been in the business for more than 25 years, Sorbus has a good history in third-party maintenance (TPM). The company currently operates from more than 200 field locations nationwide, employing more than 1,600 field engineers. To track its parts inventory of more than 230,000 part numbers (six million items), Sorbus uses an online Inventory Management System capable of locating individual parts in the disbursed inventory system down to the site level and even to an FE with the part in his car.

DEC service and parts recently have been added to Sorbus' network. The PDP-11 series, MICROVAX I and II systems and the VAX 11/700 line now are being fully supported. The VAX 8000 series will be added when customer demand becomes apparent; as of now most of these systems are still under warranty, according to William Patch, Sorbus' vice president of marketing and planning.

Patch added, "The move to offer service for DEC equipment nationally is Sorbus' response to the growing trend among users to have more than one make of computer within its operations. By offering customers DEC maintenance, in addition to servicing their other equipment, we can provide them with the advantage of single source maintenance for almost all of their information processing equipment." Patch went on to state that Sorbus has taken a slow approach to entering the DEC service market so as not to risk its reputation for quality service and support. "We have a 10-year plan and have researched customer needs thoroughly;

we now are ready to provide all aspects of DEC equipment maintenance, nationwide. In our study of the market, DEC users cited timely and reliable service as their major concerns. Of course, price is very important too. These are the same needs Sorbus has been successfully able to fulfill for our IBM customers. Therefore, we will be bringing this proven price/performance formula to the DEC user."

Some of the advantages Sorbus believes it offers in servicing DEC equipment are:

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6. All FEs are system trained and able to diagnose and fix any problem, not just one or two pieces of equipment.
7. A large parts inventory and automated parts tracking system reduces normal parts turnaround time to a maximum of 24 hours.
8. Lower pricing for service is lower than DEC's basic maintenance service, and is very competitive with other TPM vendors.

"Many of our IBM customers have DEC equipment, too. The MIS executives and DP managers at these sites want a single source for service. We plan to be that source," noted Patch.

Sorbus has a goal of becoming the number one independent source for

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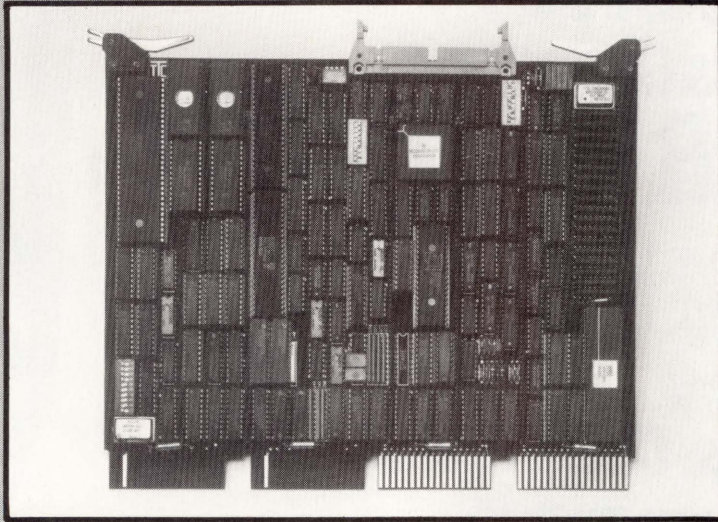
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DEC service. It plans to get there by matching service programs to customer demands.

### ESS And Repair, Parts And Training

ESS provides depot repair, parts sales, spare parts leasing, and training for DEC equipment and associated peripherals to self-maintainers, TPM companies and to its sister Bell Atlantic company, Sorbus.

Its repair and refurbishment services include a standard five-day turnaround for repair or module upgrade, circuit board swap programs, quality control measures and a full one-year warranty on all parts sold or repaired. ESS maintains a working inventory in excess of 100,000 parts.

For Western European customers, ESS offers equipment turnaround in 30 days, including shipping, while most other sources quote average repair times for DEC products of from three to six months. Other service areas include Canada, Australia and parts of Africa.

ESS repairs products across the entire DEC line, from the PDP8 to the VAX 8800. As an added plus, during repairs, equipment automatically is upgraded to the current revision level. Once the problem has been corrected, repaired circuit boards or other equipment undergo testing and failure analysis. Circuit boards are "burned-in" or run for extended periods of time on the systems for which they were designed. Warren Haerberle, president of ESS, is very proud of its reputation, "One of the unique things we do is offer a one-year warranty that starts when the customer places the part back in service, and there are no exclusions to this policy."

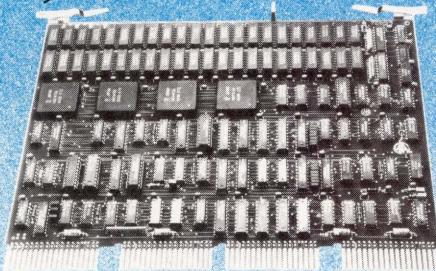
The company services over 3,000 customers from its 53,000 plus square foot lab and warehouse facility in Menomonee Falls, Wisconsin. The 80 full-time employees handle an average of 6,200 circuit board repairs each month. ESS maintains that it has a less than one percent return rate — one of the best in the industry.

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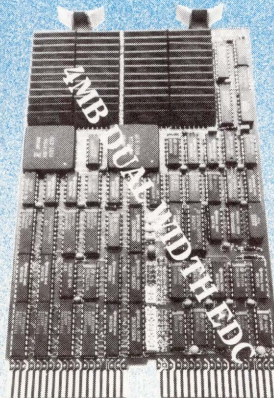
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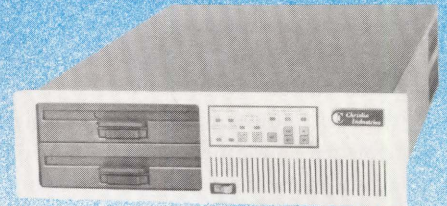
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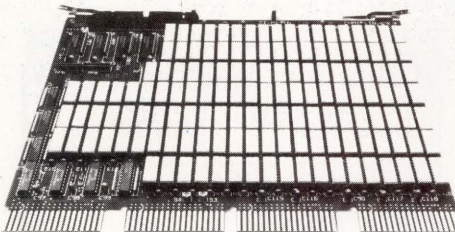
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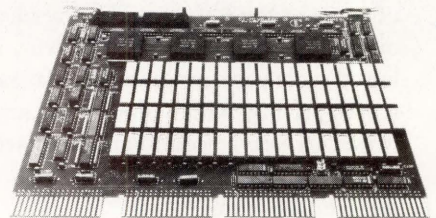
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sponse can be upgraded, if needed, to next-flight-out service on parts and module swaps, or 24-hour rush turn-around on repairs. Key clients can receive round-the-clock parts availability. And most important for MIS and DP managers, ESS services can be used on an as-needed basis. There's no need to lock yourself into a contract or any other long-term commitment.

Parts, module and system sales are another major business within ESS. With over 140,000 pieces of new and refurbished equipment, ranging from small components to entire systems inventoried, sales support is never more than a phone call away for self-maintainers and TPM firms.

ESS has pioneered a unique program allowing customers to lease or rent spares and spare-parts kits, or maintain a consignment inventory. Lease or lease purchase arrangements are available in one- to-five-year terms.

Same day parts shipments, counter-to-counter shipments, and mailings via all common carriers are supported. There are no minimum order requirements. ESS claims that the combination of some of the lowest prices anywhere on new and used DEC equipment, its leased spare parts program, and flat-rate repair pricing with volume discounts make it very economical for self-maintainers and independent firms to service DEC equipment.

### **Hands-On Training**

ESS also provides a rare opportunity for third-party and self-maintainers to receive training in all areas of DEC board and system level maintenance. The Hi-Tech Training Division is a comprehensive maintenance training school for DEC computers and peripherals. Located near the company's headquarters in Menomonee Falls, this 3,300 square-foot facility was specially designed for optimum hands-on training.

The school is equipped with DEC

computers and peripherals. ESS Hi-Tech Training currently offers 35 different courses of instruction, covering everything from LSI-11 maintenance to VAX-8600/8650 module-level troubleshooting. A variety of tape drive, disk drive and terminal maintenance training

“

***Bell Atlantic Capital Corporation, through its two operating companies, provides financing for industrial and commercial equipment.***

”

also is offered. Class lengths are from three days to four weeks.

In addition to these scheduled courses, on-demand course development, exclusive custom-ordered courses and on-site maintenance training at client company facilities also are available. Michael Kieft, the school's director, has 12 years of experience teaching DEC maintenance courses.

It should be noted, that although ESS is a Bell Atlantic company, it wasn't purchased for or intended to be only a Sorbus supplier. ESS continues to offer its repair, sales and training services to all third-party maintenance companies and self-maintainers. Sorbus is just another customer, availing itself of the FE training and depot repair services that ESS offers to all clients.

Bell Atlantic Capital Corporation, through its two operating companies, Bell Atlantic TriCon Leasing, and Bell Atlantic Systems Leasing provides financing for industrial and commercial equipment. It also buys, sells and leases new and used computer equipment to vendors and end users. Under a new program announced at the end of last year, Sorbus maintenance will be part of an optional package for operating and

finance leases of DEC equipment.

TriCon is one of the top 10 equipment leasing corporations in the country, providing operating leases, tax type leases and full-spectrum financing on three- to-five-year terms, on all sorts of equipment. Equipment leasing for DEC-based systems now is available for all computer VARs, dealers and end users. Customer plans can be either of the step-up or step-down type. With 30 leasing offices around the country, TriCon is easy to find and deal with.

What TriCon provides is one-stop, single-source financing for equipment and maintenance. "The reseller or end user gets one lease for mixed equipment sales and the maintenance contract," according to Peter Cakiades, TriCon national accounts executive. Through this arrangement the purchaser is provided the means for not only financing DEC and other equipment for either sale or lease, but for arranging maintenance to keep the system running smoothly.

Additionally, Sorbus maintenance on leased equipment is priced at a flat fee over the length of the lease. "This

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fixed-price service can be as long as five years. We believe we're the first service provider in the industry to offer a maintenance contract like that," stated Dick Cooper, manager of marketing communications at Sorbus.

Here's how it works: The lease goes through Bell Atlantic as one contract for equipment leasing and maintenance, but the customer receives a separate billing for each. Sorbus is guaranteeing the price of the maintenance service for the length of the lease, usually three or five years. This is a totally new concept in TPM business strategy.

### What Does It All Mean?

This means that Bell Atlantic is taking the DEC-based field service, maintenance and training markets seriously and committing its diverse resources to becoming a major player, if not number one, in the market. And its resources are impressive!

Information obtained at this October's Frost & Sullivan Third-Party Maintenance Conference in San Francisco estimated Sorbus' revenues at more than \$180 million and ESS' income at approximately \$20 million for 1986. TriCon sales data pegs income at \$70 million.

There is little doubt that these three Bell Atlantic operating units have the financial strength to make and sustain a major push into the DEC maintenance and service marketplace. How this will affect the MIS executives and DP managers responsible for purchasing DEC-based system training, maintenance and/or services or the other TPM vendors only can be guessed at this time.

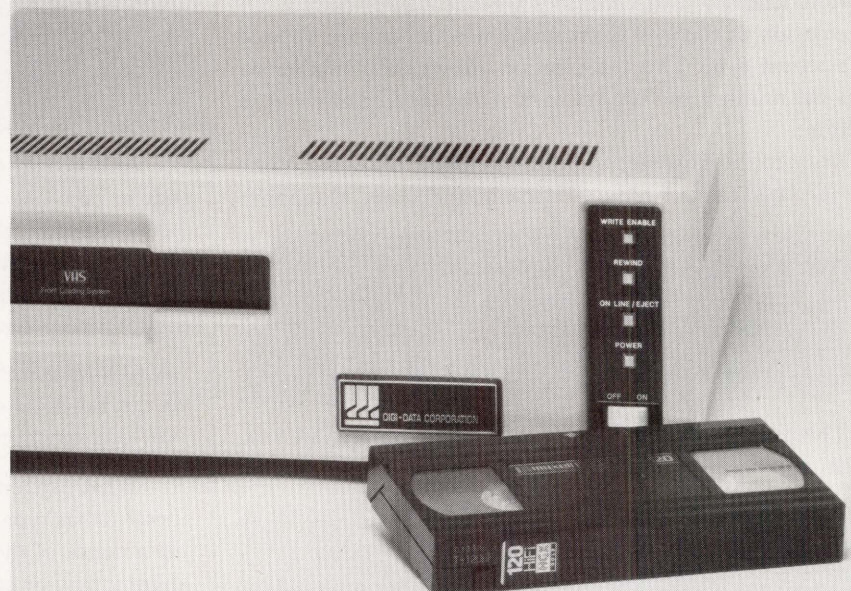
However, increased competition in the DEC-based maintenance and training business can only benefit purchasers of such services. Prices should come down as competition heats up, and the quality of service provided by the vendors also will improve. Originally, there was no choice, you either bought DEC service or did your own. Then service vendors such as TRW, CDC and others entered the market providing some alternatives for service purchasers. But

these offerings were less complete than the Bell Atlantic offerings and the impact, while measurable, was not enough to alter service and pricing policies among the major vendors. Bell Atlantic, with its unique approach, may change all that for the better.

This is a direct challenge to DEC to

improve its maintenance contracts, services and customer relations. As many of you are painfully aware, DEC often has been sadly lacking in these areas. Well, Bell Atlantic promises to more than make up for this. It will be interesting to see how DEC rises to meet the competition. ■

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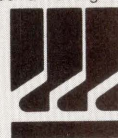


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# Function Prototypes, Part I

*Editor's note: A weak point of C, and other languages, has been the lack of argument checking across function calls. This problem has been solved largely in C with*

*the addition to the ANSI C Standard of function prototypes. From an average C programmer's point of view, prototypes are probably the single most useful addition to the language. This is Part I of a two-part series.*

A function prototype (called prototype for short) is a function declaration that includes argument information; it's an extension to the syntax currently used to declare a function's return type. This information allows the compiler to check the number and type of each argument in a call to that function.

Prior to the existence of prototypes, the following functions (declared in `math.h`) would have been declared as follows:

```
double sqrt();
double sin();
double cos();
double tan();
double frexp();
double pow();
```

The prototypes for these functions (as declared in VAX C V2.3) are:

```
double sqrt(double x);
double sin(double x);
double cos(double x);
double tan(double x);
double frexp(double value, int *exp);
double pow(double base, double exp);
```

Each prototype declares the arguments in the order that they must appear in a call to that function. The argument names are optional; they simply indicate where an actual argument name would go in a function call or definition. (Using them makes prototypes easier to clone from "new-style" function definitions.) Note that in an earlier draft of the ANSI C Standard, these names didn't exist, so compilers that faithfully implement that earlier version will not accept them there.

Why have prototypes? Their purpose is to allow argument list type, order and count checking across multiple source files at compile time. If the prototype for a function is placed in a header that's included in the file where that function is defined and in all files where it's referenced, the compiler can check that all references to the same function match each other and that of the definition. It's not sufficient to ensure that all calls to a function are compatible; it's also necessary that the

calls be compatible with the function's definition.

Let's see what the VAX C V2.3 compiler does with the following example:

```
#include <math.h>

test()
{
    double d;

    /*1*/ d = sqrt(10.0);
    /*2*/ d = sqrt(); /* error */
    /*3*/ d = sqrt(10,10); /* error */
    /*4*/ d = sqrt(10); /* ?? */
}
```

As noted above, the prototype for `sqrt` in `math.h` declares `sqrt` to take one **double** argument and to return a **double** value. Therefore, the first call is compatible with the prototype. However, calls two and three are not because one has too few arguments and the other has too many. These calls produce the following error message:

```
%CC-W-MISARGNUMBER, The number of arguments passed
to the function does not match the number declared in a
previous function prototype.
```

What happens with the fourth call? Clearly, the numeric literal 10 has type **int** and yet **double** is expected by `sqrt`. In the absence of the argument list in the function declaration, an **int** would be passed and misinterpreted as a **double** by `sqrt` resulting in a bug. However, all is well in this case because the prototype causes the **int** argument to be "widened" to **double**. In other words, the cast `(double)10` is implied.

Let's investigate this further with other types. The purpose here is to call function `fun`, passing it various types of arguments to see what, if anything, conflicts with `fun`'s prototype:

```
int fun(int i);

enum color {red, blue, green, black};

struct st {
    int i;
    char *pi;
};

main()
{
    char c = 'a';
    unsigned char uc = '\350';
```



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```

short s = 100;
unsigned short us = 0xff;

int i = 100;
unsigned int ui = 0xff;

long l = 100;
unsigned long ul = 0xff;

float f = 1.234;

double d = 3.456;

int *pi = &i;

enum color car_color = red;

struct st st1;

char name[20];

fun(c);
fun(uc);
fun(s);
fun(us);
fun(i);
fun(ui);
fun(l);          /* ?? */
fun(ul);         /* ?? */
fun(f);
fun(d);
fun(pi);         /* error ?? */
fun(car_color);
fun(st1);        /* error */
fun(name);       /* error ?? */
fun(fun);        /* error ?? */
}

```

Not surprisingly, all of the integral types **char**, **short** and **int**, both signed and unsigned, are passed correctly because these types always are widened to **int** when used as function arguments (at least they are in VAX C). In any case, the prototype explicitly forces them to be widened to **int** as necessary.

The types **long** and **unsigned long** also are handled correctly because **ints** and **longs** have exactly the same size and properties on a VAX. However, this behavior is implementation-defined.

On a 16-bit system, for example, the **long** and **unsigned long** arguments quietly would be truncated to **ints** as determined by the prototype. Of course, a diligent compiler might issue a warning. (To get VAX C to be more diligent, use the compilation switch `/STANDARD=PORTABLE`.)

The **float** and **double** arguments also are converted quietly to **ints** (with appropriate rounding and potential loss of information.) Because enumerated types are simply **ints** in disguise, **car\_color** is directly compatible with the prototype.

Strictly speaking, a pointer isn't compatible with an **int**, so the argument **pi** should produce an error. However, with VAX C V2.3, this isn't the case due to a feature (or bug, depending on your view).

Pointers are, in essence, unsigned integers and seem to be treated as such in VAX C, so no error results. The same is true for the arguments, **name** and **fun**, resulting in arguments of

type pointer to **char**, pointer to function returning **int** and taking one **int** argument, respectively. All three expressions should produce errors under strict ANSI C rules. The only argument that VAX C complains about is **st1** because it (correctly) can't convert a structure into an **int**.

## Function Pointers And Prototypes

Let's digress a moment and look at what the proposed ANSI standard has to say about function pointer compatibility:

```

int f1(int i);
int f2(int i, int j);
int f3(void);

int (*fp0)();
int (*fp1)(int i);
int (*fp2)(int i, int j);
int (*fp3)(void);

test()
{
    fp0 = f1;
    fp0 = f2;
    fp0 = f3;

    fp1 = f1;
    fp1 = f2;      /* error */
    fp1 = f3;      /* error */
}

```

Before prototypes were available, the declarations of **f1**, **f2** and **f3** would have been identical: all three functions return type **int**. However, because they have different argument lists, the three functions no longer are treated as being the same type as is demonstrated by the assignments into **fp1**. **fp1** is a pointer to a function returning **int** and having one **int** argument, so it's only compatible with expressions having that same exact type. Because the expressions **f2** and **f3** point to functions of the same return type but with different argument lists, they're not assignment-compatible with **fp1**.

Note, though, that this strict assignment-compatibility checking is not yet implemented in VAX C, although an ANSI C-conforming implementation will require it. The type of a function pointer will include the argument list information of the function to which it is pointing. If you think the ANSI Standard has gone too far with such type checking, you can rest easy because you can still mix apples and oranges; you just have to be overt about it by using an explicit cast. For example, **f2** can be assigned to **fp1** using:

```
fp1 = (int (*)(int i)) f2
```

Also, the checking could be disabled by omitting the prototype information from the function declaration.

A similar situation exists with pointers to arrays. For example:

```
void sub(char (*p)[5]);

test()
```

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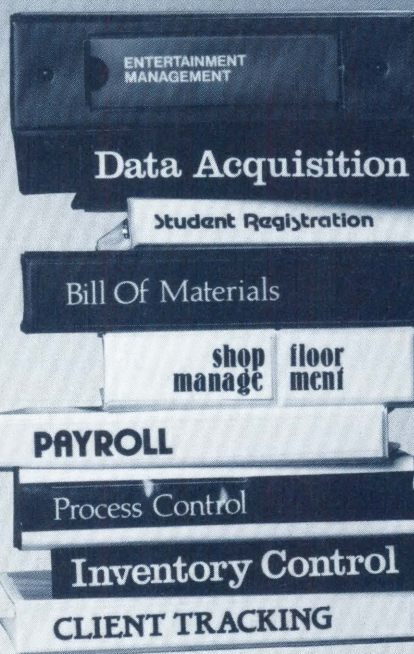
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tation and shouldn't use leading underscores; if they do, they share the same identifier name space as user programs.

Function prototypes are designed to be used with functions. Yet if we see an expression of the form *identifier(expression-list)*, we can't tell immediately if that is indeed a function call; it may be a macro call.

If **isascii** were a function, its prototype would be:

```
int isascii(int c);
```

If we provided more than one argument or an argument of type other than **int**, a mismatch would be detected or the prototype would cause the argument to be converted, as appropriate. If, however, **isascii** is a macro, as is the case with VAX C, any prototype is ignored, because no function call is seen. For example, in:

