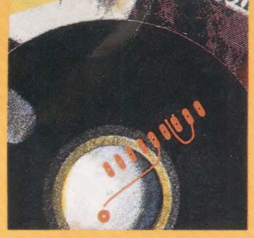

SOFTWARE

D-PICT

■ VAXSTATION II/GPX For Image Processing

■ MAC-To-VAX CAD/CAM Connection

■ Laptops Let You Compute On The Go

AUGUST ■ 1988

DEC Professional

An Independent Magazine from Professional Press

$4.00 ■ VOL. 7, NO. 8

Graphics: Seeing Is Believing

End-Users Make SMARTSTAR A Hot Property At Cain & Scott.

Cain & Scott, a Seattle-based commercial real estate firm, is a true end-user environment. "We have no programmers on board and I'm not a software person," says Research Director Patty Dupre. "But SMARTSTAR® documentation is so easy and your service hotline people so helpful, I was able to create an excellent forms-based application. It gives each of our brokers and consultants instant access to the near-3000 apartment buildings in our database. Productivity for reporting and querying our database is at least 10 times higher with this software. Everyone is on-line and they have no problems; they love using SMARTSTAR!"

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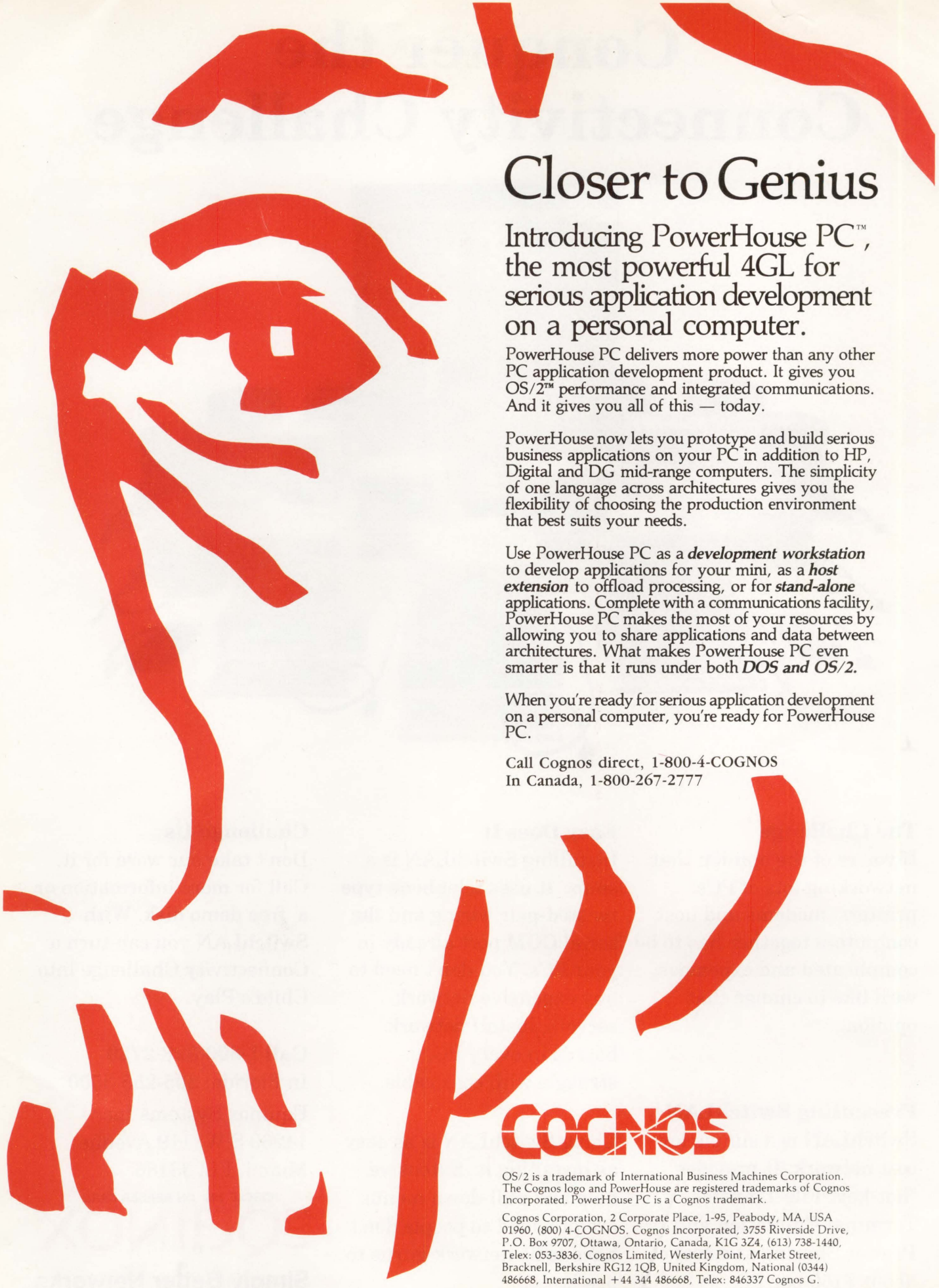

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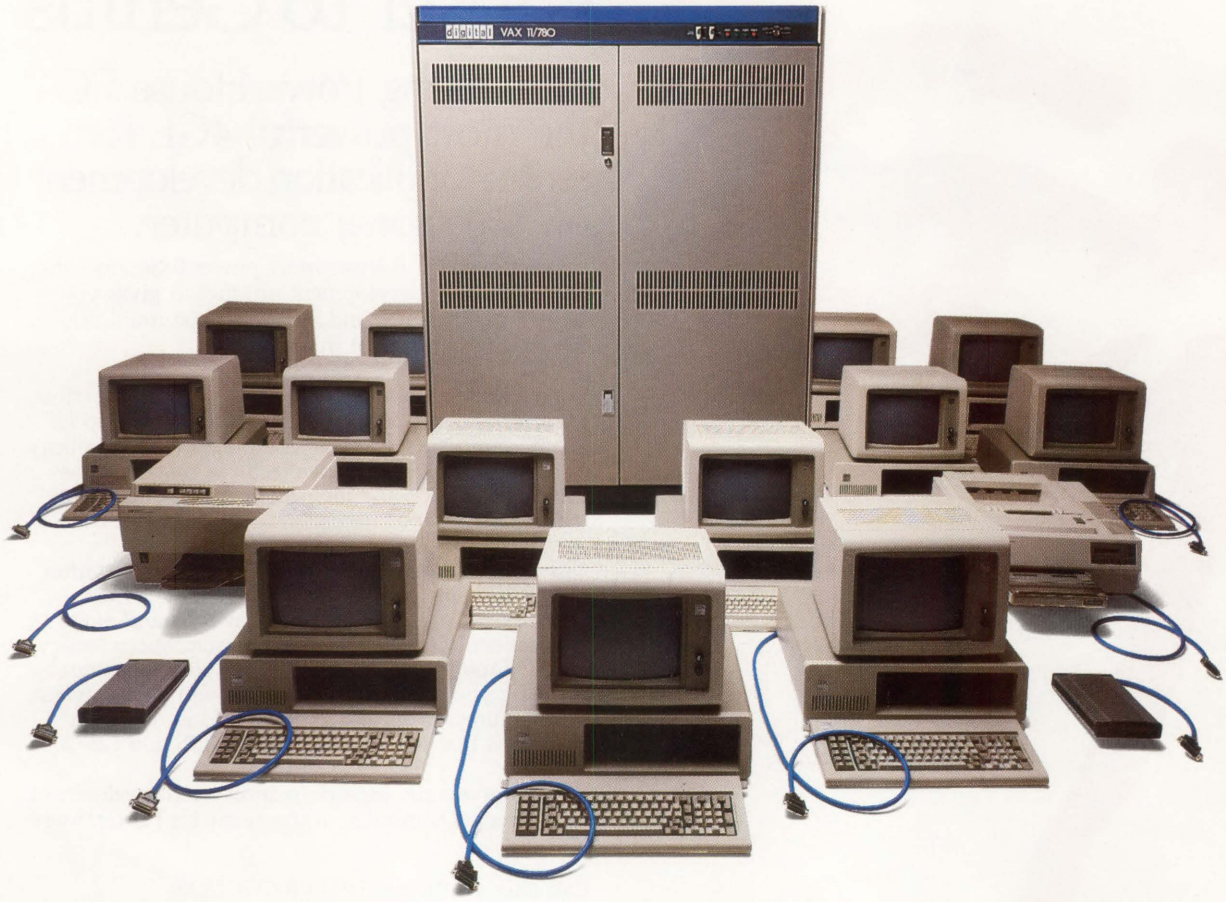
CIRCLE 108 ON READER CARD

Conquer the Connectivity Challenge



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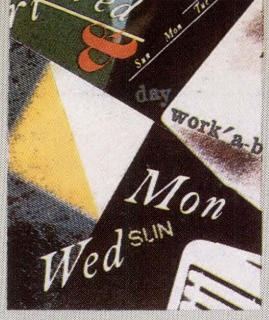


DEC Professional

CONTENTS

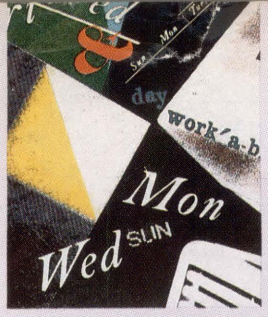
AUGUST 1988 VOL. 7, NO. 8

GRAPHICS

ON THE COVER:
The palm tree chart was created by Ross Richardson of Pansophic Systems Inc. using Pansophic's D-Pict Intellichart on a MICROVAX II and output on a Matrix PCR film recorder.

ARTICLES

Continued on page 4.



CONTENTS

Continued from page 3.

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

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CIRCLE 175 ON READER CARD

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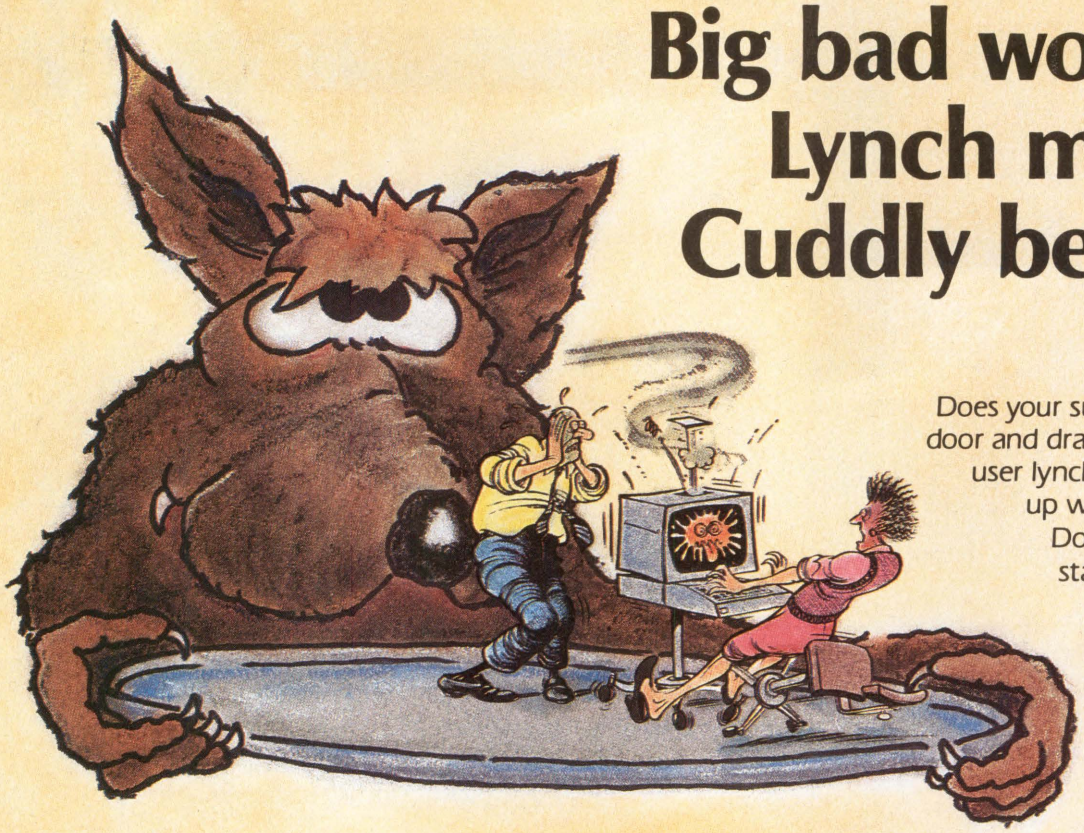
Big bad wolves? no. Lynch mobs? no. Cuddly bears? YES.



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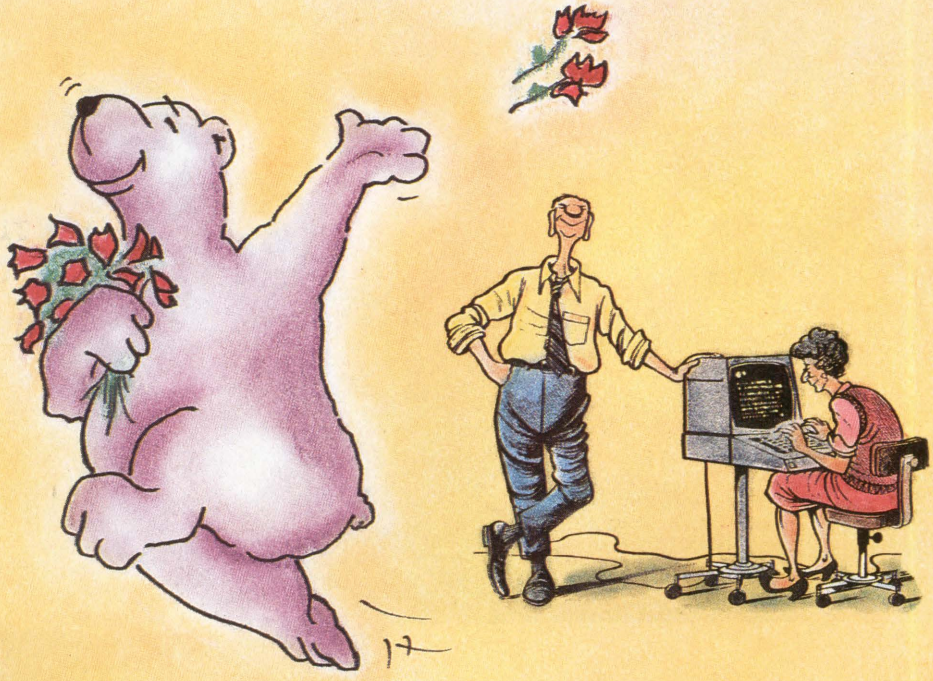

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CIRCLE 167 ON READER CARD

PUBLISHER

Carl B. Marbach

Who Has It Now?

On June 21, IBM announced its new line of midrange computers. Code-named Silverlake, the system will be called Application System/400 or AS/400. The new computers are the real "VAX killers" in the IBM arsenal.

Midrange computing, once called minicomputing, spans the roles of departmental computer and small business computer, with all they imply. A midrange computer can be inexpensive; IBM's new Model B10 will start at about $30,000. On the other hand, a large cluster of AS/400s will fall in the $1 million range; and yes, I said cluster! The AS/400 can grow from a desktop to a roomful, have a consistent architecture so that business and applications can have a growth path, and be easy to program and operate.

For some time, the domain of the midrange has been typified by the VAX. DEC's share of the midrange market has eroded IBM's gigantic lead in all phases of computing. IBM was most vulnerable in the middle because its architectures, System/36 and /38, were inconsistent, didn't grow big or small enough, and had trouble connecting among themselves, up to mainframes and down to PCs. "Digital has it now" referred to all these things.

IBM has decided that mainframe technology won't change drastically, that there will be three levels of computing in the IBM scheme, and that they'll all work together. The basic needs of each kind of computing can't be solved by a single architecture, but rather by PCs/workstations, midrange-sized interactive systems and large corporate data centers where mainframes rule.

This is a strategy that should make DEC stand up and take notice. IBM has become a viable VAX competitor.

The AS/400 comes as small as a MICROVAX II and grows to the size of an 8800. The promise of smaller and larger is implicit in any system architected today, and the AS/400 is no exception. DEC has a scalable architecture and a line of small and large computers, but IBM also has it now.

The AS/400 can act as a file and device server for PCs attached directly or by a token ring interface. The operating system is designed to have a large number of PCs in its network.

According to IBM, AS/400 systems can be connected so that a program running on one AS/400 can access a file stored on another transparently to both programmer and user. A program running on one AS/400 can use the high-speed printer of another AS/400.

We don't know yet if this is like DECNET or clustering. But if DEC has connectivity between processors, IBM also has it now.

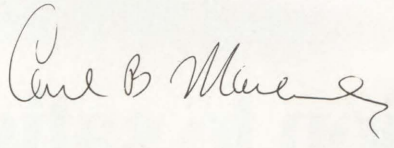
Assuming that the new IBM system is reasonably close to DEC in price/performance, then marketing and distribution will be critical. IBM expects that as many as two-thirds of the new systems will be sold by IBM Business Partners, who will number in the thousands.

While DEC carefully has dismembered its OEMs, IBM is attacking the DEC market with these Partners. Application developers will look closely at whether the VAX or the AS/400 will offer a better platform and which system and company provide the best opportunity for them to make money. Many won't forget that while Digital had it, it didn't share it with them. Now that DEC needs them, many may opt for the IBM solution.

IBM has chosen to fight by selling *solutions*, not mips. It's no accident that the new computer line is called Application System/400. Selling applications takes partnering. By closing the architecture with the BI bus, decimating the OEMs and being litigious with third parties, DEC has signaled that it doesn't take kindly to partners. Although many love the company's computers, there are many who don't love the company. In a competitive market, it could get tough for DEC.

Sometimes a punch in the teeth allows you to reassess what you've been doing. This might be a good time for DEC to acknowledge that its direction with its customers has been off the mark. The installed base, previously loyal but often ignored, may begin to look elsewhere. It's time for DEC to remember who pays its bills and for whom it works. The customers' best interests need to become DEC's corporate goal.

I wonder how the ads will read when Digital, Hewlett-Packard and IBM all have it now.



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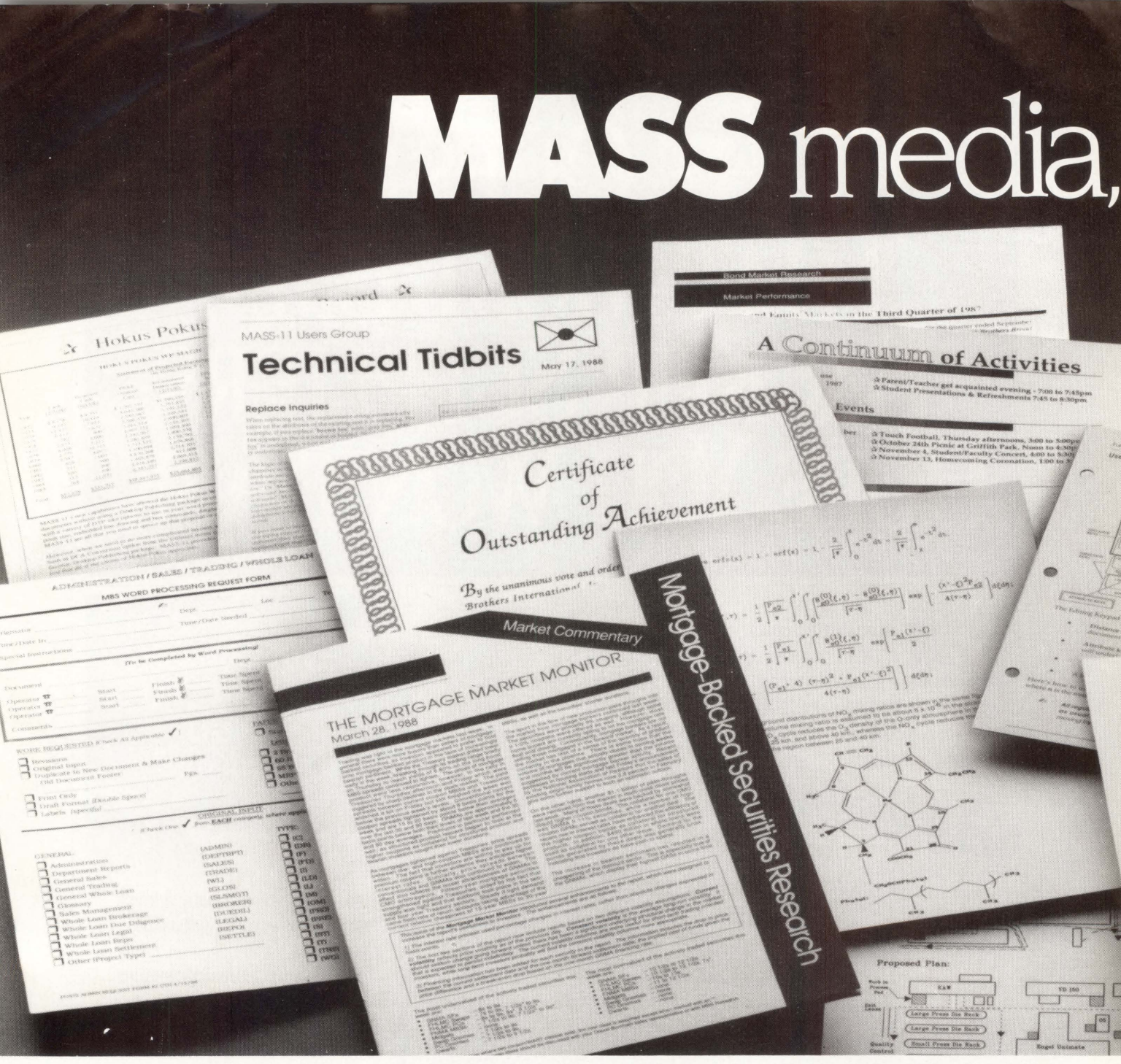

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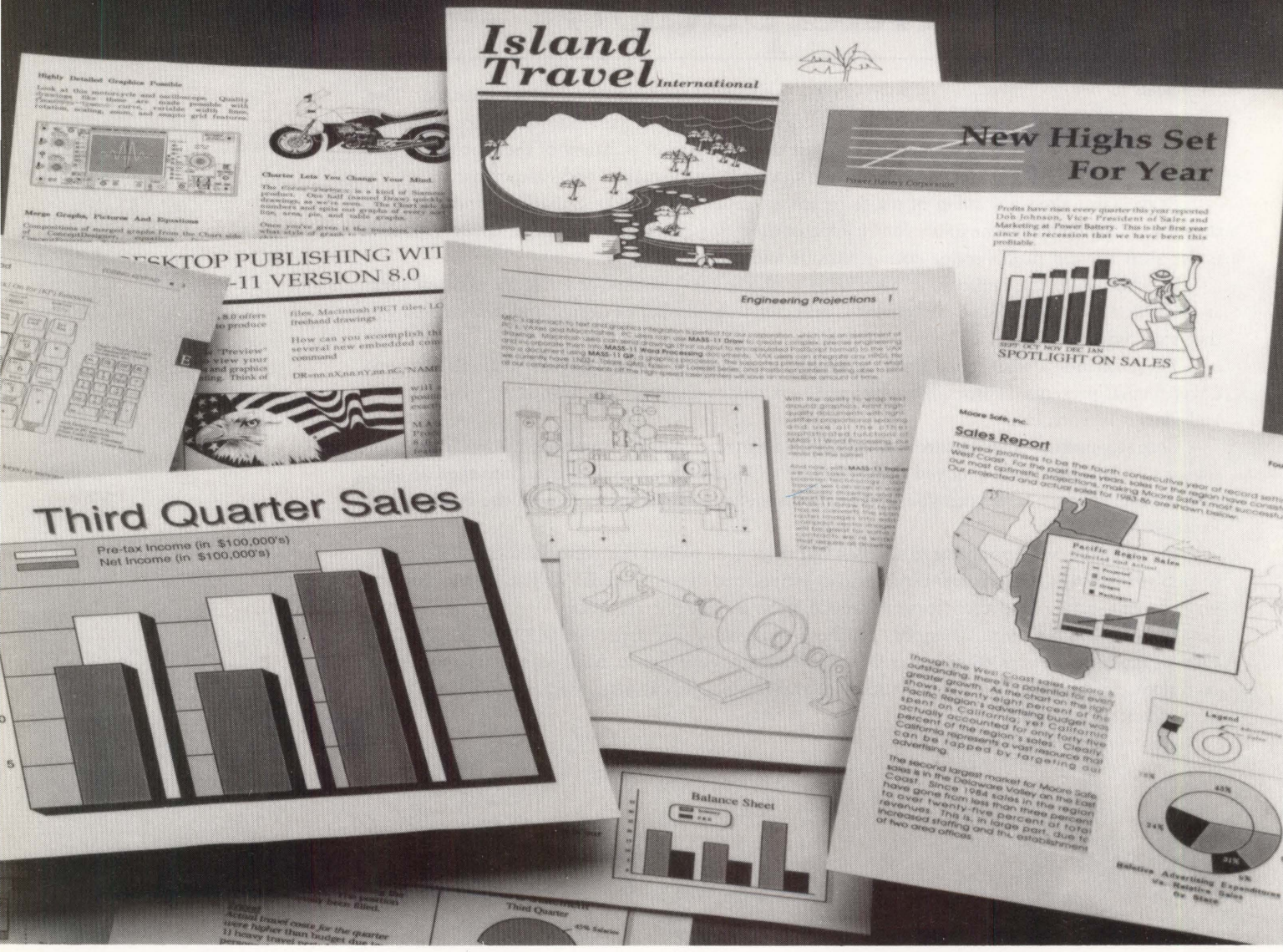

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CIRCLE 231 ON READER CARD

EDITORIAL

Lou Pilla

Anticipation

This is an exciting time for users of DEC computers and equipment. The new-product announcements that stream daily into our office represent how vibrant and robust the DEC market is. Many of these products can improve your system's power, functionality and ease of use.

At the same time, a number of major trends are influencing the DEC market. Undoubtedly, they'll alter the Digital scene in the future. One of these, for example, is the rise of UNIX. Another is the shift toward multivendor configurations and interoperability.

In addition to the enthusiasm associated with the DEC market, it's also an exciting time at *DEC PROFESSIONAL*. That excitement is reflected in a number of design and format changes that start with this issue.

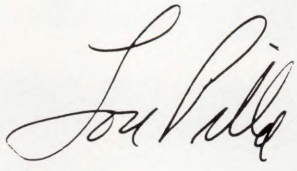
These include a redesigned front cover and an expanded From The Lab section. The new cover format presents a colorful, uncluttered look that will allow you to spot the major theme and stories in each issue.

Our streamlined Lab features an enhanced format in which to present in-depth product reviews. In addition, we've moved Dave Mallery's Cluster Chronicles column into the Lab section. In this context, he'll keep you up to date on the latest developments with the Professional Press VAXCLUSTER.

In the future, we'll continue to sharpen our design, as well as our editorial focus. We'll strive to publish relevant, timely, technical articles pinpointed at your needs. We'll keep looking for ways to fine-tune our presentation of information to make it accessible.

We'd like to hear your thoughts on these changes or any aspect of *DEC PROFESSIONAL*. Our primary concern is to serve, and even anticipate, your needs. Mail us a letter with your comments or drop us a few lines through ARIS. We'll publish as many contributions as we can in our Letters column.

Get in on the excitement!



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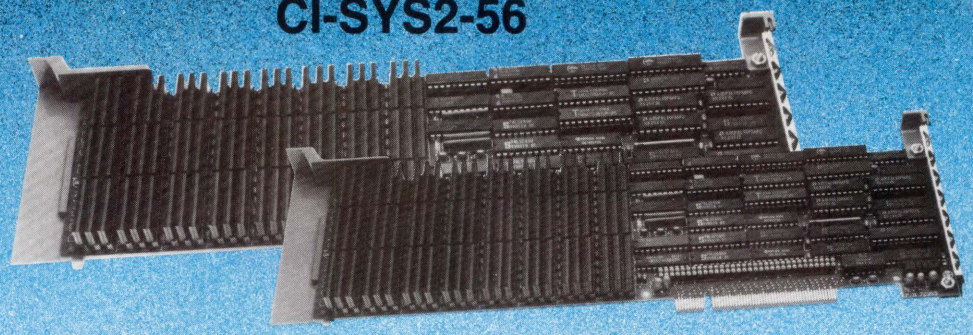

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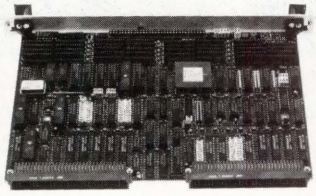

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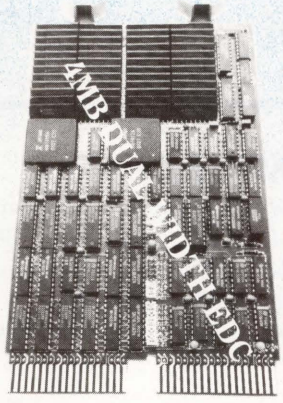

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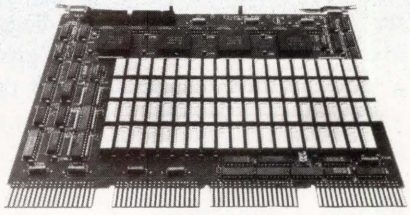

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CIRCLE 104 ON READER CARD

A Wonderful World of Memories!

LETTERS

DEFAULTS FOR NON-PRIVILEGED USERS

"The Scheme Of Things" by Betty Steele Adukoski (June 1988) addresses a fundamental, yet often misunderstood, concept of VMS. The article was long overdue.

However, contrary to the article's title, the default values for ownership and protection of new files/directories cited only apply to privileged users, specifically SYSPRV. A non-privileged user obtains default values from different sources.

I would amend Adukoski's table of security defaults on page 52 to include the default values for non-privileged users (see Table shown here). This gives a more detailed representation of the VMS protection scheme as it applies to all users.

Ron McCarthy
Enfield, Connecticut

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.

GRAFKIT REVISITED

We are writing in regard to the article titled "GRAFKIT" (June 1988) by David G. Goldstein. There's another product that is comparable to GRAFkit.

GRAFkit sells for $2,995 to $25,995, depending on CPU and number of users, and includes two binders of documentation. GRAFkit is similar to a product from the National Center for Atmospheric Research (NCAR). This product is distributed at a low cost and also includes two binders of instructions and examples. Code for the NCAR package is included and is easily modified for interactive use. The only stipulation on the NCAR package is that it cannot be repackaged or used as the basis of another product.

Harvey Edwards
Robert Mullen
NSTL Station, Mississippi

Editor's note: The National Center for Atmospheric Research has a product called NCAR Graphics that sells for $500 to universities, $1,000 to government agencies and $2,000 to private industry. To obtain information on NCAR Graphics, write: NCAR, Science Computing Division, Attention: Graphics Information, P.O. Box 3000, Boulder, CO 80307-3000; or call (303) 497-1201.

DC POWER FOR LANS

While reading "Coping With The Electronic Achilles' Heel" (June 1988), I was taken by a feeling of uneasiness.

Dr. Severinsky fully and articulately described the power problems facing site managers and computer users. In his presentation of protection devices and evaluation criteria, however, he'd have us believe that output AC power "that mimics the ideal utility power" is what's required in a power protection device. He failed to recognize that power supplies require AC power, LAN components require DC.

AC power transformations are inefficient, create devices with low power-to-weight ratios and are ultimately only

TABLE.

	Security Defaults			
	Privileged (SYSPRV ON)		Non-Privileged	
Action	UIC	Protection	UIC	Protection
Create new file	Directory	Default Process Protection	User UIC	Default Process Protection
Copy new file	Directory	Default Process Protection	User UIC	Default Process Protection
Previous version	Previous File	Previous File	User UIC	Default Process Protection
Subdirectory	Next Highest Directory	Next Highest Directory less Delete	User UIC	Next Highest Directory less Delete
Root directory	Disk Volume	MFD less Delete	SYSPRV Required to Create Root Directory	

Megabytes to go.

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(Data Shuttle 2000 illustrated)

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As for flexibility, you can configure any 5¼″ storage drive in canisters or specify one with a permanently mounted removable media back-up drive.

They come with a one-year warranty including shock related failure and are available with or without controllers or drives.

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CIRCLE 304 ON READER CARD

as efficient as internal AC-to-DC power supplies. Should the internal power supply fail, it doesn't matter what type wave form the protection device produces; the component is dead.

By recognizing the power requirement of the component and not solely the component's power supply, alternative solutions to the power problem evolve. The recent introduction of Continuous Parallel-power System (CPS) technology has produced efficient devices with high power-to-weight ratios that handle the problems expected of top-end UPS/SPS devices and provide power in the event of internal power supply failure.

Bob Hopkins
Atlanta, Georgia ■

CORRECTIONS

In addition to the companies listed under "Sources For SPS And UPS" in "Coping With The Electronic Achilles' Heel" in June, the following companies are sources for SPS and UPS:

Kalglo Electronics Co. Inc.
Colony Drive Industrial Park
6584 Ruch Rd.-E. Allen Twp.
Bethlehem, PA 18017-9359
(215) 837-0700
CIRCLE 556 ON READER CARD

RTE Deltec Corporation
2727 Kurtz St.
San Diego, CA 92110
(619) 291-4211
CIRCLE 555 ON READER CARD

Viteq Corporation
10000 Aerospace Rd.
Lanham, MD 20706
(301) 731-0400
CIRCLE 554 ON READER CARD

In June's From The Lab titled "Modular Office Wiring" by David W. Bynon, the address of Cabletron Systems was listed incorrectly. It should have read:

10 Main St., Box 6257
E. Rochester, NH 03867
(603) 332-9400
CIRCLE 565 ON READER CARD

AMAZING PDP-11 MIRACLE REVERSES THE AGING PROCESS.

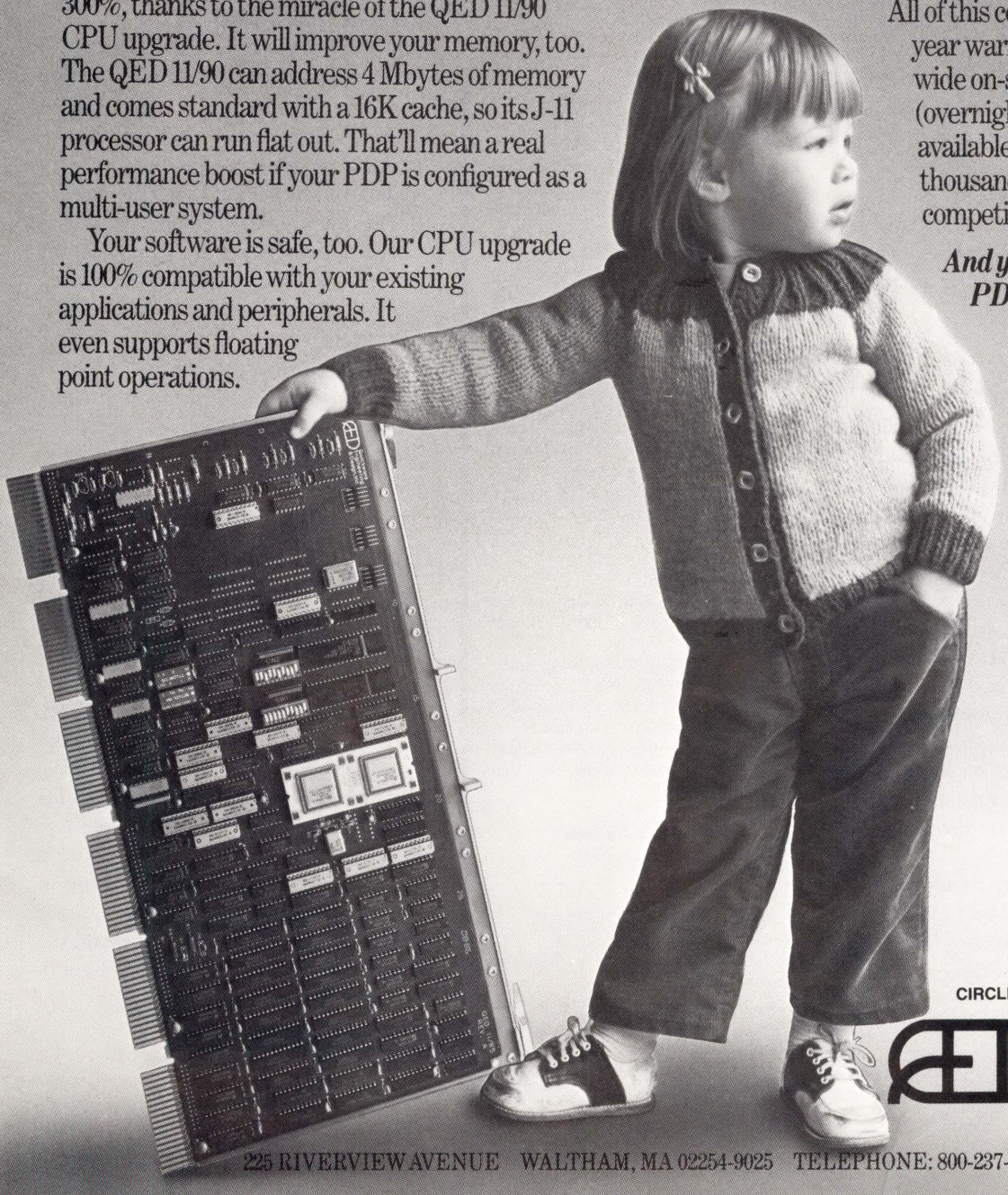
Now your PDP-11/04, 24, and 34 can perform like kids again.

You can increase system performance by up to 300%, thanks to the miracle of the QED 11/90 CPU upgrade. It will improve your memory, too. The QED 11/90 can address 4 Mbytes of memory and comes standard with a 16K cache, so its J-11 processor can run flat out. That'll mean a real performance boost if your PDP is configured as a multi-user system.

Your software is safe, too. Our CPU upgrade is 100% compatible with your existing applications and peripherals. It even supports floating point operations.

Surprisingly, the QED 11/90 can be installed in any PDP-11 in just a couple of minutes, because it fits all existing CPU's with no backplane changes. All of this comes with a one year warranty and nationwide on-site service (overnight replacement available). Best of all, it's thousands less than the competition.

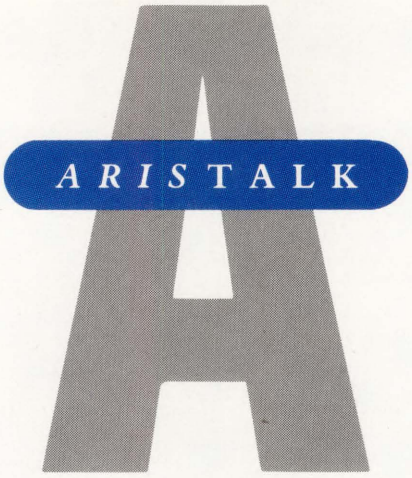
And you thought your PDP-11's were getting senile.



CIRCLE 319 ON READER CARD

QED QUICKWARE ENGINEERING & DESIGN, INC.

225 RIVERVIEW AVENUE WALTHAM, MA 02254-9025 TELEPHONE: 800-237-1185 IN MA 617-647-3800



AUTOMATIC BACKUP

QUERY:

Marty King *(SIG 12/MESS 219):* I'd like to know how to create a process that runs all the time that will do a backup automatically every night. The RUN command is only for executable files, and SPAWN creates a subprocess that ends when the main process goes away.

REPLIES:

Eric S. Duggan *(SIG 12/MESS 223):* You need to create a *.COM file that has your backup commands in it and has as its last line:

```
$ SUBMIT/KEEP/AFTER =
  "TOMORROW + 02:00" BACKUP
```

Then you need to submit BACKUP.COM to a batch queue using the same command. Every morning at 2 a.m., your backups will be performed. Obviously, you need a batch queue running on your system, and if you're planning to back up to tape, this won't work unless you know your backup won't consume more than one tape, depending on how many tape drives you have.

Chris Gould *(SIG 12/MESS 225):* I run RSX-11/M on an 11/73. For backups, I have a DCL routine that's spawned by an installed task and run via the RUN/SCHEDULE: option.

It works very well, even prompting the operator when to load and unload our disks (we back up on RLO2s). We've used this routine for about three years without problems.

How To Use ARIS

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

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

Recent Changes

A new SIG has been added to the Message Center. It's 28 — Laser Printers.

As a *DEC PROFESSIONAL* subscriber, you can download any of the programs marked with an ARIS symbol in *DEC PROFESSIONAL*. You can access programs from *VAX PROFESSIONAL* only by also subscribing to that publication.

XMODEM is available.
KERMIT is available.

SIG Identification

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

22 .....Mass Storage
28 .....Laser Printers

MAXTOR, RA81s AND 8MMs

QUERY:

Fran Shields *(SIG 22/MESS 185):* I have a MICROVAX II and three RA81s. Unfortunately, this system isn't in a conditioned environment, and the temperature generally is 70 to 80 degrees. Rather than upgrading the environment, which can't be done in the near future, I've considered getting Maxtor disks to reduce the amount of heat generated by the system; RA81s generate approximately 2200 BTUs per hour and Maxtor about 300. I can get four Maxtors to replace my RAs and reduce the heat threefold.

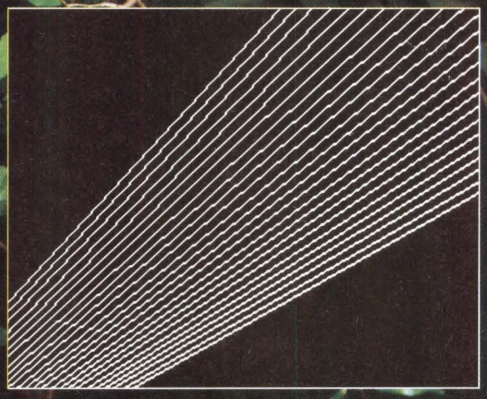
I've also considered getting an SI 8mm tape drive because one of the RAs is used as a backup disk, and I need the RAs for another location.

Any thoughts on these drives and my computer room environment?

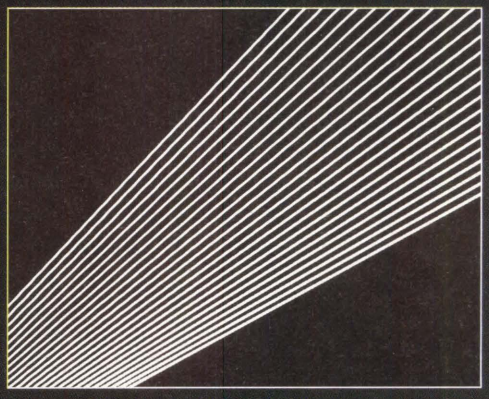
REPLIES:

Bruce A. Grembowski *(SIG 22/MESS 190):* Fran, I've seen very few problems with the Maxtor drives my clients use. In fact, only one problem has been pinned down to a Maxtor drive in three years. These are smaller (140 MB) than the RA81, but hopefully Maxtor will have the same degree of reliability in its bigger drives. As for environment, I've been told that up to 80 degrees is OK as long as there isn't a big fluctuation in temperature. Our PDP's air conditioner broke down one Friday night, and the thermometer was broken when I got in

Codonics brings you the first affordable graphics terminal without the jaggies



The competition's 1024 x 780 pixel display



Codonics' true-line™ display

The Codonics 4096. Finally, a graphics terminal with Tektronix 4010/4014 emulation, DEC VT320/220/100 alphanumerics and no jaggies.

A few features:

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Monday morning; it was more than 100 degrees. We lost only one of the four RA80s. I don't know if the Maxtor can handle that kind of heat, but the ones my clients have aren't in climate-controlled rooms, and they seem to do OK.

Guy Oliva *(SIG 22/MESS 193):* We've purchased a Transitional Technologies (TTI) 8mm tape drive and will be installing it on an 8700 with a UNIBUS controller. Then we'll test it to death. We chose TTI because of its UNIBUS controller option and some good references. Assuming the testing goes well, we might purchase other units, including the SI59 if it gets a UNIBUS controller. Ideally, I'd like a BI or HSC interface, but no one has that right now. Based on some reviews I've read, 8mm and VHS definitely are worth considering as a means to back up large disk farms.

RUMOR HAS IT

Dr. R: MICROPRISM, a 16-mip RISC microprocessor for workstations only is being tested somewhere in Littleton, Massachusetts. Running under the EMERALD operating system (VMS and UNIX emulations), it might appear sometime in 1989.

More certain is the debut of Pandamate, a low-end 80386 VAXMATE, at DECWORLD 1988. PVAX is delayed until the Anaheim DECUS.

LASER LIGHT

QUERY:

Dan Fraser *(SIG 28/MESS 6):* I have an LN03 printer that refuses to reset the light indicating a need for periodic maintenance on the printer. I have placed two containers of toner in the system and run two maintenance kits through it, and it still flashes the Need Maintenance light. Can anyone help me? I've powered it down and back up several times.

REPLIES:

Robert G. Schraffath *(SIG 28/MESS 7):* I had a problem similar to yours at my previous job. I called DEC and was told not to worry. There's some kind of sensor inside the LN03 that occasionally needs to be checked. Offhand, I can't remember what it is.

Although the printer will work fine, if the light annoys you, you have two choices:

1. If the printer is under contract, have it serviced.
2. Place a sticker over the light (no kidding, we did).

The best indicators for maintenance are the quality of the print and the number of pages printed since the last kit change; 10,000 pages is the recommended interval. It's a good idea to keep a log of the page-counter number every time you install a maintenance kit.

John Lappetito *(SIG 28/MESS 7):* There's a difference between the Maintenance light and the Add Toner light. When the Maintenance light comes on, you need to install a maintenance kit; we get ours from DEC, but other vendors carry them.

This is more than adding toner. Change the quenching lamp, ozone filter and OPC cartridge in addition to adding toner. If you can add paper, you can do maintenance on an LN03 (I've done it several times).

Jonathan M. Prigot *(SIG 28/MESS 8):* Assuming that you want to shut off the light and not ignore it, open the top of the printer to gain access to the fuser unit. Unlatch and swivel up the fuser. If you look in from the back of the printer toward the front, you'll see the print belt. Above that on the left (as you face the front of the printer) is the reset switch.

Pull out the print drawer (with the toner and print belt), and you'll see a pin on the front of the switch. Normally a breakaway tab on a new print belt will push in this pin when you replace the belt. If you push in the pin, it will have the same effect. ■

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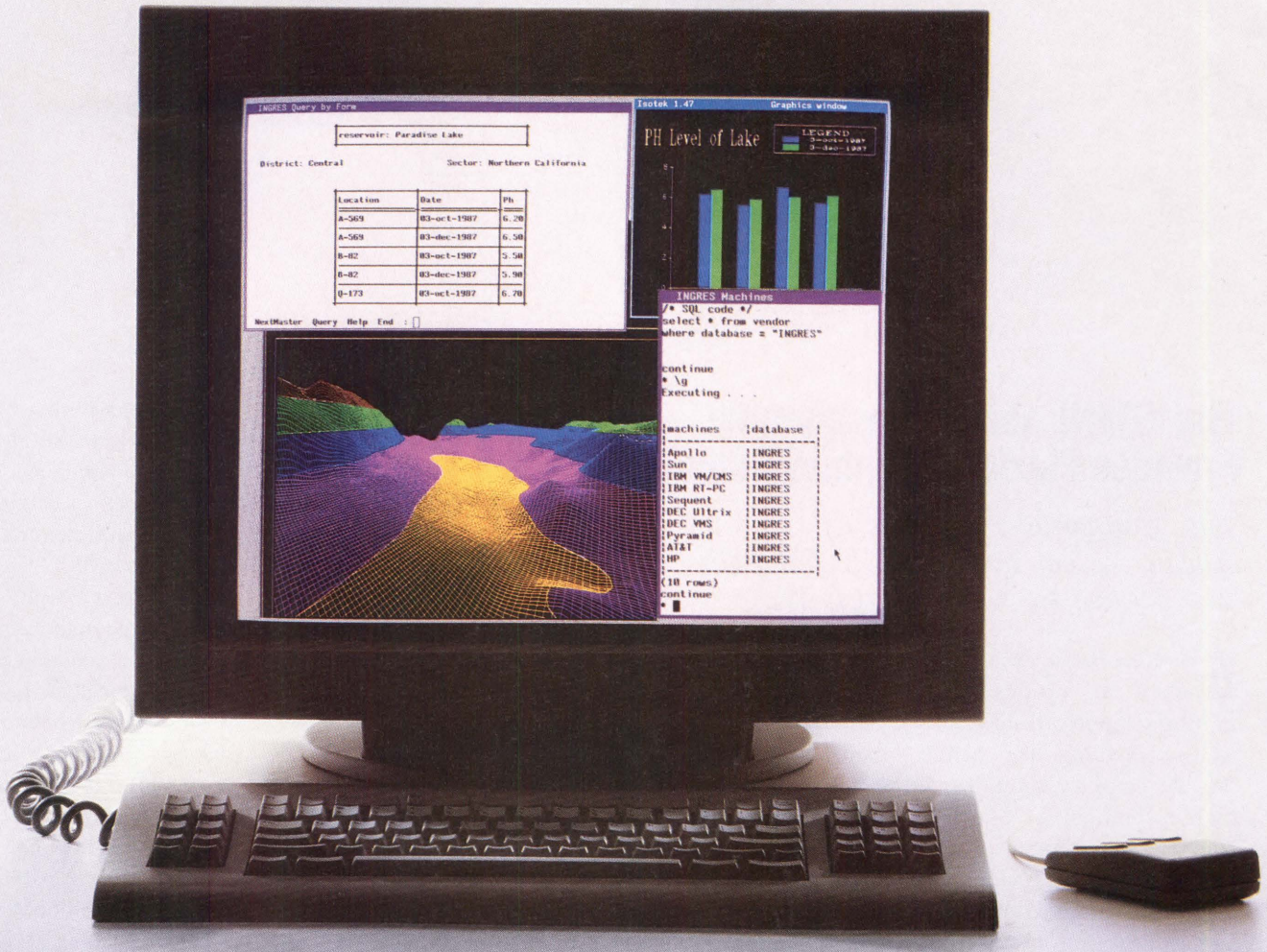

Power. Most people take it for granted. But with the power of INGRES DBMS you can maximize workstation productivity. And that's something no one takes for granted.

Here's what INGRES means to you: Our distributed database capabilities give you the power to put the right information in the hands of the right users, across a network of different operating systems, databases and hardware.

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CIRCLE 155 ON READER CARD

INGRES Distributed DBMS for VAX/VMS, UNIX, MS-DOS, IBM VM/CMS, MVS. Relational Technology, 1080 Marina Village Parkway, Alameda, CA 94501

PRODUCT WATCH

The OMNI 1500 Transportable Provides Flexible Graphics Solutions

The Transportable's Flexibility Allows System Integrators To Configure The System In A Variety Of Ways

Everyone has a wish list when it comes to graphics applications. It reads something like this: flexible graphics solutions, high resolution, a 15-inch color monitor, easy-to-use firmware and large memory.