```
#include <stdio.h>
#include <ctype.h>

main()
{
    int i;

    if (isascii(65.345))
        printf("Yes\n");
    else
        printf("No\n");

    i = islower(1.234);
}
```

the macros **isascii** and **islower** are expanded as follows:

```
if (isascii(65.345))
if (((unsigned)(65.345) <= 0x7F))

i = islower(1.234);
i = (_ctype_[(1.234) & 0x7F] & 0x2);
```

Fortunately, the **isascii** macro definition includes a cast to **unsigned int**, so an **int** (with value 65) is passed, and an **int** is expected. In fact, this is the same behavior we would get if **isascii** were a function with the prototype shown earlier. The only problem is that the argument 65.345 looks rather odd, and it's illogical. Either the programmer wanted 65, or he's confused. Either way, it would be nice to get a warning but that's not possible because the compiler sees nothing wrong.

The argument to **islower** is equally ridiculous but again, VAX C makes sense out of it when strictly, it shouldn't. Because the bit-wise AND operator **&** requires integral operands, a syntax error should result. However, VAX C produces the following message, converts the double constant to an **int** and continues on its merry way:

```
%CC-W-NOFLOATOP, The left operand of a "&" operator
has been converted from floating-point to integer.
```

The bottom line, then, is that if something is implemented as a macro only, a prototype is unnecessary and, if present, isn't used. Therefore, implementations of **ctype.h** that use macros for the **is\*** and **to\*** routines almost certainly will not

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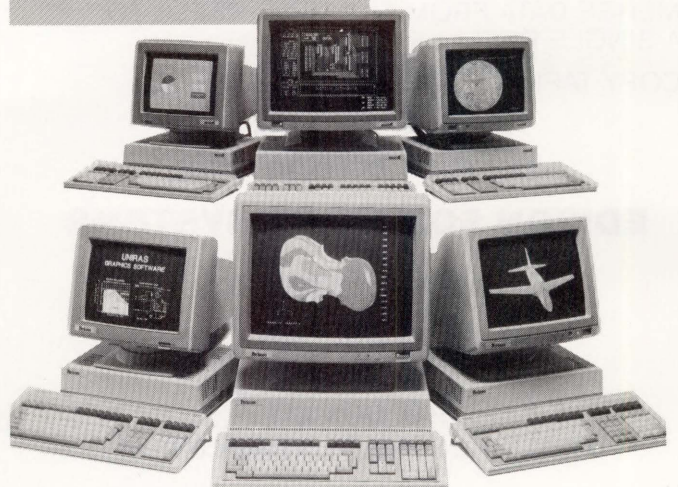
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contain prototypes for them. Implementations that provide both macro and function versions or function versions only will, in ANSI-mode at least, provide prototypes. And, depending on the way in which the macro is written or the degree of liberty the compiler allows, you may or may not get errors or implicit casting.

A different scenario exists when a macro actually is expanded to a function call as follows:

```
#include <stdio.h>

main()
{
    int c;

    c = getchar(10);
    printf("Char read was %d, %c\n", c, c);
}
```

VAX C, like many other compilers, implements **getchar** (and **putchar**) as a macro, although not all implementations translate **getchar** directly into a function call. The macro expansion is:

```
c = getchar(10);
c = fgetc(stdin);
```

and the following warning is issued:

```
%CC-W-NOFLOATOP, The left operand of a "&" operator
has been converted from floating-point to integer.
```

Again, no prototype exists for **getchar** because it's a macro. However, the compiler still detects the error, because the macro **getchar** takes no argument, yet it has been called with one.

Other examples of prototypes (from `string.h`) are:

```
char *strcpy (char *s1, const char *s2);
char *strcat (char *s1, const char *s2);
int strcmp (const char *s1, const char *s2);
```

Here, the new keyword **const** is used. This indicates that the corresponding variables are to remain constant; they may not be changed by the called function. This provides an opportunity for optimization by the compiler. If it knows that an argument is passed by address, yet that argument has the attribute **const**, it can optimize across that function call because it can assume that the called function will not change the value of that argument. However, to make this assumption a correct one, the function definition must declare the corresponding format arguments as being **const**. For example, the function definition for **strcpy** should be:

```
char *strcpy (char *s1, const char *s2) {...}
```

rather than:

```
char *strcpy (char *s1, char *s2) {...}
```

Note that **string.h** is relatively new for most compilers. It contains the **str\*** and **mem\*** library function declarations that were previously declared in **stdio.h**. When you convert existing code that uses these functions, you will have to include **string.h**, so their return values are declared properly. If you forget to do this, or you don't realize you have to do this, you may or may not get an error depending on how you use these functions. Your hardware architecture might also affect the outcome. For example:

```
#include <stdio.h>
...
char *temp;
...
temp = strcpy(dest, source);
...
```

This should work on compilers that declare **strcpy** in **stdio.h**. However, if they declare it in **string.h** and implement the proposed ANSI strong type-compatibility checking, you should get a syntax error. This is because **strcpy** isn't declared and, therefore, defaults to an **int** return type; yet you're assigning that **int** to a character pointer and these types aren't compatible. If you really want to do such an assignment, you must use an explicit cast. In any case, the error is really that **#include <string.h>** is missing from the file.

If **stdio.h** doesn't contain a declaration for **strcpy** and you're compiling on a system in which a pointer and **int** have different sizes (such as the large memory model on DOS), the pointer returned by **strcpy** will be truncated and interpreted as an **int**, causing a real problem when next you use **temp**. Of course, this assumes your compiler is loose about assigning an **int** into a pointer (and many implementations are):

```
#include <stdio.h>
...
strcpy(dest, source);
...
```

In this case, the return value from **strcpy** isn't used, so it's irrelevant whether it returns an **int** or **char \*** and the absence of **#include <string.h>** is of no consequence.

To be on the safe side, you should inspect the contents of headers provided with each release of your compiler. There certainly are differences between the headers of VAX C V2.2 and V2.3, and I don't recall them being mentioned adequately either in the release notes or the new manual set.

Readers are encouraged to submit any C-related comments and suggestions to Rex Jaeschke, 2051 Swans Neck Way, Reston, VA, 22091. —*Rex Jaeschke is an independent consultant, author and lecturer. He's DEC PROFESSIONAL's representative on the ANSI C Standards Committee.*

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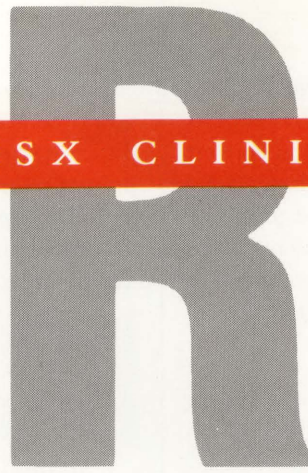
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## DISK BENCHMARKING

**QUESTION:** *We've done a benchmark on the RD52 data transfer rates for our Micro-11 running MICRO/RSX version 3.0. The results are disappointing, showing we're getting only about five percent of the ST506 specified data transfer rate of 625 KB per second. We open a file and then write a series of 1,600 byte records into it. Is our RQDX1 that slow? We need to transfer the maximum number of bytes per second in our process control system.*

**REPLY:** While the RQDX1 has a reputation for being slow, that doesn't explain such a disparity of results. Review your benchmark technique. Benchmark data for RSX systems is sparse, due primarily to the difficulty of doing accurate benchmarks in an RSX system.

If you want to measure disk transfer rate, you first must assure that the only data transfer to or from the disk is the transfer you initiate with your benchmarking program. Check the following items:

1. Get control of all disk transfers. Turning off checkpointing (ACS DU0:BLKS=0). Log onto the system and disable LOGONS (Set /NOLOGON). Don't turn off system resource accounting yet; you'll need it. System resource accounting is turned off as the last step in preparation for the actual benchmark measurement.
2. Remember that loading and running your benchmark program can cause disk activity. Build your benchmark program with no disk-resident overlays. INSTALL and FIX your benchmark program.
3. Pay attention to your test file. You don't want F11ACP running and possibly loading its overlays or reading from disk directories. Your test data file should be contiguous, or the disk must be MOUNTed with /MAP=FULL.
4. Account for overheads. You don't want FCS to interfere with your mea-

### By James A. McGlinchey

I respond to those questions that are interesting and applicable to the general RSX user. Please mail your questions to: RSX Clinic, DEC PROFESSIONAL, P.O. Box 503, Spring House, PA 19477-0503. Questions also can be submitted through ARIS.

surements and you don't want F11ACP rumbling through directories to find your file. Use direct QIOs to open the file (IO.ACR, IO.ACW). If you're not familiar with these QIOs, they're documented in the appendix to the I/O driver reference manual titled, *QIO Interface to the ACPs*. Your 1,600 byte record length is causing FCS to read and deblock the records, incurring extra CPU-bound overhead. Read/write blocks directly into the file (IO.RVB, IO.WVB). The byte count in your QIO, therefore, should be an integer multiple of 512.

The time required to perform a QIO will be a factor, so read/write many blocks with a single QIO. Allow 1.67 milliseconds for each QIO overhead on your MICRO/PDP-11/23, proportionately lower for the faster MICRO/PDP-11s.

5. Do a dry run. To determine the composite overhead incurred by running the test program, run your benchmark program with output to the null device (NL:) first. Run your benchmark program against the real file, using the I/O counts display page of RMDemo (SHOW MEMORY in DCL) to make sure that the only QIOs being issued to the disk are

the ones coming from your program. You may see one or two QIOs being issued by the system's resource accounting facility. It periodically writes its accounting records to the ACNTRN.SYS file. When you're satisfied that you totally are controlling the QIOs to the disk, turn off resource accounting (STOP/ACCOUNTING).

Your results should be an accurate measure of the data rate achievable with your configuration, and should be considerably better than those you report. If maximum transfer rate is important to you, you may want to use a different disk and/or controller. The first thing I would do is upgrade that disk controller to an RQDX3. The difference will be considerable.

## UPGRADING RSX SYSTEMS

**QUESTION:** *Can the CPU size be changed in RSX-11M version 2 without doing a SYSGEN? I would like to add more memory but don't have the required disks to do a SYSGEN and can't locate anyone who has them. If I update the operating system to be able to do a SYSGEN, I also will need to get disk drives with larger capacity and update some purchased software. Our system is a PDP-11/34, with three RK05s, 80K words of memory and some special UNIBUS equipment.*

**REPLY:** If you're still using RSX-11M version 2, your system is about 10 years old. In most cases you can add memory to an RSX system, even one of this vintage, without doing a SYSGEN. Plug in the new memory and boot your system. RSX will determine the memory size when it boots. An RSX-11M system generation must be done if your total memory, after the upgrade, exceeds 128K words; i.e., you leave the 18-bit memory space and enter the 22-bit memory space. Because you're using an 11/34 you don't have a problem here because the maximum memory you can have on



your 11/34 is 128K words.

The answer to your real question isn't that simple, and brings up the issue of upgrading RSX systems. You have many options available to you, some more expensive than others. I'll list the more realistic ones in order of increasing cost.

1. Expand the existing system to its limit at minimum cost. Expand your memory to 128K words and reboot. It has 128K words of memory, may run a little faster and can support a few more users. This is the cheapest option available, and is practically the only option if you insist on staying with RSX-11M version 2.

2. Upgrade to current RSX; add more disk and memory. In addition to the 64K memory, you need to upgrade those RK05s, if only because RSX is no longer distributed on RK05s. RSX still supports RK05s, but RK05-based distribution kits are no longer available. A fairly low-cost option is to upgrade to RL02 disks. You'll need an RL02 controller and two, preferably three, disk drives. You'll find that the RLs are faster and more spacious than the RKs. Lots of RL02s are available on the used equipment market at bargain prices. DEC will install and service this equipment.

While you're at it, get rid of those DL-11s in your backplane and replace them with a DZ-11 terminal multiplexer. DZs are available from used computer outlets at low prices. Since you already have an RSX license (although it's probably burnt-stick-on-parchment) you can purchase an updated operating system kit for less than the full license cost. There's no sense upgrading to anything but the current release, which is version 4.2, patch level D.

All other upgrade options require replacement of major pieces of your system.

3. Upgrade processor to J-11; add disk; upgrade to M-PLUS. This option involves replacing your PDP-11/34 processor card set with one of the third-party single board CPUs based on the DEC J-11 chip set. Several vendors can supply these CPU replacements. They

all have some high-speed on-board memory that can take you into the .5 to 1 MB memory range. Your system then would take on the functional appearance of a PDP-11/84. Work out the field service arrangement beforehand; you'll need to establish who fixes what in such a system.

You'll want to add more disk, and going to the RLs is also realistic. I don't think it makes sense to stay with RSX-11M when you have a J-11-based CPU. You can upgrade your operating system to RSX-11M-PLUS inexpensively if you specifically request the RSX-11M to RSX-11M-PLUS upgrade license. An added benefit occurs here: You'll avoid doing SYSGENS entirely if you go with the RSX-11M-PLUS pregenerated kit, which is distributed on RL02s.

4. Upgrade the processor to a PDP-11/44. The used computer market is loaded with 11/44s at reasonable prices. Find one with .5 to 1 MB of memory on it. The RL02s are again an acceptable option, but you might find an RM02 or an RA80 cheaper. You'll need a tape for backups if you go this route. TS11s and TU80s are good.

Upgrade to RSX-11M-PLUS. You'll need a full distribution kit if you go with the RM02s; the RA8x disks are supported on the pregenerated kit.

Your PDP-11/34 has depreciated down to nothing and used computer shops get more for boat anchors than they do for your 11/34. Unload it somehow and go for the hot setup.

5. Start over. If you must stay in the UNIBUS family, go for a PDP-11/84 with at least 1 MB of memory, a DHU-11 terminal multiplexer, an RA60 or RA81 disk, a TS05 tape drive and RSX-11M-PLUS.

My choice would be a PDP-11/83, 2 MB of memory, a KDA-50 disk controller, RA60 disk, TSV05 tape and RSX-11M-PLUS. I'd interface that special UNIBUS gear with a Q-bus converter, available from several vendors.

I've chosen examples from a wide spectrum of options that are available to you in the PDP-11 family. I hope these help. Your 11/34 has served you well, but it's time to move on. ■

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## FROM THE LAB

Dave Mallery

# Random Colleague Terminal

The Colleague from Random Corporation of Cincinnati, Ohio, is a battery-powered, full-screen, portable VT220 emulating terminal with integral modem and dialing directory support software. It weighs 7.5 pounds and fits into my attache case (2 5/8 inches x 13 inches x 10 inches). The built-in battery will run the terminal for about 10 hours and give fair warning of the impending blackout at the end.

Physically, it's housed in an attractive black plastic case. Although LCD screens are never great, this one's quite good. A key on the keyboard changes the contrast to suit.

There are a few really fine features. First, it's a full screen; no scrolling up and down. The keyboard has a crisp feel; no rattling or iffyness. Keyboards are often the bane of portable terminals. This is one of the best ones I've seen.

The terminal has a local RS232 connector and has no problem running locally at speeds up to 9600 baud, although it's a little touchy on multiple hundred foot runs. That means that I can use it in the office as well as on the road. (As I write this, it's sitting at my right hand, acting as the console of my lab MICROVAX.)

The biggest drawback is that there aren't enough keys. Because there's no numeric keypad, your EDT is limited. If you stay in VT100 emulation, you get PF1 through PF4. If you switch to VT200 emulation, the F1 through F8 keys are changed so that they emulate the editing keypad (the one above the arrows: help, do, find, insert here, remove, select, prev

screen, next screen). Goodbye PF1 through PF4.

I'm told that this problem has been removed in the current edition of the product by the addition of a separate external keypad. Lacking that, you can reprogram F8 through F16 to perform some of the EDT keypad functions.

Another recently announced (but not reviewed) feature is off/line file creation/editing with a capacity of 60 KB. The ram disk also can be used to capture incoming documents for later review. (See "External Keypad For Laptop Terminals," December 1987, p. 215.) The Colleague Plus has this feature built in and lists for \$1,295.

The Dialing Menu has a rich repertoire of commands, including the usual delays, the ability to control pulse tone, dial tone waits, etc. The logon sequence allows testing for the next character(s) to verify that you received the right prompt. The directory has a capacity of

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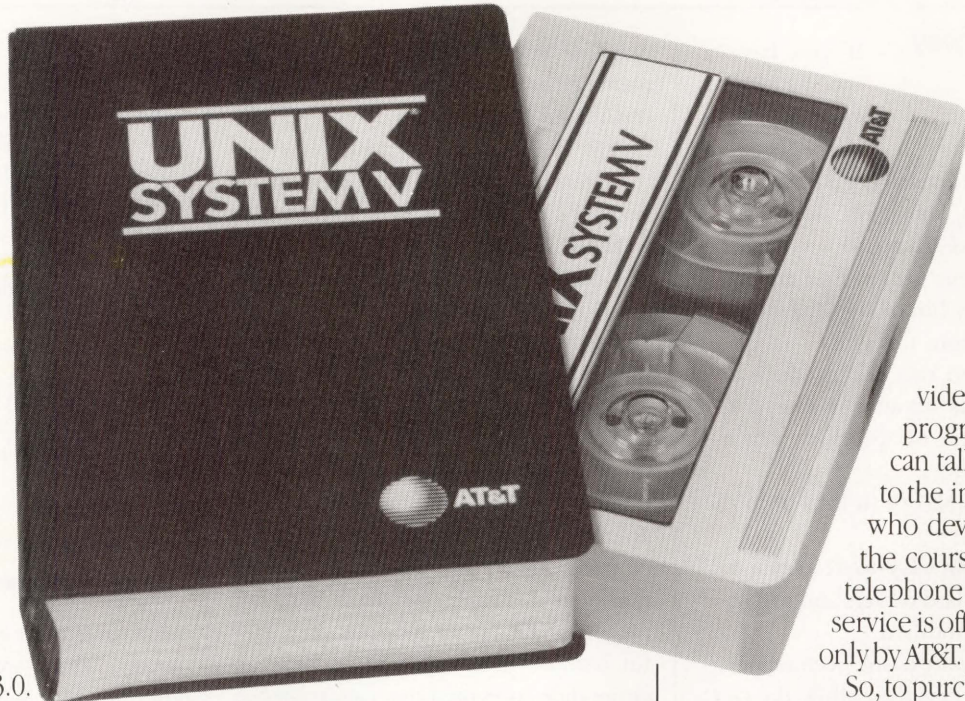
20 destinations, each with a three-deep menu-setting all-specific terminal, modem and logon characteristics for that connection.

Keep in mind that this terminal isn't meant to be a permanent fixture on your desk, but rather in your attache case. Our salesman who uses it loves it. He can call from a hotel room and read his mail and enter his call reports each evening. It's cheaper than the nearest laptop and has enough functions for the salesman. In fact, I had to pull rank on him to get it long enough to review it. ■



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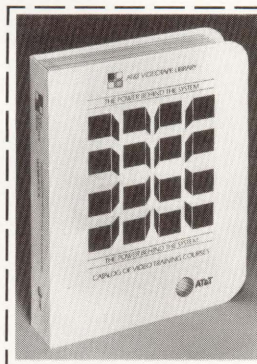
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## FROM THE LAB

John F. McGlinchey

# DataLock

If you have a specific need to encrypt data according to

the U.S. Government's Data Encryption Standard (DES), then you should take note of *DataLock*. *DataLock* was written by JPY Associates Ltd. in England, and is distributed by Interactive Technology Inc. of Beaverton, Oregon.

One reason that the product impressed me was because it passed my "primary rules of product professionalism" test:

1. It uses VMSINSTAL to load onto the system.
2. It includes an easy-to-read manual.
3. Digital standard drivers and software haven't been modified.
4. Digital software hasn't been rendered useless. In this case they allow the DEC ENCRYPT and DECRYPT commands to

work, if you have them available, by naming their versions ENCIPHER and DECIPHER.

5. VMS HELP files are included.

*DataLock* provides three methods of encryption. The first is a straightforward DCL interface that lets you encrypt and decrypt files with the same ease as a DCL copy command. The second enables you to encrypt an entire set of files on a disk in a "Virtual Volume." This is a single disk file that's manipulated by the VVDRIVER that comes with the product. You can mount and dismount the file as if it were a disk volume. When mounted, the encryption is invisible to the user. When dismounted it can't be read without *DataLock*. This feature can be very useful because it allows you to have an entire disk encrypted that uses someone else's third-party software that has a

### DataLock

Interactive Technology Inc.  
460 Park Plaza West  
10700 SW Beaverton Hillsdale Hwy.  
Beaverton, OR 97005  
(800) 362-6203  
(503) 644-0111 in OR  
Price: For a MICROVAX, \$2,995, for a VAX 8600, \$4,995.

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JPY Associates Ltd.  
138 High St.  
New Malden, Surrey KT3 4EP  
England  
(01) 949-1088

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need for greater security. You'll need to worry about who can mount this volume, but ACLs should be able to solve that. Another way is to put it on

## PROGRAM.

```

$ TYPE EXAMPLE.FOR
C      EXAMPLE.FOR : Example program to test CIPHER procedure.
      IMPLICIT NONE
      REAL*8      PTEXT(5000), CTEXT(5000), KEY, ICV, OCV
      INTEGER*4   CIPHER, STATUS, FUNCTION, IPMODE
      INTEGER*4   SHORT, LENGTH, CHAIN, I
      EXTERNAL   CFR$ ENCIPHER, CFR$ DECIPHER, CFR$ PAD
      EXTERNAL   CFR$ EXECUTE, CFR$ BLOCK, CFR$ CHAIN

      KEY =      '0123456789ABCDEF'X
      PTEXT(1) = '0123456789ABCDEF'X
      PTEXT(2) = 'DD7F121CA5015619'X
      PTEXT(3) = '2E865310AF3834EA'X
      PTEXT(4) = '48D388FF6CD81D4F'X
      PTEXT(5) = '8000000000000000'X
      PTEXT(6) = '4000000000000000'X
      PTEXT(7) = '2000000000000000'X
      PTEXT(8) = '1000000000000000'X

      ICV = 0
      CHAIN = %LOC(CFR$ BLOCK)
      SHORT = %LOC(CFR$ PAD)
      IPMODE = %LOC(CFR$ EXECUTE)
      LENGTH = 64

      STATUS = CIPHER (PTEXT(1), CTEXT(1), KEY, LENGTH, FUNCTION, ICV,
1      CHAIN, OCV, SHORT, IPMODE)
      IF (.NOT. STATUS) CALL LIB$SIGNAL(%VAL(STATUS))
      WRITE (5, 2000)
      FORMAT('/// Encrypt : ///' Key'T26'Plaintext'T46'Ciphertext'//)
      DO I = 1, 8
        WRITE (5, 1000) KEY, PTEXT(I), CTEXT(I)
      END DO
      FORMAT(X, 3220)
      CALL EXIT
      END

$ FORTRAN EXAMPLE
$ LINK EXAMPLE
$ RUN EXAMPLE

Encrypt :
Key          Plaintext          Ciphertext
123456789ABCDEF  123456789ABCDEF  56CC09E7CFDC4GEF
123456789ABCDEF  DD7F121CA5015619 BE52FF63A5B63254
123456789ABCDEF  2E865310AF3834EA  837016838A7AA95C
123456789ABCDEF  48D388FF6CD81D4F  81F9E06C9A0ED959
123456789ABCDEF  8000000000000000  CAE534C5231E79
123456789ABCDEF  4000000000000000  DC6C457361C7B5D9
123456789ABCDEF  2000000000000000  94C083B053F8BA52
123456789ABCDEF  1000000000000000  1068E3A888D2001C

```

DataLock example program.

“

... the product ...  
passed my "primary  
rules of product  
professionalism" test ...

”

a disk drive by itself and only let the user that needs it mount it. A removable drive can be used if you need that much security.

The third method of encryption is a callable interface that enables you to encrypt specific data items from any language that adheres to the VMS Callable Standard. If you've figured out how to use SYSS\$ calls, then this will be easy.

### Performance

The figures below show some performance data gathered on a MICROVAX II with 9 MB of memory and about 15 concurrent users.

The test file used was VMSINSTAL.COM from SYSS\$UPDATE.

VMS COPY		ENCIPHER/DECIPHER
1.5	CPU Seconds	12.3
100	Page Faults	128
25	I/O	43

These figures are averages based on 10 runs of both VMS COPY and EN-CIPHER or DECIPHER.

The manual gives you an example in FORTRAN that's easily understood. It would have been nice for them to include the example in the software

distribution, but it's short, so retyping shouldn't be a problem.

The manual is handbook sized with glued binding. I would have preferred it ring bound so that I could lay it flat without breaking its back. The manual tells how to use the product and gives a brief discussion of the DES standard and the amount of time it would take to break it. They say that with a dedicated general-purpose computer it would take 1,145 years to crack the DES. Using a dedicated machine with some degree of parallelism you could get this down, but it would be expensive. In short, DES provides all the security that 99 percent of us need in this evolution of computing machinery.

This is a good product and should be given some inspection if you have security in mind. Pick up a copy on your way home tonight and give some thought to tightening up your system's security. ■

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## FROM THE LAB

Howell E. Dell

# KEA Systems' PowerStation-220

*PowerStation-220*, from Canada's KEA Systems Ltd., is more than an average terminal emulator. The *PowerStation-220* is a complete package that upgrades your PC, XT or AT system.

The package is made up of the PS200, an LK220-style keyboard that's a plug-compatible replacement for an AT or XT, and the ZSTEMpc-VT220 emulator, which is one of the most complete VT200 emulators on the market. It includes:

1. True 132-column mode supported with VGA and EGA "superset" video boards. However, some EGA boards can't do it alone. To solve this problem, KEA Systems designed a chip called the EGAmate that's inserted into the expansion port.

For systems without such hardware, the ZSTEMpc emulator supports a windowing feature to slide the screen over, giving you access to the rightmost columns.

2. Complete 8-bit environment support.
3. User defined function keys with pattern matching and loop construct capabilities.
4. National replacement character sets with full support of the National and Multinational mode.
5. Downline loadable fonts.
6. True double-high, double-wide characters on most CGA, EGA, MDA and VGA adapters.
7. VT200, VT100 and VT52 modes.
8. Tektronix 4014 graphics.

In addition, the emulator provides



*The PowerStation-220 is a complete package that upgrades your PC, XT or AT system.*

you with two standard file transfer utilities, KERMIT and XMODEM.

### Keyboard

The PS200 keyboard is identical to the VT200 in terms of the physical layout, spacing between keys, keypads and function keys. The keyboard has a PC feel rather than the soft feel of the DEC LK200. KEA Systems has made an important improvement over the DEC version: The keyboard is wider, providing a space for a comfortable hand rest.

### Installation

Installing the ZSTEMpc-VT220 emulator was simple and straightforward. I created a subdirectory, called \ZSTEM, on the DEC PROFESSIONAL Testing Center's WYSE-286 PC. I used the COPY command to copy all the files from the

"A" floppy drive into the subdirectory I created. Next, I unplugged the WYSE keyboard and put it aside. I set the switch on the underside of the PS220 keyboard for AT compatibility, and connected the PS220. I pressed <RETURN> and received an immediate response: "C:\ZSTEM>".

I called up various PC programs, such as *Lotus*, *Multiplex* and *Mobius*, and in each case, the software perceived the keyboard to be an enhanced AT.

After checking out the keyboard in IBM mode, I started the emulator by typing the command:

```
C:\ZSTEM>{ zstem220
```

The ZSTEM logo appeared and,

KEA Systems Ltd.  
2150 West Broadway, Ste. 412  
Vancouver, BC V6K 4L9  
(604) 732-7411

PowerStation 220, including keyboard,  
ZSTEMpc-VT200 Emulation Software  
and User's Manual: \$289  
ZSTEMpc-VT200 Emulator: \$150  
EGamate option: \$39  
ZSTEMpc-4014 option: \$99  
ZSTEMpc-VT100 Emulator: \$99.  
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using ALT-Z, I entered command mode. With this, a whole world of options appeared. The user's manual completely describes each option, but fortunately, KEA Systems had the foresight to pre-configure the emulator.

Exiting the menu and pressing return yielded the message USERNAME:, and I knew I was only a short step away from the VAX. Entering my username and password brought up the familiar "\$".

I then subjected the ZSTEMpc to my favorite emulator breaker test, the VMS MONITOR utility. This simple terminal testing utility uses some of the VT200 features including the line drawing character set, alternate character set, cursor positioning, etc. Using the SET TERMINAL command, I tested both VT200 and VT100 modes.

After passing the screen test, I put EVE to test on the PS220 keyboard. It was amazing: cut, paste, delete, next screen, etc.

Everything worked.

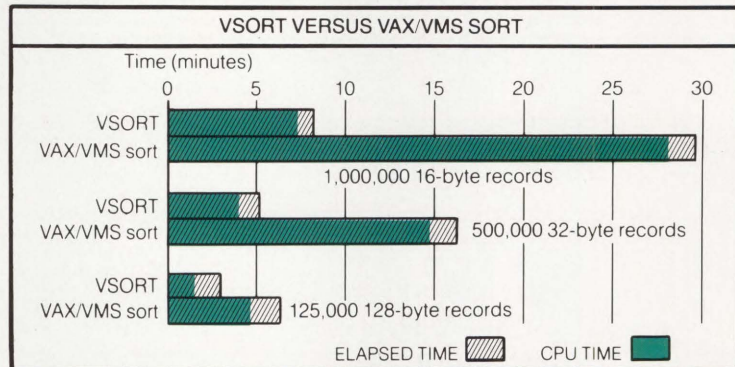
If you own an IBM PC and are looking for good DEC emulation, don't overlook the *PowerStation-220*. It's a complete communication package at a reasonable price.

*Editor's note: Since the time of this writing, KEA Systems has announced the ZSTEMpc-VT240 and PowerStation 240 for connecting XT's, AT's, PS/2's and compatibles to VAX's and PDP-11's.*

# VSORT AND VSELECT

## The fastest way to sort and extract records on a VAX.

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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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- *TAM* an efficient screen formatter for transaction processing applications. (Also available for RSX-11M.)
- *DIALUP* a data communications package that links RSTS/E and VAX/VMS systems to remote computers.
- *BSC/DV* a device driver for DEC's DV11.

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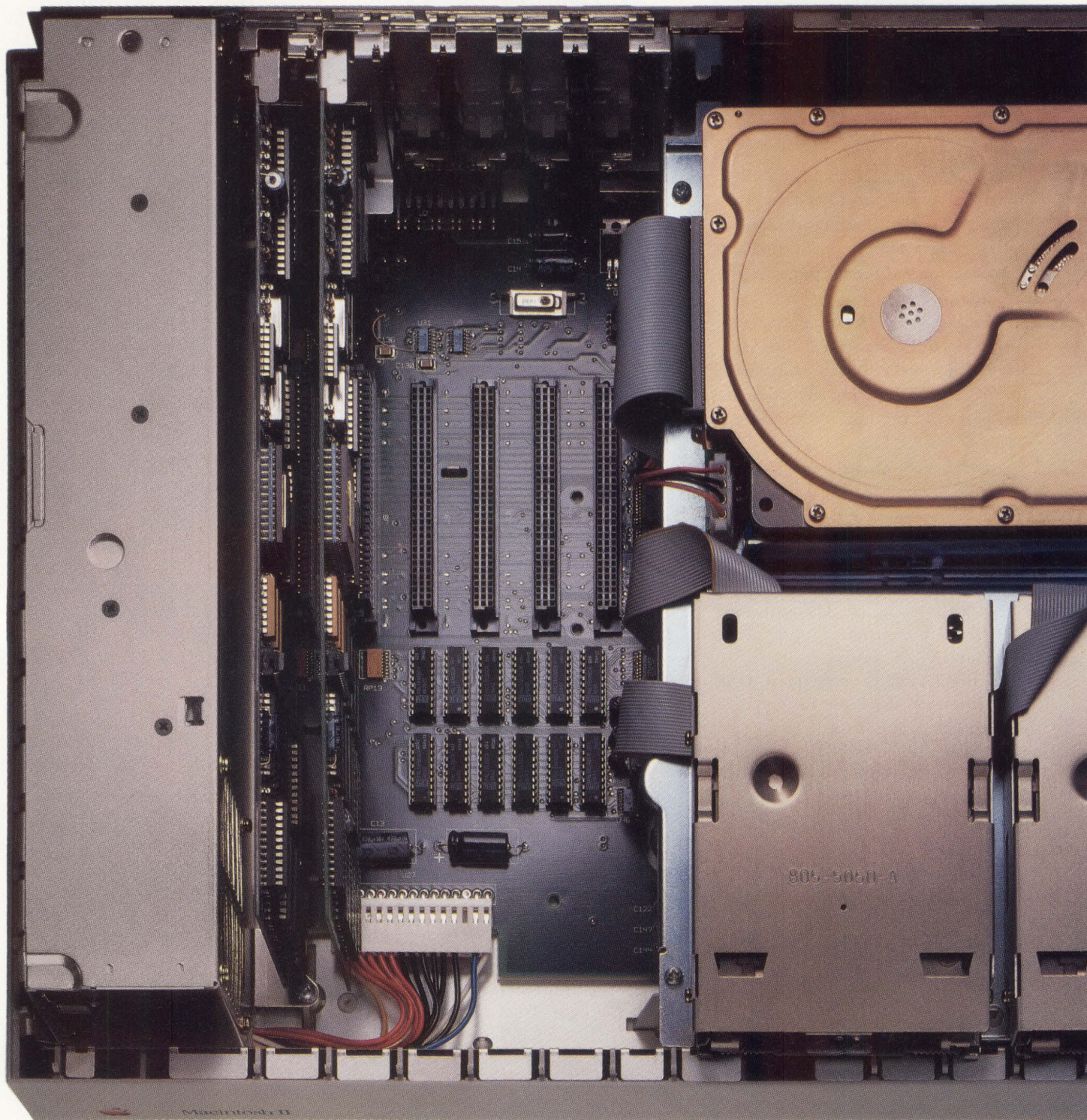
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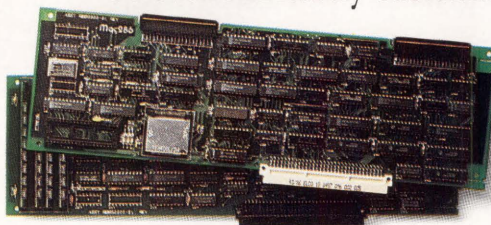
And because its slots are NuBus technology, they not only move information much faster—they have the good manners to “configure” themselves.

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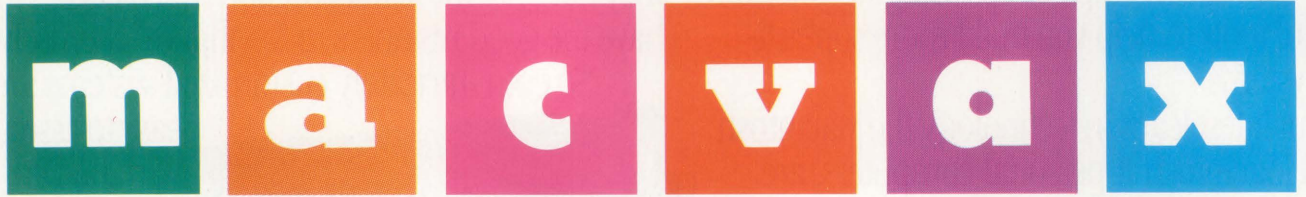
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# DEXPO's Apple-DEC Computing Center

So Many Products, So Little Time.

BY AL CINI

YOU MIGHT EXPECT an off-season DEXPO, one without an accompanying DECUS Symposium, to be an interesting but relatively quiet place, presenting a largely predictable assortment of DEC-related show booths to browse through. At the February DEXPO East 88, however, one of the world's largest makers of computer products will be on hand in a big way with quite a few surprises.

No, I'm not talking about DEC or IBM. I'm talking about Apple Computer Inc. In total, Apple and friends will be occupying more than a quarter of the floor space, drawing the lion's share of buyer and media attention to its large and growing array of Macintosh/DEC connectivity products and services. John Sculley, Ap-

ple's CEO and, some say, corporate savior, will be this MACSPO's, er, I mean DEXPO's, keynote speaker, and believe me, he isn't there to announce VMS V5. He'll be there to talk about open systems, multivendor networks, and other things that will curl your hair and open your eyes.

If you're planning to attend, you should spend a little time beforehand assembling your shopping list. The show will offer a lot to look at and understand, and some advance planning on your part will help you bring what you need into focus. And, if the early publicity this special DEXPO has been receiving is any indication, you certainly won't be alone. You can expect some of the key vendors' booths to be surrounded by the kind of

crowds you'd find at a one-day-only Macy's sale. So, be prepared and bring your PRO-350 or VAXMATE along to stand on and get a better view.

## ATTITUDE ADJUSTMENTS

LET'S START WITH some warm-up exercises. Of the many networking products you'll find on display, almost none will be of Apple or Digital manufacture. In fact, most will be offered by an assortment of small third-party companies. Your first exercise then, is to look in a mirror and repeat 10 times, "I can make it happen for myself!" Armed with a little courage, you can begin at DEXPO to learn how to build a reliable and manageable Macintosh/VAX computer network

## Companies Mentioned

Alisa Systems Inc.  
1221 E. Walnut Ave., Ste. 230  
Pasadena, CA 91101  
(818) 792-9474  
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Apple Computer Inc.  
20525 Mariani Ave.  
Cupertino, CA 95014  
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Dove Computer  
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Odesta Corporation  
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Northbrook, IL 60062  
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Oracle Corporation  
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Belmont, CA 94002  
(415) 598-8000  
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Pacer Software Inc.  
7911 Herschel Ave., Ste. 402  
La Jolla, CA 92037  
(619) 454-0565  
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Technology Concepts Inc.  
40 Tall Pine Dr.  
Sudbury, MA 01776  
(617) 443-7311  
**ENTER 454 ON READER CARD**

Telos Software Products  
3420 Ocean Park Blvd.  
Santa Monica, CA 94050  
(213) 450-2424  
**ENTER 455 ON READER CARD**

White Pine Software Inc.  
94 Route 101A, Box 1108  
Amherst, NH 03031  
(603) 886-9050  
**ENTER 457 ON READER CARD**

with a variety of complementary products from several small sources. You really don't need to lean on a monolithic single large vendor to take care of all this for you. Remember your last experiences with a single large vendor? It put one hand on your shoulder, promised you all kinds of wonderful single-vendor things "coming down the pike" in some far-off Q1 or Q2, and generally made you so comfortable you couldn't feel the other hand wandering hungrily through your pockets. You should have learned this when you dumped your IBM system for your DEC gear. Don't let anyone do it to you again.

There will be plenty of "here and now" networking products for you to see at DEXPO's Apple-DEC Computing Center, many of them already more than a year old and some already installed at hundreds of sites. (Many

of these have been reviewed in our MAC/VAX section which began in August.) If you have a big enough shopping bag, you can take some of it home and build a surprisingly powerful network in just a few hours. Much of what you'll see, though, will be very new alpha and beta test material. Which brings you to the second warm-up exercise. While you're staring at your newly emboldened self in the mirror, give yourself a little reality pinch. Then, when you see something you really like at DEXPO, repeat this exercise before you place an order. Even better than a pinch, get references, and ask for evaluation units or licenses. That dream product might still be just a dream.

Next, you'll be surprised to find that most of the products can be mixed and matched in many creative ways, allowing you to tailor a unique

network around your particular functions and wiring constraints. Be aware that in some cases, these products actually preclude each other! Be sure to ask the vendors about this before you mix their products in your network. Sadly, the kind of standardization we take for granted at home in our sliced bread: No matter who bakes it, its all cut to fit in anybody's toaster. In the computing business, this is a major miracle. In the Apple Connectivity Center, the products based on the ISO's Open Systems Interconnect standard will play best together (both Apple and Digital have firmly stated their support for these standards). Be prepared to question vendors on their commitment to these standards, because adopting products from non-compliant vendors will lock you into their products and severely restrict your future networking options. So, for your third mental exercise, whenever you think some product is the best thing since sliced bread, remember that the really big deal is the cut of the slice and not the taste of the bread.

## WHAT TO LOOK FOR

START IN THE center of the ExpoCenter, at the Apple booth. There, you'll find plenty of general information about Macintosh/VAX connectivity. You'll also find Apple's own connectivity products, such as its EtherTalk card for the Macintosh II. There will be a Connectivity Center-wide Ethernet, interconnecting almost all of the DEXPO booths on a common network, and the general wiring diagram you'll find at the Apple booth might give you some useful networking ideas. While you're there, check out Apple's intriguing AppleFAX modem.

If you're interested in DECNET on your Macintosh, consider *TSSNET* software at Alisa Systems' booth. This software-only product allows your Mac to behave like a DECNET Phase IV end-node, over either an asyn-

chronous or direct Ethernet connection. Technology Concepts Inc. also will be demonstrating its Macintosh/DECNET product, *CommUnity-Mac*, which implements DECNET on a Macintosh by combining TCI-proprietary software with a SCSI-to-Ethernet communications box from Dove Computer. There will be some important differences between these products, but both will offer DECNET-style remote file access, electronic mail and remote terminal services.

While you're visiting Alisa, take a look at its *AlisaTalk* software. This product provides VAX-based remote terminal, file server and printer spooler services, neatly integrated into your Macintosh's familiar and friendly interface — all by implementing AppleTalk protocols under VAX/VMS. Then, drop by Pacer Software's booth and take a look at its *PacerShare* file

server software. With *PacerShare*, your VAX shows up in a Macintosh user's Chooser, just like Apple's AppleShare server. In fact, all you'll see in your Chooser are AppleShare server icons, and you won't be able to tell which is the VAX! While you're there, take a look at the nifty soft key feature in its *PCLINK* VT220 terminal emulator. With it, you can invoke whole host procedures with a single mouse click. And, by showtime the VT240 graphics terminal emulator version of *PCLINK* should be available for demonstration.

Speaking of terminal emulators, be sure to visit White Pine's booth. Its Mac240 terminal emulator has been providing Mac-based ReGIS graphics terminal support for more than a year now, and a lot of planned enhancements should be ready by DEXPO. While you're there, ask about the *VmacS* file transfer and Reggie

MacDraw-to-ReGIS conversion software. Engineering users looking for Tektronix terminal emulation will find it in PCS' *VersaTerm PRO* software. If you haven't checked into it lately, this product is worth more than a second look, especially on a Macintosh II's color monitor.

## NETWORKED APPLICATIONS

BEYOND THE NORMAL enhancements to existing products, you'll find several new Mac/VAX software offerings at DEXPO. Telos will be showing its *MacNOW* product, which front-ends *ALL-IN-1*'s complicated menus with a simple Mac-style desktop. And look for what may be the hottest software to come from Italy since *Donkey Kong*. List's *Makeasy* (not yet available in the U.S.) provides a similar Mac-style interface to VAX/VMS in general, replacing DCL with icons.

Ask around for mail bridges. As the the X.400 E-Mail protocol standard stabilizes, you'll begin to find VAX-based bridge processes that can convert and route mail messages between, say, a Mac running InBox or Intermail and a VAX running DECmail.

The first networked database product to fuse a Macintosh and a VAX in a true client-server relationship, *Helix VMX* from Odesta, should ship this month. Be sure to spend some time at Odesta's booth. And by February, a number of other vendors should be announcing or demonstrating Mac front ends to more conventional VAX/VMS databases, such as *Oracle*.

Don't let the variety of competing alternatives at DEXPO scare you. This competition is working constantly in your favor by expanding, improving and lowering the prices of the products. Besides, if you've successfully managed to get into New York and through town to the New York City Pier Expocenter, nothing at DEXPO can harm you. ■

File Edit Baud Settings Phone Emulation Commands

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New Plot Form Range Window Grid Order Title Subt Labels Heading Axis Name Quit

Display the graph

	Homers	Mens	Children	Children	Cats	Dogs
Nikes	23	15	16.2	16.2	21	13
Reebok's	17.2	17	9.35	9.35	15.2	15
Dr. Brooks	12.5	23	13	9	10.5	21
Pro-Keds	24	25	13.5	13	22	23
Converse	19	33	21	21	18	31
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LEGEND

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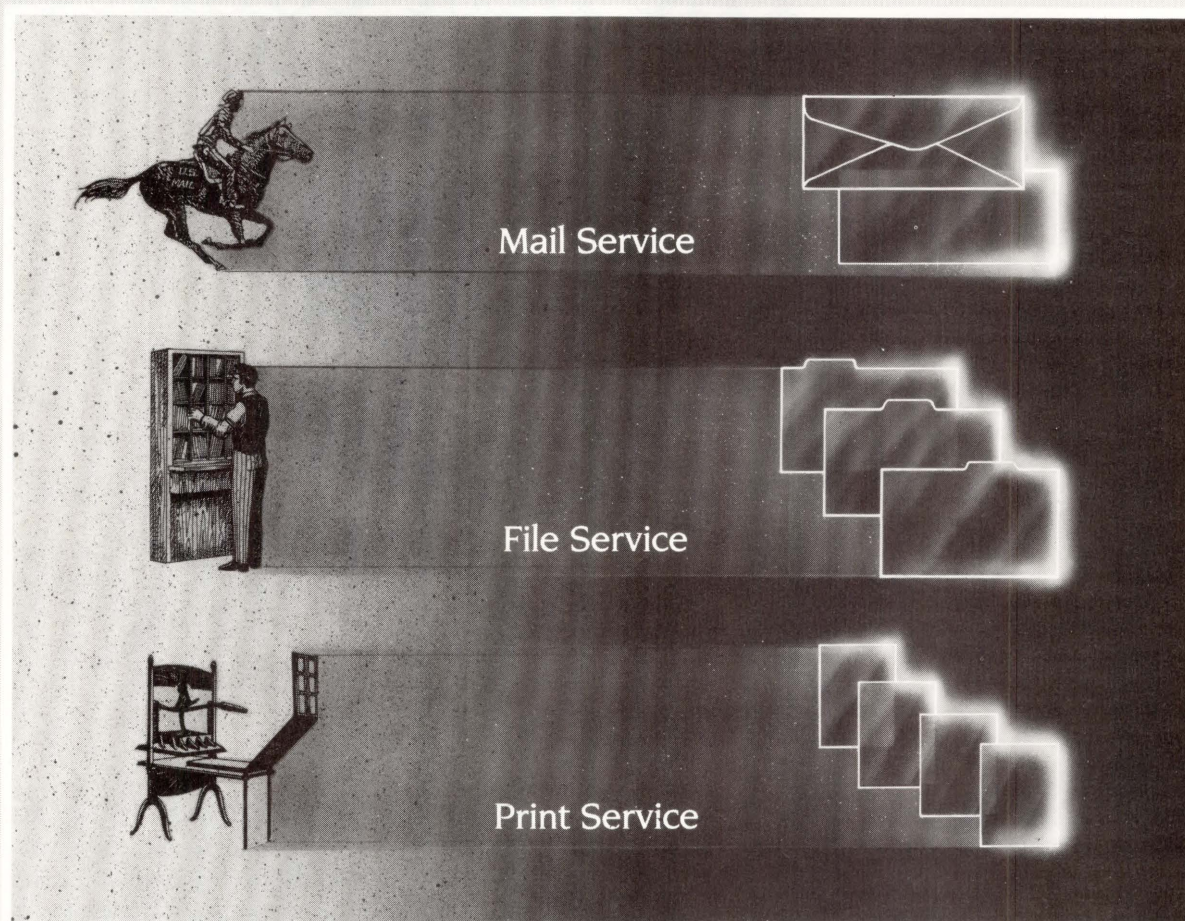
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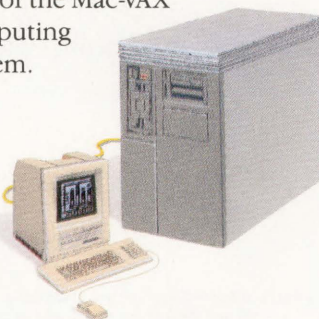
For the SCSI-based Macintosh, including the Macintosh Plus, you can have direct access to Ethernet through the SCSI device chain. Just add on the Kinetics EtherSC, our outboard Ethernet controller.

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toshes on AppleTalk Personal Network cabling, the Kinetics FastPath AppleTalk-Ethernet gateway connects the two networks. The FastPath acts as a bridge between networks, providing full support for AppleTalk zones.

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Ethernet is the network of choice in the DEC world. And the Macintosh fits naturally into the DEC world with Kinetics products for the Apple-DEC connection. Your Macintosh on an AppleTalk network, or connected directly to Ethernet, now becomes a vital part of the Mac-VAX computing system.



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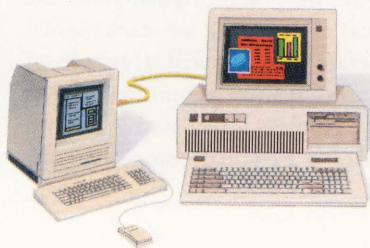


Or simply use TCP/IP on the Macintosh.

Kinetics and our third-party partners offer seamless software built on AppleTalk or TCP/IP to bring the UNIX and Macintosh worlds together. AppleTalk development tools are also available from Kinetics for UNIX programmers who wish to develop custom UNIX-Macintosh solutions. In addition, UNIX system vendors offer special UNIX-Macintosh packages.

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And of course the well-connected Macintosh cannot ignore the IBM PC and compatibles. Whether the PC is on an AppleTalk Personal



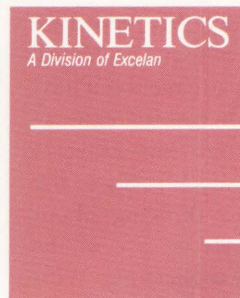
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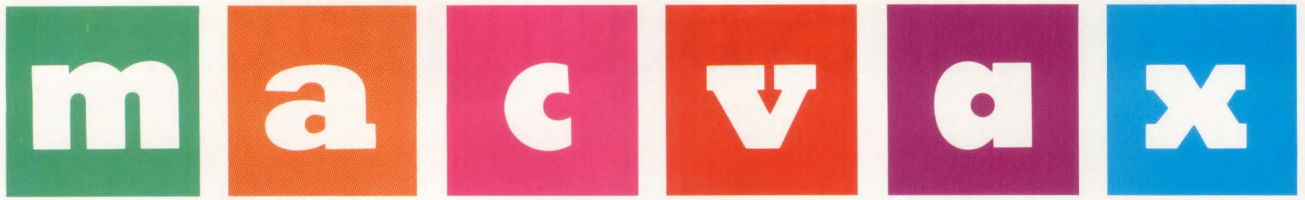
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# Confessions Of A Macintosh Addict

Macs are more fun to work with than the average personal computer.

BY BILL HANCOCK

I'M A MACINTOSH bigot. I admit it. I've tried to fight the urge, but the truth is that I'd rather work on a Mac than any other computer. My addiction sometimes results in social problems. No one wants to talk to me about how well *Excel* from Microsoft Corporation works or about how Ethernet from my VAXs connects easily to my Mac. Forget even thinking about mentioning the ease of use of the mouse, WYSIWYG applications, window/mouse-oriented debugging in C or FORTRAN, or anything else that the Mac can do nicely. No, everyone wants to talk about his plain IBM PC or clone, *Lotus 1-2-3*, or the new version of Microsoft *Word* for the PC.

I feel the odd man out. Then again, I felt that way in the late '60s and early '70s when I was messing with stuff like PDP-8s, PDP-11s, DEC-10/20s and all those other non-IBM systems that wouldn't last long.

I was told then that DEC wasn't going to amount to much and that my career would best be spent pursuing the dreaded blue machine.

Anyway, when I was sitting down to write this article on hardware and networking with Macintosh systems, I had to think about why I feel the way I do about the Mac. Well, Macs are more fun to work with than the average personal computer, and they make more sense to me than other systems in their class.

## NETWORK NATURAL

MACS CAN BE networked in a variety of ways. Several interesting hardware solutions allow them to talk to each other over twisted-pair networks, Ethernet, and soon, token rings. In short, whatever your favorite networking medium, there is a hardware and software interface for you and your Macintosh. With all the recent

attention it's been getting, it might seem that Macintosh networks are a new idea, but despite its popular "closed architecture" reputation, the Macintosh actually was developed with networking in mind.

Almost from the beginning, Macs could share resources through Apple's AppleTalk network architecture. AppleTalk uses the printer port on the back of the Macintosh as an interface to a simple and inexpensive twisted-pair network cable that allows a variety of client PC and server devices (Macs, laser printers, etc.) to be connected. Imagine networking for the mere \$50 price of a plug! Nothing else to buy. Networking hardware and software were built originally into the chassis and ROMs of each node! AppleTalk also allowed a couple of Mac users to share a common printer. Today, AppleTalk has evolved into a full-blown personal computer con-



nectivity framework that theoretically can offer millions of workstation users, on either Macs or IBM PCs, access to networked peripherals, mass storage servers and even VAX systems.

Before such a "Global Macintosh" network village could be built, some early limitations had to be overcome. Apple's conventional twisted-pair AppleTalk, for instance, limits a connected community to 32 devices or less. And, software-wise, network users want to share more than printers. Big networks need more speed, flexibility and power than the early Macintosh and AppleTalk products could deliver.

Almost immediately after Apple announced AppleTalk, Hayes announced its Interbridge that allows multiple AppleTalk networks to be connected in a manner similar to the way that a LANBridge 100 connects Ethernet segments. For the low cost of a bridge or two, AppleTalk services could be provided to a building full of Mac users.

In recent years, new Macintosh systems (the Macintosh Plus, the Mac SE and the Mac II) offered increased power, some new connection ports and even a peripheral bus. The previously closed Mac had been opened, and the world was invited in. This, along with the Ethernet-like, layered nature of AppleTalk's protocols, inspired Apple and several enterprising third parties to build a variety of AppleTalk/Ethernet interfaces.