Omnicomp Graphics Corporation of Houston, Texas, grants these graphics wishes with the OMNI 1500 Transportable. The Transportable is a powerful, self-contained, high-resolution graphics system that can be stored with a standard 9-U NATO (EDAC) case, providing protection from impact, temperature change, humidity and other environmental demands for field use. The Transportable is designed to support multiple screen applications including process control/industrial automation and military workstations.

The Transportable standalone graphics system includes a 15-inch monitor, a full-function keyboard and a wide range of alternative configurations of motherboards, communications interfaces and mass storage options. System integrators can configure the system in a number of ways. For example, in graphics display list processing, the system is equipped with Omnicomp's OMNI 1500 Display List Processor (DLP), which is based on Intel's 80386 microprocessor/80387 numeric coprocessor.

With the 1500 DLP being local to the graphics workstation instead of the host, the volume of bus traffic and host computation associated with display list processing is alleviated by providing extended ISO/ANSI Graphics Kernel Standard (GKS) functionality on a single PC/AT add-in circuit card. Up to 4 MB of high-density dynamic RAM enables the user to manipulate an image without returning to the host computer and slowing processing speed.

The Transportable can be equipped with a passive backplane or 80386/80387 motherboard with an Omnicomp OMNI 1400 Graphics Display Controller (GDC) or OMNI 1600 GDC. The 1400 GDC offers high-speed drawing and high resolution (2048 x 1024 image memory with four or eight graphics planes of up to 1408 x 1024 display resolution) for the IBM PC/AT and compatibles, and supports the IBM CGA graphics standard. Two overlay planes allow insertion of other data without affecting the images. The 1400 GDC supports displays of 256 colors with a palette of up to 16.7 million colors.

All configurations of the 1500 Transportable offer the OMNI*KERNEL System. This enables system integrators to write complex technical applications software that's portable between host computers from several different vendors.

The OMNI 1500 Transportable lists for $12,950.

For further details, contact Omnicomp Graphics Corporation, 1734 West Belt North, Houston, TX 77043; (713) 464-2990.

Circle 445 on reader card

—Suzanne Garr

The OMNI 1500 Transportable offers powerful graphics capabilities in a single, self-contained unit.

Once there were four publications* providing *"need to know"* information for today's VAX manager...

...now there are again!

Sys$System, from Preferred Technologies, is a newsletter written specifically for system managers and operators that are responsible for maintaining the efficient operation of one or more VAX systems. *Sys$System* provides "need to know" information, product updates, market insight, recommendations, and guidelines for proper VAX system management. It's a valuable tool for both new and experienced VAX managers.

Eliminating the myth and lore that has been handed down from manager to manager and standardizing system management methods, *Sys$System* includes commentary on disk performance, disk management, optimization, space management, system tuning, security management, performance measurement, data integrity, and more.

System managers and operators may obtain a complimentary copy of *Sys$System* by contacting Preferred Technologies toll free at:

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* The four major publications covering the DEC market included the DEC Professional, Digital News, Digital Review, and Hardcopy. As of June, 1988, Hardcopy magazine has been purchased from Seldin Publishing by Digital News Publishing Co.

Since 1981, Hardcopy, the oldest of the four major DEC specific publications, provided DEC users with important insight and information about the use and management of DEC systems. Thank you, Hardcopy, for the years of dedication in providing a valuable service to DEC users worldwide.

CIRCLE 308 ON READER CARD

Magnetic Printing Process Targets High-Volume Applications

Bull Adds A Page-Per-Second Printer To Its MP6000 Family

Mainframe and clustered sites responsible for high-volume data processing activities often run applications that require high-volume printers. This can include any batch-type, mass-production job from bar coding and mailings to forms, checks and labels.

Laser printers and other non-impact printing approaches have been introduced to these industries, but lower-cost line printers, an older technology with better maintenance records, have dominated. Still, momentum is building quickly for the non-impact machines. Dataquest of San Jose, California, for example, predicts that the non-impact printer market will reach $3.3 billion by the end of 1988, while the line printer market declines.

With last year's MP6090 printer, Bull Peripherals of Waltham, Massachusetts, a wholly owned subsidiary of Groupe Bull of France, introduced an alternative non-impact technology called magnetography, which has contributed to the momentum for non-impact devices. Bull has followed the MP6090 with the MP6060, which is capable of printing 60 pages per minute.

Bull designed the MP6000 family, comprising the 6090 and 6060, in an effort to reduce costs associated with large printing jobs, while keeping print speeds as high as possible. Both sell for under $100,000.

The 6060 features approximately 200 moving parts (less than similarly sized laser printers) and a footprint half the size of most laser printers in mainframe sites. At less than 62 dB, the MP6000s are quieter than the average line printer.

Magnetography is closer to disk drive technology than photocopying technology, which laser printing adapts. Page images are magnetically stored on a stainless steel drum. The drum rotates across writing heads that magnetize character images on the drum's surface. A raster image microprocessor inside the printer stores images.

The drum then passes through toner, which adheres to the magnetized areas. A heat and fusing process that's integral to magnetography fixes the toner to the page.

Dot placement and letter integrity are the result of a proprietary rectangular print head. In fact, the output appears similar to laser printer output.

At 60 pages per minute, the MP6060 takes about 20 minutes to print out a standard-sized box of paper. The print resolution is 240 dots per inch.

The user can control the printer's functions and switch channels from an external operating panel or from software through a terminal. A system diskette with a user menu can be loaded directly into the printer.

From the operator's panel, the user also can select up to 99 copies and any of four ASCII character sets. Each set contains 96 different characters. The paper size is also selectable: It ranges from 6.5 to 15.75 inches in width and from 6.5 to 14 inches in length.

The printer offers selectable horizontal densities of 10, 12 or 15 characters per inch and vertical densities of 6, 8 or 10 lines per inch.

The MP6000s have a Dataproducts interface that connects to the UNIBUS, BI-bus or Q-bus — any DEC system with a DMF 32 or Wespercorp DCP 1100 controller. The printers are also compatible with IBM's 3000 and 4300 series through third-party solutions.

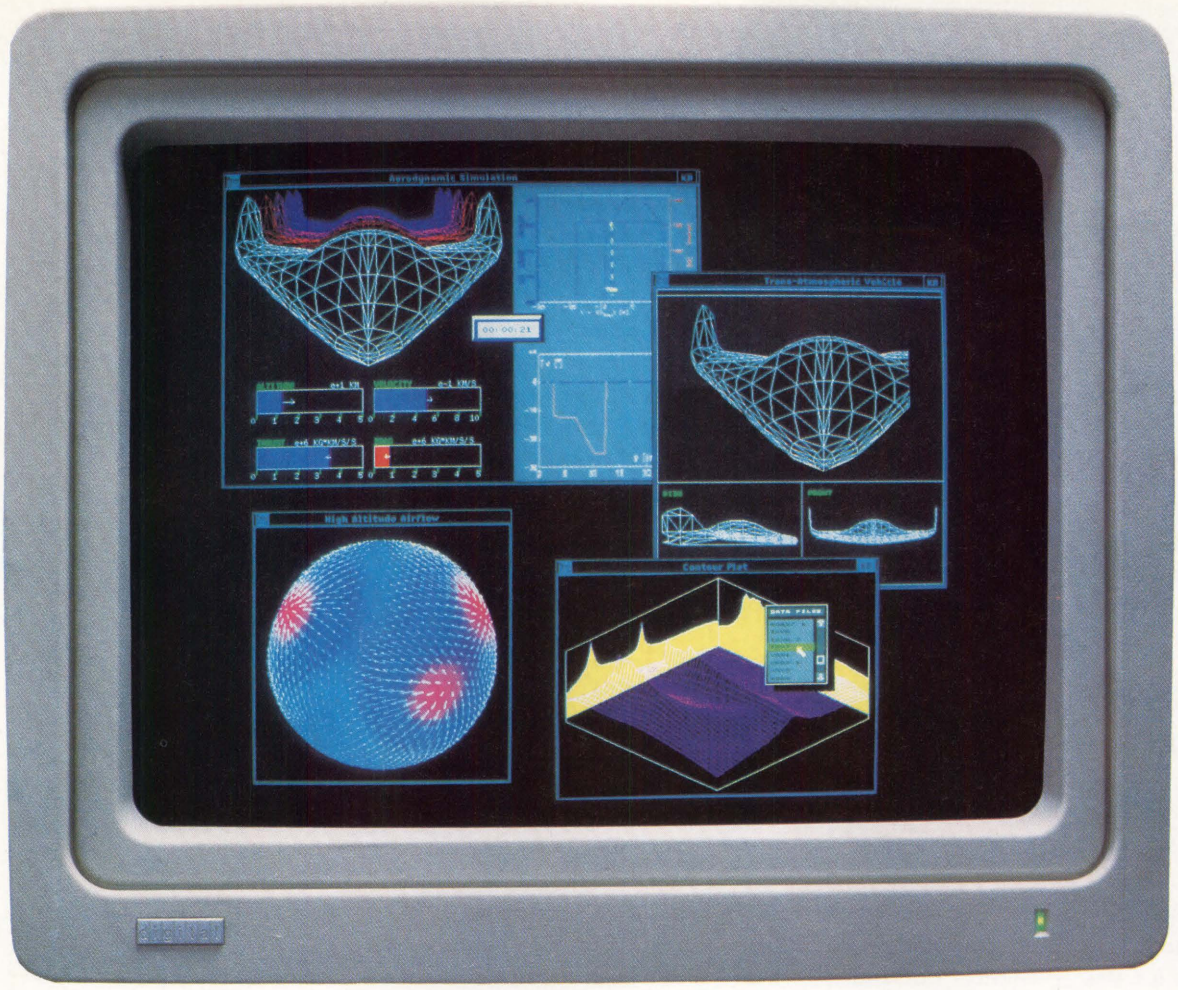
The MP6060 lists at $77,851. Bull plans to market the MP6060 through distributors and VARs.

For more information, contact Bull Peripherals Corp., 303 Wyman St., Waltham, MA 02154; (617) 890-5200.

Circle 448 on reader card

—Evan Birkhead

The MP6060 from Bull Peripherals operates at 60 ppm.



Multiple graphics windows and multiple views are shown in this aerodynamic simulation application. One view is dedicated to rapid updates of data, shown as a strip chart. This view is selectively updated as data changes; the model's view is updated only when the application requests the update.

Software simulations may be disabled on a per-view basis, providing rapid view update.

Pop-up menus and custom cursors are created using GFX-4000's raster operations.

GFX-4000™ from Precision Visuals

Graphics Software Tools for Technical Workstations

The Product GFX-4000 is a high-performance graphics software tools package for application developers. With functionality drawn extensively from the proposed PHIGS* standard, GFX-4000 is enhanced to improve control over functions like windowing and viewing. Our software is optimized for VAXstations to get the most from your hardware.

The Performance GFX-4000 is built for speed. Pictures can be modified quickly using the quick update viewing feature. Graphic information can be sent directly to the screen using temporary data structures, rather than accessing central structure storage. Structures are "posted-to-views," saving time by updating views of the same graphics structures independently. Raster operations are also available to store and manipulate images.

The Integration GFX-4000 will fit your current and future programming environments. It's tightly integrated with the VWS (also known as UIS) window manager, giving the application full control over window management. A forthcoming release will provide easy application transition to DEC Windows. GFX-4000 supports the CGM standard so you can exchange pictures with the outside world, and you can display your images on most hardcopy devices.

GFX-4000 supports VAXstations running VMS (including models 2000, II, II/RC, II/GPX, 3200, and 3500). Written in 'C', GFX-4000 allows programmers to use either 'C' or FORTRAN subroutine interfaces.

The Features Hierarchical Structures and Structure Editing ■ Multiple Graphics Windows Within a Single Process ■ Multiple Views Per Window ■ Nameset Filtering for Selective Display/Suppression of Graphics Elements ■ Presentation-quality software fonts, in addition to support for hardware text ■ PHIGS standard graphics primitives plus added 2D/3D planar and 3D shell primitives ■ Extensive user support is available through Precision Visuals' telephone HelpLine service and local technical support engineers.

The Applications Software developers use GFX-4000 in a variety of graphics applications, such as data analysis, data display, process modeling or control, molecular modeling, manufacturing simulation, ME, EE and AEC CAD, and earth sciences.

The Offer To qualify for a free demonstration copy of GFX-4000 or to get complete technical information, phone Chris Logan at 303/530-9000. If your software project requires graphics on a VAXstation, give us a call!

Precision Visuals®

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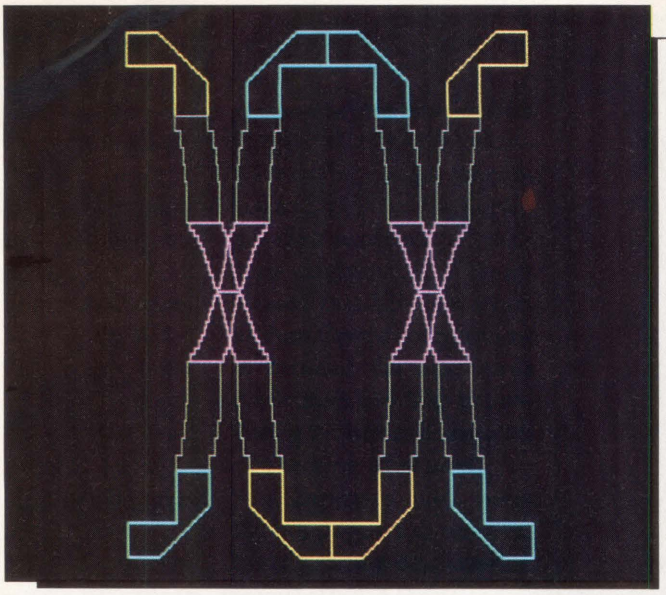
*Programmer's Hierarchical Interactive Graphics System

CIRCLE 148 ON READER CARD



A sample of a MiCAD II autoprocessed drawing.

CAD Software For Microwave Designers

EEsof Makes Design Of Complex Microwave Circuits 'EEasy'

Transforming microwave design simulations into production artwork is a task handled by custom software written by EEsof Inc., Westlake Village, California.

A typical microwave circuit design starts with simulations using programs such as EEsof's Touchstone for linear circuit simulation, Microwave SPICE for nonlinear simulations or Libra, which performs harmonic-balance simulation and nonlinear circuit analysis.

Touchstone, for example, provides an interactive design environment with windowing capability. A library of more than 120 element models, eight optimizers, statistical tools and an interactive tuner are supplied. Touchstone can be used for Monte Carlo yield prediction and supports a number of network analyzers, including the Wiltron Model 360 and Hewlett-Packard 8510, 8753 and 3577. It's suited ideally for the design of MMICs, amplifier networks, filters, microstrip and stripline circuits, multiplexers, oscillators, diplexers and many other RF/microwave circuits.

Once circuits are designed and optimized, a circuit file is produced and layout work can begin. Here's where EEsof's MiCAD II comes into the picture. Circuit designers use circuit files created by Touchstone, Libra and Microwave SPICE as input to MiCAD II, which can create drawings automatically from design data. Drawings then can be analyzed for errors or design changes.

MiCAD's graphics editor allows the drawing to be changed quickly. The graphics editor provides a powerful macro capability to allow custom element design. Designers can create their own element libraries to be used in future projects. Text can be added to any drawing in block or stick-letter style. In addition to working with previously created circuit files, designers can use MiCAD II's graphics editor to create their own designs from scratch.

The program supports microstrip, stripline, suspended substrate elements and coplanar waveguide elements.

MiCAD II's interface features expanded on-screen prompting and help menus, "rubber-banding" cursor capability, pop-up windows, mouse control and dual-monitor operation.

Up to 500 design layers can be held in MiCAD II's hierarchical database to handle complex designs, such as supercomponents, stripline layouts and microstrip. Layers and mask levels can be referenced by user-defined names, making their recall easy. Up to 35 drawing files can be active at once.

MiCAD II drawings and windows can be sent to any supported device including artwork generators, such as the Aristo Graphics Coordinatograph, Gerber Photoplotter, Hewlett-Packard 7470, 7475 and 7550 plotters, Hewlett-Packard 7580/85/86 Drafting Plotters, Wild Heerbrugg Aviotab TA2 and Calma GDSII.

At Pennsylvania State University, Touchstone and MiCAD II are used extensively to supplement lectures and labs dealing with microwave circuit design. According to Dr. Lynn Carpenter, associate professor of electrical engineering, "We are pleased that EEsof is a part of Penn State's commitment to broaden the microwave curriculum and help in producing the best in microwave engineering graduates."

Carpenter also notes EEsof's support as an asset. EEsof provides new licensees with a one-year unlimited telephone support plan. Carpenter feels that MiCAD II provides a student with a solid introduction to CAD programs in general and will help graduates use CAD software on the job.

Touchstone, Libra, Microwave SPICE and MiCAD II are available for the VAX and VAXSTATION. All EEsof products feature its General User Interface (GUI), which unifies user, graphic, hardware and operating system interfaces. This establishes a common ground for all EEsof products and ensures software and hardware independence.

Prices for Touchstone start at $14,000. Libra, which includes Touchstone, starts at $23,000. Both Microwave SPICE and MiCAD II start at $11,000.

EEsof has a complete line of software for the microwave and RF circuit designer.

For further information, contact EEsof Inc., 5795 Lindero Canyon Rd., Westlake Village, CA 91362; (818) 991-7530.

Circle 447 on reader card

—David B. Miller

From what they say, you'd think that all terminal manufacturers are industry leaders. And that their terminals provide unmatched performance, emulation, reliability, value, and just about anything else you could want. We say all that too, about GraphOn. And about our terminals. So we're not surprised that the other guys say it. They're not about to say that their terminals are almost as good as ours. But the fact is that people *are buying* terminals that are almost as good as ours. We know you want the best DEC and Tek emulations you can get—along with all the other features of a top terminal. So we're happy to send you specifications and other information about GraphOn monochrome and color terminals, but… It's one thing to read about all the features and benefits of a terminal. It's another thing to actually experience them. Face it. There's really only one way to judge a terminal. And that's to see it at work on your own applications, in your own environment. Phone us today for your special hands-on demonstration. 1-800-GRAPHON.

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CIRCLE 265 ON READER CARD

Chipcom's Fiber Optic Ethernet

Active Star Topology Uses Fiber Cable For Network Backbone

As the popularity of fiber optic cabling technology increases, its applicability in Ethernet networks becomes more apparent. Seeing an important market emerging, DEC and third parties are lobbying for fiber optic standards that have been virtually non-existent. ANSI X3T9.5 now defines a Fiber Data Distributed Interface (FDDI) standard, while an IEEE specification describes how to do Ethernet collision detection (CSMA/CD).

Recently, DEC announced that it will integrate the FDDI standard into DECconnect. "Future higher-speed FDDI networks will be used as backbone solutions or for special applications and will complement DEC's industry-standard successful Ethernet LAN solution," said William Johnson, DEC's vice president for distributed systems.

Fiber optics is now less expensive than broadband or baseband for connecting Ethernet subnetworks. Historically, a fundamental drawback of fiber optics has been that it supports only one connection per fiber. But it has found a home in long-distance networks (it's the foundation of Europe's PTTs) and in sites where future expansion is a key consideration.

Indeed, as a backbone, fiber optics has fewer drawbacks. Installations are increasing rapidly in government, where high data security is important, and in manufacturing, where its noise immunity is an advantage.

One estimate projects that the fiber optic Ethernet industry will reach $90 to $100 million in 1990 or 10 to 15 percent of all Ethernet cabling. Five years ago, the market was zero.

Now Chipcom Corporation of Waltham, Massachusetts, has joined the growing legion of manufacturers who are acknowledging that fiber optics is ready to take off. Implementing its broadband expertise, Chipcom is offering ORnet, an Ethernet coupler and fiber optic transceiver that's intended to sustain the original ideas behind Ethernet.

Chipcom is promoting ORnet as an ideal Ethernet backbone. We probably can expect the next wave of fiber optics vendors to promote fiber connections between buildings, while twisted pair will continue to handle data between local-area desktops.

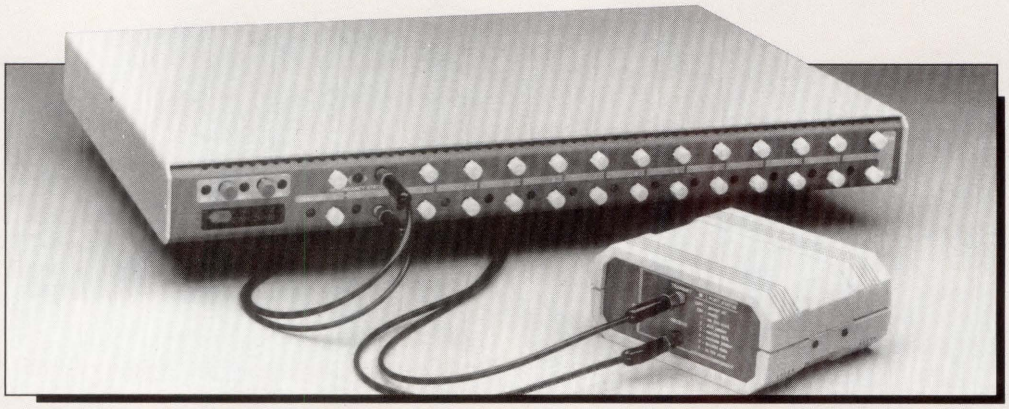
ORnet connects with all networking devices that comply with Ethernet 2.0 and IEEE 802.3. Besides DEC products, this includes products from networking giants Sun, Novell, 3Com and a broad range of LAN devices from single nodes to the largest multinode subnetworks. The name is derived from Orion, the constellation noted for connecting several stars of a variety of sizes.

A full set of internal diagnostics was built into both the 14-port active star coupler and the transceiver to make installation easier, according to Chipcom. ORnet uses a 15-pin AUI transceiver interface connector.

Certain links can be configured to be redundant, and an optional redundant power supply is also available. Therefore, if a link goes down, a backup link keeps data moving. Likewise, if a power failure occurs, replacing the power supply doesn't involve replacing the star.

The advantage of this, maintains Chipcom, is that even if the star goes down, the network doesn't. By adding substars, the topology allows your network to grow as a tree, ring or bus.

An important feature of ORnet's diagnostics is a jabbering controller, which protects the network from streaming failures and notifies the network manager of the problem. The transceiver also can detect no light or low light coming from a star and send a signal to that star. Status of all ports of a given star can be monitored.



The ORnet star coupler (top) and transceiver feature extensive diagnostics and redundancy.

ORnet features data transfer rates of 10 Mbps (specified in 802.3) and has full CSMA/CD. The coupler/transceiver configuration requires no repeaters, but it can be connected to repeaters on twisted pair or baseband Ethernets.

Chipcom has set pricing for the 14-port star at $5,450 and the transceiver at $545. In settings that use all connections, this translates to less than $1,000 per port.

For more information, contact Chipcom Corp., 195 Bear Hill Road, Waltham, MA 02154; (617) 890-6844.

Circle 449 on reader card

—Evan Birkhead

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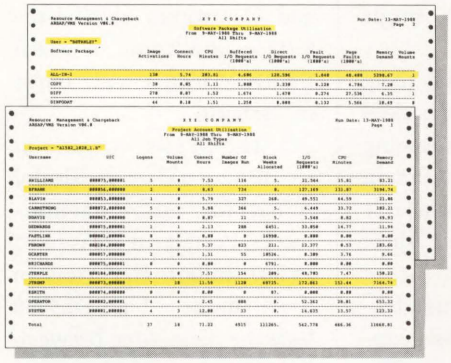

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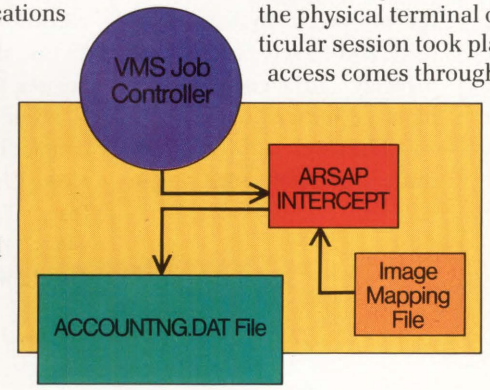

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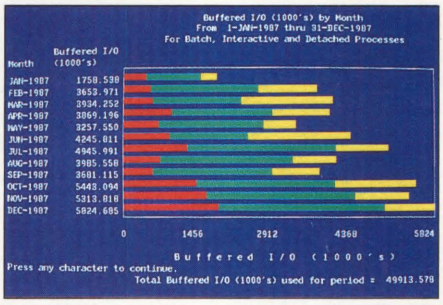

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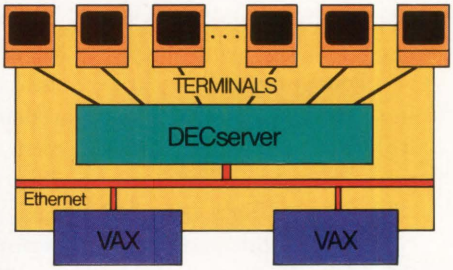

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CIRCLE 273 ON READER CARD

Fujitsu Offers High-Speed Text And Color Graphics

DL5600 Printer Provides Maximum Flexibility Coupled With Ease Of Use

High-speed text, color graphics, multiple emulations, versatility and ease of use — the DL5600 24-wire dot matrix printer from Fujitsu America Inc., San Jose, California, wraps these features into one package.

A print speed and quality exist for any application. The DL5600 boasts print speeds of 486 cps in draft mode in 12 cpi and 405 cps in 10 cpi. True letter-quality printing is turned out at 162 cps in 12 cpi and 135 cps in 10 cpi. Between draft and letter quality is report mode printing, rated at 324 cps in 12 cpi and 270 cps in 10 cpi.

Four fonts are standard — Courier 10, Prestige Elite, Boldface PS and Compressed. Optional fonts include Orator, Light Italic, 12 cpi Letter Gothic and 12 cpi Scientific. Font cards with two fonts per card supply the extra capability.

In addition to the type quality and font capabilities, the DL5600 supports a wide range of word processing functions. These include underscore, bold overprint, shadow print, justification, italics and double-high and double-wide characters.

Graphics can be printed in seven colors. With Fujitsu's special ribbon and transparencies, full-color transparencies can be produced.

Emulations include the IBM Graphics Printer, IBM Proprinter XL, Diablo 630 API and Fujitsu DPL24C. For color printing, the DL5600 emulates the Epson JX-80. These emulations ensure that the DL5600 will work with popular text and graphics software and also will be easy to program.

According to senior vice president Mike Gluck, "The DL5600, which prints more than 200 lines per minute, is ideal for office users who want both the speed of a line printer combined with the versatility of a 24-wire dot matrix printer. The DL5600 has been designed to handle the data processing needs of a shared resource environment, where one printer does a variety of tasks, as well as to support high-performance PC output."

To bring all this ability under control, the DL5600 includes a number of operator conveniences. Rather than forcing paper through the usual serpentine course, the DL5600 uses a 90 degree, C-shaped paper path and a bidirectional tractor. This arrangement provides a less winding paper path and reduces the possibility of paper jams.

The DL5600 can handle paper ranging in width from four to 16 inches. Up to eight copies, including the original, can be processed.

Automatic paper loading and unloading is standard. Also, you don't have to unload continuous forms in order to print on single sheets.

The DL5600 dot matrix printer combines ease of use with high-speed printing and optional color capability.

Up to two cut sheet feeders can be piggybacked onto the first one, allowing you to have three different cut sheet forms available simultaneously. Cut sheet feeders are optional.

Other ease-of-use features include the message indicator and the controls. The 16-character LCD indicator spells out plain-English messages such as "QUALITY: LETTER" and "SELF TEST PRINT." A pushbutton panel for online, form feed, line feed and reset controls is directly adjacent to the message indicator.

User-selectable input buffers of 256B, 2 KB, 8 KB and 24 KB come as standard equipment. A dual RS232C and Centronics parallel interface allows you to attach the DL5600 to a wide range of systems.

The DL5600 operates at 55 dBA, making it ideally suited for office environments. Print head life is rated at 300 million characters in draft mode. The DL5600 boasts a mean time between failures rate of 8000 power-on hours at 25 percent duty cycle.

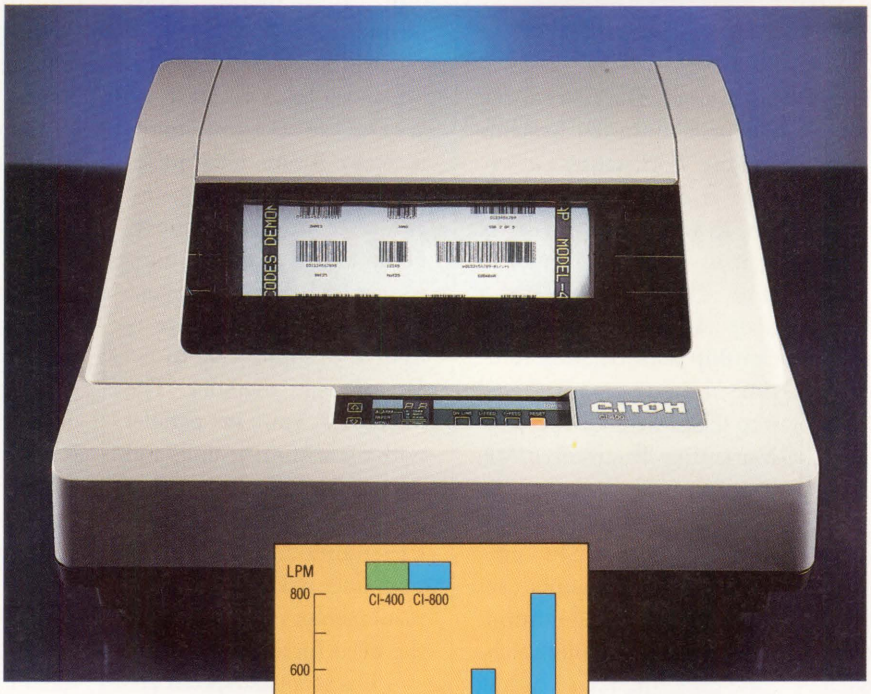
The DL5600 is available immediately in monochrome and color models. Monochrome models are priced at $2,195; the color option increases the price to $2,395.

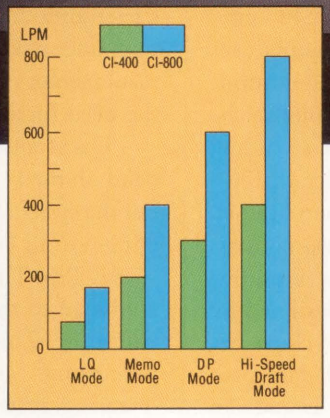
For further information, contact Fujitsu America Inc., 3055 Orchard Drive, San Jose, CA 95134-2017; (408) 946-8777.

Circle 444 on reader card

—David B. Miller

Power Lines.





We built something special into our PowerLine CI-400 and CI-800 dot matrix printers that opens a whole new page in output opportunities. It's a fourth mode called Hi-Speed Draft. And it lets you get more out of your printer and your business than ever before.

It also makes any line printer with three speeds look old-fashioned and awkward. And a thing of the past.

Our four-speed PowerLines can print just about anything your business needs. The CI-400, for example, prints out 400 lines per minute for high-speed data processing assignments. On another line, tight and accurate letter quality at 85 lpm. In between you get 300 lpm for crisp, high-contrast bar codes and graphics, and a convenient 200 lpm memo mode.

The CI-800 PowerLine takes four speeds even further. For greater flexibility at 170, 400, 600 and 800 lines per minute.

No matter what mode you're in, both printers use C.Itoh's proprietary long-life print head design, and a small dot wire to fill those hard-to-reach corners for corporate letter quality correspondence and solid industry-specified bar codes.

All of which means you don't have to use one printer for one job and a different printer for another. Because the four speeds are all-in-one. Ready and waiting for your commands.

Our PowerLine CI-400 and CI-800 line printers. You'll quickly like what they can do. In four very powerful ways.

For more information on our PowerLine family of line printers, contact C.Itoh Electronics, (714) 757-4492 for the nearest reseller in your area.

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CIRCLE 310 ON READER CARD

C.Itoh Electronics, Inc., 2505 McCabe Way, Irvine, CA 92714

Array Processor Pushes 32-Bit Applications To 40 MFLOPS

CSPI Offers High-Speed MICROVAX Boards As RISC Workstation Alternative

If you're thinking about purchasing one of those superworkstations that have received so much publicity, you should be aware that for many applications there's an alternative. CSPI of Billerica, Massachusetts, a third-party company with long bloodlines in the DEC industry and close ties with DEC, is producing a board-level solution that could boost your MICROVAXs to the performance level you require.

CSPI's MAP-4000 Application Accelerator is a three-board array processing set that implements parallel architecture. It's designed for scalar and vector mathematics-intensive applications, such as signal processing, mathematic modeling, image processing and financial analysis.

The 32-bit floating point performance of the system has been measured at 40 MFLOPS and the 64-bit performance at 20 MFLOPS. CSPI reports that it can generate compiled code 10 times faster than a MICROVAX. That figure balloons to 100 times faster than the MICROVAX for number-crunching vector and matrix arithmetic.

The MAP-4000 is Q-bus compatible, but CSPI is now working on a BI-bus version. It occupies three slots on a MICROVAX workstation.

Three groups at DEC watched closely during development of the system: Laboratory Data Products, Financial Industry Systems and the Workstation Group. DEC is expected to play a part in selling the MAP-4000, as it has with previous APs from CSPI. CSPI has had a cooperative marketing relationship with DEC for some time and was grandfathered into the present Cooperative Marketing Program (CMP) in 1982.

During the product's development, CSPI emphasized that the target user was a high-end applications user, rather than a more technical programmer, according to Geoffrey Cohler, director of customer support at CSPI.

The MAP-4000 consists of 13 custom VLSI chips, five of which were designed by CSPI. The large chips are custom-designed data path switchers. These include an adder and a multiplier with a complete instruction set. Two cooling towers are required.

A control microprocessor, developed by Weitek, is also onboard. The 10-mips unit implements RISC architecture.

Memory in the MAP-4000 has two levels of access: local and main memory. It runs at 80 MB/sec for local (64 KB) fetches and 30 MB/sec for main memory. Forty MB of main memory is standard, but the system architecture can be configured to support up to 256 MB of main memory. The memories run in parallel with the arithmetic units and system contoller.

An unlimited program size ensures that any application undertaken will fit in main memory and eliminates the need for disk space.

Data transfer speeds depend on the I/O mechanism, but the system bus is capable of rates from 13 to 30 MB/sec.

A Real-Time Executive is pivotal to the parallel architecture. This controls AP processing, as well as a queueing system that communicates with the MICROVAX.

The MAP-4000 also includes a FORTRAN-77 debugger and compiler. The vectorizing compiler, called MAPFORT, uses code compaction techniques, developed at Yale, that eliminate unnecessary memory accesses and calculations of elements. More than 500 subroutines are stored in the MAP-4000's library, which functions as an application development environment for applications in linear algebra, signal and image processing and so forth.

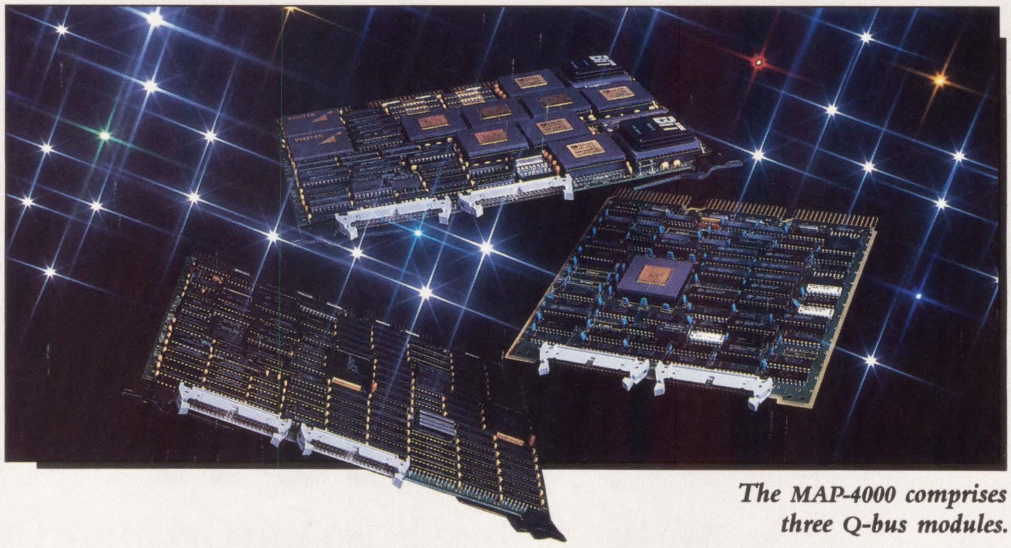
An additional program developed by Pacific Sierra Research Corporation of Los Angeles will recognize the FORTRAN DO loops on one side and the subroutine library on the other.

The MAP-4000 is priced at $18,995 with a 2 MB memory board and at $22,500 for an 8 MB configuration. The VAX/VMS version is expected to start shipping next month; an ULTRIX version is due at the end of the year.

For more information, contact CSPI, 40 Linnell Circle, Billerica, MA 01821; (617) 272-6020.

Circle 450 on reader card

—Evan Birkhead



The MAP-4000 comprises three Q-bus modules.

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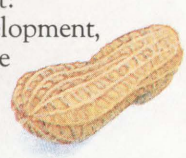

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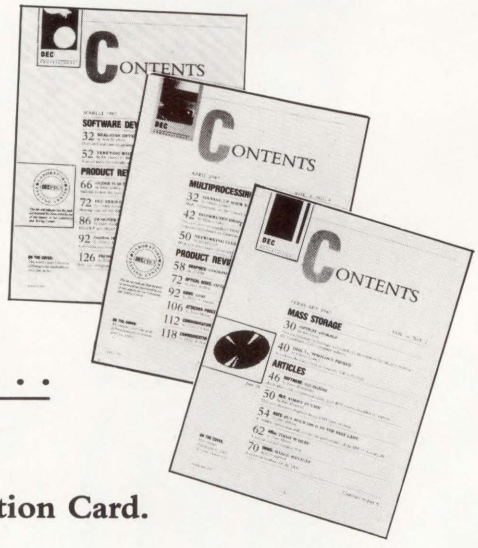

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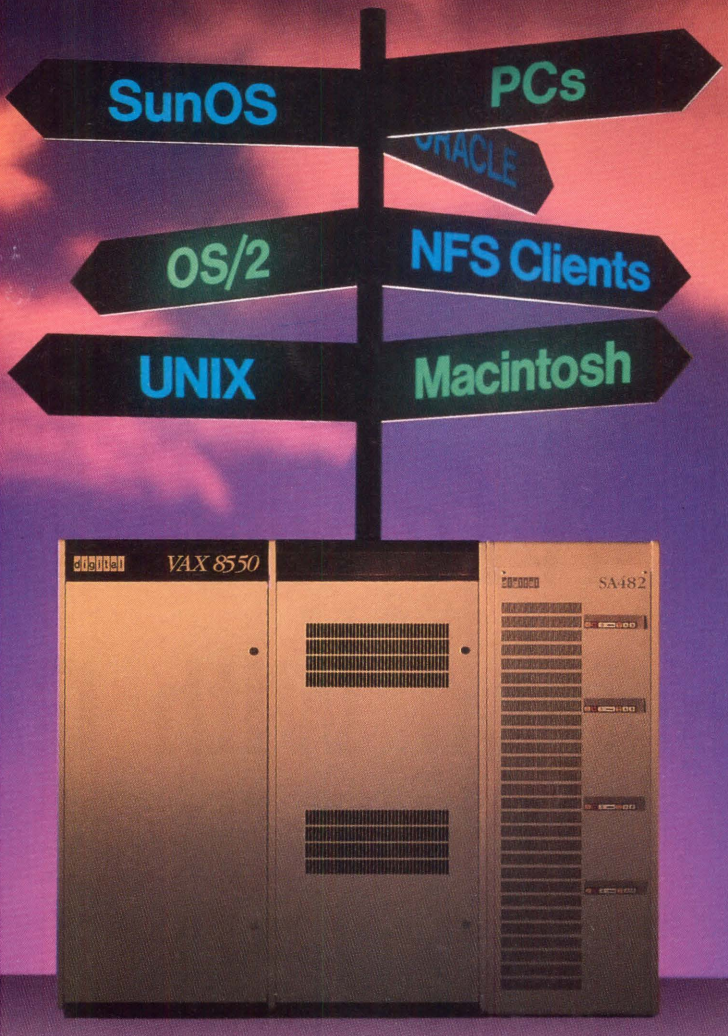

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CIRCLE 325 ON READER CARD

Pictures And Menus Simplified With GKS

TEACHING NEW TRICKS to a novice.

BY ROBERT P. LARSEN

PICTORIAL INPUTS (menus) and outputs (pictures) generally are perceived by novice programmers as complex and exceedingly difficult to incorporate in applications. This discussion is aimed at dispelling this attitude by simplifying the use of color graphics with the DEC Graphical Kernel System (GKS) software package.

By using incremental development strategies, object-oriented programming, and simplified GKS approaches, the novice programmer can incorporate menus and color pictures into applications with minimal effort. Pictorial communications, even in relatively simple applications, can result in improved user acceptance.

GKS is a DEC software product that enables software applications to use pictorial inputs and outputs that provide generality, functionality and portability. It adheres to the ANSI X3.124-1985 and ISO 7942-1985 standards.

Figure 1 shows the interface structure of GKS. Note that this layering of interfaces between the application and the workstation makes the software developer immune from the particular workstation interface details.

Because GKS supports a wide spectrum of graphics functionality, it's easy to become confused and overwhelmed with a myriad of details. These details can include workstation setup and breakdown, application scaling, attribute selection, graphics function call sequences and error handling.

These features are essential for the experienced programmer in developing sophisticated pictorial presentations. But the novice programmer needs to simplify his initial implementations, at the cost of generality, to obtain immediate graphics benefits.

It's better to demonstrate graphics communication early in the software development cycle to garner the en-

thusiastic support of the future user community, than delay demonstrations based on more generalized software. Now the user is a partner in the development process, and his critique can be valuable in determining the final reception of the software application.

Furthermore, GKS can be used in an incremental style to support application development. This discussion is aimed at simplifying the use of GKS, so graphics novices quickly can gain from the benefits of pictorial presentations as a means of conveying input/output information. As familiarity with GKS increases, the more sophisticated features can be explored, tested and used.

Display Hardware

Assume that the user has a DEC VR260 black-and-white display or a DEC VR290 color display. Each has a keyboard and a mouse as input devices. This setup generally is found with any MICROVAX II or MICROVAX II/GPX workstation configuration. The display hardware is high quality and is easy to use, as it produces crisp pictorial presentations with relatively good color painting speeds.

> . . . GKS can be used in an incremental style to support application development.

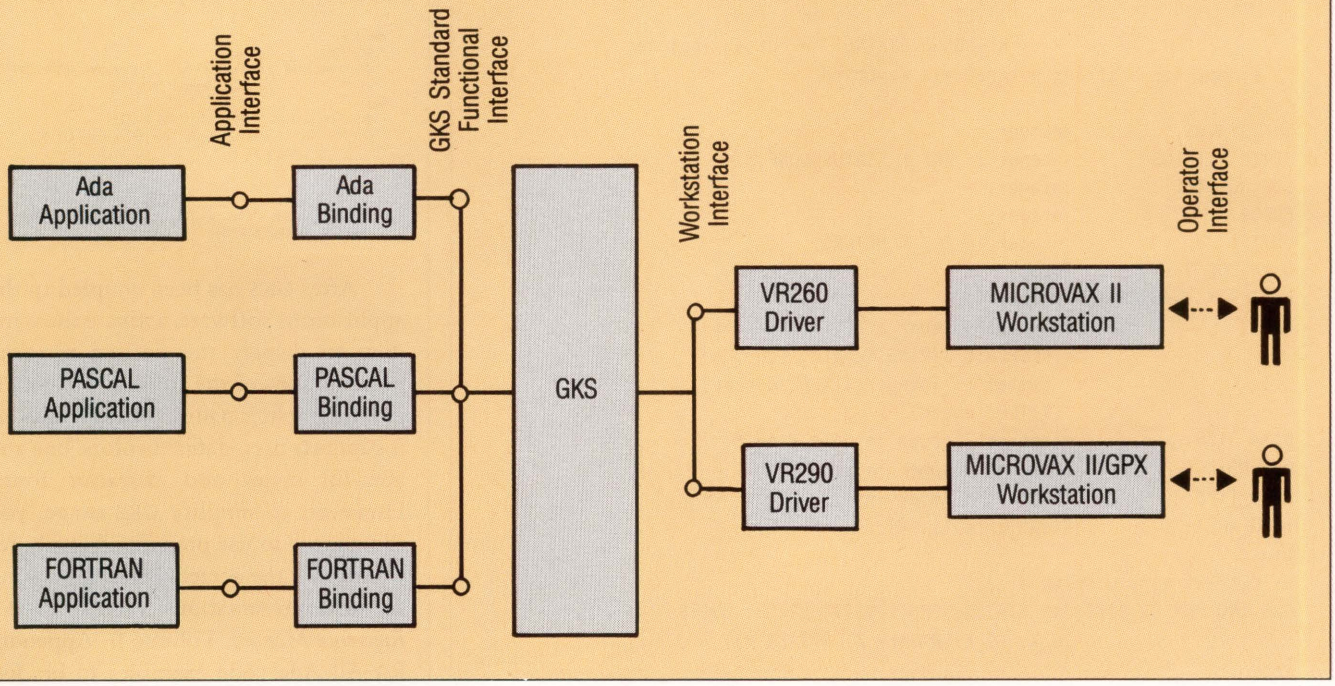
IDEALLY, GRAPHICS SOFTWARE DEVELOPMENT should be approached with a structured, object-oriented perspective in an effort to use modern implementation principles. So, Ada implementations of GKS are used to illustrate the concept of graphics objects and object-oriented programming. Ada supports the use of tasking objects that enables exploiting concurrency in graphics applications.

The simplest program architecture is to collect all graphics objects implementing pictorial functions, input and output, into one package. This results in a program architecture as shown in Figure 2. If you use other programming languages, such as PASCAL or FORTRAN, the style of constant names being used is different. But there's no profound impact on procedure calls and data types implementing a wide variety of common graphics functions.

Any good system programmer can set up GKS under the VMS operating environment. After loading GKS, you compile the language binding module. In Ada, you execute the command ACS SET LIBRARY [.applicationName] to couple to the application library. Then,

GKS interface structure.

Figure 1.



you execute the command ADA GKSDEFS.ADA to establish the Ada binding module.

Now, you can include this Ada package in any application to test various GKS functions of interest to a specific application by executing the command ACS LINK/DEBUG program-Name. This is similar to the standard compile-link sequence for any DEC support language under VMS.

An ancillary benefit in using GKS is that the workstation window management features are fully supportive of GKS-created windows. This means you can resize windows and drag windows to new locations in controlling window compositions, reduce windows to icons for temporary parking as a means of reducing window clutter, and create screen dumps of window portions for hard copy. These features are intrinsic and require no effort by the programmer.

AFTER GKS has been coupled to the applications software, activate the window to display the desired pictorial presentations . . .

GKS preliminaries involve the procedures required to obtain user inputs via string and choice menus and establish an applications window for displaying pictures to the user. The following Ada statements must surround the applications program as defined in the MAIN procedure for coupling and decoupling to GKS:

```
declare
  GKS_STATUS:     integer;
  GKS_ERROR_FILE: constant string(1..14) := "GKS_ERRORS.TXT";
  WS_ID:          constant integer := 1;
begin
  GKS_OPEN_GKS(GKS_STATUS, GKS_ERROR_FILE);
  GKS_OPEN_WS(GKS_STATUS, WS_ID, "desired_window_title",
              GKS_K_VSII);
    .
    .
    .
  GKS_CLOSE_WS(GKS_STATUS, WS_ID);
  GKS_CLOSE_GKS(GKS_STATUS);
end;
```

After GKS has been coupled to the applications software, activate the window to display the desired pictorial presentations of the application. GKS is rich in graphics painting capabilities, as it supports user-defined colors, line and area-fill styles and character fonts. However, to simplify GKS usage, you can choose to use predefined attributes to simplify the prerequisites to painting pictorial presentations. (See DEC *GKS Reference Manual*, Volume II, Appendix K.) All Ada code examples to be dis-

Program 1.

```
procedure BEEP(WS_ID: in integer) is
  -- Ring keyboard bell to signal input request.

  BEEP_ATTRIBUTES: constant float_array(1..2) := (0.5,   -- Loudness.
                                                  0.01); -- Duration.
  DATA:       constant integer_array(1..5) := (1, 2, 0,
                system.to_integer(WS_ID'address),
                system.to_integer(BEEP_ATTRIBUTES(1)'address));
  DATA_SIZE:  constant integer := DATA'size/8;
  DUMMY:      constant integer_array(1..2) := (0, 0);
  GKS_STATUS: integer;
begin
  GKS_ESCAPE(GKS_STATUS, GKS_K_ESC_BEEP, DATA, DATA_SIZE, DUMMY, 0, 0);
end BEEP;
```

Program 2.

```
procedure PROMPT_FOR_STRING(WS_ID:           in integer;
                            TITLE:           in string;
                            RESPONSE_STRING: in out string) is
  -- Prompt for a string entered via keyboard.

  GKS_STATUS:          integer;
  STRING_STATUS:       integer := GKS_K_STATUS_NONE;
  STRING_SIZE:         integer;
  ERROR:               integer;
  UNITS:               integer := GKS_K_METERS;
  DC_X, DC_Y:          float;
  RASTER_X, RASTER_Y:  integer;
  DATA:                constant integer_array(1..4) := (
                         RESPONSE_STRING'length, 1,
                         system.to_integer(TITLE'address),
                         TITLE'length);
  DATA_SIZE:           constant integer := DATA'size/8;
  DEV_NO:              constant integer := 1;
  ECHO_TYPE:           constant integer := 1;
  ECHO_AREA:           float_array(1..4);
begin
  -- Extract echo display area.
  GKS_INQ_MAX_DS_SIZE(GKS_STATUS, GKS_K_VSII, ERROR, UNITS,
                      DC_X, DC_Y, RASTER_X, RASTER_Y);
```

Continued.