Why all the excitement over Ethernet? Speed! An Ethernet can provide a raw connection speed of 10 MB per second (individual node speed is slower because of controller and system overhead). By comparison, twisted-pair AppleTalk signals at only 230.4 KB per second. Perhaps just as important as transfer speed, a transparent Macintosh/AppleTalk interface to Ethernet also means seamless integration with present and future

Ethernet developments, such as fiber Ethernets and other upcoming Ethernet-compatible technologies that will supply the Macintosh with the network hardware speed and durability that network users and managers require.

Recognizing both the strategic and commercial importance of this technology, Apple offers its own Ethernet product, the Ethertalk interface card for the Macintosh II. From the AppleTalk user's viewpoint, Macintosh systems and peripherals "see" each other over Ethernet the same as they see each other over a twisted-pair network, only faster. Similarly, the IBM PC-heavy Novell recently announced support for the Mac through a product called Netware-Ethernet. Through the use of the product and an Ethernet adapter card, Mac users can connect to Novell file servers and share files with IBM PCs and PSs. A side offering also allows the Mac systems to access X.25 resources and SNA resources through the server and specialized connection hardware. Kinetics, Dove Computer and 3Com offer direct Macintosh-to-Ethernet connections as well, some working through the Mac SE's expansion port and others through any Mac's SCSI port.

Inexpensive twisted-pair AppleTalk workgroups even can be married over a common Ethernet backbone using Kinetics' *FastPath* gateway product. This 68008-based box allows the devices on an AppleTalk network to send packets of information onto an Ethernet network, where directly connected Macintosh systems or other *FastPath* boxes can "see" the messages as if they were standard Ethernet packets. Physically, the *FastPath* box presents two simple connections: one to the AppleTalk network and the other to a conventional Ethernet transceiver.

Once connected, the box's

operating software is downloaded from a Mac host on the AppleTalk side of the network and the AppleTalk-Ethernet "internet" is ready to go. Kinetics-supplied software includes bridge handling for both TCP/IP and AppleTalk client packets. Apple's own MIS organization uses *FastPath* to connect more than 3,000 Macintoshes used in the various buildings that house its sales, marketing, engineering and other departments.

## SOFTWARE SOLUTIONS

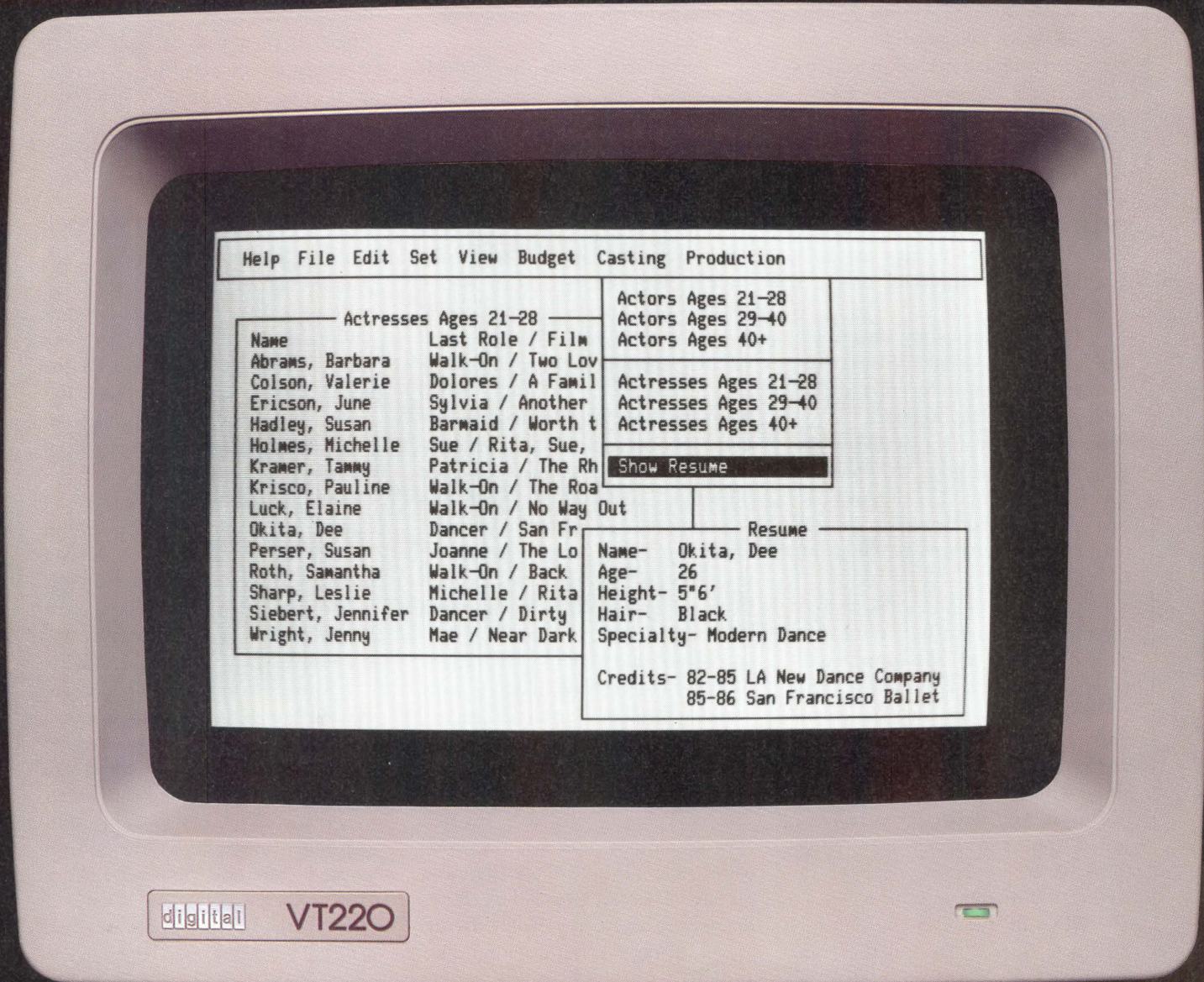
THE REAL KEY to networking is application software. This was true even in the early days of AppleTalk network devices. From the outside, Apple's LaserWriters look like printers. On the inside, they're dedicated-application computer systems like Motorola 68000 CPUs with a couple of megabytes of memory, and ROM code galore. Macintosh users were able to share the expense of the hardware because these systems had all the resource sharing network software they needed built in. Because it looked like one, most people thought of the AppleTalk cable as a simple hardware peripheral wire.

Software companies, though, saw the cable's potential as a network bus, and began writing Macintosh server code to take advantage of it. Electronic mail (InBox, Intermail), networked file transfer (TOPS, 3Com) and distributed application servers (networked versions of Helix from Odesta Corporation, and Omnis 3 Plus from Blythe Software Inc. database products) soon began to appear along with shared printers on our Chooser windows and menu bars (For more on Chooser, see "The Invisible VAX" by Al Cini, November 1987).

At this point, a couple of companies started to develop AppleTalk cards for the IBM PC. Why? To get at the LaserWriters, share files, and provide some level of connectivity. Some of these connection packages, such as

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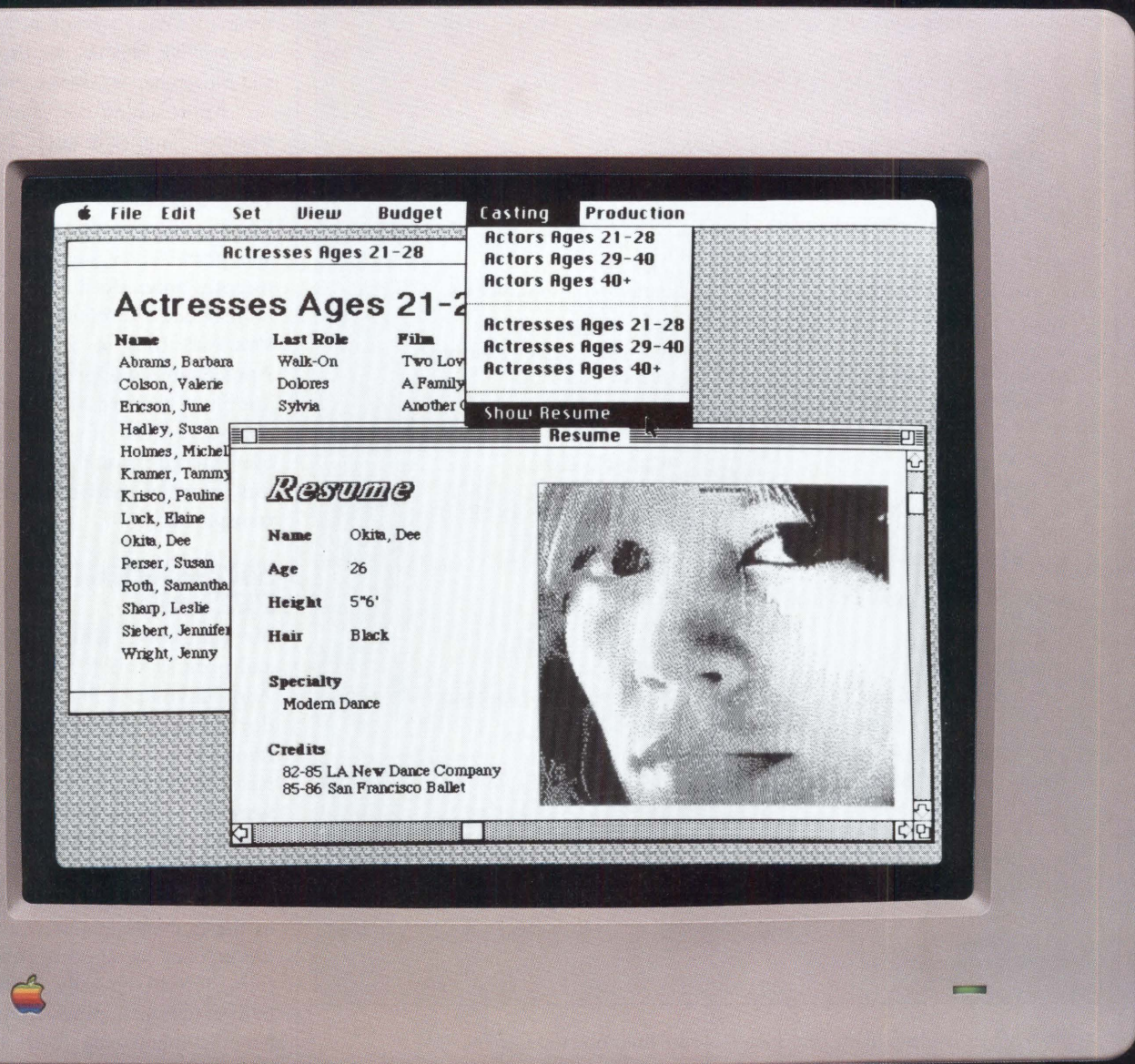
*"...a breakthrough software technology that exemplifies Digital's concept of what PC integration should mean."*

Richard Smith  
Business Development Manager, MicroVAX Systems  
Digital Equipment Corporation

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HELIX VMX

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that lets you rapidly develop VAX-based software. These applications can be used from either Macintoshes or VT terminals.

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## Companies Mentioned

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Pasadena, CA 91101  
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Apple Computer Inc.  
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TOPS from TOPS Inc. (formerly Centram), proved to be successful and let Macs and less capable PCs coexist on the same network in a relatively useful manner. Again, recognizing an important strategic market foothold, Apple has introduced its own MS-DOS AppleTalk hardware and software products. If products as far apart as the Mac and the IBM PC could AppleTalk to each other, why couldn't a VAX join

in the conversation?

Once Macintosh-to-Ethernet hardware opened the door, software companies such as Alisa Systems were quick to jump in. Working closely with Apple, Alisa developed a VAX/VMS package called *AlisaTalk* which provides AppleTalk protocol support on a VAX system. Its *AppleTalk for VMS* subroutine library allows VMS processes to exchange messages with

nodes on an AppleTalk network. Built on this platform, The *AlisaTalk* product delivers true virtual disk, interactive terminal and print spooler services from the VAX, to users on networked Macintosh systems. (For a review of *AlisaTalk* and a description of *AppleTalk for VMS*, see the October and November 1987 issues, respectively.)

Approaching the same problem from a different direction, Pacer Software's *PCLINK* product similarly provides Macintosh users with VAX-based interactive terminal, virtual file, and print server support. In fact, a recently announced enhancement to its product, *PacerShare*, can serve up VAX/VMS files to a Macintosh or AppleShare-equipped IBM PC user just like a standard Mac-based AppleShare server can. If you like the Mac's user interface, you'll really appreciate this kind of networking software transparency.

## NETWORKING FUTURES

BUT WHAT NEXT? What lies beyond file and print servers for Mac networks? A lot has to do with the fact that vendor independent interconnectivity of resources is fast becoming *the* deciding factor in the kind of computing hardware companies will buy. Packages that adhere to the International Standards Organization's (ISO) Open System Interconnect (OSI) model, such as the ISDN basic service connector, are starting to appear. Along these lines, it will be only a short time before network product developers provide token ring (IEEE 802.5) and other open systems connections for the Macintosh. As an OSI-compliant family of protocols, AppleTalk naturally will drop right in.

In an OSI-connected world, VAX and other large systems can supply electronic mail, data format conversion, database, and other true distributed application services to personal computer users, as well as the

familiar file and print services. Embryonic forms of such products already are beginning to appear between the VAX and the Macintosh.

Where are Macs going? Part of the answer can only be addressed by Apple and "they ain't talkin'." Based on my experience with Apple's tradition of doing unorthodox things, however, I can make a few educated guesses. One possibility that's been talked about lately is the laptop Mac. What does this have to do with networks? Everything. To realize its full potential, an organization's network must be tapped by the portable systems that will become increasingly popular over the next few years. In Apple's case, it's no secret that there has been some consideration of the Xerox Dynabook technology. Dynabook, developed by Alan Kay at the Xerox Palo Alto Research Center

(PARC), demonstrated the usefulness of small, powerful computer systems that were about the size of a standard 8½ x 11-inch book. Considering that Apple is projecting 100-mip desktop systems in the '90s (the Mac II is about 2.5 mips, comparable to a MICROVAX 3000 system), and guessing that they probably are waiting for favorable market and component conditions to introduce their own line of portable systems, the need to provide Mac connectivity for mobile Macs becomes an important issue. With ISDN, this can be handled because of the modular connector standard as well as the connectivity capabilities inherent in the ISDN. Connection points, however, are not everything. The chips necessary to provide Ethernet or ISDN connectivity are expensive and large, although they are shrinking in size and cost. Application-specific integrated

circuits (ASIC) technologies are starting to appear that will drop the cost of network hardware components dramatically. 3Com, one of the companies involved in ASIC, expects that ASIC will cause its pricing for certain Ethernet cards to drop as much as 40 percent because of lower cost components. This most certainly will have an effect on future Mac network hardware support and capabilities.

Say "network" and people think cables and interfaces: hardware. Happily, everything you need to connect a Macintosh to a VAX is available today, and there's a variety of more flexible media soon to follow.

But, remember, hardware isn't all; software still is needed to complete the network connection between DEC systems and Mac systems.

And that, of course, is probably the hardest part. ■

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## Raw FORTRAN, COBOL Data Turned Into Information

CompuServe Data Technologies has released Reporter/1022, a software package for obtaining information from COBOL and FORTRAN file management systems running on DECsystem mainframes.

Without extensive training, end users can query their data files and generate custom reports with full control over detail, complexity, and format. Access to ISAM, SIX-BIT and ASCII files is "as is." Users don't need to convert files, just define what the data looks like.

Reporter/1022 delivers all the power of System 1022's proven 4GL that's running one-third of all DECsystems.

Reporter/1022 allows one or two concurrent users, appropriate for reporting needs.

Prices start at \$16,000.

Find out more by contacting CompuServe Data Technologies, 1000 Massachusetts Ave., Cambridge, MA 02138; (617) 661-9440. Stop by Booth No. 736.

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## Access Device Driver Supports Talaris 20/20

Access Technology Inc. has developed a new device driver that permits users to print spreadsheets, graphics and reports on the Talaris family of QUIC-based laser printers. Users can select various printing options from within the 20/20 print menu, including 80- or 132-column spreadsheets, landscape or portrait orientation and bold printing.

The new device driver is included in Release 2.2, currently available for VAX/VMS. 20/20 combines an integrated spreadsheet with graphics, database management and project modeling facilities. The Talaris family of QUIC-based laser printers is designed for multiuser installations requiring large volumes of high-quality text and graphics output.

Additional information is available from Talaris Systems Inc., 6059 Cornerstone Court West, P.O. Box 261580, San Diego, CA 92126; (619) 587-0787. Visit Booth No. 434.

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## Cortex Automates Application Development

Through a process called Picture Programming, Cortex Corporation's newest CASE product, CorVision, automates the software life cycle from design and specification through application generation and maintenance. The company's first product, Application Factory, automates the software life cycle from specification through programming and maintenance.

CorVision automates design and specification, programming, testing, implementation and maintenance by linking design diagramming tools on an IBM PC/AT with an application generator on a VAX.

Like CorVision, Application Factory manages and stores application specifications in a central repository. Both support all DEC/VMS-compatible 3GLs. Developers also can write specialized routines in a 3GL and incorporate them into a generated application.

Find out more by contacting Cortex Corp., 138 Technology Dr., Waltham, MA 02154; (617) 894-7000. Stop by Booth No. 626.

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## Simpact Announces Turnkey DDN Connection

Simpact Associates Inc. has announced a series of Defense Data Network (DDN) communication interfaces for DEC computers. The products provide full service interfaces that incorporate all layers of the DoD protocol architecture.

The CPI 9000 series is based on Simpact's X.25 interfaces that are certified for the DDN by the Defense Communications Agency. Consisting of a single or multiple port front-end processor and X.25 protocol software, the interfaces improve host efficiency by offloading interrupt-intensive network communication tasks from the host.

The CPI 9000 products support VAXBI, Q-bus and UNIBUS computers under VMS and ULTRIX.

Depending on the bus selected, prices range from \$4,500 to \$8,900 for ULTRIX and \$9,000 to \$45,250 for VMS.

Find out more by contacting Simpact Associates Inc., 9210 Sky Park Ct., San Diego, CA 92123; (619) 565-1865. Visit Booth No. 131.

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## Diskeeper Defragmenter For MicroVAX 3000s

Executive Software Inc. announces Diskeeper, the online disk defragmenter for the MicroVAX 3000 series. Diskeeper keeps larger disks from becoming fragmented and impacting the processing capabilities of Digital's newest VAX systems. Diskeeper will manage these larger disks and allow data to be read at maximum speed while also grouping free space at the front of the disk for efficient and contiguous creation of new files.

With the ability to run Diskeeper online as a detached process while users are accessing the system, Diskeeper keeps these larger disks running at peak performance without interrupting the users. Overhead for most systems is only a few minutes of CPU time per day.

Diskeeper is priced at \$375 for the VAXstation 2000, \$750 for the MicroVAX, \$1,500 for the VAX 7xx series, \$2,000 for the VAX 3xx series and \$2,500 for the 8xx series.

For further information, contact Executive Software Inc., 3131 Foothill Blvd., Ste. F, La Crescenta, CA 91214-2699; (800) 346-4707 or (818) 249-4707 in CA, Telex: (910) 240-9222. Stop by Booth No. 530.

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## CDC Vista Family Allows Mainframe Access

Control Data has announced a set of software products that improve communication capabilities between micros and host systems. Vista software helps PC users enhance the functions performed on their machines while

allowing easy access to mainframes.

VistaCOM, an asynchronous micro-computer package, simplifies login and interaction with the host. It provides standard access to all host systems as well as VT100/VT131, Televideo 950, and Tektronix 4105 emulation. VistaHOST, a mainframe system, works in conjunction with VistaCOM to achieve reliable and efficient transfer of character or binary files between host and micros.

To obtain additional information, contact Control Data, 9111 Edmonston Rd., Ste. 200, Greenbelt, MD 20770; (301) 982-9550. Visit Booth No. 632.

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## DDA Monitors Complaints

The Digital Dealers Association (DDA) is beginning its sixth year as a trade association and will have a booth at DEXPO East. High professional standards and ethics are a prerequisite for membership and the association monitors complaints against all resellers of Digital equipment.

Meetings are held twice each year with programs geared to advance member's business practices. A newsletter, *DDA NEWS*, is published quarterly and an increasing number of services are available to members.

Specific information regarding the association and applications for membership will be available at the booth.

Information may be obtained by contacting DDA headquarters, 107½ S. Main St., Ste., 202, Chelsea, MI 48118; (313) 475-8333. Visit Booth No. 535.

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## RAXCO Unveils RABBIT-9 V.A.S.T.

RABBIT-9 V.A.S.T. (VAX Acceleration Software Technology) from RAXCO Rabbit Software is a newly achieved innovation of heuristic programming, artificial intelligence and classic feedback loops. Dynamic tuning results from heuristic interpretation of user patterns that automatically adjust VMS parameters for optimal performance results. V.A.S.T. is an ever-vigilant VMS system manager.

This software utility runs continuously in detached mode while using virtually no CPU time. Dynamic tuning bursts constantly adjust VAX/VMS system and per-process parameters to meet ever-changing user needs and system demands. Users report dramatic improvements in response time and system throughput.

R-9 V.A.S.T. is available for VAX and MicroVAX systems.

To learn more, contact RAXCO Rabbit Software, 1370 Piccard Dr., Rockville, MD 20850; (301) 258-2620. Stop by Booth No. 138.

**Enter 485 on reader card**

## Access Announces 20/20 Database Connection

Access Technology Inc. announced a new database interface product for spreadsheet users called the 20/20 Database Connection. This is a new extension to the 20/20 spreadsheet, which provides a seamless bridge between 20/20 and several VAX databases.

Working from within 20/20, users access the Database Connection from the /Tools command. The menus allow users to build



## DEC PROs At DEXPO

Carl B. Marbach, publisher; Dave Mallery, editorial director; and Senior Technical Editor Al Cini will be speaking on the issues pertinent to both the DEC and Apple communities at the upcoming DEXPO East '88 conference. Check your schedule for the appropriate times and locations.

Remember how computers remembered? Mercury delay lines? Punched cards with 90 columns and round holes? Hand-wired magnetic cores? In case your memory needs refreshing, The Computer Museum would like to share its memories with you.

**The Computer Museum Memory Poster**  
We have created a limited edition, 20" x 32" poster of the picture shown below. Printed in

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full-color, it includes an identification key to help you recall the memories you've forgotten. To get your poster, along with an information kit on museum membership, exhibits and activities, send a tax-deductible contribution of \$25 or more to:

Memory Poster, The Computer Museum,  
300 Congress Street, Museum Wharf,  
Boston, MA 02210.

Please allow six weeks for delivery.

**YES!** Please refresh my computer memories. A tax-deductible donation of \$25 or more made payable to The Computer Museum is enclosed.

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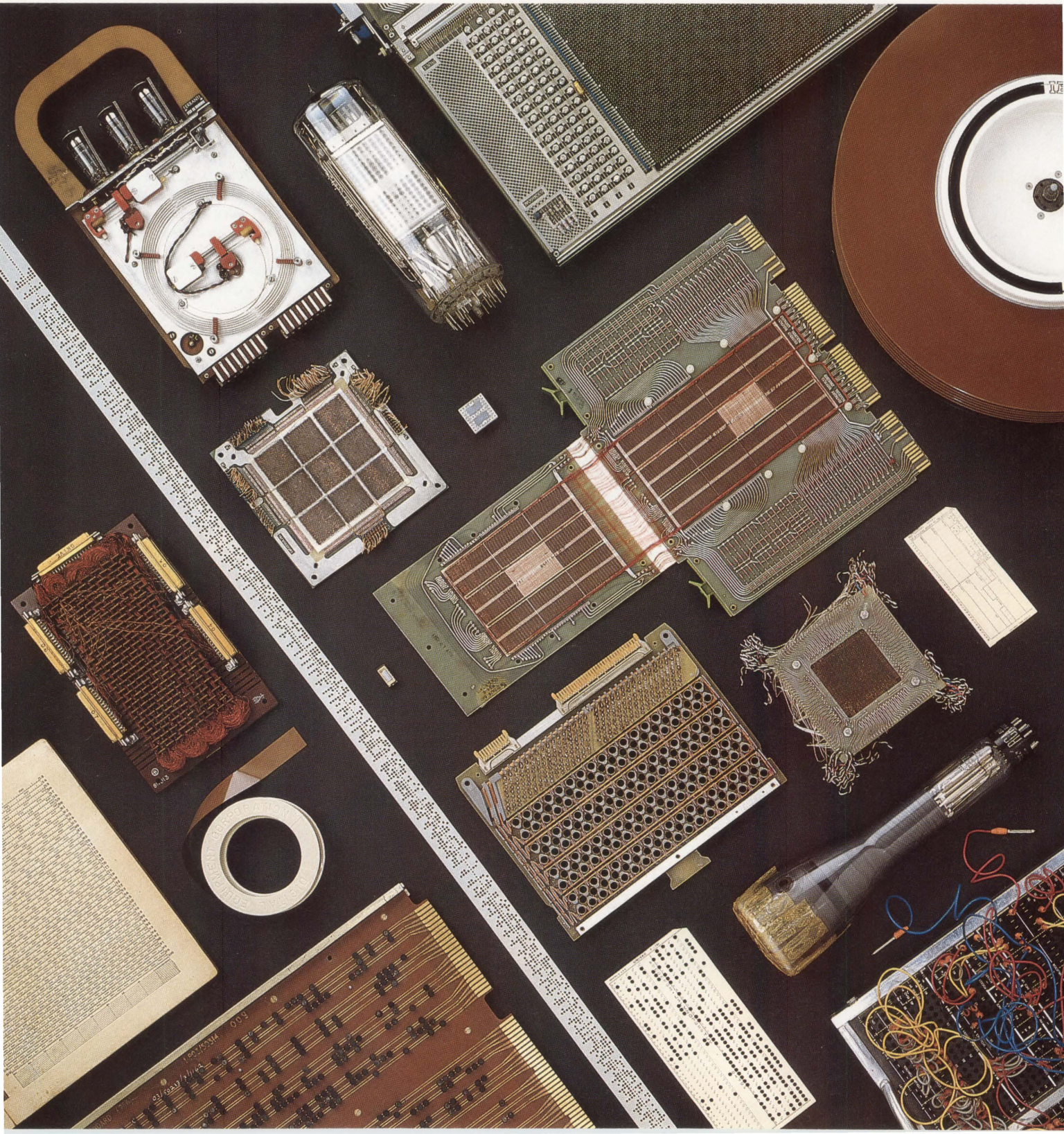


Located on Museum Wharf  
300 Congress Street, Boston, MA 02210  
(617) 426-2800

E

# COMPUTER MEMORIES FOR SALE

Special thanks to this publication, Scitex America Corp. (color separations), Grafik Communications, Ltd. (design), David Sharpe Studio (photography) and VM Software, Inc. (poster).





and execute a database query with simple, spreadsheet-style commands. Windows display available database files and fields from which users can select, sort, summarize and retrieve data, without having to exit 20/20.

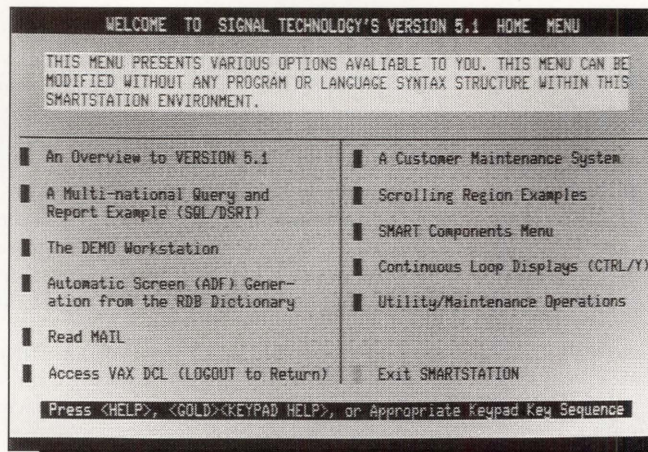
The 20/20 Database Connection is available for use with VAX DATATRIEVE. VAX Rdb/VMS and VAX DBMS databases, and RMS files also can be accessed through the DATATRIEVE interface.

Access Technology Inc. is located at 6 Pleasant St., S. Natick, MA 01760; (617) 655-9191. Visit Booth No. 434

**Enter 486 on reader card**

## Signal Brings Desktop Management To VAX/VMS

Signal Technology Inc.'s SMARTSTAR 4GL V5.1 application development system features a 4GL facility for creating scrolling regions using keypad commands. Scrolling regions allow for efficient viewing and management of multiple data items on the screen. Applications can be presented in windowed arrangements, and a user can work with these in a manner similar to working with papers on a desktop. The nontechnical user and pro-



fessional developer can make productive use of the facility.

Version 5.1 also provides 4GL support to a number of data movement functions, such as data movement across different database file structures.

SMARTSTAR runs on the VAX and on VAX systems linked with Britton Lee Inc.'s

Shared Database systems.

Prices range from \$7,000 to \$55,000 depending on configuration.

For further information, contact Signal Technology Inc., 5951 Encina Rd., Goleta, CA 93117; (805) 235-5787 or (805) 683-3771. Visit Booth No. 818.

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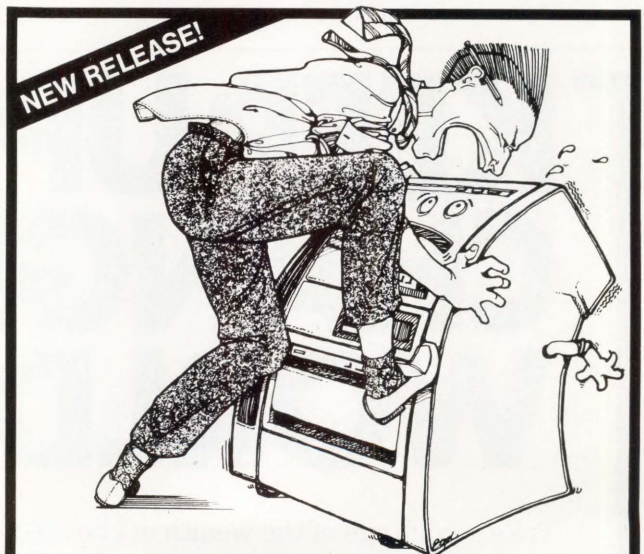


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## SPSS To Feature Graphics For ULTRIX

SPSS Inc. will feature SPSS Graphics for ULTRIX systems. SPSS Graphics is an easy-to-use, interactive system for the creation of presentation and business graphics. It provides more than 40 different chart types including several types of maps, pie charts, bar charts, line charts, regression charts, text pages, and multiformat combinations. SPSS Graphics' menus and forms guide the user through the creative process and allow for quick editing of graphic output.

SPSS Graphics currently runs under VAX/VMS, IBM CMS, MVS/TSO, Prime PRIMOS, Honeywell GCOS and Data General AOS/VS.

For additional information, contact SPSS Inc., 444 N. Michigan Ave., Chicago, IL 60611; (312) 329-3500. Visit Booth No. 370.

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## Collier-Jackson Announces New Release

Collier-Jackson has announced its latest release of CJ/Advanced General Ledger with

improved financial reporting capabilities. Projections now can be compared and analyzed against results on the same report. Through extended report definition, individual budgets or forecasts also can be evaluated at department or account levels.

A currency conversion feature has been added to administer and consolidate foreign currencies. Security has been enhanced as well, restricting access to the department level.

Collier-Jackson is a Digital Cooperative Marketing Partner (CMP) featuring a complete line of financial accounting and human resource management software.

To find out more, contact Collier-Jackson Inc., 3707 W. Cherry St., Tampa, FL 33607; (813) 872-9990. Stop by Booth No. 630.

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## Datamedia Releases COLORSCAN/2

Datamedia Corporation recently introduced the COLORSCAN/2, a two-in-one workstation that combines the capabilities of an IBM Personal System/2-, PC XT/AT-compatible with the communications and graphics capabilities of a VT240 terminal.

The COLORSCAN/2 features parallel operation in the VAX and MS-DOS environments, which allows the user to switch between them with a single keystroke. Datamedia's COLORSCAN/2 has incorporated full IBM and DEC compatibility and functionality into a powerful and compact diskless workstation measuring 10 x 15 x 2½ inches.

COLORSCAN/2 prices start at \$2,000, or lower for high volumes.

For more information, contact Datamedia Corporation, 11 Trafalgar Square, Nashua, NH 03063; (603) 886-1570. Visit Booth No. 258.

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## LPC 115-4-T Joins The "Z-LINE" Family

Pulizzi Engineering Inc., the designer and manufacturer of "Z-LINE" power controllers and line conditioners, has introduced the LPC 115-4-T. The LPC 115-4-T helps protect your system from system lock up, component failure, lost information, distorted data files and total board failure.

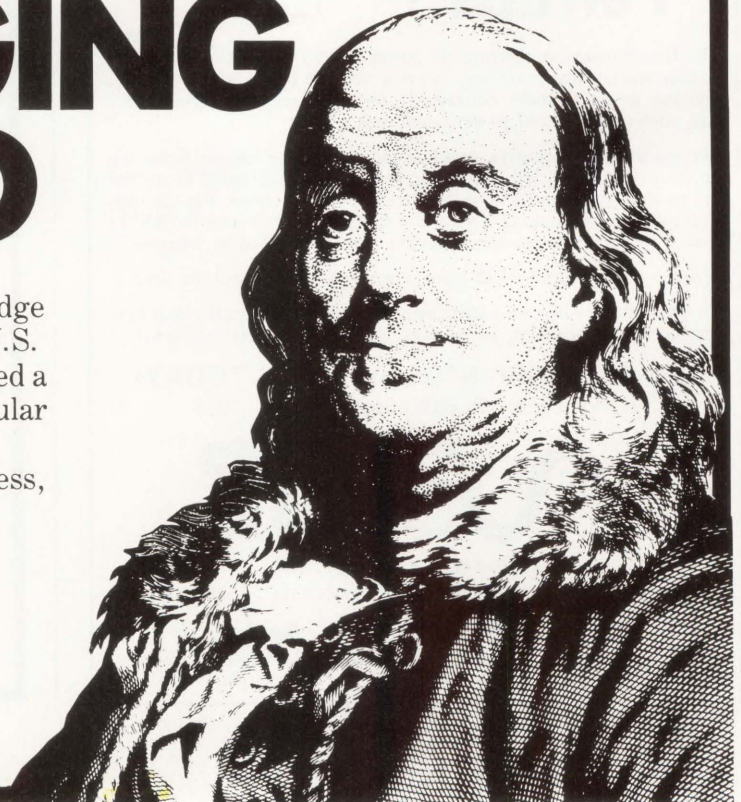
"Z-LINE" protects from spikes and surges line to line, line to ground and neutral

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# It's Not That Easy.

## PC-to-DEC Communications, The Right Way.

Some companies think it's easy to make your IBM PCs act like a DEC terminal. But before you settle for some patch job, consider these facts.

Only Polygon has consistently offered true emulation through the years. In fact, when Digital Equipment Corporation went looking for terminal emulation software to license, they didn't choose just anyone. They chose Polygon. Today Polygon continues to be used in more DEC installations than any other competitive product.

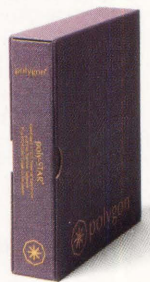
Polygon is ahead in other ways, too. We were first to ship VT220 emulation. First with VT240 emulation. First with full-color VT241 support. And now we provide Ethernet (LAT) communications as well.

You'll find our dedication shows in a whole range of products, featuring error-free file transfers, and sharing PC files in a VAX library. Our poly-STAR, poly-SHARE and the famous poly-COM series of products have set the standards for DEC communications software.

So if you want it done right, talk to Polygon.

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We'll send a free demo package to any qualified company. Just call or write us. Polygon, Inc., 1024 Executive Parkway, Saint Louis, MO 63141 (314) 576-7709, Telefax: (314) 275-9185. Telex 883245.



Terminal Emulation, The Right Way.

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to ground. Your system also is protected from electromagnetic (EMI) and radio frequency interface (RFI) both line to line and line to ground.

Many of the same components used in "Z-LINE"'s larger units are incorporated into the LPC 115-4-T. This includes a "REAL" 20 amp EMI/RFI filter. The "Z-LINE" controller is installed easily between any common ground wall receptacle and your microcomputer, telecommunication system, microprocessor-based control equipment, video or audio equipment. To learn more, contact Pulizzi Engineering Inc., 3260 S. Susan St., Santa Ana, CA 92704-6865; (714) 540-4229. Stop by Booth No. 538.

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## VAX/VMS Spreadsheet Offers 3-D Graphics

Stone Mountain Computing recently announced release 4.5 of Graphic Outlook, a spreadsheet that offers 3-D perspective plots or spreadsheet data. Graphic Outlook reads and writes LOTUS and Symphony spreadsheets including the LOTUS version 2 for-

mat. Under the "Lotus Mode" user interface option, the command structure closely parallels that of LOTUS 1-2-3, allowing you to move spreadsheet work between PCs and VAXs without having to learn separate programs.

Fully integrating graphics with spreadsheet functions, Graphic Outlook draws high-quality color and monochrome bar pie, line and scatter plots on most popular graphics devices. The low-resolution graphics feature draws bar charts and line plots on VT100-type terminals.

Demonstration tapes are available from Stone Mountain Computing Corp., P.O. Box 1369, Goleta, CA 93116; (805) 964-9101; Stop by Booth No. 504.

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## ASCII Spell Checker Supports 10 Languages

Intermation Corporation announced the release of its ASCII spell checker, available separately for English, Spanish and eight European languages.

OS\*SPELL will accept any file in ASCII format, including those of word processing

packages like WordPerfect, WPS Plus and Interimation's own IT\*OS.

OS\*SPELL includes an 87,000 word English dictionary, supports nine additional languages, and also allows you to create any number of personal dictionaries of unlimited size. The user is able to see the incorrectly spelled word on screen in the context of the sentence, then choose from a menu of options.

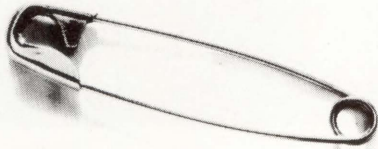
OS\*SPELL is available for VAX/VMS systems. The package is priced at \$850. Find out more by contacting Interimation Corp., 234 E. Colorado Blvd., Pasadena, CA 91101; (818) 796-9371. Visit Booth No. 160.

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## MacNOW Performs ALL-IN-1 Functions

Telos Corporation is introducing MacNOW, a Macintosh-based interface for the ALL-IN-1 Office and Information System.

MacNOW performs ALL-IN-1 functions such as electronic mail, word processing and file cabinet management in addition to file transfer, terminal emulation and user scripts. Users work off-line at a networked



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Macintosh, thereby offloading the CPU processing requirements from the VAX and improving overall system performance. The host acts as a file server, allowing storage and access to documents as well as electronic mail. All of these OA functions are performed with the Macintosh interface of pull-down menus, icons, dialog boxes and a mouse.

Telos will charge a one-time CPU license fee of \$3,000 and \$200 per Macintosh. Complete information is available from Telos Corp., 3420 Ocean Park Blvd., Santa Monica, CA 90405; (213) 450-2424. Stop by Booth No. 664.

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## CDSA Exhibiting At DEXPO

C.D. Smith & Associates Inc. (CDSA) will be exhibiting at DEXPO East. CDSA specializes in VAX 8000 and MicroVAX II products line, and buys, sells and rents VAX systems, options and CPUs. If you're considering buying, selling or renting a VAX system or option now or in the near future, please stop by the booth. C.D. Smith &

Associates Inc., will be offering specially priced VAX 700 and 8000 systems and options to qualified buyers during the convention. CDSA is a member of Digital Dealers Association (DDA).

To receive more information, contact C.D. Smith & Associates Inc., 12605 East Freeway, Ste. 318, Houston, TX 77015. Visit Booth No. 137.

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## V5.1 Of Minitab Offered For PDP-11 And LSI-11

Minitab Inc. recently announced Release 5.1 of Minitab Statistical Software available for the PDP-11 and LSI-11 series of DEC computers. The file handling system has been rewritten to permit up to four open files simultaneously, providing greater flexibility in writing Minitab macros and redirecting output.

Minitab performs basic statistical analysis; regression analysis; non-parametric tests; tabulation, including chi-square tests and contingency tables; time series analysis; distributions; diagnostic graphics; and much more. High-resolution graphics greatly

enhance the display of the your data.

Annual license fees for Minitab on PDP-11 and LSI-11 computers are \$1,300. For more information, contact Minitab, 3081 Enterprise Dr., State College, PA 16801; (814) 238-3280, Telex: 881612. Stop by Booth No. 512.

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## EMC Exhibits Archeion

EMC Corporation will exhibit Archeion Optical Disk Subsystem. The company also will display its DEC-compatible enhancements, including memory arrays for all VAX systems.

Archeion uses write-once-read-many (WORM) optical disk technology and features up to 56 gigabytes of online storage and retrieval. Archeion also supports three concurrent data transfer modes, a 770 KB-per-second transfer rate in burst mode and 485 KB per second in sustained mode.

Find out more by contacting EMC Corp., 171 South St., Hopkinton, MA 01748-9103; (800) 222-EMC. Stop by Booth No. 226.

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# WORKHORSE.

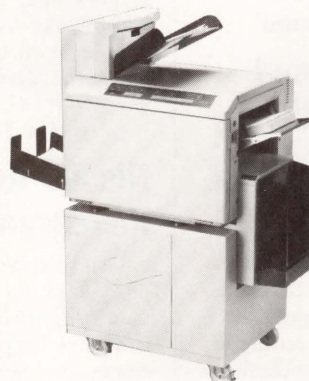
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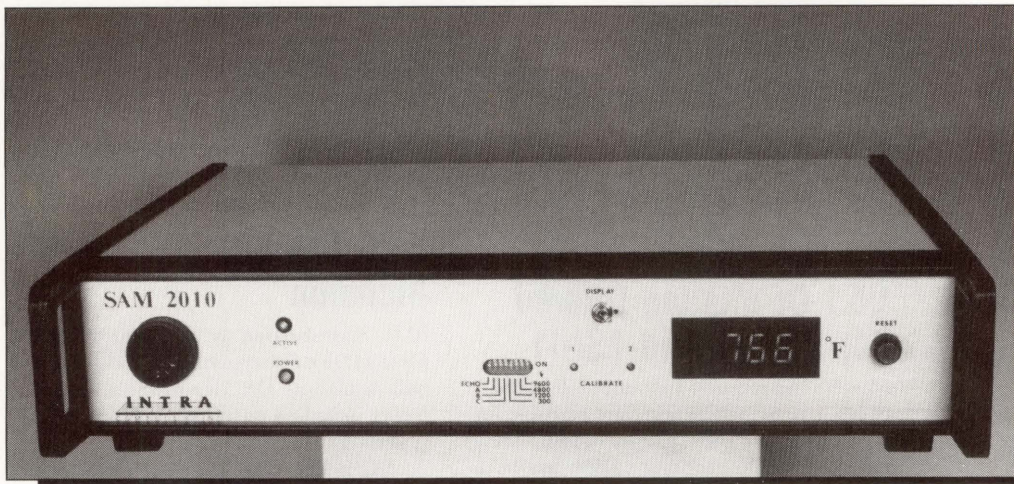
For heavier output, the S-6000-II is another DeRex field-proven, high speed, reliable printer. At 75 pages per minute, with both portrait and landscape orientations, it provides great versatility of output at higher speeds.



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*SAM2010 from Intra Computer Inc., protects computers from environmental hazards.*

## SAM2010 Protects From Environmental Hazards

The SAM2010, announced by Intra Computer Inc., is capable of powering down a host computer system in the event that environmental conditions endanger the computer.

SAM2010 can be mounted in a standard 19-inch RETMA rack that includes an LED digital temperature display, two temperature probes, seven inputs for various sensors (humidity, smoke, water, air-flow, power-line-monitor, intrusion), and four software-controllable relay outputs that can be used to power-down a system and activate auto-dialers or other warning devices.

Host computer software packages are available to run on VAX systems with VMS or UNIX, PDP with RSX or RSTS, DGMV series systems with AOS/VS, IBM-360/370, 4300 systems with VM/SP-OS and HONEYWELL with PICK operating systems.

To find out more, contact Intra Computer Inc., 875 Ave. of The Americas, New York, NY 10001; (212) 947-5533. Visit Booth No. 507.

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## Multiplex/XL Released By Network Innovations

Network Innovations Corporation has introduced Multiplex/XL, a connectivity software product that lets PC users access minicomputer data and automatically integrate it into Microsoft Excel spreadsheets.

Multiplex/XL is Microsoft Excel add-in that links Microsoft Excel spreadsheets directly to corporate databases on departmental computers. Accessible host platforms include minicomputers such as VAX/VMS

systems and UNIX-based departmental systems from AT&T, Sun, etc.

Multiplex/XL sells for \$99.

Find out more by contacting Network Innovations Corp., 20863 Stevens Creek Blvd., Cupertino, CA 95014; (408) 257-6800. Stop by Booth No. 664.

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## Farallon PhoneNET At DEXPO East

Farallon Computing Inc.'s PhoneNET System and MacRecorder Sound System product lines will be exhibited at DEXPO East. PhoneNET System is a networking scheme that runs AppleTalk over telephone wire. Networking and management products in the System include PhoneNET PLUS Connectors, StarController, TrafficWatch and CheckNET.

MacRecorder is a sound system that records real sound into the Macintosh. It's compact and simple to use. With the built-in microphone or an external microphone, any sound source can be accessed to make recordings. Software applications include HyperSound, HyperCard, StudioSession, VideoWorks and Beep INITs.

Find out more by contacting Farallon Computing Inc., 2150 Kittredge St., Berkeley, CA 94704; (415) 849-2331. Visit Booth No. 552.

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## Nissho Announces Increased Memory

Nissho Electronics (U.S.A.) Corporation has introduced the N1100-Plus Dual Board Computer based on the DEC J-11 micro-computer chip. The N1100-Plus is an enhanced version of the N1100 and includes a memory capacity of 4 MB, 8K of cache,

floating point accelerator option and memory management unit. The N1100-Plus incorporates an Independent Memory Bus (IMB) that, combined with high-speed DRAM, provides any PDP-11/24/34 with PDP-11/84-type performance.

The N1100-Plus consists of two HEX size UNIBUS boards and can be installed in any standard SPC slots without backplane changes. The processor operates on the 18-bit backplane and provides UNIBUS Mapping to its own IMB.

The price for the N1100-Plus is \$12,000. For further information, contact Nissho Electronics (U.S.A.) Corp., Inwood Park, Ste. 200, 17310 Red Hill Ave., Irvine, CA 92714; (714) 261-8811. Stop by Booth No. 106.

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## IMSL Announces New FORTRAN Libraries

IMSL has restructured the IMSL Library, a standard numerical computing resource for 15 years, creating three distinct but coordinated libraries of FORTRAN subprograms.

Contents of the Library have been expanded and divided into MATH/LIBRARY, for solving mathematical problems; STAT/LIBRARY, for analyzing statistical data; and SFRN/LIBRARY, for evaluating special functions.

In MATH/LIBRARY, numerical computing capabilities have expanded in areas such as optimization, quadrature and interpolation. STAT/LIBRARY enhancements focus on ease of use.

To learn more, contact IMSL Sales Division, 2500 ParkWest Tower One, 2500 CityWest Blvd., Houston, TX 77042-3020; (800) 222-IMSL, Telex: 791923. Stop by Booth No. 636.

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## VAX Exhibited As Macintosh File Server

Pacer Software Inc. will exhibit PacerShare, a software product that enables any VAX/VMS system to function as an AppleShare-compatible file server for a Macintosh network. The Macintosh mouse and graphical interface can be used to directly peruse the VMS file system, create directories, move directory trees or access any VMS file type from within a standard Macintosh application. The VAX file system is viewed from the Macintosh as a series of hierarchical volumes with VAX directories being represented as folders. Individual files are directly available to both Macintosh and VAX applications.

Pacer Software Inc. is located at 7911 Herschel Ave., Ste. 402, La Jolla, CA 92037; (619) 454-0565. Visit Booth No. 746.

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## KSC To Introduce FORUM At DEXPO East