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CIRCLE 162 ON READER CARD

Program 2. . . . *continued*

```
-- Force pop-up menu to appear at top-left of screen.
ECHO_AREA(1) := 0.0;
if (RESPONSE_STRING'length > TITLE'length+4)
  then ECHO_AREA(2) := DC_X * (float(RESPONSE_STRING'length) * 0.0133);
  else ECHO_AREA(2) := DC_X * (float(TITLE'length) + 4.0)    * 0.0133);
end if;
ECHO_AREA(3) := DC_Y * 0.9716;
ECHO_AREA(4) := DC_Y;

-- Set initial cursor position at last character in string.
DATA(2) := 1;
while (RESPONSE_STRING(DATA(@)) /= ' ') loop;
  DATA(2) := DATA(2) + 1;
end loop;

-- Input state of RESPONSE_STRING is displayed for alteration.
if (DATA(2) > 1)
  then DATA(2) := DATA(2) - 1;
       GKS_INIT_STRING(GKS_STATUS, WS_ID, DEV_NO,
                       RESPONSE_STRING(1..DATA(2)), ECHO_TYPE,
                       ECHO_AREA, DATA, DATA_SIZE);
  else GKS_INIT_STRING(GKS_STATUS, WS_ID, DEV_NO, "", ECHO_TYPE,
                       ECHO_AREA, DATA, DATA_SIZE);
end if;
GKS_SET_STRING_MODE(GKS_STATUS, WS_ID, DEV_NO, GKS_K_INPUT_MODE_REQUEST,
                    GKS_K_ECHO);
while (STRING_STATUS /= GKS_K_STATUS_OK) loop
  BEEP(WS_ID);
  GKS_REQUEST_STRING(GKS_STATUS, WS_ID, DEV_NO, STRING_STATUS,
                     RESPONSE_STRING, STRING_SIZE);
end loop;
RESPONSE_STRING(STRING_SIZE+1..RESPONSE_STRING'last) := (others => ' ');
end PROMPT_FOR_STRING;
```

Program 3.

```
with DYNAMIC_STRINGS;  use DYNAMIC_STRINGS;

procedure PROMPT_FOR_CHOICE(WS_ID:    in     integer;
                            -- Menu title.
                            TITLE:    in     string;
                            -- Dynamic string array defining choices.
                            CHOICES: in     CHOICES_TYPE;
                            CHOICE:   in out integer) is
  -- Use mouse to select option from displayed pop-up menu.

  GKS_STATUS:          integer;
  CHOICE_STATUS:       integer range GKS_K_STATUS_NONE..GKS_K_STATUS_NOCHOICE
                         := GKS_K_STATUS_NONE;
  INPUT_STATUS:        integer := GKS_K_)STATUS_NOCHOICE;
```

Continued.

cussed will assume these bundled attributes.

The following GKS commands must bound the GKS painting command sequence, which activates the window to accept updates and terminates by deactivating the window to preserve its pictorial contents while performing other application functions:

```
declare
  GKS_STATUS: integer;
  WS_ID:          constant integer := 1;
  FLAGS: constant integer_array(1..13) :=
         (others => GKS_K_ASF_BUNDLED);
begin
  GKS_ACTIVATE_WS(GKS_STATUS, WS_ID);
  GKS_SET_ASF(GKS_STATUS, FLAGS);  -- Set bundled attribute mode.
    .
    .
    .
  GKS_DEACTIVATE_WS(GKS_STATUS, WS_ID);
end;
```

To simplify the scaling issues in mapping graphics primitives (lines, polygons, text strings) to a window and reading mouse sites from a window, use Normalized Device Coordinates (NDC). The applications window is perceived as a quantized X-Y grid with a range of 0.0 to 1.0. For initial applications, the concept of world coordinates related to the application won't be introduced, because this is a generalization that requires knowledge about additional GKS commands.

First, there are the mapping requirements associated with the painting of objects in composing a window display; i.e., mapping from the application coordinate world to the workstation window coordinate world. The inverse mapping problem is associated with reading mouse-designated sites in a window display and relating them to points in the application space.

The use of mouse manipulations affords the application a new means of receiving inputs relative to pictorial presentations. For example, the mouse can point to waveform contours to designate a point where the user desires to know the attributes of voltage, time and first derivative. This mapping problem now is to map from the workstation window coordinate world to the application coordinate world. The scaling parameters necessary to support these mapping requirements are common.

Because windows are square in

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Program 3. . . . *continued*

```
  ERROR:                integer;
  UNITS:                integer := GKS_K_METERS;
  DC_X, DC_Y:           float;
  RASTER_X, RASTER_Y:   integer;
  DEV_NO:               constant integer := 1;
  ECHO_TYPE:            constant integer := 1;
  ECHO_AREA:            float_array(1..4);
  CHOICE_STRINGS:       array(1..CHOICES'last) of string(1..CHOICES(1).Size);
  CHOICE_SIZES:         array(1..CHOICES'last) of integer;
  CHOICE_ADDRESSES:     array(1..CHOICES'last) of integer;
  DATA:                 integer_array(1..5);
  DATA_SIZE:            constant integer := DATA'size/8;
begin
  -- Extract echo display area.
  GKS_INQ_MAX_DS_SIZE(GKS_STATUS, GKS_K_VSII, ERROR, UNITS,
                      DC_X, DC_Y, RASTER_X, RASTER_Y);

  -- Force pop-up menu to appear at lower-right of screen.
  if (CHOICES(1).Size > TITLE'length+4)
    then ECHO_AREA(1) := DC_X * (1.0 - (float(CHOICES(1).Size) * 0.0133);
    else ECHO_AREA(1) := DC_X * (1.0 - (float(TITLE'length) + 4.0) * 0.0133);
  end if;
  ECHO_AREA(2) := DC_X;
  ECHO_AREA(3) := 0.0;
  ECHO_AREA(4) := DC_Y * (float(CHOICES'last) * 0.0284);

  for J in 1..CHOICE_STRINGS'last loop
    CHOICE_SIZES(J) := CHOICES(J).SIZE;
    CHOICE_STRINGS(J) := Type_Convert(CHOICES(J)):
    CHOICE_ADDRESSES(J) := system.to_integer(CHOICE_STRINGS(J)'address);
  end loop;

  DATA(1) := CHOICES'last;
  DATA(2) := system.to_integer(CHOICE_SIZES'address);
  DATA(3) := system.to_integer(CHOICE_ADDRESSES'address);
  DATA(4) := system.to_integer(TITLE'address);
  DATA(5) := TITLE'length;

  GKS_INIT_CHOICE(GKS_STATUS, WS_ID, DEV_NO, INPUT_STATUS, CHOICE,
                  ECHO_TYPE, ECHO_AREA, DATA, DATA_SIZE);
  GKS_SET_CHOICE_MODE(GKS_STATUS, WS_ID, DEV_NO, GKS_K_INPUT_MODE_REQUEST,
                      GKS_K_ECHO);
  loop
    BEEP(WS_ID);
    GKS_REQUEST_CHOICE(GKS_STATUS, WS_ID, DEV_NO, CHOICE_STATUS, CHOICE);
    case CHOICE_STATUS is
      when GKS_K_STATUS_OK         -- Left button depressed.
        => exit;
      when GKS_K_STATUS_NONE       -- Middle button depressed.
        => exit;
      when GKS_K_STATUS_NOCHOICE   -- Triggered without choosing.
        => null;
    end case;
  end loop;
end PROMPT_FOR_CHOICE;
```

GKS, you must determine the maximum application range, say Wmin and Wmax, from both the X and Y coordinate ranges of the application space. Then the window scaling can be determined as: Wscale = 1 / (Wmax — Wmin) with Woffset = 0. This scaling maps the application perspective to the entire window.

> A MAJOR limitation in GKS is that no convenient functions exist to create iconic menus.

If you want to center the application perspective in the window to provide a surrounding frame effect, the window scaling is Wscale = 0.8 / (Wmax — Wmin) with Woffset = 0.1.

Inputs

Most applications need to receive text information such as labels, attributes and file names. The string menu object, defined in Programs 1 and 2, can be invoked easily to receive a string via the workstation keyboard, which then can be parsed and accordingly processed. The following Ada structure illustrates the easy use of this string menu object to request a file name:

```
declare
  WS_ID:     integer := 1;  -- Workstation id.
  FILE_NAME: string(1..48);
begin
  .
  .
  .
  PROMPT_FOR_STRING(WS_ID, "Enter File Name:", FILE_NAME);
  -- Now parse and process file name for I/O operations.
  .
  .
  .
end;
```

Today, choice menus are the most widely used mechanism to control program flow. Each specific application can be perceived as a control state hierarchy with choice menus associated with each

GKS Tips For Novice Programmers

1. Implement all code using the predefined GKS constants found in the GKSDEFS package. These Ada constants have the form: GKS_K_ . . .
2. Use full-screen windows as derived by using GKS_INQ_MAX_DS_SIZE and GKS_SET_WS_WINDOW.
3. Compose picture presentations using Normalized Device Coordinates (NDC) (0.0 < = NDC < = 1.0) to minimize scaling complexities.
4. Use predefined bundled attributes for your workstation. See *DEC GKS Reference Manual*, Volume II, Appendix K.
5. Use an object-oriented approach in defining the graphics objects and operators required by the application and collect them in a GRAPHICS package (specification plus body).
6. Implement the application using an incremental development methodology. Start with simple pictorial presentations, incrementally enhancing as you learn more about GKS.

permissible control state transition. Given a particular control state, a choice menu is displayed that allows the user to transition to a new state or return to the previous state by selecting the menu option using mouse manipulations.

Using the choice menu object, defined in Program 3, the following Ada structure illustrates a simple state controller. This state controller concept can be nested to provide depth in the control state hierarchy.

```
declare
  type CHOICES_TYPE is array(integer range <>) of Dyn_String;

  WS_ID:   integer := 1;  -- Workstation id.
  TITLE:   constant string(1..7) := "Options";
  CHOICES: CHOICES_TYPE(1..3) := (
             Type_Convert(" State 1 "),
             Type_Convert(" State 2 "),
             Type_Convert("  Exit   "));
  CHOICE:  integer range 1..3 := 1;
begin
    .
    .
    .
  loop
    PROMPT_FOR_CHOICE(WS_ID, TITLE, CHOICES, CHOICE);
    case CHOICE is
      when 1
        => .
           . -- Control state 1 processing.
           .
      when 2
        => .
           . -- Control state 2 ;
           .
      when 3  -- Control state 3.
        => exit;
    end case;
  end loop;
    .
    .
    .
end;
```

Workstation applications depend heavily on the use of a mouse as a pointer to designate an interest point within an existing pictorial presentation. This mapping problem involves the process of mapping a point in the workstation window coordinate world to its related point in the application coordinate world. To illustrate this mapping, the following Ada program structure assumes the use of the graphic object called MOUSE_SITE defined in Program 4. It's assumed that the scaling parameters were determined when the pictorial presentation was created and are globally available.

```
declare
  X, Y:                 float;
  W_X, W_Y:             float;
  W_X_MIN, W_Y_MIN:     float;
  W_X_SCALE, W_Y_SCALE: float;
  W_OFFSET:             float;
begin
  MOUSE_SITE(W_X, W_Y);
  X := ((W_X - W_OFFSET) / W_X_SCALE) + W_X_MIN;
  Y := ((W_Y - W_OFFSET) / W_Y_SCALE) + W_Y_MIN;
  -- Now relate X, Y to application object set.
    .
    .
    .
end;
```

A major limitation in GKS is that no convenient functions exist to create iconic menus. This is of interest to those applications currently running on Apple computers that wish to port the applica-

Program 4.

```
procedure MOUSE_SITE(X, Y: in out float) is
  -- Use mouse to designate point of interest.

  DATA:           constant integer_array(1..2) := (0, 0);
  DATA_LENGTH:    constant integer := 0;
  DEV_NO:         integer := 1;
  ECHO_TYPE:      integer := 2;  -- Vertical-horizontal line cursor.
  ECHO_AREA:      float_array(1..4) := (0.0, 0.0, 0.0, 0.0);
  LOCATOR_STATUS: integer GKS_K_STATUS_NONE;
  X_FORM:         integer := 1;

begin


  GKS_INIT_LOCATOR(GKS_STATUS, WS_ID, DEV_NO, X, Y, X_FORM,
                   ECHO_TYPE, ECHO_AREA, DATA, DATA_LENGTH);
  GKS_SET_LOCATOR_MODE(GKS_STATUS, WS_ID, DEV_NO,
                       GKS_K_INPUT_MODE_REQUEST, GKS_K_ECHO);
  while (LOCATOR_STATUS = GKS_K_STATUS_NONE) loop
    BEEP(WS_ID);
    GKS_REQUEST_LOCATOR(GKS_STATUS, WS_ID, DEV_NO, LOCATOR_STATUS,
                        X_FORM, X, Y);
  end loop;

  -- Restore mouse arrow mode.
  ECHO_TYPE := 1;
  GKS_INIT_LOCATOR(GKS_STATUS, WS_ID, DEV_NO, X, Y, X_FORM,
                   ECHO_TYPE, ECHO_AREA, DATA, DATA_LENGTH);
end MOUSE_SITE;
```

Program 5.

```
declare
  N:          integer;  -- Number of waveform points.
  O_X, O_Y: array(1..N) of float;  -- Waveform points.
  W_X, W_Y: float_array(1..N);
  WS_ID:      integer := 1;  -- Workstation id.
  RED:        constant integer := 2;  -- Red bundled index.
  W_OFFSET: constant float := 0.1;
  A_X_MIN, A_Y_MIN:     float := float(max_int);
  A_X_MAX, A_Y_MAX:     float := float(min_int);
  W_X_MIN, W_Y_MIN:     float := float(max_int);
  W_X_SCALE, W_Y_SCALE: float;
  GKS_STATUS:           integer;
begin
  for J in O_X'first..O_X'last loop
    if (O_X(J) < A_X_MIN)
      then A_X_MIN := O_X(J);
      elsif (O_X(J) > A_X_MAX)
          then A_X_MAX := O_X(J);
    end if;
    if (O_Y(J) < A_Y_MIN)
      then A_Y_MIN := O_Y(J);
      elsif (O_Y(J) > A_Y_MAX)
          then A_Y_MAX := O_Y(J);
    end if;
  end loop;
  -- Waveform to be centered in window with frame.
  W_X_SCALE := 0.8 / (A_X_MAX - A_X_MIN);
  W_Y_SCALE := 0.8 / (A_Y_MAX - A_Y_MIN);
  W_X_MIN := A_X_MIN;
  W_Y_MIN := A_Y_MIN;
  for J in O_X'first..O_X'last loop
    W_X(J) := ((O_X(J) - W_X_MIN) * W_X_SCALE) + W_OFFSET;
    W_Y(J) := ((O_Y(J) - W_Y_MIN) * W_Y_SCALE) + W_OFFSET;
  end loop;
  GKS_CLEAR_WINDOW(GKS_STATUS, WS_ID, GKS_K_CLEAR_ALWAYS);
  GKS_SET_PLINE_INDEX(GKS_STATUS, RED):
  GKS_POLTLINE(GKS_STATUS, N, W_X, W_Y);
end;
```

tion to MICROVAX workstations without altering the graphics methodology. GKS won't allow easy emulation of Apple-like iconic menus.

Another limitation is that property sheet operation isn't supported. This is the concept of displaying properties or attributes in a pop-up menu and allowing the user to modify any number of values selectively. An example of the need for this feature is the transistor modeling parameters used in a SPICE circuit simulation.

Iconic menus and property sheets should be considered seriously for incorporation into future versions of GKS. However, nothing can be expected from DEC in the near future, as it's primarily concerned with transitioning GKS to operate with the X Window System.

Outputs

Generally, pictorial presentations can be composed using the graphics primitives of lines, filled areas and character strings for object labeling and pictorial text annotation. With the proposed simple scaling concept, each object point in the application perspective must be mapped from the application coordinate world to the workstation window coordinate world.

To illustrate line mapping, assume a waveform, consisting of a set of n voltage-time points, is to be displayed in red. The Ada code is shown in Program 5.

To illustrate painting of areas, assume a green-filled rectangle is to be displayed whose boundaries, in the application coordinate world, are defined as LEFT, BOTTOM, RIGHT, TOP where A_X_MIN <= LEFT, RIGHT <= A_X_MAX and A_Y_MIN <= BOTTOM, TOP <= A_Y_MAX. Assuming the scaling parameters from the previous line example, the Ada structure illustrating filled areas is:

```
declare
  LEFT:       float;
  BOTTOM:     float;
  RIGHT:      float;
  TOP:        float;
  W_X, W_Y: float_array(1..4);
  WS_ID:      integer := 1;  -- Workstation id.
  GREEN:      constant integer := 3;  -- Solid green bundled index.
  W_OFFSET: constant float := 0.1;
  W_X_MIN, W_Y_MIN:     float;
  W_X_SCALE, W_Y_SCALE: float;
  GKS_STATUS:           integer;
begin
  W_X(1) := ((LEFT   - W_X_MIN) * W_X_SCALE) + W_OFFSET;
  W_Y(1) := ((BOTTOM - W_Y_MIN) * W_X_SCALE) + W_OFFSET;
  W_X(2) := W_X(1);
  W_Y(2) := ((TOP    - W_Y_MIN) * W_X_SCALE) + W_OFFSET;
  W_X(3) := ((RIGHT  - W_X_MIN) * W_X_SCALE) + W_OFFSET;
  W_Y(3) := W_Y(2);
  W_X(4) := W_X(3);
  W_Y(4) := W_Y(1);
  GKS_SET_FILL_INDEX(GKS_STATUS, GREEN);
  GKS_FILL_AREA(GKS_STATUS, 4, W_X, W_Y);
end;
```

To illustrate the placement of text in a pictorial presentation, assuming the scaling parameters from the above line example, the Ada structure to place Box at the center of the previously painted solid green rectangle, in black lettering, is:

```
declare
  LEFT:       float;
  BOTTOM:     float;
  RIGHT:      float;
  TOP:        float;
  X, Y:       float;
  WS_ID:      integer := 1;  -- Workstation id.
  W_OFFSET: constant float := 0.1;
  W_X_MIN, W_Y_MIN:     float;
  W_X_SCALE, W_Y_SCALE: float;
  GKS_STATUS:           integer;
begin
  X := ((((LEFT + RIGHT) * 0.5) - W_X_MIN) * W_X_SCALE) + W_OFFSET;
  Y := ((((BOTTOM + TOP) * 0.5) - W_Y_MIN) * W_X_SCALE) + W_OFFSET;
  GKS_TEXT(GKS_STATUS, X, Y, "Box");
end;
```

Software Structuring

Regarding software structuring as shown in Figure 2, note that the Ada

HOST PROGRAMMABLE GRAPHICS

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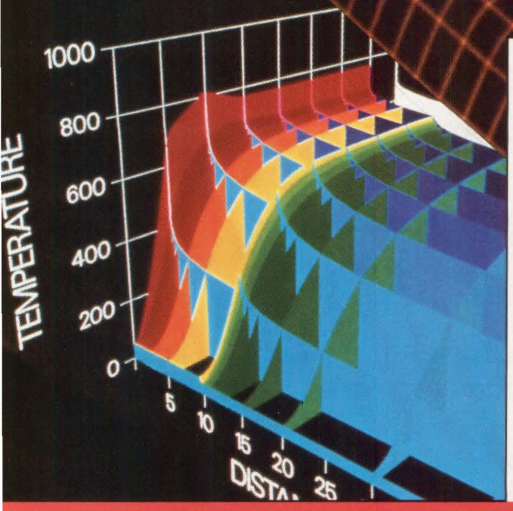

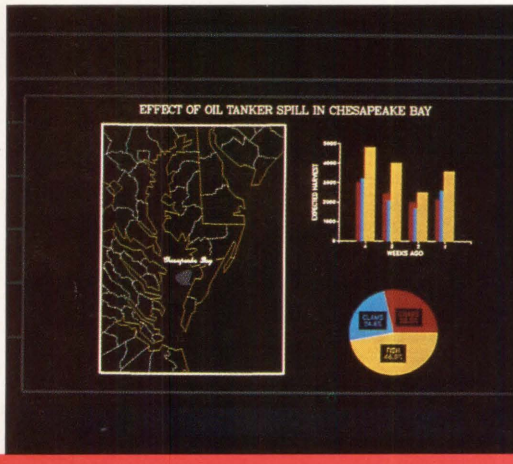

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package concept is used with a package consisting of an interface specification and a body of procedures. This package concept enables the creation of a package (named GRAPHICS here) to collect all these input-output graphics objects, so they all reside in only one source code file. The Ada statements, with GKSDEFS and use GKSDEFS, provide the linkage to the GKS software.

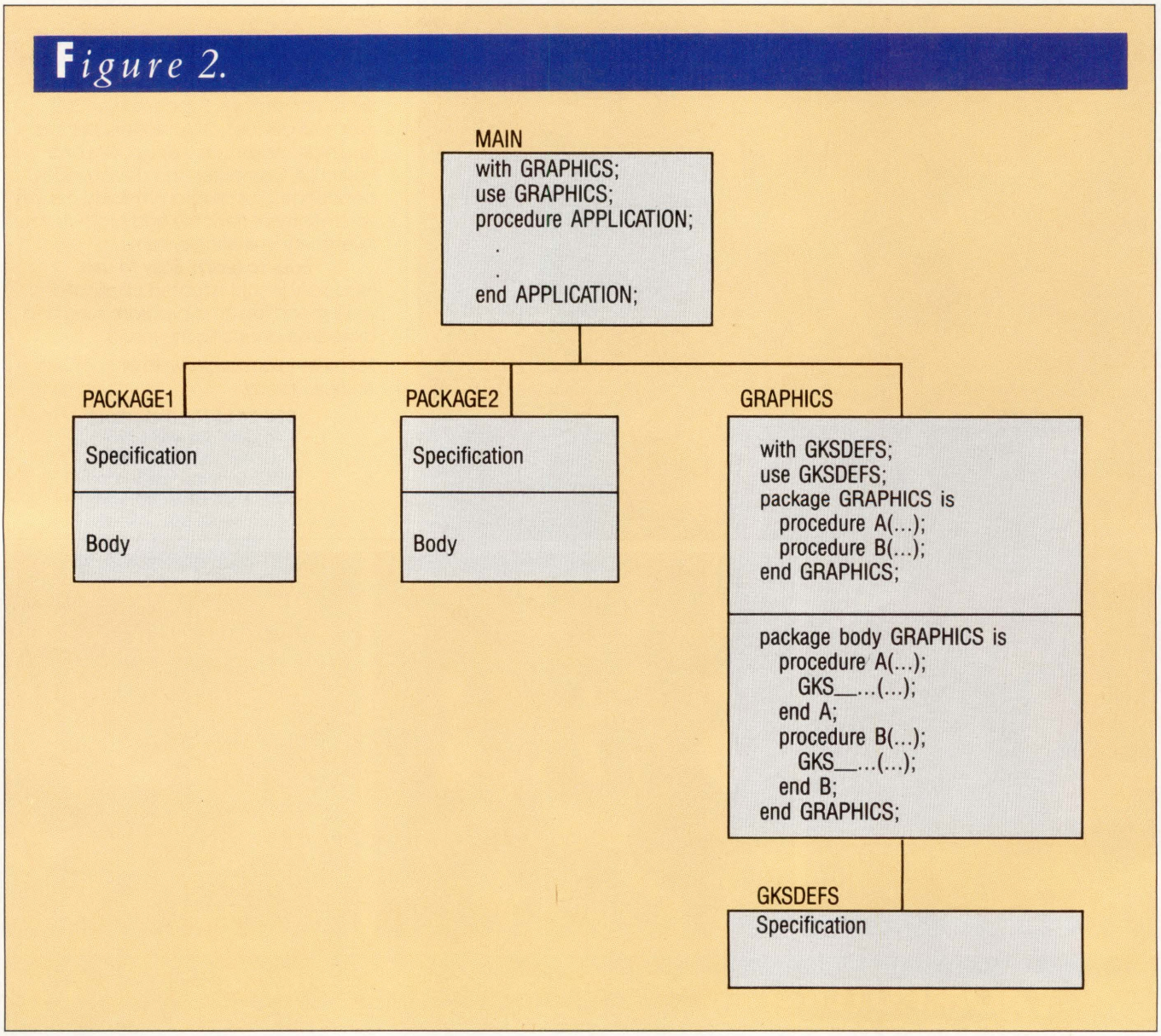
New graphics objects can be added easily to the GRAPHICS package as demanded by application growth; i.e., incrementally. Existing graphics objects may be enhanced with new options and/or functional features as demanded by application growth with no impact on overall software architecture.

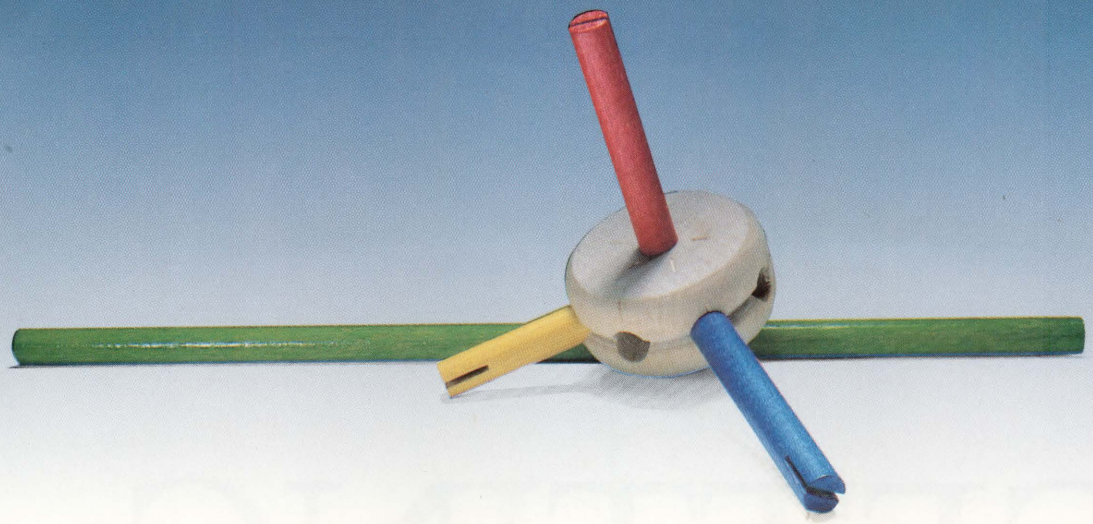
THE SIMPLIFIED GKS CONCEPTS and objects discussed are aimed at getting the novice programmer quickly involved in picture-oriented communications. This approach will produce results in two to five days.

You'll soon be poking around GKS to strive for more generality and more sophisticated uses of menus and pictures. Collecting the graphics objects into a GRAPHICS package allows upward compatibility, so older code still will execute properly. This is the whole concept of incremental development: Get something usable and respectable in the marketplace fast. *—Robert P. Larsen is engineering fellow in the Semiconductor Products Division of Rockwell International, Newport Beach, California.*

Ada program architecture with GKS coupling.

Figure 2.





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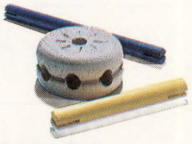

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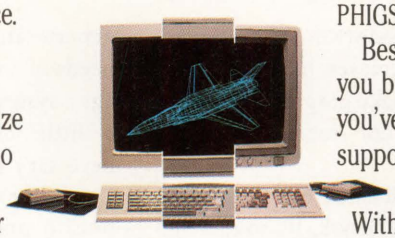

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GETTING G·R·A·P·H·I·C

D-PICT INTELLICHART meets the needs of a host of presentation requirements.

BY DAVID B. MILLER

AS IN-HOUSE PREPARATION of presentation graphics increases in popularity, vendors seek to make graphics packages easier to use while increasing their flexibility.

D-Pict Intellichart from Pansophic Systems Inc., Oak Brook, Illinois, is the presentation graphics member of a large family of graphics packages designed to meet the needs of users involved in fields from business and finance to marketing and research. The system is designed for ease of use, while providing extensive color, fill, pattern and text capabilities to produce bar, pie, line, XY and word charts on a number of devices.

Installation

Installation took about a half-hour, but the procedure was straightforward. Because the installation documentation is generic and addresses the installation needs of a number of Pansophic's packages, system managers might have to do a little checking to filter out the necessary steps.

After you back up the three distribution tapes to disk and enter product passwords for validation, you can run the supplied DPICTINST.COM command file. This guides you through system configuration.

Device support is extensive enough to warrant a separate bound manual to list each device or class of devices and any associated information. Supported DEC products include VT series terminals, LA and LN series printers and GIGI terminals. Hewlett-Packard and Tektronix devices, as well as a host of others, are included. You can define and install your own device drivers, but Pansophic won't support them.

Entering DPICT INTELLICHART or DPICT IC brings the program to life. You then are required to enter the name of two devices. One is used to display text and the other to display graphics. These are driver names or categories installed previously.

Intellichart then places you at the main menu displayed in Screen 1. The documentation refers to the screens as panels. Subpanels are displayed upon making a choice from the main panel.

Moving from panel to panel requires a few keystrokes and is further enhanced because Intellichart remembers the last five panels accessed. This reduces the tedium of performing repetitive tasks.

Intellichart assigns special functions to your terminal's keys to perform such

tasks as moving from field to field, erasing field contents and displaying graphs. For VT terminal users, these functions are concentrated on the numeric keypad.

Two special panels are ENVIRONMENT ATTRIBUTES and PANEL ATTRIBUTES. Accessed outside the main menu, they control a number of features. These can include second and third graphics devices (perhaps printers attached to the primary terminal), text control through hardware or software, and fill pattern type and mode. These panels also can control basic environmental considerations, such as default colors for displayed text and menu panels, and error messages. System managers can define a systemwide default environment, as well as letting users define their own custom environments.

MOVING FROM panel to panel requires a few keystrokes and is further enhanced because Intellichart remembers the last five panels accessed.

Getting Started

Acquiring data is the first step toward creating charts. Intellichart's DATA TABLE EDITOR is used for this purpose.

A data table contains an unlimited number of rows and 40 columns. The intersection of a row and column is referred to as a cell, similar to spreadsheet software. Each column has a Description and Units value associated with it, which will appear on the final graph. Screen 2 illustrates a typical data table.

As with spreadsheet programs, commands are provided to copy, move, delete, insert, erase and generate row, column and cell range (a block of cells) contents, as well as changing column widths. No built-in functions are provided to compute range totals, averages or to do other computational tasks. If you require computational capability, it's best to generate a worksheet or some other table of data using another software package and import it into Intellichart.

Intellichart can import a variety of

MENU_ME

COMMAND:

DATA TABLE EDITOR	LINE CHART	PIE CHART
Data.....D1	Arrangement.....L1	Arrangement.....P1
Text.....D2	Line type & Fill.....L2	Slices.....nP2
	Enhancement.....L3	Annotation.....P3
DATA SELECTION.....DS	Annotation.....L4	Annotation Font.....P4
ENHANCEMENTS	BAR CHART	WORD CHART
Titles.....T	Arrangement.....B1	Arrangement.....W1
Legend.....LE	Area Fill.....B2	Primary Text Font.....W2
Data Lines.....DL	Annotation.....B3	Secondary Text Font.....W3
Vectors & Arrows.....V		
Text.....ET1	AXES	PAGE LAYOUT
Text Font.....ET2	Y-axes Form.....A1	Arrangement.....PL1
	X-axes Form.....A2	Borders.....PL2
	Tick Marks.....A3	
	Annotation.....A4	
	Annotation Font.....A5	

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Screen 1: Intellichart's main panel displays choices to create various types of graphs and charts, as well as commands for enhancement features.

DATA TABLE EDITOR, Data_D1

COMMAND:

DESC: UNIT:	QUARTER	FRANCE $$	BRITAIN $$	MEXICO $$	TAIWAN $$		
	A	B	C	D	E	F	G
1	Q1 '87	6700	11130	570	8370		
2	Q2 '87	4210	8650	530	7180		
3	Q3 '87	5720	9670	670	7530		
4	Q4 '87	5200	8280	730	9410		
5							
6							
7							
8							
9							
10							
11							
12							

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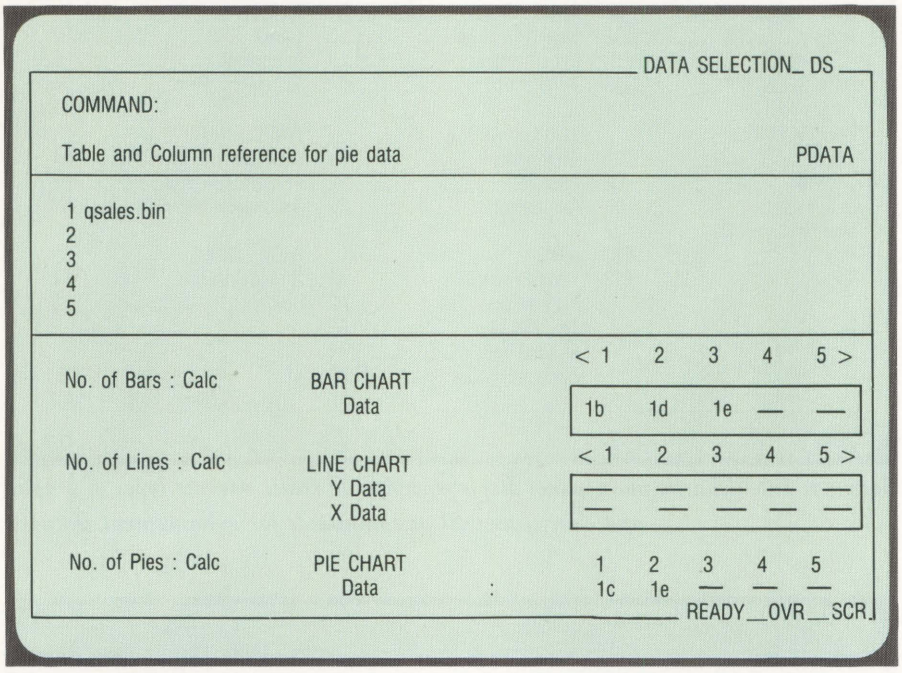
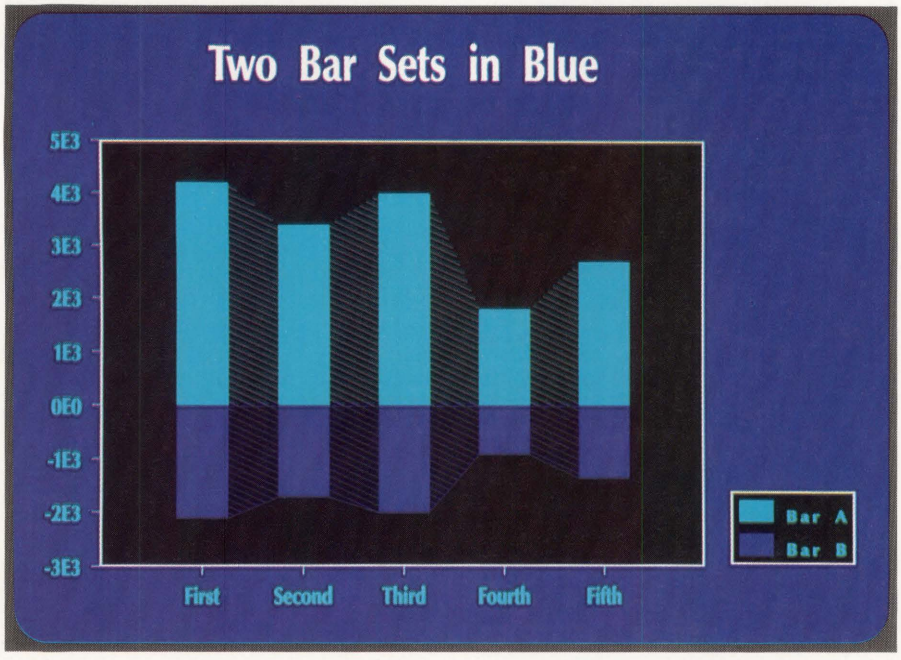
Screen 2: Using the Data Table Editor, Intellichart gets graph data from worksheet-like data tables. Each column represents a data set.

file types. These include /TABULAR (ASCII files); /COLUMNAR, which stores a table as a sequence of columns, one cell per line, with start-of-column indicators; /WRK; /WKS; /WK1; /DIF; and /TDF (a D-Pict proprietary format).

To produce a chart, you first must select data from the appropriate tables. These are accessed via the DATA SELECTION screen displayed in Screen 3.



Screen 3: The Data Selection panel contains data to determine which columns of a data table are to be used to create various charts.



Screen 4: Using two data sets, Intellichart lets you create combined graphs, as this bar chart illustrates.

Up to five data tables can be selected and partial data can be extracted from each. Up to 20 columns of data can be specified for bar charts (all displayed on the same chart), 10 sets for line charts and five for pies.

Pies are produced separately for each selected data range, but they're all grouped together on the same screen. A maximum of 25 slices per pie is possible.

After data is entered and selected, graphs can be generated. We'll look at bar chart generation as a typical example. The Bar Chart Arrangement screen lists the available options.

Columnar data can be specified for up to 20 bars from this panel, as well as from the DATA SELECTION panel. Other factors controllable from this panel include:

1. Chart orientation — You can select upright, rotate left, rotate right and inverted views.
2. Number of bars per cluster — Specifying 1 produces a stacked graph. A number between one and the number of data sets causes the first n bars to appear side by side and the rest stacked. Letting Intellichart handle it produces side-by-side bar charts.
3. Bar width — You can override the default value with inches or centimeter specifications. If the bar width you specify is too large, Intellichart will fill bars until adjacent ones touch and the available graph area is filled.
4. Bar separation — You can specify any overlap of adjacent bars. The default is no overlap.
5. Link mode — Adjacent bars can be joined by a single line from top right to top left corners. Block link creates a 3-D effect. But this can only be used with single or stacked bars.
6. Floating bars — Two data sets are combined to produce one set of bars to cause a floating effect.

At any point, the DISplay command (or Display key on the keypad) can be used to display the current graph. A typical bar chart example is shown in Screen 4.

You can change a number of bar chart parameters. This gives you con-

trol over the finished graph's appearance. Available options include:

1. Visible/invisible — Individual bars can be displayed or hidden from view.
2. Outline — The color, style and width of each bar can be modified. D-Pict provides 74 colors, specified by number. The number of colors you can see depends on the capabilities of your hardware. Sixteen line styles of various combinations of dots and dashes are available. Line widths range from one to 10, with each single increment increasing line size by .01 inch.
3. Fill area — Fill color and pattern style are specified for each bar. You can choose from the 74 colors noted above, as well as 160 different patterns.
4. Link area — If bars are linked together or blocked, these areas can be filled as well with color and patterns.

Annotation

The default setting for D-Pict Intellichart doesn't provide for annotations. But you can create annotations by using the Bar Chart Annotation panel — B3 from the main menu. Available options include:

1. Location — Annotation for each bar can be displayed at the outside top, inside top, center or bottom of the bar. Use the Option key (keypad 5) to change the values.
2. Percentage — Rather than annotate by bar value, stacked bars can use annotation representing the percentage of the total stack each segment uses.
3. Stack total — This displays the sum of the values of each stacked bar.
4. Size — You can let the system display text on a best-fit basis, or you can override this by specifying an absolute character size.
5. Precision — Similar to the refinements of values used in spreadsheet programs, the precision value determines the number of decimal places and format to use when displaying numeric information. For example, the value F3 displays numbers in floating point format with three decimal places. C format places commas every third position, S format uses spaces rather than commas, E causes exponential display and I displays values with no decimals.
6. Font — Twenty-one fonts are available including Greek, math, map, weather and zodiac symbols. Slant angle, aspect ratio, spacing (proportional or mono) and intercharacter spacing also can be specified.
7. Color — Outline and fill color (or patterns) can be specified for face fonts. For other fonts, the outline color determines the color of the text.

More Options

This bar chart example demonstrates the flexibility you have in regard to chart appearance. Similar options exist for line and pie charts.

Pie charts, for instance, can be exploded, pie slices filled with various colors and annotation customized to appear anywhere you want it. In word charts, text may be adjusted in size relative to other text, centered, marked, and so forth.

X and Y axes also can be tailored to fit your needs by using the AXES section of the main menu. These modifications include options, such as labels and tick marks of various types, distances the axes are from the actual graph, line width and scaling parameters.

Under the ENHANCEMENTS section of the main menu, a number of options are available. For example, legends can be displayed on any side of the graphing area with associated text displayed on any side of the legend.

Data lines can be drawn at specified points on the X and/or Y axes. These are especially useful for line charts; i.e., to specify a base level that the line rises above or dips below. Instead of simple data lines, vectors can be drawn between specified points on the graph for enhancement purposes.

Rather than take the default title line, three lines can be specified in various sizes and fonts to enhance the chart's appearance. Extra text strings can be user-defined or drawn from labels in data tables and placed on the chart where you want them. Their attributes in regard to font, size, and so forth are user-definable.

To print a chart of any type, you simply issue the DISplay/SECONDARY command. This directs output to the secondary graphics device specified in the ENVIRONMENT ATTRIBUTES panel.

Advanced Features

Intellichart includes many sophisticated graphics and chart-making capabilities. But some advanced features worthy of note are:

1. Multiple charts — Many charts of any type can be pulled from saved graphics files and displayed on the same screen.
2. XY charts — With independent/dependent variable data, Intellichart can be used to generate XY graphs. Vectors, arrows, symbols and longer text strings can be added to the chart to highlight specific points.
3. Macros — Up to 20 internal macros and an unlimited number of external macros can be defined.
4. User-defined keys — If you're not

happy with the default keyboard layout, you can rearrange it. Also, 20 more User Function Keys can be defined.

5. Model graphics library — Intellichart provides more than 140 template graphs you can recall and modify. Your own data tables can be used to supply the data needed to complete the graphs.

D-PICT

Intellichart is a flexible, powerful, easy-to-use presentation graphics system providing excellent device support.

Documentation

Intellichart's documentation includes an installation guide, quick reference command summary, and a graphics guide that provides references for colors, fonts, line styles, and so forth. The documentation also includes the device driver reference mentioned in the section on installation, a user's guide, command reference manual and self-study tutorial.

I used them all to do the review and found them to be well written and clear, although I could have used a wheelbarrow to carry it all around.

D-PICT INTELLICHART is a flexible, powerful, easy-to-use presentation graphics system providing excellent device support. The ability to import data files from various sources is a timesaver. The user interface is straightforward and the documentation is well thought out and clearly presented. Anyone with presentation graphics requirements should check out Intellichart.

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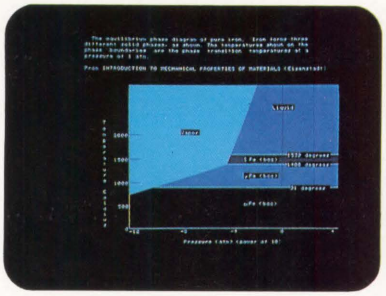

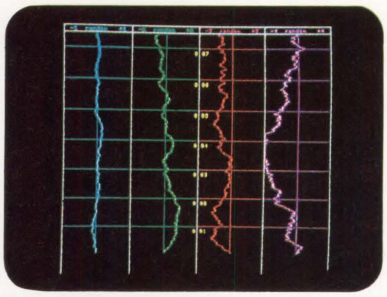

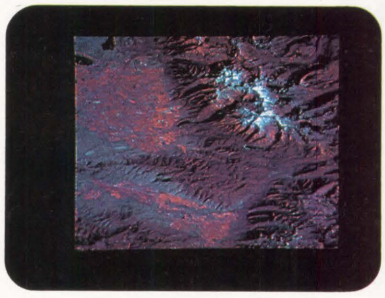

	MODEL	Q-BUS/ UNIBUS*	PIXEL GRAPHICS	ALPHA-NUMERICS	COLORS
COLOR	VCK8	Q & U	1024 × 1024	64 × 85	256
	VCK24	Q & U	1024 × 1024	64 × 85	16 million
	VCX8	Q & U	512 × 512	48 × 80	256
	VCX24	Q & U	512 × 512	48 × 80	16 million
	VCH	Q	512 × 512		256
	VCG512	Q	512 × 512		16
	VCG640	Q	512 × 640		8
	VRC	Q & U		24 × 80 48 × 80	64 64
MONOCHROME	VRH	Q	1024 × 1024	64 × 128	
	VRS	Q	512 × 512	48 × 80	
	VRG	Q	512 × 512	32 × 64	
	VRA	Q & U		24 × 80 48 × 80	

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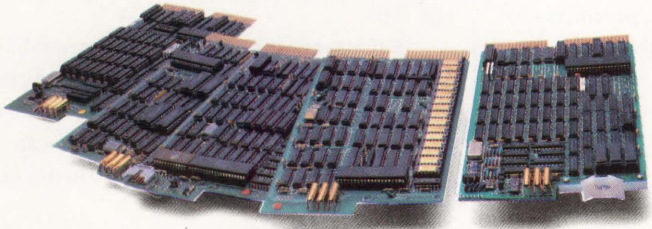

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IMAGE PROCESSING

IMAGES WITH A VAXSTATION

By Jeffrey W. Porter And Randall Tagg

Using A VAXSTATION II/GPX To Study The Physical World.

Reduced hardware costs have brought image processing to a wider base of users. As a result, digital imaging is becoming a laboratory and engineering tool as standard as an oscilloscope. In this article, we present an example of an image processing system configured around a VAXSTATION II/GPX.

A VAXSTATION-based system with plug-in frame grabbing and image processing boards is, in terms of cost, a midrange solution. At the low end are the PC-based imaging systems in which the imaging hardware and software can overwhelm the resources of the microcomputer.

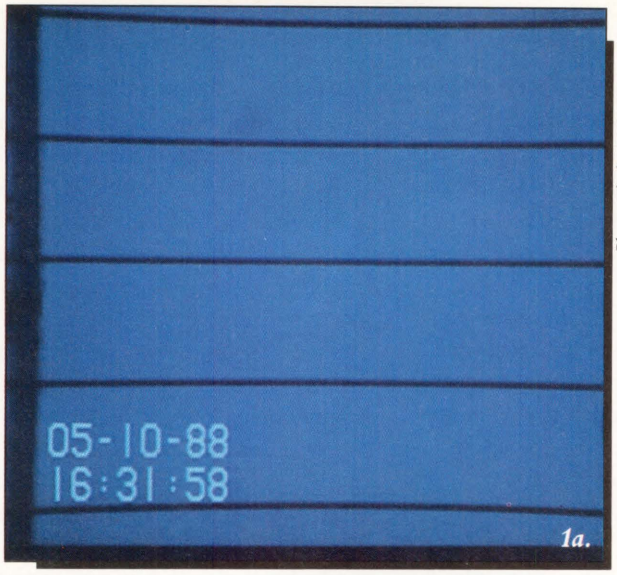
At the high end are standalone image processing subsystems connected to a host computer, often a VAX or MICROVAX, that offer real-time processing, storage and retrieval capabilities. Recently, some standalone boxes have reached the market at prices not far beyond the cost of our system.

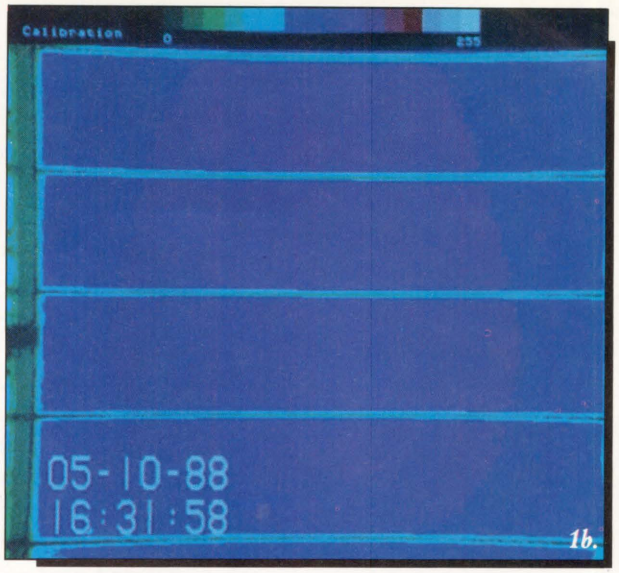
In selecting the components of our midrange image processing system, we aimed to do the following:

1. Provide a flexible software environment that performs standard image processing functions efficiently and provides the primitives for developing unusual applications.
2. Provide a two-user system that allows one user access to image acquisition hardware and live video display, while the other user analyzes previously acquired images at a separate display.
3. Communicate with other laboratory computers for synchronizing image acquisition with experiment control.
4. Permit data acquisition from non-standard image sources such as linear charge coupled device (CCD) arrays — so-called slow-scan devices.
5. Allow direct software access to the hardware for customized control.
6. Provide computer control of various video equipment.
7. Provide for very large data storage; i.e., more than 500 MB.

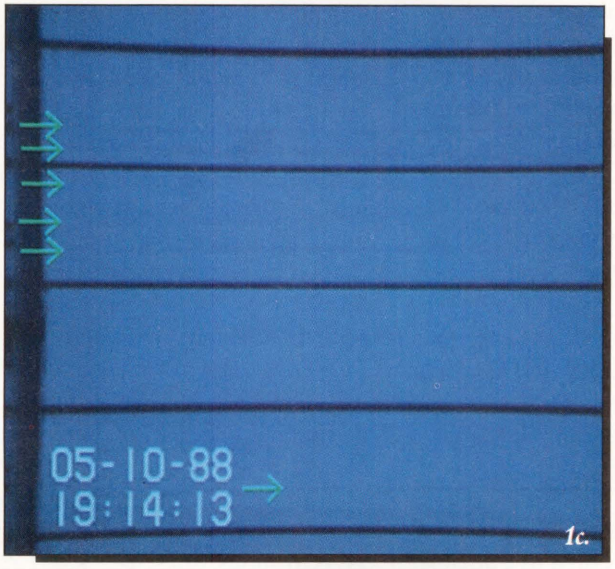
Image processing software influenced our choice of an image processing system. Our early image processing work was done at a central campus facility using a software package called Interactive Data Language (IDL), sold by Research Systems Inc. This software package had been used extensively by our astronomy colleagues, and we found it to be a flexible environment for manipulating image data.

IDL is an interactive, interpreter-based language that provides automatic data typing and allows free intermixing of scalars, vectors and arrays. IDL commands also can be grouped along with control statements (e.g.,





Photographs by Michael Schatz.