KineticSystems Corporation will introduce FORUM at DEXPO East. FORUM is a powerful CAMAC system for flexible process control, offering engineers and researchers the benefits of Computer Automated Measurement and Control standardization and field-proven concepts, including modular flexibility, limitless expansion, system longevity and computer independence.

FORUM combines KSC's new K-SCAN process control software, a choice of DEC computers and wide selection of field-proven CAMAC process I/O modules. With FORUM, it's simple to design and implement systems tailored to a user's need. It offers the ability to start small and add I/O points, upgrade computers, or extend the distributed highway as needs grow.

To learn more, contact KineticSystems Corp., 11 Maryknoll Dr., Lockport, IL 60441; (815) 838-0005. Visit Booth No. 409.

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## Meadowlark Buys And Sells DEC Computers

Meadowlark Enterprises Inc., a buyer and reseller of new and used DEC computer equipment, will exhibit at DEXPO East.

Meadowlark is a member of the Digital Dealers Association (DDA) and offers money-saving programs and opportunities for the system integrator and user of DEC equipment, including purchase, sale and trade of new and used DEC equipment, and lease and rental.

Learn more by contacting Meadowlark

Enterprises Inc., 37 High St., Danvers, MA 01923; (617) 777-4666. Stop by Booth No. 154.

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## Enhanced Security For ACCENT R

National Information Systems Inc. (NIS) has announced security enhancement to its

ACCENT R Total Applications Development Environment. ACCENT R protects programs and data in two ways. First, passwords can be assigned to data sets, schemas, programs, records, and fields to individually protect these items. Second, data and programs can be protected so that only specific users or a specific communications line can access the data or programs. Any part of an application can be encrypted so that it's

# Career Territory



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This is the Data Systems Services Division of EATON CORPORATION. The territory covers over 140 locations worldwide where 500 professionals provide 24-hour third-party maintenance to some of the largest DEC installations within the U.S. government and military.

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For professional consideration, please submit resume to L. Gallagher, EATON CORPORATION, Data Systems Services Division, Dept. CTDP-02, 5875 Green Valley Circle, Culver City, CA 90230. EOE M/F/V/H. Must have U.S. Citizenship. A background investigation may be required.

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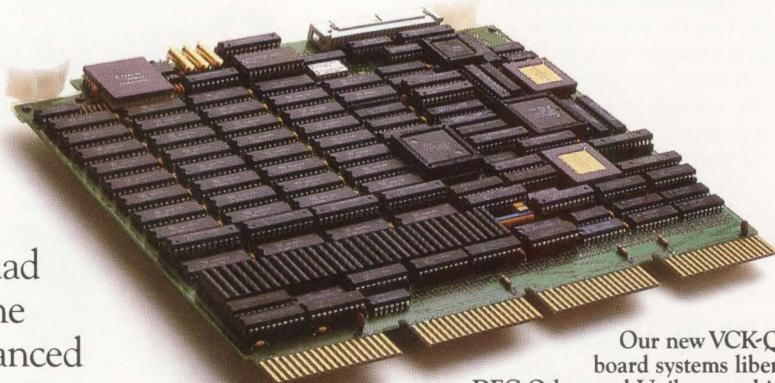
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# Call it the computergraphics freedom machine

Take the load off your host CPU in both Q-bus and Unibus DEC computers with our new VCK-Q/U tightly coupled combined graphics controller and single board computer. Our new quad height board gives you a stand-alone 68010-based computer and an advanced CRT controller to do graphics primitives, zoom, pan and scroll. On board to lend power to the 68010 are 1-megabyte of system RAM, fast DMA circuitry, serial I/O ports and a SCSI port for a hard disk.



Our new VCK-Q/U board systems liberate DEC Q-bus and Unibus machines. In your VAX or Microvax, a formidable combination indeed.

One VCK-Q/U provides  $1024 \times 1024 \times 8$  to display 256 colors out of 16 million. Multiple VCK-Q/U's can be used together to extend bit plane depth to  $1024 \times 1024 \times 16$ , 24, 32, and up for fine color control. Advanced applications include animation and high resolution imaging.

Use the SCSI/DMA link to quickly input and output images, display lists, commands, and programs. The DMA controller lets you rapidly move data between the SCSI port, CRT controller, computer bus, and all on-board memory.

Our microcomputer has a 9.8 MHz 68010 CPU and a 68881 FPU with access to all other on-board devices including 1 MB each of system and video RAM, two video

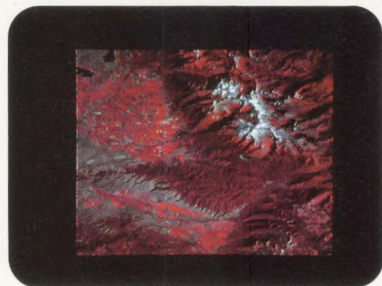
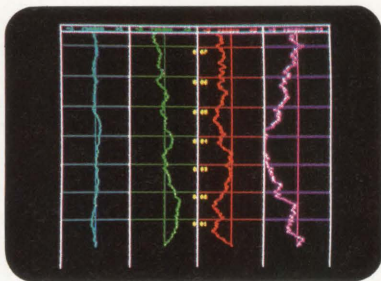
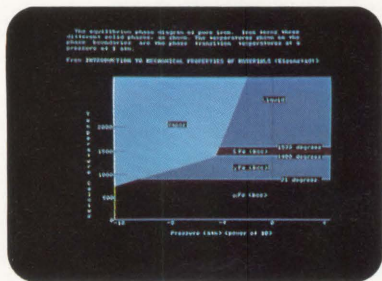
overlay memories, and up to 128 KB of EPROM and 16 KB RAM.

For the rest of the story, phone (415) 531-6500. TWX: 910-366-2029. Or write Peritek Corporation, 5550 Redwood Road, Oakland, CA 94619.

DEC, Q-bus, Unibus are trademarks of Digital Equipment Corporation.

**Peritek**

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not readable outside the ACCENT R environment.

A 30-day trial is provided.

More information can be obtained from National Information Systems Inc., 1190 Saratoga Ave., San Jose, CA 95129; (408) 985-7100, Telex: 750031. Visit Booth No. 564.

Enter 342 on reader card

## Vented, Side Panel Retrofits Announced

Everest Electronic Equipment Inc. offers vented side panel retrofits for its EH9642 Series cabinets. Extended sides provide a cooling solution for MicroVAX, CPA expansion units and disk drives that require side-to-side cooling. These panels look like DEC's "JA" Microsystem Cabinet. Customers can install Microsystem products and achieve the desired cooling simply by installing vented side panels. Expansion Multibay Kits also are offered.

Side panel kits start at \$485.

For more information, contact Everest Electronic Equipment Inc., 1800-G MacLeod Dr., Lawrenceville, GA 30245; (404) 995-8688; in CA (714) 634-2200. Visit Booth No. 107.

Enter 345 on reader card

## CIS Offers VAX Systems Software

Computer Information Systems Inc. (CIS) will demonstrate its family of Quantum products. Quantum RS, the VAX resource management software, will be featured as well as two new products, Quantum PM and Quantum I/O.

Quantum PM collects and reports configuration, CPU, I/O and memory statistics for performance analysis, system turning and capacity planning.

Quantum I/O is a layered product consisting of a set of routines written in MACRO32 that permit faster I/O processing. To learn more, contact Computer Information Systems Inc., 165 Bay State Dr., Braintree, MA 02184; (617) 848-7515. Visit Booth No. 413. CIS also will be exhibiting at DEXPO Europe Stand No. 316.

Enter 362 on reader card

## INFO-DB+ 4GL Succeeds INFO

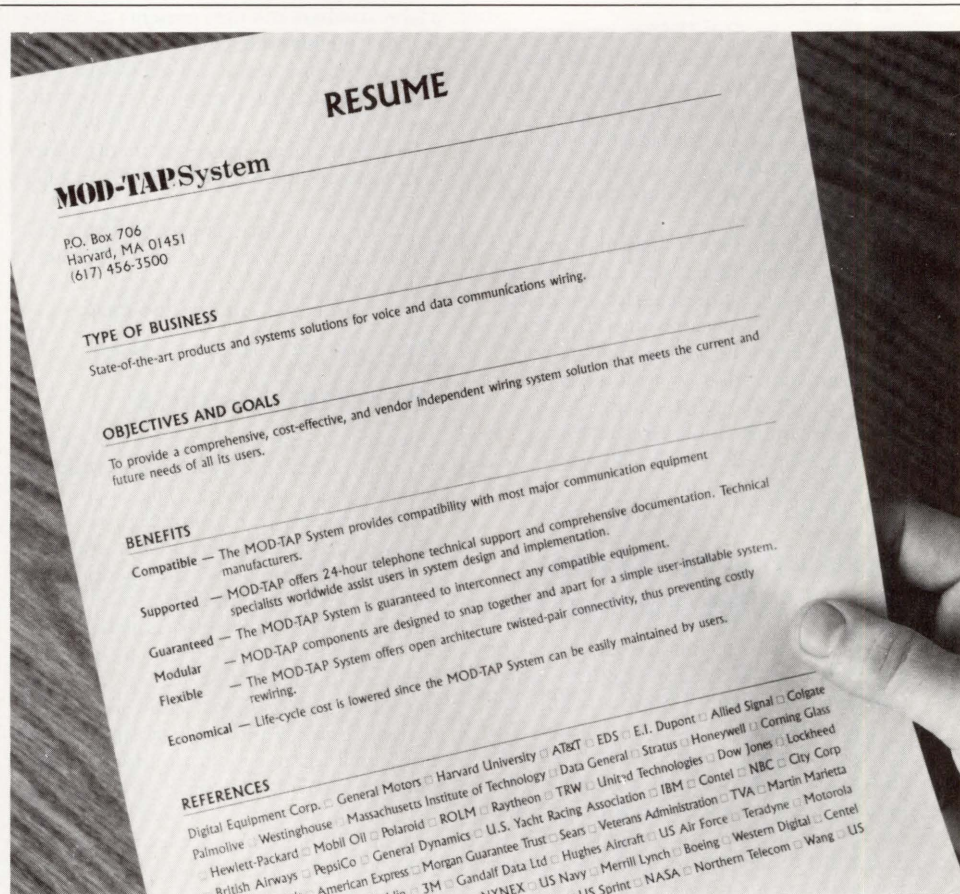
Doric Computer Systems will be an exhibitor at DEXPO Europe in London, England, March 1-3. Its product, INFO-DB+ is the successor to the popular 4th generation software INFO which has been available for nearly 10 years. A new develop-

ment is a free text storage and retrieval capability available as a standard feature along with a powerful RDBMS, making INFO-DB+ a powerful tool for the VAX. Novices can develop their own databases with little support while data processing professionals can develop sophisticated applications

quickly and easily.

Find out more by contacting Doric Computer Systems, Doric House, 23, Woodford Rd., Watford, 1 Herts. WD1 1PB; (0923) 52288, Telex: 895-3687. See INFO-DB+ in action at Stand No. 44 at DEXPO Europe.

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## WANTED: Communications Wiring System

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The **MOD-TAP Communications Wiring System** is a modular solution for voice and data building wiring. **MOD-TAP System** is not biased towards any particular manufacturer's equipment or Local Area Networking scheme. **MOD-TAP System** is guaranteed to interconnect any compatible equipment utilizing twisted pair wiring.

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England  
44 703 212120

**MOD-TAP System**  
See us at DEXPO East, Booth #802.

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## GP-220W Offers DEC VT220 Emulation

Northwest Digital Systems recently introduced its GP-220 windowing terminal. The GP-220W features sophisticated windowing capabilities and Tektronix 4014 and VT220 emulation.

Within the GP-220W's window environment, the terminal has the ability to maintain 16 separate text windows of any size. The terminal allows an application program to directly manage the windows through commands such as open window, close window, swap window, clear window and scroll window, etc.

Once a window is defined, it may be used as an independent DEC emulating terminal complete with standard commands such as direct cursor addressing. The terminal also allows an application program to download menus and windowing commands into the terminal's 512 KB memory.

For further information, contact Northwest Digital Systems, P.O. Box 15288, Seattle, WA 98115; (206) 524-0014.

**Enter 349 on reader card**

## Access Control System For VAX/VMS Environment

Security Dynamics Inc. has expanded the capability of its ACE Access Control System to include the VAX/VMS product line. The system consists of two components. The software component runs under VAX/VMS and a time synchronized algorithm. The hardware component, the SecureID card, is carried by the user. It's a credit card-sized device that contains a microprocessor, power source, RAM and ROM memory, and a visually readable LCD display.

The new VAX/VMS software is a fully integrated, automatic loading and configuring module with a wide variety of options. The system can be implemented while users are running under VMS 4.4 or later. When next they try to enter the system, they will require authentication by the ACE System. To obtain additional information, contact Security Dynamics Inc., 2067 Massachusetts Ave., Cambridge, MA 02140; (617) 547-7820, Telex: (510) 601-2924.

**Enter 350 on reader card**

## Software AG Releases Five Software Tools

Software AG of North America Inc. recently announced the availability of five new software tools for the VAX environment. Software AG's new CASE tool, NATURAL CONSTRUCT, is a set of automated tools that assist the natural application developer

in the design and implementation of natural systems.

ADABAS SQL is an SQL syntax embedded in a 3GL that interfaces with ADABAS, Software AG's Adaptable Data Base System. NATURAL Graphics is a mainframe-based graphics software that enables the extraction of information from a large database and then presents the information quickly and effectively in a wide range of graphic formats. NATURAL Elite is the computer-based training system, written in NATURAL, and WORKBENCH is an interactive menu-driven system that forms an integrated outer shell for Software AG's VAX products.

For more information, contact Software AG, 11800 Sunrise Valley Dr., Reston, VA 22091; (703) 860-5050, Telex: 899112.

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## Chemical Design Has Go-Faster Graphics

Chemical Design Inc. has a new generation of high-performance raster graphics displays for molecular modeling. The S6236 and S6266 terminals are based on Sigmex's 6000 series displays but incorporate customized hardware which improves their performance with Chemical Design's Chem-X molecular modeling by an order of magnitude.

Depth-cueing is controlled by hardware within the terminal rather than by the modeling software. Combined with existing 3-D custom firmware for local transformations, this permits more rapid rotation and translation of solid 3-D structures on the screen.

The S6236 has a peak vector performance of 170,000 vectors per second and costs \$26,000. The S6266 has a higher screen resolution — 1448 x 1024.

Complete details are available from Chemical Design Inc., 200 Route 17 South, Ste. 120, Mahwah, NJ 07430; (201) 529-3323.

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## LeMans Draws 1,000,000 Vectors Per Second

Chromatics Inc. has introduced the Le Mans Colorgraphic Display System. Le Mans features a microcoded implementation of industry standard GKS software for optimum performance.

Le Mans can draw one million fully transformed 2-D vectors per second and 250,000 fully transformed 3-D vectors per second. It also can generate 25,000 smooth-shaded polygons per second using the Gouraud algorithm with hidden surface removal in 3-D applications.

Le Mans provides a 1280 by 1024 non-interlaced display monitor. The system is software compatible with the Chromatics

CX series and can be interfaced to host computers such as VAX or Sun.

Learn more from Chromatics, 2558 Mountain Industrial Blvd., Tucker, GA 30084; (404) 493-7000.

**Enter 355 on reader card**

## Polygen Introduces QUANTA

Polygen Corporation recently introduced QUANTA, a comprehensive graphics software system for molecular construction, modeling and analysis, which serves as the unified interface to all modeling and simulation applications used by a research organization.

QUANTA is important in the development of new polymers, drugs and other chemical materials. In serving as a unified interface, the system accommodates all classes of molecular and macromolecular systems, integrates other proprietary the third-party software, runs on a wide range of powerful hardware platforms and performs multiple tasks simultaneously.

QUANTA currently runs on Silicon Graphics' IRIS model 3000 and 4D/60 series graphics workstations, and the Evans & Sutherland PS 300 series with a VAX or MicroVAX host.

Learn more by contacting Polygen Corp., 200 Fifth Ave., Waltham, MA 02254; (617) 890-2888, Telex: 387810 POLYGNUS.

**Enter 370 on reader card**

## Digital Enhances IBM Interoperability

Digital Equipment Corporation recently announced version 2.0 of its VIDA With IDMS/R software, a product that gives users of VMS end user and programming products direct access to data on IBM mainframes. VIDA With IDMS/R software allows users to copy a VAX Rdb/VMS database table from a VAX processor into an IDMS/R table on an IBM system.

VIDA combines database expertise and powerful DECnet/SNA interconnect network technology to offer distributed access to Cullinet IBM databases.

The software gives direct access to data stored in Cullinet's information center management system (C/ICMS). The IBM-stored data then can participate with VAX-system-stored data in end user and other VAX Information Architecture applications.

VIDA with IDMS/R software is licensed from \$5,250 on the MicroVAX 2000 to \$52,500 on the VAX 8800.

Learn more by contacting Digital Equipment Corporation, Maynard, MA 01754-2571; (800) DEC-INFO.

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## AST-220C Is Compatible With Color Monitors

AST Camintonn Digital Division recently announced a PC to VAX link, the AST-220C, which is compatible with both enhanced monochrome and color PC monitors. AST-220C is a multitasking controller card that allows an IBM PC XT/AT or compatible to operate concurrently in the DOS and VMS environments while serving as a PC and as two VT220 terminals for DEC hosts, from the MicroVAX I to the VAX 8000 series.

The full-sized PC card has an on-board 80186 microprocessor and 128 KB of its own RAM. AST-220C displays up to five user-configurable windows simultaneously and provides a copy and paste function which transfers text between files in separate windows in addition to background file transfer with ASCII, Xmodem, and Kermit protocols. During file transfer, AST-220C's interrupt driven driver transfers data between the disk and the AST-220C card, leaving the PC's CPU free for other applications.

AST-220C is priced at \$795.

For further information, contact AST Research Inc., 2121 Alton Ave., Irvine, CA 92714; (714) 553-0247.

**Enter 358 on reader card**

## UNIX TWIN Released By Mosaic

Mosaic Marketing Inc. has completed development of UNIX versions of Twin for AT&T 3B2 and VAX computers. UNIX TWIN is an 8192-row by 256-column integrated spreadsheet program that emulates Lotus 1-2-3, Version 1A in the UNIX environment.

UNIX TWIN offers a standard user interface, eliminating the cost of retraining users who are already familiar with 1-2-3. It encourages the portability of applications software from one UNIX system to another and encourages the integration of data from multiple sites and multiple users.

For more information, contact Mosaic Marketing Inc., 1972 Massachusetts Ave., Cambridge, MA 02140; (617) 491-2434.

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## TekCASE Designer Supports French, German

Tektronix's TekCASE Designer now supports the French and German languages. TekCASE Designer lets users create and verify a Structured Design model of their software system. The Designer automatically generates an initial system design from system specifications made with TekCASE Analyst/RT.

The Designer also creates a Structured Design model from source code by comparing this to the baseline design. This capability helps users verify that their software is implemented as designed. This code verification tool also allows users to document existing code for structured maintenance and reusability.

The Designer is available for VAX/VMS and VAX/UNIX systems and on VAXstations. The Designer is priced from \$3,600 to \$36,000.

For additional information, contact Tektronix Inc., P.O. Box 14752, Portland, OR 97214; (800) TEK-WIDE.

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# Q-BUS SYSTEM PACKAGES

Zoltech's modular design allows literally thousands of configurations to be built with its V-series family of system chassis. Zoltech will deliver anything from empty metal shells to completely tested turnkey systems: You decide what you want to do and Zoltech will do the rest. Q-Bus and VME systems are our specialty, but we also do custom designs.

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# INTRODUCING THE BRIGHTEST IDEA EVER IN VAX COMMUNICATIONS SERVERS.

## The MAXserver™ 5000 from Xyplex.

Before you buy a terminal server, look at what Xyplex has to offer.

Xyplex now offers the MAXserver 5000, with more performance, more reliability, and more capability than anything Digital has to offer. All at a much lower price! Here are just some of the eye-opening facts:

**Blazing performance.** Digital's DECservers™ are based on an old single-processor design, so they slow down as you add users. But the MAXserver 5000 uses advanced parallel processing, so you get the same high performance with 120 users as you get with one user. In fact, the MAXserver delivers five times more power than any DECserver.

**Shining reliability.** Did you know that when one DECserver component fails, the whole server can fail? Not with MAXserver 5000. Xyplex has designed it for uninterrupted service, with redundant power supplies and multiple network interfaces. Plus our "hot-swap" serial cards allow you to change cards without disrupting the network.

**LAN and WAN, brilliantly integrated.** MAXserver even integrates both LAN and WAN, as well as TCP/IP connectivity, in one package. Its open architecture and expandable design means you'll be able to communicate with existing and emerging industry-standard systems.

**A brighter approach to management.** MAXserver comes standard with Xyplex Advanced Network Management Software, the only unified network management software available in the VAX/VMS™ server market. So you get better control, regular reporting of network performance, and early evidence of network problems.

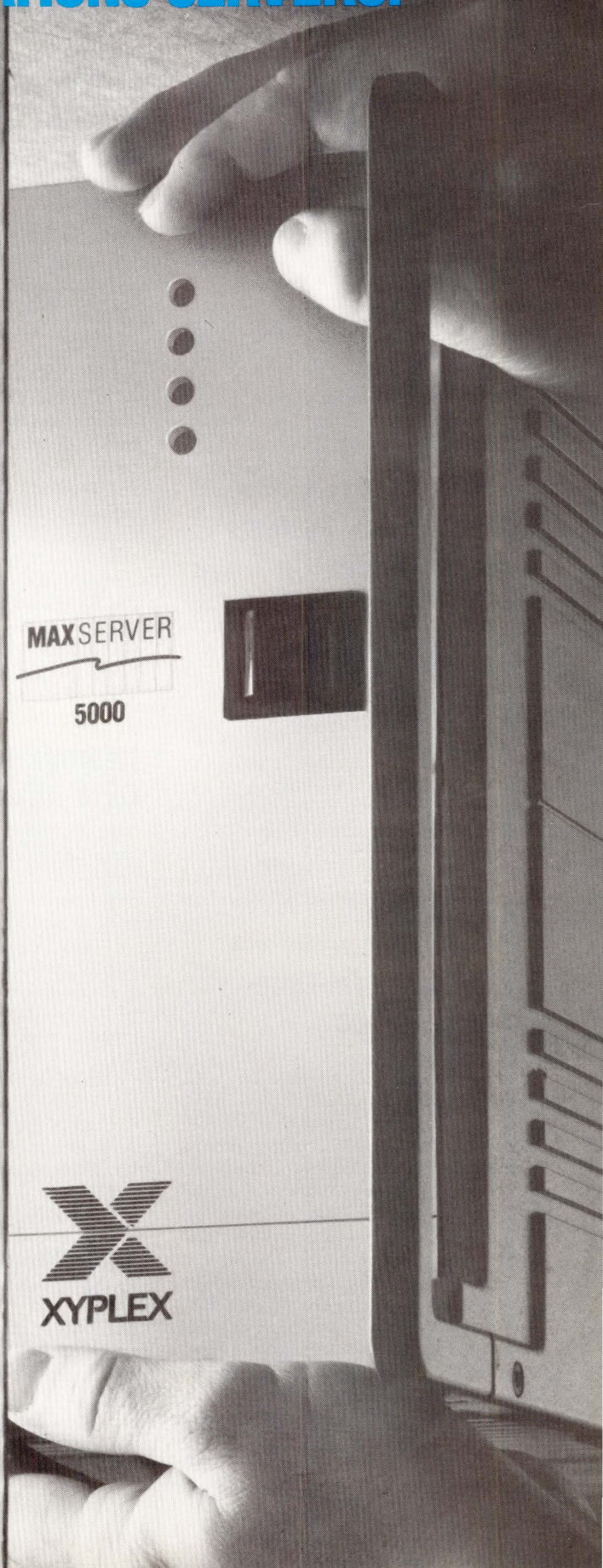