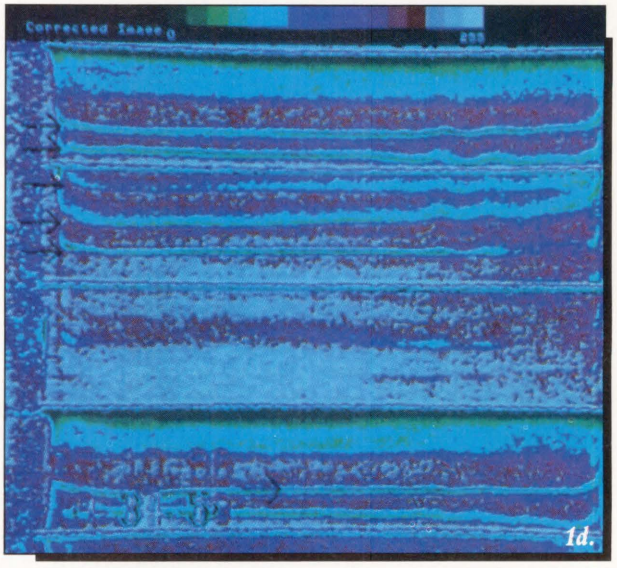
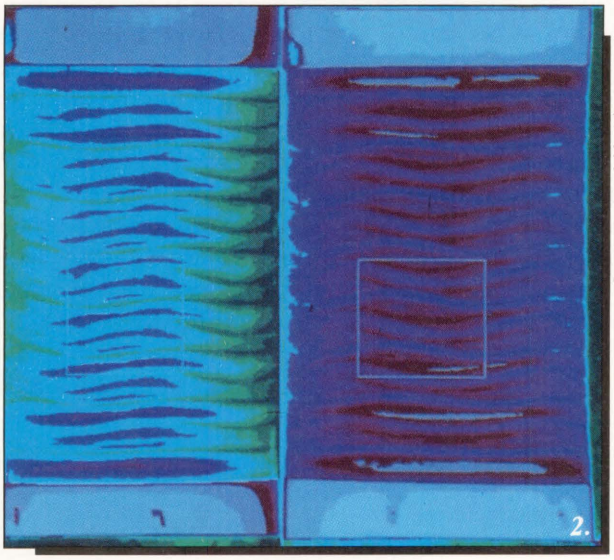


Image-feature enhancement of channel flow images. The variations in intensity in the calibration image (see Photo 1a) are evident in a 16-level pseudo-color image (see Photo 1b). The flow features that were barely visible in the original image (see Photo 1c) are apparent in the corrected and enhanced image (see Photo 1d.)



Images were recorded by John M. Good.

A video multiviewer was used to combine images from two cameras into a single frame. The flow features in the two squares will be compared numerically.

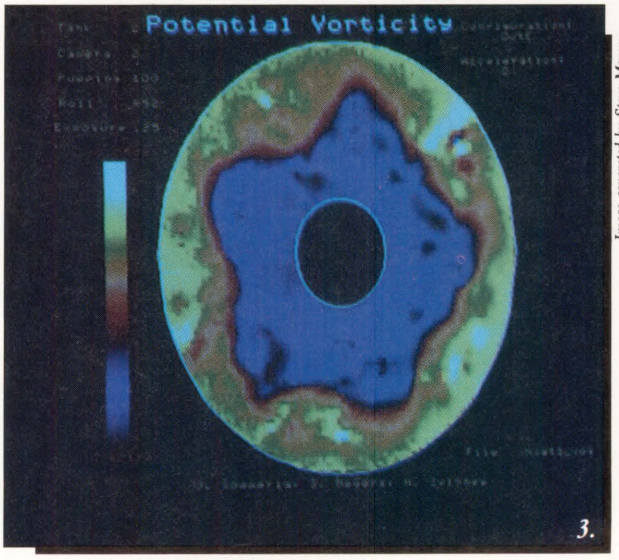


Image generated by Steve Meyers.

This image shows properties of the fluid flow in a rotating tank. The colors represent the potential vorticity (angular momentum) of the fluid at each point in the tank.

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IF-THEN-ELSE, FOR-DO, WHILE-DO and procedure calls) into user-written procedures. These procedures can be used interactively, or complete data-analysis programs can be constructed and run as batch jobs within DCL command procedures.

IDL isn't specifically an image processing package. Rather, it's a general-purpose language for manipulating arrays of data. It includes many image processing features, and large applications can be constructed easily.

Routines written in other languages (e.g., C or FORTRAN) can be linked into IDL and used as regular commands. A variety of input and output devices, including the VAXSTATION II/GPX display, is supported. IDL includes procedures for moving images to and from the image acquisition and display devices.

Hardware

We decided on a VAXSTATION and VAX/VMS because IDL was available. At the time, IDL had been developed specifically for the VAX/VMS environment, although recently it has been under development for UNIX systems. A special price offer from DEC and a generous dean enabled the purchase of a VAXSTATION II.

The speed and memory capacity of a VAXSTATION were suited to a flexible image processing system. The original 71 MB of disk storage was inadequate for imaging work, however, so we added two external Fujitsu M2333K disks with a total formatted capacity of 548 MB. Finally, an upgrade to a GPX eight-plane graphics system provided for image display directly on the workstation monitor.

The choices of Q-bus-based image acquisition hardware were evolving rapidly, and the chief vendors with midrange products were Data Cube, Data Translation and Imaging Technology. Rapid product development by all three manufacturers made the choice a moving target. But we finally settled on the Data Translation DT2651 frame grabber/frame store, DT2658 auxiliary frame processor and DT-IRIS device drivers and subroutine library.

Figure 1 shows some of the hardware capabilities. Of particular interest were the dual 512 x 512 x 8-bit frame stores, the capability to read from slow-scan devices, the claimed robustness in grabbing images from jittery sources like videocassette recorders and the supplemental processor board with an additional 16-bit frame store that allows arithmetic operations and image averaging without truncation.

At the time of purchase, IDL software support wasn't available for the Data Translation product, but we took a calculated risk that it was forthcoming. Indeed a version of IDL is now marketed cooperatively by Data Translation as a high-level software package for its Q-bus imaging boards.

Our image processing system is integrated into our laboratory environment. Separate computers control various experiments by systematically changing a control parameter, stopping to take data, processing the data and sometimes using the results to guide further parameter variation. Our desire was to include the acquisition and processing of image data in the experiment control loop (see Figure 2).

In our present configuration, the computers are connected with direct asynchronous links; i.e., RS232 cables. Simple keyword sequences are sent from the control computers to the VAXSTATION.

A program running on the VAXSTATION reads the keywords, chooses the proper video acquisition modes and activates DCL command procedures to take the image data. The VAXSTATION sends status strings back to the control computers to provide the handshaking needed to keep everything synchronized.

After we install Ethernet hardware in all the systems, the communication link will be through DECNET. With DECNET, we will be able to send extensive data blocks to the VAXSTATION to

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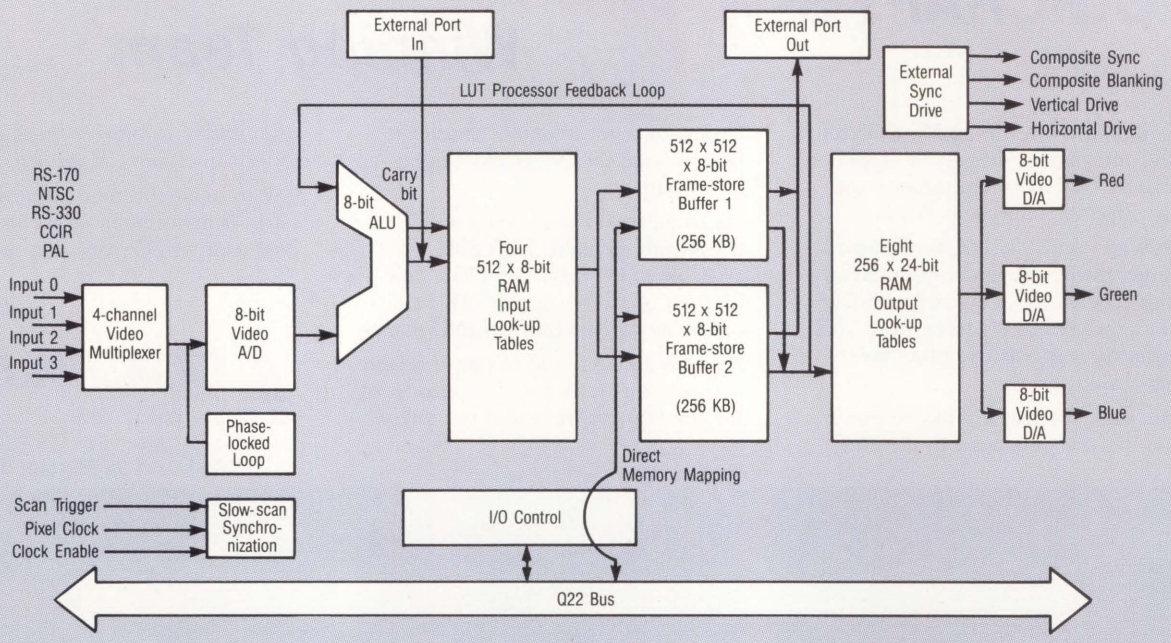
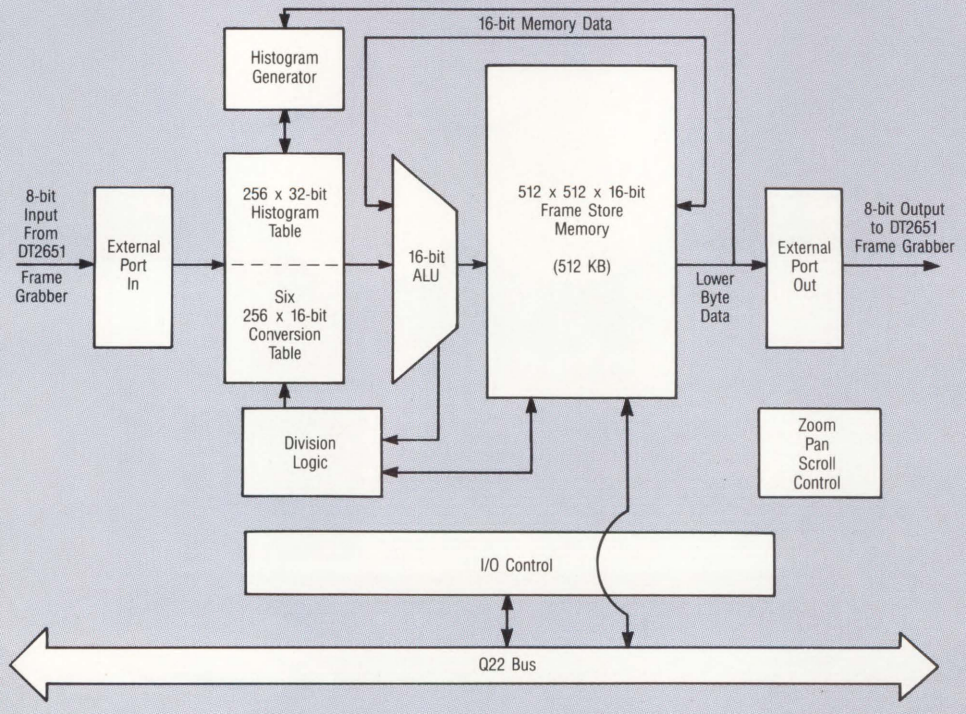
FIGURE 1.





Data Translation DT2651 (top) and DT2658 (bottom) architecture.

Flexibility in data taking and processing has been a key goal in our effort to integrate our image processing system into the laboratory.

be stored with the digital images. The data blocks will record the conditions of the experiment (for example, time, temperature and parameter settings) at the time the image was digitized. This information will be useful when we analyze a set of images.

Flexibility in data taking and processing has been a key goal in our effort to integrate our image processing system into the laboratory. Much of the lowest level software for these interconnections and for other special manipulations of hardware is written in C, thus allowing flexibility in the I/O control.

DCL command files administer the overall strategy of an experimental run and its associated image processing. Data analysis is done with IDL procedures, which are developed interactively but later are run from DCL command files. This combination of C programs, IDL procedures and DCL command files has proved efficient and flexible.

The video hardware we use is suitable for medium-resolution (512 x 480 pixel) imaging. We use CCD array cameras (Sanyo VDC 3800) because of their compactness, geometric stability and uniformity.

Alternatively, we achieve higher spatial resolution by using a 3456 x 1 element linear CCD array camera, digitized in slow-scan mode. The camera is based on the Texas Instruments TC104 integrated circuit.

Unfortunately, switching the frame grabber input mode between standard video signals, which are ac-coupled, and slow-scan signals, which must be dc-coupled, requires manually changing two jumpers on the DT2651 frame grabber. We're investigating replacing the jumpers with relays, so the alteration can be done under computer control.

Methodology

When we run an experiment, the standard video signals either can be digitized directly or recorded on videotape for later analysis. There's some loss of resolution when digitizing images from videotape. The main difficulty, however, is getting the DT2651 to lock onto the jittery synchronization signals produced by the video recorder.

In our application, the DT2651 synchronization circuitry has not proved to be very robust. Digitizing from videotape remains tricky, but large amounts of image data can be processed. Thus, undaunted by occasional fuzzy or distorted images, we have installed a digital input/output interface, DRV11J, in the VAXSTATION to control the frame advance of the videocassette recorders under program control.

We also use the digital I/O port to control a video multiviewer (the FOR-A MV24GL). This device allows one, two or four images to appear simultaneously on a single screen. It also can be used as a simple channel selector.

Some of our applications have required digitizing more than one image within one frame time; i.e., 1/30th second. The screen is shared among the required cameras and the resulting composite image is digitized. However, for the split-screen mode, cameras allowing both external vertical and horizontal scan synchronization are needed; the Sanyo cameras are unsuitable in this respect.

The DT2651 frame grabber and the GPX display provide for video displays of imaging data. The DT2651 digitizes the input video signal in real time and stores the data in the frame buffer. Simultaneously, the output circuitry of the DT2651 reads frame buffer data, passes the data through three parallel look-up tables and generates red-green-blue analog video signals.

These three signals drive the RGB inputs of the Electrohome ECM1311 color monitor. By modifying the look-up tables, pseudo-color renditions of the original image can be produced. The frame grabber/frame store also can be used to display previously acquired images by writing image data into the frame store.

The eight-plane GPX screen provides a second image display, allowing another user to analyze or acquire images. Finally, the display drivers for both display devices support mouse-controlled cursors. The cursors are useful for marking points on the image and thereby obtaining quantitative spatial information.

We can obtain hard copy of the images in a variety of ways. First, the image displays can be photographed directly. Second, we have developed a PostScript translator to transmit gray-scale images to a laser printer. The image quality rendered by 32 effective gray levels and 300 dots per inch is surprisingly good.

For publication-quality hard copy, we can send image files over our LAN to a Matrix camera connected to another VAXSTATION. The Matrix camera is capable of producing quality images in a variety of film formats.

Applications

We use a variety of standard image processing techniques for our applications. These include contrast enhancement, correction for uneven illumination,

geometrical corrections and sharpening or deblurring.

More demanding applications of image processing include image comparison, measurement of distances between features in the images, computation of spatial power spectra by fast Fourier transform, pattern recognition and tracking particles from image to image.

Some interesting ways of generating images include generation of space-time diagrams, looking at all sides of an object (e.g., a cylinder) by stretching and splicing multiple simultaneous images, and synthetically generating images out of numerically computed data.

You can use image processing techniques to enhance the features of an image (see Photos 1a — 1d). The pattern of fluid flow through a narrow channel is made visible by injecting dye or suspending reflective flakes in the liquid. Pictures of these patterns sometimes suffer from uneven illumination and poor contrast. To compensate, a calibration image of a patternless (smooth) flow is recorded. Each raw image is corrected with the following calculation:

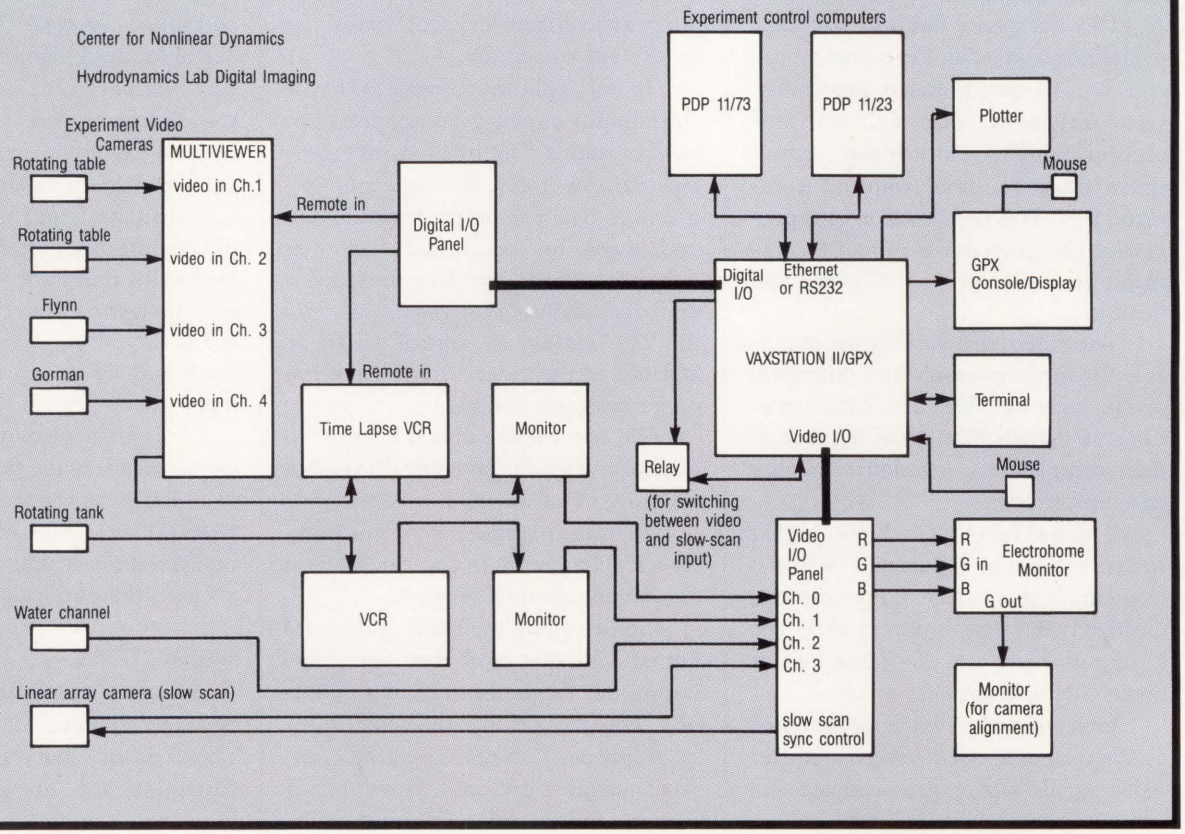
New = (Original — Calibration) / Calibration (on a pixel-by-pixel basis)

and is rescaled so that the pixel values are well distributed. We use the video multiviewer to acquire two simultaneous images of fluid flow between two rotating cylinders (see Photo 2). The left-hand side of the image is from one camera, and the right-hand side of the image is from another camera positioned 45 degrees away (as viewed from the cylinder).

By carefully correcting for uneven illumination and geometric distortion due to the curvature of the cylinder, we can compare two portions of the images and numerically measure the degree of similarity between the features of each image subsection.

We've also used image processing techniques to look at the world in new ways. We are interested in how flow patterns behave as time varies. By recording

FIGURE 2.



VAXSTATION II/GPX-based digital imaging system. The VAXSTATION is integrated into the control, acquisition and analysis of the image data.

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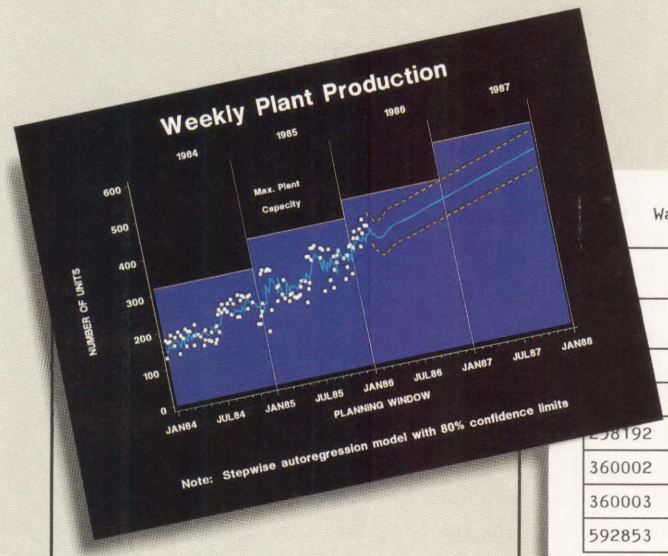

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	Quantity on Hand	Quantity on Order	Projected Reorder Date
	123980	10000	THU, FEB 12, 87
	89450	5000	FRI, FEB 20, 87
98192	20110	1000	MON, MAR 30, 87
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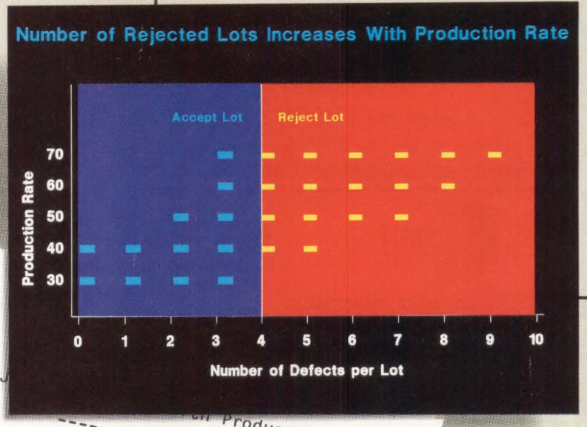

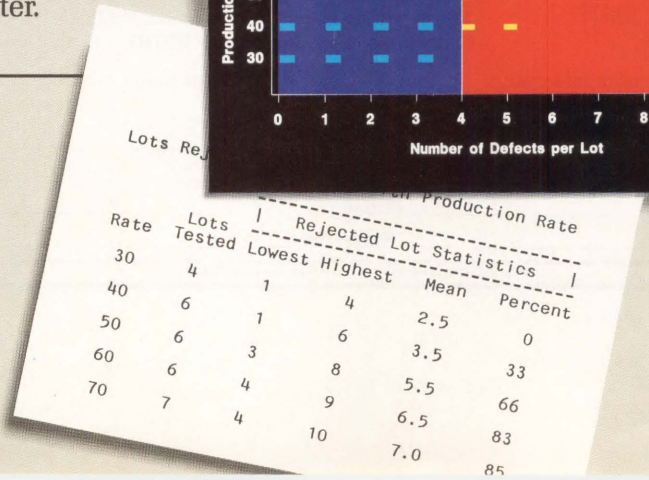

* Computer Intelligence, January 1986.

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a narrow strip of the live image every second, a long history of the flow pattern can be compiled.

An image processing system can be used for image and data analysis (see Photo 3). The doughnut-shaped object represents a rotating tank filled with fluid. The colors represent the direction and speed with which the fluid is moving in the tank.

Problems

Despite these capabilities, there are a few problems with our current image processing system:

1. Switching between standard video and slow-scan input requires changing jumpers on the frame-grabber board.
2. Capturing images from videotape is still done by trial and error, often requiring subsequent corrections; e.g., deblurring by shifting the interlaced image fields into registration.
3. Analysis through Fourier transforms puts a heavy load on the VAXSTATION CPU.
4. We've made it so easy to incorporate image acquisition into our experiments that we have a data explosion. Unimportant images must be purged quickly, but the remainder must regularly be compressed and put into archival storage.

ONE DESIRED ENHANCEMENT would be our own dedicated hard-copy device. Second, we've looked at array processors for use in performing Fourier transforms; it's highly desirable that the data transfer be done through the external data port on the Data Translation board. Data Translation markets just this sort of configuration for its PC-based image processing systems.

Also under consideration is a scanner for quickly digitizing photographic film. Because of the much higher resolution of the film, small sections of the photograph would be digitized. Then a larger, high-resolution image would be constructed from these segments.

For software enhancements, we're trying to integrate various graphics packages into our workstation environment. A lot of theoretical data in fluid dynamics is presented in graphical form, such as streamline patterns or flow fields. Easy access to such displays in conjunction with our images will aid in the interpretation of our results.

An image processing system can be used for image and data analysis.

It's our goal to analyze time-varying image features by computing fast Fourier transforms of large series of images; e.g., more than 32,000 images. Until now, this type of analysis has been done only for a few channels of data (points), not the 262,144 points characteristic of images.

Acknowledgments: This work has been carried out in the laboratories of Professor Harry Swinney, who has given us the financial support and considerable flexibility in developing the system. We also thank Professor Chet Opal and Dr. Philip Kelton of the UT Astronomy Department and Marge Knox, Thomas Linscomb and Philip Watson of the UT Advanced Graphics Lab for their frequent advice. Dan Lathrop has developed our slow-scan camera, and Bright Dornblaser has provided substantial assistance in experiment control. *—Jeffrey W. Porter is an undergraduate research assistant and Randall Tagg is a research associate in the Center for Nonlinear Dynamics in the Department of Physics at the University of Texas at Austin.*

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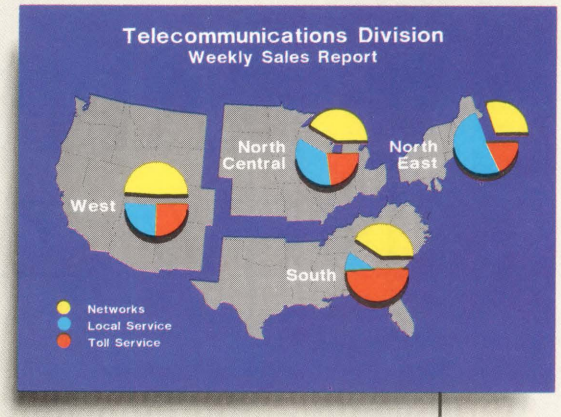

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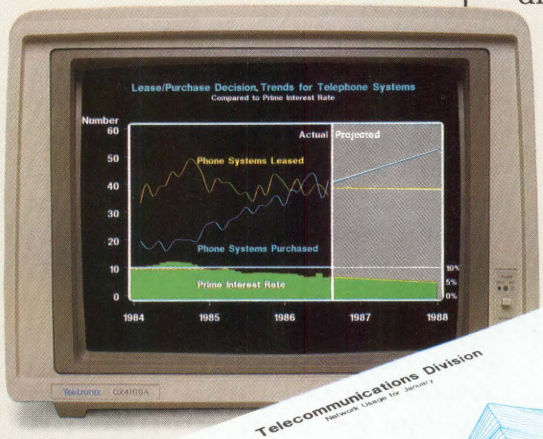

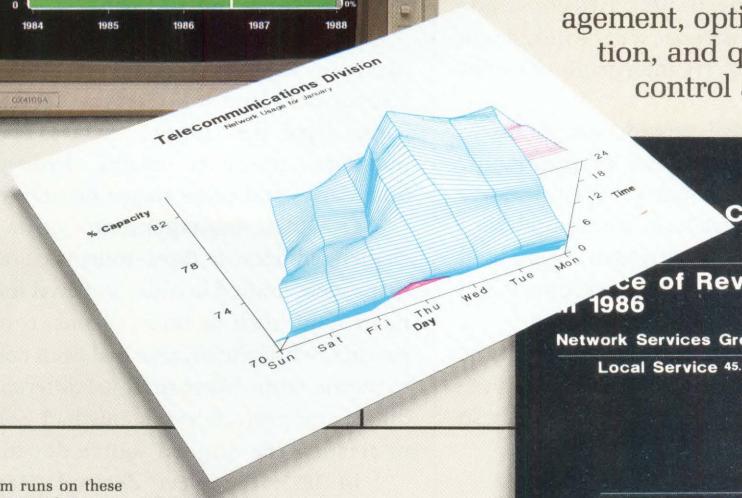

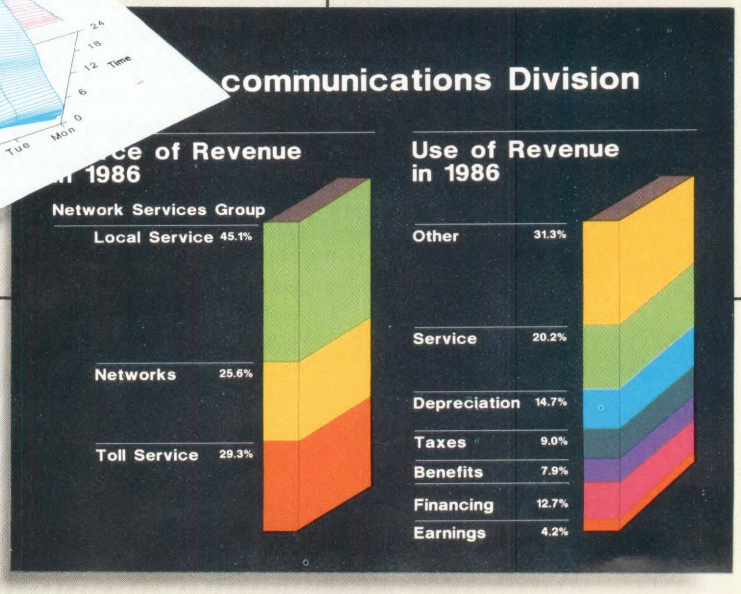

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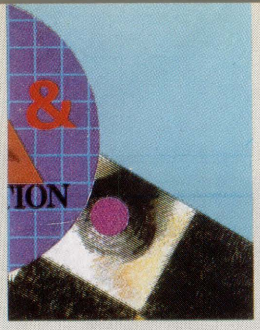


IMAGE PROCESSING

MAPPING NEW ZEALAND

By Ron C. Spencer

Creating An Intelligent Electronic Map For The Entire Country.

In December 1986, the New Zealand Department of Survey and Land Information (DOSLI) embarked on a comprehensive cadastral, or property-based, database project. The objective of the project is to transform 20,000 paper maps, some of which were created from survey data dating from 1840, to an intelligent electronic map spanning the entire country.

Known as the Digital Cadastral Database (DCDB), the system ultimately will represent the most accurate description of the country's land parcel ownership framework picture available at any given time. Just as important, DCDB will form the land base foundation for the Land Information New Zealand (LINZ) project. Through this project, five core land-related information projects will be linked into a computerized property information base for the whole country.

Also, DCDB will provide the means to automate a broad spectrum of geographic themes covering the country's 104,000 square miles. It will form the basis for a number of computerized land-related systems being used or contemplated by the local government and the private sector.

By 1991, the project could represent the largest computerized cadastral database in the world, one that has been planned carefully so it ultimately will pay for itself through a unique cost recovery program.

The Challenge

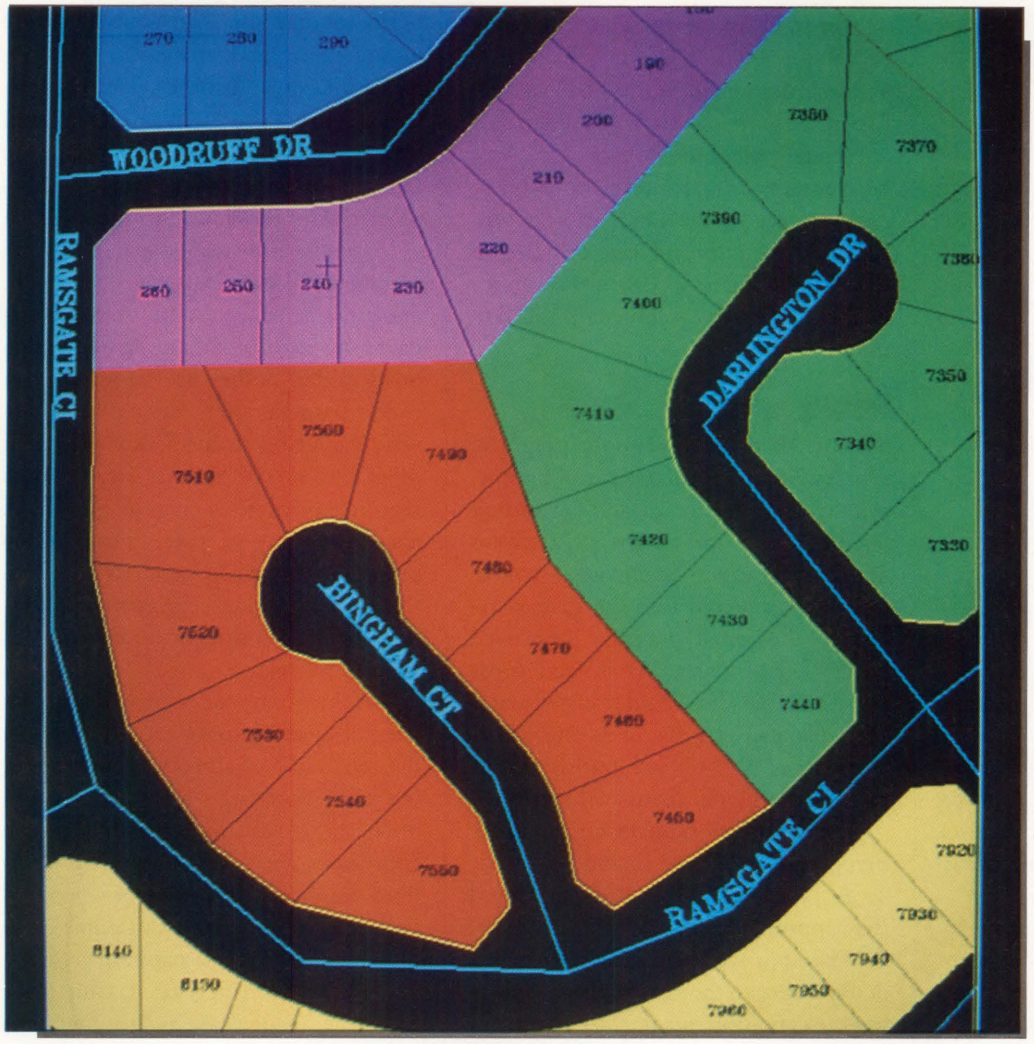
When DOSLI embarked on its Digital Cadastral Database project, existing forms of parcel information management differed little from methodologies employed at the turn of the century.

As the agency responsible for supplying basic survey information for the country, DOSLI was faced with managing 20,000 manually produced paper maps. These maps were used to represent the 2.6 million land parcels managed nationwide, along with the millions of associated descriptive records that provide information on legal appellation, survey records, and so forth.

The cadastral maps depict the location of surveyed legal boundaries of private and Crown-held land and reserves. They include parcel legal descriptions, names, area plan numbers, transport routes, hydrographic boundaries and other major natural features.

DOSLI's management skills were challenged because three-fourths of its paper maps were drafted in older imperial measurement units such as links, chains, roods and perches, while the balance had been converted to metric units. More than 100 different coordinate and projection systems had been used in creating the original source documents.

In 1973, the New Zealand Map Grid (NZMG) was introduced as a means to establish a single, standardized metric coordinate sys-



The database will hold, in addition to land ownership and appellation, 35 descriptive attributes for each parcel.

tem. It was selected as the unified coordinate system, on which all coordinates will be represented, for the nationwide Digital Cadastral Database project.

Thus, to build a more accessible approach to land information management, DOSLI had to convert chains and links to meters. It also had to change to the New Zealand Map Grid and address other conversion issues.

The problems associated with creating a single, continuous electronic map with standardized formats and units of measurement presented interesting technical challenges. So did the task of compiling the 35 descriptive attributes associated with each parcel that ultimately will become part of the database.

To compound the problem, many maps made up portions of other maps. Thus a single parcel change often had to be reflected on multiple map documents. This led to redundancy in drafting efforts, as well as the opportunity for error this redundancy introduced. To put the problem into perspective, consider that DOSLI is faced with an average of 71,000 parcel updates and 31,600 new parcels each year.

Facing The Challenge

Using a dedicated computer network and specialized software, DOSLI has embarked on a project that will provide both itself and the public and private industries it serves with on-demand access to current information about the country's land-related information.

Through the Digital Cadastral Database project, people with access to the system can create a wide variety of maps and reports about the country's land base. The system output capabilities are limited only by the infor-

mation that has been entered into the database and the imagination of the user.

The goals of the newly implemented system are to:

1. Produce maps tailored for the needs of each user.
2. More effectively deal with problems associated with dwindling supply of drafting personnel.
3. Allow multiple representations of the same data in different types of maps and reports.
4. Speed map production and updating.
5. Facilitate analysis of data.
6. Minimize map storage requirements.
7. Allow creation of maps that were previously difficult to produce by hand.
8. Produce maps less expensively.
9. Create maps in which selection and generalization rules are defined explicitly and consistently executed.
10. Create ad hoc, often single-purpose, single-use maps for a variety of planning land use decisions.

Roads, railways and hydrographic features and reserves also are being input.

DOSLI selected a system developed by GeoVision Corporation, Ottawa, Ontario, to meet its objectives. The system includes 52 graphics workstations. These are distributed throughout the department's 12 district offices in Auckland, Hamilton, Gisborne, Napier, New Plymouth, Wellington, Nelson, Blenheim, Hokitika, Christchurch, Dunedin, and Invercargill. Wellington is also the location of the Head Office.

In addition, a large VAX 8300 computer system has been installed at the Central Mapping Unit of the Head Office in Wellington. That's where the data collected by all of the district offices will be centralized, and interfaces to other components of the LINZ project will take place. Equipment was installed in the six largest sites in 1987; the seven remaining sites had equipment installed in mid-1988.

What's In It?

The DCDB will comprise the graphical representation of all land parcel boundaries within New Zealand, including legal roads, Maori roadways, railways and hydrographic boundaries. Source data being entered into the system includes the most recently approved survey office plans, Maori land court plans and deposited land transfer plans. Data also includes diagrams on transfer as recorded in the Land Transfer Division of the Department of Justice.

For each parcel, many attributes are being entered. These include:

1. A standard appellation (legal description).
2. The approved and official area.
3. Reference to the survey plan supporting the definition, the transfer document defining the subdivision or the Maori Land Court records defining the land partitions.

Roads, railways and hydrographic features and reserves also are being input. The system is capable of handling an unlimited number of database elements or features, some 64,000 overlays, and polygonal and linear networks. Information in the database can be extracted, manipulated and displayed in any combination.

Data Capture And Maintenance

The DCDB is being created by digitizing existing source maps. So that the database always contains the most accurate available information, the database is being supplemented constantly with actual survey coordinate data from survey plans.

Over the past three years, the department has put considerable effort into ensuring that its manual maps are ready for entry into the computer system. Many have been redrawn, and translation tables now exist within the DCDB system to convert survey coordinates from previous data into NZMG.

To further increase the integrity and accuracy of the database, the department has established a system whereby updated survey coordinates are continuously added as they are captured. Any time a parcel is split, merged or otherwise changed, a mathematical validation of all new survey plans at lodgement is required prior to their registration. A natural output of these survey procedures is coordinate geometry input to the database, which improves the confidence level in the corner coordinates of land parcels.

A hierarchy of source codes has been designed into the DCDB to report the reliability of all coordinates. Thus, the reliability level is increased as coordinate locations are perfected through coordinate geometry. Previously digitized points, usually of lower reliability, will be either confirmed or adjusted to maintain a coherent mapping base.

With 71,000 updates taking place each year, the database integrity will improve on a daily basis. This provision should enable any prospective user of the system to assess the accuracy of location information relative to his specific application requirements.

System Criteria

DOSLI's automated land records management system is based on the department's familiarity with computer technology and its applicability to the department's information management challenges. DOSLI built a prototype mapping system in the late '70s. With this early system, the department converted 540 of its manually produced map sheets.

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with this system was the catalyst for the design of the new system architecture. The technology employed in the design of the prototype system presented many limitations in the types of queries that could be performed, the flexibility to extract any desired combination of data at any scale and covering any user-specified area of the country.

In developing the functional criteria for DCDB, the department specified several important software requirements. Each of these embodies the latest available technology in spatial analysis, cartography, distributed processing and database management.

A relational database management system was an important criterion of the DCDB project because of the complex and changing relationships among the database elements. It was selected as the best way to eliminate redundancy, share data, enforce standards, apply security restrictions and maintain data integrity. Through dynamic relational links among graphic and attribute elements, DOSLI can produce many maps and reports that would be difficult without such an approach.

Types of relationships among the DCDB attributes, the variety of polygons that define property parcels, and the combinations of polygons that make up the many district maps produced by DOSLI require the one-to-one, one-to-many and many-to-many relationships made possible by the unique algebra and operators of a relational database structure.

A main purpose of the DCDB project was to eliminate the problems associated with the map sheet approach of both the manual environment and the original prototype system by creating a continuous digital map. With this single, seamless database of the entire country from which any user-specified area can be extracted, the system required sophisticated coordinate transformation and edge-matching capabilities. It also required the ability to provide rapid response to user queries regardless of the eventual size of the database.

A topological structure (i.e., one that stores and maintains the spatial connections between both linear and polygon data) was important to the way in which DOSLI is building and changing its database. Like many such projects, data will be entered by digitizing existing source documents. Unlike many projects, however, confidence in the cadastral information continually will be improved as changes are made to the land fabric.

As the parcel coordinates are updated through coordinate geometry, the topology of the DCDB system automatically knows that the corner point of the parcel being updated also can be the corner of one or more adjacent parcels. Thus, a change to the location of one parcel corner is automatically and dynamically reflected in all adjacent parcels.

The topological structure also knows which parcel boundaries are attached to the corner points and implicitly moves these line segments according to the new corner locations. The time saved through this intelligent connectivity will improve project productivity.

DCDB project had two objectives that pointed to a distributed processing technology for information sharing and processing. On one hand, each district office required the autonomy and processing power to handle its own land records management mandate. On the other, one goal is an integrated nationwide network through which information can be shared and interfaces developed between the DCDB land base and other LINZ projects.

The resulting system consists of 52 VAXSTATIONs, each containing its own copy of GeoVision software. Each workstation has its own processing power, so that operations are performed locally to eliminate reliance on a host-based system.

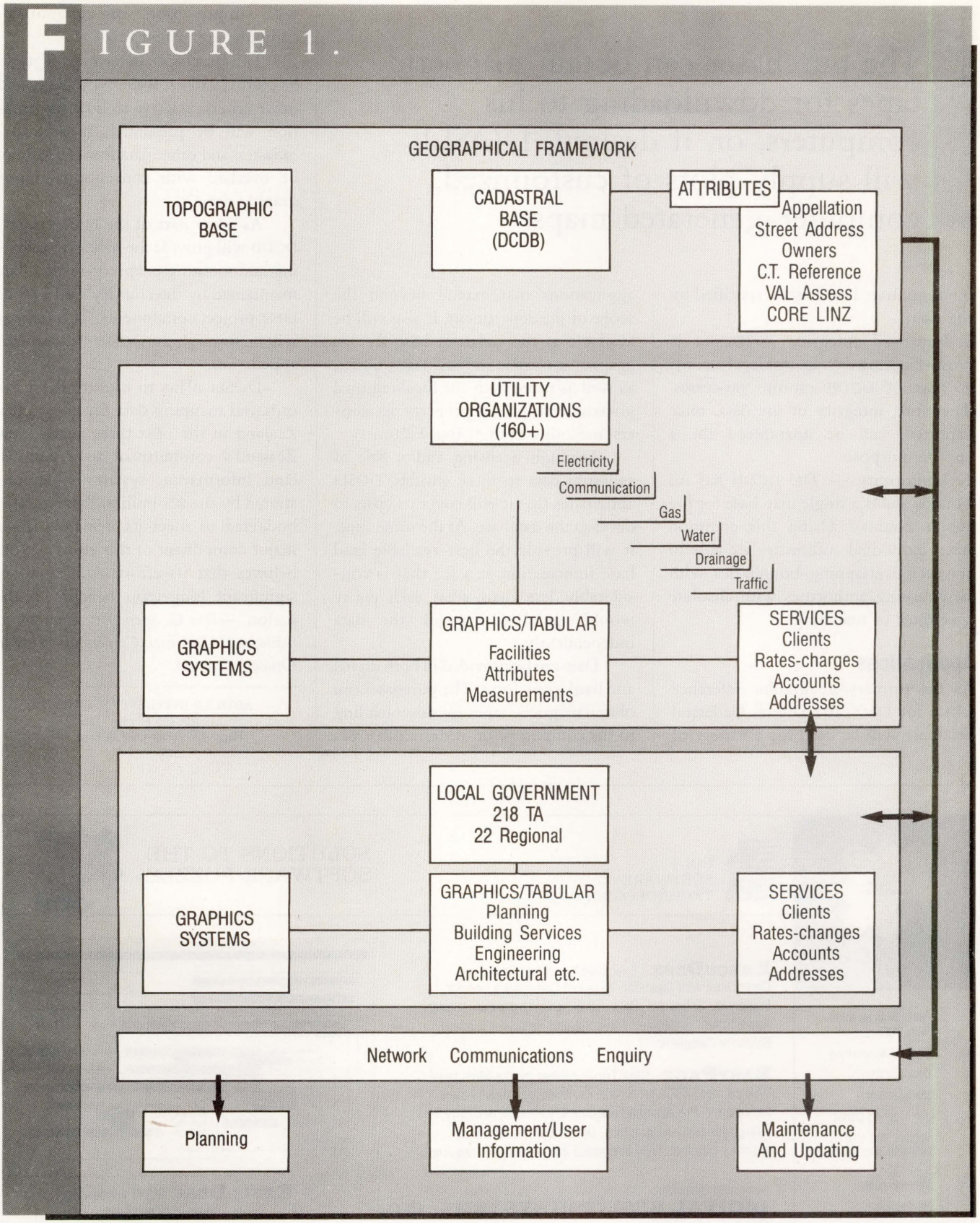
One result of this configuration is that additional workstations continually can be added to the network without impacting system performance. The ultimate objective is to link these workstations to the VAX 8300 at the Central Mapping Unit in Wellington — with its intelligent workstations — to create a countrywide network.

Benefits

Based on a year of experience with the DCDB, DOSLI has recognized many benefits from the database:

1. Improved quality — In its responsibility for monitoring the national survey control and survey plan examination systems, DOSLI now has a higher degree of confidence in its land base data and is updating the database on a daily basis as new land subdivision occurs.
2. Increased accuracy — The DCDB, while initially being captured through digitizing, will be updated by numeric methods. Over a relatively short time, the accuracy will be upgraded to survey accuracy. Besides the unique solution for adjusting old cadastral datum coordinates, the department has developed a process for mathematically transforming lower grade coordinates in the vicinity of new survey coordinates to effect upgrades.
3. Better data availability — With equipment distributed into its 12 district offices, data and processing power are placed strategically to meet the demands of local users on the basis of their priorities for information.
4. Varied outputs — Through the flexibility of the system software, the user has a wide range of output capabilities. After it's in the database, information can be extracted and output in any com-

FIGURE 1.



Land information infrastructure.

The purchaser can obtain magnetic tapes for downloading to his computers, or, if desired, DOSLI will supply plots of customized, computer-generated maps.

bination, based on criteria specified by the user.

5. Improved integrity — DOSLI is cross-checking data against legal records as part of DCDB capture processes. Therefore, integrity of the data, once captured, can be guaranteed for a specific purpose.

6. Uniformity — The DCDB has no bounds and is a single map base for the whole country. Using this common base, individual authorities are able to traverse overlapping boundaries with neighboring authorities with absolute guarantee of matching.

Applications

As the primary geographic reference fabric for LINZ, the Digital Cadastral Database will be used for a variety of applications that extend beyond the scope of the department. It also will be available as the cadastral base for 160 gas, water, electric and drainage utilities, as well as more than 200 local/regional governments, private property developers and other entities (see Figure 1).

Through licensing and/or sale of cadastral data to these entities, DOSLI anticipates that it will cover its costs to develop the database. At the same time, it will provide the best-available land base information at a fee that is considerably less than what each entity would spend to capture the data independently.

Data can be provided in both digital and hard-copy form. The purchaser can obtain magnetic tapes for downloading to his computers, or, if desired, DOSLI will supply plots of customized, computer-generated maps.

The purchaser determines data to be plotted, colors, scale, symbology and other criteria relative to how information will be presented. In addition, cadastral and other data from DCDB can be overlaid with conventional topographic data.

As a key part of the LINZ project, DCDB will provide the method for linking and merging property-related data maintained by the country's other four LINZ project components. This linkage will be through the DCDB standardized appellation.

DOSLI plans to capture the basic cadastral mapping data for all of New Zealand in the next three years. New Zealand's commitment to a national land information system is demonstrated by the $27 million that has been budgeted to meet its demands. As a major component of this effort, DOSLI believes that its efforts will result in significant long-term benefits to the nation. *—Ron C. Spencer is senior project manager at GeoVision Corporation, based in Ottawa, Ontario.*

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WORD PROCESSING

WORDPERFECT VERSION 4.2

By G. Thomas Kurdy

The Advantages And Limitations Of The New Version.

There were two reasons I was excited about WordPerfect for VMS. First, I liked the idea of being able to move documents from one machine to another without having to convert documents and re-edit because of lost attributes. Second, I liked the idea of not having to relearn functions and keystrokes among machines.

I began using WordPerfect because it seemed to be the best PC word processor available. It offers great functionality but is still easy to learn.

I have used it on Amiga PCs and on IBM PCs or clones. Now, WordPerfect is available for VAX/VMS, combining a machine I love and a word processor I can use on all my machines.

Installation

I installed WordPerfect on a VAX 11/750 with 15 MB and two RA81 drives. The *Installation Guide* provided the necessary information. There were only a few glitches.

The instructions assume that the person installing the product is familiar with VMS system operations. They tell you what privileges, global pages and sections, and disk space are necessary. They also provide a sample step-by-step installation.

The instructions don't, however, give details on how to determine all the page and section values or make necessary changes. You can read VMS guides to learn how to find such information, but that's inconvenient. Such instructions could be included by adding a page or two to the *Guide.* Nevertheless, WordPerfect 4.2 ran on my first try.

Keep It Simple

I like using WordPerfect 4.1 and 4.2 on PCs and Amigas. On the Amiga system, the software is menu- and mouse-driven, with the use of function keys and the keypad. On the PC, function keys and keypad can be used to create swell stuff.

WordPerfect has great functional range, and quality control seems a high priority. On VMS, that doesn't change. Simple editing is fast, easy and bug-free.

The *User Guide* is thorough and leads you step by step through all major functions. WordPerfect has all you need to create letters, manuals, mailing lists and more.

You can use WordPerfect to create a manuscript, its contents, outline and index, plus tables and graphs. You can format and print on a variety of printers, and setting WordPerfect for output to existing VMS queues is quick and easy.

When The Going Gets Tough

If you need WordPerfect for simple tasks, then the program is simple to use. But if you need to do complicated work, WordPerfect becomes complicated too.

First, WordPerfect performs functions and formatting by inserting invisible codes into the body of the document. But sometimes the cursor isn't where it appears to be. If you push an arrow key to move the cursor, it appears to remain stationary. Actually, the cursor has

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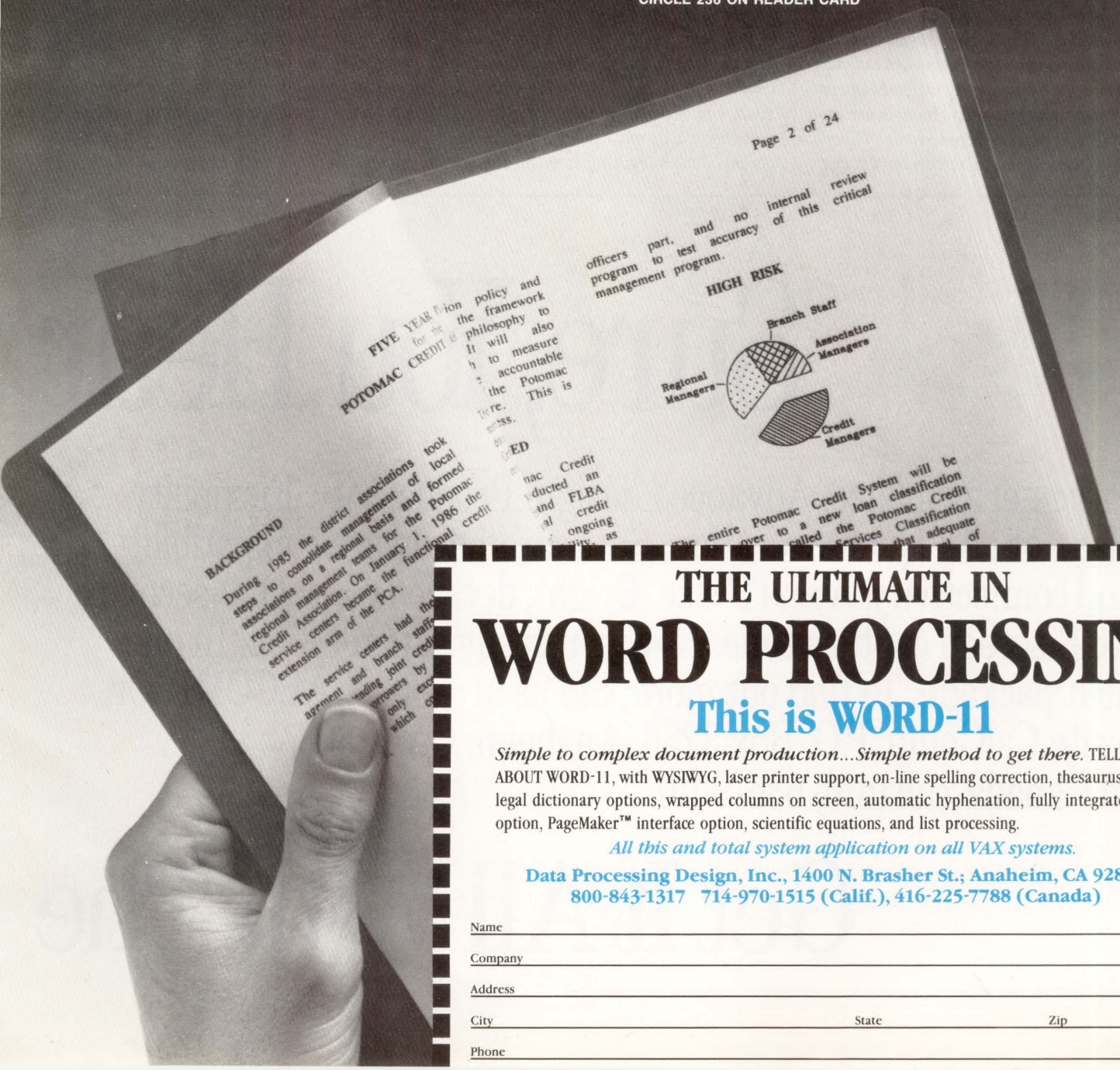

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moved past the code, but this doesn't show on the screen. For example:

1. You begin typing, and the text appears bold along with existing text. This is because the cursor happened to be between the invisible codes for turning bolding on and off.
2. You want to delete a character, and a prompt appears asking Delete BOLD. If answered incorrectly, bolding may disappear, but the character will remain.
3. You might change a margin setting without realizing that between the new setting and previously entered text, there's a different setting. That different setting will be used when the document is printed. This will result in an incorrect margin.

Second, changing rulers, specifically margin and tab settings, is easy but requires two completely different operations. After that, such changes are annoying, as well as problematic. There's no indication on the screen for the current settings. You must look at previous text and guess, or actually initiate the functions, in order to change the settings to determine them with certainty.

Furthermore, when you change the left margin, the text on screen shifts to the left by as many characters as necessary. This means that the first 10 characters of previously entered text disappear from the screen when the margin setting is changed from 0-left, 80-right to 10-left, 80-right.

The screen width, the maximum number of characters you actually can see, has no effect on this aberration. The entire screen continually shifts from left to right as the cursor moves from one margin setting to another.

This makes for difficult proofreading when paragraphs, quotations and citations have various margin settings. Also, you can waste time trying to find missing text or rereading material to be certain that everything is positioned in the way it should be.

In addition, you'll often find that text isn't printed as expected. I found this to be true while working through the samples in the *User Guide*, as well as in creating other documents. A draft copy must be created to make format-code changes before you resume editing a document.

What's A Code Among Friends?

Regardless of these complications, I thought the files created on PCs and Amigas, as well as Mac IIs and Apple II/GS systems, would be compatible among PC and VAX systems — just move a file from PC to host VAX.

Also, I assumed that because functions were the same, and similar keys were available among the different keyboards, I wouldn't have to learn which keys performed which functions. I was wrong on both counts. The only safe files were those with no special codes

in them, such as those for bolding or underlining.

In addition, even though a conversion function (to or from ASCII) is provided, I couldn't convert a WordPerfect document to ASCII (created with 4.2 for VMS) and import that ASCII text into a 4.2 or 4.1 WordPerfect document on a PC, Amiga or Apple system without complications. Nor could I import from a PC system to WordPerfect on VMS without similar problems.

This is because the ASCII conversion doesn't handle some of the embedded document codes very well. I lost a lot of time rekeying documents and editing out the problem codes and hard carriage returns. Then I had to reorganize the document, print a draft copy and hope I didn't need to re-edit codes for a final printed copy.

You must understand the implications of creating a document with, for example, WordPerfect V5.0 on an IBM PC and transferring it to WordPerfect V4.2 on VMS. It's possible to use functions and create information with V5.0 that aren't supported with V4.2, and you may lose some information. File compatibility among machines should become a non-existent issue as WordPerfect makes its latest PC version, WordPerfect V5.0, available across all the systems it supports.

Also, take care with communication and file transfer software used to move a document from one system to another. WordPerfect will supply a table of necessary file conversions among machines and versions of WordPerfect to ease the burden of file compatibility.

Once Learned, Twice Shy

My second major premise, that I would be able to use WordPerfect on VMS without much relearning, quickly disappeared. I tested WordPerfect for VMS using VT220 and VT100 terminals, as well as a VT220 clone by TeleVideo, and VT100 terminal emulation software on the Amiga and on IBM PC ATs.

The *User Guide* is to be used with an LKxxx-style Digital keyboard, like those on VT220 series terminals. However, the keypad template is for a VT100-style keyboard.

There's also a keypad-toggle key sequence you must initiate to make the VT100 template valid. If you use the keypad toggle on an LK-style keyboard, nothing works as the *Guide* instructs.

When using terminal emulation software or a VT220 terminal look-alike, such as that from TeleVideo, be sure that the settings are for ANSI and either VT100 or VT200 series emulation. I spent a half-hour trying to page up and wondering why I kept getting Macro Error. I found that my LK-style keyboard didn't work because the terminal was set for VT100 emulation.

Last, the keyboards aren't mapped

as they are on the standard IBM PC XT or AT. The keypad is different for the VT100, and the template must be used.

On the VT220, all 20 function keys (F1 to F20) are brought into play. These keys are used in combination with the PF1 to PF4 keys on the keypad, and some of the keypad (0 to 9) keys work as on the IBM PC keypad. No template is provided.

The CTRL key isn't used, nor is the ESC key. But on the VT220 keyboard, there's a center set of keys with the arrow keys (e.g., Find, Insert, Remove) that are used. The key functions aren't obvious.

The *User Guide* doesn't warn of any of these potential pitfalls. If you're familiar with WordPerfect on an IBM PC AT, you might be hard pressed to figure out what's going on if you're using terminal emulation software on that PC to communicate, and using WordPerfect for VMS on a VAX.

I found the easiest way to work was to set my VT220 terminal to emulate a VT100 and use the VT100 template supplied with the VMS kit. It most closely matches the IBM PC keypad usage.

So What's Good?

Despite these flaws, WordPerfect's simple editing features are complete and solid, and it handles spell checking well. Footnotes and endnotes are easy to create but don't appear in the text as you proofread the document on the screen.

Creating and using columns within a document works wonders for newsletter and mailing-list applications. WordPerfect's merge and sort functions provide flexibility that otherwise might require a separate database application.

Unfortunately, macros are another matter; they get complicated quickly. Most of my problems resulted from WordPerfect's requirement that you create macros by doing. You create macros by initiating the function, then performing the operations real-time while WordPerfect records the keystrokes. If an operation fails, you must start the process again.

These examples of how WordPerfect operates illustrate the potential

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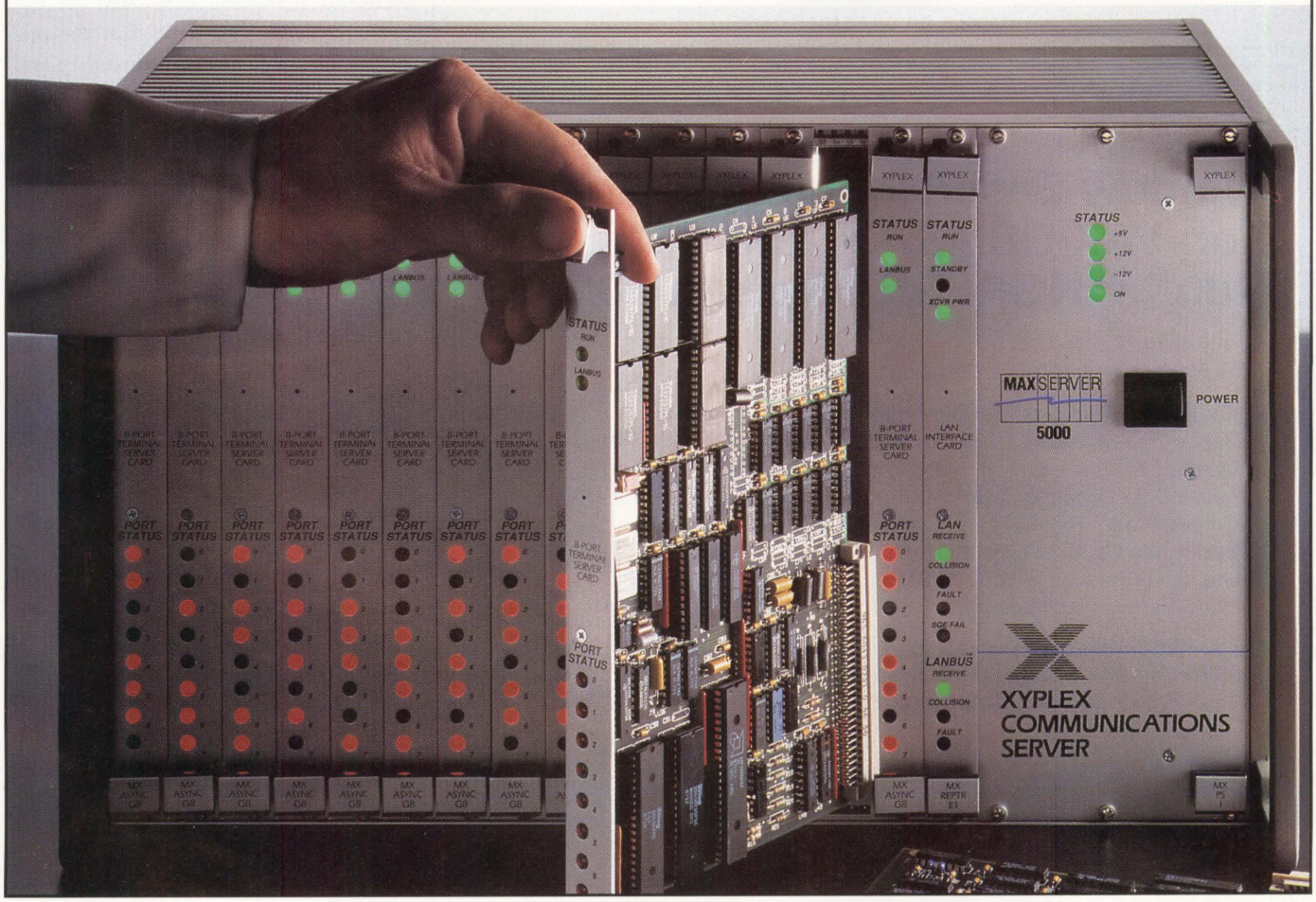

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technical problems that even an experienced user can have. But the real problem is in the lost productivity and annoyances caused by never being certain how the text will look when read on screen and when printed.

I worked through all the examples and samples provided in the WordPerfect user documentation and Learn modules. Many times I printed something that didn't resemble what I thought I had created. I then had to edit the codes and reprint the document. Even after becoming comfortable with WordPerfect, I was never sure how text would look when printed.

WordPerfect is a powerful tool on VMS. The user documentation samples are clear and well written, and the company supplies competent technical and user hotline support. If you need its vast functionality, it's as solid a product on VMS as it is on PC systems. —*G. Thomas Kurdy is an office systems consultant for TOMMYVISION in Washington, D.C.*

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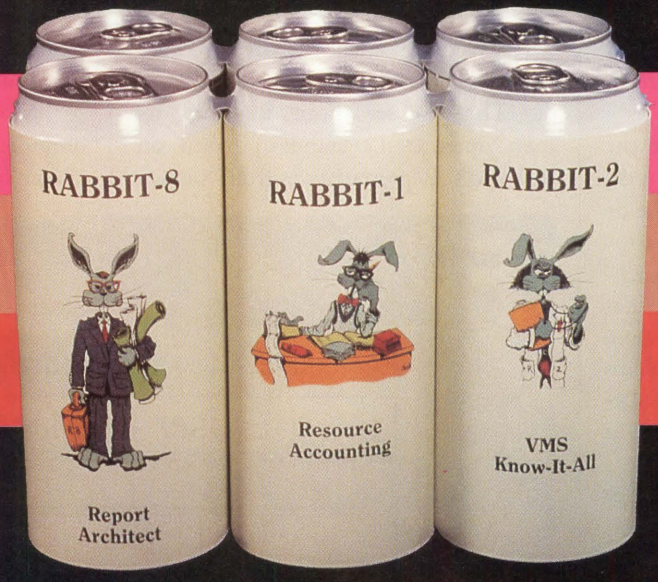

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The Super Standard

Ken Olsen's famous snake oil tirade put it succinctly. In March, before an audience of industry analysts, DEC's president criticized UNIX-look-alike vendors for claiming their products solved interchangeability problems. Olsen called this sales tactic "absolute snake oil" and said he was "dismayed by people who say [non-proprietary versions] are pure UNIX."

Olsen pointed out that there are several pieces to the industrywide platform compatibility puzzle besides the operating system. These pieces include windowing and graphics standards and communications protocols. He maintained that DEC will be a major player in the quest for open standards, noting that 10 percent of VAXs are sold for UNIX markets. Although that's a small portion of DEC's business, it makes DEC the number one vendor of UNIX computers.

MIT's X Window System and the ISO's Open Systems Interconnect (OSI) networking protocol are among the de facto industry standards DEC is supporting. "Interchangeability is hard," acknowledged Olsen, adding that through open standards like IEEE POSIX, "the operating system problems will be taken care of." Indeed, a POSIX-compliant version of VAX/VMS is reportedly in the works.

Olsen's position includes action as well as words. DEC has lent its support to X/Open, an independent standard decision-making group that's pushing to establish a superset of standards called the Common Applications Environment (CAE). (See Figure.) The goal is open portability — software that runs on all major hardware platforms and is supported by third-party software vendors.

Bob Ackerman, X/Open's chief marketing officer, emphasizes that "X/Open adopts and adapts standards and de facto standards. It does not create them." X/Open's intent, specifies Ackerman, is to standardize on interfaces and specifications, not proprietary products. That explains X/Open's close alliance with standards organizations, including IEEE, ANSI, ISO and the NBS' Institute of Computer Sciences and Technology.

In May, X/Open received a boost with the formation of the Open Software Foundation (OSF), an unprecedented alliance of seven major hardware vendors, including DEC and IBM (see sidebar). The members of the foundation proclaimed that AT&T has been tightening its proprietary grip on UNIX, after acquiring an interest in Sun Microsystems, a major UNIX hardware vendor.

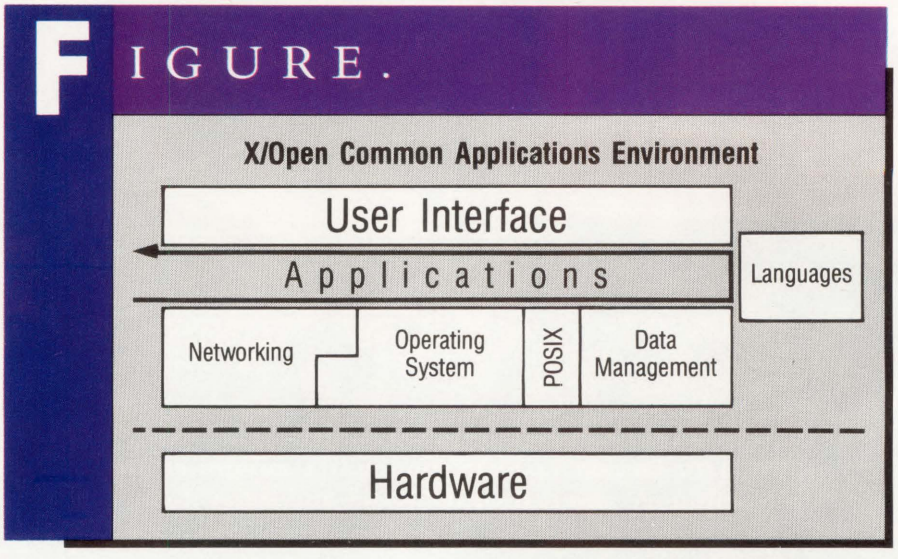
The OSF set about designing its own open UNIX standard based on IBM's AIX. Representatives from X/Open and Digital told *DEC PROFESSIONAL* that the relationship between OSF and X/Open will be mutually beneficial.

A System V Backbone

X/Open decided to make AT&T's UNIX System V the foundation of the CAE, but it's an adapted System V with extensive annotations that accommodate additional interfaces. X/Open and IEEE worked to ensure that this new operating system fully involves POSIX, the Portable Operating System Interface. Word of POSIX's capability has spread so rapidly that it has become nationally associated with X/Open's goals. It might be the single most instrumental element in X/Open's efforts.

POSIX has been approved by the National Bureau of Standards and is well on its way toward completion in IEEE Committee 1003.1. The OSF reported that its open operating system also will comply with POSIX.

Momentum behind UNIX and its omnipresent flavors makes it the logical choice for X/Open's multivendor back-



X/Open's CAE blueprint.

bone. Between ULTRIX, AIX, XENIX, A/UX, HP-UX and others, UNIX is available on all the major platforms. According to International Data Corporation (IDC), Framingham, Massachusetts, the absolute size of the UNIX market reached $7.3 billion in 1987 and will reach $21.3 billion by 1991. IDC says that the installed base of UNIX is growing in excess of the industry average.

UNIX's broad wingspan underscores the trend toward systems integration and multiple sourcing, and from this, a new urgency for standards can be detected.

Besides POSIX and ISO/OSI, the SQL relational database language, X Window System and Informix's ISAM data manager are among the standards X/Open is adapting for the CAE. Programming languages chosen by X/Open include the widely supported definitions of FORTRAN-77, ISO PASCAL, GSA Ada and COBOL-74 (with some slight extensions and alterations). ANSI C with an additional porting utility is another important part of the X/Open-System V infrastructure.

Although the user interface (UNIX clone plus POSIX) was the top priority of the 13 companies that make up X/Open, the organization also is concerned with developing standard methods of transaction processing, networking and data security. It's also creating a consistent look and feel that will stem from standard screens and icons. International character sets and protocols that facilitate source code transfer also will be standarized.

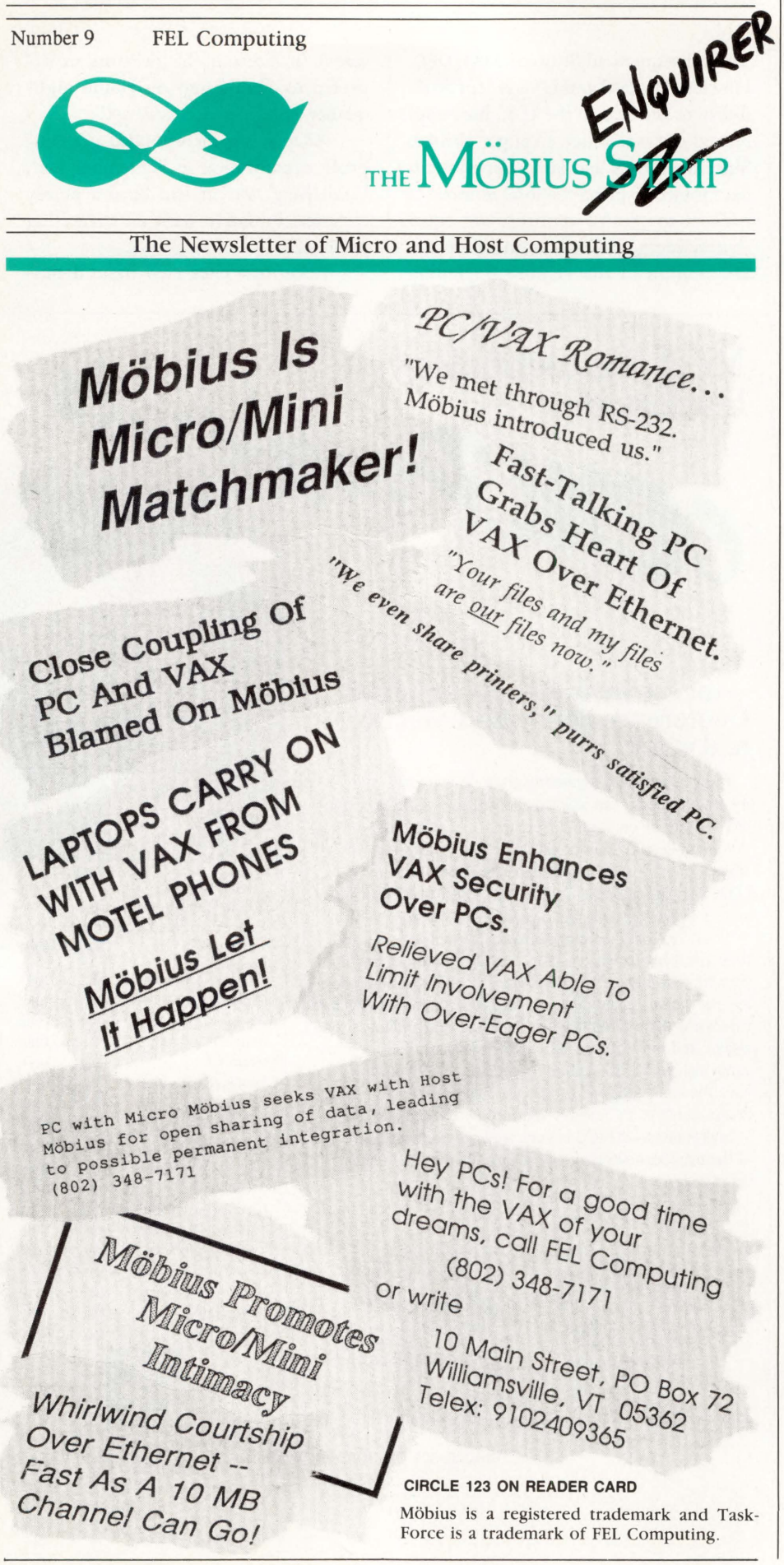
The objective of X/Open is to integrate these standards in one software portability database field, which will theoretically unite the traditional departmental, multivendor islands of computing: accounting, marketing, manufacturing, administration and so forth.

Corporate Sponsorship

In 1984, X/Open was established in Europe with sponsorship from Bull, Ericsson, International Computers, Nixdorf, Olivetti, Philips and Siemens. The subsequent addition of AT&T, DEC, Hewlett-Packard and Unisys lent credibility to the idea in the U.S., but, until recently, it was much stronger abroad. Since then, NCR and Sun Microsystems have joined to bring the total number of backers to 13. All sponsors are equal shareholders, and each annually invests $1.5 million in the venture (including taxes). In addition, the investors are expected to "build and distribute high-quality conformance systems."

X/Open was incorporated as a nonprofit organization in September 1987. Until May 1987, it had been a purely technical initiative with no marketing presence.

Ackerman cites two basic demo-



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1750 Montgomery St.
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cratic tenets of the organization:

1. None of the participants will gain a competitive advantage over other participants.
2. All strategies of the partnership — including a book that details compliance specifications — are available to all users, members or non-members, on an equal basis. The *X/Open Portability Guide* is available from Elsevier Publishing Company (New York and Amsterdam) for $125.

The intent is that ultimately any manufacturer can build an X/Open-compliant product, whether it's a member or not.

Once products from independent software vendors (ISVs) are proven to meet specifications outlined in the guide, X/Open will create a CAE-compliant marketplace by placing the X/Open logo on CAE-compliant software packaging. The participating ISVs can become part of the X/Open Software Partners Program. (The sponsoring hardware companies will bear the logo as well.)

For promotion, X/Open publishes a newsletter three times a year and an applications directory that lists compliant software products.

Proving It Will Work

While X/Open sounds good on paper, does it work? The first public demonstration of a heterogeneous X/Open

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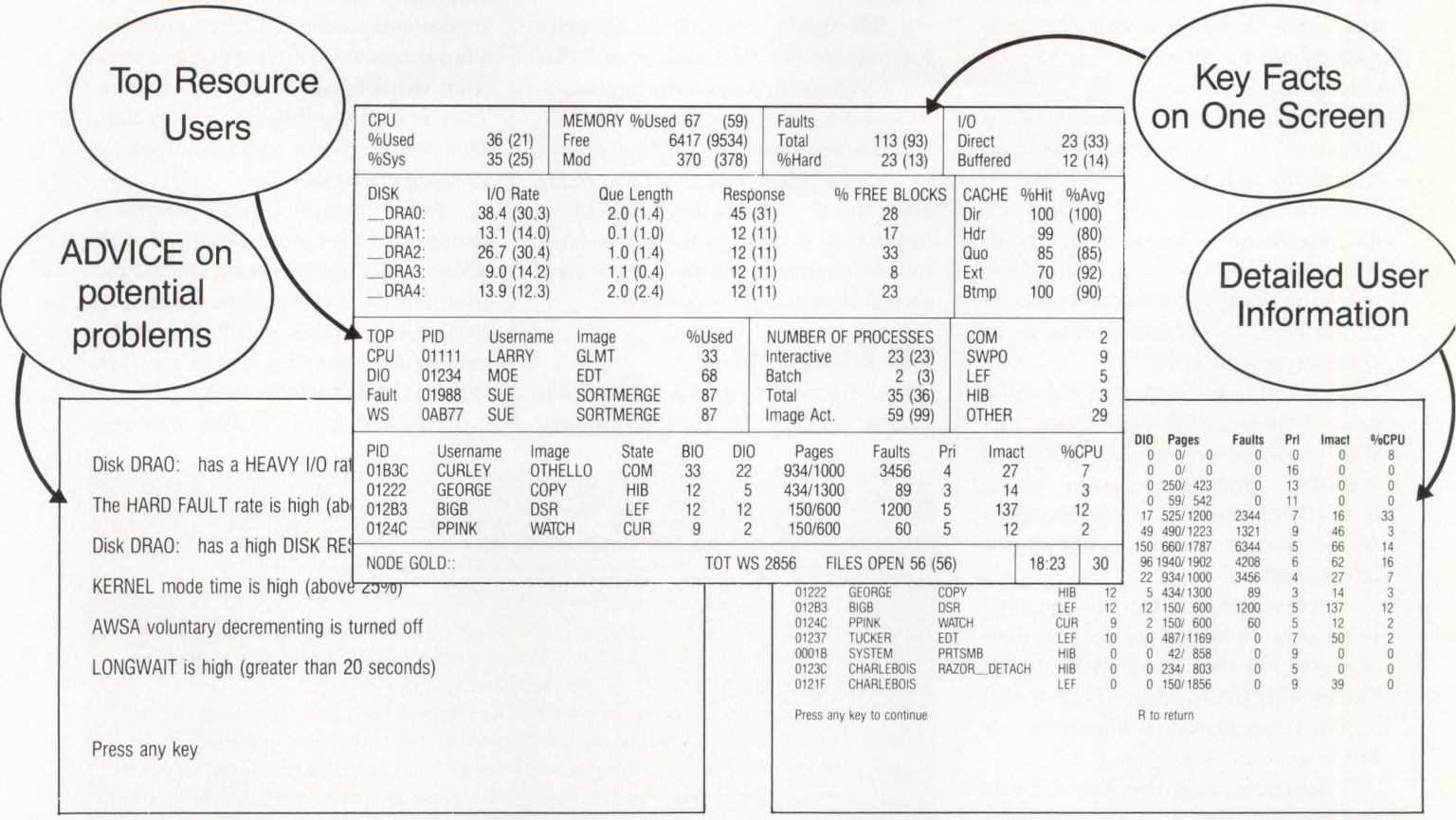

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platform was in February 1987 in Europe. Before an audience of vendors and users, Access Technology's 20/20 spreadsheet was ported across 10 processors in a network. The X/Open associates consider this event to be a milestone for bringing their abstract concept to reality.

"We sent a tape with little or no documentation to Amsterdam," recalls Access' Jeff Hulton, "and without too much rewriting, 20/20 was compiled on 10 different processors running X/Open-compliant UNIX."

Hulton feels that part of switching to an X/Open world will require software vendors changing their traditional mentality about giving away source code. "The bottom line is that customers are demanding it, and it could mean a larger market."

Access is now a fervent supporter of X/Open. "It helped get us in the door in places like the European Economic Community [EEC]," claims Hulton. EEC requirements played an important role in the genesis of X/Open.

Ackerman says that the software partners will benefit from CAE compliance "through reduced software development cycles and broader market opportunity." He expects to have 200 partners by the end of the year and claims to have more than 500 applications.

Advisory Councils

The compliant software partners play an important role in the CAE evolution. X/Open actively seeks out suggestions from the partners and from users. To facilitate this dialogue, X/Open established a User Advisory Council and an ISV Advisory Council.

American-based companies on the ISV Advisory Council currently include Cullinet, Foundation Computer, Informix, Oracle, Quadratron, Relational Technology, Sybase and Unify. Prominent users on the User Advisory Council are Aetna, Lockheed, Shearson-Lehman, the U.S. Treasury and Eastman Kodak.

Bill Bonin, who heads X/Open's software vendor relations, reports that the government, manufacturing industries and a growing legion of users in all application areas are lending support to X/Open. However, there are many users and ISVs that will be difficult to convert. In Boston, at the first session to solicit software partners, there were several skeptical potential ISVs.

The X/Obstacles

The conversion X/Open is calling for is secular — a shift from proprietary technology to open systems — and not everyone is going to want to give up vendor independence. X/Open promotes a fundamentally different point of view from that of many software vendors. They're happy going along with IBM, DEC or pure UNIX and aren't looking to change religions.

Many potential software partners in Boston said they are tied to producing software that is compliant with OS/2 and Microsoft's Presentation Manager, IBM's SAA or ISO's TCP/IP. The major proprietary stumbling blocks are VMS, IBM's MVS and AT&T's UNIX.

At Uniforum in Dallas, AT&T said

OSF And X/Open At Odds?

Like X/Open, the Open Software Foundation (OSF) comprises European and American hardware companies with a great deal of money invested in developing an industrywide operating standard. And like X/Open, OSF will use a variation of UNIX, this time IBM's AIX, as a development platform. But will the two be at odds?

Definitely not, according to most people involved with both operations. In fact, the *X/Open Portability Guide* is one of three standards documents that will be implemented by OSF, according to Jim Barclay, DEC's base product marketing manager for operating systems and systems software. The others are the National Bureau of Standards' (NBS) *Application Portability Profile* and OSF's *Applications Environment Specifications.*

Still, there are some kinks to be worked out.

Reaction To AT&T

OSF was created after AT&T, proprietor of UNIX System V, bought an interest in Sun Microsystems, the leading vendor of UNIX workstations. No one seemed too concerned with AT&T's progressively restrictive policies toward outside UNIX development until AT&T got a stake in UNIX hardware.

"There was a real risk that the user community was being misled, and there was a need for standards," explained Jack Shields, DEC's senior vice president, at CinterAct, the Cincom users conference. "I think the culmination of these two issues made us join together."

DEC's objections to AT&T's proprietary position peaked in the aftermath of a controversial U.S. government benchmark that measured different flavors of UNIX against a System V standard. DEC immediately filed suit against the government, arguing that the proprietary version, System V, was given an unfair advantage. "Over in UNIX," says Shields, "there were some funny things going on."

The other founding fathers of OSF include Hewlett-Packard, Apollo, Bull, Siemens, Nixdorf and, most surprisingly, IBM. Each company has pledged to contribute $4.5 million a year and to develop technology that OSF will license as part of an open product that will begin delivery in January 1990.

Part of DEC's role will be the development of a user interface toolkit based on the X Window System.

Downfield Blocking

The new alliance has confused the industry but should help the UNIX market in the long run. That's because UNIX has been selected twice as the operating system most

future versions of UNIX will conform to X/Open specs. But with the formation of OSF, a split has occurred.

Here, the complex choices facing X/Open become evident. How can they possibly expect to make everyone happy? Scalability to different architectures (e.g., micro to mainframe) and different processor configurations (e.g., RISC) is just the beginning of nonstandardized hardware issues. "We're trying to make a decision which markets to develop for," said Bonin. "We want to provide as many points of commonality today. Everything will be vendor-independent standards-based."

For example, X/Open is not designed to follow SAA but "will provide an environment as robust with as many points of commonality as possible," said Ackerman. "Vendors have to devise a product strategy that adjusts to the long haul."

IBM Standards

Of course, IBM's conspicuous absence from the list of corporate sponsors is the undoing of many potential partners. "We have an open and active dialogue with IBM," explained Ackerman. "There is every indication they'll commit, but it's a choice they have to make. Our open system architecture has to respect that there's a lot of history.

"IBM will include more and more standards in SAA in response to common demand," reasoned Ackerman. "We can't adhere strictly to something like SAA and give up our vendor independence."

"SAA makes sense as an IBM solution to an IBM problem," Bonin added. "But the bottom line is, for multivendors, SAA narrows the focus of potential users."

The portable TCP/IP protocol is another missing link. "OSI will some day show up. We're taking advantage of what we've got today," said Ackerman. "But our underlying commitment is to OSI."

"Sometimes you have to put the rules aside and talk about what you're trying to accomplish instead," argues Joe Aro at TRW/Information Networks Division, which has products that implement the TCP/IP protocol. "Like baseball. It's not important that it's 90 feet to first base or however far to the pitcher's mound. What's important is worrying about how to score, how to play the game."

X/Open has been in discussions beyond Europe as well. "The outlook for Japanese manufacturers is quite good," Ackerman projected. "Japanese interest is very high." His goal is to include large Japanese and other Far East manufacturers in the organization by early 1989.

But IBM may hold the key in the U.S. and also to X/Open's global success. "It's not like 13 guys, not including IBM, have hatched up this scheme to reorganize the marketplace," stressed Bonin. "The reorganization is already taking place."

Some reports have speculated that IBM quietly has applied for membership and might be approved by late summer. Now that DEC and others have united with IBM by conceding to an AIX foundation for OSF, the key may be turning. ■

likely to succeed in the future world of open systems. The competition spurred by IBM/DEC vs. AT&T/Sun could push the development of a true open system.

Yet the OSF side has two distinct advantages. In its stable are DEC, the number one seller of UNIX computers, and IBM, the number one seller of computers. Was this a union made in operating system heaven or not?

X/Open and the POSIX committee already have done the downfield blocking for OSF. But the goal of OSF will be to link UNIX with proprietary systems; i.e., UNIX flavors as well as VMS, MVS and MS-DOS.

Getting the right levels of interfaces still will be a problem. The presence of seven vendors, each accustomed to its own closed, proprietary operating systems, eventually should result in the appearance of additional compatibility issues. Many think January '90 isn't a realistic delivery date.

Shields thinks that POSIX is the key to UNIX's future. "It [UNIX] has a life of its own. It probably will be POSIX. It's obvious. You can write an application in POSIX, and it will play."

If so, coordination between X/Open and OSF will be vital. But there's a split within X/Open companies; some are adherents of System V, and others are members of OSF. Sun, for example, will make a pivotal next move.

"It's gonna get complicated," admits Shields. "My feelings are that they [X/Open and OSF] eventually will merge."

"It appears that most parties who are involved are motivated to do that," he adds.

DEC And OSF

After years of barely acknowledging the UNIX side of its business, DEC suddenly seems to be seeking publicity for ULTRIX. Shields says that's a bad rap: "They [critics] have this notion that there's Digital, they have this proprietary system called VMS, so therefore they're anti-UNIX."

OSF Level 1 is expected at the end of the year. Barclay says that the next version of ULTRIX will be Level 1-compliant.

But how will DEC justify selling VMS after it has an open ULTRIX? According to Shields, the more you want security, networking, system management, transaction processing, and compute-intensive capabilities, the more you need VMS. "But if you want UNIX," he explains, "we've got it."

Was uniting with IBM really cooperative, or are the two just trying to throw off AT&T? "I've read the cynical comments on both sides," notes Shields. "You've got to wait and see.

"It's a lot better than 40 different products called UNIX that weren't compatible."

MANAGING YOUR MICROVAX

David W. Bynon

VAXSTATION Management

I've been using VAXSTATIONs since they were introduced in 1984. However, it wasn't until my personal VAXSTATION II, Biff, turned into vapor that I realized how productive I am with it.

I was lost and grouchy without it. During those weeks without Biff's VAXSTATION display, I tried to make do by putting three terminals at my desk. It simply wasn't the same, nor was my desk; I kept losing my coffee cup.

Recently, after Doctor VAX administered to Biff, a client marveled over some of the features I've set up on Biff. Biff has a list of icon-based programs from which to choose, as well as a robust options menu.

My VAXSTATION is a resource that must be managed carefully. As more VAXSTATIONs infiltrate the ranks of sophisticated users, the problem of how to use them escalates.

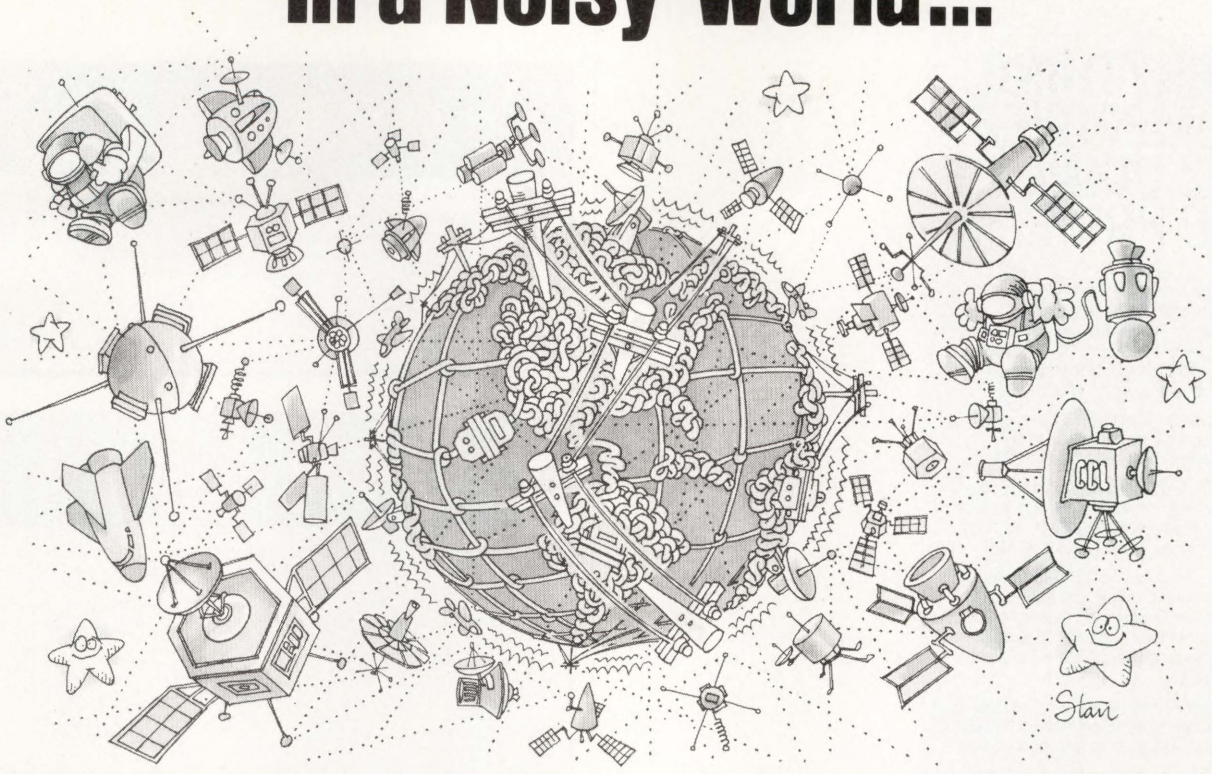
> ***As more VAXSTATIONs infiltrate the ranks of sophisticated users, the problem of how to use them escalates.***

A VAXSTATION, whether it's a VAXSTATION II, II/GPX or 2000, is a MICROVAX system with a special display, display processor and a mouse. It's special not because of the display hardware, but because of the display software, VAX Worksta-

PROGRAM 1.

```
UISBG.DAT
-------------------------------------------------------------------------
!
TITLE "Workstation Options" -
            /INSTRUCTION_FONT=DTABER0003WK00GG0001UZZZZ02A000 -
            /CHOICE_FONT=DTABER0003WK00PG0001UZZZZ02A000
SPACE
INSTRUCTION "Move the mouse to the desired item"
INSTRUCTION "and then click the leftmost button."
SPACE
INSTRUCTION "________ TERMINALS _________"
CHOICE "Create VT220 (autologin)" -
            /ROUTINE=UISBG$AUTOLOGIN_TERMINAL -
            /IMAGE=SYS$SYSTEM:LOGINOUT.EXE -
            /TERMINAL=WT
CHOICE "Create VT220" -
            /ROUTINE=UISBG$CREATE_TERMINAL -
            /IMAGE=SYS$SYSTEM:LOGINOUT.EXE -
            /TERMINAL=WT
CHOICE "Create Network VT220" -
            /ROUTINE=UISBG$CREATE_PROCESS -
            /PROCESS_NAME="Network VT220" -
            /INPUT=sys$system:sethost.com -
            /OUTPUT=NLA0: -
            /ERROR=NLA0:
CHOICE "Create TEK4014" -
            /ROUTINE=UISBG$AUTOLOGIN_TERMINAL -
            /IMAGE=SYS$SYSTEM:LOGINOUT.EXE -
            /TERMINAL=TK
SPACE
INSTRUCTION "___________ HELP ___________"
CHOICE "VAX/VMS Help" -
            /ROUTINE=UISBG$CREATE_TERMINAL -
            /IMAGE=SYS$SYSTEM:WSHELP.EXE -
            /TITLE="VAX/VMS HELP" -
            /TERMINAL=WT
CHOICE "VAXstation Help" -
            /ROUTINE=UISBG$CREATE_TERMINAL -
            /IMAGE=SYS$SYSTEM:UISHELP.EXE -
            /TITLE="VAXstation HELP" -
            /TERMINAL=WT
SPACE
INSTRUCTION "________ APPLICATIONS ________"
CHOICE "VAX Sight" -
            /ROUTINE=UISBG$CREATE_PROCESS -
            /PROCESS_NAME="VAX Sight" -
            /IMAGE=SYS$SYSTEM:SIGHT.EXE -
            /INPUT=NLA0: -
            /OUTPUT=NLA0: -
            /ERROR=NLA0:
CHOICE "AutoCAD" -
            /ROUTINE=UISBG$CREATE_PROCESS -
            /PROCESS_NAME="AutoCAD" -
            /IMAGE=SYS$SYSTEM:AUTOCAD -
            /INPUT=NLA0: -
            /OUTPUT=NLA0: -
            /ERROR=NLA0:
CHOICE "Book Reader" -
            /ROUTINE=UISBG$CREATE_PROCESS -
            /PROCESS_NAME="Book Reader" -
            /IMAGE=SYS$SYSTEM:READER.EXE -
            /INPUT=SYS$SYSTEM:READER.COM -
            /OUTPUT=NLA0: -
            /ERROR=NLA0:
SPACE
INSTRUCTION "________ WORKSTATION _______"
CHOICE "Print (portion of) screen" -
            /ROUTINE=UISBG$PRINT_SCREEN
CHOICE "Set up the workstation" -
            /ROUTINE=UISBG$SETUP
CHOICE "Exit this menu" -
            /ROUTINE=UISBG$EXIT -
            /DEFAULT
```

In a Noisy World...



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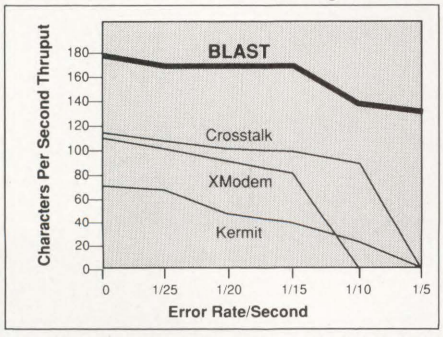

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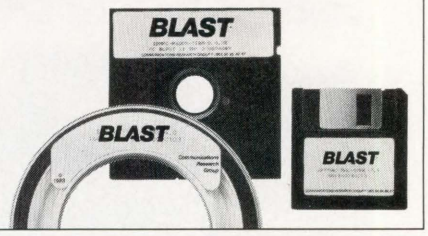

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PROGRAM 2.

```
            PROGRAM WSHELP
C-------------------------------------------------------------------------
C WSHELP.FOR -- Simple program to call the GETHELP() function. This
C               program can be written in your language of choice.
C-------------------------------------------------------------------------
C Program to call GETHELP
C
            CALL GETHELP()
            END
```

PROGRAM 3.

```
;------------ -- ------------------------------------------ ---------- ------
; GETHELP.MAR -- Function to call VMS HELP
;
; Copyright(C), 1987, David W. Bynon. This program may be copied freely
;  and used for non-profit purposes.
;------------------------------------------------------------------- ------
            .PSECT      DATA        LONG, NOEXE
;
; Parameters
;
ONE:        .LONG       1
WIDTH:      .LONG       80
LIB:        .ASCID      /SYS$HELP:HELPLIB/
ID:         .ASCID      /VMS Help Library/
;
; Error messages
;
EMSG1:      .ASCID      /LBR$USRINPERR/
EMSG2:      .ASCID      /LBR$ILLOUTROU/
EMSG3:      .ASCID      /LBR$TOOMNYARG/
EMSG4:      .ASCID      /LBR$ILLINROU/
;
.PSECT      CODE        LONG, NOWRT
.ENTRY      GETHELP     ^M<R6>
;
; Display title
;
            MOVL        4(AP),R5
            PUSHAQ      ID
            CALLS       #1,G^LIB$PUT_OUTPUT
;
; Invoke help librarian
;
            CLRL        R0
            PUSHAL      G^LIB$GET_INPUT
            PUSHAL      ONE
            PUSHAQ      LIB
            PUSHL       R5
            PUSHAL      WIDTH
            PUSHAL      G^LIB$PUT_OUTPUT
            CALLS       #6,G^LBR$OUTPUT_HELP
;
; Begin error checking
;
            MOVL        R0,R5
            CMPL        R0,#LBR$_USRINPERR
            BNEQ        L10
            PUSHAQ      EMSG1
            CALLS       #1,G^LIB$PUT_OUTPUT
            RET
L10:
            CMPL        R0,#LBR$_ILLOUTROU
            BNEQ        L20
            PUSHAQ      EMSG2
            CALLS       #1,G^LIB$PUT_OUTPUT
            RET
;
; Here if too many arguments on command line
;
L20:
            RET
            CMPL        R0,#LBR$_TOOMNYARG
            BNEQ        L30
            PUSHAQ      EMSG3
```

Continued.

PROGRAM 3. . . . *continued*

```
            CALLS       #1,G^LIB$PUT_OUTPUT
;
; Here if user input error
;
L30:
            CMPL        R0,#LBR$_ILLINROU
            BNEQ        L40
            PUSHAQ      EMSG4
            CALLS       #1,G^LIB$PUT_OUTPUT
L40:        MOVL        R5,R0
            RET
            .END
```

tion Software (VWS).

The current problem with the VAXSTATION family is a lack of application software that takes advantage of its capabilities.

Software is what makes a workstation worth having.

Look, for example, at the Apple Macintosh. The hardware is no great shakes, but the software is slick. So, the biggest challenge a VAXSTATION system manager faces is to make the VAXSTATION as useful as possible, while applications are being developed.

Your tools are an elementary user interface and a set for application developers, VWS. VWS can exploit the full capability of a VAX/VMS system using a pointer-driven graphics interface. At a VAXSTATION, you can create and maintain as many processes (detached or interactive), graphics windows and terminal emulation windows as the system behind it can handle.

"The biggest challenge a VAXSTATION system manager faces is to make the VAXSTATION as useful as possible, while applications are being developed."

For me, this capability is important because, simultaneously, I'm a writer, programmer, system manager, consultant and small-business manager. When I work, I like to do a little bit here and there, and the VAXSTATION accommodates me. However, it took a little programming to do it.

The Workstation Options Menu

The first-level interface to VWS is a window-based menu called the Workstation Options Menu. This menu is described to VWS through a series of commands stored in a data file called SYS$MANAGER:UISBG.DAT. The Workstation Options Menu is under the control of the UIS Display Manager, a detached system process.

Through UISBG.DAT, you can provide user instructions,

define menu selections to create new terminal windows, create new processes, print portions of the screen and set up workstation features. Unfortunately, your span of control over these functions is limited. In general, you can create a terminal emulation window and start an application to run in it, or you can run a program that creates its own windows and displays.

You have no control over the ownership of the process created to perform this work for you. The process is created at a system level, not a user level.

This isn't a problem when creating a new terminal from which to perform interactive DCL work. That's because the LOGINOUT image gets activated. LOGINOUT ensures that a user gets logged in properly.

On the other hand, it's possible to create a terminal emulation window and activate highly privileged images, such as AUTHORIZE, NCP and SYSGEN. If your system is secure and/or private, having these items on the menu is handy. Program 1 is a sample UISBG.DAT file that has been expanded.