**See the price and see the light.** Here's the clincher: Xyplex offers all the of the above advantages—and more—for a much lower price. See for yourself how Xyplex delivers more server for less money.

Shouldn't you find out about the brightest VAX communications server ever offered? For complete product information and a free in-depth report comparing the MAXserver 5000 with the DECserver 500, call Xyplex at **1-800-338-5316**, or write Xyplex, Inc., 100 Domino Drive, Concord, MA 01742.



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DECserver, VAX and VMS are trademarks of Digital Equipment Corporation.

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## Excelan Expands VMS Product Family

Excelan Inc. has expanded its VMS product family with the introduction of a high-performance networking package, EXOS 10624, for the VAX. Concurrently, the company reduced the price on its current VAX/VMS product by 25 percent.

EXOS 10624 uses Excelan's EXOS 304 intelligent controller board that's based on Intel's 80286 microprocessor and Excelan's TCP/IP. EXOS 10624 handles the high data throughput of DEC's new 8000 series systems. VAX 750, 780 and 785s also will benefit when used as network servers and to run distributed file systems and distributed applications requiring high connectivity and data throughput rates.

EXOS 10624 sells for \$7,545.

Learn more by contacting Excelan Inc., 2180 Fortune Dr., San Jose, CA 95131; (408) 434-2226.

**Enter 373 on reader card**

## Westford Disk Systems Reduces Prices On Drive

Westford Disk Systems has announced a price reduction on its Model 100 disk drive for the MicroVAX and VAXstation computers. Shipped with all switch panels and other hardware necessary for installation in a BA123 or VAXstation enclosure, it sells for \$3,025 in single quantities. The Model 100 is completely RD54 compatible. Other features include 159 MB of formatted storage, a 30-millisecond access time, and no additional controller required; it uses DEC's RQDX3 controller.

For further information, contact Westford Disk Systems, P.O. Box 43, Carlisle, MA 01741; (617) 371-7015.

**Enter 374 on reader card**

## V.I. Offers Real-Time Color Graphics

V.I. Corporation offers workstation-based color graphics for companies that need tools to develop custom graphics displays in application areas such as real-time network monitoring, rapid prototyping, process monitoring and control, instrument panel simulation, real-time financial analysis, and military command and control.

The product line consists of the Data-Views family that includes DV-Tools, a subroutine package for developing custom color graphics displays of dynamic, real-time data; and DV-Draw a companion drawing editor used to create two-dimensional drawings in a standalone format or in conjunction with DV-Tools.

V.I. products run under UNIX and

VMS workstations and minis from DEC, SUN, Apollo, IBM and Hewlett-Packard. To learn more, contact V.I. Corp., 160 Old Farm Rd., Amherst, MA 01002; (413) 253-3482.

**Enter 375 on reader card**

## GENROCO Announces Q-bus Memory Product

GENROCO Inc. has announced its high-density Q-bus memory product, the MSV11-S. Configurations are available with 1, 2 or 4 MB of RAM. The memory control and status register (CSR) are compatible with the DEC's MSV11-P.

The 4-MB limitation of the Q-bus may be exceeded by using the GENROCO proprietary bank switching feature that allows up to 32 MB of memory to be configured. The starting address and window size for the bank switching are adjustable over a wide range.

There also are provisions for PROM memory. Either user-programmed or factory-provided bootstrap PROMs may be placed in the sockets provided. Both the starting address and the window size of the PROM space may be adjusted.

For additional information, contact GENROCO Inc., 205 Kettle Moraine Dr. North, Slinger, WI 53086; (414) 644-8700, Telex: 671-7062 GENROCO.

**Enter 376 on reader card**

## Informix Launches New OEM Alliance Program

Informix Software Inc. announced its new "Informix OEM Alliance Program." This program offers three levels of defined support based on OEMs' needs and commitment to Informix products.

Level I enhances the support Informix already provides its OEM customers. Additional comarketing cooperation is available with Level II. Level III is the codevelopment program, which provides the highest level of Informix OEM support.

Informix Software runs on a variety of VMS, UNIX, MVS, MS-DOS and networked computer systems.

To find out more, contact Informix Software Inc., 4100 Bohannon Dr., Menlo Park, CA 94025; (415) 322-4100, Telex: 361834.

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## Toshiba Markets Fast Half-High CD-ROM

The XM-3100B, from Toshiba America, is a fast access CD-ROM. The new half-high drive has an average access (time-to-data) of 400ms.

The XM-3100B accepts the industry-

standard CD-ROM cartridge which holds 680 MB of information, the equivalent of 300,000 pages of text. The drive also has an integral audio capability that allows high-fidelity stereo sound to accompany the text and images. This feature is useful in instructional or promotional applications. Intended for the OEM/VAD/VAR market, the drive with its embedded SCSI interface can be integrated easily into any half-high 5.25-inch drive slot.

The XM-3100B costs less than \$600 in OEM quantities over 100 units.

For more information, contact Toshiba America, Disk Products Division, 9740 Irvine Blvd., Irvine, CA 92718; (714) 583-3108.

**Enter 378 on reader card**

## Version 1.1 Of VAX SQL Software Offered

DEC has announced version 1.1 of its VAX SQL software. VAX SQL software is a high-level database language used as an interactive and software development interface for VAX Rdb/VMS and VIDA with IDMS/R databases, which conform to the DSRI Architecture.

Version 1.1 adds ANSI standard features, a VAX C language precompiler and improves the Dynamic SQL interface. With it, users can embed SQL statements in source files written in VAX C.

Packages including VAX Rdb/VMS runtime licenses are priced from \$1,770 on the VAXstation 2000 to \$42,480 on the VAX 8800.

For further information, contact Digital Equipment Corporation, Maynard, MA 01754-2571; (800) DEC-INFO.

**Enter 379 on reader card**

## Applix Announces Alis For VAXstation 3500

Applix Inc. has announced the availability of its Alis office automation software on VAXstation 3200 and 3500 workstations through DEC's Cooperative Marketing Program for the full line of current VAX and VAXstation models.

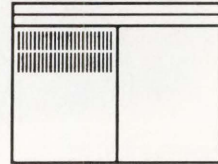
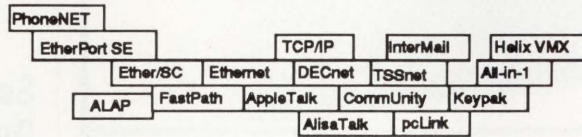
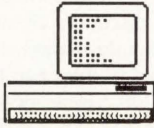
Running under ULTRIX, Alis' full range of integrated office automation functions includes multifont word processing, spreadsheets, business graphics, free-hand drawing and data management, all of which take advantage of the superior graphics capabilities of the VAXstation.

For the VAXstation 3200 and 3500 workstations, prices start at \$2,495.

To learn more, contact Applix Inc., 112 Turnpike Rd., Westboro, MA 01581; (617) 870-0300.

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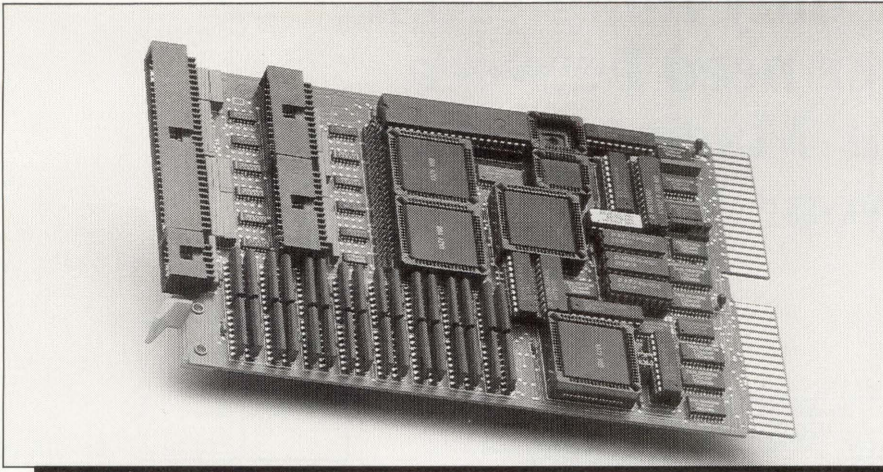
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Qualogy's QLC-1000 optical disk controller is fast for WORM technology.

## Qualogy Speeds Up WORM Technology

A new optical disk controller board from Qualogy Inc. brings fast economical WORM technology to Q-bus systems. The

QLC-1000 optical controller solves the problems of slow writing speeds and the need for special software. It's a solution for backup in large-scale archiving applications such as CAD/CAM, medical imaging and financial data. Because the QLC-1000

emulates tape, users can write files up to nine times faster.

The QLC-1000, a dual-wide Q-bus board, is 100 percent DEC compatible and uses a proprietary gate array to further reduce processing time. It also uses an NEC V50 microprocessor and 64K of RAM cache to maximize efficiency of the drive and provide a continuous flow of information.

The QLC-1000 is available for \$1,995, and volume discounts are available. For additional information, contact Qualogy Inc., 2241 Lundy Ave., San Jose, CA 95131; (408) 434-5200, Telex: 499-3489.

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## Scribe STEPS Improves Document Generation

Scribe Systems Inc. introduced Scribe Technical Electronic Publishing System (STEPS) for the creation and management of technical documentation and proposals. STEPS' composition engine is SCRIBE, composition software for technical documentation.

The STEPS document management

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## Execucom Introduces Business Graphics

Execucom Systems Corporation has announced Impressionist 2.0, a full-function business graphics software product available on corporate mainframes, departmental mini and micro workstations.

Impressionist addresses the entire spectrum of business graphics, from ad hoc analysis to boardroom quality presentations and can be accessed using simple menus, commands or command files.

Impressionist includes a Chartbook for beginners, Basic Graphics for creating more complex graphs and for building applications and a Graphics Editor for customizing graphs and free-form drawing. Impressionist can be used independently or with other business software products.

Impressionist runs on VAX and prime environments as well as the IBM PC XT/AT with a minimum 512K.

For further details, contact Execucom Systems Corp., 9442 Capital of Texas Hwy. N., Arboretum Plaza One, Austin, TX 78759; (512) 346-4980.

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## The DATA Group Enhances Fieldwatch

The DATA Group is shipping version 7.0 of Fieldwatch service management information software system, adding speed and reporting. The VAX version features two additional modules: Repair Center Management (RCM-Plus) and Scheduling-Plus.

RCM-Plus tracks and controls all aspects of the repair depot operations function. Scheduling-Plus handles the scheduling of corrective and preventive maintenance, equipment installation and de-installation, field engineering changes, equipment moves and similar planned activities.

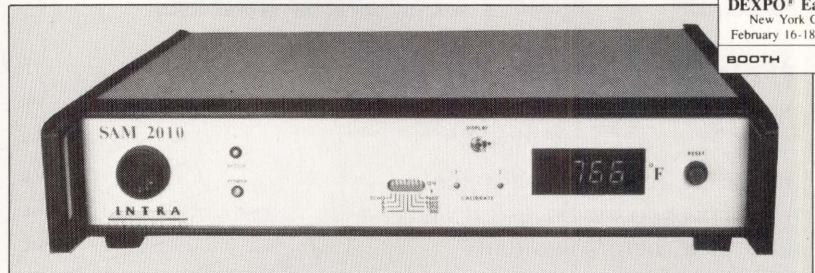
The cost of Fieldwatch ranges from \$45,000 to \$21,000 depending on customer

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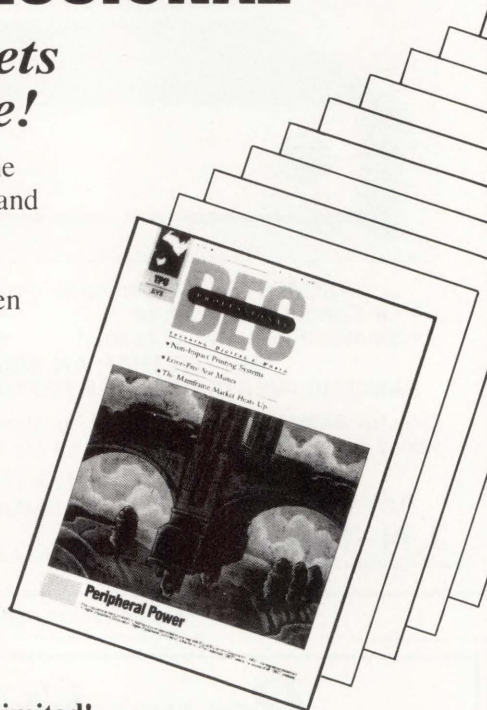
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requirements and system configuration. Fieldwatch is available on a wide range of mainframe, mini and microcomputer systems.

Additional information is available from The DATA Group, Burlington Business Center Two, 77 S. Bedford St., Burlington, MA 01803; (800) 247-1300.

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## InterBase Enhances Its Distributed DBMS

InterBase Software Corporation has announced version 2 of InterBase relational DBMS. Version 2 provides distributed database access among networks of similar or diverse systems, including DEC, Apollo and Sun workstations. The InterBase DBMS is geared specifically to production computing, from engineering and scientific to financial trading applications.

InterBase is introducing a new forms package that includes FRED, an interactive screen painter.

Version 2 of InterBase DBMS is available at prices ranging from \$5,000 to \$75,000.

To learn more, contact InterBase Software Corp., 150 Westford Rd., Tyngsborough, MA 01879; (617) 649-3977, Telex: (910) 240-3465.

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## UniPress Introduces Q-Calc Standard

UniPress Software Inc. has announced Q-Calc Standard, an enhanced UNIX spreadsheet package that features a Lotus 1-2-3 work-alike interface, complete file compatibility with 1-2-3 files, and more flexible macros. Q-Calc Standard gives users all the benefits of Lotus 1-2-3 with all the flexibility and speed of their UNIX-based system.

Q-Calc Standard requires 50 percent less RAM than Q-Calc, and its powerful macros let users create more sophisticated applications. Q-Calc Standard's 94 financial, statistical and mathematical functions give users additional capabilities. Q-Calc Standard is available for computers running UNIX, XENIX, ULTRIX and other UNIX derivatives.

Q-Calc Standard is priced at \$750 for IBM PC-RT, Sun and MicroVAX workstations; \$2,500 for VAX 780/785 and Pyramid 90xx; and \$4,000 for Supermini (VAX 8600, Gould PN9000). UniPress also has a special upgrade program.

To obtain further information, contact UniPress Software, 2025 Lincoln Hwy., Edison, NJ 08817; (201) 985-8000, Telex: 709418.

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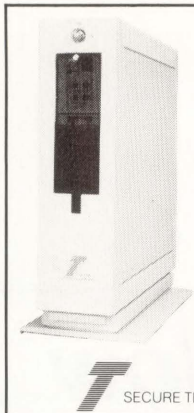
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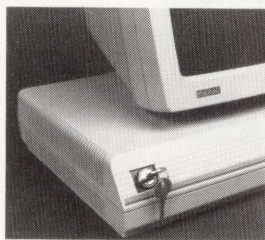
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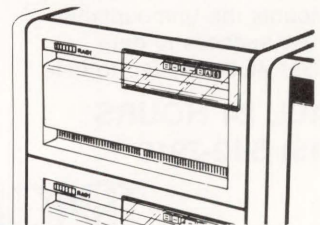
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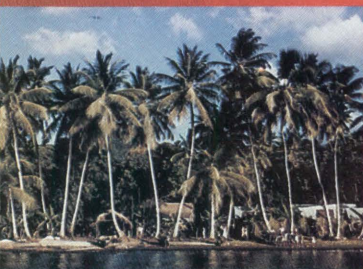
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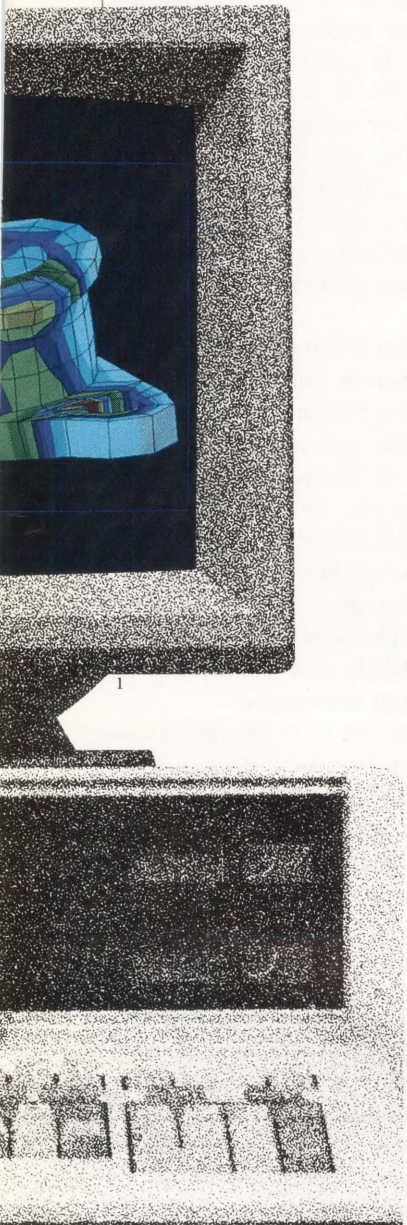




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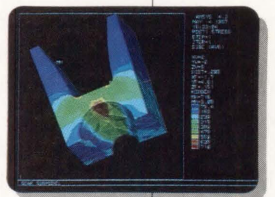
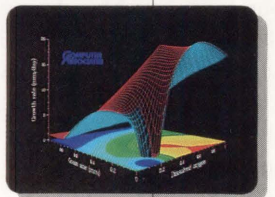
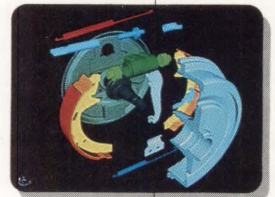
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# Hmm, Mac Or PC?

More and more I read about how DEC users are

trying to hook Macintoshes to a VAX or PCs to a VAX. Sometimes the reason is that some manager thinks it's cheaper to use a PC clone than a DEC terminal with the added advantage that the PC clone can run a bootleg copy of *Lotus 1-2-3* in its spare time. Whatever the case, businesses are buying PCs or Macintoshes for use as the combination desktop/personal computer and system terminal.

DEC users notoriously are naive when it comes to deciding whether to buy a PC or a Mac. Many tend toward the PC because the operating system, MS-DOS, essentially is rooted in DEC history and there's a *deja vu* quality about it. MS-DOS derived its command structure and "feel" from CP/M, an old eight-bit operating system used on Z-80 and 8080 microcomputers. CP/M, in turn, was modeled after the old TOPS operating system used on early DEC minis. So, DEC users are at home with MS-DOS.

On the other hand, the heaviest of the hacker types prefer the Mac. The reasons are sometimes purist, because the Motorola family of 68,000 chips is thought to be based on a sensible architecture. Another reason is the graphical interface, and still another reason is the common user interface.

The common user interface forced on the developer makes it so that most Mac applications require little instruction on their use. The Mac requirements for menus and editing are so rigid that most applications have a similarity that makes using any new application a snap. That, of course, assumes the package runs at all. The Mac is too bug-ridden for many users, but not for the experienced pro who's used to bugs in new stuff.

So, here's a list of considerations to review when considering the purchase of a Mac or PC for office or home use.

## The PC

1. Although the IBM version of the machine isn't cheap, the Taiwanese clones are. Some American vendors of their own clone designs such as PCs Limited and PC Designs make hot little machines for very little money. Regarding cost per mip, these machines can't be beat.
2. When purchasing a clone, I recommend that you buy it from a local dealer or even a guy in his garage who can fix the thing if it fails. I always anticipate having to hand deliver a machine or card to a vendor for repair.
3. The PC family has the most software for terminal emulation and networking.
4. The PC is a known entity in large corporations and easily accepted in that environment.
5. The PC is relatively boring.
6. You may consider the new IBM PS/2 computers. Remember that they use a different bus and the add-in cards will be more expensive than for a PC-type machine.
7. A hard disk is essential in today's world of inefficient and slow loading software.

## The Mac

1. It's expensive and there are no clones.
2. Although it's easy to use, it's also complex and state of the art. This means that not all software works as advertised. Some processes are very time consuming because of the complexity of the computer.
3. Because of the operating system, floppy disk controller and large program size, it takes an eon for a program to load or a file to save. A hard disk is a necessity with a Mac. If you don't

want to fool around with add-ons, I'd recommend that you buy a Mac SE.

4. On the high end, Apple has developed an open architecture Mac called the Mac II. It uses a Nubus and is designed for multiple processors. This machine also uses a large screen and resembles a classic workstation. The variety of display cards and video displays makes it very appealing. There are also a few vendors of 80286 cards for the thing.

The idea is that if you want to put a Macintosh in your office but the specifications for purchase indicate IBM or compatible, you can buy one of these cards to meet the specs and later sell it to someone else. Let's face it, nobody wants to run MS-DOS on a Mac II.

5. The Mac machines can do things the IBM machines don't do well. Combined with an Apple LaserWriter, you can produce incredible and attractive documents almost effortlessly.

6. The Mac has to be recognized as a time waster. Because it does so much, there's a tendency to fine tune documents, reports and graphics using bit editors and to print out too many copies of a document, changing it until you get it right.

It's also hard to resist the temptation to add graphs, drawings and scanned images into documents, memos and letters. This is very time consuming. Although the finished result sometimes is astonishing, productivity falls off. The value of astonishing output has to be weighed against this factor.

7. The Mac is not boring.
8. Mac users are cliquish, so expect to be part of the clique if you begin to use this machine seriously. If you want to feel superior in your choice of a personal or desktop computer, a Mac should be your selection. Because many DEC users already feel that way, the Mac should fit right in.

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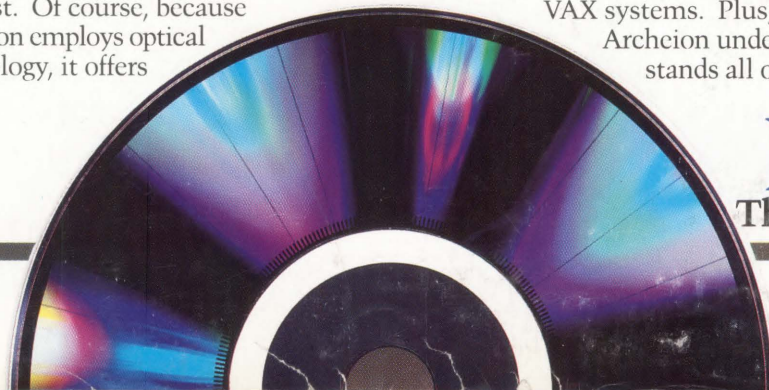
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