Creating Workstation Terminal Applications

To make the VAXSTATION more useful, you can create simple applications that take advantage of the VWS terminal emulation windows. For instance, how many times have you wanted to access VMS Help, but had to stop what you were doing to get to it? In my case, this was a daily occurrence, so I wrote WSHELP (see Programs 2 and 3).

To make the VAXSTATION more useful, you can create simple applications that take advantage of the VWS terminal emulation windows.

It calls the VMS Librarian and specifies HELPLIB.HLB as the library to process. WSHELP can be invoked within its own VT 220 window, so you never have to quit what you're doing to get VMS Help. UISBG.DAT demonstrates how to invoke WSHELP from the Workstation Options Menu.

Another useful workstation program is one that creates

a workstation terminal emulation window for general-purpose applications. I needed such a program so I could create a terminal and connect (SET HOST) to a remote system through it, without having to login to the VAXSTATION.

CREATERM (see Program 4) creates a VT220 terminal window and assigns its device name to the logical name CREATERM$DEVNAM. This logical name can be used by the creating process to allocate the terminal. Additionally, a parameter can be passed to the CREATERM program, through the logical name CREATERM$BANNER, which defines the banner information at the top of the terminal window.

To use CREATERM, you need a program or DCL command procedure that calls it and sets up your application. In my example, Create Network VT220, the cooperating program is a command procedure called SETHOST (see Program 5). SETHOST calls CREATERM to create a VT220 window, then opens the terminal for reading and writing. The user is prompted for a nodename, which is used with the SET HOST command. An example of how to call this from the Workstation Options Menu is in Program 1.

Literally dozens of commands and utilities can be used through a command procedure and the CREATERM program. This mechanism will make your VAXSTATIONs more productive.

PROGRAM 4.

```
            PROGRAM CREATERM
C-------------------------------------------------------------------------
C CREATERM.EXE -- Program to create a VAXSTATION VT220 terminal
C
C Copyright(C), 1987, David W. Bynon.
C This program may be copied freely and used for non-profit purposes.
C-------------------------------------------------------------------------
C
            INCLUDE                     'SYS$LIBRARY:UISENTRY'
            INCLUDE                     'SYS$LIBRARY:UISUSRDEF'
            INCLUDE                     '($LNMDEF)'
            INTEGER*2                   ATTR_LIST(2), DLEN
            INTEGER*4                   SYS$TRNLNM, SYS$CRELNM, STATUS, TERM_NAME_LEN
            CHARACTER*6                 DEVICE_NAME
            CHARACTER*40                TERM_NAME
C
            STRUCTURE /ILIST/
              INTEGER*2 BUFF_LEN
              INTEGER*2 CODE
              INTEGER*4 BUFF_ADRS
              INTEGER*4 RET_LEN_ADRS
              INTEGER*4 END_LIST
            END STRUCTURE
            RECORD /ILIST/ ITEM_LIST
C
C Translate the logical name of the terminal
C
            ITEM_LIST.BUFF_LEN = 40
            ITEM_LIST.CODE = LNM$_STRING
            ITEM_LIST.BUFF_ADRS = %LOC(TERM_NAME)
            ITEM_LIST.RET_LEN_ADRS = %LOC(TERM_NAME_LEN)
```

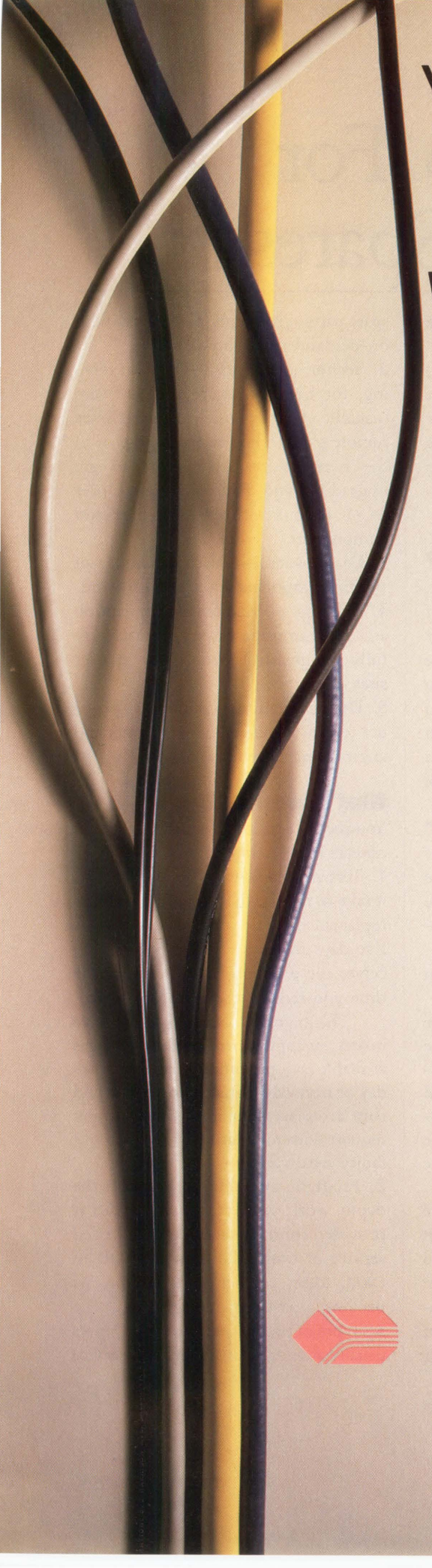
Continued.

PROGRAM 4. . . . *continued*

```
            ITEM_LIST.END_LIST = 0
            STATUS = SYS$TRNLNM(,'LNM$JOB','TERM$NAME',,ITEM_LIST)
C
C If the logical name does not exist then make up a name
C
            IF(.NOT. STATUS) THEN
              TERM_NAME = 'VT220 Terminal'
              TERM_NAME_LEN = 14
            END IF
C
C Create the terminal
C
            STATUS = VIS$CREATE_TERMINAL('WT',
           2                        TERM_NAME(1:TERM_NAME_LEN),
           2                        ATTR_LIST,
           2                        %DESCR(DEVICE_NAME),DLEN)
C
C Define a logical name for the terminal device
C
            ITEM_LIST.BUFF_LEN = DLEN
            ITEM_LIST.CODE = LNM$_STRING
            ITEM_LIST.BUFF_ADRS = %LOC(DEVICE_NAME)
            ITEM_LIST.RET_LEN_ADRS = 0
            ITEM_LIST.END_LIST = 0
            STATUS = SYS$CRELNM(,'LNM$JOB','TERM$DEVNAM',,ITEM_LIST)
            IF(.NOT. STATUS) CALL LIB$SIGNAL(%VAL(STATUS))
C
C Done
C
            CALL EXIT
            END
```

PROGRAM 5.

```
$!-------------------------------------------------------------------------
$! SETHOST.COM -- Procedure to create a VS VT220 window, reassign terminal
$!                I/O channels, and set host to a remote system.
$!
$! Copyright(C), 1987, David W. Bynon.
$! This program may be copied freely and used for non-profit purposes.
$!-------------------------------------------------------------------------
$ SET NOON
$ SET NOVERIFY
$ DEFINE/JOB TERM$NAME "Remote VT220 Terminal"
$ RUN SYS$SYSTEM:CREATERM
$ TERM = F$TRNLNM("TERM$DEVNAM","LNM$JOB")
$ DEASSIGN/JOB TERM$NAME
$ DEASSIGN/JOB/USER TERM$DEVNAM
$ OPEN/READ/WRITE TERMINAL 'TERM'
$ READ/PROMPT="NODE NAME: " TERMINAL NODE
$ SET PROC/NAME='NODE'
$ DEFINE/NOLOG SYS$INPUT 'TERM'
$ DEFINE/NOLOG SYS$COMMAND 'TERM'
$ DEFINE/NOLOG SYS$OUTPUT 'TERM'
$ SET HOST 'NODE'
$ EXIT
```



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FIELD SERVICE

Ron Levine

Where To Go For Repairs And Spares

On-site preventive maintenance and trouble-shooting are the first steps in avoiding or resolving hardware problems. Repairing or replacing the faulty unit or component is the next crucial step, and it usually requires the services of a depot repair center.

Whether you're an in-house maintenance group, independent service firm or manufacturer, where you go for repairs and spares and how long it takes to get the part fixed or replaced are important concerns. Locating a fault or potential malfunction by itself is useless unless the right part can be installed quickly.

Repair depots either belong to the OEM or are independent operations. The independents are called fourth-party maintenance providers. That's because they usually don't engage in field service; i.e., maintenance or troubleshooting at customer sites. Users of these fourth-party firms must ship or bring the item to be repaired to the depot, although some depots have a pickup and delivery service for contract clients.

The bulk of the fourth-party maintenance customer base is made up of the third-party maintenance (TPM) vendors who don't have their own repair facilities, end-users doing their own in-house service and OEMs who contract out warranty or end-of-life repairs.

Many of these depot repair centers provide board swapping or immediate parts replacement, in addition to the straight repair of boards, components and other items. Full system spare kits are also available from some of these depots.

Auxiliary services, such as training, system upgrades and technical support assistance, commonly are provided. For self-maintainers, in particular, being able to acquire outside technical assistance is a vital element in providing effective in-house field services.

What Can You Get From A Depot?

You can get many services from a depot, but hardware repair is the mainstay of depot business. Whether they repair components, modules, units or complete systems, most depots specialize in a product array. The repair center can specialize in one line of equipment, such as DEC or IBM, or it can service a specific type of peripheral, such as disk drives, tape drives or terminals.

Some have carved out very small niches in areas such as print head or tape and disk head repair only. Although the majority of depots provide repairs at the field level, some do complete refurbishment or remanufacturing of components, and a few do whole system reconditioning.

Depots owned and operated by the hardware manufacturer supply all the necessary repair and replacement services required by the OEM's field engineering force or the customer. Additional maintenance aids usually can be obtained from other divisions within the manufacturing organization.

Independent depots provide the same type of repair and replacement services for self-maintenance users and TPMs. Additional maintenance aids are also available from many of the independents. Common auxiliary support services provided by many of the repair centers include:

1. Parts logistics — Purchase or lease spare parts agreements, parts banks with on-demand parts shipment.
2. Technical support — Problem solving, for both hardware and software (usually via telephone). This includes remote troubleshooting aids now or in the near future. Also provided are upgrading and Field Change Order (FCO) revisions to existing modules/components.
3. Diagnostics — Purchase or use of system/component level test software.
4. Training — Maintenance, operation and programming classes conducted in fully equipped classrooms or at user sites.
5. Documentation — Full sets of product technical manuals, logic prints and engineering drawings.

What's Important?

You should consider a number of special criteria in selecting depot service:

1. Turnaround time — How long does it take to receive the repaired part or its replacement? The industry standard is five days from the time the depot receives the problem hardware until the time you receive a working product.

The majority of depots either have board swapping or express services available (at a premium price) for same-day or next-day turnarounds. Some will ship a replacement immediately upon request without waiting to receive your faulty hardware.

2. Programs available — How does the depot work with customers? Does it provide contract service, as-needed service or both? Will it work with an OEM, TPM, reseller, user or anyone needing a part repaired?
3. Types of products serviced — Depots usually are specialists. Some will service

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complete systems from specified computer manufacturers and peripheral suppliers. Others are more restrictive, servicing only certain system units or modules. Still others repair specific components, such as printer or tape drive heads, HDA or power supplies.

4. Pricing policy — This varies depending on the depot, type of product serviced and the level of service required. Fixed-price servicing either on a contract or item-specific basis is readily available. Time and materials pricing is also common for pay-as-you-go arrangements.

Hourly charges should be avoided for straight repair work but can be acceptable for other types of services; e.g., technical support and remote diagnostics usage. The user (customer) usually pays shipping charges both ways and any pickup/delivery fees.

5. Auxiliary services offered — Training, documentation, parts leasing or inventorying may be important to accomplish your service goals. If these and other services are required from outside sources, find one competent supplier to supply them. Combining these secondary maintenance requirements with basic parts repair and replacement simplifies management and control functions.

What's Ahead?

A supermarket of support services lies ahead. As hardware repairs become a diminishing segment of the depot's business, look for a supermarket approach to providing the TPM and self-maintainer with basic support services. This will include reverse engineering support to provide documentation, specifications and upgrading of repaired and spare parts. Authorized parts distribution to the aftermarket via a fourth-party network, together with on-demand inventory and shipment, will free the field service companies from carrying expensive individual parts inventories.

New repair/exchange overnight or even same-day turnaround will become the norm. Remote diagnostics and technical support for hardware, software and networks, along with technician training programs, will be available to all field maintenance groups as standard depot offerings.

Soon, the depots will team up with the independent service companies to help them penetrate the end-user market. Actual depot repairs may be bid at a flat rate as part of the service provider's site contract.

> ***"The field service companies will expect to deal with one competent supplier to meet all their support needs."***

The depot's engineering capabilities can be tapped to produce compatible custom chips, in the communications and diagnostics area, which the independents can't obtain from the OEMs. And a central, parts sourcing, automated listing service, providing all service companies with data on who has what part and where it's located, probably is coming soon.

At the same time, expect the OEMs to subcontract large shares of warranty and end-of-life repair and replacement work to the depots. By doing this, the OEM frees time, space and resources for current production needs.

Some larger depots already are offering one or more of these services as auxiliary items. But within the next few years, all will have to provide an array of them as standard fare. The field service companies will expect to deal with one competent supplier to meet all their support needs. The users doing their own servicing also will demand total one-stop shopping for any technical assistance.

See page 102 for vendor information.

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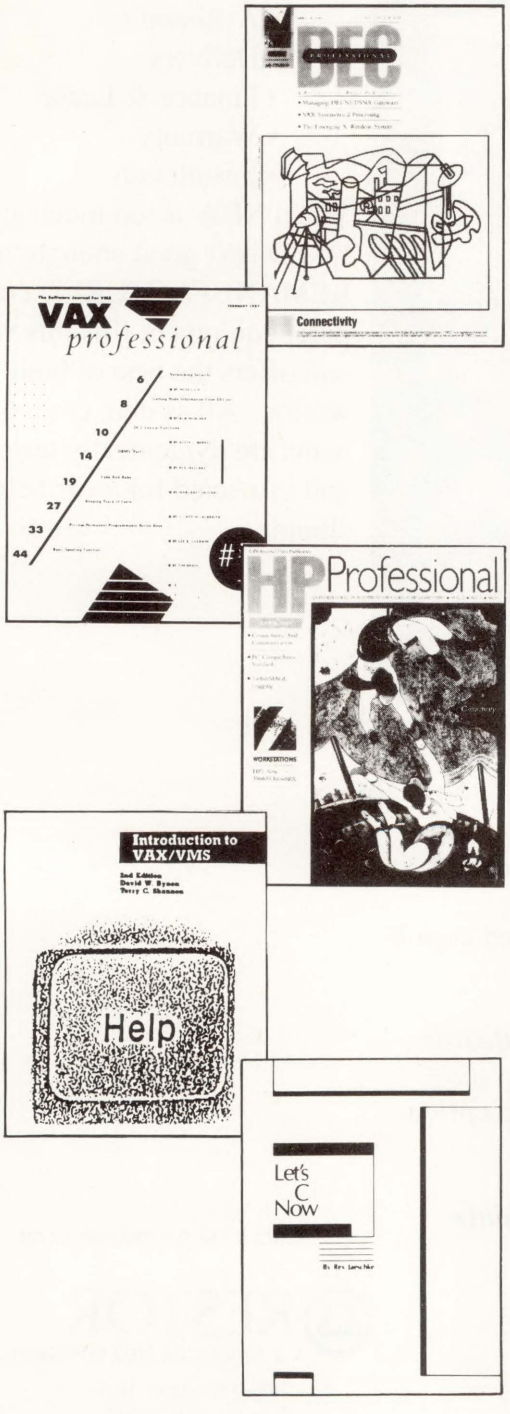

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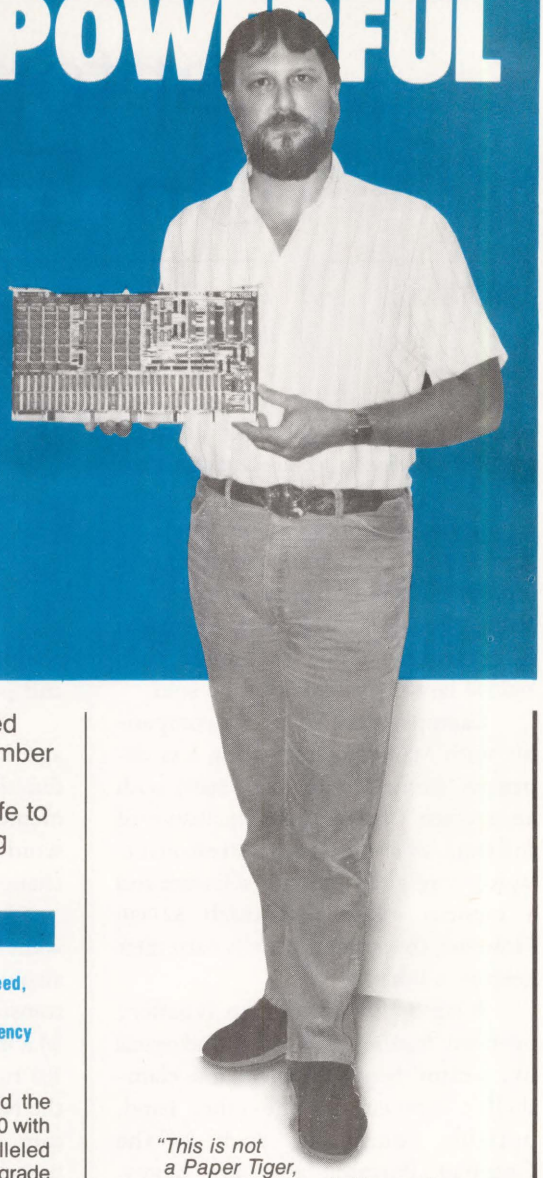

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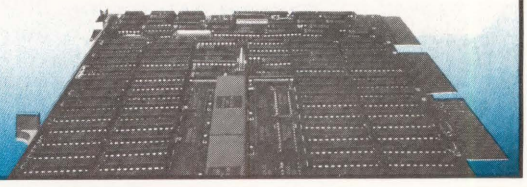

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CIRCLE 228 ON READER CARD

NETWORKING EDITOR

Bill Hancock

Laptops To Compute On The Go, Part 1

Editor's note: In this first part of a two-part series on laptop computers, Bill Hancock looks at screen readability, keyboards, terminal emulation and modems.

If you're thinking about buying a laptop, you're not alone. Some figures for 1987 put annual laptop sales at about 360,000. In 1988, some market research firms are estimating that more than 840,000 laptop systems will be sold.

Laptops, especially those compatible with MS-DOS, are getting less expensive (some are down to $600) with an average system price, exclusive of software, of about $1,500. A reasonable laptop configuration with software and a modem easily will reach $2,000. However, the systems usually earn their keep in a hurry.

A laptop fits on your lap, is battery operated, features a flat screen and opens like a clam, hence the nickname clamshell computer. On the other hand, portable computers, such as the Compaq Portable 386, are heavy, somewhat tedious to operate and aren't truly portable. Many require AC current or more space than that available to you on, say, an airplane.

Laptop systems are small and light. My Tandy 102 weighs three pounds; other clamshell systems average 10 to 14 pounds. It has an eight-line, 40-column display, 32 KB of battery-backed-up RAM, various ROM programs and a built-in 300-baud modem. It also can connect up through an RS-232 port on the back, allow the plugging in of other accessories and provide external access to the system bus for entrepreneurial companies to provide unique solutions and products.

A laptop fits on your lap, is battery operated, features a flat screen and opens like a clam, hence the nickname clamshell computer.

When I received the 102 two years ago, I thought it was cute but not very functional. An upgrade to 192 KB of memory, a floppy disk and a new ROM word processor with an 80-column font changed that.

I use it on short trips when I don't want to carry around a lot of weight. I also use it to enter text that I eventually transfer to NEC Multispeed, Apple Macintosh Plus or VAX systems. The 102 runs on four AA batteries, whereas the NEC requires recharging and other care and feeding. By taking this approach, I can use the battery on the NEC sparingly in its role as a file storage system for dumping the 102's contents.

Other advantages of the 102 are price and peripherals. It lists for about $500 and goes on sale for substantially less. Vendors supply a number of add-on products for the Tandy 102 and 100, such as battery-powered printers, disk drives with greater storage capability than the Tandy offerings, special operating systems, special ROM programs and memory expansion subsystems.

You'll also want to think about carrying cases, amount of external paraphernalia required to support your needs, set-up and break-down time, and durability. Getting your unit fixed in a hurry is another issue to consider.

When selecting a laptop system for use in the DEC environment, you must consider screen readability, keyboards, terminal emulation and modem features.

Screen Readability

Screen readability has improved dramatically over the last two years. The Grid Compass that I first used has an electroluminescent (EL) screen that is bright amber and easy to read. It allows you to load a particular font and size as the default screen font, which increases the readability of the screen.

There are drawbacks, however, to an EL screen. EL systems tend to be heavier and are more expensive. Further, EL screens are power-hungry, which means that they're not battery powered. This hinders their portability.

After EL screens came liquid crystal display (LCD) screens. Although cheaper than EL screens, LCD screens are dark and foreboding. In low light, LCD screens are almost unreadable.

To help improve readability, some manufacturers are building screens into their laptops that contain supertwist LCD capability and/or backlighted screens, where a low-power light is used behind the LCD plane to light up the screen. Such improvements really help

in low-light situations, such as on a darkened aircraft. Also, many laptop vendors allow the user to adjust the contrast and sometimes the brightness of the screen.

Many laptops place the screen in the top of the case and hinge the screen to open when the laptop is opened. So, a proper viewing angle becomes critical. It's not always possible to adjust the viewing angle. If the person in front of you on an airplane reclines his seat while your laptop is set up on the seat-back tray, your laptop could end up semi-closed, rendering the screen unreadable.

This is a problem on laptops that have larger screens or on laptops where the entire upper part of the case must be opened to see the screen, such as the Zenith 181 and 183. Pay attention to the tilt mechanism. Some systems provide continuous-tilt capability; others allow three, six or some combination of locking positions for the screen.

Smaller-screen systems, such as the Toshiba T1000, T1100 and T1100 Plus, can tolerate an LCD screen a little better. That's because the screen is easier to adjust. However, with a smaller screen, the characters might not be as legible or could appear squashed in the display.

Do you need the extra readability of the EL screen? My Grid has an EL and my NEC is LCD. Although EL would be nice to have all the time, I prefer total portability; i.e., battery power. To help the LCD, I bought a small $3 reading lamp that I attach to the NEC.

Keyboard Concerns

The degree to which you rely on your VT220 or VT320 keypad dictates which laptop is right for your needs. Most laptops don't have a full keyboard like those offered on standard PCs and terminals. As a result, most of the terminal keyboard functions are supplied by either singular keys or combinations of keystrokes, such as an ALT-K.

Some keyboards, such as the NEC, provide separate keypads and function keys. Other laptops, such as the Zenith, Toshiba and Grid, emulate the keypad commands via special function keys or combination keystrokes. If you're an ardent user of EVE or ALL-IN-ONE, you might need a full keypad. Why should you look closely at keypad layouts when considering laptop terminal emulation? Various terminal emulation packages define the keypads and control sequences differently, depending on the system they're running on.

Some systems have full keyboard mapping, which allows you to define any key as any ASCII character or special escape sequence. Full keyboard mapping is desirable, especially in the DEC environment, where the Delete key is more important than the Backspace key.

Companies Mentioned In This Article

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Some vendors have developed mini-keypad attachments to allow a separate keypad, but that's one more attachment to drag around.

Terminal Emulation

Terminal emulation packages proliferate on the market. Here are the features to consider when looking for a terminal emulator for your laptop:

1. Ensure that the emulator is capable of emulating at least a VT100. Dial up the Digital Store, and see how the terminal emulation reacts. It shouldn't leave the cursor in strange locations on the screen, and it should allow the various set-up parameters that you get on DEC VT series terminals.

2. If the emulator you're considering imitates more than one type of terminal, be aware that many times there's one emulation that is usually better than another. It might not be the one that you'll use most of the time. Check out the software carefully.

3. A terminal emulator should allow you to capture incoming text and screens into a file or allow printing them to an attached printer. Further, it should allow you to transmit a prepared file on the laptop to the remote system as if you were typing in the file; in other words, the send file capability.

Some terminal emulators include a feature that allows you to specify that a screen is to be saved into a file before the screen is cleared. This is handy if you're dialed in to a screen-oriented application that erases the screen constantly when menus or data screens are paginated to you.

4. An important feature in a terminal emulator is the ability to insert delays between the transmission of characters and line feeds when sending files to the remote host. It's easy, especially at higher baud rates, to overflow the host terminal driver typeahead buffer on a slower system or on systems that are busy and can't service interrupts fast enough to keep up with the file transfer. By inserting delays between characters and line feeds, it's possible to transfer files to such systems without too much hassle. It can take a little longer, but the data gets there.

5. Support for a public transfer protocol, although not critical, is a desirable feature. It's nice to use standard protocols, such as Xmodem, Ymodem or KERMIT, to transfer files back and forth on an error-free basis.

Most dial-up services allow the use of Xmodem and/or KERMIT for file transfer. Also, programs for host systems such as RSX-11M/Plus, RSTS/E, VMS, TOPS, UNIX, ULTRIX, MS-DOS, Macintosh and many other operating systems exist in the public domain and cost little to acquire.

Some terminal emulators provide advanced terminal features such as VT240 emulation (ReGIS graphics) and possibly Tektronix 4010, 4014 or 4015 emulation. Unfortunately, most laptops don't have color monitors. If you really need color, you'll have to get a laptop with an external monitor port and attach an external monitor.

I use two different terminal emulators on my MS-DOS-compatible laptops, Crosstalk and Persoft VT240

emulation. The Crosstalk package is inexpensive and provides automatic dial-up and scripts; VT100, Xmodem and KERMIT capabilities; and the ability to capture text into a file or to a connected printer.

The Persoft software is fairly good but seems to access the disk a lot, which causes slowdowns. I use the Persoft package for the VT240 emulation, such as when I'm running SPM for tuning VAXs or messing around with DECGRAPH or another ReGIS-oriented application. By having both capabilities, I get maximum terminal effectiveness from my laptop and the ability to support ReGIS graphics without the price of the VT240 or VT241.

Modems

After deciding on keyboard and terminal emulation issues, the next step is to consider modems. Most laptops allow a built-in modem, although few include it as standard equipment. A Bell 212A emulation modem is the minimum necessary; i.e., 8300/1200 baud. The Hayes-compatible 2400-baud MNP-protocol modems that allow not only 2400 baud but 300 and 1200 as well are increasingly popular.

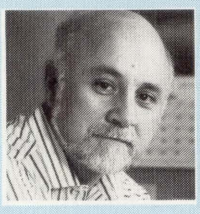
Note that 2400-baud modems are dropping in price. I bought a new Packard-Bell 2400-baud modem for $120. But built-in 2400-baud modems still command a premium price; most are around $400.

If you can live with an external modem, take a look at the pocket modems. They plug into the serial port on a laptop without requiring a power supply (they're battery powered) or a modem cable. An external modem can be connected to other laptops, terminals or systems when it's not on the road. If you decide on an external modem, make sure you get the right type of cable for your modem. Typically you would want to purchase a cable that has pins 2 and 3 straight (not crossed as in a null-modem cable), DTR and DCD (pins 20 and 8) and a ground. That's usually enough for a modem cable to work with most modems and laptops.

If you're thinking of hooking your laptop directly to a system, such as a VAX or terminal server, simply disconnect the cable from any terminal and connect it to the serial port. Tell the terminal emulation software what baud rate to use, and ensure that you're communicating through the proper port if you have a built-in modem. The serial port on a laptop is usually COM1, and the built-in modem is usually COM2. Data transfers go blindingly fast at a speed of 9600 baud or, on some laptops, up to 38.4K baud.

Editor's note: In Part 2, Bill Hancock will look at data exchange/compatibility, disks, batteries, printers and software. ■

from the lab



The Lab's New Look

Dave Mallery

In the magazine business, when you want to draw attention to something you're doing, you redesign it.

We've redesigned *DEC PROFESSIONAL*'s Lab section to highlight all the activity that's going on there. We've assembled a state-of-the-art cluster here in Spring House and have extended our reach from coast to coast. Our cluster is a true test bed for both hardware and software. As we've been finding, some things that work by themselves on a dedicated MICROVAX II will tear down networks that are otherwise perfect when installed, because of the interdependencies with other software/hardware running flawlessly on the network.

In a nutshell, a true testing lab should have a real network running as many varied combinations of protocols and hardware as possible.

We've also added several people to our Lab effort. David B. Miller joined our editorial staff as a full-time technical editor. John F. McGlinchey, our MIS manager, spends much of his time grafting new combinations onto the network and keeping it up. After all, our network actually is the primary data processing facility for the company. We do all our work right there.

Where's it going? The watchword for the end of the decade will be interoperability; i.e., the ability to interconnect platforms from many vendors and actually use these platforms in harmony to do real work.

DECWINDOWS in VMS V5 will be a large part of the solution. Soon I plan to have at least one foreign UNIX platform working in our cluster. It will be doing useful work and will be seamlessly accessible from the cluster and from all terminals. We then will be in a position to test DECWINDOWS against the X11 variety.

In June, we bought an 8250 that should be running as you read this. In addition to alleviating our production mips crunch, it gives us a BI-bus and KDB50 on which we can test the direct- and indirect-connect products proliferating on the marketplace.

We're also getting a color VAXSTATION for the Editorial Department. A wealth of new VAXSTATION software is coming on the market, and we're hampered with only two black-and-white nodes.

We're serious about our Lab here at Professional Press. We're spending money now, so we can have the correct testing environment running when you need it.

So our Lab will grow with the industry. When true interoperability arrives, we'll share our experiences with you.

CONTENTS

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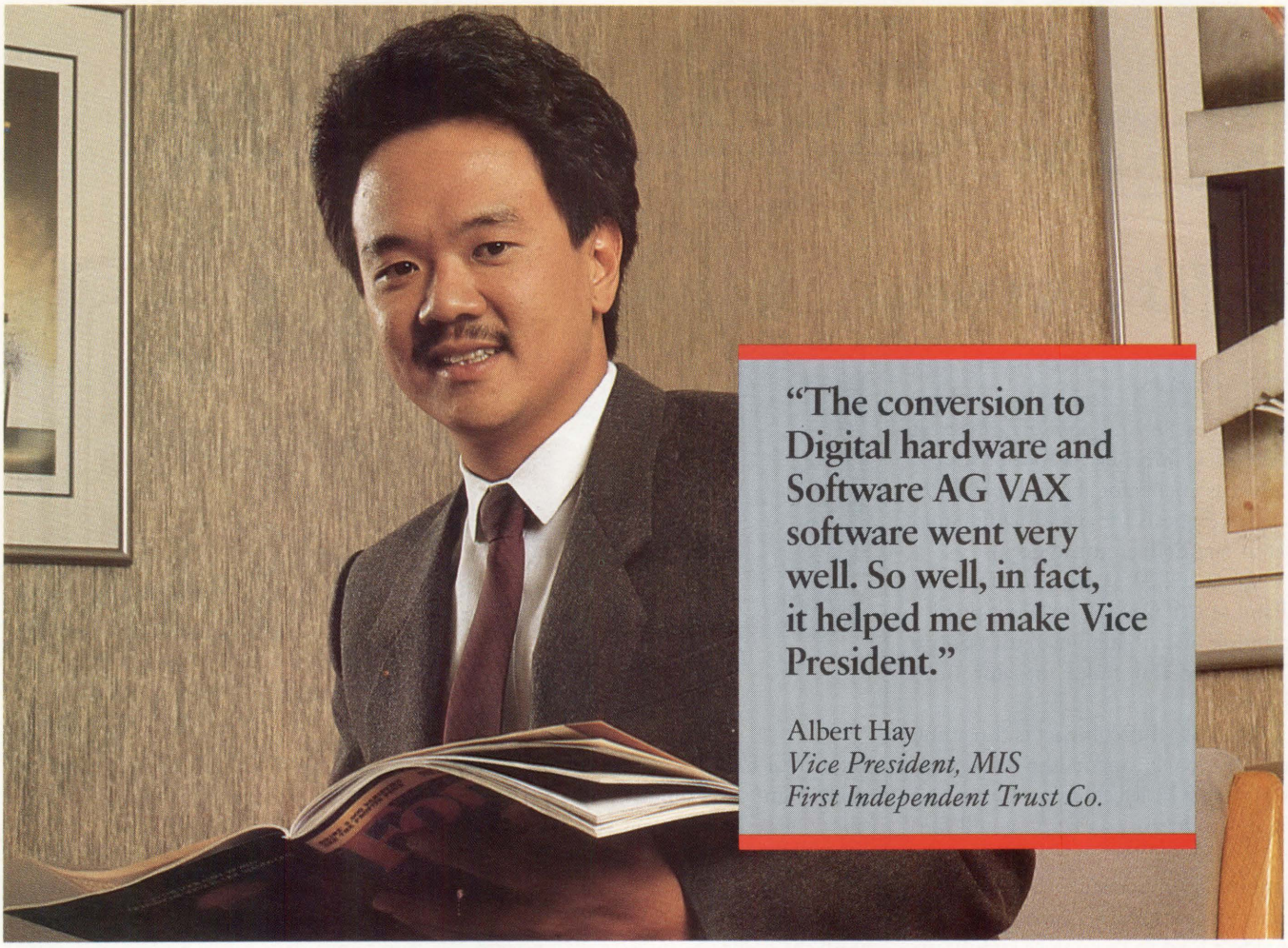

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from the lab

MTI's Exabyte

Dave Mallery The Exabyte 5¼-inch helical scan tape drive from Micro Technology Inc. (MTI) of Placentia, California, has been featured in advertisements for about a year. After repeated requests for an evaluation unit, MTI at last delivered the goods.

We installed it in FRODO::, our valiant MICROVAX II. MTI supplied a mounting plate that bolts to the bottom of the drive and slides into the BA23 cabinet.

The only difficult part is threading the cable back under the backplane through that little cable slot. If that unit slot always has been empty, you'll find the power cable plugged into the distribution panel behind the drive. This connector goes to a set of resistors that provide a load to the power supply instead of a drive.

The power connector is ready and waiting. That's all there is to the physical installation.

The controller from TD Systems of Lowell, Massachusetts, emulates a TK50 and talks SCSI. You can hang up to four drives from it. In our case, we didn't have another TK50 device on the machine, so the default address was fine.

The good news is that it works. We consistently are able to copy 2.2 GB onto a single cartridge. It doesn't matter whether the data is local to the MICROVAX II or whether it's served from the 750 over the LAVC. It takes about seven hours to perform this feat unattended every night. It puts a fair burden on the CPU time in the cluster.

Until we began using Exabyte, we were doing backup by rotating full images of individual drives and doing incremental backups of the other drives each night. We mount and dismount about 10 reels per night and carry that many off-site every day. Now, the full image fits in your shirt pocket, leading to a security problem. You can walk out with the company in your shirt pocket.

In addition to the BA cabinet add-in kit, MTI can supply the Exabyte drives in a two-pack for either rack-mount or tabletop installation.

The media is an 8mm video cartridge that measures 3.75 by 2.5 by 0.6 inches. You can buy one at your local high-end stereo emporium for less than $10. We bought and tried a TDK P6-120MP cartridge that seems as good as the private-label cartridge that came with the drive.

This new size creates new solutions. You can keep an extensive library of image backups in a single fireproof filing cabinet; i.e., the kind that's used for classified materials with the thick steel bar and padlock. With proper controls over access to this cabinet, you can have tighter reins over the backup media than you have with a big tape rack.

We're now using the unit for all our daily backup. By buying 8mm cassettes in quantities of 30, we spend 30 percent less than the unit price.

I plan to get a different mounting unit; i.e., a rack-mount with two drives rather than the single drive in the BA23. The second unit will allow us to back up the rest of our rapidly growing disk farm.

We just added a 1.2 GB CDC Sabre eight-inch drive with Andromeda controller that we'll review next month.

Exabyte

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FOUNDED: 1979

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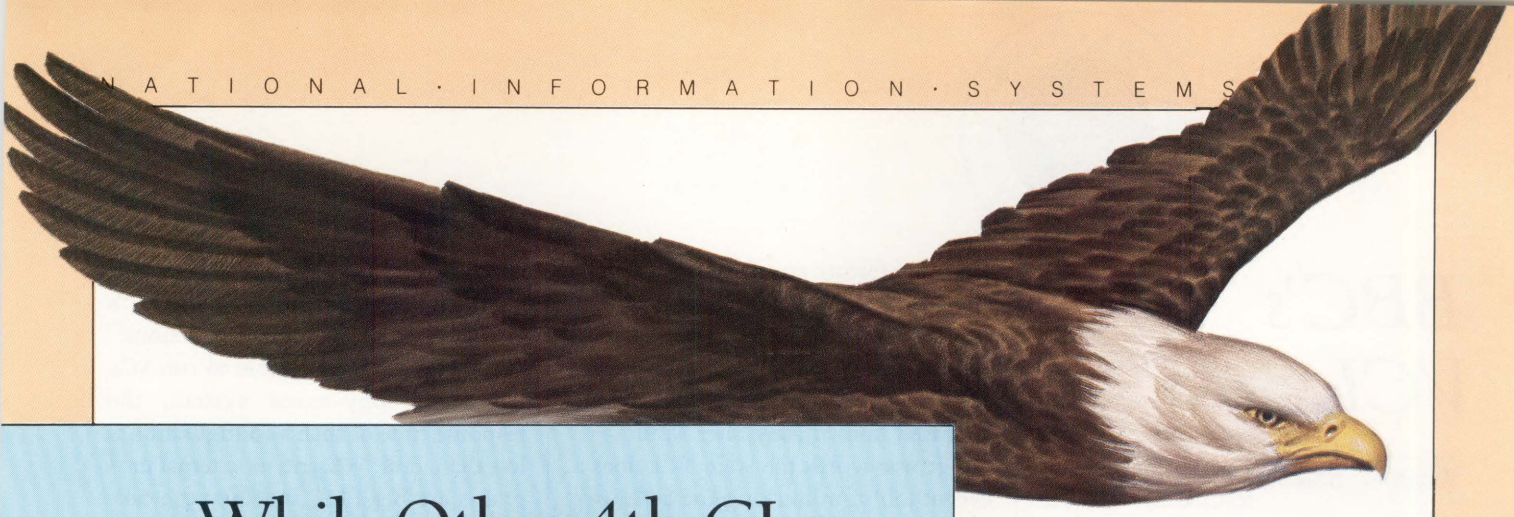

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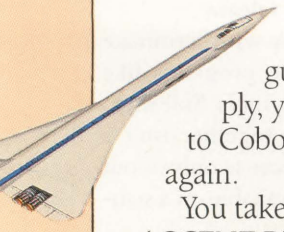

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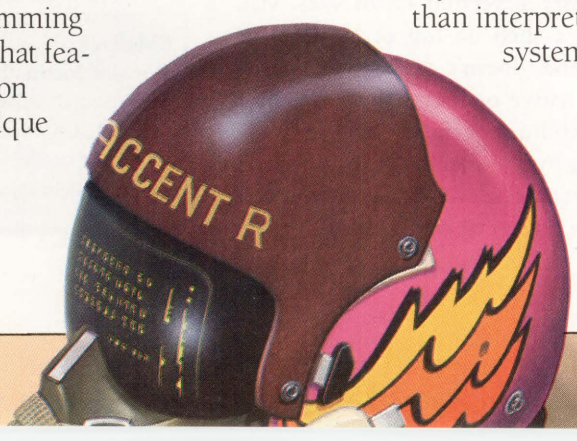

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BBC's VCL

Kevin G. Barkes Perhaps the best testimonial for VCL, a product of Boston Business Computing (BBC) of Lawrence, Massachusetts, is that you sometimes can forget where you are.

I installed the software, which is a DCL emulator for MS-DOS and UNIX systems, on the PC that I use to dial into remote VAXs. Distracted by a phone call, I returned to the keyboard and spent several frustrating minutes trying to find a file that I knew was on the disk. When I finally noticed the flashing LED on the PC's hard disk, I realized that I wasn't on a VAX but was running VCL on the micro.

Although not a perfect emulation, VCL is close enough to be a helpful tool for the VAX user trying to cope with the less-than-friendly MS-DOS and UNIX operating systems' user interfaces.

It's possible to set up a LOGIN.COM command file containing symbol and logical name assignments similar to your normal VMS environment, eliminating the loss of efficiency generally caused by force-of-habit entering of DCL commands on the PC. VCL's versions of DIFFERENCES, DUMP and other utilities also make experienced VMS users more productive on the foreign CPUs.

When BBC announced VCL early this year, I quickly ordered it, only to be disappointed by its initial implementation. VCL 1.0, which the vendor described as minimal, was a letdown. It lacked many basic DCL commands and had no control constructs.

BBC promised a full-blown MS-DOS VCL and delivered version 2 in late April, three months behind schedule. The delay resulted from the number of ports required for the product. VCL is a popular feature on minicomputers offered by non-DEC vendors seeking a clone of the VAX user interface, and BBC had its hands full meeting its commitments. V2.1, which fixed a few bugs, appeared immediately after V2.0.

It was worth the wait. VCL does a decent job of mimicking the DCL user interface and executing simple command procedures.

It supports extensive VMS-like online help; a TEACH command, which displays the UNIX or MS-DOS equivalent to the DCL command being issued; and a utility for generating customized help files.

One useful feature is VCL's SET VCL/PASSTHRU command, which allows native operating system commands to be issued while within the emulator. With /PASSTHRU enabled, non-VCL commands are passed through to MS-DOS and executed, including MS-DOS .COM, .EXE and .BAT files. This provides the best of both worlds. Instead of entering the DCL command:

```
$ SET DEFAULT [.text.old]
```

you can enter:

```
$ CD TEXT\OLD
```

and VCL still will get you there.

By using the EXECUTE command, you can direct VCL to pass the command directly to MS-DOS without attempting to interpret it. This is handy when you want to execute an MS-DOS command such as DIR, which has a VCL equivalent.

VCL provides an adequate emulation of the interactive DCL environment as it exists in version 4.x of VMS. VCL runs as a shell on top of MS-DOS or UNIX and doesn't replace the computer's native operating system. Thus, the capabilities of the product are constrained by the machine on which it's being run. The MS-DOS version was used for this review, and many of the functionality problems in VCL are due to the inherent limitations of the PC's OS, particularly memory restrictions.

Although it's possible to run VCL from a floppy-based system, the response time of such a configuration is less than ideal. VCL and its external programs are big files, and they can take time to load.

VCL's interpreter and external commands cause your PC to run perceptibly slower than at the native MS-DOS level, but the loss of throughput at the interactive level is tolerable and not much of a hindrance. VCL is slow in performing WRITEs and READs in command files, though, and it's possible to cause a fatal error and end up at the MS-DOS prompt if your .COM files are too ambitious and eat up too much memory. Remember, VCL is emulating DCL, not VMS.

The main VCL program, the equivalent of DCL's command line interpreter (CLI), requires about 150 KB of memory. Memory use is dynamic, with VCL grabbing bytes for logical name and symbol assignments and the command line recall buffer. The initial release of VCL 2.1 can store the last 128 lines, which can eat up a lot of memory. BBC is considering restricting the command recall to 20 lines for the MS-DOS version of VCL, or possibly implementing the VMS version 5.0 RECALL/ERASE command in a future release.

VCL doesn't work with terminate and stay resident (TSR) programs like Borland International Inc.'s SideKick. Using TSRs and VCL together isn't a wise move anyway, because only about 450 KB of memory is available on a stan-

SideKick
Borland International Inc.
4585 Scotts Valley Dr.
Scotts Valley, CA 95066
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dard 640 KB PC after VCL is loaded. VCL can't use expanded or extended memory, so there are certain applications that can't run while VCL is resident.

This restriction can be circumvented simply by logging out of VCL before running the memory hog. The program exits cleanly, releasing its memory for use by other programs. VCL then can be reinvoked when the DOS program is completed.

Like DCL on a VAX, VCL uses external commands (programs) to reduce the size of the main CLI. The DIFFERENCES, DUMP, MERGE, PRINT, SHOW TERMINAL, SORT and other utilities are called by VCL when invoked.

Although the utilities do an excellent job of mimicking DCL, most lack a few of the more esoteric DCL qualifiers and have other restrictions. VCL's SORT utility, for example, only can sort files that can fit in memory. VCL DUMP has some problems displaying the contents of binary files when the /BYTE and /HEX qualifiers are used. Still, it's comforting to see the normal VMS right-to-left dump representation, rather than those dump representations available on MS-DOS, which go left to right.

As the utilities are standalone programs, it's possible to run them without having VCL itself loaded; i.e., you can fire them up from MS-DOS.

Limitations

VCL doesn't support administrative or accounting functions, interprocess communications, queue or RMS management, privilege manipulation, resource allocation, run-time routines or VMS System Services.

The process-permanent logical names SYS$OUTPUT, SYS$INPUT, SYS$ERROR and SYS$COMMAND can't be reassigned. This limitation is circumvented by the fact that most commands have an explicit /OUTPUT qualifier. Also, VCL exhibits some decidedly non-DCL behavior in this respect.

In a typical command file, used to invoke an editor, the pure DCL version is:

```
$ ASSIGN/USER SYS$COMMAND SYS$INPUT
$ EDIT 'P1'
```

The logical name assignment is necessary for DCL to get the name of the file to edit from SYS$COMMAND, the command file, rather than from SYS$INPUT, the terminal. In VCL, a simple:

```
$ EDIT 'P1'
```

causes the editor to get the filename from the P1 parameter.

There's no support for logical name lists, although individual logical name assignments work. Like VMS, VCL maintains a number of separate logical name tables. This is a puzzling feature for the MS-DOS version, which, like MS-DOS, doesn't support multitasking. Batch-related commands aren't supported, with the exception of PRINT.

Also missing in VCL are the terminal CTRL-T function file version numbers and node names. This is again due to the limitations of the base operating systems.

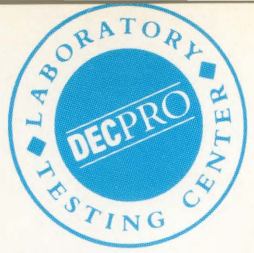
Because VMS System Services and Run-time Libraries don't exist on a PC, the number of lexical functions supported is limited, and some of those that do exist don't behave precisely as their DCL counterparts.

The version of VCL that I was using also had problems properly interpreting $SEVERITY. My VCL .CMD files (remember, .COM files in MS-DOS are executable programs) always would exit when they encountered commands that returned a value of 3 (an informational message). Three should be interpreted as successful completion, not an error. Simply reassigning a logical name, which returned an informational message, caused the VCL procedure to exit. Placing a SET NOON at the beginning of the file solved the problem. BBC promises a fix in a future release.

VCL's quirky command file behavior is its biggest shortcoming. Aside from rudimentary command procedures, most .COM files ported directly from the VAX will require reworking to operate properly under VCL. Again, part of the problem is the limitations of MS-DOS; however, VCL can be unpredictable in command procedure execution. Keep your VCL .CMD files short and to the point.

VCL PROVIDES a good emulation of the interactive DCL environment and DCL's most popular commands. The product makes life more pleasant for VAX users forced to jump from VMS to the MS-DOS or UNIX operating systems.

Author's note: BBC sells a companion product, PC-EDT, which emulates the EDT editor.



Cluster Chronicles: Our Ethernet Goes Coast To Coast

Editor's note: Starting this month, you can find Cluster Chronicles in From The Lab. The idea for the series began last December, when we watched our first LAVC come up for the first time. BILBO::, our 750 with disk farm, met FRODO::, our MICROVAX II, over the Ethernet and up they came.

We've been keeping copious notes, and since March we've been publishing our findings on a regular basis. Now that we have our cluster going, we can help you get yours running (or keep it running). Mac Ethernet connectivity and the dawn of the X Window System for VMS are on the top of our list. Stay tuned.

Dave Mallery Professional Press has two California offices, one in Pasadena and one in San Bruno, supporting both sales and editorial. Our Pasadena office houses *DEC PROFESSIONAL*'s West Coast Editor Philip A. Naecker. Phil has a MICROVAX II (OASIS::) in the office. We've found that having our offices directly online (rather than via dial-up) is a great advantage. Professional Press runs on VAXMAIL.

Joining Pasadena to the cluster at our Spring House, Pennsylvania, office was relatively simple. I ordered a leased line from Spring House to Pasadena. As I noted last month, I used Williams Telecommunications Group, a pipeline company that had pulled fiber through old unused gas pipeline and was suddenly in the interstate data transmission business.

The installation was flawless and the line was operational within 24 hours of the scheduled date. Williams monitors the line from a central site. We found Williams easy to deal with and competent.

The modems are from Emulex Corporation. I got a pair of its new 14.4 KB model. They worked on the line immediately. The only glitch was that I had to reverse the polarity of each of the wires within each of the pairs to get them to synch up the first time.

They have an elegant menu-driven setup dialog that works with buttons and an LCD display. Phil is able to inspect the setup of the modem in Spring House from the modem in Pasadena. They can be set to monitor the status of the line constantly, and display signal quality or signal level on the LCD readout.

We didn't need any special features like auto-speed degradation, because the line seemed to be perfect. I've been installing leased lines for longer than I like to remember and I've seldom experienced an installation this normal.

The strategy for connection was to bring the Ethernet to Pasadena. We did it with a pair of intelligent gateways from Xyplex Inc. These gateways filter the traffic and pass on only those packets that are destined for the devices on the other end. Our Ethernet in Spring House currently is operating at between 600 and 1,000 packets per second. That load would overrun the line's capacity completely. Filtration is necessary.

At Pasadena, we connect the gateway to a Microcom DELNI equivalent. Then we distribute to a Xyplex eight-port cluster controller for local terminals and dial-in, and to a Xyplex HIU (host interface) card in OASIS::.

Using the Xyplex switching software, I can connect my terminal in Spring House to OASIS:: in Pasadena. Likewise, any terminal in Pasadena can connect either to OASIS:: or to any cluster member (except the VAXSTATIONS) in Spring House. The Xyplex network monitoring software works transparently over the link, allowing us to reboot or inspect any unit in California.

The only drawback is that the Xyplex gateways do not pass DECNET packets. That means no SET HOST or direct mail/file connections.

We will install about four dial-in lines in Pasadena, and instruct Xyplex to connect them permanently to a host in Spring House, allowing low-cost ac-

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3545 Harbor Blvd.
P.O. Box 6725
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Tulsa, OK 74121
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Xyplex Inc.
100 Domino Dr.
Concord, MA 01742
(617) 371-1400
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cess to ARIS from Southern California. These should arrive soon.

The next expansion after Pasadena is to run a stub to our San Bruno office. At first, we'll serve this with a pair of MICOM multiplexers, because there's no MICROVAX there. We hope to provide local ARIS access from San Bruno to those of you in Northern California.

We also hope to add an 8250 to the cluster soon. Joining the cluster in June was BOMBUR::, another VAXSTATION 2000 on the desk of Bonnie Auclair, our ARIS manager. BOMBUR:: is diskless with only 4 MB. He came out of the box and was a cluster member within an hour.

Jager's WATCH

David B. Miller

To keep users happy and computer systems running smoothly, managers need tools to monitor system activity. They have to locate and identify problems quickly so that they can take action.

VMS provides system management tools to help the manager perform his function. However, VMS tools such as MONITOR (with all its qualifiers and options) can at times be difficult to understand, particularly for an inexperienced VAX manager.

WATCH version 2.2, from Jager Computer Systems of Calgary, Alberta, goes a long way in reducing some of that confusion. With a minimum of qualifiers and commands to remember, WATCH presents vital system statistics on one easy-to-read screen.

From left to right, top to bottom, the WATCH screen (see Screen 1) reports:

1. CPU — The percentages of CPU time used by users (Used) and the

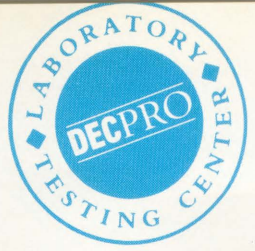
```
CPU                  MEMORY %Used 39 ( 39)   FAULTS                I/O
%Used 20 (19)        Free         14912 (15076)  Total    25 (156)  Direct     0 (  2)
%Sys  17 (16)        Modified     99    ( 69)    %Hard    0  (  6)  Buffered   14 ( 13)

DISK          I/O Rate      Que Length      Response    FILES        CACHE    %Hit %Avg
                                                       Open         Dir      0  (  0)
                                                                    Hdr      0  (100)
                                                       115          Quo      0  (  0)
                                                       (115)        Ext      0  (  0)
                                                                    Btmp     0  (  0)

TOP     PID     Username  Image   %Used   NUMBER OF PROCESSES          COM      1
BIO     01A3E   LSP104    SED       49    Interactive      17 ( 17)    SWPO     0
DIO     01A3E   LSP104    SED        0    Batch             0 (  0)    LEF     16
FAULT   01CAE   DMILLER   WATCH     36    Total            29 ( 29)    HIB     11
WS      01C82   LSP105    LISP       5    Image Act.        1 (  1)    OTHER    1

 PID    Username  Image  State  BIO  DIO   Pages      Faults  Pri  Imact  %CPU
01CAE   DMILLER   WATCH  CUR      0    0   363/3057        9    7      8     6
01A3E   LSP104    SED    LEF      7    0   445/1986        2    9     16     2
018B1   CCC116    SED    LEF      4    0   395/1653        0    9    127     1
01A60   CCC103            LEF      2    0   129/9246        0    5     27     1

WATCH>                                                              18:49     3
```

Screen 1: WATCH squeezes a lot of valuable system information on one screen.

PID	Username	Image	State	BIO	DIO	Pages	Faults	Pri	Imact	%CPU
00080	— system —		COM	0	0	0/ 0	0	0	0	70
00081	— system —		HIB	0	0	0/ 0	0	16	0	0
01C82	LSP105	LISP	HIB	0	0	500/9246	0	9	20	0
00084	SYSTEM	ERRFMT	HIB	0	0	93/ 400	0	12	0	0
00085	SYSTEM	OPCOM	LEF	0	0	59/ 542	0	11	0	0
00086	SYSTEM	JOBCTL	HIB	0	0	311/ 554	0	13	0	0
00087	DECNET	NETACP	HIB	0	0	193/ 667	0	13	0	0
00088	DECNET	EVL	HIB	0	0	291/ 780	0	9	1	0
00089	SYSTEM	REMACP	HIB	0	0	36/ 454	0	13	0	0
0008A	SYSTEM	PRTSMB	HIB	0	0	52/1628	0	9	0	0
0008B	SYSTEM	VAXSIM	HIB	0	0	154/ 683	0	12	0	0
0008D	DMILLER	MNSERV	HIB	0	0	63/ 910	0	9	0	0
01C90	CS2316		LEF	0	0	152/1826	0	9	18	0
01296	MAC103	KERMIT	LEF	0	0	261/8266	0	9	16	0
01627	ADA116	ICC	LEF	0	0	404/1434	0	9	9	0
01B29	ADA116		LEF	0	0	133/1282	0	9	8	0
01BAC	LSP105	LISP	HIB	0	0	500/9246	0	9	9	0
01D2D	ADA113		LEF	0	0	134/1159	0	9	8	0
01CAE	DMILLER	WATCH	CUR	8	0	363/3057	2	7	8	5
01CAF	BALCER		LEF	0	0	152/1321	0	9	7	0
018B1	CCC116	SED	LEF	0	0	397/1653	0	9	127	0

Press any key

Screen 2: The /USERS option displays processes on the system. Pressing any key displays processes not able to fit on a single screen.



system in kernel and interrupt modes (Sys).

2. MEMORY — The amount of memory allocated to user processes (Used), the free page list (Free) and modified page list (Modified).

3. FAULTS — The total number of page faults per second and the percentage of total faults that were hard.

> ***WATCH provides an easy-to-use, easy-to-understand way of monitoring system resources.***

4. I/O — The number of direct I/O (disk to tape) operations and buffered (terminal and printer) I/Os per second over the data collection interval.

5. DISK — Number of I/O operations per second, average number of queued I/O requests and the response time (in milliseconds) that an I/O request must wait before being serviced. With the /DISK=(list of disks) qualifier on the WATCH command line, statistics for up to five disks can be displayed at a time.

6. FILES — Number of open disk files.

7. CACHE — The current and average hit rates for the directory, file header, quota, extent and disk bitmap caches. A zero percent figure means no attempts have been made yet.

8. TOP — Heaviest users of critical resources. The resources include four of the following: CPU, direct I/O, buffered I/O, page faults and working set. The single resource not displayed in this area of the screen is shown in the process area in the lower portion of the screen.

9. NUMBER OF PROCESSES — The number of interactive and batch processes along with the total. The total figure also includes any detached processes. The last figure displays the total number of image activations since WATCH was started.

10. STATES — The number of processes ready to run (COM), swapped out (SWPO), in local event flag state (LEF) and hibernating (HIB) are displayed here. Any other state is included in the total for OTHER.

11. PROCESS DISPLAY — The top four users of a SINGLE resource, like the TOP display. You can tell WATCH on which resource to concentrate by including the /TOP=resource_name qualifier on the WATCH command line when invoking it. The heaviest user of the resource in question is listed first.

The last line of the display contains areas to enter internal commands to WATCH, messages, the hour and minute of last screen update and the interval of time between screen updates, which can be changed from the WATCH command line when invoking it.

Before invoking WATCH, you can add qualifiers to the command line to do the following:

1. /COMPARISON — Notice two sets of numbers on the screen; one set is in parentheses. The figures in parentheses reflect statistics from the last data collection. The COMPARISON qualifier allows you to specify whether the second set of numbers reflects the last interval's actual figure or the difference between the last interval and this interval.

2. /DISK=(disk designations) — Up to five disks can be specified here. Logical names are allowed.

3. /INTERVAL — You can change the default data collection range (in seconds) from 10 seconds to any number between five and 900.

4. /TOP — The /TOP qualifier allows you to specify what critical resource (CPU, DIO, BIO, etc.) you wish to highlight in the process area near the bottom of the screen. The other resources are grouped together in the TOP area of the display mentioned above.

5. /END_TIME, /NODISPLAY, /RECORD, /PLAYBACK — Using /RECORD, WATCH data can be written to a file with the data collection ending at the specified /END_TIME. When running WATCH interactively, the screen display can be eliminated with /NODISPLAY.

Later, the recorded data can be played back by specifying the previously created recording file with the /PLAYBACK qualifier. This feature allows you to record the data initially with one interval, then play it back with a shorter interval, thus cutting the time it takes to view the data collected.

In addition to command qualifiers, a few internal commands are provided. REPAINT serves to refresh the terminal screen. DCL commands and other processes can be invoked without stopping WATCH by issuing the SPAWN command. TOP works similarly to the /TOP command qualifier in that it provides the capability to respecify what system resource you'd like to see highlighted in the process section of the display.

The USERS internal command causes WATCH to replace its normal screen display with an expanded display of the users on the system (see Screen 2), rather than the four listed on the initial WATCH screen. This is particularly useful for systems with many users. Managers can exit to the expanded user process screen and jump back into the regular WATCH screen at will.

Documentation

Documentation is clear and concise, although not much documentation is needed. WATCH is self-explanatory, and the HELP WATCH command is inserted into the help library at installation time.

WATCH provides an easy-to-use, easy-to-understand way of monitoring system resources. It's a bargain at

WATCH

PLATFORMS: All VAX systems

PRICE: $695

JAGER COMPUTER SYSTEMS

HEADQUARTERS:
8835 MacLeod Trail SW
Calgary, Alberta, T2H OM3
(403) 259-0700

FOUNDED: 1986

PRODUCT LINE: VAX system management software in the $200 to $800 range

REVENUES: $570,000 per year

OWNERSHIP: Jager Computer Systems is a division of Jager Industries Inc., a privately held construction, manufacturing and land management firm

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$695.00, whether you're running it on a MICROVAX or an 8800. An unlimited site license only adds $100.00 to the price tag. For an extra $250.00, Jager will throw in the source code, so you can tailor it to your requirements.

With a minimum of fuss and trouble, novice as well as experienced system managers will find WATCH to be a valuable system management tool.

Author's note: Version 3.0 of WATCH was released in June. A number of enhancements were made, including:

1. A streamlined installation process.
2. Expanded documentation, help screens and error messages. Main information screens also have been cleaned up.
3. A /NOPRIORITY switch that prevents WATCH from running at high priority, thus maintaining performance during peak periods on heavily loaded systems.
4. Expansion of some reporting fields to accommodate larger values, additional information and multiple nodes.
5. Ability to print selected information from the recording file.

Under The Hood Of A VAXSTATION 2000

Philip A. Naecker

Call me cheap, but I can't see paying $3,990 for a new disk when I can get the same thing (almost) for $750, plus an hour's work. That's what happens if you order a VAXSTATION 2000 with a 71-MB RD53 from DEC, instead of ordering the diskless system and putting in a third-party or reconditioned disk. Considering that a $3,990 disk costs more than the entire processor with licenses (when purchased from a distributor), you may want to consider picking up a screwdriver rather than spending your dollars. Buying and installing the disk is as easy as changing a tire, and the only tools you need are two screwdrivers, an antistatic pad and a pair of pliers.

A diskless VAXSTATION comes with everything you need to add a disk. Included is the disk cable for either a single RD53- or RD54-style (ST506) disk or for a half-height hard disk and a single floppy drive. To make your life even easier, the MICROVAX 2000's onboard diagnostics can verify and format a disk, so don't worry about whether the disk has been formatted properly for this controller. (Most available RD-style disks already are formatted for RQDX3s, but it's still nice to have the formatting capability). So just buy a diskless VAXSTATION and a disk from a third party.

To begin, unpack your VAXSTATION and run all the diagnostics. Allow an hour from the arrival of the delivery man to the end of the diagnostics; longer if you want to read the entire hardware documentation. The hardest part is finding a clear space on your desktop.

Unplug the System Box from all external cables and place the system on a grounded antistatic pad. Wear an antistatic wrist band to prevent static damage to the system or the circuit boards on the disk drive. Remove only the black Phillips head screws; don't touch the silver screws. First remove the four screws on the bottom of the system box that hold the plastic casing in place. Then use the blade of a flat screwdriver as a wedge to gently ease off the front three-quarters of the casing, leaving behind the guts of the system box and the back panel of the plastic casing. Next, remove the four silver screws that hold black filler panels onto the front of the disk cavity.

With the casing off and the system sitting on its rubber feet with the power switch facing you, locate the five exposed black screws that hold on the CPU motherboard; two on the top at the rear, one in front on a metal tab, one on the right on a tab and one on the left above the power supply. Remove the screws, being careful not to drop them where they may be irretrievable. The motherboard now can be pulled carefully forward and tilted upward, pivoting the back end of the board so that the cables connected there aren't overextended. This exposes the connector for the disks and allows access to the loadboard power plugs.

The design of a power supply can be simplified, if the power supply always operates at or near the same load. The loadboard simulates two devices attached to the power supply (such as two half-height drives), so a diskless machine underloads the power supply. When you install the new disk, remove the loadboard. There are four standoffs that you remove by squeezing with the pliers from beneath, and you also must unplug the loadboard from the power supply.

Remove the two disk-mounting brackets from the cabinet (three silver screws; two right, one left) and screw the brackets to the new disk housing with the screws provided in the baggie the cable came in. Place the drive into the disk cavity and connect the power cable (use the short one) and the two ribbon cables. One ribbon cable is obvious; it's the only one that fits on the right edge connector on the disk's circuit board. There are two choices for the other edge connector; choose the one that's the same length as the right cable, the one with fewer conductors (20). The remaining connector is for the optional internal floppy drive.

Now slide the disk into place and plug the disk cable into the motherboard. There's a key on the cable, so you can't install it wrong, and there's only one place for it to connect. You may need to tilt the motherboard down slightly to make the cable reach, because there's no slack in the disk cable. Screw the disk retaining brackets to the system casing. Then fold down the motherboard, and replace the five screws holding it in place. Put the external cables back on the system and power it up before you put the cover back on. The system should boot as it did when you took it out of the box, except now it will find a disk (DUA0), and it will attempt to boot the operating system from it. Use the TEST 71 command at the boot prompt to verify the hard disk. You also may need to format it, as described in the instructions that came with the machine.

The first time I did this operation, it took me about 90 minutes, but now I have it down to about 20 minutes. You should be able to do it in about an hour. For my next project, I'm going to connect an external floppy. ■

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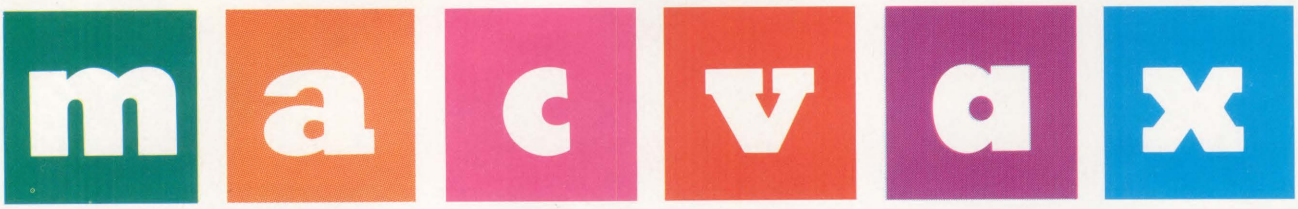
*IDC 1986 U.S. Terminal Census.



The Macintosh/VAX CAD/CAM Connection

It's come a long way and still has a long way to go.

BY JAMES K. ANDERS

SINCE THE EARLY 1970S, DEC has been a major OEM supplier of computers to companies producing turnkey Computer Aided Design/Computer Aided Manufacturing (CAD/CAM) systems. Today, companies such as Intergraph (IGDS, I/EMS), Autodesk (AUTOCAD), Schlumberger/Applicon (Bravo 3, BravoDraft), MCS Inc. (Anvil-4000), Auto-Trol, MacNeal-Schwendler (Nastran), Swanson (Ansys), PDA Engineering (Patran), G. E. Calma and McDonnell Douglas (McAuto/Unigraphics) use the VAX as a delivery platform.

In fact, the availability of minicomputers, such as the PDP-11 and VAX, fueled the growth for the CAD market during the last 15 years. CAD companies were able to market complete solutions, including hardware and software. They developed sophisticated software packages to automate design, drafting, analysis and manufacturing.

The first generation of CAD/CAM systems, introduced in 1970, provided a 2-D graphics environment used for specific vertical applications. These included electrical schematic layout, printed wiring board and integrated circuit design and basic drafting.

By 1980, a typical single-terminal 2-D CAD/CAM system cost $150,000; each additional terminal sold for $50,000. Modules for 3-D design and numerical machine tool control ranged from $30,000 to $80,000.

This was an expensive proposition. But the promise of integrating design and manufacturing along with an attendant increase in productivity convinced many companies to acquire this technology.

Instead of each department reconstructing information for its own unique requirements, there would be a single design model. Each depart-

ment would access this single model and use it to produce engineering drawings, machining and inspection data, and technical illustrations.

CAD/CAM ADVANCES

HAVE THE ADVANCES made in computer technology since 1980 affected the CAD/CAM market? The answer is yes and no.

Electrical CAD/CAE has done very well. On the other hand, mechanical CAD/CAM has stagnated.

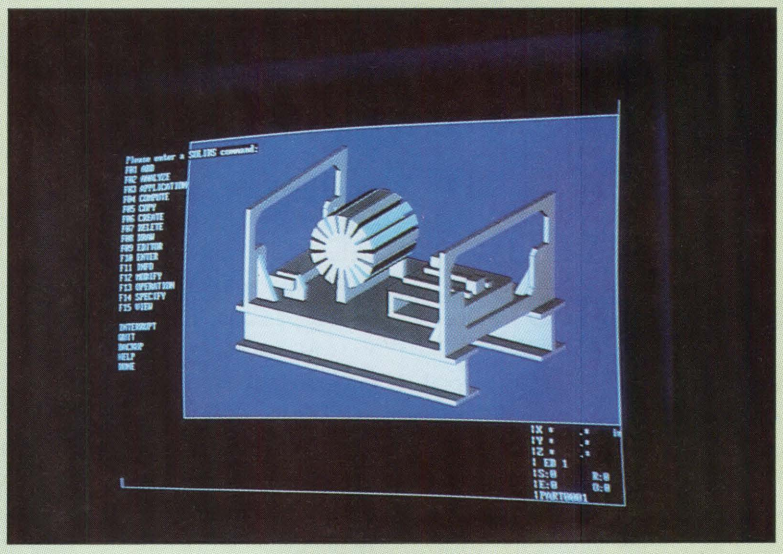
Mechanical design and drafting software has steadily improved, but attempts to implement the centralized database concept, for the most part, have met with limited success. The newer generation of integrated CAD packages has introduced layers of CPU processing overhead and imposed penalties on the ease of use and flexibility of the system.

Only recently have CAD/CAM vendors begun to offer effective tools that are linked to the outside world. For example, Intergraph announced a marketing pact with Relational Technology Inc., the developers of the INGRES relational database. INGRES 6.0 will be made available along with version 1.1 of Intergraph's Engineering Modeling System (I/EMS).

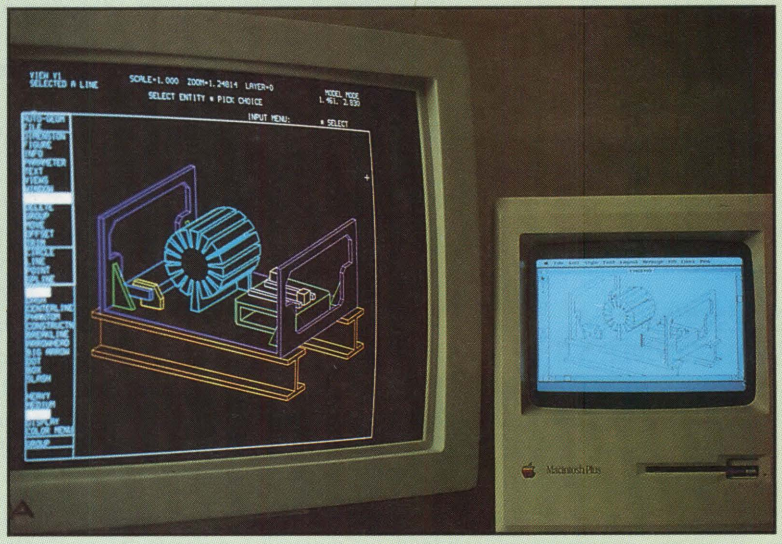
Another company, Auto-Trol, has linked up with the VAX-based relational database Empress 32 from Empress. By designing a high-level SQL procedural interface between Empress 32 and Auto-Trol's Series 5000 Graphics Software, the company gives users interactive access to engineering information.

You need this kind of database linkage to achieve even the simplest of integration tasks, such as bill of material generation.

Mechanical CAD/CAM and Computer Integrated Manufacturing (CIM) were supposed to eliminate the so-called islands of automation that exist in most organizations. Except for a few industries with a great deal of



3-D solids model shown on a VAX-based Schlumberger/Applicon Bravo3 workstation.



View data of Schlumberger/Applicon solids model moved to ADRA 3000 2-D workstation and Macintosh Plus running MacDraw using IGES file format and Cadmover.

Macintosh CAD graphics can be pasted in other Mac applications.

commitment and funding, this total integration hasn't occurred yet. That's because of several factors:

1. Mechanical CAD/CAM systems are expensive. They can cost $100,000 per workstation. This prohibits widespread installation throughout a company.
2. Training is expensive and takes a long time. A six-month learning curve for an integrated 2-D/3-D mechanical CAD system is common.
3. Until recently, data interchange between different CAD systems and other supporting computer systems hasn't lived up to the expectations of users.
4. A way hasn't yet been found to structure and manipulate a centralized master design model that is flexible enough to drive all subsequent departmental processes.

RECENT DEVELOPMENTS

DURING THE LAST eight years, established minicomputer CAD software packages have migrated to the microcomputer. Little has been done for new CAD/CAM software development. With the exception of solids modeling, the theme has been old software, new machines.

Moving the old software to the microcomputer removed one stumbling block to the wider acceptance of CAD; i.e., the high cost. Hundreds of thousands of micro-based CAD/CAM packages were sold during the past eight years.

When announced in the early 1980s, these micro-based packages weren't necessarily any easier to learn or use than their more expensive counterparts. Response time was slow and drawing size limited when compared to the larger systems. The market flourished anyway. Engineers, architects, draftsmen and designers in both small and large companies acquired personal computers and 2-D/3-D CAD packages, whether they were integrated or not.

When Apple introduced the Macintosh in 1984, the small monochrome screen and closed architecture did nothing to promote its use as a CAD workstation. But the machine appealed to the design professional, perhaps because of its reliance on a graphical user interface or paper-white screen.

Macintosh CAD packages started to appear, and Apple, even though it took a while, introduced the Macintosh II. When popular IBM-PC CAD packages, such as VERSACAD and now AUTOCAD, announced Macintosh versions, the Macintosh became, even to the disbelievers, a legitimate CAD/CAM platform.

Macintosh CAD programs removed two more roadblocks to wider acceptance of CAD: excessive training requirements and data interchange. Apple created an environment where programs could be mastered quickly and easily, and data could be transferred among diverse applications from different developers by using the Clipboard.

The software applications were dramatically different as well. Programs like MacDraw, although never intended to be an entry-level CAD program, showed the true meaning of interactive graphics, and pointed the way for many new CAD programs.

When Apple developed the Macintosh, it created an environment where all applications can share data. For example, CAD programs can accept text from the word processor of choice and tabular numerical data and graphs from spreadsheets like Microsoft's Excel.

This sharing of information can work the other way as well. Macintosh CAD graphics can be pasted in other Macintosh applications. Never before have CAD users had so much freedom to manipulate and transfer information. This open environment has been one of the primary reasons for the Macintosh's success in the engineering and technical marketplace.

Separately, the Macintosh and the VAX are qualified for the CAD environment. Together, they can augment each other and provide remarkable benefits.

MAC FOR CAD/CAM

ONE REASON THAT Macintoshes are used in a VAX CAD setting is to take advantage of the Macintosh's strengths with desktop publication and presentations. VAX-based CAD/CAM data can be extracted and placed into Macintosh applications, such as Aldus's Pagemaker or Quark's Xpress. This can be accomplished in several ways.

Many VAX-based CAD/CAM systems use Tektronix graphics terminals. A Macintosh running the Versaterm-Pro terminal emulator can capture Tektronix screen images and convert them into PICT documents. From this point, the images can be pasted into a technical document or stored into the Macintosh's Scrapbook or to Odesta's Helix/VMX database. Helix/VMX is a Macintosh/VAX cooperative application that can store graphic images as well as text.

A more formal way to convert CAD data is to use an interchange format, such as Initial Graphics Exchange Specification (IGES) or DXF. IGES is an industry standard that most CAD/CAM programs support. These

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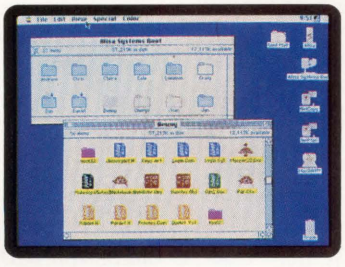

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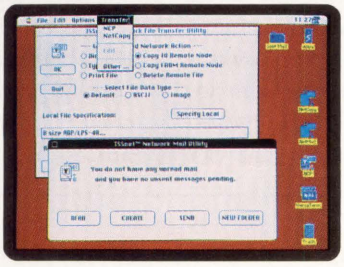

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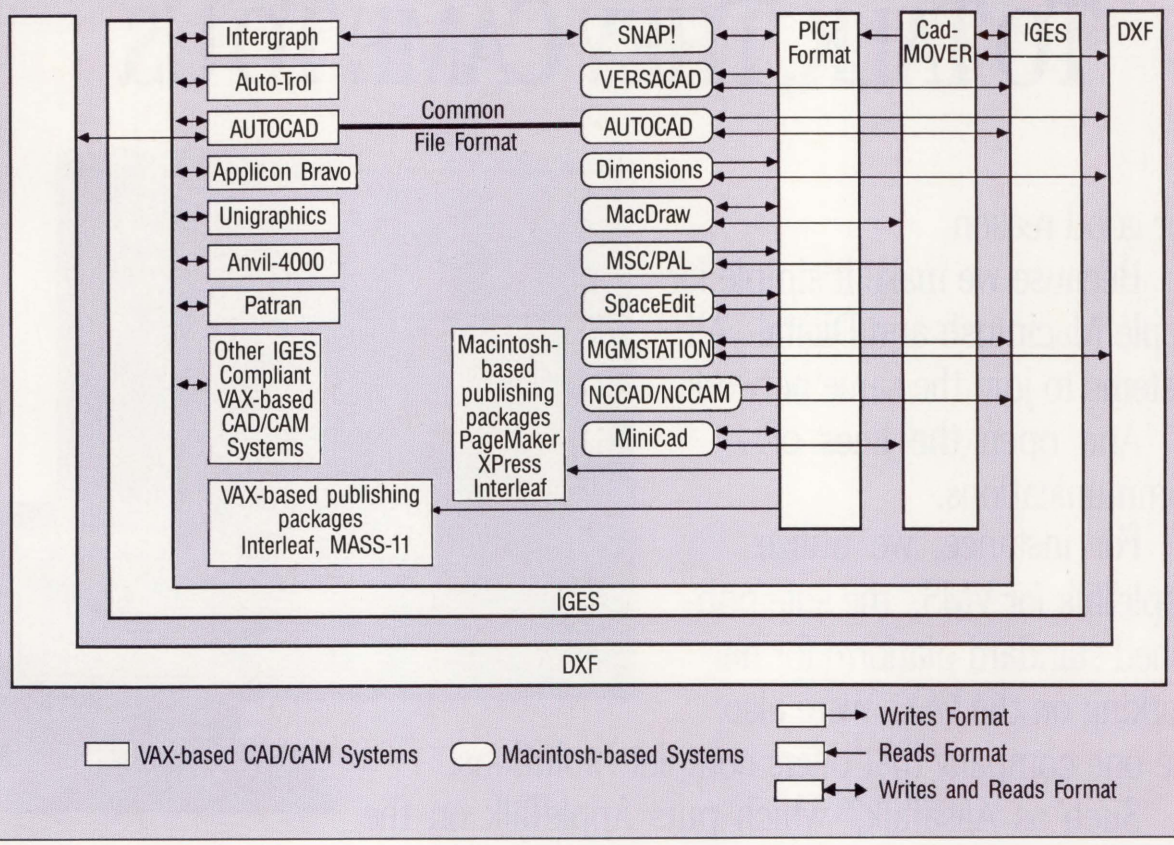
FIGURE 1.

A few common Macintosh/VAX CAD/CAM programs and their interchange formats.



interchange formats are similar in concept to the SYLK and WKS formats used for spreadsheet interchange. But in this case, the task is more difficult.

Many CAD programs don't have corresponding graphic entities or represent those entities in a fundamentally different way. This can make IGES transfers problematic. During the past several years, however, the IGES specification has continued to mature and CAD vendors have implemented respectable IGES translators.

For a typical IGES conversion, most of the common graphic elements, such as lines and arcs, are perfectly translated. But complex entities, such as surfaces, can present problems. Several Macintosh programs, such as VERSACAD, MGMSTATION, EZ-CAM and NCCAD/NCCAM, support the input of IGES files directly (see Figure 1). At a recent conference held by Apple, CAD/CAM developers were told that IGES and DXF interchange capabilities were strategically important and should be included where appropriate.

DXF is an exchange format used by AUTOCAD. Now that Autodesk has announced a version of AUTOCAD for the Macintosh, users can access and share their AUTOCAD files among different platforms, one hopes without conversion. Autodesk has, in addition to the ever-popular IBM-PC version, versions that run on the VAX and Sun workstations. Several CAD vendors also supply DXF interfaces into their products.

Another way to translate or convert CAD data is through a direct translator. SNAP! from Data Basics provides an optional direct translator that converts Intergraph IGDS native binary files into the native SNAP! format. Direct translators have the benefit of a more specific and tailored conversion, instead of the common denominator approach of IGES.

They also can require less computing resources and take less time. IGES translations are a two-part process; i.e., writing and reading. Direct conversions write and read as a single process and are faster.

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In addition, we have a package, Reggie, that converts those beautiful Macintosh graphics into DEC formats (ReGIS and SIXEL) for use by VAX applications or output devices. And VMacS provides two-way file transfer and conversion to allow users to store and manage Macintosh files on the VAX's hard disks and tape drives.

So if your VAX is still using dumb terminals, maybe it's time they got smart. Or if your Macintosh and VAX don't communicate, maybe it's time *you* did.

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For more information, or to order, call your local computer dealer or contact: White Pine Software, 94 Route 101A, P.O. Box 1108, Amherst, NH 03031, (603) 886-9050.

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For those CAD/CAM programs that don't include an IGES or DXF translator, there's another alternative. Cadmover from Kandu Software is a Macintosh-based utility program that will convert IGES or DXF text files created by VAX-based CAD systems or other systems, such as the ADRA 3000, and then create a Macintosh document supported by MacDraw, PICT, MiniCad from Diehl Graphsoft, SpaceEdit from Abvent or MSC/PAL from MacNeal-Schwendler. Cadmover also will translate between certain Macintosh formats; i.e., MacDraw to MSC/PAL.

These conversion tools offer many ways to get VAX-based graphics into the Mac for enhancement and inclusion into technical documents, reports and manuals. They also provide a mechanism to get the same images into presentation packages, such as PowerPoint from Microsoft and Cricket Presents from Cricket Software. With these programs and a Mac with a video projector, the traditional design review with blueprints tacked to the walls is gone forever.

TODAY'S DESIGN

NOW ENGINEERS AND DESIGNERS can extract and convert CAD images from the VAX and/or Macintosh. They can annotate and enhance the images, thereby creating a professional-looking electronic slide show.

Macintosh data easily can be moved to the VAX. PICT documents created by Macintosh applications such as MacDraw and Cadmover can be imported into VAX-based applications, such as Interleaf's TPS and Microsystems Engineering's MASS-11.

Using Reggie from White Pine Software (see "White Pine's Reggie," July 1988, p. 140), the same images can be converted to ReGIS for display on a VAX graphics terminal. DEC is starting to position itself as a third-party integrator of Corporate Electronic Publishing (CEP) systems.

It has established cooperative marketing agreements with such companies as Interleaf and Aldus. Because of the Apple/DEC joint effort and standards such as PICT, IGES and PostScript, the Macintosh will be an important factor in CEP implementation.

Along with the notion of a centralized database, CAD vendors have promised integrated modeling and drafting. This means that 3-D models and the 2-D drawings that represent them are dynamically linked. An alteration of the model automatically is reflected in the drawing and vice versa.

Most high-end CAD/CAM packages can demonstrate this geometric associativity. But except for the most simplistic cases, this associativity is too awkward and time consuming to maintain.

For a system to associate a dimension with a part measurement, the dimension must be tied to specific multiple geometric instances. For example, to associate the dimension of 1.000 inch to the width of a simple cube requires that the dimension be uniquely associated to eight vertices.

This complex mapping isn't done automatically, it's done interactively by the user. In practice, because of the time and effort, this linkage is rarely done. When dimensions aren't functionally associated to part geometry, a major claimed benefit of model/drawing dimensional associativity is nullified.

PART MODELING

WHEN A PART IS MODELED in a CAD system, the idealized or theoretically exact part is modeled. CAD systems don't provide for the part variation that's permitted by the design tolerances. Thus, the CAD model is merely a snapshot of the model at a specific dimensional state.

This often creates a conflict during the modeling process. If a part dimension is to be 1.023/1.018, for example, what will the modeled dimension be? Should the user simply average the two values? What about 1.000 + .005/-.000? Should this be averaged as well?

The problem of accurate, unambiguous part models is complex. This ambiguity represents another area where, in actual practice, the advertised dimensional associativity is compromised.

The extent to which physical objects can be accurately modeled determines the potential level of model/drawing associativity. When modeling an object, you must determine the level of detail that is appropriate to describe the object. There is often a wealth of geometric and non-geometric information that's contained in the drawing but not represented in the model.

Geometric information, such as bend radii, chamfers and draft angles are examples of geometry usually omitted on the model to expedite the design process and to minimize system response time.

Symbols placed on the body of a drawing actively control the permissible part variations. Variations in size, position and form that are specified symbolically have no geometric representation in the model.

These compromises exist in all CAD systems. Unfortunately, these requirements force the disassociation of the drawing geometry from the model geometry. After this is done, any changes made to the drawing won't be reflected in the model and vice versa.

Once smashed, most of the advantages of keeping the drawing information local to the parent file are lost. The only associativity that exists is due to the fact that the model and drawing are stored in the same file by default.

Because of these problems, complete model/drawing associativity is, at present, an unrealistic goal. This

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problem won't be solved until solids modeling fully matures. Now, solids models aren't revised easily and the level of modeling complexity along with the concomitant computing resources needs to be increased by several orders of magnitude. This may not occur for five to 10 years.

If we have to accept limited association between models and drawings, then the possibility of moving geometry outside the parent 3-D CAD system offers attractive alternatives.

Macintoshes can be used as 2-D drafting workstations working in conjunction with high-performance 3-D modeling systems running on VAX workstations, like the VAXSTATION II/GPX and the new VAXSTATION 8000. Today's solids modeling packages need this kind of performance. But for 2-D drafting, these workstations are too expensive.

Most CAD companies are beginning to offer more affordable 2-D drafting packages. Schlumberger (nee Applicon) has announced a drafting package called BravoDraft. Based on the VAXSTATION 2000, the unit cost of $20,000 is less than the typical $75,000 price of a CAD workstation. For around $10,000, though, a Macintosh II can be equipped with a color monitor, 2 MB of memory, a 2-D drafting package and an Ethernet board.

Most high-end 3-D packages provide the capability of generating 2-D views of the 3-D model. By using an interchange format such as IGES or DXF, this 2-D view data can be passed from the higher-performance 3-D packages down to the Macintosh drafting packages.

In addition to engineering data interchange, the connection to the VAX provides a way to eliminate local tape backup units using VAX-based AppleShare file servers, such as the recently announced Alisa Systems' AlisaShare and Pacer Software's PacerShare. Centrally stored data makes the job of data management much easier.

Most high-end 3-D packages provide the capability of generating 2-D views of the 3-D model.

DATA MANAGEMENT

THE PROBLEM OF engineering data management has been underestimated and overlooked. A general database is needed to handle more fundamental information.

One company, Sherpa, has developed an engineering data management system that runs on the VAX. Sherpa's DMS provides tools to track revision levels and history of CAD files, provide configuration management, control the signature and release procedures, handle engineering changes and control access to information.

The system is flexible enough to manage manually generated information. The CAD/CAM market has begun to realize that the control of meta-information (i.e., information about information) is as important as the information itself. This is an important role that an internetworked VAX can assume.

The VAX also can be a way to manage printing and plotting resources. Many CAD systems use the VAX's resources to format and queue CAD plots. Most of the Macintosh CAD packages support PostScript output, and therefore can print directly to Apple's LaserWriter.

With programs such as Alisa's DEC Printing (ADP) package, PostScript files also can be printed on DEC PostScript printers, the LN03-R and the PrintServer-40. With ADP, these printers are selected through the Macintosh Chooser. The PrintServer-40 is capable of printing B-size (11- x 17-inch) pages, but I'm not aware of any Macintosh program that currently takes advantage of this feature.

Larger-size output can be handled by pen plotters or electrostatic plotters that are attached to a VAX. Plot files created by Macintoshes or other CAD systems can be sent to the VAX for queuing. In the past, Macintosh applications have focused on the pen plotter for larger output.

But the same pen plotter plot files often can be sent to the electrostatic plotters as well because of their ability to emulate common plot file formats, such as Calcomp 925. Some users have developed PostScript converters for their particular plot format.

A more elegant solution would be the PostScript-equipped electrostatic plotter. It's ironic that even though Adobe's pioneering efforts in PostScript first were done on an electrostatic plotter, no such product is available today.

The marriage of the Macintosh with the VAX provides a synergistic effect in the engineering/CAD/CAM world. Much of the engineer's or designer's time is spent writing proposals, preparing schedules and on other non-CAD-related tasks. The Macintosh connected to a VAX provides an inexpensive but effective combination to bring engineering tools to the desktop. —*James K. Anders is senior software engineer at Computer Methods Corporation in Marlton, New Jersey.*

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PRODUCTS

Interlink Introduces The Missing Link

Interlink Computer Sciences Inc. has announced the SNS/937X, which provides a high-speed communications link between the IBM 9370 Information System and systems on a DECnet network. The SNS/937X software resides on the IBM 9370 Information System, which is connected to Ethernet.

Users can transfer files transparently, send messages and share hardware resources and applications software across the IBM mainframe and DEC systems. SNS/937X features include support for the IEEE 802.3 IBM LAN Adapter, 128 simultaneous sessions, an operator interface for monitoring network activity and IBM- or DEC-initiated file transfer.

The standard SNS/937X package is priced less than $30,000. For more information, contact George Saupe, Interlink Computer Sciences Inc., 47370 Fremont Blvd., Fremont, CA, 94538; (800) 422-3711.

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Network Systems Announces HYPERchannel

Network Systems Corporation has announced its HYPERchannel-DX series, a new generation of computer-networking products that makes possible "networks of networks" that incorporate industry standards and accommodate different vendors' equipment, as well as different transmission media and protocols.

The HYPERchannel-DX architecture yields products with flexibility in three areas: performance, media and protocol. The initial HYPERchannel-DX products include units for supercomputers from Cray Research Inc., large IBM and plug-compatible mainframes and minicomputers from vendors such as DEC, HP and Data General.

Depending on options, prices range from $30,000 to $100,000.

For more information, contact Gerald K. Hoppe, Network Systems Corp.,. 7600 Boone Ave. Minneapolis, MN 55428; (612) 424-4888.

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Tektronix Offers Real-Time Support

Tektronix Inc's new V1750A Software Integration System supports the PACE 1750A processor at 30 MHz with no wait states.

The Tektronix V1750A debugs software on the PACE1750 target system. This technique is effective in detecting subtle errors because the real-time environment is maintained as the software executes. The V1750A provides the control and monitoring capability while the software is executing in real time. It also has a built-in 1750A processor (optional) that allows the software to be tested on a target processor when the actual target system is unavailable.

The V1750A is priced at $33,500.

For more information, write on letterhead to Q Division Marketing, Attention: PACE 1750Ada, Tektronix Inc., P.O. Box 12132, Portland, OR 97212; (800) 245-2036.

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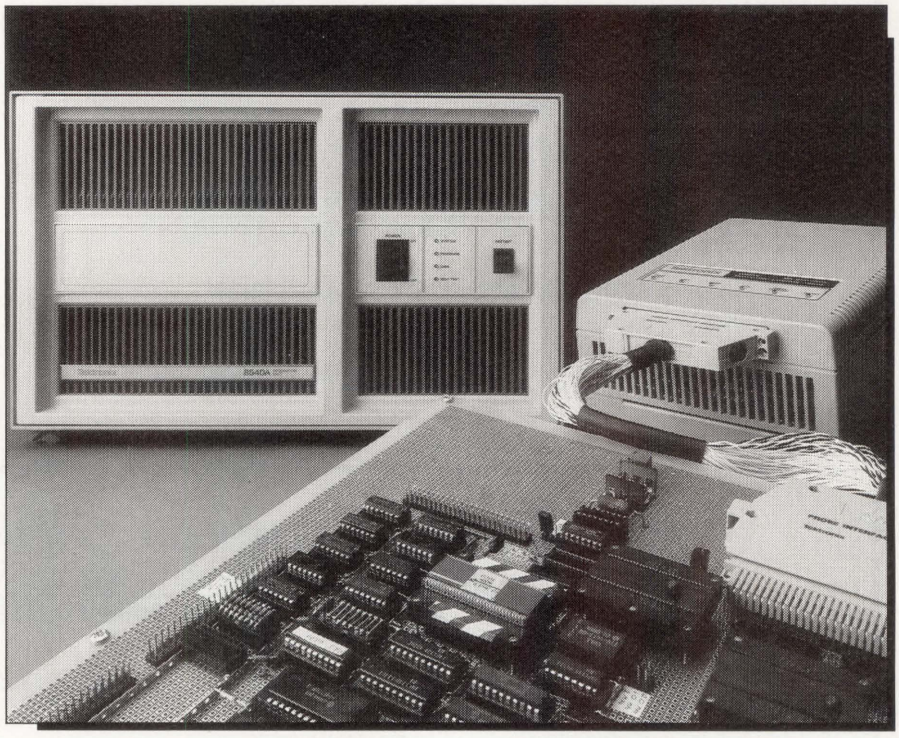

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For more information, contact Darcy Gray, RAXCO RABBIT Software, 2440 Research Blvd., Rockville, MD 20850; (301) 258-2620.

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Wellfleet Premiers First Products

Wellfleet Communications Inc. introduced its first high-performance LAN communications servers solving local- and wide-area interconnect problems for LAN users. A communication server functionality includes concurrent, multiprotocol N-way routing and bridging, fully integrated AT&T-compatible T1 connections and extensive T1 bandwidth management with voice integration.

The product line includes two full-function servers, the Link Node (LN) and Concentrator Node (CN). The LN supports the requirements of small- to medium-sized networks and, in larger configurations, operates as a remote node interconnected with other Wellfleet nodes. The CN supports the extensive interconnect requirements of large networks.

Prices for the LN begin at $10,800 and the CN begins at $16,000.

For more information, contact Kristi Furrer, Wellfleet Communications Inc., 12 DeAngelo Dr., Bedford, MA 01730-2204; (617) 275-2400.

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VT340 Capabilities Added To VT240 Emulator

KEA Systems Ltd. has added key VT340 features to V2 of ZSTEM 240 and the Powerstation 240. Highlights include full VT340 resolution and 16-color capability, extended KERMIT support and increased network capabilities.

ZSTEM 240 emulation software is $295. The Powerstation 240 package with the standard keyboard is $435 or with the gold-labeled keyboard for WPS word processing is $465.

For more information, contact Danielle Galbraith, KEA Systems Ltd., 2150 West Broadway, Ste. 412, Vancouver, BC, V6K 4L9; (604) 732-0715.

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The RACE-ARRAY Is RA Compatible

EXSYS Storage Systems has introduced the RACE-ARRAY, a disk storage array of one-to-four drives, with data rates of 1.8 MB/sec and a formatted capacity from 280 MB to 2.2 GB per single SDI connection. By configuring more than one drive per SDI port, the EXSYS RACE-ARRAY lets users increase their storage limits without increasing their controller connections and the associated cost.

The EXSYS RACE series can be attached directly to all DEC DSA controllers, eliminating space and cabling requirements. Find out more by contacting EXSYS Storage Systems, 1340 Tully Road, San Jose, CA 95122; (408) 292-0343.

Circle 562 on reader card

Kinetics Claims Direct Connection

Kinetics Inc. has announced A/UX support for the EtherPort II, an Ethernet adapter card for the Macintosh II. The EtherPort II in a Macintosh II continues to support diverse networking protocols under the Macintosh Operating System, including TCP/IP, DECnet, OSI and AppleTalk. Macintosh II users running A/UX now can connect their systems directly to an Ethernet network, which provides a high-speed connection for Internet Protocol (IP) communications.

More information is available if you contact Tom Cromelin, Kinetics Inc., 2540 Camino Diablo, Walnut Creek, CA 94596; (415) 947-0998.

Circle 563 on reader card

Emulex Introduces MicroVAX Controllers

Emulex Corporation has introduced a new family of high-performance disk and tape controllers for the MicroVAX 3500/3600. The quad-size, Q-bus boards include the QD34 and QD24 disk controllers, which support SMD/E and ESDI interface, respectively, and the QT14 tape controller with TSV05 and TMSCP emulations.

Conforming with the revised Q-bus packaging used by DEC in the MicroVAX 3500/3600, the three new boards are equipped with a MicroVAX 3500/3600-compatible handle, which replaces the "rabbit-ear" arrangement used on traditional Q-bus boards.

Prices are $2,495 for the QD34, $1,795 for the QD24 and $1,395 for the QT14.

Learn more by contacting Katrina Adney-Leslie, Emulex Corp., 3545 Harbor Blvd., P.O. Box 6725, Costa Mesa, CA 92626; (714) 662-5600; outside CA, (800) EMULEX 3.

Circle 502 on reader card

Transitional Debuts Tape Subsystem For Mac

Transitional Technology Inc. has a new Macintosh-compatible version of its CTS-8 cartridge tape subsystem. The CTS-8/M brings to Mac users the same 8mm, helical

scan technology that TTI has been supplying to VAX users since last year. The growing family of CTS-8 subsystems now includes versions for the VAX, MicroVAX and Macintosh.

The CTS-8 subsystems employ the latest helical scan technology, allowing up to 2.3 GB of data to be stored on an inexpensive 8mm video cassette. The CTS-8 family of products provide functionality not previously available.

Pricing for the CTS-8/M is $4,995. For more information, contact Matthew Goldbach, Transitional Technology Inc., 1401 N. Batavia, Ste. 204, Orange, CA 92667; (714) 744-1030.

Circle 503 on reader card

Reflection 4 Emulates VT241 Terminal

Walker Richer & Quinn Inc. is shipping Reflection 4, its latest terminal emulation product. Reflection 4 emulates the VT241 and VT340 ReGIS graphics commands and has the same features as Reflection 2: command language, total keyboard remapping, Tektronix 4014 monochrome graphics emulation, multitasking, 132-column mode and proprietary file transfer to VAX/VMS and UNIX/ULTRIX hosts. Reflection 4 also transfers files via KERMIT and XMODEM.

Reflection 4's PLUS option adds file backup, restore capabilities and LAN support.

Upgrade information is available by dialing (800) 8PC-2VAX. Current users can upgrade to Reflection 4 and 4 Plus for $100. The retail price of Reflection 4 is $299, Reflection 4 Plus is $349.

Walker Richer & Quinn is located at 2825 Eastlake Ave. E., Seattle, WA 98102; (206) 324-0350.

Circle 504 on reader card

American Management Enhances V-X MASTER

American Management Company Inc. has announced V1.4 of the V-X MASTER family of system products. The new release includes major enhancements to the existing Operations Management and Menu Management systems and includes an additional module, the VMS Reporting & Analysis system (RAS).

RAS allows the system manager to monitor and access information from VMS system files for performance management, security management, user management and disk management. It includes three components: standard reports, a reporting language and a screen-based report builder.

AMC offers V-X MASTER in two versions. V-X MASTER II includes all three modules and is used by system managers to improve operations and offload routine functions to less-experienced operators. It also can be used to assist in managing remote sites. V-X MASTER I includes a subset of the three modules and is designed for new and part-time system managers.

For more information, contact J. Michael Cline, American Management Co. Inc., 420 Bedford St., Lexington, MA 02173; (617) 861-6262.

Circle 511 on reader card

Consulting Firm Announces VAX/VMS Training

Bernstein & Associates Inc. (B&A), a full-service VAX/VMS training and consulting firm, announced "Performance Education."

Customers receive a free memory tune-up by ordering their main memory upgrade with any of B&A's VAX/VMS courses, in-

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cluding BUILD-A-COURSE. The tune-up is done while a B&A consultant is teaching the course at the customer's site.

Also included is a copy of B&A's Working Set Adjustment module.

Bernstein & Associates sells DEC, EMC and Clearpoint memories.

For more information, contact Bernstein & Associates Inc., 3 Dunwoody Park, Ste. 103, Atlanta, GA 30338; (404) 392-1488.

Circle 505 on reader card

INGRES Breaks 100 TPS Barrier

Relational Technology Inc. has announced that its INGRES RDBMS, running on a Sequent Symmetry system, has broken the 100 transactions per second (TPS) barrier. INGRES performance was rated at 104.4 TPS, with 95.4 percent of all transactions completed in one second or less.

INGRES' multiserver architecture capitalizes on parallel processing for multiprocessors and networked systems. At $8,500/TPS initial cost and $12,900/TPS with maintenance, INGRES running on a Sequent Symmetry system offers its users low cost per TPS.

For more information, contact Relational Technology Inc., 1080 Marina Village Pkwy., Alameda, CA 94501-9891; (800) 4-INGRES.

Circle 506 on reader card

Nastec's RTrace For Requirements Management

Nastec Corporation recently announced RTrace, a complete requirements management facility. RTrace provides development managers with tools to manage complex systems development based on system requirements. RTrace is suited to DoD STD 2167A, but it can be used with any life cycle methodology in government, civilian or private industry development.

RTrace isn't limited to computer software or hardware development. Any development project that must meet a set of requirements and document compliance can use RTrace; i.e., everything from accounting systems to submarines.

RTrace runs on VAX/VMS 4.6 or higher with a minimum of 60,000 free blocks and 4 MB of memory. RTrace supports cluster configurations and can be installed to take advantage of multiple disks.

The single-copy price for a MicroVAX 2000 is $30,000.

For further details, contact Judy Smiley, Nastec Corp., 24681 Northwestern Hwy., Southfield, MI 48075; (313) 353-3300.

Circle 507 on reader card

Talaris Introduces NetPrint And Terminal

Talaris Systems has developed a network inquiry program, NetPrint, that works in conjunction with T-LAP-Ethernet, the VAX/VMS Ethernet connection for Talaris Printstations. NetPrint allows users and system managers to learn the status of Printstations on Ethernet queues. NetPrint can tell users which Printstations are busy, which ones are available, and if there's one that's reporting an error, such as a paper exit jam or lack of paper. This program is provided free to purchasers of T-LAP-Ethernet.

The Talaris 7600, a low-priced composite previewing terminal, is similar to the Talaris 7800. The Talaris 7600 terminal provides bit-mapped display with 1024 x 780 pixel resolution, and high-speed graphic and alphanumeric display. It's customized for VAX/VMS sites using TEX. The terminal is priced at $1,995.

Further information can be obtained from Janice Hall, Talaris Systems Inc., P.O. Box 261580, San Diego, CA 92126; (619) 587-0787.

Circle 508 on reader card

Power Techniques Adds German Controllers

Power Techniques announces the addition of German receptacle power controllers to the standard line of single-phase power controllers. This accommodates both German equipment with German plugs, allowing for use of any American equipment without modification.

The unit has four shucko 16A 250-Volt controlled receptacles and two nema 6-20 receptacles; one is controlled and the other is unswitched. The controllers include three DEC-compatible remote I/Os for remote on/off control and emergency shutdown, and offer the option of adding a fourth remote I/O for daisy chaining of multiple controllers.

Controllers in the PT 2000E-GER series are provided with a dual-pole 20/20 circuit breaker for overload protection and as a master on/off switch. It also has a switch for local and/or remote on/off control. The PT 8740-GER series has a three-pole 20/20/30 circuit breaker and the same on/off controls. To learn more, contact Kay Trimm, Power Techniques Inc., 40 Aero Camino, Goleta, CA 93117; (805) 685-0533.

Circle 510 on reader card

SI Debuts Integrated Storage Subsystems

System Industries Inc. has announced its Micro Power Pac family of MicroVAX II- and MicroVAX 3000-compatible subsystems packaged in DA123 cabinetry. The subsystems are available in storage configurations of S156 and S157 Disk Modules in both fixed and removable chassis and SI59 Cartridge Tape Systems.

The new MicroVAX-compatible subsystems can store up to 2.4 GB formatted, 3.04 GB unformatted. A typical package would provide 2 GB of integrated cartridge tape capacity, which permits unattended backup.

For more information, contact Ron Carlini, North American Marketing System Ind., 560 Cottonwood Dr., Milpitas, CA 95035; (408) 432-1212.

Circle 512 on reader card

RAF Supports DEC's DEPCA Ethernet Card

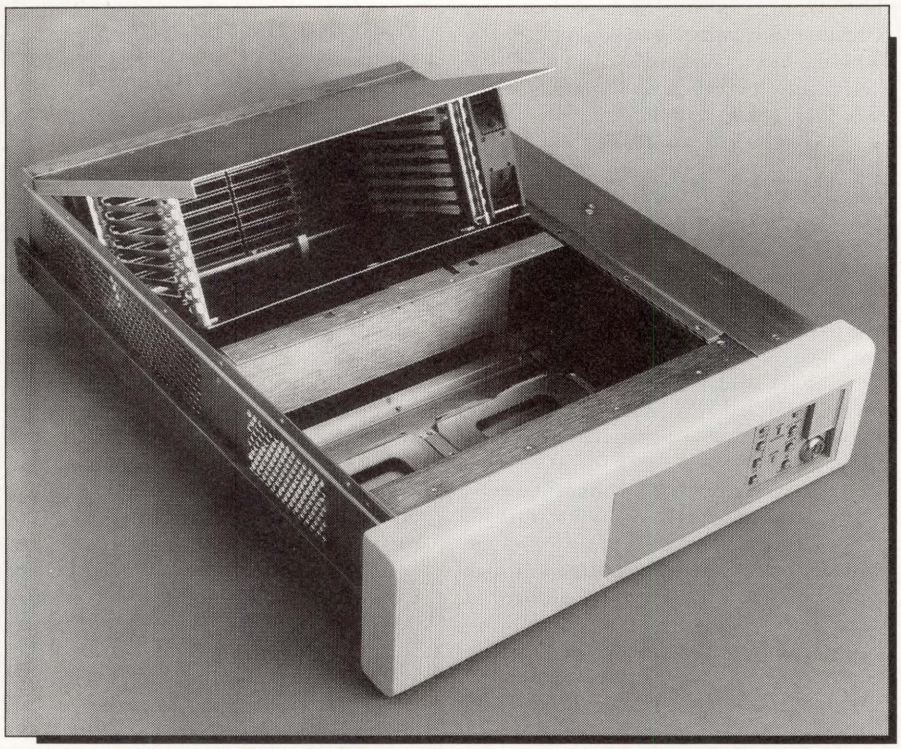
Datability Software Systems has announced support for the DEPCA Ethernet Card, which is included in V1.9(5) — a release to Remote Access Facility (RAF). It also can transfer data at great speeds, when compared to current DEC software solutions.

Enhancements in V1.9(5) include a menu program, 132-column emulation and international keyboard support.

RAF is a PC-to-host integration system that lets PC users access and use the processing power of a remote VAX without any knowledge of remote computer commands. Using RAF, PCs are able to communicate over Ethernet at speeds of over 100,00 cps or asynchronously at speeds up to 19,200 baud.

The cost for RAF is $395 per PC and $395 per host, or the user has the option of purchasing an unlimited host master license. For further information, contact Datability Software Systems Inc., 322 Eighth Ave., New York, NY 10001; (800) 342-5377, in NY, (212) 807-7800.

Circle 513 on reader card



The DA 23 system enclosure from TRIMM Industries.

New System Enclosures Unveiled By TRIMM

The TRIMM DA 23 is a Q-bus-compatible, 5¼-inch system enclosure offering advantages over the DEC BA 23. A 350-watt cps offers the integrator more power to drive DEC-compatible modules.

Chassis slides, tilt-up and locking card-cage greatly enhance the serviceability of the enclosure.

CD and Q22 backplanes are available, and other standard features include DEC-compatible slide plates for mounting two 5¼-inch peripheral devices, I/O panel with A-, C- and D-size module openings and bridges, allowing up to five B-size openings. A full-featured control console offers all Q-bus functions plus two write protect/ready switches, disk access indicator, key-activated power switch with system security position, advanced cooling with audible thermal protection alarm and power supply voltage monitoring with indicators.

I.E.C. multiple-voltage AC input and remote on/off connector enhance system use. The DA 23 represents an economical solution for MicroVAX and Micro-11 integrators. For further information, contact Phil Drachman, TRIMM Ind., 11949 Sherman Rd., North Hollywood, CA 91605; (800) 423-2024.

Circle 509 on reader card

New Unisys Line Provides DEC Emulation

Link Plus Inc. has announced the MC 27, an alphanumeric terminal designed to be used with Unisys/Burroughs computer systems. It also can be configured with a DEC VT220 emulation to allow the unit to be connected simultaneously to both Burroughs and DEC systems while the operator accesses each through separate windows on the display screen.

The list price of the MC 27 is $895. The optional VT220 emulator is priced at $125. List price for a similar unit as offered by Unisys is $1,395.

For complete information, contact Link Plus Inc., 47343 Warm Springs Blvd., Fremont, CA 94539; (415) 683-5304.

Circle 514 on reader card

386WARE ULTRIX Version Gives IBM PC Access

Logicraft Inc. has released an ULTRIX version of its 386WARE DOS server. 386WARE now enables VT terminals and VAXstations running under ULTRIX also to run IBM PC software, in addition to storing the DOS files and programs on the VAX hard disk to ensure data backup and security.

The heart of 386WARE is the high-speed, 32-bit 80386 microprocessor that enables VT terminals to run PC software up to five times that of an IBM PC AT.

386WARE is offered at $9,995 for four simultaneous users and $15,995 for an eight-user system. Pricing includes all the hardware and software needed to add PC capability to your DEC system.

For complete details, contact Jennifer Tyrrell, Logicraft Inc., 22 Cotton Rd., Nashua, NH 03063; (603) 880-0300.

Circle 517 on reader card

Cognos Adds Screen Painter To PowerHouse

Cognos Incorporated has added a screen painter, enhanced performance and increased functionality to its latest version of PowerHouse. PowerHouse 5.08, released for the VAX line of mid-range computers, lets users design and modify PowerHouse screens using function keys.

The screen painter integrates seamlessly with PowerHouse. A single command, PAINT, activates the screen painter subsystem, and it can be used to build a screen from a default layout or to modify an active screen.

PowerHouse 5.08 supports RMS Journaling, a DEC product that features three journaling types. Any one of these can be used with any file in a PowerHouse application. This new version also has been tested and is compatible with VMS 5.0.

Further information is available by contacting Pierre Viau, Cognos Inc., P.O. Box 9707, 3755 Riverside Dr., Ottawa, Ontario K1G 3Z4; (613) 738-1440.

Circle 518 on reader card

HYPER-CACHE For The PDP Increases 11/70 Power

Digital Data Systems Inc. and SETASI Research and Development have announced HYPER-CACHE, their third enhancement product for PDP-11 systems.

HYPER-CACHE replaces cache modules presently in the PDP-11/70 system. Used in conjunction with the PEP-70, HYPER-CACHE dramatically increases PDP-11/70 performance. As an example, the combination of the PEP-70 and the HYPER-CACHE, in a RSTS operating system has improved performance reliably by up to 65 percent. These products are 100 percent compatible with all operating systems with slight performance-factor variation. The PEP-70, HYPER-CACHE and the UEP increase bus bandwidth, providing for a faster system at the application level.

To learn more, contact Digital Data Systems Inc., 1551 N.W. 65th Ave., Ft. Lauderdale, FL 33313; (305) 792-3290.

Circle 519 on reader card

TRW System Exerciser Provides Extra Security

TRW Information Systems Group has developed a security program for MicroVAX II users who work with highly sensitive data. The program, TRW DECLASS, will be included as an enhancement to TRW's M.T.P. online system exerciser now available to MicroVAX II system managers and maintainers. The program also will be offered as a separate module.

The TRW DECLASS program gives system managers increased data security by providing the ability to repeatedly overwrite the system's main memory on command. Because TRW DECLASS is invoked in standalone mode only, users can't inadvertently destroy data. Also, secondary memory devices, such as disks and tapes, totally are unaffected by this program.

Prior purchasers of the TRW M.T.P. system exerciser who subscribe to TRW's update service will be receiving the TRW DECLASS product in a future update. New TRW M.T.P. packages also will include the program. TRW DECLASS is also available as a separate utility for $300 per CPU.
For more information, contact TRW Information Systems Group, 15 Law Dr., Fairfield, NJ 07006; (201) 575-7110.

Circle 515 on reader card

System 1032 Supports VMS Version 5.0

CompuServe Data Technologies has announced support of VMS version 5.0. Because of its design, System 1032 customers will take full advantage of the symmetric multiprocessing (SMP) capabilities and performance gains provided with the VAX 6200 systems and the VAX 8800 multiprocessor systems.

Users running on different processors share a single area of memory that tracks record access. System 1032 uses its detached process only when users concurrently access the same data value.
For more information, contact Leslie Scott, CompuServe Data Tech., 1000 Massachusetts Ave., Cambridge, MA 02138; (617) 661-9440.

Circle 516 on reader card

ERI Training To Hold VMS V5 Two-Day Seminars

ERI Training is conducting a tour of two-day seminars covering the VMS V5 upgrade. The speakers at the V5 Seminars promise to deliver a candid, objective, no-holds-barred picture of V5.

The seminars are being held into 1989 in major U.S. cities. They address system managers, system programmers, application programmers and system analysts in a detailed and wide-ranging survey of the impact of the V5 upgrade. Complete coverage is provided of the upgrade, from new DCL commands and system services enhancements to symmetric multiprocessing, new network management features and more.

The speakers are Bill Hancock, director elect, DECUS/United States; Robert Branchek, vice president of training, ERI; Philip Lovecchio; and John Juliano. All have worked as trainers for DEC, giving them a unique insider/outsider perspective.

Tuition is $595. For schedules and locations, contact Robert Russo, Essential Resources Inc., 462 Broadway, New York, NY 10013; (212) 334-1240.

Circle 523 on reader card

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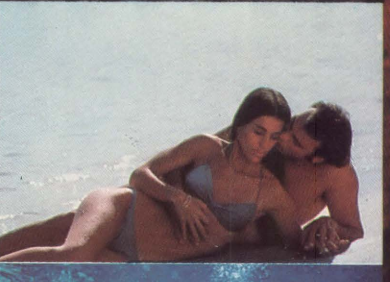

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VMacS Connects Macintosh To VAX

White Pine Software has announced V2.0 of its Macintosh-to-VAX connectivity package, VMacS. VMacS, a VAX file transfer application, lets Mac users with a terminal emulator store and share files on VAX. Once on the VAX, VMacS converts Macintosh files in MacWrite or Microsoft Word format to VMS text files.

VMacS gives Mac users the file sharing capability, storage capacity, and file protection and security of the VAX. V2.0 provides KERMIT protocol support for 7-bit file transfer in addition to the 8-bit protocol XMODEM already supported. This lets users send files through a variety of communications equipment, such as terminal servers, multiplexers and modems that support only 7-bit data.

VMacS V2.0 is priced at $399 for a single-user license and $999 for a multiuser license.

To learn more, contact Scott Darling, White Pine Software, 94 Rt. 101A, P.O. Box 1108, Amherst, NH 03031; (603) 886-9050.

Circle 580 on reader card

Odesta Provides Data Analysis For Mac

Odesta Corporation has introduced Data Desk Professional, a data analysis and graphics software program that runs on the Macintosh. Data Desk Professional provides an icon-based, Macintosh-like desktop environment, featuring advanced statistical procedures, interactive graphics and built-in expert guidance for the process of data analysis.

With Data Desk Professional, you can analyze data directly from databases created with Odesta's Double Helix II database management system without first having to export that data, as well as data from spreadsheets, other PC databases and mainframe-originated ASCII files. Data Desk also can be used to analyze VAX-based data brought to the Macintosh desktop with Odesta's Helix VMS.

Priced at $495, Data Desk Professional runs on the Macintosh Plus, SE and II PCs and is fully compatible with the Macintosh MultiFinder system.

For additional information, contact Stuart Cooke, Odesta Corp., 4084 Commercial Ave., Northbrook, IL 60062; (312) 498-5615.

Circle 521 on reader card

Pericom's VT340 ReGIS Emulator Enhanced

Pericom Inc. has introduced a new version of its MX7100 entry-level color graphics terminal with full 800 x 480 VT340 ReGIS resolution supporting up to 16 colors. Dubbed the MX7100R with a one-off, end-user price of $3,450, the new 14-inch screen product provides the full-feature list of the VT340 with the single exception of a dual-session mode.

The MX7100R retains a 640 x 480 resolution Tel 4207 emulation, displayed on a slightly reduced viewable screen area, as well as VT100/220/240 emulations with a choice of keyboards.

The MX7100R has an adjustable alpha screen format that allows you to select 24, 32 or 48 lines by 80 or 132 characters.

Support for DEC printers, such as the LN03 and LA50, is provided for the correct screen dump of graphic images. In Tek mode, up to 12 different printer drivers are available. For more information, contact Bill Tickner, Pericom PLC, The Priory Cosgrove, Milton Keynes MK19 7JJ; 44 908 560022. 08

Circle 525 on reader card

VT330/VT340 Emulation From C.Itoh Electronics

C.Itoh Electronics Inc. has introduced the CIT334 monochrome and CIT344 color graphics terminals, which provide VT330 and VT340 emulation. They also work with DEC's Session Support Utility (SSU), making it possible to connect to two sessions over a single wire simultaneously.

Compatible with all DEC graphics software applications, the CIT334/344 terminals support Tektronix 4010/4014 and ReGIS and sixel graphics protocols. The CIT344 can display 16 user-selected colors from a palette of 256,000 in each of its two windows. An RGB option is available for external monitors or hard copy output.

To find out more, contact Marc Liebesman, C.Itoh Electronics Inc., 2505 McCabe Way, Irvine, CA 92714; (714) 660-1421.

Circle 522 on reader card

Simpact Announces Support For MicroVAX III

Simpact Associates Inc.'s line of high-performance, Q-bus-compatible, data communications interfaces is available for the MicroVAX 3500 and 3600. The performance and backplane efficiency of Simpact's multiport interfaces provide MicroVAX III users with cost-effective solutions to communications requirements.

The platform for the interfaces is the ICP1622T, a functionally equivalent repackaging of the ICP1622S communications front-end processor. Introduced with the new processor is a full compliment of distribution panels, shielded cables and a standalone distribution box that supports up to 16 independent communication lines. Rounding out the offering is a MicroVAX III-compatible 12-port expansion module.

Simpact's standard software protocol packages that execute on the new ICP1622T include HDLC, SDLC, ADCCP, DDCMP, X.25, DDN, BSC and MAP. Custom protocols, previously programmed for Simpact's ICP1622S by Simpact or its customers, can be ported to the ICP1622T without change.

The price of the ICP1622T is $4,500. More information is available, by contacting Tom Stockey, Simpact Associates Inc., 9210 Sky Park Ct., San Diego, CA 92123; (619) 565-1865.

Circle 524 on reader card

Alisa Provides Support To Server, Gateway Family

Alisa Systems Inc. has entered into a cooperative development relationship with Microsoft Corporation, aimed at producing a VAX/VMS-based server and gateway family for Microsoft Mail, the electronic mail package for Apple Macintosh systems. Alisa also has been selected by Microsoft as its VAR for the VAX/VMS market and will sell and support both the Alisa server/gateway family and Microsoft Mail client software for the Macintosh.

Electronic mail currently is enjoying a broad expansion in the micro and mini arenas. The integration of an award-winning Macintosh mail system with DEC's mail systems provides users in both communities with expanded service and convenience. Also, DEC's MailBus provides links to MCI Mail and X.400, and these services will be made available to Microsoft Mail users via Alisa's products.

For more information, contact Alisa Systems Inc., 221 E. Walnut St., Ste. 175, Pasadena, CA 91101; (818) 792-9474.

Circle 528 on reader card

SPSS Products Available For VAX 6200 Series

SPSS Inc.'s family of data analysis, statistical, forecasting and presentation software is available for the VAX 6200 Series.

SPSS-X is a data analysis software package for mainframes and minicomputers, with a set of advanced statistical procedures for business and scientific research. Applications include marketing research, product testing, health care analysis and statistical quality control.

SPSS-X performs sophisticated data analysis, either interactively or in a batch mode. It includes a macro facility that easily allows users to create their own SPSS-X commands and specifications to accomplish complex or repetitive tasks. Also, an ALL-IN-1 version of SPSS-X is available, which provides users with the ability to use SPSS-X as a layered ALL-IN-1 product or as a VMS application.

For further information, contact Jeff Wiss, SPSS Inc., 444 N. Michigan Ave., Chicago, IL 60611; (312) 329-3500.

Circle 529 on reader card

Summus Releases GigaTape 1000 JBL

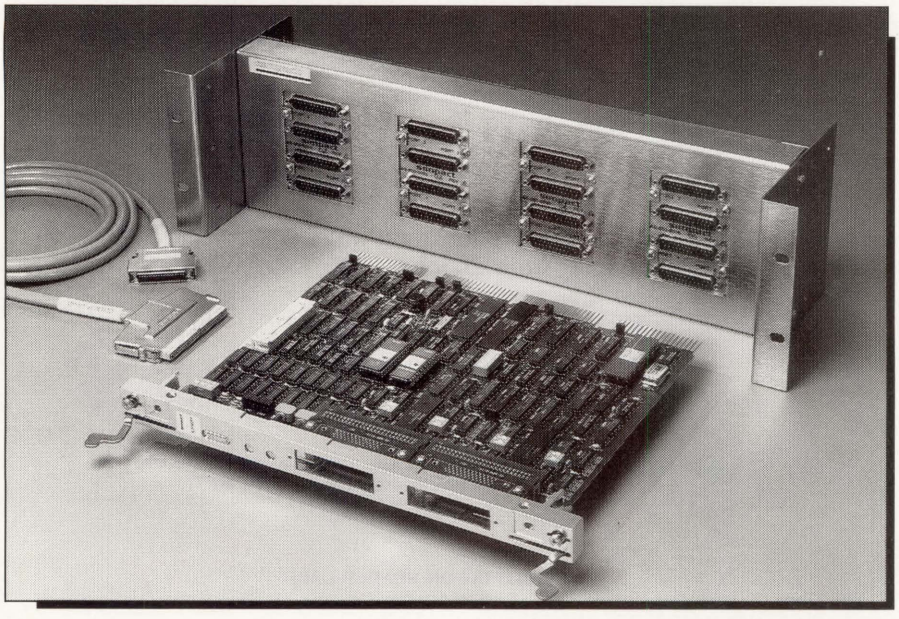
Summus Computer Systems has announced GigaTape 1000 JBL, a mass-storage subsystem combining 8mm helical-scan recording technology with an auto-load "jukebox" that allows random access to 1 terabyte of digital data in a standard NEMA 19-inch rack.

This subsystem can be configured in many capacities, ranging from 120 GB (occupying a 7-inch front panel of a 19-inch rackmount) to multiple terabytes. It's available with host adapters that are compatible with Q-bus, UNIBUS and BI architectures, VME and Multibus. An Ethernet adapter compatible with DECnet and TCP/IP protocols is being developed to support network server applications.

List price for the GigaTape 1000 JBL subsystem, including a 2-MB data cache, the Terabyte Librarian, and a DEC BI host adapter, is $192,000.

To find out more, contact Summus Computer Systems, P.O. Box 820549, Houston, TX 77282-0549; (800) 255-9638 or (713) 589-9772.

Circle 531 on reader card



Simpact's hardware supports the MicroVAX III.

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MAX 331

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Lanpar Fills The Gap.

Nobody understands DEC better than Lanpar.

In fact, Lanpar has over 10 years experience as DEC's largest Canadian distributor. Our overall experience as an innovative product designer and manufacturer of DEC compatible terminals is so well recognized, that other manufacturers have often come to us to help them improve and debug their own DEC compatible terminals.

That's why, in 1985, we quietly began designing the next generation of video displays—the MAX family of DEC compatible terminals.

New Product #1

The new MAX 331 fits neatly into the gap in DEC's own product line, giving 100% DEC VT330 compatible graphics, with features such as:

- 800×500 resolution
- Full ReGIS, Tektronix 4010/4014, and SIXEL compatible graphics for integrating text and graphics
- Flat 14-inch screen.

Plus, we've significantly improved on the user interface in set-up by featuring:

- User-friendly pop-up option menus
- Easy-to-use function key editor/loader
- Plus, an on-screen status line Time and Date display.

The MAX 331 is ideal for users who need truly compatible VT330 graphics—including features such as Polygon Fill, Interactive Mode/Cursor Enhancements, and National Character Replacement Set support.

MAX 331 has it all, filling the gap between DEC's VT320 and VT330. It gives VT220/320 users an opportunity to add graphics while maintaining DEC standards. But without paying the VT330 price.

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CIRCLE 323 ON READER CARD

Synercom Announces PC-Interface System

Synercom Technology Inc. has released its INFORMAP Windows Station (IWS), a software system that interfaces its geo-relational IMS, INFORMAP, to the PC environment.

The IWS interface is implemented under Microsoft Windows as an extension of the PC MS-DOS environment. The system can be run on any IBM PC, or compatible PC or IBM PS/2 that supports Microsoft Windows. Features are windowing, cooperative multitasking and relative graphics device independence. The IWS includes a title bar with system menu box, menu bar, graphics area and icon area.

The IWS software user can perform INFORMAP inquiry and editing functions and can access other corporate databases from the PC as with a standard INFORMAP graphics workstation. In the IWS/PC environment, INFORMAP resides at the host VAX. The IWS runs in conjunction with SWIFT, a Synercom-developed, host-based process that improves system performance by reducing the time involved in transmitting data from the host to the PC and in graphics transformation operations.

For more information, contact Synercom Technology Inc., 2500 City West Blvd., Ste. 1100, Houston, TX 77042; (713) 954-7000.

Circle 530 on reader card

Printronix Announces P3040 Matrix Printer

Printronix Inc. has announced that its P3040, a 400-lpm matrix line printer, is available for distribution through the Printronix exclusive distributor network.

The P3040 offers printing versatility, including speeds ranging from 175 to 400 lpm, a wide selection of character styles and pitches that can be intermixed on the same print line and the ability to handle forms of up to 80 pounds, as well as multipart forms of up to six parts.

The P3040 features both serial and parallel interfaces, eliminating the cost of an add-on interface board. An auto-ranging power supply automatically adjusts to the proper voltage for easy installation worldwide.

The list price for the P3040 is $4,750 including pedestal and paper tray.

For further information, contact Jill Green, Printronix, 17500 Cartwright, Irvine, CA 92714; (714) 863-1900.

Circle 532 on reader card

New Rollaround Cabinet Offers DEC Compatibility

Everest Electronic Equipment recently offered its unshielded MicroSystems Rollaround cabinet, compatible with DEC's BA123 World Box and designed to accommodate multiple configurations for disk subsystems expansion and system integration applications.

Equal in height but wider and deeper than the DEC unit, the Everest Rollaround provides ample space for optional 5¼-inch and 8-inch disk drive mounting kits as well as any rackmountable 5¼-inch, vertically mounted chassis such as a DEC BA23 box.

Everest also will customize the Rollaround cabinet to meet specific requirements. For more information, contact Barry Holman, Everest Electronic Equipment Inc., 1800-G MacLeod Dr., Lawrenceville, GA 30243; (404) 995-8688.

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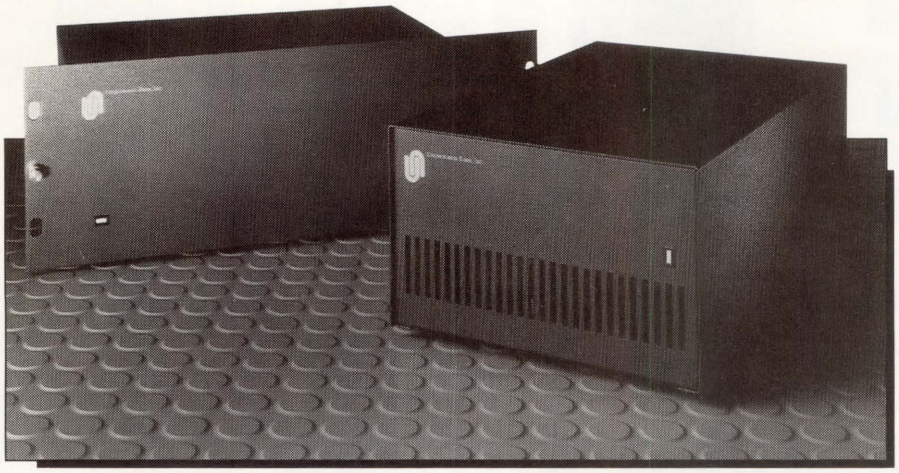

The Net/One NIU-DHS from Ungermann-Bass integrates PC network services into VAX environments.

Net/One Integrates VAX Environment

Users of Net/One networks now can access VAX systems asynchronously and as MS-Net disk and print servers, using Ungermann-Bass' new Net/One NIU-DHS network interface unit. The NIU-DHS ties together isolated workgroups with departmental VAXs, maximizing use of existing resources and facilitating network management.

The NIU-DHS allows a VAX host to act as a Net/One print and disk server, enabling PC users to access applications and large databases on the VAX using normal DOS commands. PC files are stored on VAX disks as virtual DOS disks.

The Net/One NIU-DHS is compatible with both Q-bus and UNIBUS-based VAX systems, providing seamless access to VMS-based applications. PCs emulating DEC terminals or VT100/200/300 class terminals connected through Ungermann-Bass terminal servers, such as the Access/One, NIU-180, or NIU-130 can gain full access to the VAX/VMS environment.

For more information, contact Barb Tobias, Ungermann-Bass Inc., 3900 Freedom Cir., Santa Clara, CA 95052; (408) 496-0111.

Circle 535 on reader card

ALPS Introduces DEC-Compatible Printer

ALPS America has introduced a DEC-compatible version of its 18-pin P2100 dot-matrix printer. The P2100/DEC is a high-performance replacement for any DEC 9-pin printer.

The P2100/DEC achieves a speed of 400 characters per second in draft mode and has a mean-time-between-failure rate of 5,000 hours.

The plug-in interface cartridge allows users with a variety of systems to configure the printer for IBM PCs and compatibles. The printer's 4K buffer is expandable up to 256K, which enables the P2100/DEC to store up to 128 pages.

This printer is available from all ALPS America dealers. The P2100/DEC is priced at $1,695. DEC interface modules for existing P2100 printers can be purchased for $295. More information is available by contacting Dennis Steele, ALPS America, 3553 N. First St., San Jose, CA 95134; (408) 432-6000.

Circle 534 on reader card

G2 Now Available For VAXstation 2000

Gensym Corporation has unveiled G2 on the VAXstation 2000, a real-time expert system product that focuses on the low-end and midrange deployment of real-time expert systems. This version functions identically to other G2 versions and application-specific knowledge bases can be transferred easily from one machine to another as desired.

G2 previously was established as a product for large applications with up to several thousand rules and an equal number of online data inputs to monitor; it's presently being offered on larger VAXstations, as well as workstations from Sun Microsystems, Texas Instruments and Symbolics.

G2 on the VAXstation is priced at $18,000.

Contact Jim Neumann, Gensym Corp., 125 CambridgePark Dr., Cambridge, MA 02140; (617) 547-1962.

Circle 536 on reader card

Control Data Boosts Maintenance Offering

Control Data Corporation has introduced its ProAct Service Series, which will supply a user-based set of system management tools for VAX/VMS systems.

This introduction features the first two levels in the series, ProAct 1000 and 2000. This initial set of software tools will monitor system integrity, enhance system security and supply data for system performance analysis.

Both levels offer features, such as Programmable Thresholds, Command Procedure Activation, and an interface to DECTALK.

The ProAct Service Series can be used with a single standalone system or with multiple VAXs in network or cluster configurations.

Prices for ProAct 1000 and 2000 Services vary between five percent and 15 percent of the basic monthly maintenance charge.

More information is available from Patricia Williams, Control Data Technical Services, 1101 E. 78th St., Bloomington, MN 55420-1478; (800) 345-9903.

Circle 537 on reader card

DBMS Product Eases Porting Of Applications

Intelligent Industrial Systems Inc. has announced a database management product, IMAGE/VMS for users who will convert applications from HP 1000 minicomputers to VAX/VMS systems.

Faced with porting an application written in FORTRAN and using IMAGE/1000 as its database management system, from an HP 1000 to any VAX/VMS system, a developer can use the routines and subroutine library comprising IMAGE/VMS to effect conversion. IMAGE/1000 databases become RMS-indexed sequential files under VMS.

IMAGE/VMS provides routines to convert database schemata, build the new datasets and load DBBLD-formatted data files into the new datasets. All datasets and items retain their names and descriptions. The developer must choose the directories where the datasets will reside.

Learn more by contacting Harlan Arthur Hurwitz, Intelligent Industrial Systems Inc., 333 Meadowland Pkwy., Secaucus, NJ 07094; (201) 319-1200.

Circle 538 on reader card

AutoCAD Release 10 Offers 3-D Functionality

Autodesk Inc. has announced AutoCAD Release 10. The Autodesk Advanced User Interface (AUI) features pull-down menus and 3-D icons that step the user through program operation. The new User Coordinate System (UCS) feature helps make 3-D design an intuitive process for those familiar with AutoCAD's 2-D functionality.

With Release 10, any existing AutoCAD drawing entity can be used in 3-D. The package has been extended to include 3-D

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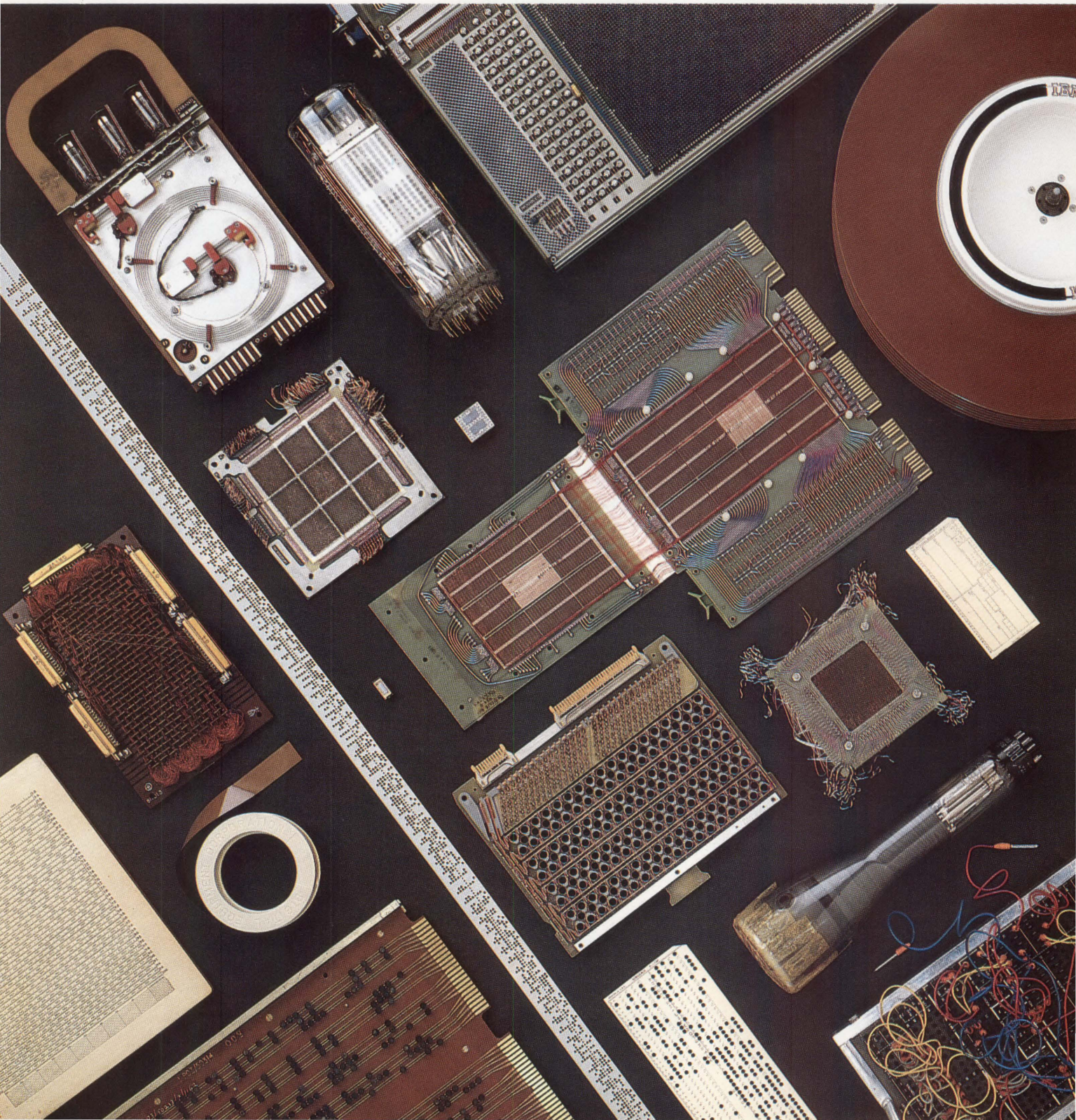

polylines, which allow for the creation of multisegmented lines that can be drawn anywhere in 3-D space.

Surface modeling features include 3-D meshes, 3-D surfaces of revolution, 3-D tabulated cylinders, 3-D ruled surfaces defined by two boundary curves, and 3-D Coons surfaces.

AutoCAD is available on the VAXstation II/RC/GPX and 2000 systems under VMS among others.

Release is priced at $3,000.

Find out more by contacting Malcolm Davies, Autodesk Inc., 2320 Marinship Way, Sausalito, CA 94965; (415) 332-2344, ext. 2822.

Circle 539 on reader card

Automotive EDI Software Is For VAX Computers

Birmingham Computer Group (BCG) has introduced Automotive EDI (ARS/FTS), a software communications program for VAXs. This program combines features that let automotive suppliers accept, monitor and schedule production component orders from the four major automobile manufacturers.

The software handles many variable transaction sets through the use of externally maintained tables. It's available as a standalone for the VAX. Variable record formats include material releases, advance shipping notices, purchase orders, purchase order acknowledgements, requests for quotes.

ARS/FTS costs $15,000.

For more information, contact Charles S. Townsend, Birmingham Computer Group, 400 W. Maple, Ste. 202, Birmingham, MI 48011-1492; (313) 540-0640.

Circle 548 on reader card

Optical Disk Drives Are For DEC, Mac II, PS/2

Laserdrive Limited has announced three optical disk drives for the Macintosh II, MicroVAX and IBM PS/2 environments. The write-once-read-many (WORM) optical disk subsystems include the model 820, 840 and 850.

All models connect to host systems via the SCSI bus. Each model provides 810 MB of storage capacity on each 5¼-inch removable cartridge and requires no modification to existing operating systems or application software.

Model 840 integrates with the MicroVAX II by connecting to the host computer's Q-bus via a standard SCSI host bus interface. The interface handles translation of MSCP bus commands to standard SCSI commands. The VMS operating system is fully supported.

The Model 820 is priced at $6,995. The

Model 840 is $9,495. The Model 850 is priced at $5,995.

Obtain more information by contacting Darrel G. McCollough, Laserdrive Ltd., 1101 Space Park Dr., Santa Clara, CA 95054; (408) 970-3600.

Circle 549 on reader card

TYX Announces ATE Software Tool

A software product that reduces the time and cost of ATE test program development and documentation has been introduced by TYX Corporation. The Test Diagram Generator, working within TYX's ATE-related system environment, creates detailed test diagrams from ATLAS (Abbreviated Test Language for All Systems) source programs. It shows the path of an electrical signal from the test equipment to the unit being tested, called the UUT (Unit Under Test).

The Test Diagram Generator creates both new and updated diagrams in final form at an average rate of six pages per minute. The system uses laser printers to create its output.

The Test Diagram Generator is available for VAX, HP 9000 and IBM PC/AT systems. For more information, contact Barry A. Schaeffer, TYX Corp., 1851 Alexander Bell Dr., Ste. 200, Reston, VA 22091-4345; (703) 264-1080.

Circle 550 on reader card

JLCS Announces Business Software

JLCS has announced V4.00 of its Business Management Software. JLCS Business Management Software is designed for manufacturing, distribution, construction and dental users.

The JLCS Base Module provides system security, multilevel password protection, record and file locking, multicompany support, ANSI color support and online Help and Explain functions. It also offers simultaneous forms and data printing with Talaris Systems laser printers, interuser mail, interfaces to popular word processors and spreadsheets, a report writer, communications and file transfer and automatic daily data backup.

Suggested list prices range from $750 (MS-DOS/PC-DOS packages) to $3,300 (VAX/VMS packages) per package. The dental management package ranges from $5,000 (MS-DOS/PC-DOS package) to $22,000 (VAX/VMS package).

More information is available by contacting J. Robin MacNab, J.L. Computer Systems Inc., 3403 Lancaster Ave., Wilmington, DE 19805; (302) 998-8030.

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In other words, "The COLORSCAN/2," according to Frank J. Derfler, Jr., editor of *PC Magazine*, "is an excellent solution to desktop clutter for any combination of PC, LAN-based and host-based applications."

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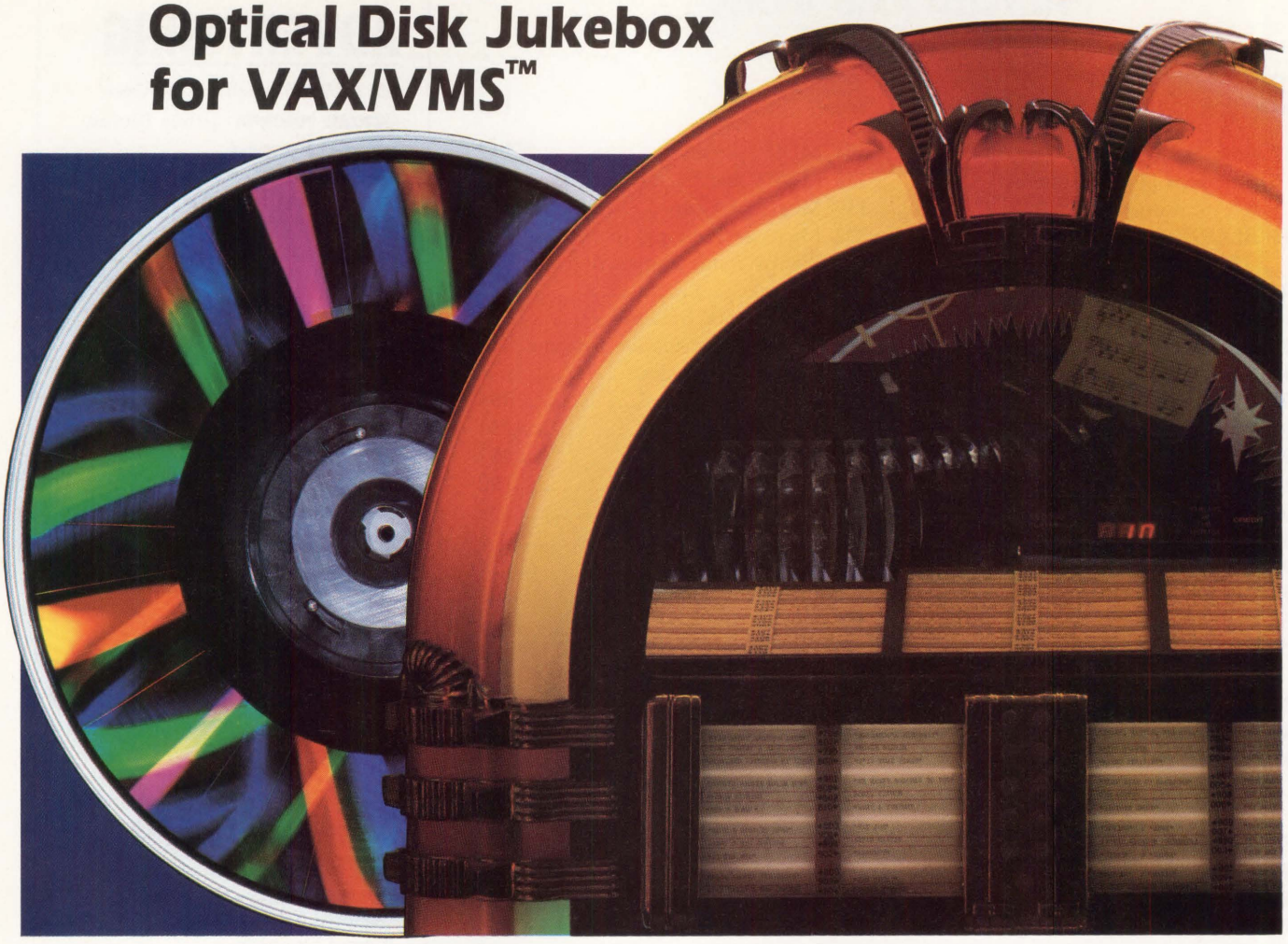

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BACK END

John C. Dvorak

Aliens And The OS/2 Connection

Being snatched by aliens is an inconvenience that nobody should have to endure. There's no legislation to protect you and it seems that our government doesn't want to fight these creatures.

I had just finished reading the book *Communion* and was certain I wouldn't have to tolerate an embarrassing abduction. After all, I never sensed any lifelong paranoia indicating that I was some sort of monkey in a never-ending experiment, as did the author of the book.

You can imagine my surprise when, last month, about five bug-eyed midgets barreled into my house and zapped me with some unknown paralyzing ray. They spirited me into a huge spinning spacecraft that hovered over the Berkeley Hills in California. Within minutes I was in deep space.

I figured I was a goner. Who knows what they'd do to me? Boy was I shocked when one of them entered the room and apologized. I wasn't sure what an old alien looked like, but I assumed he was old. He had a wizened look.

He opened the door to the stark white holding cell and spoke. "Mr. Dvorak, we'd like to apologize. Normally, we don't grab people like this unless there's a reason. Follow me please."

I followed the little guy (as if I had a choice) through a hallway leading into what appeared to be a conference room.

Everyone sat on smallish stools, and my guide led me to a larger seat. As I sat down, one of the aliens seated at the head of the large black table pointed some sort of remote control device that lit up a large screen on the wall opposite me.

Within seconds a projected image appeared of what looked like an enormous, somewhat depressing, alien office. On each desk was an IBM PC or compatible (I couldn't tell which brand).

The alien with the device turned to me and spoke. "Do you see all these machines? They're all XT-compatible clones. There are 100,000 of them. How in the heck are we supposed to go to OS/2? It's going to cost a fortune to upgrade all these machines to 286s! Why can't they upgrade our machines to go beyond the 640K barrier?"

I was shocked. Before I could speak, a creepy-looking alien sitting across from me stood up and motioned for me to say nothing.

Looking at the other fellow, he shook his head. "Mezmore, my friend, I told you this would happen when you signed the purchase order for these machines. Now you abduct idiots from Earth in a futile attempt to bail you out of a bad decision.

"It won't work. You and your foolish stooges will be banished for buying 100,000 XT clones when you should have waited and bought ATs. You saved what, a few thousand dollars? Meanwhile, you cost the Maldronians an edge in our battle against Blimpton. I hear that Blimpton bought 90,000 AT clones and 10,000 Macintoshes."

"This is insubordination!" screamed the other alien. "Sit down before I have you vaporized!"

The ugly fellow sat down. He motioned to me, indicating that I had the floor.

Just as I was about to speak, another alien jumped from his seat. He was a big fat alien, far larger than anyone else there. "UNIX," he shouted. "I told you all years ago to think UNIX. But does anyone listen to me? Noooooooo!"

The head alien was incensed. "Sit down and let the earthman speak!"

The fat alien sat down and angrily crossed his arms. The head alien looked at me and said, "Just how important is OS/2 to us?"

Nonplussed, I asked, "Exactly what do you use all those computers for?"

"Lotus and a little word processing," he said. "A lot of budgeting is done with those machines."

"First off, I'm a bit curious as to why your civilization, which sure seems advanced, doesn't make its own personal computers."

"Our government controls much of our commerce. Hundreds of years ago, it was determined that PCs were useless. It was written in a report submitted by the planetary MIS society. Needless to say, they were wrong, and now we import all our PCs from Earth. They go through Mexico."

I rolled my eyes. "OK. Well, since you're hardly overworking the machines, I think you'll be fine with the XTs for at least two more years."

"Good, then they'll be paid out."

"Lies!" shouted the ugly alien. He pulled out some sort of weapon and aimed it at me. As he pulled the trigger, the head alien drew fast and shot the weapon from the ugly guy's hand.

The ugly alien dropped to the floor, obviously wounded. He wept openly. "OS/2 now!" he sobbed.

I turned to the alien seated on my right, who had not said a word during the entire meeting. "What's his problem?" I asked.

He looked up at me. "He has a contract with Bantam to do an OS/2 book."

That's all I remember. Next thing I knew, I was on my couch waking up in the 14th inning of a televised Oakland-New York baseball game. Dave Henderson hit a homer to win in the bottom of the 14th. Score: Oakland 3, Yankees 2.

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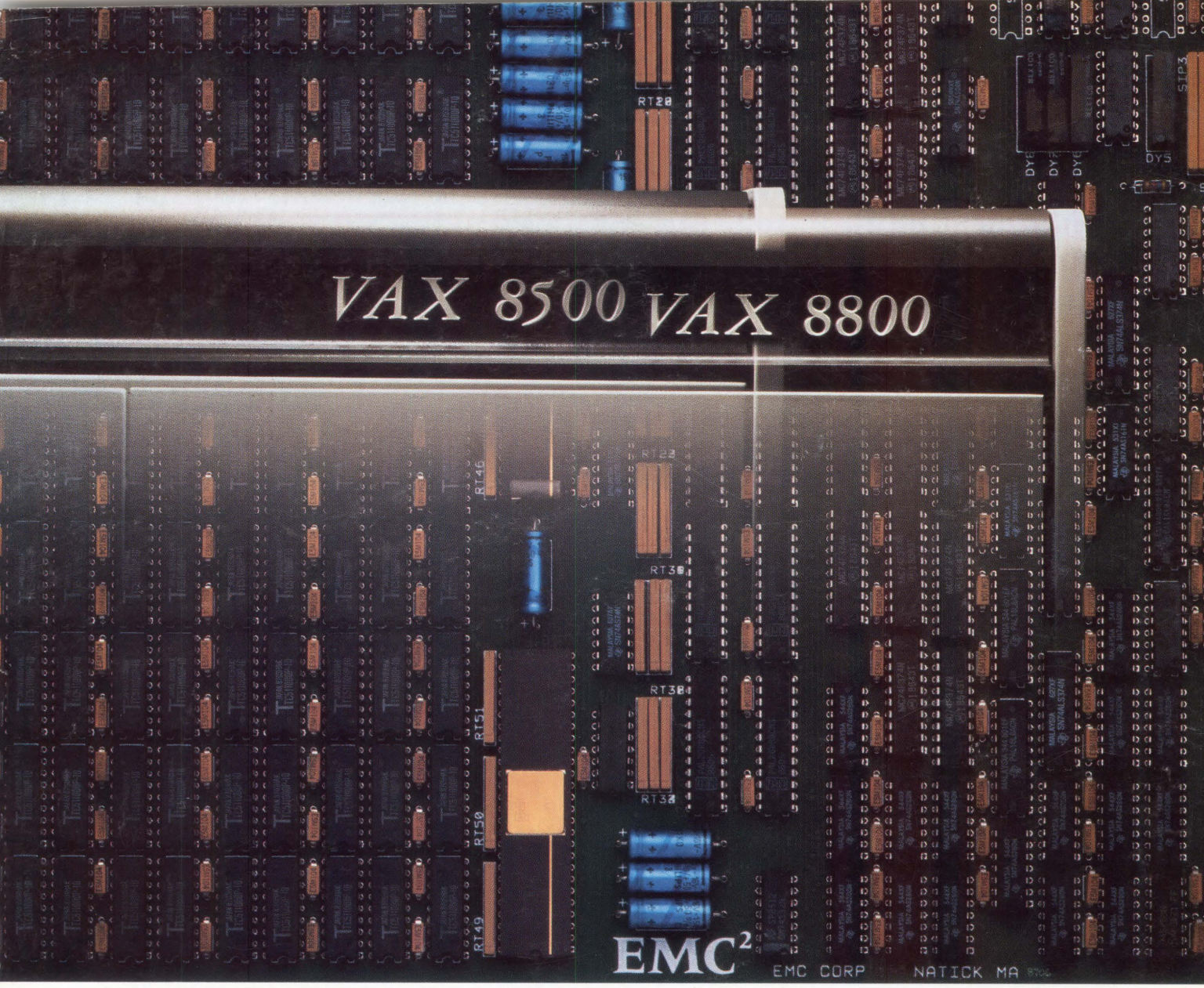

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*EMC 8000 memory includes: 16MB, 32MB, and 64MB arrays for VAX 8500, 8530, 8550, 8700, 8800 computers.

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